



Control solutions

TERACOM



TSM400-4-TH
Modbus humidity and temperature sensor
Version 1.0 / September 2022

USER MANUAL

1. Short description

TSM400-4-TH is a humidity and temperature sensor that supports MODBUS RTU protocol over the RS-485 interface. 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 TSM400-4-TH multi-sensor is housed in a slim plastic enclosure. The bottom part of the enclosure is suitable for installation on standard flush-mounted/cavity wall boxes ø68mm, with installation openings on 61 mm.

2. Features

- LED indicator for status of communication;
- Long-term stability based on digital signal processing;
- RS-485 interface carrying up to 32 nodes;
- Changeable bitrate and other communication parameters;
- Firmware update via the interface.

3. Applications

- Environmental quality monitoring and assessment for offices
- Server room and data centers humidity and temperature monitoring
- Smart ventilation systems

4. Specifications

- Physical characteristics
Dimensions: 81 x 81 x 30 mm
Weight: 66 g
- Environmental limits
Operating temperature range: -20 to 60°C
Operating relative humidity range: 5 to 95% (non-condensing)
Storage temperature range: -20 to 60°C
Storage relative humidity range: 5 to 95% (non-condensing)
Ingress protection: IP20
- Power requirements
Operating voltage range (including -15/+20% according to IEC 62368-1): 4.5 to 26 VDC
Current consumption: 25 mA@5VDC (Peak: 150 mA@5VDC)
- Humidity measurements
Accuracy (min): ±3.0 %RH (in 20 to 80 %RH range)
Accuracy (max): ±5.0 %RH (in 5 to 95 %RH range)
Resolution: 0.1 %RH
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.
- Temperature measurements
Accuracy (min): ±0.4 °C (in -10 to +60°C range)
Accuracy (max): ±0.6 °C (in -20 to +60°C range)
Resolution: 0.1 °C
- Warranty
Warranty period: 3 years

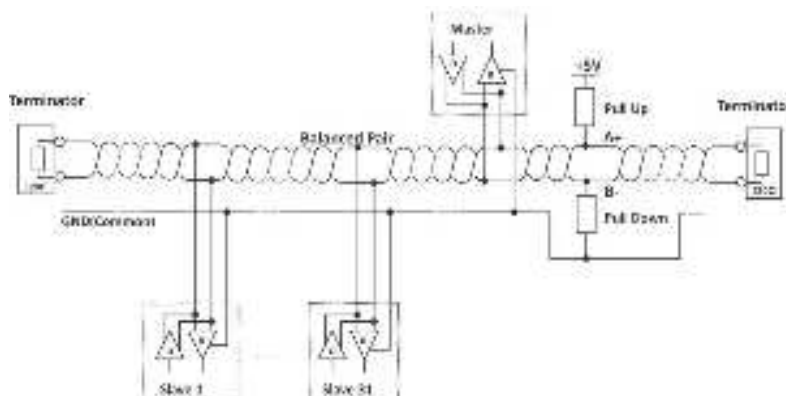
5. Pinout

	Pin	Description	UTP wires color
	1-W	Not used	
	+5÷30V	Positive power supply	Brown/White Tracer
	GND	Ground (negative) supply	Brown
	A+	Line A+ of RS-485	Blue/White Tracer
	B-	Line B- of RS-485	Blue
	TERM	For termination, connect to B-	

6. Installation

Two-Wire MODBUS definition according to modbus.org:

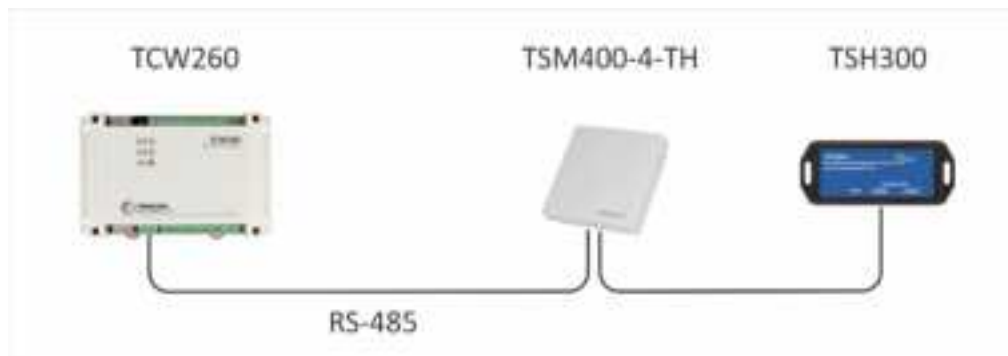
“A MODBUS solution over a serial line should implement a “Two-Wire” electrical interface in accordance with EIA/TIA-485 standard. On such a “Two-Wire” topology, at any time one driver only has the right for transmitting. In fact, a third conductor must also interconnect all the devices of the bus - the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



Attention:

For proper operation of the interface, terminators (120 ohms resistors) must be installed at both ends of the bus. The device has a built-in 120-ohm resistor and to terminate the line, “B-” and “TERM” must be shortened.

A daisy-chained (linear) topology for multiple sensors should be used. UTP/FTP cables are mandatory for interconnection.



7. Installation tips

The location and the mounting position of the sensor have a direct effect on the accuracy of the measurement. The tips below will ensure good measuring results:

- Sensor shall be installed about 1.2-1.4 m above the floor;

- 1400-4-TH sensor is intended for installation on a cavity wall box with 68mm diameter and 61 screw spacing.



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

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

The firmware of the sensor can be updated with a Teracom controller which supports MODBUS RTU or MBRTU-Config 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)
Sub-family number	R	3	14	40015	40001	16-bit uns. integer	1	0xC9
FW version	R	3	15	40016	40001	16-bit uns. integer		
Vendor URL	R	3	16	40017	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(0xFC19)
Signed integer test value (MSWF)	R	3	87	40088	40001	32-bit sig. integer		-99999(0xFFFFE7961)
Signed integer test value (LSWF)	R	3	89	40090	40001	32-bit sig. integer		-99999(0xFFFFE7961)
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	400	40401	40001	32-bit float		
Humidity %RH	R	3	402	40403	40001	32-bit float		
Dew point °F	R	3	404	40405	40001	32-bit float		
Temperature °C x 100	R	3	600	40601	40001	16-bit sig. integer		
Humidity %RH x 100	R	3	601	40602	40001	16-bit uns. integer		
Dew point °C x 100	R	3	602	40603	40001	16-bit sig. integer		
Temperature °F x 100	R	3	1000	41001	40001	16-bit sig. integer		
Humidity %RH x 100	R	3	1001	41002	40001	16-bit uns. integer		
Dew point °C x 100	R	3	1002	41003	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

A “NaN” value is returned for unavailable floating-point values (e.g. in case of measurement error)

* The settings will take effect after restarting the device by power off, power on.

12.Recycling

Recycle all applicable material.



Do not dispose of with regular household refuse.

