



Hygrometer and thermometer

THT

Humidity measuring range: 0 to 100 %

Temperature measuring range: -40 to +123.8 °C

Dew point automatic calculation

Communication via RS485 line



THT

Datasheet

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BASIC INFORMATION

Description

THT is an intelligent humidity and temperature sensor measuring **humidity** directly in percentage and **temperature** in degrees Celsius. It can also use both values to calculate a **dew point**. All values are available in digital format via the RS485 communication line.

THT has low consumption – it is easy to create a network of these devices connected via a single four-wire cable (RS485 + power supply) ranging up to 1200 metres.

Humidity is measured using a polymer sensor with $\pm 2\%$ RH accuracy installed under a plastic grid. Temperature measured by THT ranges from -40 to $+123.8\text{ }^{\circ}\text{C}$, humidity from 0% to 100% .

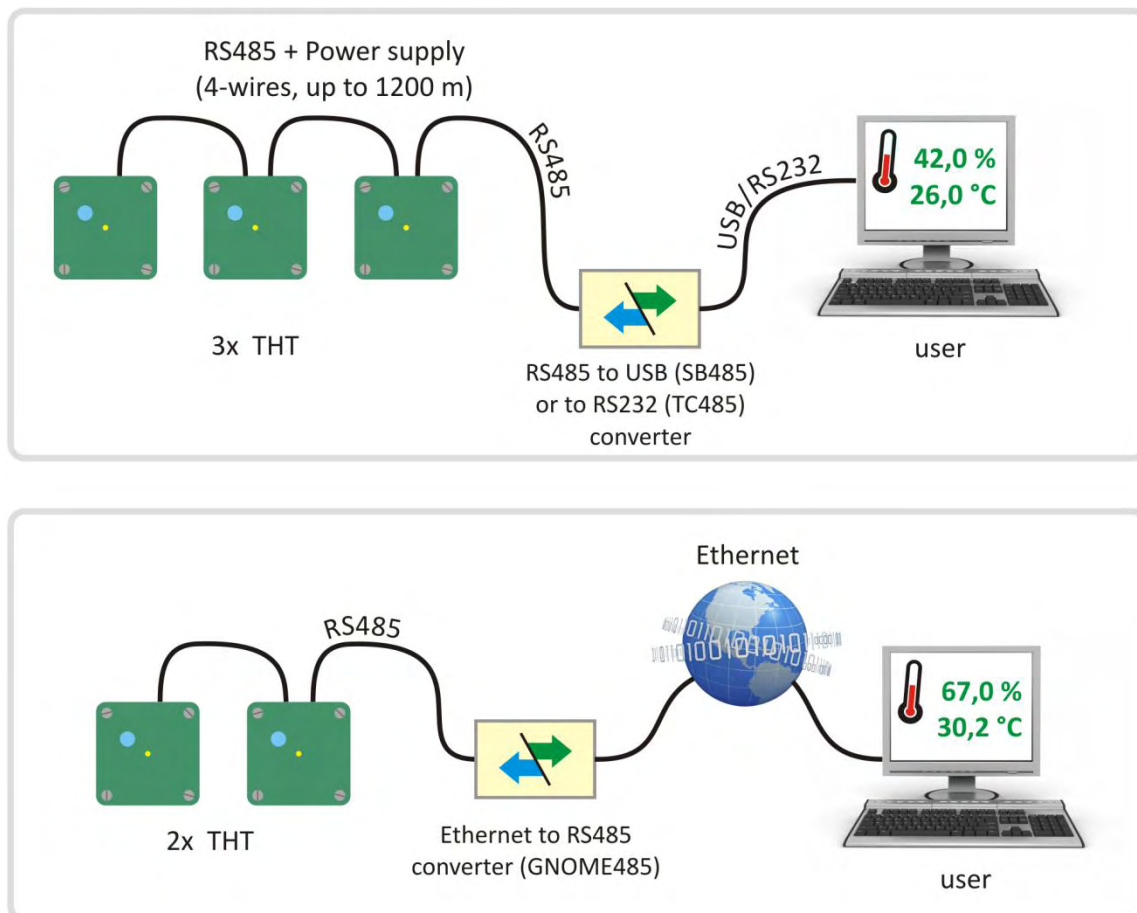


Fig. 1 – Example of THT sensors connection to PC (directly or over Ethernet)

