

myPCProbe

INSTRUCTION MANUAL



INTRODUCTION

myPCProbe is either a temperature sensor (**TEMP** model) or a temperature and humidity sensor (**RHT** model) that features an USB interface for communication with your PC. It is the ideal instrument for monitoring and recording lab data from teaching, research and industry settings. It is supplied with an Windows application that enables the instant visualization of logged data in display, bar, gauge or chart formats. The application provides history data logging of **myPCProbe** readings, offering resources to visualize data graphically and to export them in different formats. The PC USB port is accessed as a virtual serial port, which enables compliance with SCADA software that support Modbus RTU serial communication, or any other application that supports ASCII serial communication.

Multiple modules can be installed, one at each USB port, thus making it easier to increase the number of inputs. **myPCLab** application can communicate simultaneously with all installed sensors.

This guide brings the installation and module connection instructions. For information on **myPCLab** use instructions, refer to the online Help.

SPECIFICATIONS

TEMP Model (temperature)

- **Sensors:** The required sensor model must be defined at purchase. Available models are listed below, with their respective measurement ranges.

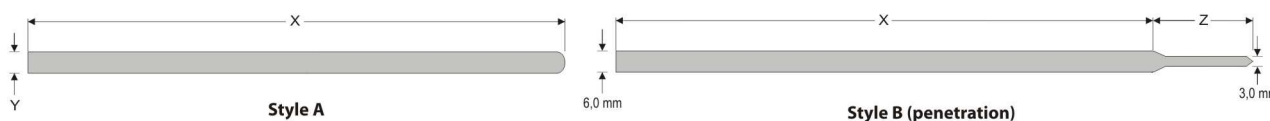


Figure 01 – Available probe styles

	Style	Dimensions (mm)	Sensor	Measurement Range
1	A	X = 150,0; Y = 3,0	Pt100	-200 to 200 °C (-328 to 392 °F)
2	A	X = 150,0; Y = 3,0	Mineral thermocouple K	-100 to 500 °C (-148 to 932 °F)
3	A	X = 300,0; Y = 3,0	Pt100	-200 to 200 °C (-328 to 392 °F)
4	A	X = 300,0; Y = 3,0	Mineral thermocouple K	-100 to 500 °C (-148 to 932 °F)
5	A	X = 300,0; Y = 6,0	Pt100	-200 to 300 °C (-328 to 572 °F)
6	A	X = 300,0; Y = 6,0	Mineral thermocouple K	-100 to 1000 °C (-148 to 1932 °F)
7	A	X = 500,0; Y = 6,0	Pt100	-200 to 300 °C (-328 to 572 °F)
8	A	X = 500,0; Y = 6,0	Mineral thermocouple K	-100 to 1200 °C (-148 to 2192 °F)
9	B	X = 120,0; Z = 30,0	Pt100	-200 to 200 °C (-328 to 392 °F)
10	B	X = 120,0; Z = 30,0	Mineral thermocouple K	-100 to 300 °C (-148 to 572 °F)
11	B	X = 75,0; Z = 25,0	Pt100	-200 to 200 °C (-328 to 392 °F)
12	B	X = 75,0; Z = 25,0	Mineral thermocouple K	-100 to 300 °C (-148 to 572 °F)

Table 01 - **myPCProbe-TEMP** available models, defined at purchase

- **Dimensions:** Refer to Figure 02, Table 01 and Figure 01.

