LogBox-RHT-LCD

TEMPERATURE AND HUMIDITY LOGGER – INSTRUCTIONS MANUAL V1.1x D

1   PRESENTATION

LogBox-RHT-LCD is an electronic logger of temperature and relative humidity. There are sensors that measure such data and values (data) obtained are displayed in an LCD screen and stored 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 humidity output can be configured to display **Relative Humidity** values or the temperature value of **Dew Point**.

The **NXperience** and the **LogChart II** configurator software are the tools used to configure the operating mode and to view the downloaded data. Parameters such as start and end times of logs and log interval, for example, are easily defined through the **NXperience** and the **LogChart II** software.

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

1.1   IDENTIFICATION

The identification label is on the logger body. Check if the features described are in accordance with your order. The **RHT-LCD** model is designed to measure temperature and relative humidity.
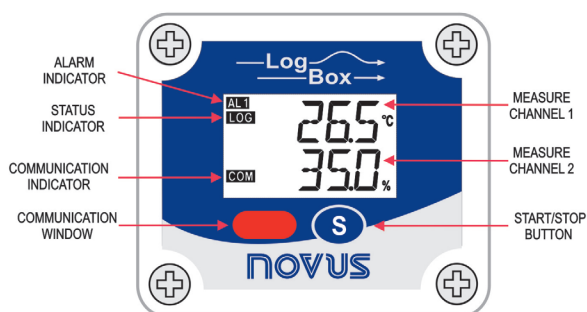
The following elements are shown in the logger front:

Fig. 1 – Logger Front

START / STOP button: Can be configured to start or stop logging when pressed. It can also be used to browse and change screens.

Status indicator (LOG): Indicates when the device is logging.

Note: When logs are finished or not started, the indicator remains deactivated.

Alarm Indicator (AL1 and/or AL2): Warns the user as to alarm conditions. It remains active whenever an alarm condition occurs, until a new configuration is applied to the logger.

IR Communication Window (COM): Activated when there is a communication attempt or when communication between logger and PC is activated.

2   SPECIFICATIONS

|	
Operating temperature	From –40 °C to 70 °C
Sensor measure range	Temperature: –40.0 °C to 80.0 °C. Relative Humidity (RH): 0.0 to 100.0 %, without condensation. Dew Point: –40.0 °C and 100.0 °C
Accuracy	See **Fig. 2**. **Note**: A measure error can be ruled out using the **OFFSET** parameter in the **NXperience** or **LogChart II** software.
Measurement resolutions	Temperature: 0.1 °C. 14 bits (16383 levels) Relative Humidity (RH): 0.1 %. 12 bits (4095 levels)
Response time	Temperature: up to 30 seconds with fairly still air. Humidity: up to 8 seconds with fairly still air (20 to 80 %RH).
Memory capacity	64.00 (64 k) logs: **Half** for each channel or **total** when one of the channels is not enabled.
Measurement interval	1 second min. 18 hours max.
Supply	3.6 Vdc lithium battery (1/2 AA), built-in
Estimated autonomy	Higher than 200 days, with weekly data reading. Frequent logged data readings may shorten battery life and the interval between acquisitions is too short.
Case	Polycarbonate
Protection	Suitable for products with protection level **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	Interface IR/USB or IR/Serial.
NXperience software operation environment	Configurator software for Windows ® 10, 8, 7 and XP. Menus in Portuguese, English, French or Spanish. Sets up, reads and displays data on the screen.
LogChart II software operation environment	Configurator Software for Windows 7, Vista, XP, 2000, NT and 98. Menus in Portuguese, English or Spanish. Sets up, reads and displays data on the screen.

