RSTHH-3

TEMPERATURE AND RELATIVE HUMIDITY ROOM TRANSMITTER

Mounting and operating instructions

Table of contents

SAFETY AND PRECSAFETY AND PRECAUTIONS

Read all the information, the datasheet, Modbus map, mounting and operating instructions and study the wiring and connection diagram before working with the product. For personal and equipment safety, and for optimum product performance, make sure you entirely understand the contents before installing, using, or maintaining this product.

For safety and licensing (CE) reasons, unauthorised conversion and / or modifications of the product are inadmissible.

The product should not be exposed to abnormal conditions, such as extreme temperatures, direct sunlight or vibrations. Long-term exposure to chemical vapours in high concentration can affect the product performance. Make sure the work environment is as dry as possible; avoid condensation.

All installations shall comply with local health and safety regulations and local electrical standards and approved codes. This product can only be installed by an engineer or a technician who has expert knowledge of the product and safety precautions.

Avoid contacts with energised electrical parts. Always disconnect the power supply before connecting, servicing or repairing the product.

Always verify that you apply appropriate power supply to the product and use appropriate wire size and characteristics. Make sure that all the screws and nuts are well tightened and fuses (if any) are fitted well.

Recycling of equipment and packaging should be taken into consideration and these should be disposed of in accordance with local and national legislation / regulations.

In case there are any questions that are not answered, please contact your technical support or consult a professional.

PRODUCT DESCRIPTION

The RSTHH-3 series are room sensors which measure temperature, relative humidity and ambient light. They feature 24 VDC power supply (Power over Modbus) and 3 analogue / modulating outputs. All parameters are accessible via Modbus RTU.

ARTICLE CODES

Article code	Supply	Connection type	Imax
RSTHH-3	24 VDC, PoM	RJ45 or terminal block	75 mA

INTENDED AREA OF USE

- Monitoring indoor temperature and relative humidity in HVAC applications
- Suitable for residential and commercial buildings
- For indoor use only

TECHNICAL DATA

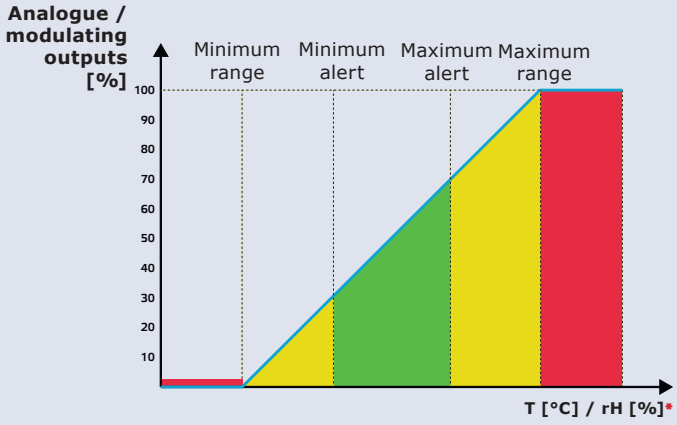
- Spring contact terminal block or RJ45 connections
- 3 analogue/ modulating outputs:
  - 0—10 VDC mode: $R_L \geq 50$ kΩ
  - 0—20 mA: $R_L \leq 500$ Ω
  - PWM (open-collector type): PWM Frequency: 1 kHz, $R_L \geq 50$ kΩ; PWM voltage level 3,3 or 12 VDC
- Selectable temperature range: 0—50 ºC
- Selectable relative humidity range: 0—100 %
- Ambient light sensor with adjustable 'active' and 'standby' level
- 3 LEDs for status indication with adjustable light intensity
- Accuracy: ±0,4 ºC (range 0—50 ºC); ±3 % rH (range 0—95 % rH)
- Enclosure:
  - rear plate: plastic ABS, black (RAL 9004)
  - front cover: ASA, ivory (RAL 9010)
- Protection standard: IP30 (according to EN 60529)
- Typical range of use:
  - temperature: 0—50 ºC
  - rel. humidity: 0—95 % rH, (non-condensing)
- Storage temperature: -10—60 ºC