Application

- Temperature and humidity measurement, dew point calculation

Features

- Relative humidity measurement in the range from 0% to 100%
- Temperature measurement in the range from -40 to $+123.8\text{ }^{\circ}\text{C}$
- Dew point calculation
- Communication via RS485 (Spinel protocol; MODBUS RTU protocol)
- Low consumption, non-stabilized voltage power supply, IP 65 protection

CONNECTION

- 1) In most cases, shielded TP cable (so called STP or FTP cable – standard cable used in computer networks) will be fully sufficient as interconnector.

This cable contains four pairs of twisted conductors:

Use the first pair for data. One wire shall be **RxTx+**, the other one **RxTx-**.

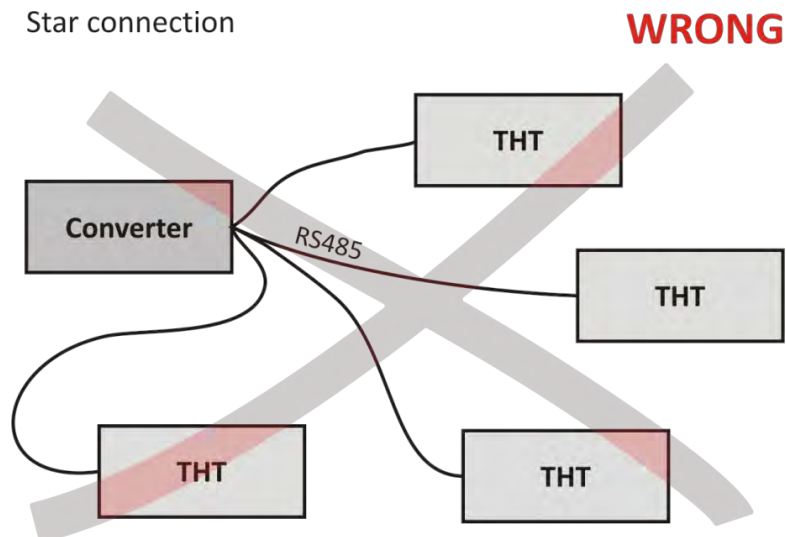
The second pair: interconnect both conductors and use them for the positive pole of the power supply (**PWR**).

The third pair: interconnect both conductors and use them for power supply grounding (**GND**).

The fourth pair: Leave unconnected. As a backup for any future use.

If more THT devices are to be connected via the RS485 line, connect the cable in the way as illustrated below – i.e. one module after the other. The total length of the cable can reach up to 1200 metres.

Star connection



Continual parallel connection

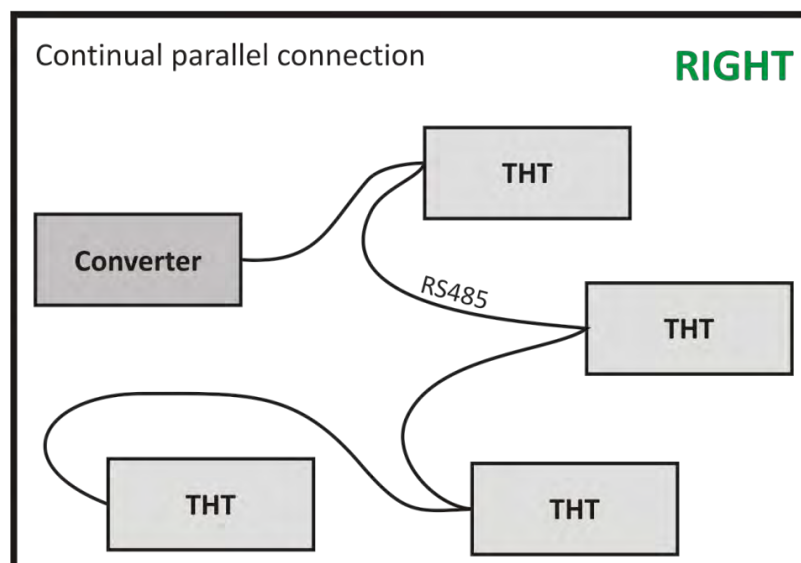


Fig. 2 – Incorrect and correct method of connecting a higher number of THT devices via RS485

