



RHT-WM-485-LCD, RHT-DM-485-LCD and RHT-P10-485-LCD

TEMPERATURE AND HUMIDITY TRANSMITTER

USER GUIDE V2.0x A

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1. SAFETY ALERTS

The symbols below are used in the device and throughout this manual to draw the user's attention to essential information related to device safety and use.

		
CAUTION Read the manual fully before installing and operating the device.	CAUTION OR HAZARD Risk of electric shock.	ATTENTION Material sensitive to static charge. Check precautions before handling.

All safety recommendations appearing in this manual must be followed to ensure personal safety and prevent damage to the instrument or system. If the instrument is used in a manner other than that specified in this manual, the device's safety protections may not be effective.

2. INTRODUCTION

RHT-WM-485-LCD, **RHT-DM-485-LCD**, and **RHT-P10-485-LCD** transmitters include high accuracy and stability sensors for measuring temperature and relative humidity. They are microprocessed devices and, therefore, allow being entirely configured through a RS485 interface, using the Modbus RTU commands. **DigiConfig** allows the configuration of all transmitters features as well as its diagnostic procedure.

The transmitter can be configured or displaying the values of measured temperature and **Relative Humidity** or the values of measured temperature and **Dew Point**.

2.1 IDENTIFICATION

The identification label is fixed on the transmitter body. Check if the features described on this label are in accordance with your order.

The **RHT-WM-485-LCD** and **RHT-P10-485-LCD** models intended for wall mounting, while the **RHT-DM-485-LCD** model comes with a probe tip rod for installation in ducts or through walls.

The following elements are located at the front side of the transmitter:

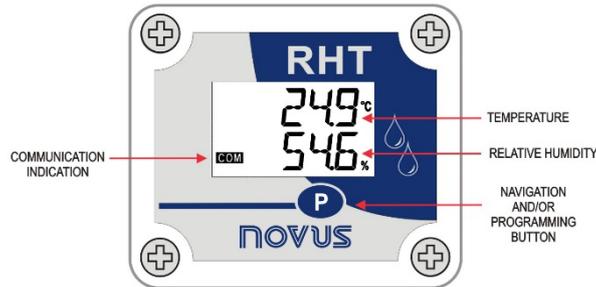


Figure 1 – Transmitter main screen

Communication Indicator (COM): Indicates when the device is receiving data from the Modbus network.

Button P (Programming): Button used for configuration of the communication parameters and for screen changing.

Temperature: Value of measured temperature.

Relative Humidity: Value of measured relative humidity.

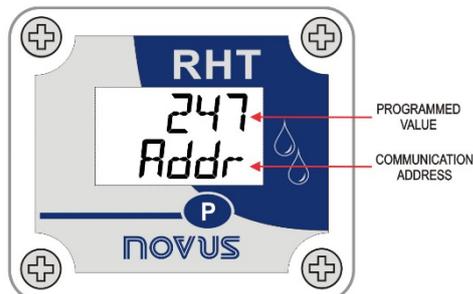


Figure 2 – Transmitter second screen

Communication Address: Value programmed for identifying the transmitter of the Modbus network. Programmable between **1** and **247**.

3. MECHANICAL INSTALLATION

3.1 RHT-DM-485-LCD

The **RHT-DM-485-LCD** (*Duct Mount*) model transmitter must be installed with a flange. This flange is first screwed onto the duct wall, and the transmitter probe is then inserted into the flange central hole and locked. The figure below shows flange dimensions and holes. Available in stainless steel or polyamide 6.6.

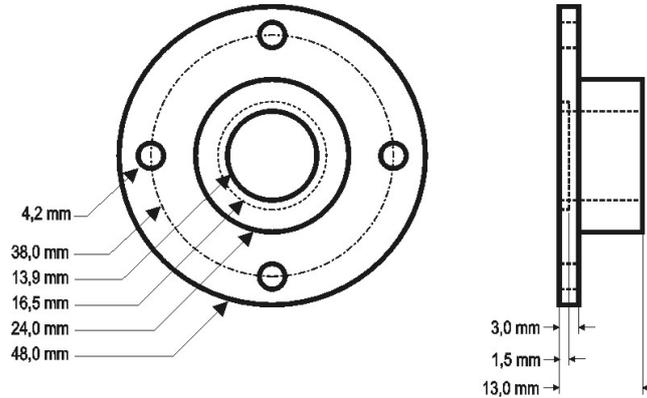


Figure 3 – Flange for fixation of the RHT-DM-485-LCD model

The probe is made in stainless steel, with standard lengths of 150 mm or 250 mm.