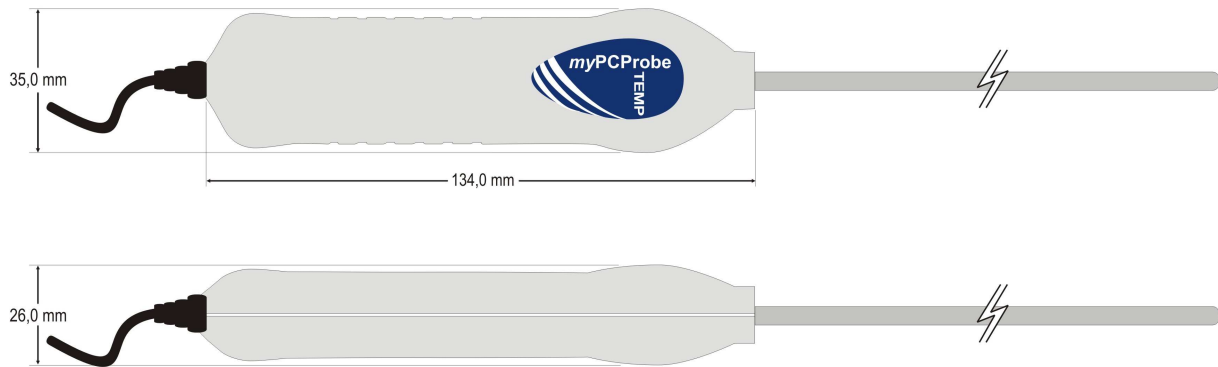


Figure 02 – TEMP model dimensions

- **Ambient temperature channel:** Internal thermistor.
- **Built-in cold junction compensation for thermocouples and wire resistance for Pt100.**
- **Total accuracy:**
 - Thermocouple K: $\pm 4.5^{\circ}\text{C}$ (when maximum resolution is selected);
 - Pt100: $\pm 1.5^{\circ}\text{C}$ (when maximum resolution is selected);
 - Ambient Temperature Channel: $\pm 1.5^{\circ}\text{C}$ (20 minutes after connection to the USB port)

Note: It is possible to reduce (and even cut out) errors if after calibration the calibration points are transferred to the device using the custom calibration screen (via software).
- **A/D resolution:** Configurable from 15 to 11 bits.
- **Sampling rate:** 8 to 128 samples per second, depending on resolution and number of channels enabled.

RHT Model (temperature and relative humidity)

- **Maximum measurement range:** -20 to 100°C and 0 to 100% RH (available also as dew point). See Figure 04 "Humidity sensor operating conditions".
- **Dimensions:** See Figure 03.

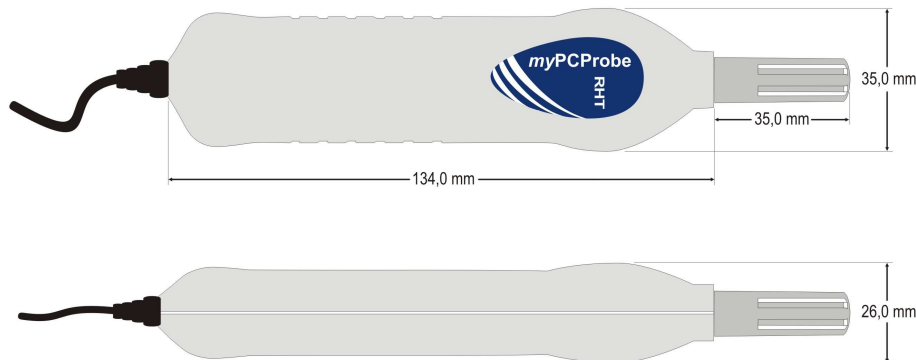


Figure 03 - RHT model dimensions

- **Accuracy:** See Figure 04.
 - Note:** It is possible to reduce (and even cut out) errors if after calibration the calibration points are transferred to the device using the custom calibration screen (via software).

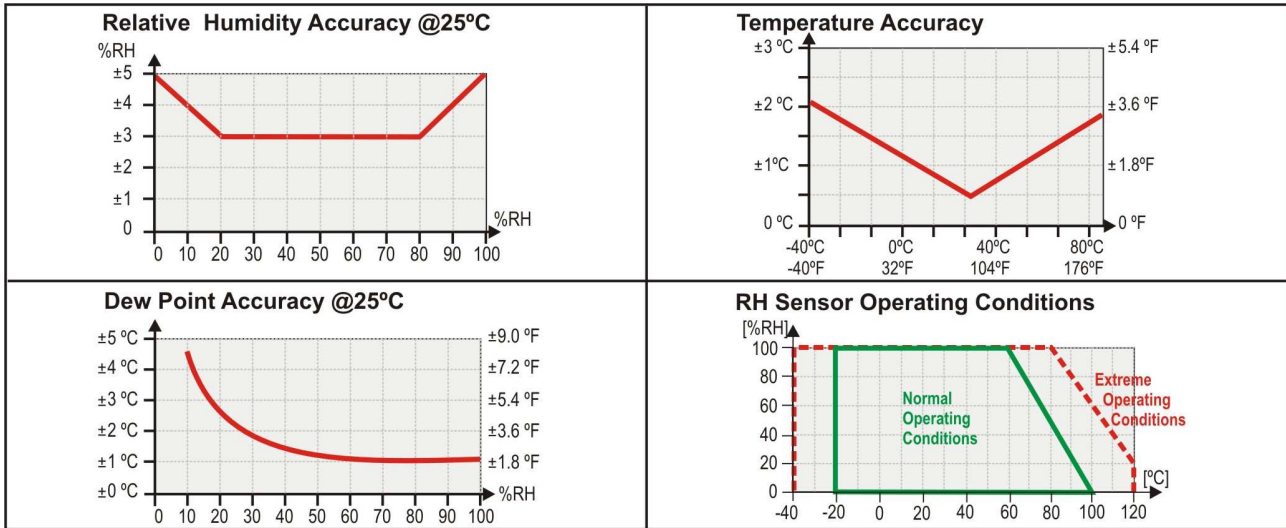


Figure 04 – Operating accuracy and conditions of RHT model

- **Sampling rate:** one sample at every 1 or 3 seconds, depending on the resolution selected.