2) Connect conductors to the THT Wago terminal block in the following way:

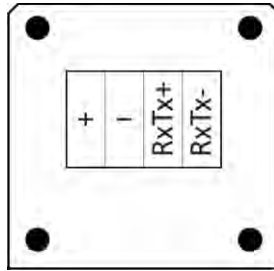


Fig. 3 – Terminals on the electronics board

+ power supply positive pole.

- power supply grounding.

RxTx+ more positive wire of the RS485 communication line (can also be marked A)

RxTx- more negative wire of the RS485 communication line (can also be marked B)

3) With other devices the RS485 communication lines shall be connected 1:1, i.e. RxTx+ on THT to RxTx+ of the other device and RxTx- to RxTx- respectively.

An example of a connection between a THT, GNOME485¹ converter and any other additional devices is shown in the following figure.

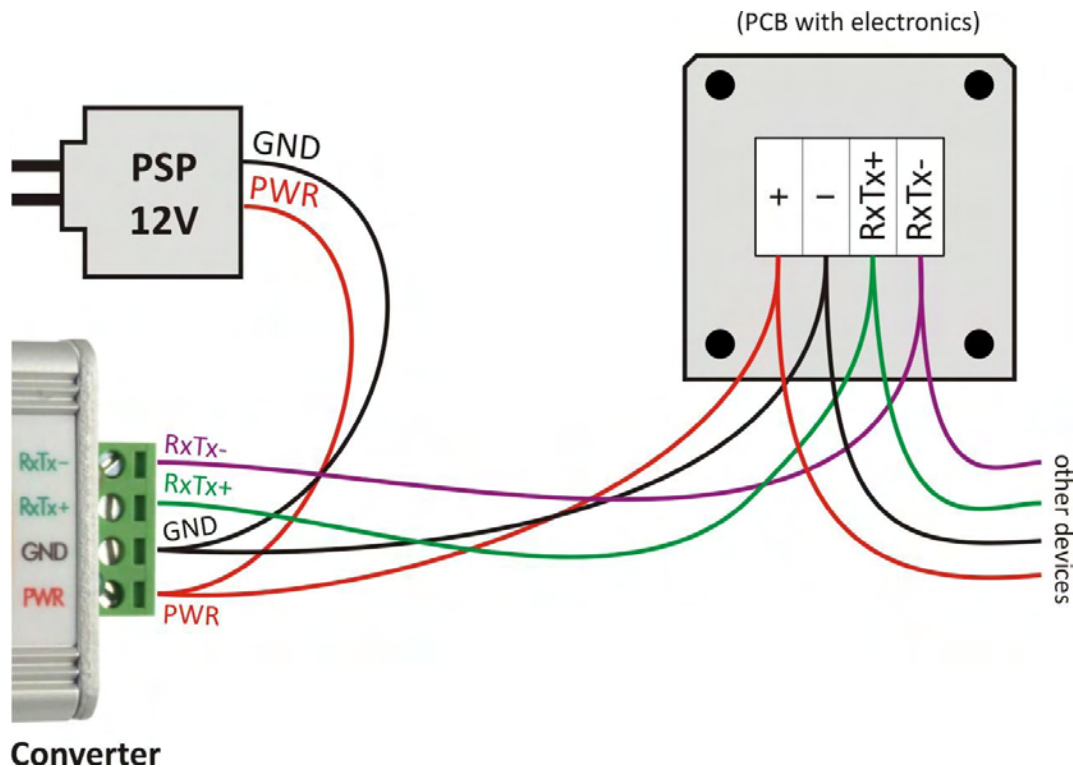


Fig. 4 – Example of a connection between a converter, THT and other devices

¹ RS485 to Ethernet converter. It can be used to connect the sensors to a computer network and even to the Internet and thus to collect data from any place connectable to the Internet. For more information about GNOME485 converter visit www.papouch.com.



