TagTemp-S

TEMPERATURE DATA LOGGER - INSTRUCTION MANUAL V1.0x

1 INTRODUCTION

TagTemp-S is an electronic temperature recorder. The temperature measured by the sensor is recorded in equipment internal memory. This data is transferred through a smartphone equipped with an embedded NFC interface or by an NFC interface connected to a computer through an USB port (both not included).

LogChart-NFC application for **ANDROID™** and the **Nx Software** for Windows® are the tools used to configure the operating mode, transfer and display data. The acquisition start and end parameters, logging interval, setpoint alarms and other parameters can be easily defined using these applications.

The operating manual and **Nx Software** can be downloaded from the manufacturer's website. The **ANDROID™ LogChart-NFC** app can be downloaded from **Google Play Store**.

2 MECHANICAL INSTALLATION

TagTemp-S can be installed using a double-sided adhesive tape on the back of the device, taking care not to stick it over the identification tag. Another way is to use the blister hole to attach the transmitter.

3 TECHNICAL FEATURES

Operating temperature	-30 °C to 60 °C
Storage temperature	From -30 °C to 65 °C.
Measuring range	Temperature: -30.0 °C to +60.0 °C.
Accuracy of measurement	±1 °C max. over the full measuring range. **Note**: You can correct the measurement error in the OFFSET parameter using the configuration software.
Measurement resolution	Temperature: 0.1 °C / 0.1 °F
Memory Capacity	4020 registers.
Interval between Measurements	1 minute min. 4 hours max. (240 minutes).
Power Supply	3.0 V lithium battery (CR2032), built-in, **non-replaceable**.
Battery life (estimated)	Above 2 years at a 5-minute acquisition interval.
Dimensions	37 x 57 x 8 mm
RF Interface	ISO 15693 (NFC-V) compatible.
Data transfer time between register and smartphone	Approx. 20 seconds (depends on the smartphone processing speed).
LogChart-NFC Application	**ANDROID**™ version: 4.0 or above. Languages: Portuguese or English.
NFC interface for the computer	USB to NFC interface (optional), compatible with **Nx Software** for *Windows®*.
Case	Polyvinyl Chloride (PVC)
Degree of protection	All electronics are protected by the housing. IP65 compatible.
Certification	CE

4 OPERATION

To operate the device, the user must install the **Nx Software** program or the **LogChart-NFC** application according to the instructions given in sections 5 and 6 of this manual.

To communicate with the **TagTemp-S**, you must put your smartphone or an NFC interface next to the device. The range of communication is a few centimeters, being a characteristic limitation of NFC technology.

If the computer has not been communicating for a long time and if it is in circular log mode, it is recommended to stop the operation first. To do this, simply press the Stop button through the **Nx Software** or the **LogChart-NFC** configuration software.

4.1 Memory Modes

There are two ways to program the use of device memory:

- Memory Full: Logs stop when there is no more free memory.
- Circular Memory: When reaching the end of the memory, it continues recording, overwriting the oldest records.

Logging must begin with **Nx Software** or **LogChart-NFC** applications.

The log stop can be one of the following (whichever comes first): full memory (when this mode of memory usage is configured); a smartphone command or; by pressing the application button or by **NX Software TagTemp-S**.

Note: The start and stop of the data record can be set using the Ⓢ button on the device, when set in that way through the computer or smartphone.

4.2 Luminous Notification

TagTemp-S has a LED that indicates its operation:

- One flash every 10 seconds: active;
- Two flashes every 10 seconds: recording;
- Three flashes every 10 seconds: active alarm;
- A quick flash followed by a slow flash: start or end of the records.

If the LED is always off, it can be for one of the following reasons:

- Registration has stopped.
- It is set to low power mode.
- The battery has run out.

Note: The LED flashing is intentionally weak and can be difficult to see in bright places.

Start Delay

The Start Delay is a start-up delay, set by the user, in which **TagTemp-S** will wait before starting the logs. During this delay time, the LED flashes every 5 seconds.

Ⓢ Button

The Ⓢ button, located on the front of the product, can be used to start or stop data logging, according to the settings.

To give the command to start or stop logs, press this button until the LED turns on and then release it before it goes out.

If the LED goes off before releasing the button, the command will not be validated and the button will be disabled for 30 seconds. This is a protective measure to prevent accidental touches of the button from discharging the device's battery.

This button is also used to remove the device from low-power mode (see Device Power Options section).

4.3 Temperature Unit

The unit of temperature can be chosen by the user between degrees *Celsius* (standard) and *Fahrenheit*. Changing the temperature unit causes a new setting to be sent.

4.4 Range of Alarms

It is common for the transport of perishable products and other temperature sensitive cargoes to have a preset temperature range at which the cargo is to be maintained. With the **LogChart-NFC** and **Nx Software** applications, you can configure alarms for viewing at the time a collection is performed.

Two alarm conditions can be set:

- Temperature above desired limit;
- Temperature below desired limit.

This indication can be viewed in the **LogChart-NFC** or **Nx Software**. In the app **LogChart-NFC**, you can check all alarm occurrence records in the "Events Screen"

4.5 User *Offset*

A zero offset can be set up ± 3 °C (± 5.4 ° F) for temperature adjustment. This makes it possible to reduce (or even cancel) the temperature measurement error for a given point.