PC interface: Plug and Play USB (compatible with V1.1 and V2.0), virtual serial port interface, 1.5 m long cable.

Power supply: From the USB bus. Typical current: 30 mA

Supports custom multipoint calibration, which allows for an increase of system accuracy.

Handle operating environment: 0 to 60°C and 0 to 95% RH non-condensing.

Electromagnetic compatibility: EN 50081-2, EN 50082-2.

ABS case.

TESTS

This section shows the step response of some **myPCProbe** models to humidity (RHT model) and temperature (TEMP model).

RHT MODEL

The **myPCProbe-RHT** was taken from an extremely dry environment and placed in an extremely wet environment.

Response time (0 to 90%) = 07 min 45 s

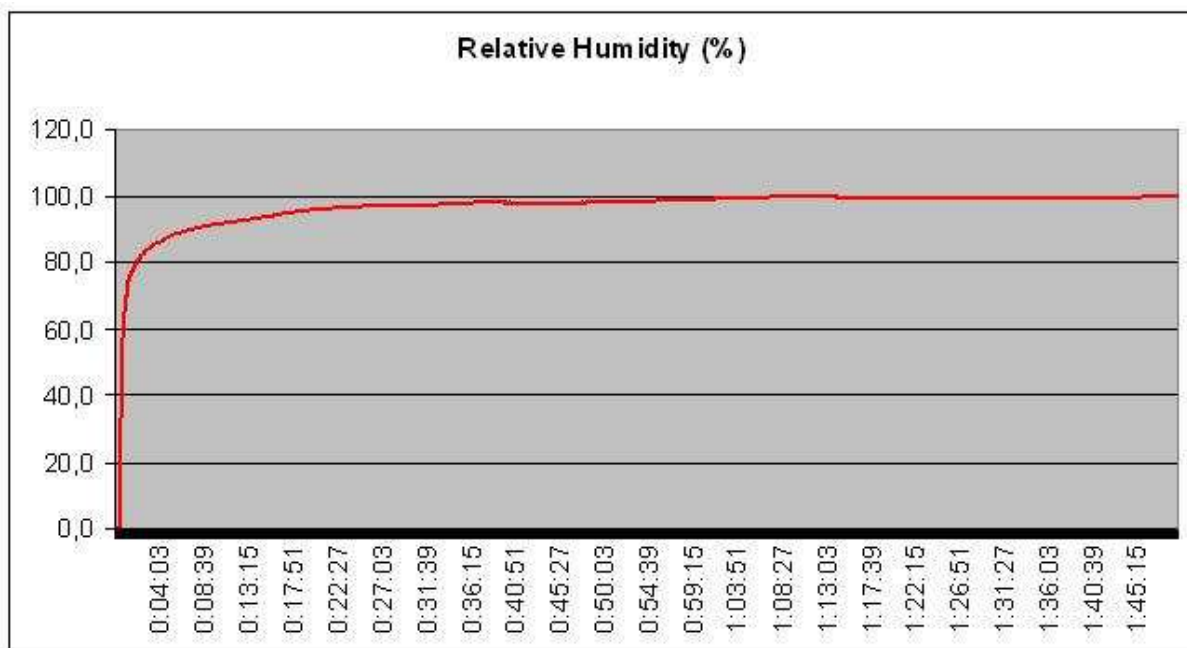


Figure 05 - RHT model humidity step response

TEMP MODEL

In these tests, a calibration furnace was used to provide the required final temperature. Basal temperature was room temperature (around 25°C; 77 °F).