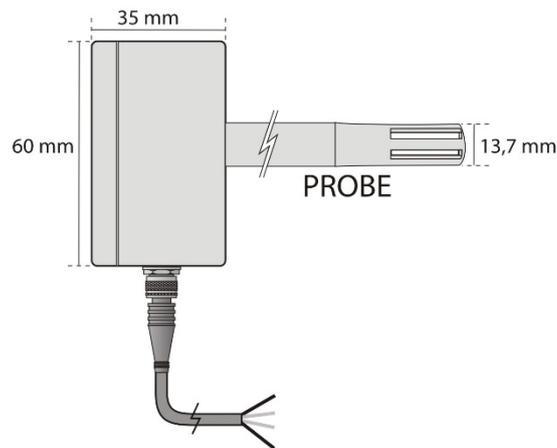


Figure 4 – Dimensions of the RHT-DM-485-LCD model

3.2 RHT-WM-485-LCD

The **RHT-WM-485-LCD** (*Wall Mount*) model is designed for wall mounting. Removing the transmitter cover gives the user access to two bores for fixing the base, as shown in the figure below.

The transmitter must be fixed with the sensor capsule directed downwards to assure the specific accuracy and protection level.

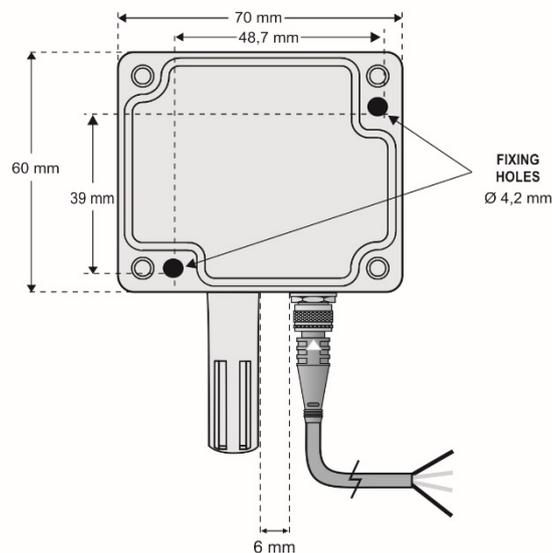


Figure 5 – Fixing bores and dimensions of the RHT-WM-485-LCD model

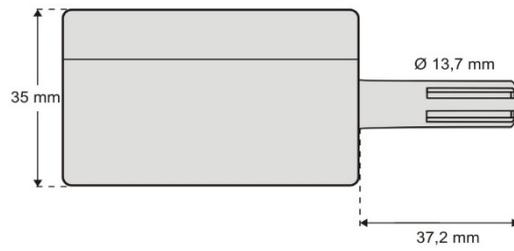


Figure 6 – Dimensions of the RHT-WM-485-LCD model

3.3 RHT-P10-485-LCD

The RHT-P10-485-LCD electronic housing is designed for wall mounting, while its remote sensor probe is intended for inserting and screwing in a flange.

