



control solutions

TERACOM



TSH300v3 **Modbus RTU humidity and temperature sensor**

Version 1.12/ July 2023

USER MANUAL

www.teracomsystems.com

1. Short description

TSH300v3 (successor of TSH300) is a humidity and temperature sensor with an RS-485 interface. It supports the Modbus RTU protocol. The device doesn't need an external power supply, it is powered through the interface.

The humidity and temperature sensor integrates basic elements plus signals processing and provides a fully calibrated digital output. A unique capacitive element is used for measuring relative humidity while the temperature is measured by a band gap sensor. Both sensors are seamlessly coupled to a 12-bit analog to digital converter. This results in superior signal quality.

The sensor is delivered with one-meter standard patch cable with RJ45 connectors.

2. Features

- RS-485 interface carrying up to 32 nodes;
- LED indicator for status of communication;
- Changeable bitrate and another communication parameters;
- Firmware update via the interface.

3. Applications

- Server room and data centers humidity and temperature logging.
- Environmental quality monitoring and assessment.
- Humidity and temperature monitoring in building management systems.
- Humidity and temperature logging for mobile operator facilities, vineyards, greenhouses, etc.

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)

Recommended operating range is 20% to 80% RH (non-condensing) over -10°C to 60°C. Prolonged operation beyond these ranges may result in a shift of sensor reading, with slow recovery time.

Long term drift typical: $\pm 0.25\%RH/year$, $\pm 0.05^\circ C/year$

Higher drift might occur due to contaminant environments with vaporized solvents, adhesives, packaging materials, etc.

Storage temperature range: -20 to 60°C

Storage relative humidity range: 10 to 90% (non-condensing)

Ingress protection: IP20

- Power requirements

Input Voltage: 4.5 to 26VDC (from the bus)

Input Current: 5mA@5VDC

- Humidity measurements

Accuracy (min): $\pm 3.0\%RH$ (in 20 to 80%RH range)

Accuracy (max): $\pm 5.0\%RH$ (in 10 to 90%RH range)

Resolution: 0.1%RH

- Temperature measurements

Accuracy (min): $\pm 0.4^\circ C$ (in -10 to +60°C range)

Accuracy (max): $\pm 0.6^\circ C$ (in -20 to +60°C range)

Resolution: 0.1°C

- Interface

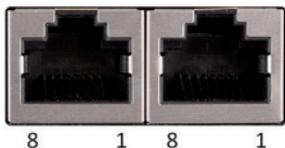
Response time $\leq 50ms$

Master response time-out \geq Response time + Answer time.

The answer time depends on the number of bits and the baud rate

- Warranty
Warranty period: 3 years

5. Pinout



Pin Description

- 1 not connected (most right)
- 2 not connected
- 3 not connected
- 4 RS485-
- 5 RS485+
- 6 not connected
- 7 +VDD
- 8 GND

Corresponding UTP wires color

- Orange/White Tracer
- Orange
- Green/White Tracer
- Blue
- Blue/White Tracer
- Green
- Brown/White Tracer
- Brown

6. Installation

A daisy-chained (linear) topology for multiple sensors should be used. UTP/FTP cables with RJ-45 connectors are used for interconnection. The popular ANSI/TIA/EIA T568B wiring is used. Standard patch LAN cables are recommended.



Attention:

The last sensor in the chain should have a 120 ohm terminator installed on the free RJ-45 socket. The terminator is delivered with the module.

7. Installation tips

The location and the mounting position of sensors has a direct effect on the accuracy of monitoring the room humidity and temperature. The tips below will ensure good measuring results:

- Sensor shall be installed about 1.2-1.4 m above the floor;
- Sensor should not be installed next to windows to avoid solar radiation;
- Sensors shall be installed in a place with sufficient air circulation;
- Sensors shall be wall mounted with vent holes up/down to ensure air circulation.

8. Status indicator

The status of the device is shown by single LED, located on the front panel:

- If the LED blinks on period of 1 second, sensor works properly;
- If the LED blinks on period of 3 seconds, there isn't communication with the controller;
- If LED doesn't blink, there isn't power supply.