150 x 3 mm probe, thermocouple K

Features: See model number 2 in Table 01.
 Probe inserted 130 mm in the furnace.
 Response time (0 to 90%) = 2 min 12 s

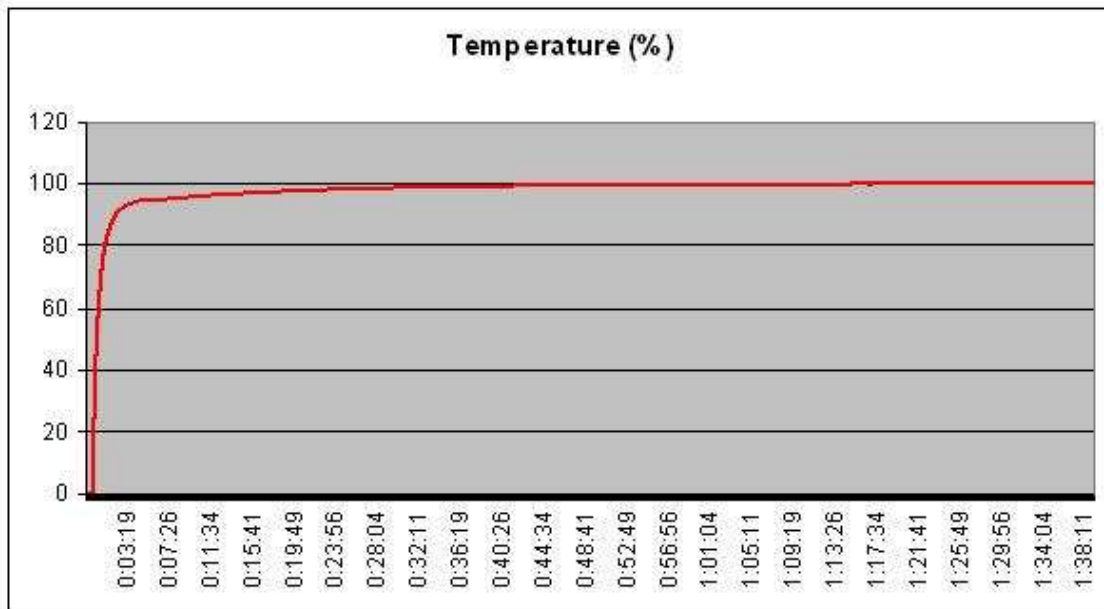


Figure 06 – TEMP model temperature step response with 150 x 3 mm, thermocouple K probe

300 x 6 mm probe, Pt100

Features: See probe number 5 in Table 01.
 Probe inserted 150 mm in the furnace.
 Response time (0 to 90%) = 3 min 46 s

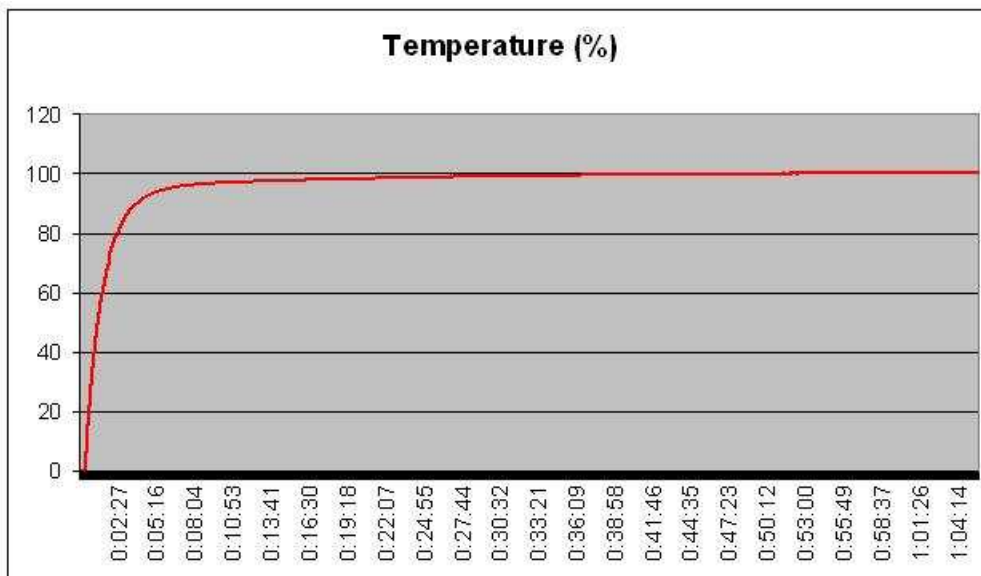


Figure 07 – TEMP model temperature step response with 300 x 6 mm, Pt100 probe

300 x 6 mm probe, thermocouple K

Features: See model number 6 in Table 01.
 Probe inserted 150 mm in the furnace.
 Response time (0 to 90%) = 1 min 21 s