5 LOGCHART-NFC MOBILE APPLICATION

LogChart-NFC is a mobile application for **ANDROID™** that allows you to configure, collect, view and share the data stored in the **TagTemp-S**.

To use this application, follow the steps below.

5.1 Installing the App

To install it, look for the "**LogChart-NFC**" application in the **Google Play Store**. After the download, open the application. **If your smartphone does not have support for NFC technology**, the application will display the following message.
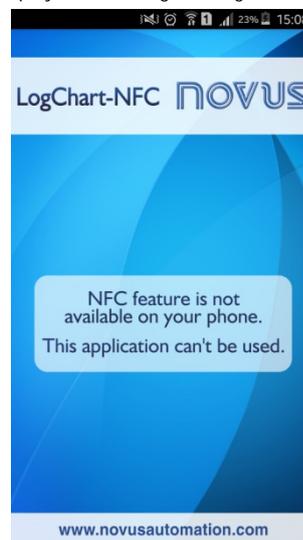

Fig. 01 – Warning screen when the NFC interface it is not available

5.2 App Operation

The communication of the mobile application with the **TagTemp-S** is done through the NFC interface of the smartphone and, therefore, must be enabled in it.
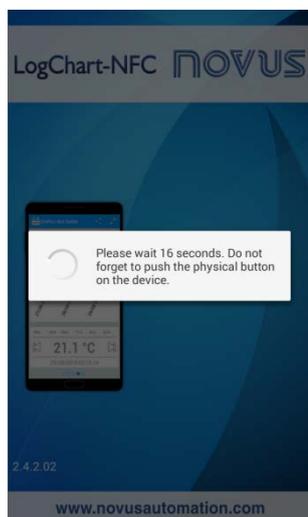
Fig. 02 – Initial screen of the application

Fig. 03 – NFC Communication

After starting the application (see **Fig. 02**), simply bring the smartphone closer to the **TagTemp-S** (see **Fig. 03**) until the data in the register has been transferred. This typically takes a few seconds, but depends on the smartphone model used.

The application has six screens:

1. *Device Status*
2. *Device Settings*
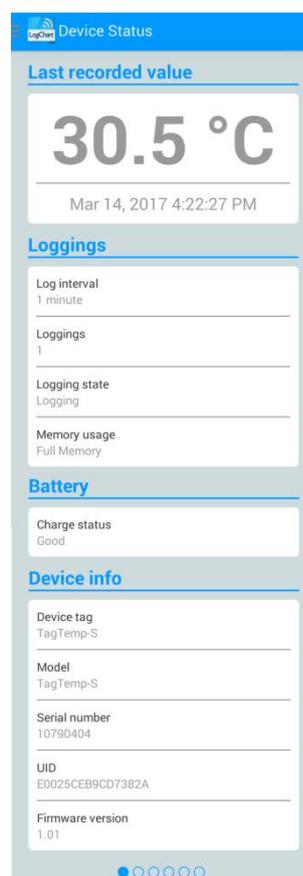3. *Events*
4. *Data Graphs*
5. *Preferences*
6. *Download*

5.2.1 Device Status Screen

Fig. 04 – Device Status Screen

- **Last recorded value**: Shows the value of the last recorded made by **TagTemp-S**. It does not always equal the current temperature.

- **Loggings**: Indicates basic information about **TagTemp-S**.

  Log interval: Indicates the value defined of the interval between each acquisition.

  Loggings: Number of records made by **TagTemp-S**.

  Logging state: Indicates whether the log is running, stopped or waiting for loggings to start – *Start Delay*.

  Memory usage: Indicates the memory usage mode (full or circular).

- **Battery**: Indicates the status of the battery charge.

  Good: Perfect to use.

  Medium: Significant discharge is already detected. It should be monitored.

  Low: The battery is discharged. In this case, you will not be able to send new settings or continue recording the temperature.

- **Device Info**: Indicates some specific information of **TagTemp-S**.

  Device tag: Identification name chosen by the user.

  Model: **TagTemp-S**.

  Serial Number: Serial number engraved factory.

  UID: Unique Identification Number. Useful for tracking applications.

  Firmware version: Device firmware version number.

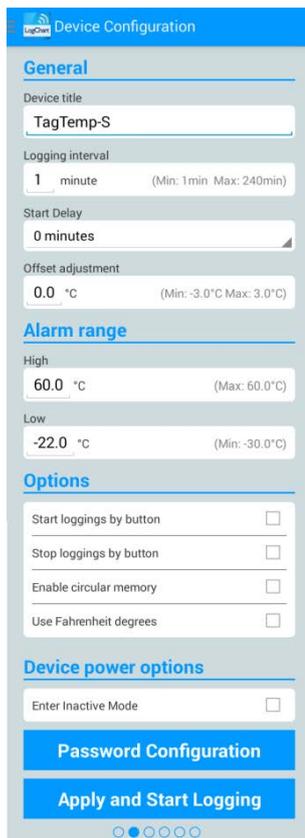### 5.2.2 Device Configuration Screen

Fig. 05 – Device Settings Screens

- **General**: General settings

  Device title: Text field in which you can define or view the device title.

  Logging interval: Text field in which you can define or view the interval between each data acquisition.

  Start Delay: This is the delay time between the **TagTemp-S** configuration and the start of the logs.