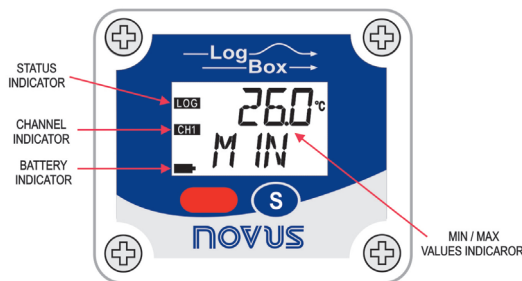## 2.1 MEASUREMENT ACCURACY
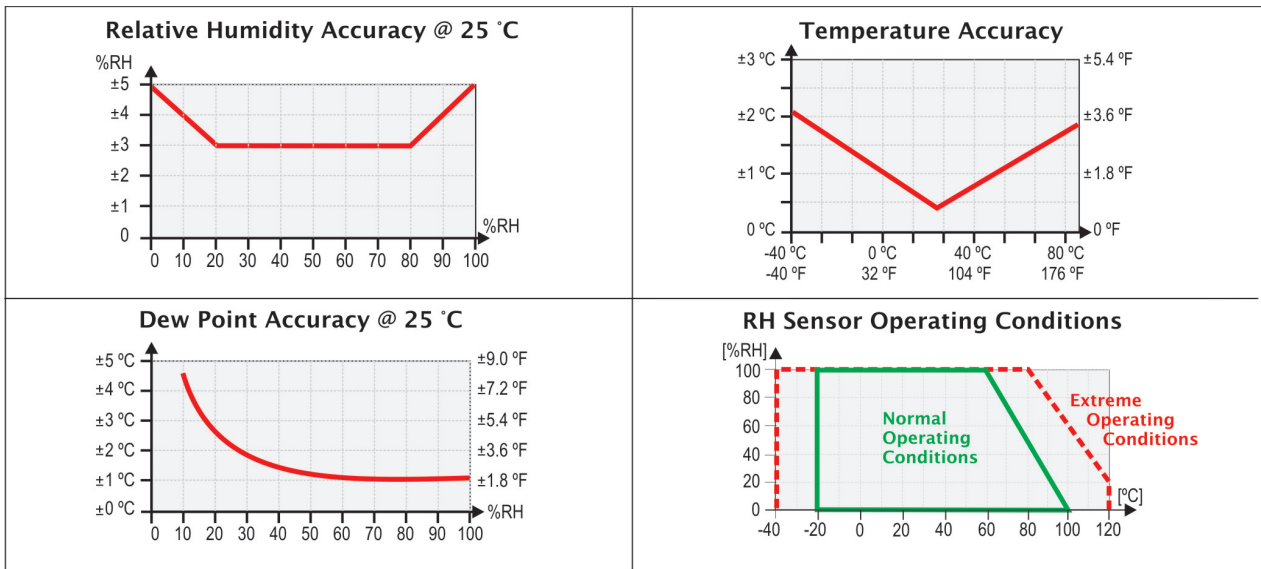
Fig. 2 - Accuracy

Fig. 3 – Logger front (CH1)

Channel Indicator: Indicates the channel selected.

Battery Indicator: The battery symbol is shown when the battery voltage is low.

MIN / MAX values indicator: **Minimum** and **maximum** value of each channel during readings.

3 OPERATION

It is only possible to operate the device after the **NXperience** or **LogChart II** software are installed to a PC, according to the steps described in the NXPERIENCE SOFTWARE and the LOGCHART II SOFTWARE chapters of this manual.

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

The logger operation mode set up is defined in advance by using **NXprience** or **LogChart II** software. The configuration is sent to the logger through the **IR-Link Interface**.

The logger starts and stops logging as defined in the setup.

3.1 REGISTERS SCREENS

#### BATTERY SAVING MODE - *IdLE*

Low battery consumption mode the register does not communicate. It always stays in this mode after reset; register does not make acquisitions and does not up-date screen measures. For skipping *IdLE* mode, press button **S** for activating communication temporarily. After an acquisition configuration has been sent, it will definitely be out of *IdLE* mode.
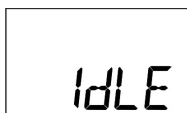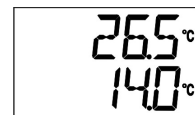

Battery Saving Mode

MAIN SCREEN

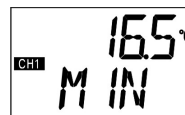Indication screen for values measured by the register:
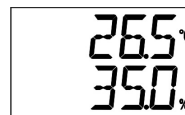
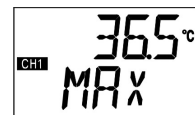| **1st Screen** – Temperature and Humidity | **2nd Screen** – Temperature and dew point |

INDICATOR SCREEN MIN / MAX – CH1

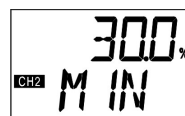It indicates the minimum and maximum value of **Chanel 1** during the acquisitions.