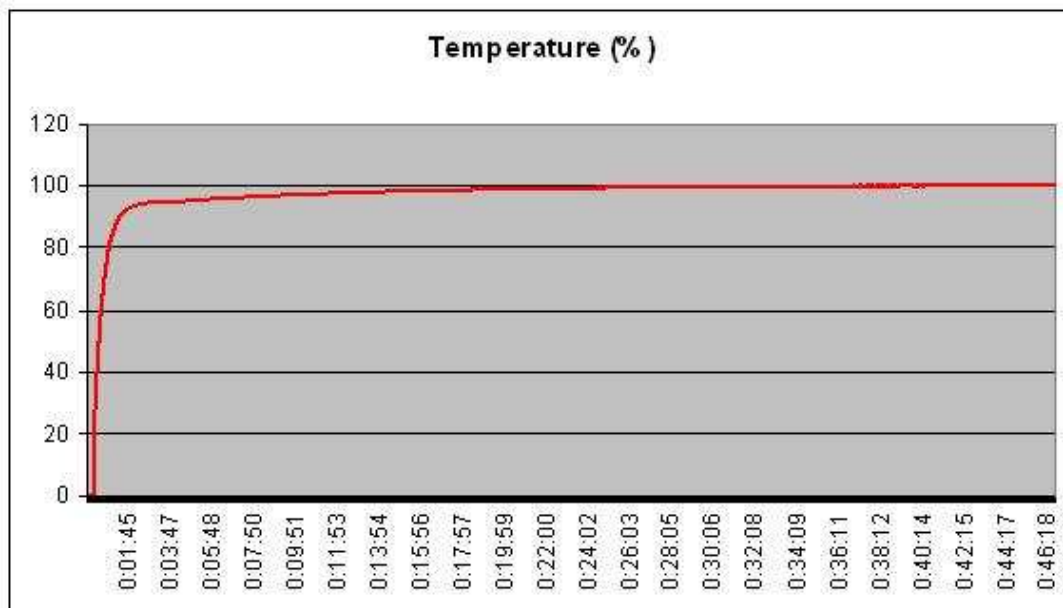


Figure 08 – TEMP model temperature step response with 300 x 6 mm, thermocouple K probe

500 x 6 mm probe, Pt100

Features: See model number 7 in Table 01.
 Probe inserted 150 mm in the furnace.
 Response time (0 to 90%) = 3 min 36 s

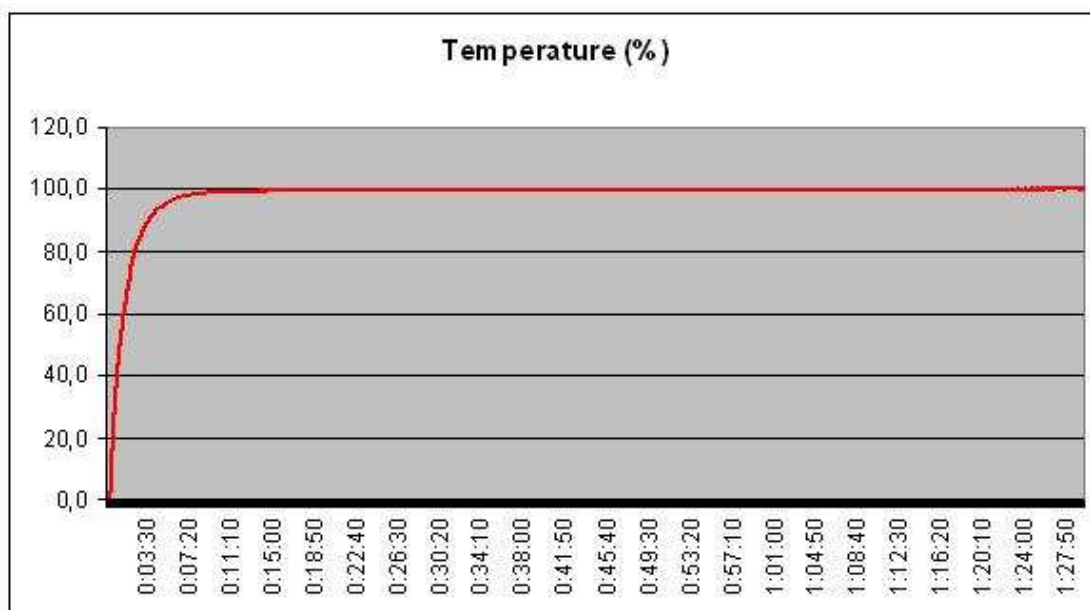


Figure 09 – TEMP model temperature step response with 500 x 6 mm, Pt100 probe

100 mm penetration probe, Pt100

Features: See model number 12 in Table 01.
 Probe inserted 80 mm in the furnace.
 Response time (0 to 90%) = 2 min 29 s