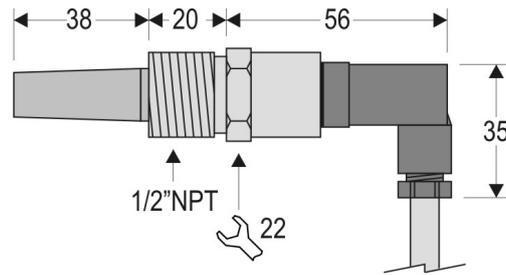


Figure 7 – Remote sensor dimensions

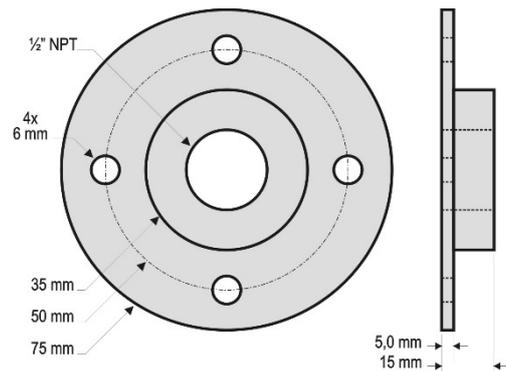


Figure 8 – Mounting flange



The flange is not bundled with the transmitter. It must be ordered separately.

4. ELECTRICAL INSTALLATION

The figure below shows the necessary electrical connection. The terminals 1, 2, 3 and 4 are intended for connection.

1	- VCC			Power supply	Black wire
2	+ VCC			Power supply	White wire
3	D1	D	D+	A	Bidirectional data line.
4	D0	\bar{D}	D-	B	Bidirectional inverted data line.

Table 1 – Electrical connections

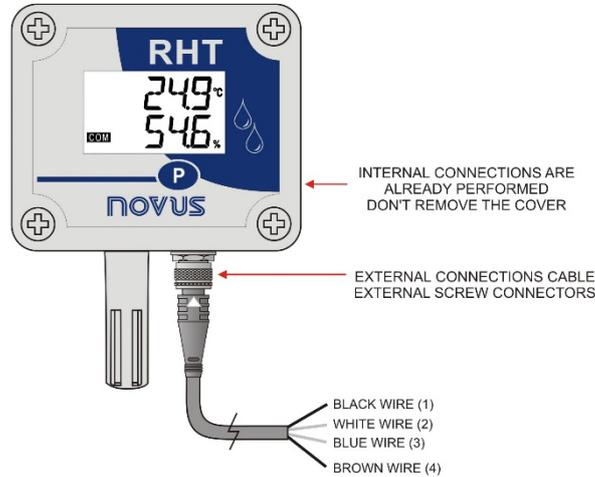


Figure 9 – Electrical connections

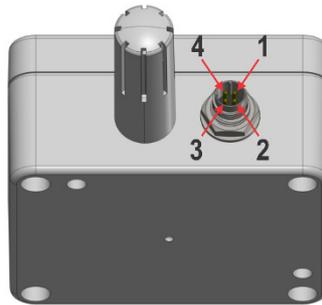


Figure 10 – M8 connector pins



Be careful when connecting the power supply wires to the RHT-WM-485-LCD, RHT-DM-485-LCD and RHT-P10-485-LCD Transmitter.
If the positive wire from the power source is connected, even momentarily, to one of the communication connection terminals, the transmitter may be damaged.

4.1 INSTALLATION RECOMMENDATIONS

- Small electric signal conductors must pass through the system plant separated from the actuating conductors or from high current or voltage lines. If possible, inside grounded conduits.
- The power supply of the instruments must be provided from a proper network for instrumentation.
- In control and monitoring applications it is essential to consider what can happen if any part of the system should fail.
- We recommend the use of RC FILTERS (47 Ω and 100nF, series) in parallel with contactor and solenoid coils etc.

5. CONFIGURATION / OPERATION

The user will receive the transmitter perfectly calibrated, without the need for any adjustments. The configuration performed at the factory has the following features:

Addr (Communication Address) = 247

bAud (Communication speed) = 115200

PAR (Parity) = Par

Stop Bit = 1

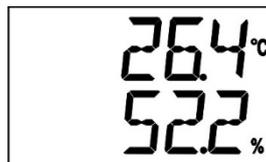
DigiConfig for Windows is a software used for configuration of the **RHT-WM-485-LCD**, **RHT-DM-485-LCD** and **RHT-P10-485-LCD** transmitters. For its installation, run the "**DigiConfigSetup.exe**" and follow the instructions as shown.

DigiConfig comes with an unabridged help tutorial, containing all the necessary information for you to use it. If you want to use help tutorial, start the application, and select the **Help** menu or press F1.