STANDARDS

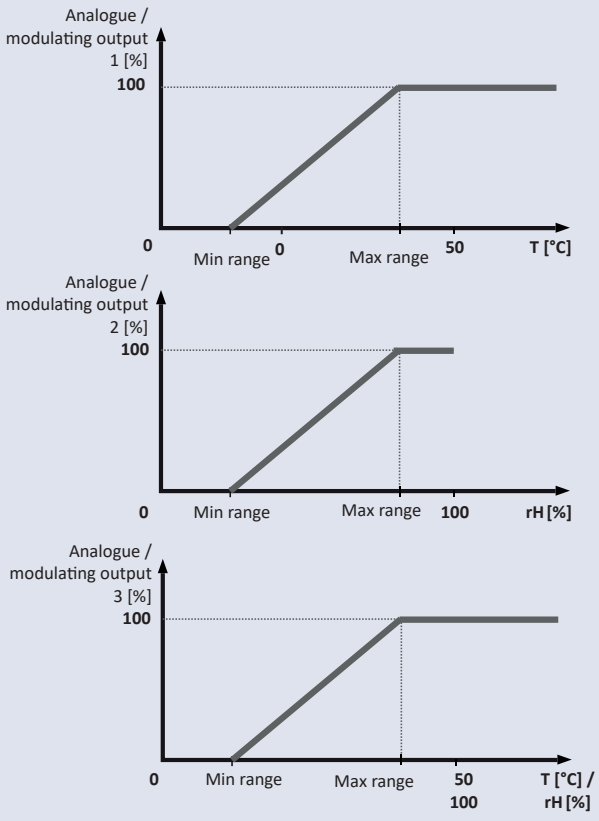
- Low Voltage Directive 2014/35/EC CE
  - EN 60529:1991 Degrees of protection provided by enclosures (IP Code) Amendment AC:1993 to EN 60529
  - EN 60730-1:2011 Automatic electrical controls for household and similar use - Part 1: General requirements
- EMC directive 2014/30/EU:
  - EN 60730-1:2011 Automatic electrical controls for household and similar use

- Part 1: General requirements
  - EN 61000-6-1:2007 Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments
  - EN 61000-6-3:2007 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments Amendments A1:2011 and AC:2012 to EN 61000-6-3
  - EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
  - EN 61326-2-3:2013 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements. Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning
- WEEE 2012/19/EC
- RoHs Directive 2011/65/EC

OPERATIONAL DIAGRAMS



** LED indications refer to T (default) or rH, depending on the selected parameter*



WIRING AND CONNECTIONS

Wiring diagram		
RJ45 sockets (Power over Modbus)		
Pin 1	24 VDC	Supply voltage
Pin 2		
Pin 3	A	Modbus RTU communication, signal A
Pin 4		
Pin 5	/B	Modbus RTU communication, signal /B
Pin 6		
Pin 7	GND	Ground, supply voltage
Pin 8		

Input terminal block	
VIN	Supply voltage 24 VDC
GND	Supply voltage, ground
A	Modbus RTU communication, signal A
/B	Modbus RTU communication, signal /B
Output terminal block	
AO1	Analogue / modulating output 1 for temperature measurement (0—10 VDC / 0—20 mA / PWM)
GND	Ground AO1
AO2	Analogue / modulating output 2 for relative humidity measurement (0—10 VDC / 0—20 mA / PWM)
GND	Ground AO2
AO3	Analogue / modulating output 3 for temperature or relative humidity measurement (0—10 VDC / 0—20 mA / PWM)
GND	Ground AO3

⚠ ATTENTION

The unit needs to be supplied via the RJ45 connector or via the Input Terminal Block. Do not use them simultaneously!

MOUNTING & OPERATING INSTRUCTIONS IN STEPS

Before you start mounting the unit, read carefully **"Safety and Precautions"**. Choose a smooth surface for installation (a wall, panel and etc.).

⚠ ATTENTION

Mount the sensor in a well-ventilated area, where it receives adequate airflow for proper operation and hide it from direct sunlight. Make sure it can be easily accessed for service.

Follow these steps:

1. Using a flat screwdriver, remove the front white cover by releasing the snap-fits on its both sides (see **Fig. 1** *Snap-fits release*).
2. Insert the cables through the opening on the rear plate (see **Fig. 2** *Mounting dimensions*.)
3. Using suitable fastening materials (not supplied), position the room sensor at least 1,5 m from the floor. When planning the installation, allow enough clearance

for maintenance and service. Mount the sensor in a well-ventilated area. Mind the correct mounting position and unit dimensions. See **Fig. 2** and **Fig. 3**.