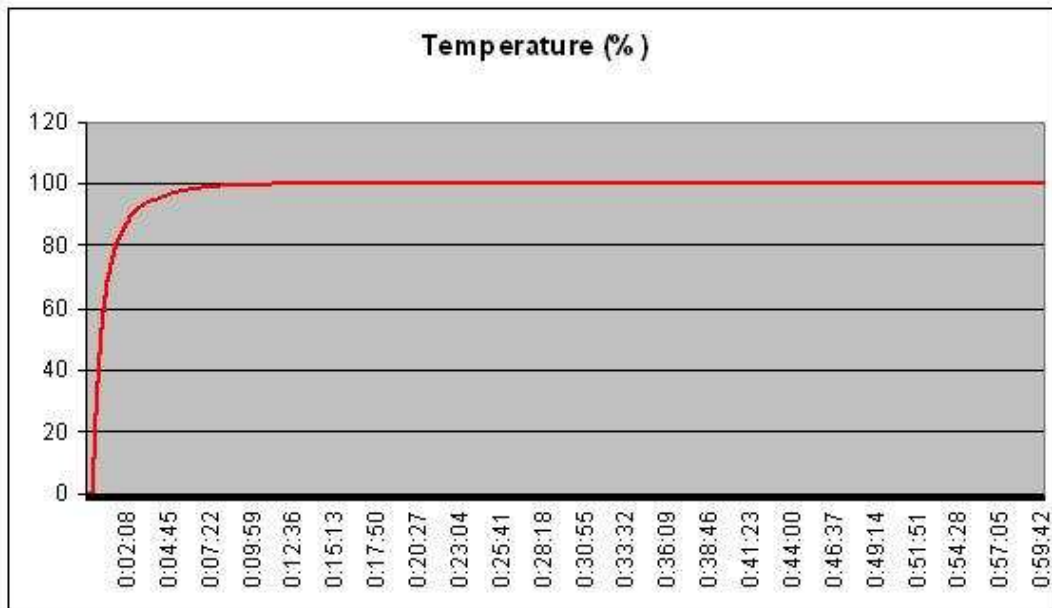


Figure 10 – TEMP model temperature step response with thermocouple K 100 mm penetration probe

USB DRIVER INSTALLATION

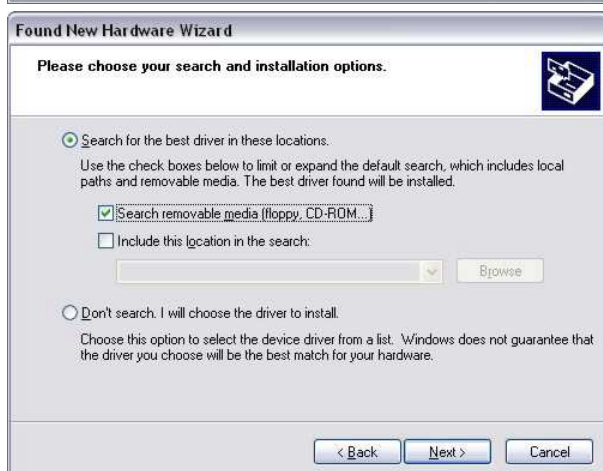
The following installation steps may be slightly different depending on your PC configuration and Windows version. Follow the Wizard instructions and use the following steps and figures to select the correct installation options.

1. Insert the **myPCProbe** CD in the CD-ROM drive.
2. Connect the module to a PC USB port. Windows® will detect the new hardware and after a few seconds the new hardware wizard will start.
3. The Found New Hardware Wizard will show-up and ask if you want to connect to Windows Update to get the driver. Select the “No, not this time” and select “Next”.
4. Select “Install from a list or specific location (advanced)” and select “Next”.
5. Select “Search for the best driver in these locations” and check option “Search removable media”. Select “Next”. If the installation files are not in a CD, select option “Include this location in the search” and type the path for the required files.
6. If a warning message regarding Windows® XP compatibility appears, select “Continue Anyway”.
7. The **myPCProbe** driver files will be copied to your computer and, when concluded, a window will show up informing that the wizard has finished installing the software. Select “Finish”.
8. It is possible that the previous steps repeat a second time for the completion of installation.

After driver installation, proceed to the next chapter to install the **myPCLab** software that provides configuration, visualization, recording and data export.

In future connection of **myPCProbe** modules, it is possible that Windows® prompt again for the USB driver installation. In this case, the same wizard will be presented. Follow the above steps, but select option “Install the software automatically (recommended)”, since the driver files are already installed.

The following figures are examples of Windows XP® New Hardware Wizard. For Windows 2000® they look different, but the information is the same.