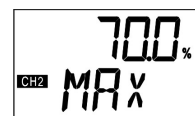| **3rd Screen** – CH1 Minimum Value | **4th Screen** – CH1 Maximum Value |

INDICATOR SCREEN MIN / MAX – CH2

It indicates the minimum and maximum value of **Chanel 2** during the acquisitions.

| **5th Screen** – CH2 Minimum Value | **6th Screen** – CH2 Maximum Value |

COMMUNICATION SCREEN IR - COM

It sets IR communication to automatic or manual:

- In the **automatic** mode (*AUt*), communication will be always active. For communicating, just direct the interface and use **NXperience** or **LogChart II** software. It always stays in this mode after *reset*.

- In the **manual** mode (*nnAn*) communication will be active 20 seconds, after pressing the **S** button. During this time, a communication shall be initiated for keeping the IR Communication active.


7th Screen – IR Communication Screens

DISPLAY UPDATING INTERVAL SCREEN - d ı5P

It sets the reading time of the sensor for the display updating. When selected by Lo6, it performs the sensor reading and the display updating, according to the interval set for acquisition.

When selected by 10 5, 30 5 or 60 5 it performs sensor reading for display updating every 10, 30 or 60 seconds. In this mode if the acquisition interval is shorter than the time set in the screen d ı5P, display will be updated according the acquisition interval.
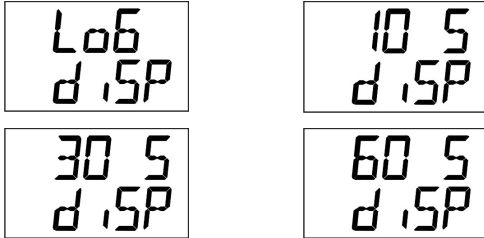
8th Screen – Updating Interval Screens

4   BATTERY AUTONOMY

The estimated battery autonomy is above 200 days. This autonomy is directly related to the register using mode. The shorter is the interval of the sensor reading, the smaller will be the autonomy, and it can last only 30 days, in the worst case.

For saving battery energy it has to set the longest interval possible between acquisitions, as well as for display updating.

Examples:

Ex. 1: Acquisitions interval equal to 10 minutes and d ı5P screen in Lo6 mode. In this case register remains sleeping and actives only in every 10 minutes to read the sensor, update the display and make the acquisitions.

Ex. 2: Acquisitions interval equal to 10 minutes and d ı5P screen in 60 5 (60 seconds). In this case, register remains sleeping and activates in every 1 minute to measure the sensor and update the display. And every 10 minutes, it activates and measures the sensor for making the acquisitions.

Comparing the **Ex. 1** and the **Ex. 2** with same acquisitions interval, the second example consumes 10 times more battery regarding the first one, due to the constant sensor reading for display updating.

Ex. 3: Medium, minimum and maximum mode.

When one of these acquisition modes is used, 10 sensor readings are performed to make one acquisition. If the acquisition interval is equal to 10 minutes and d ı5P screen is in Lo6 mode, in every 1 minute a measure will be made to make the 10 necessary measures for an acquisition. In this case consumption will be same as **Ex. 2**.

Ex. 4: Starting and ending of acquisitions.

It has to observe the best start and end acquisitions mode to save battery, due to necessity of the measures.

If the process in which the measures are performed, only a short interval happens. The best is to use start and end of acquisitions by **S** button.

If process occurs on a daily basis during the day, the best way is to use the start and end by date and daily repetition.

5   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 on our website.

5.1   USB DRIVERS INSTALLATION

The drives installation steps may vary according to the machine, even for the same version of an operating system. The following screenshots and steps are only to provide guidance.

1. Run the driver file available on our web site.

2. Connect the serial communication interface IrLink-3 to the PC USB port. Windows® will acknowledge the presence of new hardware and a few seconds later it will start the drivers installation process.

3. The found new hardware wizard will be displayed, and you will be asked if you want to install the driver from the Windows Update website. Select "No, not this time", and then click Next (**Fig. 4**).

4. Select "Install from a list or specific location (Advanced)" and click "Next" (**Fig. 5**).

5. Select "Search for the best driver in these locations" and check "Search removable media". Click "Next". If installation files are not in a CD, check "Include this location in the search" and show the file path (**Fig. 6**).

6. If a prompt warns you that it does not support Windows® XP, click "Continue anyway".

7. The interface driver files will be copied to the computer and after a few seconds a screen is displayed informing that the software installation has been concluded. Click "Finish" (**Fig. 7**).