  Offset adjustment: Field where you can set or view the offset value.

- **Alarm range**: Range of operation where the user defines the limits that, in case of exceedance, result in alarm. The device signals alarm via the LED. For more details on alarm activations, the data must be collected through the **LogChart-NFC** or **Nx Software** applications.

  High: Valid range of operation (Maximum), connected to the maximum alarm.

  Low: Valid range of operation (Minimum), connected to the minimum alarm.

- **Options**: The following options can be configured:

  Start loggings by button: When you enable this option, you can start logging data by pressing the logger button.

  Stop loggings by button: When you enable this option, you can stop logging by pressing the logger button.

  Enable circular memory: When this option is enabled, when the memory is complete, the recording will continue overwriting the oldest records.

  Use Fahrenheit degrees: when this option is enabled, the temperature unit of *Celsius* (default) is changed to *Fahrenheit*.

- **Device power options**: the device can be placed in idle mode.

Idle mode is a low-power option, in which the device does not operate.

- **Password Configuration**: The user can set a four-digit password for device security. Using a password prevents unauthorized persons from starting or stopping data logging by the **LogChart-NFC** or **Nx Software** applications or even reconfiguring the device, but does not prevent log data from being collected and shared.

- **Apply and Start Logging**: Applies the settings and starts recording the temperature.

  Stop Logging: You can stop logging using the smartphone.
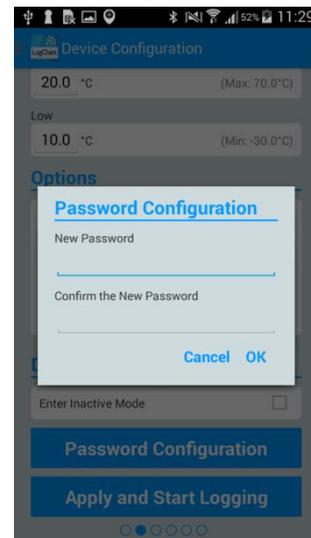
5.2.2.1 Password Configuration Screen

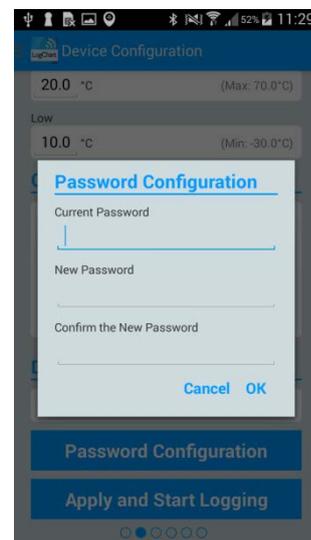**Fig. 06** – Password Configuration Screen

Fig. 07 – Password Configuration Screen

Note: **Fig. 08** shows the screen to change the password.
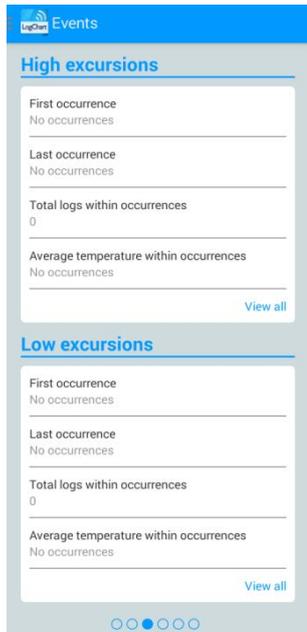
5.2.3   Events Screen

Fig. 08 – Events Screen

- **High excursions**: Indicates when the measured value has exceeded the maximum upper limit specified for the range.

  First occurrence: The time of the first event, the measured value exceeded the maximum limit.

  Last occurrence: The time of the last event, the measured value exceeded the maximum limit.

  Total logs within occurrences: Number of acquisitions above the maximum range limit.

  Average temperature within occurrences: Average value of temperatures above the maximum limit.

- **Low excursions**: Indicates when the measured value was below the specified lower limit for the range.

  First occurrence: The time of the first event, the measured value was below the minimum limit.

  Last occurrence: The time from the last event the measured value was below the minimum limit.

  Total logs within occurrences: Number of acquisitions below the minimum range limit.

  Average temperature within occurrences: Average value of temperatures below the minimum limit.

5.2.3.1   Event Screen

Selecting the "See All" option shows the high and low temperature events, their respective values and timetables. See examples in the images shown in **Fig. 10** and **Fig. 11**.

If no high or low events occurred, the messages in **Fig. 12** and **Fig. 13** will appear.
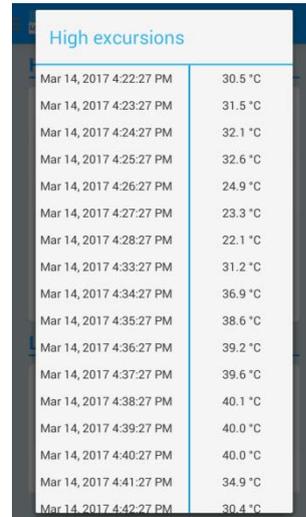