Access the site www.novusautomation.com to obtain the installer for **DigiConfig** and the additional manuals.

5.1 SCREENS OF THE TRANSMITTER

Indication screen for the measured values in the transmitter:



Screen No. 1: Main screen

For configuring the communication parameters, press the **P** button (± 5 seconds) until the screen starts blinking, then release the button and press it again to increment. When the desired value appears, release the button, and wait until the screen stops blinking (± 10 seconds). To access the next screens, press the **P** button.

Configuration screen for the **Modbus Address**: Defines the address of the module within the Modbus network. Values between 1 and 247



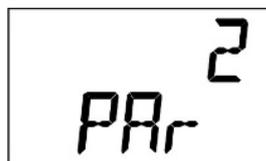
Screen No. 2: Modbus address

Configuration screen for the **Baud Rate**: Defines the Modbus communication speed. Valid values: 1,200, 2,400, 4,800, 9,600, 19,200, 38,400, 57,600 and 115,200.



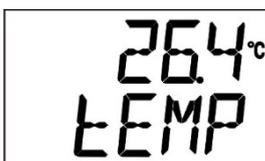
Screen No. 3: Baud Rate

Configuration screen for the **Parity**: Defines the parity code used for Modbus communication. Value **0** (none), **1** (odd) and **2** (even).

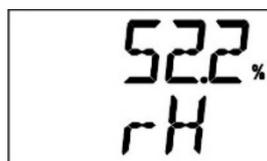


Screen No. 4: Parity

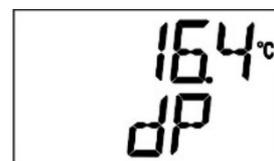
Read-only screens of the values measured by the transmitter:



Screen No. 5: Temperature



Screen No. 6: Relative humidity



Screen No. 7: Dew point

6. SERIAL COMMUNICATION

The transmitter is provided with RS485 serial communication, operating as a slave within the Modbus RTU network. The configuration of the transmitter is performed through the serial (RS485) interface. For configuring the communication parameters, you can use the programming **P** button.

In this section you will find the instructions necessary to perform the data reading without using the **DigiConfig** software. To assure correct configuration of the transmitter, always use the **DigiConfig** software. After being configured, the input data may be accessed by any other software capable for Modbus RTU communication.

6.1 MODBUS COMMANDS

The Modbus RTU commands (functions) listed in the table below are implemented. For further information with respect to each of these commands and the Modbus protocol in general, please access the site www.modbus.org.

READ HOLDING REGISTERS – 0X03

This command can be used for reading the value of one or several holding registers, according to the **Holding Registers Table**.

WRITE HOLDING REGISTERS – 0X06

This command can be used for writing in a holding register, according to the **Holding Registers Table**.

6.2 DESCRIPTION OF SOME REGISTERS

REGISTER 2 – BAUD RATE

Defines the Modbus communication speed. The transmitter comes factory-configured with a Baud Rate of 115200.

CODE	BAUD RATE
0	1.200
1	2.400
2	4.800
3	9.600
4	19.200
5	38.400
6	57.600
7	115.200

Table 2 – Baud Rate

REGISTER 3 – MODBUS ADDRESS

Defines the address of the transmitter within the Modbus network. Values between 1 and 247. The transmitter comes factory-configured with address 247.

REGISTER 4 – PARITY

Defines the parity code used for Modbus communication. The transmitter comes factory-configured with parity even.

CODE	PARITY
0	None
1	Odd
2	Even

Table 3 – Parity

REGISTER 6 – INDICATION MODE

Defines the indication mode on the display of the sensor values readout. The transmitter comes factory-configured with indication of temperature and relative humidity.

CODE	DESCRIPTION
0	Indicates temperature and relative humidity.
1	Indicates temperature and dew point.
2	Indicates relative humidity and dew point.
3	Indicates temperature only.

Table 4 – Indication mode

REGISTER 7 – TEMPERATURE VALUE (°C OR °F)

REGISTER 8 – RELATIVE HUMIDITY VALUE (%)

REGISTER 9 – DEW POINT VALUE (°C OR °F)

Shows the measured value in engineering units. The decimal point is fixed at one place, the value is exhibited without the decimal point and must be considered by the reading software.