8. In some situations, the steps described above may be repeated again. Follow the same procedures.

In later uses of the interface, Windows® may require the driver installation again. In this case, the same installation wizard will be displayed, and you will have to select the option "Install software automatically (recommended), as the driver may already be in the computer.

The following screenshots show examples of Windows XP® installation wizard. The screens in Windows 2000® are slightly different, but the content is basically the same.

Fig. 4 – USB drivers installation wizard screen (First)

Fig. 5 – USB drivers installation wizard screen (Second)
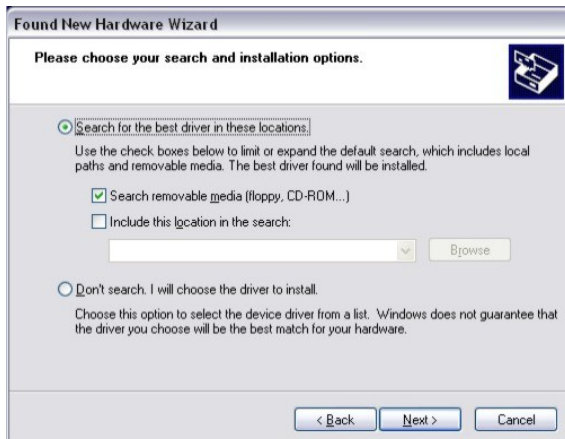

Fig. 6 – USB drivers installation wizard screen (Third)

Fig. 7 – USB drivers installation wizard screen (Conclusion)

6   CONFIGURATOR SOFTWARE

You can configure the **LogBox-RHT-LCD** using **NXperience** or **LogChart II** software. To do so, however, the **Communication Interface** must be connected to the computer.

The interface must be constantly directed towards the front part of the logger (communication window) at a maximum distance of 50 cm, as shown in **Fig 8**.
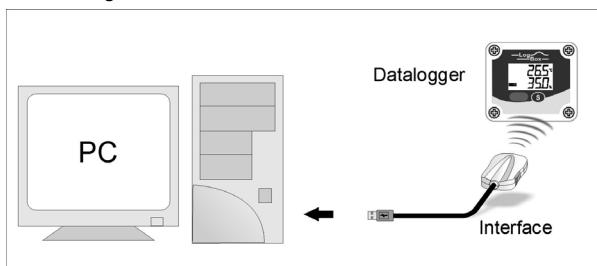

Fig. 8 – Infrared communication interface position

6.1   NXPERIENCE SOFTWARE

6.1.1   INSTALLING NXPERIENCE

NXperience software allows you to explore all the features of the device by communicating through its USB interface. It is also a complete tool to perform the analysis of the data logged by **LogBox-RHT-LCD**.

To install **NXperience**, just execute the **NxSoftwareSetup.exe** file, available from our website.

6.1.2   RUNNING NXPERIENCE

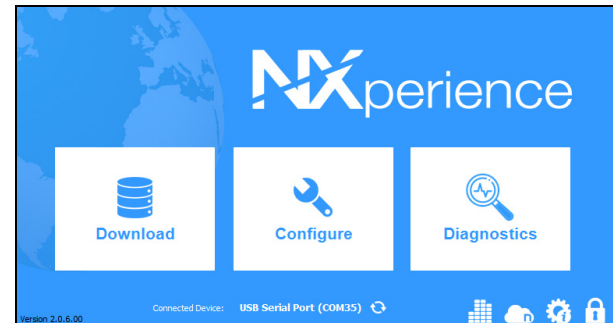When you open **NXperience**, the main window is displayed:

Fig. 9 – **NXperience** main window

6.1.3   CONFIGURING THE DEVICE

For device configuration is necessary that the device is connected to the computer. See **Fig. 8**.

