



# LogBox-RHT

## TEMPERATURE AND HUMIDITY LOGGER – INSTRUCTIONS V 1.1x A

### 1 INTRODUCTION

LogBox-RHT is an electronic logger of temperature and relative humidity. There are sensors that measure such data and store them in an electronic memory. Data can be later viewed and analyzed on a PC where they can be opened in tabular and graphical forms.

The logger is supplied with Logchart-II software, which enables to set up the logger operation mode. It is also used for data visualization. Other parameters such as end of measurements, logging interval, etc., are easily selected through the LogChart-II software.

Measurements can be exported to and opened in other applications, such as spreadsheet programs.

#### 1.1 PACKAGE CONTENTS

Besides this manual, the user must check if the items below accompany the product.

- The electronic logger LogBox-RHT;
- A CD-ROM with the Logchart-II software and a USB driver;
- A communication interface upon request.

#### 1.2 Identification

The identification label is on the logger body. Check if the features described are in accordance with your order. The RHT model is designed to measure temperature and relative humidity.

The following elements are shown in the logger front.

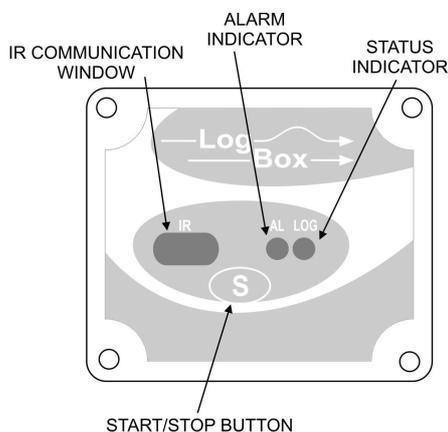


Figure 01 – Logger Front

**START / STOP button:** Can be configured to start or stop logging when pressed.

**IR Communication Window:** PC-Logger communication area. The communication interface should be pointed towards this window.

**State indicator (LOG):** While in stand-by (not logging) or after a series of measurements is ended, it flashes once at every four seconds. During logging it flashes twice at every four seconds.

**Alarm Indicator (AL):** Warns the user as to alarm conditions. Whenever an alarm situation takes place it will flash once at every four seconds, until a new configuration is applied to the logger.

### 2 TECHNICAL DATA

Measure Range	Temperature: -40 °C to 120 °C. Relative Humidity (RH): 0 a 100 %.
Accuracy	See Figure 02. Note: A measure error can be ruled out using the <b>OFFSET</b> parameter in the Logchart-II software.
Measurement Resolutions	Temperature: 0.1 °C. Relative Humidity (RH): 0,1 %.
Memory capacity	32,000 (32 k) logs. 16,000 temperature and 16,000 humidity logs or 32,000 temperature logs when relative humidity is disabled.
Measurement Interval	1 second min. 18 hours max.
Power supply	3.6 V lithium battery (1/2 AA), built-in
Estimated autonomy	Higher than 200 days with one weekly download and 5 minutes measuring interval. Battery life depends heavily on data retrieval frequency.
Operating temperature	From -40 °C to 80 °C
Case	Polycarbonate
Protection	Suitable for products with protection level IP65. See "Special Care" section. Electronic circuit case: IP65; Sensors capsule: IP40
Dimensions	60 x 70 x 35 mm
Logger-PC data transfer time	According to the number of logs. 40 seconds for 16,000 logs.
PC Interface	Ir/USB or Ir/Serial
LogChart-II software operation environment	Set up Software for Windows 95, 98, NT, 2000 and XP. Menus in Portuguese, English or Spanish. Sets up, reads and displays data on the screen.

#### 2.1 Measurement Accuracy

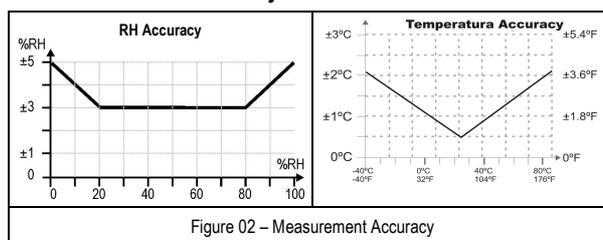


Figure 02 – Measurement Accuracy

#### NOTE

The sensor from this device may be damaged or uncalibrated if exposed to chemical agents-contaminated atmosphere. Chloridric Acid, Nitric Acid, Sulphuric Acid and Ammonia in high concentrations may damage the sensor. Acetone, Ethanol and Propylene Glycol may cause a reversible measure error.