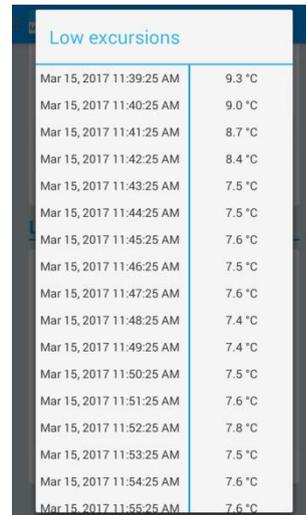**Fig. 09** – High Temperature Event Display

Fig. 10 – Low Temperature Excursion display
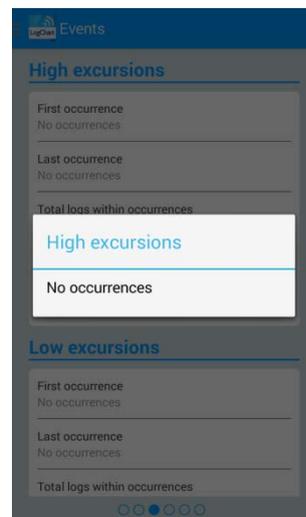

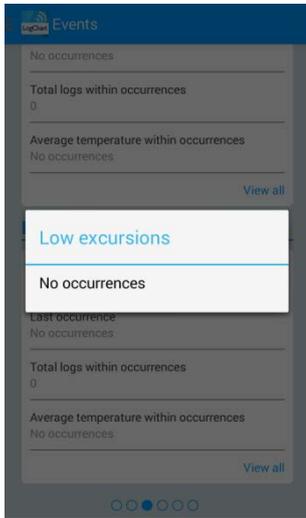**Fig. 11** – High excursions Message "No occurrences"

Fig. 12 – Low Excursions Message "No occurrences"
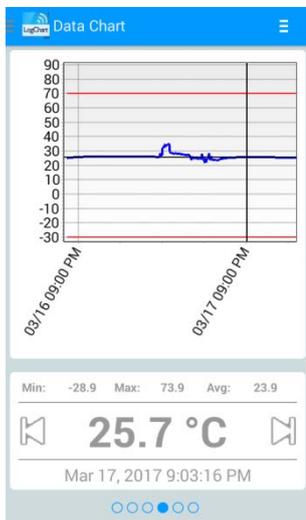
5.2.4 Data Chart Screen

Fig. 13 – Data Chart screen

In this screen, you can view the historical data in different time intervals. You can also check the values that were in alarm, maximum, minimum and the average value of temperatures.

By touching any location on the graph, you can see the temperature value and the time of the record. To view the data for each record, use the left or right arrows to select the previous or next record, respectively.

When more than 2000 data are registered, the graph will show only the last 2000. To select a graph display range, the "Chart range" option can be used.

5.2.4.1 Data Chart Options Screen

When you select the icon [≡] in the upper right of the screen, the chart options will appear.
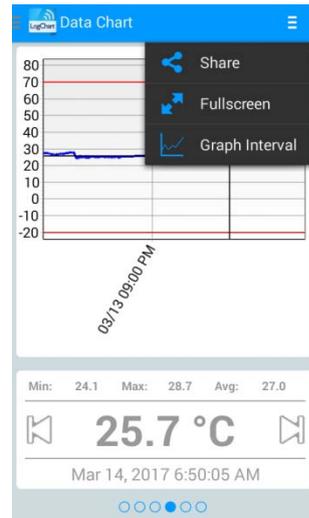

Fig. 14 – Data Chart Options screen

1. By pressing the icon [<], you can share the obtained data, using the applications already installed in the smartphone, or through the option of publishing in the **NOVUS Cloud** (you need to have an account). To include the geographical location of the data log in **NOVUS Cloud**, the GPS must be activated on the smartphone.

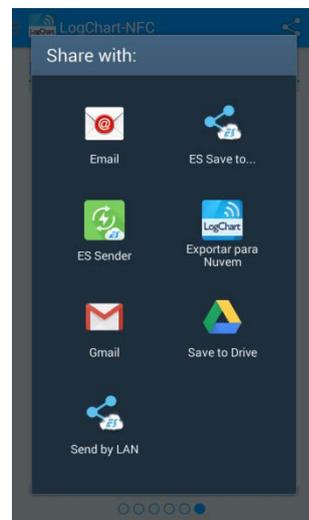The way in which the data will be shared is chosen in "Sharing Options" in the **Preferences screen**.

Fig. 15 – Share screen

2. "Full Screen" option [⤢]: With this option, the chart will be displayed in full screen in landscape mode.

Fig. 16 – Full Screen Chart

3. Chart range : Using this option allows you to select the range of values that will be displayed in the chart. This range can include up to 2000 records.

View options: option to choose the start and end date for the range of the records to see the data collected.
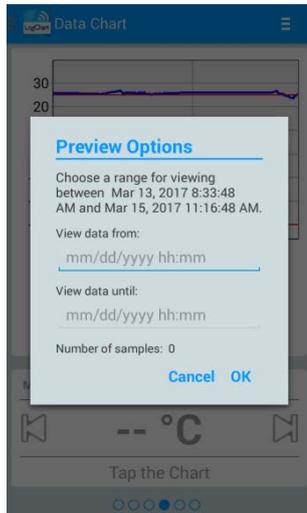

Fig. 17 – View Options Screen

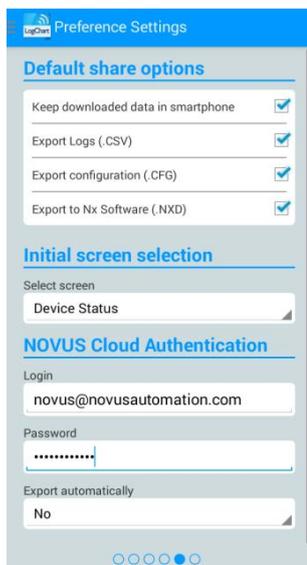### 5.2.4.2   Preference Settings Screen

Fig. 18 – Preferences Settings screen

- **Default share options**: You can set the display preferences according to the data you want to receive using the share function.