Fig. 5 – Electronics layout inside the box

INDICATION

After power up sequence the light flashes briefly to indicate proper initialization. The light also briefly flashes when communicating over RS485.

TECHNICAL PARAMETERS

Humidity Sensor

Humidity measuring range 0 % to 100 % RH ²

Increments 1% RH

Measuring repeatability ± 0.1 % RH

Temperature stability typically 0.5 % RH per year

Measuring element polymer sensor

Sensor position under the plastic grid in the upper part of the device

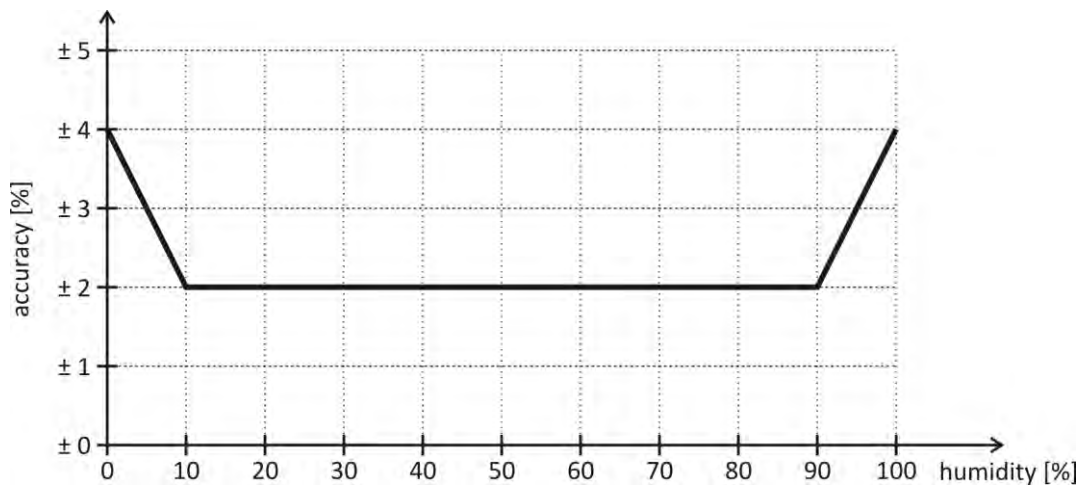


Fig. 6 – accuracy of humidity measuring

Temperature Sensor

Temperature measuring range -40.0 °C to +123.8 °C ²

Resolution 0.1 °C

Measuring repeatability ± 0.1 °C

Measuring element semiconductor sensor

Sensor position under the plastic grid in the upper part of the device

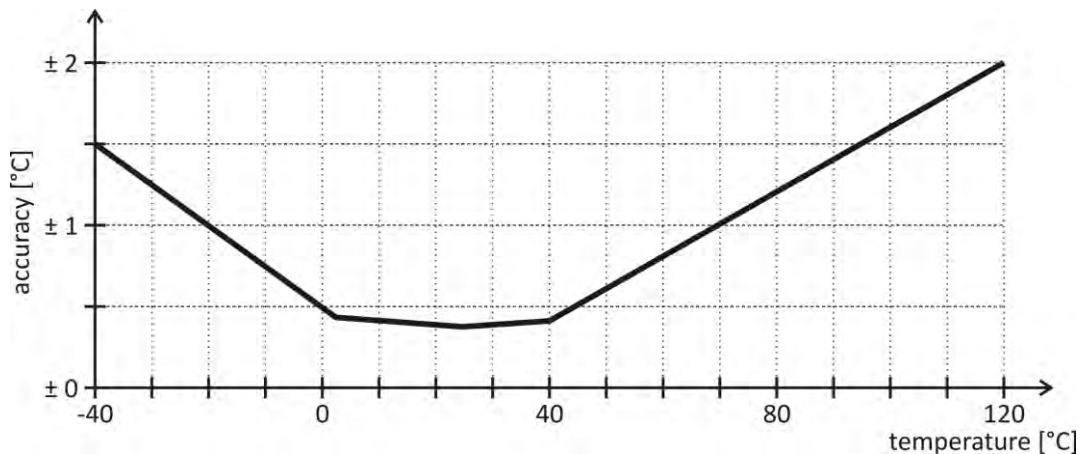


Fig. 7 – temperature measuring accuracy

² See Operating and Maximum Range of Values on page 9!