### 3 OPERATION

It is only possible to operate the logger after the Logchart-II software is installed to a PC, according to the steps described at **Logchart-II Software** section of this manual.

The communication between logger and PC is performed with the aid of the **IR-Link wand**.

The logger operation mode set up is defined in advance by using the **LogChart-II** software. Definitions are sent to the logger through the IR-Link wand. The logger starts and stops logging as defined in the setup.

### 4 INTERFACE INSTALLATION

In the Ir-Link3/RS232 model there is a RSR232/Ir communication interface. It must be connected to the serial port at the PC.

In the **Ir-Link3/USB** model there is a USB/Ir communication interface, which must be connected to the available USB port. Windows will request the proper driver installation, which is found in the CD-ROM that is provided with the logger.

### 5 LOGCHART-II SOFTWARE

#### 5.1 Installing Logchart-II

LogChart II is the software provided with the logger to allow for configuration and data offload. To install, run the **LC\_II\_Setup.exe** file provided with the CD-ROM.

Note: Be sure your Windows date separator is configured as a slash: dd/mm/yy or dd/mm/yyyy.

#### 5.2 Running Logchart-II

When you open Logchart-II the main window is displayed.



Figure 03 – LogChart-II main window

Next, select the serial port that the communication interface will use in the "Port" menu.

Check which is available. Usually COM2 is free, once the mouse uses COM1. The selected COM port will be remembered next times the LogChart II is run. When a valid port is selected, the icons below are displayed.



Figure 04 – Icons enabled when the communication port selected is a valid port

#### 5.3 CONFIGURING THE LOGGER

Make sure the communication interface is connected to the PC port selected. The interface must be constantly directed towards the front part of the logger (communication window) at a maximum distance of 1 m. (See Figure 05).

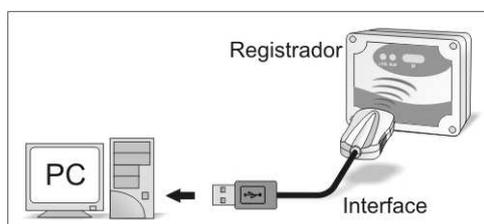


Figure 05 – Infrared communication interface position

When communication is established, select



The **Configuration Parameters** screen is displayed. In this screen the user can define the logger operation mode and also obtain general information about the device.

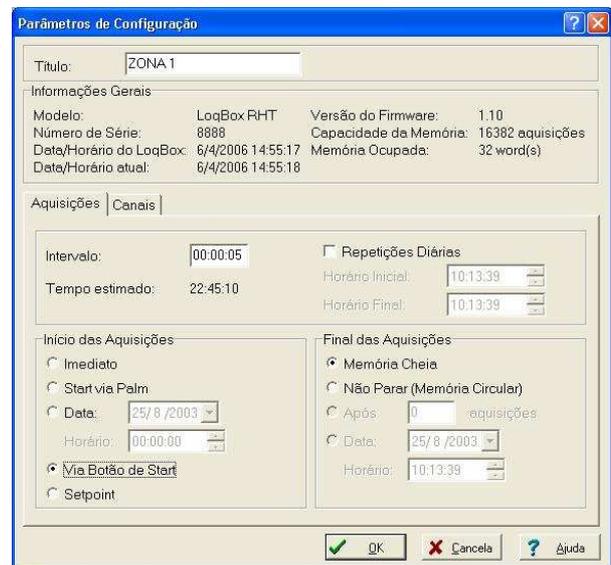


Figure 06 – Configuration window

Fields are:

**1- Title:** In this field, the user identifies the logger by assigning it a name.

**2- General information:** Area with information about the logger, such as Model, Serial Number, Logger Date/Time, PC Date/Time, firmware version, memory capacity and number of acquisitions stored in memory, etc.

In this field, time is constantly updated while the communication between logger and computer is taking place.

**4- Readings:** Presents a series of parameters that define how measurements will be.

**Interval between readings:** Defines the interval between readings: Minimum interval is 1 (one) second.

Note: When the type of value logged is mean, maximum and minimum values, the minimum interval is 10 seconds.

In **Daily repetitions** the user defines the time that daily logs will take place.

**Estimated time:** In this parameter, the logger informs the user how long it will take to occupy the full memory, in the conditions set up during configuration.