REGISTER 10 – CONFIGURATION OF MEASUREMENT UNIT

Defines the measurement unit for the temperature and the dew point. The transmitter comes factory-configured for degrees Celsius (°C).

CODE	UNITY
0	°C
1	°F

Table 5 – Unity

REGISTER 11 – DISABLED CONFIGURATION VIA BUTTON

Defines the changes of configuration via button.

CODE	DESCRIPTION
0	Factory-configured default value.
1	Disables the configuration change of communication parameters via button.

Table 6 – Button

REGISTER 12 – USER OFFSET FOR TEMPERATURE

Defines the user Offset value in engineering units for the temperature. The transmitter comes factory-configured with the Offset value equal to 0 (zero).

REGISTER 14 – USER OFFSET FOR HUMIDITY

Defines the user Offset value in engineering units for the relative humidity. The transmitter comes factory-configured with the Offset value equal to 0 (zero).

REGISTER 16 – ERROR VALUE

Shows the error value which is transmitted when the sensor has a problem. The transmitter comes factory-configured with the value -9999.

6.3 HOLDING REGISTERS TABLE

The specified addresses correspond to the low-level physical addresses, where zero (0) corresponds to the PLC 40001 address. The **Minimum** and **Maximum** columns show the range of values valid for each parameter. The **R/W** column indicates if the parameter is for reading and writing (R/W) or for reading only (R).

ADDRESS	DESCRIPTION	MINIMUM	MAXIMUM	R/W
0	Serial number (word high)	0	65535	R
1	Serial number (word low)	0	65535	R
2	Baud-Rate	0	7	R/W
3	Modbus Address	1	247	R/W
4	Parity	0	2	R/W
5	Firmware release	0	999	R
6	Indication mode	0	3	R/W
7	Temperature value (°C or °F)*	-400	1000	R
8	Relative humidity value (%)*	0	1000	R
9	Dew point value (°C or °F)*	-400	1000	R
10	Configuration of measurement unit	0	1	R/W
11	Disables configuration via button	0	1	R/W
12	User offset for temperature*	-100	100	R/W

ADDRESS	DESCRIPTION	MINIMUM	MAXIMUM	R/W
13	Reserved	0	0	R
14	User offset for humidity*	-100	100	R/W
15	Reserved			
16	Error value	-9999	9999	R/W
17	Title	-	-	R/W
18	Title	-	-	R/W
19	Title	-	-	R/W
20	Title	-	-	R/W
21	Title	-	-	R/W
62	Model	0	11	R

Table 7 – Registers

* For the ranges indicated above consider with one decimal place. Example: -100 means -10.0.

7. SPECIAL CARE

The transmitter is an electronic module and, therefore, will need some particular care when handling it:

- When you open the transmitter to fix it, avoid any contact with the electronic circuit due to the risk of damage caused by static electricity.
- Take maximum care when connecting the wires.
- When you close the case, the cover must be replaced correctly, thus assuring the sealing quality of this model.

7.1 CARE WITH SENSORS

The calibration of the humidity sensor may be changed if it is exposed to contaminant vapors or extreme humidity and temperature conditions for long time periods. For accelerating the calibration recovery follow the procedure as described below:

- Remove the sensor from the capsule.
- If there are solid particles on the sensor, wash it with deionized water.
- Place the sensor within 80 °C (+/- 10 °C) oven for 24 hours.
- Keep the sensor in a place at a temperature between 20 and 30 °C and humidity over 75 % RH for 48 hours.
- Place the sensor back in the capsule.

IMPORTANT

The sensor used in this transmitter may be damaged or become out of calibration if it is exposed to chemical agents contaminated atmosphere. Hydrochloric Acid, Nitric Acid, Sulfuric Acid, and Ammonia in high concentrations may damage the sensor. Acetone, Ethanol and Propylene Glycol may cause a reversible measurement error.