Fig. 1 Snap-fits release

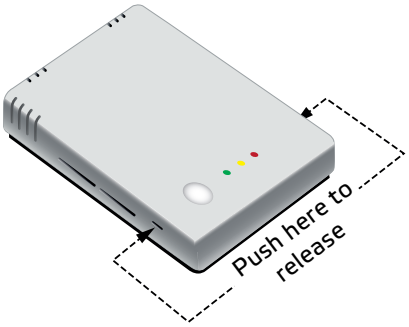


Fig. 2 Mounting dimension

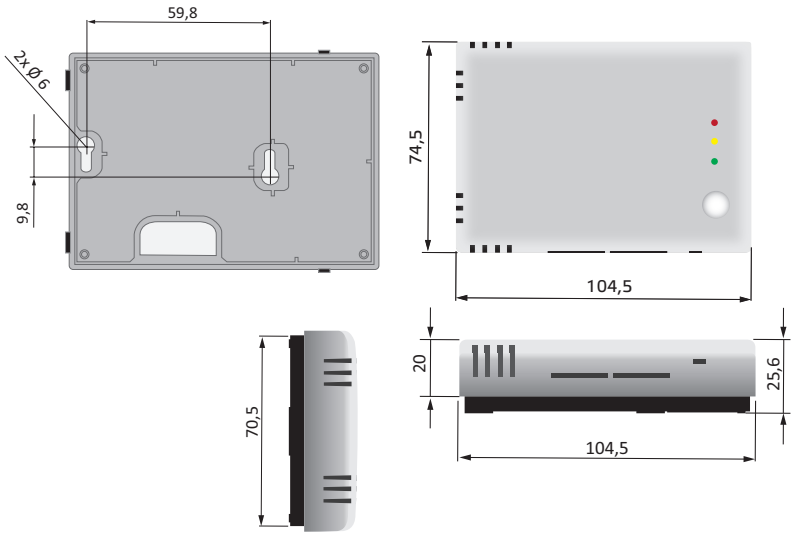
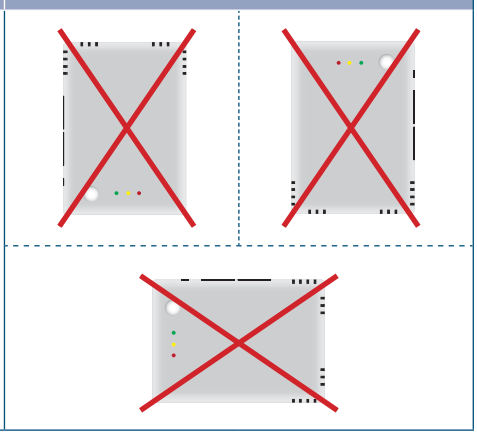


Fig. 3 Mounting position

Correct

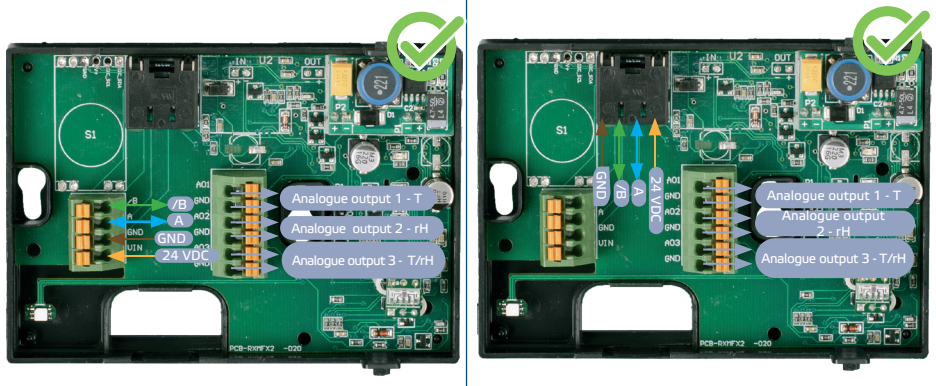
Incorrect



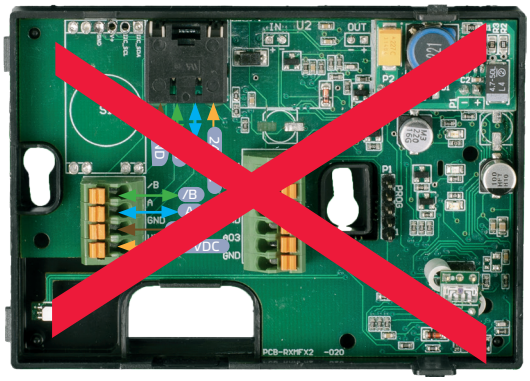
4. Do the wiring according to the wiring diagram (see **Fig. 4**).

Fig. 4 Wiring and connections

Correct connections



Wrong input connection



5. Put back the cover snap it in.
6. Switch on the mains supply.
7. Customise the factory settings to the desired ones via the SenteraWeb, 3SModbus software or Sensistant (if necessary). For the default factory setting refer to the product *Modbus register map*.