**Start of Readings:** Readings can be started in one of five different modes:

- **Immediately:** start as soon as programming is considered to be ready, and is then sent (OK) to the logger.
- **Start via Palm:** start with a command sent via Palmtop, which runs the software Log Chart Palm-OS.
- **Date:** readings start at predefined date and time.
- **Through Start Button:** starts and interrupts readings by pressuring the Start button, in the frontal part of the logger, for two seconds. See Figure 01.
- **Setpoint:** measurements start when a **temperature** setpoint is reached. In this option, the setpoint value is defined in the Channels field, where the Alarm parameter is replaced by setpoint.

**End of readings:** Options for the end of readings are:

- **Full Memory:** readings can be stored up to the full memory capacity is reached.
- **Wrap around:** readings are continuous, replacing old registers by new ones as the number of readings overpass the memory capacity.
- **After:** the logger stops readings after a certain number of readings.
- **Date:** Readings stop at user-predefined date and time. In case the logger memory capacity is reached before the date defined, readings are stopped.

**5- Channels:** Shows parameters referring to each channel separately. Channel 1 is the Temperature channel, and Channel 2 the Relative Humidity channel.

**Tag:** Defines a name for the temperature registers.

**Value:** It defines how the value measured will be logged. Options are:

- **Instantaneous:** The value logged will be exactly the value measured at each interval defined. The minimum interval between measurements is 1 second.
- **Average:** The value logged will be the mean of ten consecutive measures taken within a predefined interval. The minimum interval between measurements is 10 seconds.
- **Maximum:** The value logged will be the maximum value found within ten consecutive measurements taken within a predefined interval. The minimum interval between measurements is 10 seconds.
- **Minimum:** The value logged will be the minimum value found within ten consecutive measurements taken within a predefined interval. The minimum interval between measurements is 10 seconds.

**Offset:** Makes possible to correct the value logged.

**Unit:** Defines the unit of the value measured: °C or °F for channel 1 (temperature) and only % for channel 2 (relative humidity).

**Alarm:** Available only in the temperature channel. Defines limit values that, when exceeded, characterize an alarm condition. Alarm events are informed to the user through a flashing mode of the **Alarm Indicator**.

**Input:** Parameter available only in channel 2 (humidity). With this parameter it is possible to disable the humidity measurement, saving all memory capacity for temperature measurement.

After filling all the fields select OK and settings are sent to the logger.

## 6 OFFLOADING AND DATA VISUALIZATION

The transference of data to a PC is accomplished with the LogChart II software. Measurements are displayed in tabular and graphical form. Data can be saved in files for future analysis and comparisons.

### 6.1 Offloading data

Data offload is accomplished by clicking the button **Offload Data**:



and placing the communication interface towards the frontal part of the logger. During data transference, a status bar indicates remaining data to be transferred. Data offloading time is proportional to the number of readings logged.

### 6.2 Visualizing data

At the end of values transfer, data can be displayed in a graphical form.

#### 6.2.1 Chart window

It is possible to select a region of the chart to zoom in. Zoom commands can be accessed through the **View** menu or through zoom icons from the task bar. It is also possible to select an area

from the chart to zoom in by clicking and dragging the mouse, thus creating a zoom region starting from the upper left corner on the chart area.

The graphic curves can be vertically dragged with a right-click and dragging the mouse up and down.

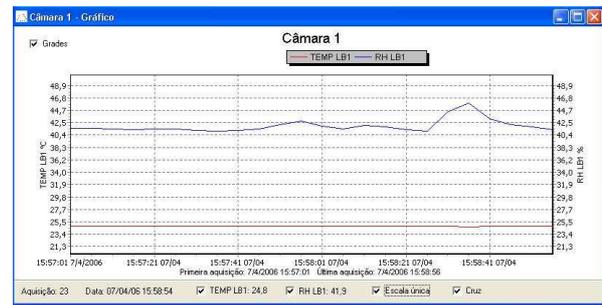


Figure 08 - Chart window.

Offloading measurements does not stop the process of data logging and reading.

### 6.2.2 Measurements Table Window

To display measurements in a tabular form, press the icon **Table View**:



Values are presented in a tabular form, listing the measurement time and value.