  Keep downloaded data in smartphone: Keeps files, previously selected in the sharing options, in a folder called **LogChart-NFC** in the internal memory of the smartphone.

  Export Logs (.CSV): Shares a file with CSV extension with all records from the last collection.

  Export Logs (.CFG): Shares a text file with **TagTemp-S** settings data, useful for backup and future reference. The shared configuration is the one that is read from the device, the subsequent changes will not be considered.

  Export to Nx Software (.NXD): Shares a file with the collected data in a format compatible with **Nx Software** (.nxd), so that the data can be read and displayed by this application.

- **Initial screen selection**: Allows you to select the startup screen after reading the data from the device.

- **NOVUS Cloud Authentication**: Hire an account in the **NOVUS Cloud** to store the **TagTemp-S** data. Enter your login credentials in the Username and Password fields to send the data.

- **Export automatically**: If this option is selected, whenever a device's data is collected, the application will try to send them automatically to **NOVUS Cloud**.
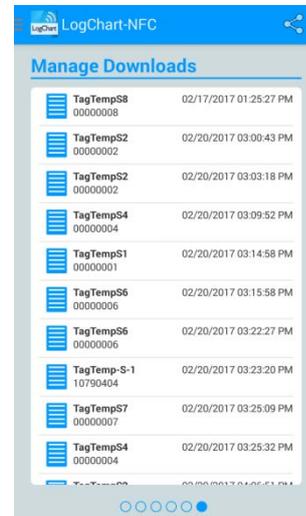
5.2.5   Manage Downloads Screen
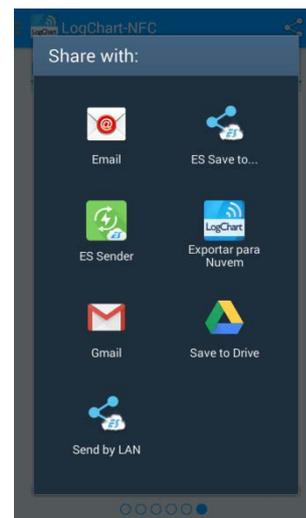

Fig. 19 – Manage Downloads screen

Fig. 20 – Share Screen

This screen allows you to delete and share the data collected previously. A list of collected data is displayed, and you can select a file to share or delete.

To share a selected item, you only have to press the corresponding button in the upper right of the screen.

To delete an item, press and hold the respective item until the delete confirmation dialog appears.

6 NX SOFTWARE

6.1 Installing the Nx Software

The **Nx Software** application is used to adjust the configuration and collection parameters of the acquired data. To install it just download and run the **NxSoftwareSetup.exe** file available on our website.

6.2 Running Nx Software

Opening the **Nx Software** shows the main screen:

Fig. 21 – **Nx Software** Main Screen

To communicate with the software, the **NFC-USB** reader must be connected to the computer and the USB drivers must be installed.

You can then choose "**Configure**" or "**Download**". The "**Monitor**" option is not available for this device model. The first time the device is read, the application prompts the user to choose which device he wants to connect. Just double click on the desired device and press the "**Ok**" button, as shown in the next image. This device will be set by default the next time the application communicates with the device.

Fig. 22 – Select Device Screen

6.3 Configuring the device

To configure the device, it is necessary to place the **TagTemp-S** on top of the **NFC-USB** reader.

When choosing the "**Configure**" button, the following screen will appear:

Fig. 23 – Configuration Selection Screen

The "**Create Configuration**" option creates a new configuration, without the need of the device. This setting can be saved to a file for future use, or recorded to a connected device. The "**Configuration File**" option is used to read an existing configuration file.

The reading of the device is done by choosing the option "**Read the Device**". If the machine is logging data, the following message will be displayed.

Fig. 24 – Reading Device Screen

Stop logging: This option stops data logging and is read, allowing the device to be configured.

Show Only: By choosing this option, you can only view the device's settings. Functions such as saving settings, changing the password or setting the device to idle mode will be disabled.

After reading the device, the configuration screen is shown below in **Fig. 25**.

Fig. 25 – Configuration Screen

The configuration of the **TagTemp-S** is distributed in several screens. The "**General**" screen contains the following information:

Device Title: This field is used to identify the device, giving it a unique name.

Information: Shows information about the device, such as: Model, Serial Number, Firmware Version, Memory Capacity, Log Status, and Battery Charge.

Clock: Shows the date and time of the device and the computer respectively. When a configuration is sent, the date and time of the device are synchronized with those of the computer.