Once connected, you must run **NXperience**, click **Configure**, and then click on **Read Device**.
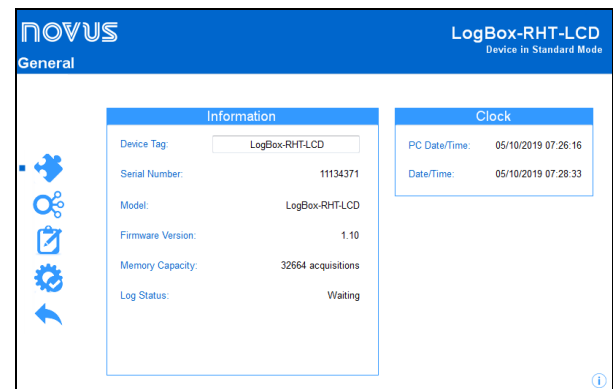
6.1.3.1   GENERAL PARAMETERS

Fig. 10 – General parameters

INFORMATION

- **Device Tag**: Allows you to set a name, which will be used as channel identification during a download, for the digital channel. The field accepts up to 16 characters.
- **Serial Number**: Shows the device unique identification number.
- **Model**: Shows the device model name.
- **Firmware Version**: Shows the firmware version recorded in the device.
- **Memory Capacity**: Shows memory space still available for new logs.
- **Log Status**: Informs if the device is registering or not.

CLOCK

- **PC Date/Time:** Shows the date and time of the computer.
- **Date/Time:** Shows the date and time of the device when it was read by **NXperience**.
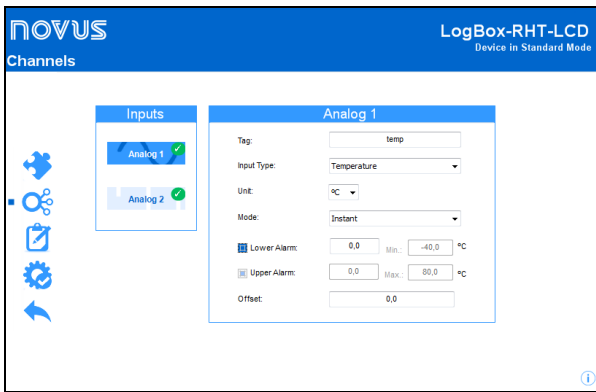
6.1.3.2 CHANNELS PARAMETERS

Fig. 11 – Channels parameters

- **Tag:** Allows you to set a name, which will be used as channel identification during a download, for the channel. The field allows up to 16 characters.
- **Input Type:** Displays the channel input type: Temperature for Analog Channel 1 and Relative Humidity for Analog Channel 2.
- **Unit**: Allows you to select the channel unit display mode: Celsius (°C) or Fahrenheit (°F) for Analog Channel 1 and percentage of relative humidity (%) for Analog Channel 2.
- **Mode**: It defines how the value measured will be registered.
  - **Instant**: The value logged will be exactly the value measured at each interval defined. Measurement is taken at the end of the defined interval. The minimum interval between measurements is 1 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.
  - **Medium**: The registered value will be the average of ten measurements made on log interval. The minimum time between each record is 10 seconds.
- **Lower Alarm:** Allows you to enable and configure a lower alarm setpoint (option available only if the Start Mode is set to "Immediate Start" or "Date/Time").
  - **Minimum:** Displays the minimum temperature supported by the device.
- **Upper Alarm:** Allows you to enable and configure a higher alarm setpoint (option available only if the Start Mode is set to "Immediate Start" or "Date/Time").
  - **Maximum:** Displays the maximum temperature supported by the device.
- **Lower Setpoint:** When the measured temperature is lower than the value set in this parameter, the device will start the logs (option available only if the log Start Mode is set to "Setpoint").
  - **Minimum:** Displays the minimum temperature supported by the device.
- **Upper Setpoint:** When the measured temperature is higher than the value set in this parameter, the device will start the logs (option available only if the log Start Mode is set to "Setpoint").
  - **Maximum:** Displays the maximum temperature supported by the device.
- **Offset**: Allows you to make small adjustments to the channel readings. The configured offset will be added to all readings performed.
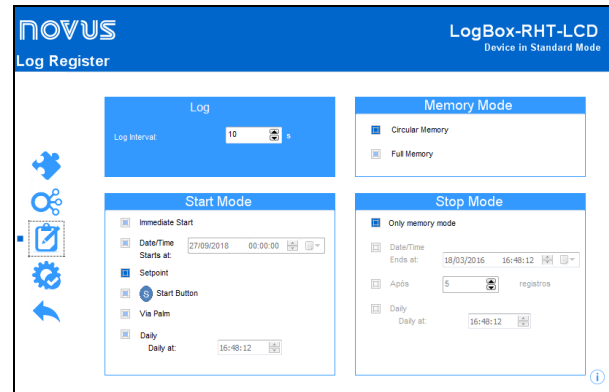
6.1.3.3 CONFIGURATION OF LOG REGISTER

Fig. 12 – Configuration of log register

LOG

- **Log Interval:** Allows you to select the frequency (in hours, minutes or seconds) with which a log must be made and logged in the memory.