Nr. Registro	Horário	Data	TEMP LB1 [°C]	RH LB1 [%]
00001	15:57:01	7/4/2006	24,8	41,6
00002	15:57:06	7/4/2006	24,8	41,6
00003	15:57:11	7/4/2006	24,8	41,4
00004	15:57:16	7/4/2006	24,8	41,4
00005	15:57:21	7/4/2006	24,8	41,5
00006	15:57:26	7/4/2006	24,8	41,5
00007	15:57:31	7/4/2006	24,8	41,2
00008	15:57:36	7/4/2006	24,8	41,1
00009	15:57:41	7/4/2006	24,8	41,2
00010	15:57:46	7/4/2006	24,8	41,5
00011	15:57:51	7/4/2006	24,8	42,2
00012	15:57:56	7/4/2006	24,8	42,8
00013	15:58:01	7/4/2006	24,8	42,0
00014	15:58:06	7/4/2006	24,8	41,4
00015	15:58:11	7/4/2006	24,8	42,0
00016	15:58:16	7/4/2006	24,8	41,9
00017	15:58:21	7/4/2006	24,8	41,4

Figure 09 – Screenshot showing the measurement table

### 6.2.3 General information table

This window shows some information about the logger whose data were just read and its configuration. The screen can be displayed by pressing the icon **Parameters Visualization**:



Informações Gerais	
Número de Série:	000022616
Firmware:	1.0
Capacidade Máxima de Aquisições:	16383
Canal 1:	PNP - ( )
Aquisições programadas por:	valor instantâneo
Offset:	0
Dados da Aquisição	
Título:	Pulsox
Intervalo entre leituras:	1seg
Data Inicial:	17/09/2001
Hora Inicial:	17:16:24
Data Final:	17/09/2001
Hora Final:	17:21:53
Total de Aquisições:	330
Primeira aquisição: Segunda-feira, 17 de Setembro de 2001 às 17:16:24	
Última aquisição: Segunda-feira, 17 de Setembro de 2001 às 17:21:53	

Figure 10 – General Information window

## 7 PALMTOP USER

Most of the functionality of the LogChart II is available for the PDA Palm running the LogChart PalmOS software.

The program is delivered with the logger. It is installed in the Palmtop through a *HotSync* process (data synchronization between a Palmtop and a PC).

The user needs the **Palm Desktop** and the **LogChart II** software installed in his machine. It is recommended to execute the Palm *HotSync* before installing the **LogChart PalmOS**.

To install the software, insert the disk in the driver, click on Start and Execute in the windows task bar. Type **d:\LCP\_Setup**, where **d:** is the disk driver unit. Press "OK". The installation wizard will guide you through the installation process.

Executing a new *HotSync* will install the **LogChart PalmOs** software in the Palm. The LogChart icon will be added to the Palm home screen.

Starting the **LogChart PalmOS** application will display the **Recorded Data** screen on the PDA. Starting the LogChart PalmOS application will display the **Recorded Data** screen on the Palm where from it is possible to access the logger to change settings and offload data, as well as to access recorded data.



Figure 11 – Recorded Data screen

### 7.1 ACCESSING THE LOGGERS

To have communication between the logger and the Palmtop established the user must align the Palm infrared wand to the logger, run the LogChart Palm-OS software and press **Search Device** in the **Recorded Data** screen of the software.

When the Palmtop finds the logger, the **Monitoring** screen will pop up. The screen exhibits instant values of variables measured, configuration information and current logger status.

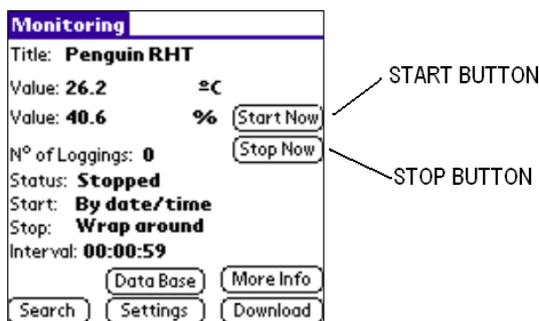


Figure 12 – Palmtop Monitoring screen

Buttons are assigned the following functions:

**Search:** It allows "searching" for another logger or reconnect communication lost for any reason. When the handheld device finds a logger, it exhibits the new **Monitoring** screen with the logger information.

**Download:** Offload logged data. Download can be partial and it does not interfere in the ongoing measurement process.

**More Info:** Display further information on the connected logger: such as model, serial number, version and memory capacity.

**Settings:** Accesses the Settings screen, which allows for modifying the logger configuration.

**Data Base:** Exhibits the **Recorded Data** screen listing all the processes stored and processed in the PDA data base.