Security: Selecting this option can create, delete or change the password of the computer. This procedure is explained in detail in the "**Finalization**" section.
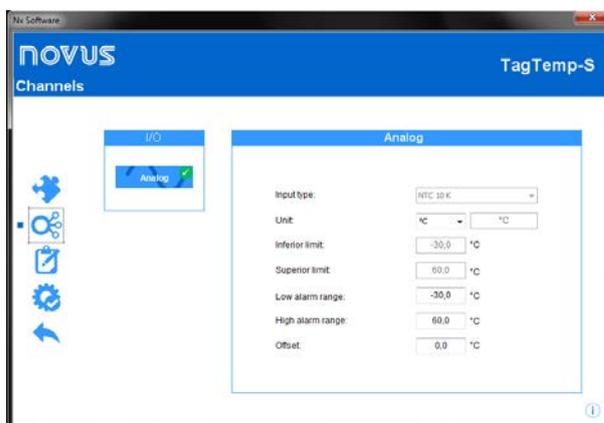

Fig. 26 – Channels Screen

The "**Channels**" screen displays the following parameters:

Input Type: Displays the type of sensor in the device.

Mode: Displays the registration mode. The instantaneous temperature is stored at each acquisition.

Unit: Sets the unit for the monitored quantity: °C or °F for the temperature channel.

Inferior and Superior Limit: Displays sensor limits.

Lower and Higher Alarm Range: Allows to define the limits of values, which, when exceeded, characterize an alarm condition. The alarm events are indicated to the user through the **Alarm Indicator**.

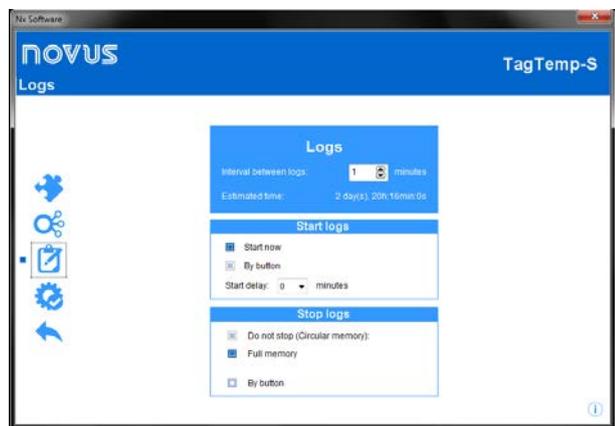**Offset**: Allows to make adjustments to the registered values.

Fig. 27 – Data Log Screen

The "**Data Log**" screen displays the following parameters:

Interval between records: sets the time interval between data acquisitions. The minimum interval is one (1) minute and the maximum is four (4) hours.

Estimated Time: Informs how long it will take to fill the available memory, with the conditions defined in the configuration.

Start of recording: The recording of data can begin in two ways: by immediate start or by using the device button.

Start delay: Parameter that determines whether the register will start immediately after the "begin registration" command or if the device must wait for a while to save the first record in memory. Intervals can be set between 0 and 120 minutes.

Stop logging: The logging can be stopped in two ways, when the memory is completed or by pressing the button on the device. Both modes can be configured to operate independently. If the option is set to "Do not Stop", the registration is done in a circular way, in which, when the memory is full, the oldest records will be overwritten with the new values.
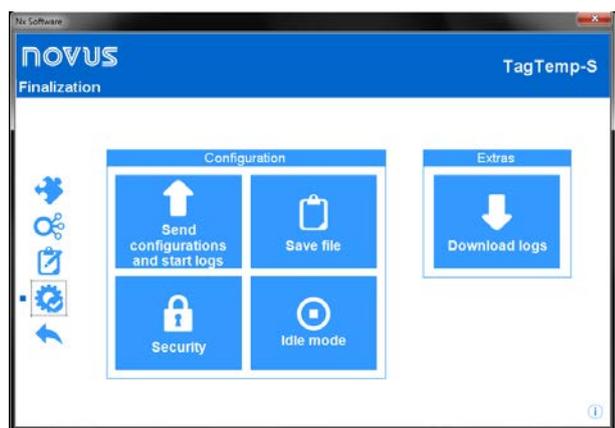

Fig. 28 – Finalization Screen

The "**Finalization**" screen is where the configuration settings are sent and allows you to perform some other useful functions.

Send Configuration: Selecting this option will send the settings made for the connected device.

Save to File: This option allows you to save the configuration settings made to a file, so it can be reused to configure other devices.

Security: This option allows you to create, change or delete a password. The password must be four digits long. **Fig. 29** shows the definition and password change screen.
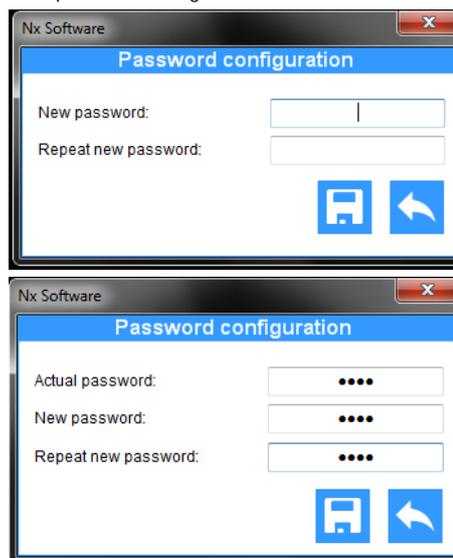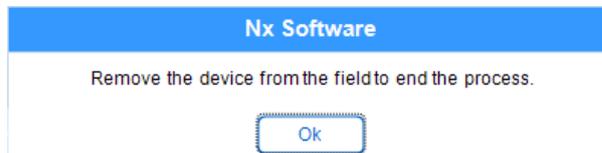