MEMORY MODE

- **Circular Memory:** Logs are continuous, replacing old logs with new ones as the number of logs overpasses the memory capacity.
- **Full Memory:** Logs can be stored up to the full memory capacity is reached.

START MODE

- **Immediate Start**: Start as soon as set up is ready and sent (OK) to the device.
- **Date/Time**: Logs start at predefined date and time.
- **Setpoint**: Logs start when a certain temperature value is reached. In this option, the setpoint value is set in the **Channels** field, in the **Upper Setpoint** and **Lower Setpoint** parameters (these options appear only when this log mode is selected).
- **Start Button** ⓢ : Starts and stops the logs by pressing for two seconds the Start/Stop button on the front of the recorder.
- **Via Palm:** Logs start with a command sent via Palm.
- **Daily:** Logs start daily, at the configured time.
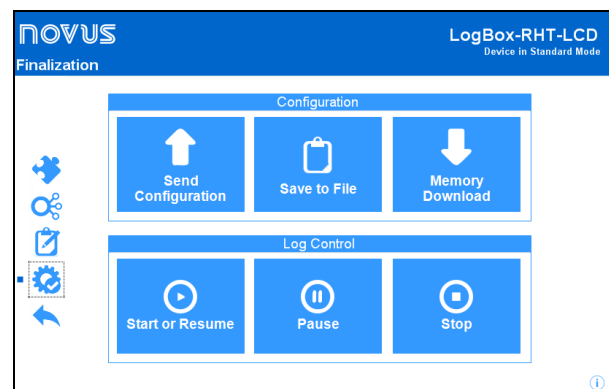
6.1.3.4 FINALIZATION

Fig. 13 – Finalization

CONFIGURATION

- **Send Configurations:** Allows you to send the configuration to the device.
- **Save to File:** Allows you to save the configuration to a file that can later be used.
- **Memory Download:** Allows you to download logs from memory.

LOG CONTROL

- **Start or Resume:** Allows you to start or resume logs that have been interrupted by the **Pause** command, without discarding logs that are in the device's memory, using the configured parameters.
- **Pause:** Allows you to stop logs, allowing them to be resumed in the future using the **Start** button.
- **Stop:** Allows you to permanently stop logs, so that the device will only re-register when it receives a new configuration.

6.1.4 DOWNLOADING AND DATA VISUALIZATION

Data downloaded are send from device to PC.

Data can be downloaded any time: at the end of the registering process or while they are being acquired. If data download takes place during the registering process, **the process will not be interrupted**, following the device configuration.

6.1.4.1 DOWNLOADING DATA

Data download is accomplished by clicking the button **Download Logs** in the **Download** screen from **NXperience**.

During data transference, a status bar indicates remaining data to be transferred. Data downloading time is proportional to the number of readings logged.

6.1.4.2 VISUALIZING DATA

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

CHART WINDOW

It is possible to select a region of the chart to zoom in. Zoom commands can be accessed 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.

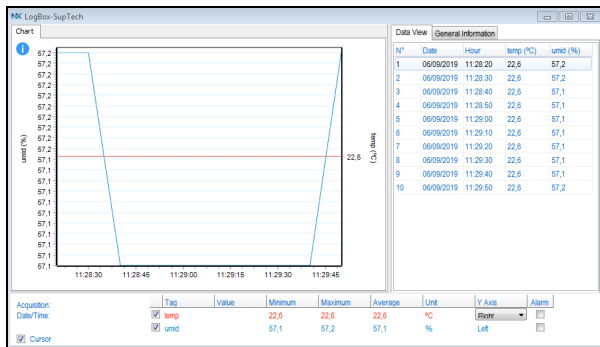The graphic curves can be vertically dragged with a right-click and dragging the mouse up and down.

Fig. 14 – **NXperience** chart window

DATA VIEW TABLE

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

Fig. 15 – Data view table

GENERAL INFORMATION TABLE

This window shows some information about the device whose data were just read and its configuration.