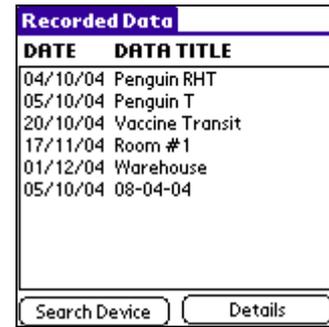


Figure 13 – Recorded Data Details screen

### 7.2 Configuring the Logger - Settings

During configuration, the logger and the Palm ports must be aligned.

Press **Settings** in the **Monitoring** screen. The screen **Settings** is opened and provides the required parameters for configuring the logger.



Figure 14 – Settings screen

The parameters to be defined are:

**Title:** Name of the process.

**Input 1 and 2:** Informs the variables measured. Monitoring of relative humidity can be disabled.

**Start:** Defines the measurements start mode. Options are:

**Immediately:** The logger starts logging as soon as configuration is sent to the logger.

**By date/time:** Start in defined data and time, always after current time. It is possible to perform daily repetitions. If this option is selected, a new box to define the stop logging time is displayed.

**By <Start> Button:** Press the **Start Now** button from the **Monitoring** screen to start logging. The PDA must be turned towards the logger. It also configures the **Start Button** of the logger to operate.

**By Setpoint value:** Measurements start when a temperature setpoint is reached. With this option it is also possible to start measurements above (**log Above**) or below (**log Below**) a temperature setpoint (channel 1). This option is not valid for alarms that have already been set up.

**By <Start/Stop> Button:** Starts when the **Start/Stop** button at the frontal side of the logger is pressed.

**Stop:** Defines the measurements stop mode: Options are:

**Full memory:** Loggings can be stored **up to** the logger full memory capacity is reached.

**Wrap around:** Logging never stops. The LogBox will keep on recording the readings and when the memory is full it will overwrite the oldest record in a circular or wrap around manner.

**After loggings:** The logging will stop after the number of readings are defined.

**By date/time:** Logging is stopped on user-defined date and time.

**Interval:** Defines the interval between readings: hour, minute and second. When the logging mode is set to the **instantaneous** the minimum interval is 1 second. For mean, maximum and minimum values, the minimum interval is 10 seconds in both models.

**Channel 1:** Opens the **Channel 1 Settings** screen, where channel 1 can be set up. This channel is for temperature measurements.

**Tag:** Defines a name for the temperature registers.

**Sensor:** Informs the sensor present in channel 1: NTC. It can not be changed. It can not be disabled.

**Unit:** Defines the measurement unit: °C or °F.

**Limits:** Informs the temperature measurement range. It can not be changed.

**Logging Mode:** It defines how the value measured will be logged. Options are:

**Instantaneous:** The value logged will be exactly the value measured. The minimum interval between measurements is 10 seconds.

**Average:** The value logged will be the mean of ten consecutive measurements taken within a minimum predefined interval of 10 seconds.

**Minimum:** The value logged will be the minimum value found in ten consecutive measurements taken within a minimum interval of 10 seconds.

**Maximum:** The value logged will be the maximum value found in ten consecutive measurements taken within a maximum interval of 10 seconds.

**Alarms:** Enables an alarm that is triggered according to user-defined parameters.

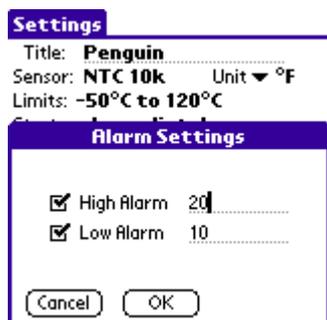


Figure 15 – Alarm settings screen

**Channel 2:** Opens the **Channel 2 Settings** screen, where channel 2 can be set up. This channel is for relative humidity measurements.

The fields of this screen are the same as the ones from **Channel 1 Setting** screen, however, for relative humidity measurements it is not possible to associate alarms, but it is possible to disable the relative humidity measurements.

**Cancel** and **OK** buttons cancel and save configurations defined in the **Channel Settings** screen.

**Clocks:** Provides access to Logger and Palm clocks. When a new configuration is sent to the logger, clocks are updated.

**Offset:** allows fine offset adjustment on the measured value. The **Reset** button clears changes made and the logged values are the measured values again.

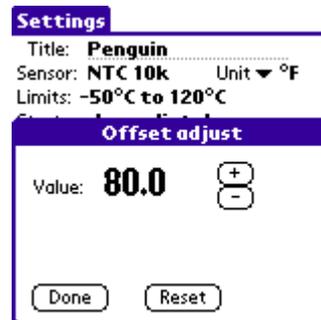


Figure 16 – Offset adjust screen

After configuring clocks in the **Settings** screen, click **Apply** to send this configuration to the Logger, returning to the **Monitoring** screen.