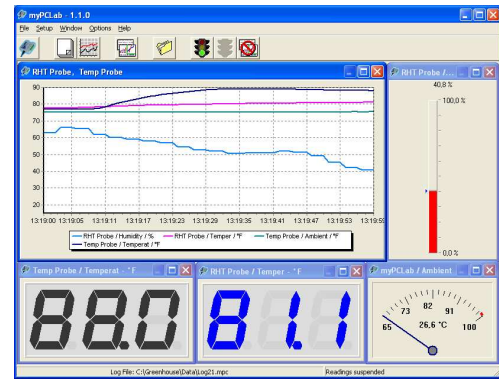
SOFTWARE INSTALLATION

The **myPCLab** software is a Windows program intended to:

- Configuration of **myPCProbe** and **myPCLab** modules.
- Plot and record data, show gauges, bargraphs and digital readouts with data from multiple modules.
- Export acquired data in multiple file formats (xls, pdf, rtf, xml, html, dbf, txt, csv).

To install, execute file **myPCLabSetup.exe** from the installation CD, and follow the instructions to proceed with installation.

The **myPCLab** software has a complete help system, with all the necessary information for its use. Start the software and press F1 or select the Help menu to show the help content.



The **myPCLab** software can simultaneously communicate with multiple modules, making easy to expand the number of inputs of a measurement system.

SERIAL PORT (COM PORT) ASSIGNMENT

A few seconds after connection of a **myPCProbe**, Windows operating system assigns a COM port number for communication. The assigned COM port number will not change in future connections to the same USB port. Users can easily identify and modify the assigned COM port in:

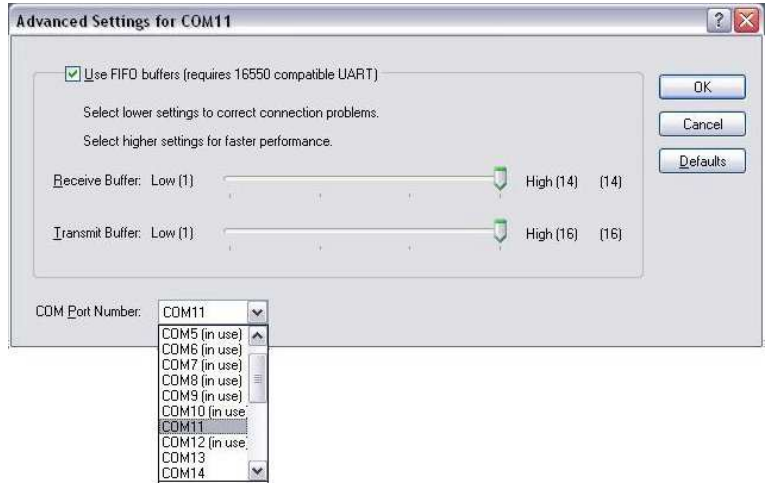
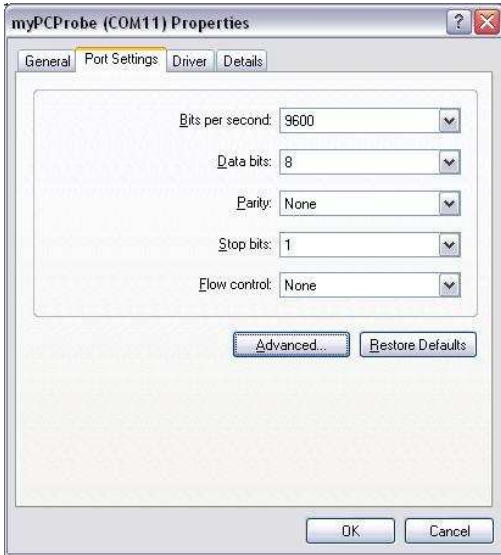
Control Panel / System / Hardware / Device Manager / Ports (COM & LPT)

Select the desired **myPCProbe** device, click with the right mouse button and select “Properties”. Select “Port Settings” and click on the “Advanced...” button. In “COM Port Number” list, select the serial port to be assigned. Some serial port can be marked as “in use”. Only select one of these ports if you are sure it is not being used by any other peripheral in your computer.

In some cases, serial port can be marked as “in use” even when the associated device is not in the computer. In this case, it is safe to assign this port to **myPCProbe**.

The following figures illustrate the most important steps for this procedure.





APPENDIX 1 – SERIAL COMMUNICATION PROTOCOLS

Each **myPCProbe** module installed in a PC is accessible as a distinct serial COM port. A module can communicate in one of two protocols: ASCII (delimited text) or Modbus RTU. Any program with serial communication capability using one of these protocols may be used to gather measurement data from the modules.