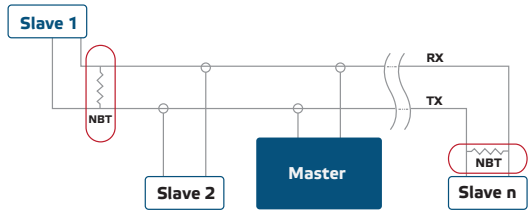
NOTE

For the complete Modbus register data, refer to the product Modbus Register Map, which is a separate document attached to the article code on the website and contains the registers list. Products with earlier firmware versions may not be compatible with this list.

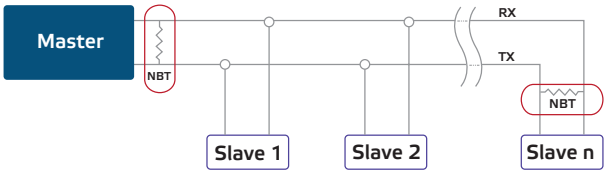
Optional settings

To assure correct communication, the NBT needs to be activated in only two devices on the Modbus RTU network. If necessary, enable the NBT resistor via 3SModbus or Sensistant (*Holding register 9*).

Example 1



Example 2



NOTE

On a Modbus RTU network, two bus terminators (NBTs) need to be activated.

ATTENTION

Do not expose to direct sunlight!

OPERATING INSTRUCTIONS

Calibration procedure

All sensor elements are calibrated and tested in our factory. Recalibration is not necessary.

Firmware update

New functionalities and bug fixes are made available via a firmware update. In case your device does not have the latest firmware installed, it can be updated. SenteraWeb is the easiest way to update the unit firmware. In case you do not have an internet gateway available, the firmware can be updated via the 3SM boot application (part of the Sentera 3SMcenter software suite).

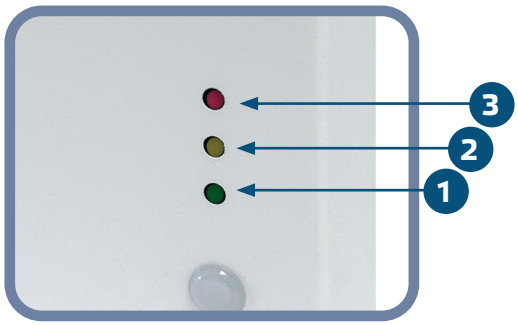
NOTE

Make sure the power supply does not get interrupted during "bootload" procedure.

LED indications

1. When the green LED is on, the measured value (temperature or relative humidity) is between the minimum and maximum alert range values (**Fig. 5 - 1**).
2. When the yellow LED is on, the measured value (temperature or relative humidity) is in the alert range (**Fig. 5 - 2**).
3. When the red LED is on, the measured value (temperature or relative humidity) is below the minimum measurement range value or above the maximum value. Blinking red LED indicates loss of communication with a sensor (**Fig. 5 - 3**).

Fig. 5 LED indications



NOTE

By default, the LED indication refers to temperature measurements. This can be changed to relative humidity values via Modbus Holding Register 79 (see **Table** *Holding registers* in the product Modbus Register Map*).*

NOTE

Green LED intensity can be adjusted between 0 and 100 % with a step of 10 % according to the value set in Holding register 80.

Ambient light sensor

The measured light intensity in lux is available in Input Register 41. Additionally, an active and standby level can be defined in Holding registers 35 and 36. Input Register 42 indicates if the measured value is below standby level, above active level or in between both levels:

- Ambient light level < standby level: Input Register 42 indicates "Standby".
- Ambient light level > active level: Input Register 42 indicates "Active".
- Standby level < Ambient light level < Active level: Input Register 42 indicates "Low intensity".

VERIFICATION OF INSTALLATION INSTRUCTIONS

After switching on the power supply one of the LEDs lights up according to the status of the measured variable. If this is not the case, check the connections.

TRANSPORT AND STORAGE

Avoid shocks and extreme conditions; stock in original packing.

WARRANTY AND RESTRICTIONS

Two years from the delivery date against defects in manufacturing. Any modifications or alterations to the product after the date of publication relieve the manufacturer of any responsibilities. The manufacturer bears no responsibility for any misprints or mistakes in this data.

MAINTENANCE

In normal conditions this product is maintenance-free. If soiled, clean with a dry or damp cloth. In case of heavy pollution, clean with a non-aggressive product. In these circumstances the unit should be disconnected from the supply. Pay attention that no fluids enter the unit. Only reconnect it to the supply when it is completely dry.