9. Factory default settings

Disconnect the sensor from the bus (switch off the power supply).

Press and hold “config” button. Don’t release the button, connecting the sensor to the bus (switch on the power supply).

The “status” LED will be ON for 3 seconds and after this will flash for 7 seconds. After the 10-th second the LED will be ON.

Release the button. The sensor will restart with factory default settings.

10. Firmware update

The firmware of the sensor can be updated with Teracom controller which supports MODBUS RTU or MBRTU-Update software. For more details ask your dealer.

11. Modbus address table

Register name	R/W	FC	PDU Address (Decimal)	Logical address (Decimal)	Offset (Decimal)	Data size	Default	Valid values
RS-485 address	R/W	03/06	10	40011	40001	16-bit uns. integer	1	1-247
Baud rate *	R/W	03/06	11	40012	40001	16-bit uns. integer	19200	2400, 4800, 9600, 19200, 38400, 57600
Parity, data, stop bits *	R/W	03/06	12	40013	40001	16-bit uns. integer	1	1=E81, 2=O81, 3=N81
Data order	R/W	03/06	13	40014	40001	16-bit uns. integer	1	1=MSWF (MSW, LSW) 2=LSWF (LSW, MSW)
Device code	R	3	14	40015	40001	16-bit uns. integer		0x00CD
FW version	R	3	15	40016	40001	16-bit uns. integer		
Vendor URL	R	3	18	40019	40001	64 bytes UTF-8		teracomsystems.com
Float test value (MSWF)	R	3	82	40083	40001	32-bit float		-9.9(0xC11E6666)
Float test value (LSWF)	R	3	84	40085	40001	32-bit float		-9.9(0xC11E6666)
Signed integer test value	R	3	86	40087	40001	16-bit sig. integer		-999(0xC19)
Signed integer test value (MSWF)	R	3	87	40088	40001	32-bit sig. integer		-99999(0xFFFF7961)
Signed integer test value (LSWF)	R	3	89	40090	40001	32-bit sig. integer		-99999(0xFFFF7961)
Unsigned integer test value	R	3	91	40092	40001	16-bit uns. integer		999(0x03E7)
Unsigned integer test value (MSWF)	R	3	92	40093	40001	32-bit uns. integer		99999(0x0001869F)
Unsigned integer test value (LSWF)	R	3	94	40095	40001	32-bit uns. integer		99999(0x0001869F)
Temperature °C	R	3	100	40101	40001	32-bit float		
Humidity %RH	R	3	102	40103	40001	32-bit float		
Dew point °C	R	3	104	40105	40001	32-bit float		
Temperature °F	R	3	200	40201	40001	32-bit float		
Humidity %RH	R	3	202	40203	40001	32-bit float		
Dew point °F	R	3	204	40205	40001	32-bit float		
Temperature °C x 100	R	3	400	40401	40001	16-bit sig. integer		
Humidity %RH x 100	R	3	401	40402	40001	16-bit sig. integer		
Dew point °C x 100	R	3	402	40403	40001	16-bit sig. integer		
Temperature °F x 100	R	3	500	40501	40001	16-bit sig. integer		
Humidity %RH x 100	R	3	501	40502	40001	16-bit sig. integer		
Dew point °F x 100	R	3	502	40503	40001	16-bit sig. integer		

MSWF - Most significant word first - (bits 31 ... 16), (bits 15 ... 0); LSWF - Least significant word first - (bits 15 ... 0), (bits 31 ... 16);

PDU address - Actual address bytes used in a Modbus Protocol Data unit

When a floating-point value is not available, the returned value is “NaN” (e.g. in case of measurement error).

When a 16-bit signed integer value is not available, the returned value is “-32768” (e.g. in case of measurement error).

* The settings will take effect after restart of the sensor by power on reset.

12. Recycling

Recycle all applicable material.



Do not dispose of with regular household refuse.