NOVUS RHT-WM-485-LCD Temperature and Humidity Transmitter Instruction Manual

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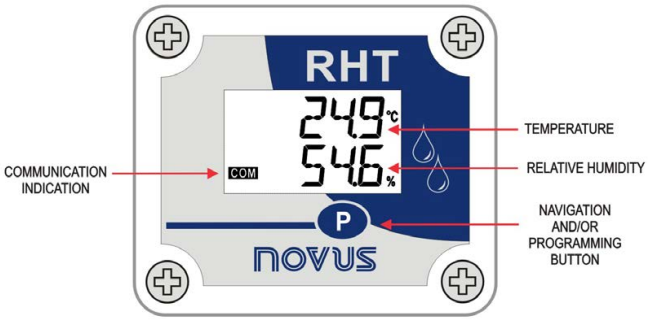
NOVUS RHT-WM-485-LCD Temperature and Humidity Transmitter

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.

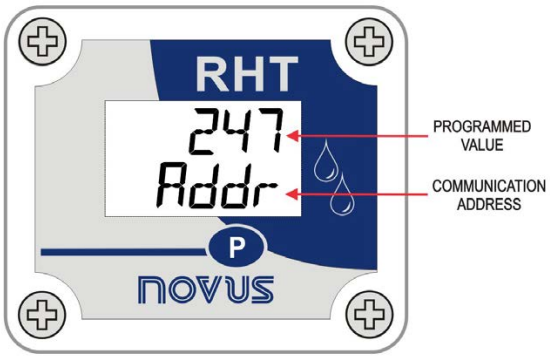
IDENTIFICATION

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:



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

Button (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.

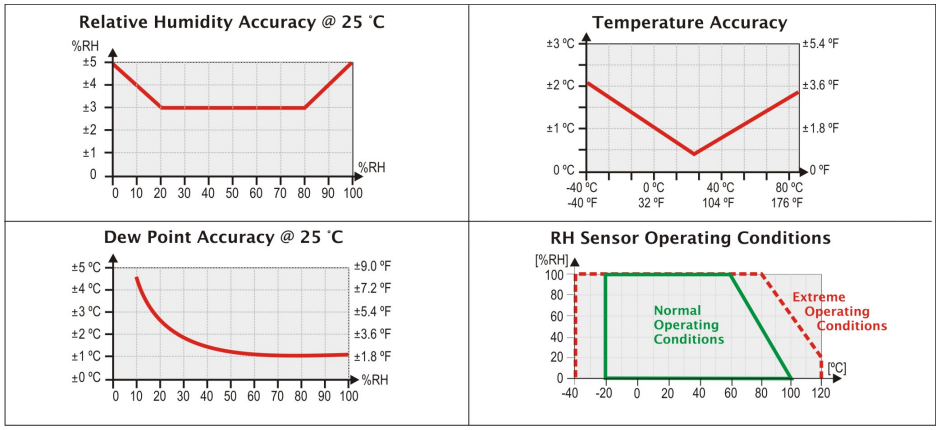


Communication Address: Value programmed for identifying the transmitter of the Modbus network. Programmable between 1 and 247.

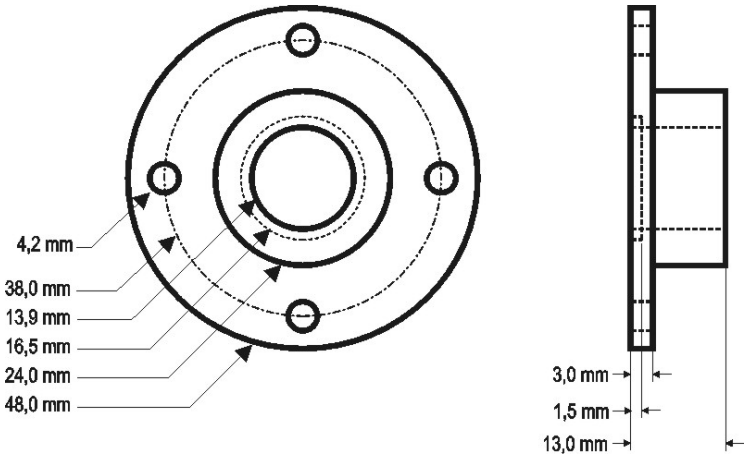
SPECIFICATIONS

Operating temperature of the transmitter	From -40 °C to 70 °C Sensor and Rod (**RHT-DM**): See **Figure 3**.
Electromagnetic compatibility	EM 61326:2000
Sensor measuring range	Temperature: -40.0 °C to 100.0 °C. Relative Humidity (RH): 0.0 to 100.0 % RH (No Condensing). Dew Point: -40.0 °C and 100.0 °C.
Measurement accuracy	See **Figure 3**. **Note**: a small measurement error can be eliminated adjusting the **OFFSET** parameter of the software.
Measuring 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 class	Product appropriate for applications which require protection class up to **IP65**. Electronic module case: IP65. 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. 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).