Fig. 16 – General information

6.1.4.3 OTHER FEATURES

Check the **NXperience** Operations Manual for more information on the other features offered by the software, such as exporting to other formats, filter logs, chart junction, etc.

6.2 LOGCHART II SOFTWARE

6.2.1 INSTALLING LOGCHART II

LogChart II is the software the logger to for configuration and data offload. To install, run the **LC_II_Setup.exe**.

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

6.2.2 RUNNING LOGCHART II

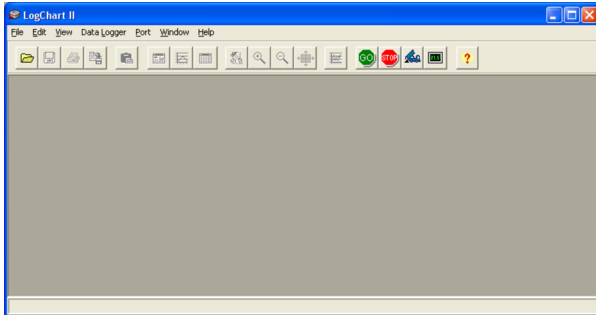When you open **LogChart II** the main window is displayed:

Fig. 17 – **LogChart II** main window

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

- For **IR-Link3/RS232** model:

Check which is the free serial port in your computer. The selected COM port will be considered as the standard port next times the **LogChart II** is run.

- For **IR-Link3/USB** model:

Select the USB serial port where the interface is connected.

Fig. 18 – Icons enabled when the communication port selected is a valid port

6.2.3 CONFIGURING THE LOGGER

To configure the device, make sure the **Communication Interface** is connected to the PC port selected.

As explained above, the **Communication Interface** must be directed to the front of the logger (communication window), as shown in **Fig. 08** (see beginning of chapter CONFIGURATOR SOFTWARE).

When communication is established, select

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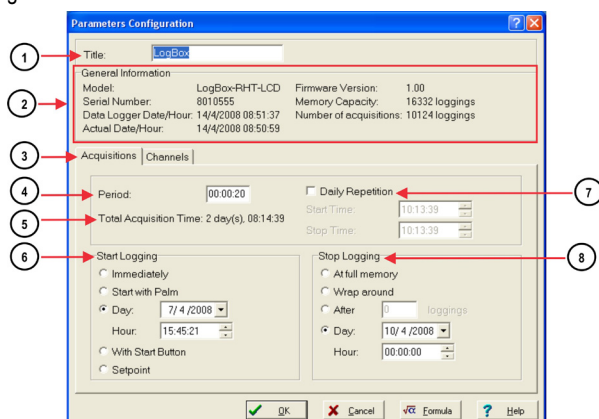

Fig. 19 – Logger Set Up (Readings)

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 current Date/Time, PC Date/Time, firmware version, memory capacity and number of acquisitions stored in memory.

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

③ Acquisitions: Presents a series of parameters that define how measurements will take place.

④ Interval: 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.

⑤ 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.

⑥ 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 with Palm**: acquisitions are initiated using a command sent via Palm.
- **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.
- **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.

⑦ Daily Repetition: In **Daily repetitions** the user defines the time that daily logs will take place.

⑧ Stop loggings: 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 records with 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.

⑨ Channels: Shows parameters referring to each channel separately. Channel 1 is the Temperature channel, and Channel 2 the Relative Humidity channel.
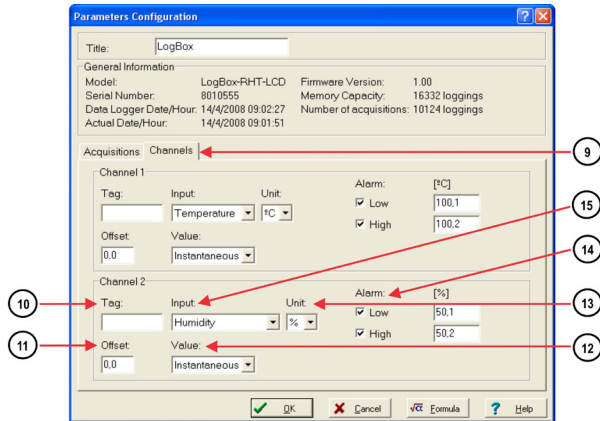
Fig. 20 – Logger Set Up (Channels)

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

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

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

- **Instantaneous**: The value logged will be exactly the value measured at each interval defined. The minimum interval between measurements is 1 seconds.