The used communication protocol depends on the “auto-send” module configuration. See the software help for information on how to change the “auto-send” configuration.

- Auto-send disabled: Communicates using Modbus RTU protocol. The module is a slave that responds to read requests issued by a Modbus master (for example a SCADA software).
- Auto-send enabled: Communicates using ASCII (delimited text) protocol. The module transmits continuously the values measured in its channels, in text format.



The module can only be configured using the **myPCLab** software.

The serial COM port assigned to a device will only be available a few seconds after connection of the **myPCProbe** module to a USB port, since Windows operating systems need to load the appropriate drivers. To check the COM port assigned to each module, use the **myPCLab** software or go to the Windows Control Panel in:

Control Panel/System/Hardware/Device Manager/Ports (COM & LPT)

MODBUS RTU (AUTO-SEND MODE DISABLED)

myPCProbe is a Modbus RTU slave that can answer to “Read Holding Register” requisitions, Modbus command number 3. The module doesn't have a specific Modbus address, since it's the only device in its serial port. It will answer to read request to any valid slave address.

When configuring the serial communication parameters of the Modbus master, set the COM port number assigned to the device. The USB port ignores all other serial communication parameters.

- **Communication Port:** Select the COM port number assigned to the **myPCProbe**.
- **Baud rate:** any
- **Number of data bits:** any
- **Stop bits:** any
- **Parity:** any

The following table shows the Modbus registers available for reading. Three different address formats are presented. Use the address format according to your Modbus master.

Modbus Address (in 3 different formats)			
Protocol, 0 based	Protocol, 1 based	PLC	Content
4	5	40005	Channel 1 value
5	6	40006	Channel 2 value (RHT model)
6	7	40007	Ambient temperature value (TEMP model)

Holding Registers Table (reference 4X)

- Channel 1 and 2 values
Current value of the input channel, in engineering units. For values with decimal places, the decimal point separator will be omitted. Example: A channel with value 13.9 will be read as 139.
Measured values above or below its specified limits will be replaced by the corresponding overflow or underflow values, according to the module configuration.
A disabled channel will return 0 (zero) as its measured value.
- Ambient Temperature Value
Current measurement from the internal ambient temperature sensor, in degrees Celsius or Fahrenheit, according to module configuration. The decimal point separator is omitted. Example: 23.8°C is read as 238.



Never send a Modbus write command to a module. Configuration or calibration registers may get corrupted and the module may get unusable.

ASCII – DELIMITED TEXT (AUTO-SEND MODE ENABLED)

When configured to the auto-send mode, the **myPCProbe** module transmits to its USB port a line of text containing the current value of all measurement channels. A new line of text is transmitted after each measurement interval, according to the module configuration.

Any software with serial communication capabilities can receive these data. When configuring the serial communication parameters of the software, set the COM port number assigned to the device. The USB port ignores all other serial communication parameters.

- **Communication Port:** Select the COM port number assigned to the **myPCProbe**.
- **Baud rate:** any
- **Number of data bits:** any
- **Stop bits:** any
- **Parity:** any

The simplest way to receive and display data is using a simple communication terminal software, like Windows® HyperTerminal. This software display on the screen all data received in the specified COM port. Other softwares like *Matlab*, *Simulink*, *HPVee*, *Testpoint*, can also be configured to receive and parse measured data.

When operating in the auto-send mode, **myPCProbe** doesn't expect to receive any information from the USB port. It transmits data continuously, with no control from the receiver. If, during a transmission, the module receives a Modbus RTU command, it will suspend the auto-send mode for 3 seconds and answer the Modbus request. After 3 seconds the auto-send mode will resume.

The line of text sent after each measurement interval has the following format:

#AAA;BBB;CCC;DDD;EEE\r\n

Where:

- “#” is the start of line delimiter.
- “;” is the separator of measurement values.
- “AAA” is always 0 (zero).
- “BBB” is the value of channel 1 (TEMP model) or humidity (RHT model).
- “CCC” is the value of temperature (RHT model).
- “DDD” is the value of the ambient temperature (TEMP model).
- “EEE” is the time in milliseconds since the transmission of the first line.
- “\r\n” are ASCII values 13 (Carriage Return) and 10 (Line Feed), end of line delimiters (these characters are not visible).

Measurements containing values with decimal separators will be transmitted with the character '.' (ASCII 46). Examples:

#0;258.1;-5.7;24.6;16772

#0;74.0;50.3;0;4900

#0;-10.9;0;19.4;338105