8. SPECIFICATIONS

FEATURES	RHT-WM-485-LCD, RHT-DM-485-LCD, and RHT-P10-485-LCD
Transmitter operating temperature	<ul style="list-style-type: none"> • WM Model: From -40 °C to 70 °C. • DM Model: From -40 °C to 100 °C. Sensor and Rod (RHT-DM): See Figure 11.
Sensor measuring range	Temperature: -40 °C to 100°C. Relative Humidity (RH): 0 to 100 % RH (No Condensing). Dew Point: -40 °C and 100 °C.
Electromagnetic compatibility	EM 61326:2000
Measurement accuracy	See Figure 11. Note: a small measurement error can be eliminated adjusting the OFFSET parameter of the software.
Measurement resolution	Temperature: 0.1 °C. 14 bits (16383 levels) Relative Humidity (RH): 0.1 %. 12 bits (4095 levels)
Response time	Temperature: Up to 30 s in slow air movement. Humidity: Up to 8 s in smooth air movement (20 to 80 % RH).
Sampling interval	3 seconds
Power supply	12 Vdc to 30 Vdc, consumption < 16 mA
Housing	Polycarbonate
Protection index	Product suitable for applications which require protection class up to IP65 . Electronic module case: IP65. <ul style="list-style-type: none"> • Sensor capsule: IP40.
Dimensions	60 x 70 x 35 mm
DigiConfig software operation environment	Configuration software for Windows 98, NT, 2000, XP, and Vista. Menus in Portuguese, English, or Spanish. <ul style="list-style-type: none"> • Configures, reads, and exhibits data on the screen.
Accessories	1.5 m long communication cable is part of the product or can be purchased separately (PN: 8813099999).

Table 8 – Specifications

8.1 MEASUREMENT ACCURACY AND OPERATIONAL LIMITS OF THE SENSORS

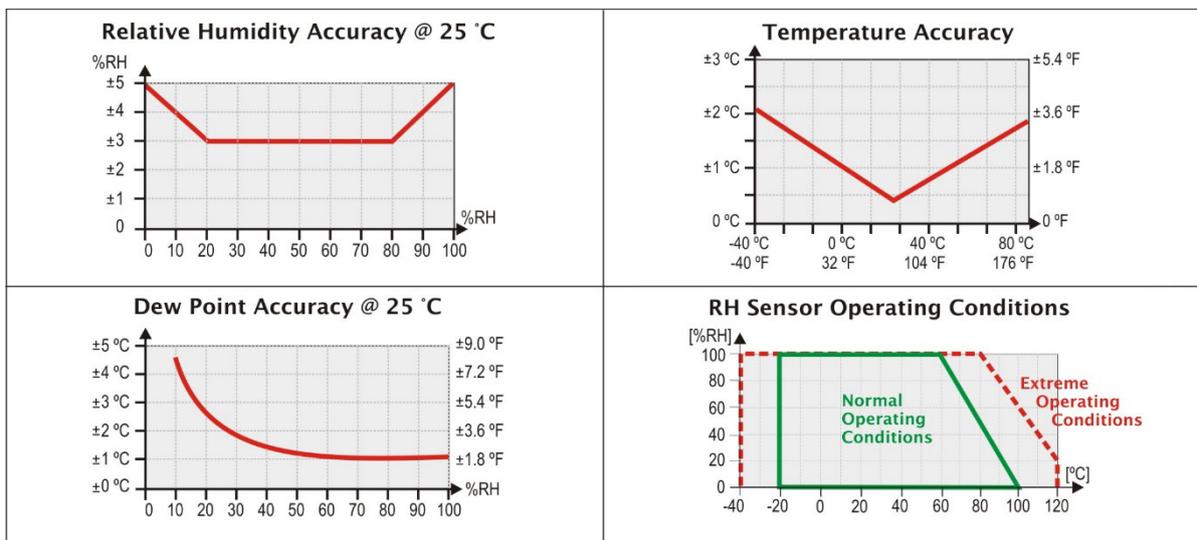


Figure 11 – Accuracy of humidity and temperature measurement

9. WARRANTY

Warranty conditions are available on our website www.novusautomation.com/warranty.