MEASUREMENT ACCURACY AND OPERATIONAL LIMITS OF THE SENSORS

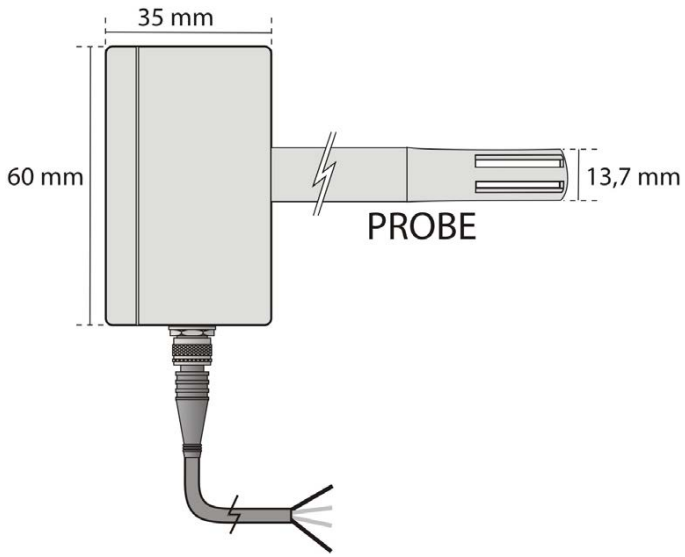


MECHANICAL INSTALLATION



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. Fig. 4 below shows flange dimensions and holes. Available in stainless steel or polyamide 6.6.

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



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

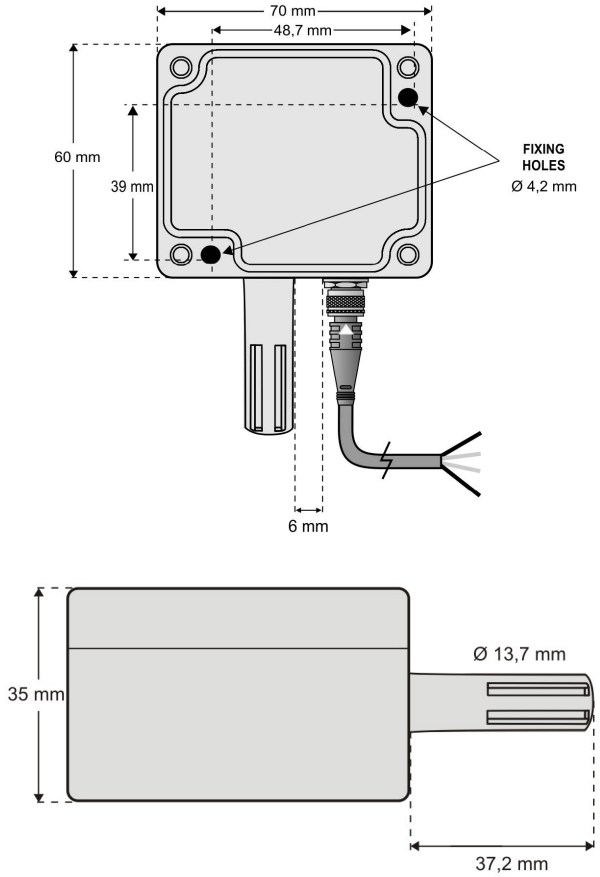


Figure 7 – Dimensions of the RHT-WM-485-LCD model
The RHT-P10-485-LCD electronic housing is designed for wall mounting, while its remote sensor probe is intended for inserting and screwing in a flange.