**Fig. 29** – Definition and Password Change Screen

Idle Mode: This option places the device in low power mode, which consumes practically no power, but also cannot perform any of its functions. Selecting this option will display the following screen:


When you select "Yes", the application will place the device in idle mode and display the following message:

To remove the device from the idle mode, you only have to do a read of it, and in doing so, the application will display the following message:
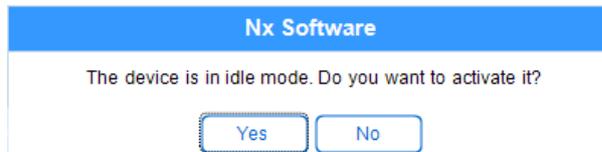

If "Yes" is selected, the application will remove the computer from idle mode, but there will still be a need to interact with the device to complete the process, according to the following message:
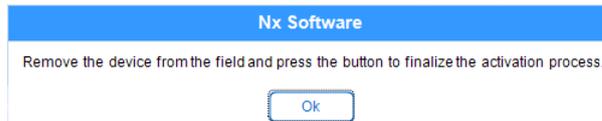
Data Collection: This option allows the data in the device memory to be transferred to the application. For more information, see "**Collecting Data**".

Stop: This option is only displayed when the configuration is being read and the device is logging, so that to send a new configuration, you need to stop the current log. See the following image.
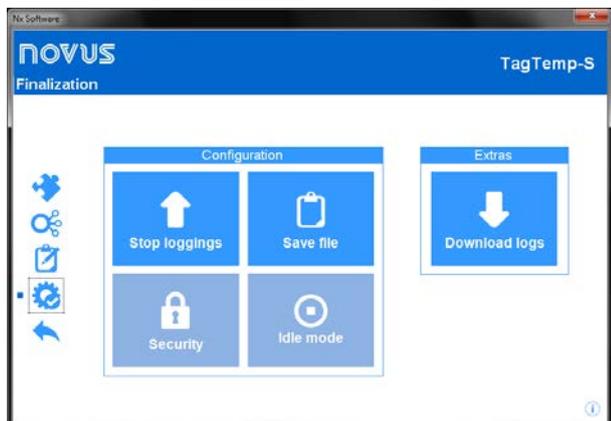
6.4 Collecting and Viewing Data

The data collection transfers the values recorded by the device to the computer. The collect can occur at any time, during or after the completion of the data acquisition process. If data collection occurs during the acquisition process, this process **is not interrupted**, and the operation is set according to the device configuration settings.
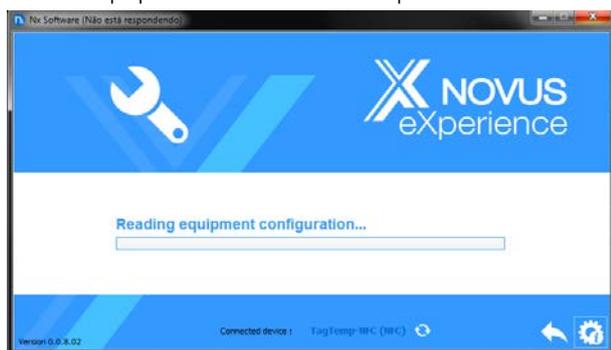
Collecting Data

When you select the "Collect" option in the application start screen, another screen with the following options will be displayed:


Log File: This option allows you to upload stored log files for viewing, customizing, preparing reports, or other functions.

Collect: This option allows transferring data from the connected device. When you perform data collection, a progress bar is displayed that indicates the progress of the transfer. The transfer time will be proportional to the number of acquisitions recorded.

Viewing Collected Data

After the transfer of the records, the data collected are presented graphically, as shown in the images below.
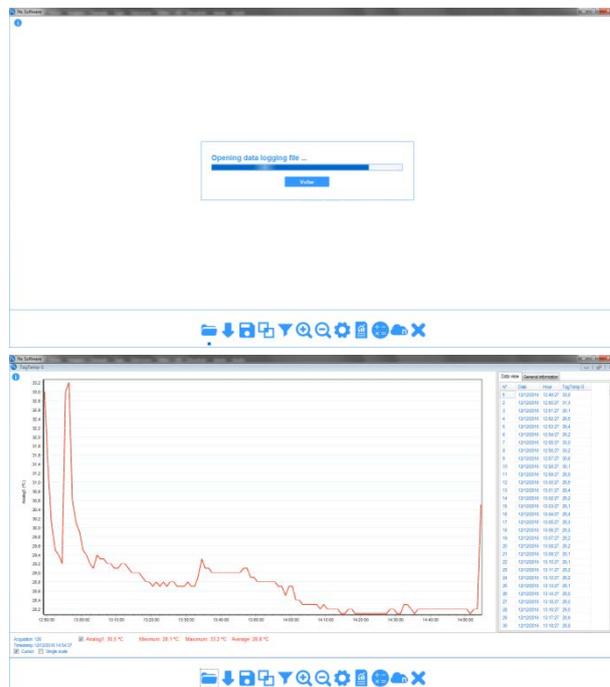
6.4.1 Sharing and processing data

After completing the collection, a screen will be displayed with the collected data and these are presented in two forms: in graph form and table form. In the same screen, the general information of the device and the data of the collected registers are shown.