Communication

Communication line	RS485
Protocols.....	Spinel, MODBUS RTU
Default address	31H ("1")
Default communication speed	9600 Bd
Adjustable communication speeds	110, 300, 600, 1 200, 2 400, 4 800, 9 600, 19 200, 38 400, 57 600, 115 200 and 230 400 Bd
Data bits number	8
Parity	no parity
Stop-bits number	1
Termination.....	No, only 22 k Ω resistors defining the idle status

Other Parameters

Electronics operating temperature	-40 °C to 85 °C
Power supply	4.5 V to 30 V DC
Polarity reversal protection	yes, diode
Power consumption	usually 6.5 mA at 12 V
Wire connection.....	WAGO terminal block
Level of protection	IP 65
Dimensions (incl. connectors).....	62 × 33 × 86 mm (length × height × width)

Operating and Maximum Range of Values

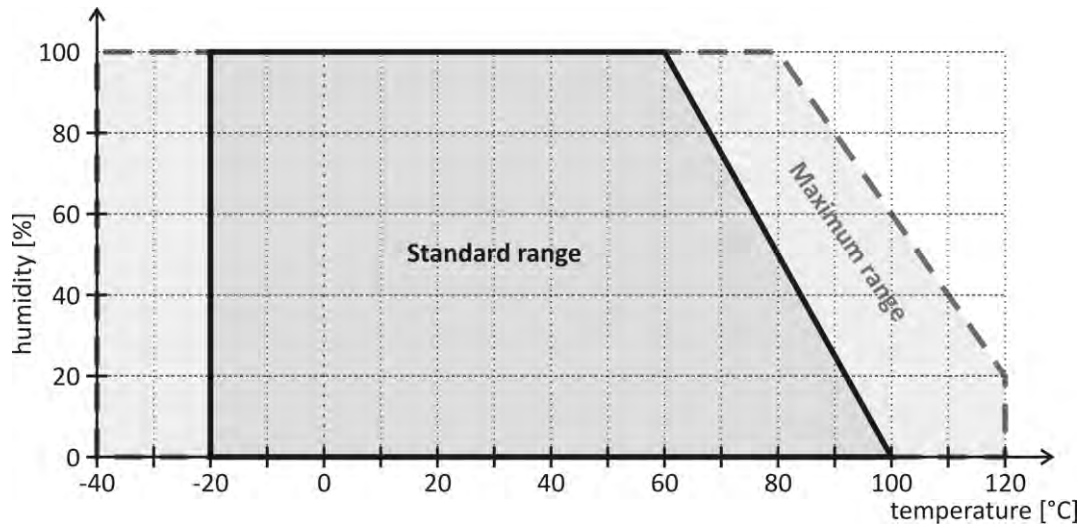


Fig. 8 – working and maximum temperature range

The sensor output can get without any limitation within the standard range of values. Within the range close to maximum values, the humidity sensor accuracy gets worse to ± 3 % RH. The sensor must not exceed the range of maximum values.

After returning from the range of maximum to standard values, the sensor regains the default calibration and accuracy. The process of regaining the original calibration can be speeded up in the following way:

- 1) For 24 hours keep the sensor in temperature between 80 and 85 °C and humidity of up to 5 %.
- 2) For 48 hours keep the sensor in temperature between 20 to 30 °C and humidity of more than 74 %.

Available designs

Holder:

- Without a holder (*standard design*)
- With a wall holder (wall fixing holes span is 73 mm)



Fig. 9 – wall holder make

Do not hesitate to contact us in case of any other special requirements concerning the THT module design and functions.

COMMUNICATION PROTOCOL

The THT module is equipped with standardized Spinel protocol (formats 66 and 97) and MODBUS RTU.

The detailed description of both Protocols protocol used by THT, including described examples, can be found on the provided CD.

Papouch s.r.o.

Data transmission in industry, line and protocol conversions, RS232/485/422/USB/Ethernet/GPRS/WiFi, measurement modules, intelligent temperature sensors, I/O modules, and custom-made electronic applications.

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