Sending a new configuration implies the **exclusion** of all data collected present in the logger memory.

### 7.3 Downloading Data from the Logger

In the **Monitoring** screen, the **Download** button performs the transfer of the data from the LogBox to the PDA. Download can be partial and it does not interfere in the ongoing acquisition process.

The data base of loggings is displayed in the **Recorded Data** screen, identified with the name assigned to the process (**Data Title**) and the date it was downloaded.

Should the PDA batteries be discharged, all readings will be lost.

### 7.4 Files Visualization

The **Recorded Data** screen lists the data base logged and stored in the PDA. To access data, select the desired data base and tap on **Details**. **Recorded Data Details** screen shows several information about the data base.

**View Data** shows in table format the logged values and the date and time they were performed.

Press **Delete** to erase the selected data base.

### 7.5 Transferring Data to your Desktop

**HotSync** of data stored in a PDA to the Desktop is performed through a conduit installed together with the LogChart Palm-OS. The conduit converts the data collected by the LogChart Palm-OS to a file compatible with the LogChart-II software.

To access the conduit options, the **HotSync Manager** software must be active. Right-click on the HotSync Manager in the Windows taskbar. Select in the drop-down menu the option **Custom**. Select **Novus LogChart Conduit** and click **Change**. The following window will be exhibited:

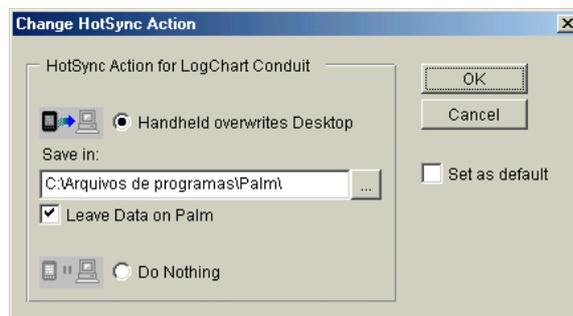


Figure 17 – LogChart Conduit options

**Handheld overwrites Desktop:** LogChart Palm-OS files are transferred to the Desktop.

**Save in:** Choose a directory to record files generated during data synchronization.

**Leave Data on Palm:** Option to keep or delete the data in the PDA after HotSync.

**Do nothing:** Data synchronization will not be performed;

**Set as default:** The same settings will be used in the next **HotSync** processes.

## 8 MOST FREQUENTLY FOUND PROBLEMS

**The LED is not flashing:** The LED flashing light is intentionally weak, and it can be difficult to see it in clear environments, certify it is really not flashing.

### Communication with the logger fails:

Make sure the COM port is selected correctly and there is no other program using the same port during communication attempts;

Make sure there is no physical obstacle blocking the infrared signal;

Make sure the cable is well connected to the PC port;

Make sure the port selected does not present any problem;

### 8.1 Logger Reset

When the user is not sure about the real condition of the logger operation, it is possible to perform an enforced Reset by removing the battery and waiting for 2 seconds to replace it. The logger will return to the stand-by mode. If measurements were being made, it will interrupt the process and start measurements again only when a new set up is made. Implemented setup remains the same after reset.

## 10 WARRANTY

Novus Produtos Eletrônicos Ltda. products are covered by a 12-month warranty provided the purchaser presents the sales receipt and the following conditions are met:

- Products are covered for one year from the original date of purchase. Please retain the dated sales receipt as evidence of the date of purchase. You will need it for any warranty service
- Within this period, warranty against defects in material and workmanship under normal use is free of charge.
- For repair, send the product and the sales receipt to our address in Porto Alegre. Expenses and transportation risks are under the purchaser's responsibility
- This warranty does not cover any damage due to accident, misuse, abuse, or negligence.

## 9 SPECIAL CARE

When handling the device and its battery, observe the following:

- When the device is opened, avoid touching the electronic components and the printed circuit board to avoid electrostatic discharge damages.
- Pay close attention to battery polarity.
- When closing, the cover and its sealing must be mounted correctly and carefully to ensure the enclosure sealing.
- Used batteries must be disposed in accordance to local regulations. Don't try to recharge, dismount or heat, since explosion may occur.

### 9.1 SENSOR HANDLING AND CARE

The calibration of the humidity sensor may change in case it is exposed to contaminating vapors or to high humidity and temperature conditions for extended periods.

In order to speed up the calibration restoration, proceed as described below:

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