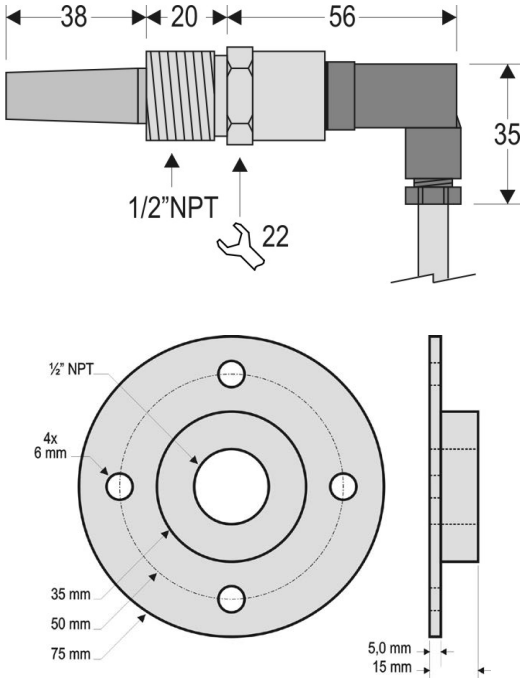
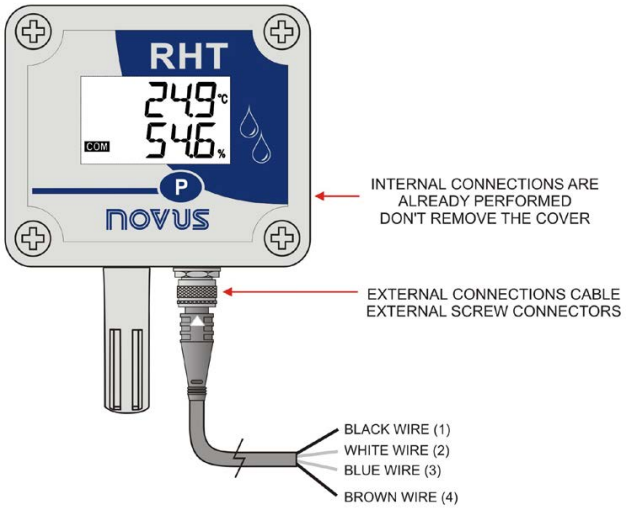


Figure 9 – Mounting flange
Note: The flange is not bundled with the transmitter. It must be ordered separately.

ELECTRICAL INSTALLATION

ELECTRICAL CONNECTIONS
The Fig.10 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**	Bi-directional data line.	Blue wire
4	**D0**		**D-**	**B**	Bi-directional inverted data line.	Brown wire



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.

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 (47Ω and 100nF, series) in parallel with contactor and solenoid coils

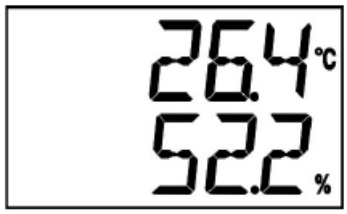
etc.

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 characteristics:
Addr (Communication Address) = 247
baVd (Communication speed) = 115200
par (Parity) = Par
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.

SCREENS OF THE TRANSMITTER

Indication screen for the measured values in the transmitter:



1ª Screen: Main

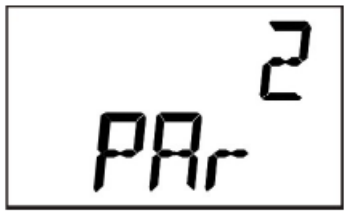
1ª Screen: Main
For configuring the communication parameters, press the button (± 5 seconds) until the screen starts blinking, then release the button and press it again to increment. When the desired value appears, release the button, and wait until the screen stops blinking (± 10 seconds). To access the next screens, press the button.
Configuration screen for the Modbus Address: Defines the address of the module within the Modbus network. Values between 1 and 247.

2ª Screen: Modbus Address

2ª Screen: 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.

3ª Screen: Baud Rate

3ª Screen: Baud Rate
Configuration screen for the Parity: Defines the parity code used for Modbus communication. Value 0 (none), 1 (odd) and 2 (even).



4ª Screen: Parity

4ª Screen: Parity
Read-only screens of the values measured by the transmitter:

5ª Screen: Temperature

6ª Screen: Relative Humidity

7ª Screen: Dew Point

7ª Screen: Dew Point

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 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.

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.

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).

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

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

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
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

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.

- 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	UNIT
0	°C
1	°F

REGISTER 11 – DISABLES 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.

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.

SPECIAL CARE

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

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 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.

Documents / Resources

	NOVUS RHT-WM-485-LCD Temperature and Humidity Transmitter [pdf] Instruction Manual RHT-WM-485-LCD, RHT-DM-485-LCD, Temperature and Humidity Transmitter, Humidity Transmitter, Temperature Transmitter, Transmitter

References

- The Modbus Organization
- NOVUS Automation Inc. - Controllers, Thermostats, Data Loggers, Solid State Relays, Sensors, Transmitters, SCADA, Data Acquisition and Temperature Controllers
- Warranty - Company - NOVUS Automation Inc.