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

13 **Unit**: Defines the unit of the value measured: **ºC** or **ºF** for channel 1 (temperature) and only **%** for channel 2 (relative humidity or dew point).

14 **Alarm**: Defines limit values that, when exceeded, characterize an alarm condition. Alarm events are informed to the user through the **Alarm Indicator**. The alarm limit value is shown with a dotted line with the same color of the channel in the chart from **LogChart II** software.

15 **Input**: Parameter available in channel 1 (**temperature**) and channel 2 (**humidity** or **dew point**). It is also possible to deactivate channel 1 and kepp the entire memory for humidity. It is possible to select the Dew Point logging.

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

6.2.4   OFFLOAD 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.

6.2.4.1 OFFLOADING DATA

To offload data, click the icon **Offloading Data**, and turn the interface towards the logger front. During data transference, a status bar indicates remaining data to be transferred. Data offloading time is proportional to the number of readings logged.

6.2.4.2 VISUALIZING DATA

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

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.

This window shows minimum and maximum values of each channel. It also shows the horizontal line of alarm values defined.

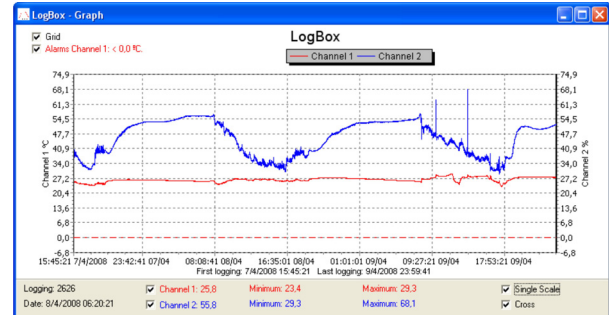A text can be associated to the chart points by double-clicking a curve point.

Fig. 21 - Logged data graph window.

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

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 (**Fig. 22**).

Fig. 22 – Acquisitions table

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 **Parameter Viewing**.

A text with notes about offloaded data can be inserted in the *General Information* window (**Fig. 23**).

LogBox – General Information	
General Information	
Data Logger	
Model:	LogBox-RHT-LCD
Serial Number:	8010555
Firmware Version:	1.00
Memory Capacity:	16332 loggings
Oven 1 [ºC]	
Input:	Temperature
Value:	Instantaneous Value
Offset:	0.0
Alarm Low:	101.1
Alarm High:	101.2
Oven 2 [%]	
Input:	Humidity
Value:	Instantaneous Value
Offset:	0.0
Alarm Low:	50.1
Alarm High:	50.2
Logging Information	
Title:	LogBox
Interval between readings:	20 sec
Total Number of Loggings:	162
Start Logging:	Day: 4/14/2008 Hour: 10:06:00 AM
Stop Logging:	Day: 4/14/2008 Hour: 11:00:00 AM
Download Time:	Monday, April 14, 2008 at 11:28:23 AM
First logging:	Monday, April 14, 2008 at 10:06:00 AM
Last logging:	Monday, April 14, 2008 at 10:59:40 AM
Place here a comment to identify the downloaded data.	

Fig. 23 – General Information

7 MOST FREQUENTLY FOUND PROBLEMS

7.1 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.

7.2 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.

7.3 ADDITIONAL INFORMATION

For further information, see the manufacturer web site.

8 SPECIAL CARE

The logger is an electronic device and some basic care is required:

- When opening the device for battery replacement or connecting sensors avoid touching the circuit for not causing damages resulting from static electricity.

- Check battery polarity carefully.

- When closing the case, the cover must be properly tightened back in its place such as to assure the sealing protection.

- Worn batteries should not be recharged, dismantled or incinerated. After use, batteries must be disposed according to local legal rules or returned to supplier.

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

8.1 ATTENTION WITH SENSORS

Calibration of the humidity sensor can be changed whenever it is exposed to contaminant vapor or external conditions of temperature and humidity for prolonged time. To configure this function, follow the steps below:

- Take the sensor out from the case.

- In case there are solid specks on the sensor, clean it with water.

- Put the sensor in an oven at 80 °C (+ -10 °C) for 24 hours.

- Let the sensor for 48 hours in a place with temperature between 20 and 30 °C and humidity over 75 % RH.

- Replace the sensor in the case.

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.