Chart: You can select a region of the chart to be viewed in detail (zoom). The zoom functions are accessed from the toolbar. You can also expand a chart area with a click and drag the mouse by creating a zoom region from the upper left corner of the desired chart area. You can also display or not, the lines that delimit the alarm values, to facilitate the visualization of the periods of these events.
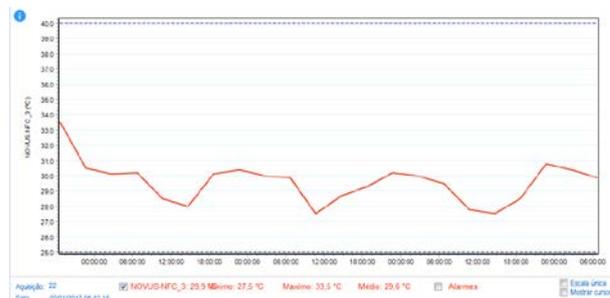

Table of values: Shows the values acquired in table format, indicating the moment of the measurement with its respective value.

N°	Date	Hour	tp1 (ºC)
1	15/03/2017	09:27:19	25,3
2	15/03/2017	09:28:19	25,2
3	15/03/2017	09:29:19	24,8
4	15/03/2017	09:30:19	24,5
5	15/03/2017	09:31:19	24,9
6	15/03/2017	09:32:19	24,7
7	15/03/2017	09:33:19	24,4
8	15/03/2017	09:34:19	24,2
9	15/03/2017	09:35:19	25,5
10	15/03/2017	09:36:19	26,3
11	15/03/2017	09:37:19	25,4
12	15/03/2017	09:38:19	25,2
13	15/03/2017	09:39:19	25,0
14	15/03/2017	09:40:19	25,3
15	15/03/2017	09:41:19	26,4
16	15/03/2017	09:42:19	25,6
17	15/03/2017	09:43:19	25,6
18	15/03/2017	09:44:19	25,4
19	15/03/2017	09:45:19	25,3
20	15/03/2017	09:46:19	25,3
21	15/03/2017	09:47:19	25,0
22	15/03/2017	09:48:19	24,8

TagTemp-S

General Information: This tab shows the basic information of the device, from which the data was collected recently and about its configuration.

Data logger	
Model	TagTemp-S
Serial number	3
Firmware version	0.98
Memory capacity	4024 Samples
NOVUS-NFC_3 (ºC)	
Input	NTC 10 K
Value	Instant
Offset	1,0
Low alarm	-20,0
High alarm	60,0
Download information	
Title	NOVUS-NFC_3
Logging interval	1 m
Total loggings	1252
Loggings start	Immediate
Memory mode	Circular Memory
Loggings stop	
Time of download	31/03/2017 15:57:41
First log	30/03/2017 17:15:41

6.4.2   Available Tools

The **NX Software** application offers several ways to customize charts, data filters, export and data sharing. All these features are easily accessible from the bottom menu of the main collection screen. The function of each option in this menu is detailed below. For more information on each of these features, check the informational content available in the application.

1. Open log file
2. Collect from the device
3. Save the log file
4. Merge graphs
5. Zoom +
6. Zoom -
7. Chart Properties
8. Reports and Data Export
9. Formulas
10. Sending data to **NOVUS Cloud**
11. Exit

6.5   Exporting and creating reports with the data collected

Using the **NX Software**, you can export the collected data to various file formats or create reports from the available templates. These two features are accessed by clicking the Reports button in the function menu.

Export: Selecting this option from the "Templates" options list displays a second list of options where you can choose different formats for exporting data.
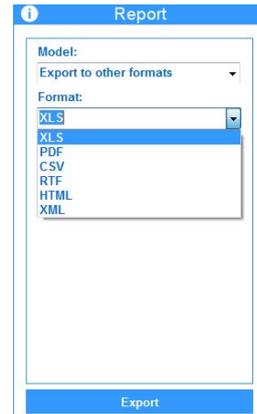
Reports: There are five report templates available, each of them has configurable parameters that can be changed before generating the report. For more information on each template, see the information available in the application.
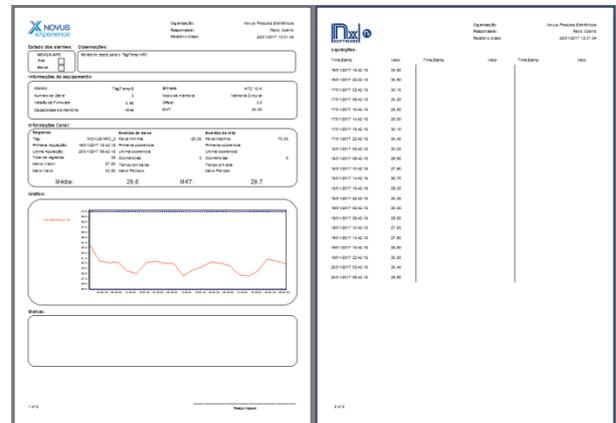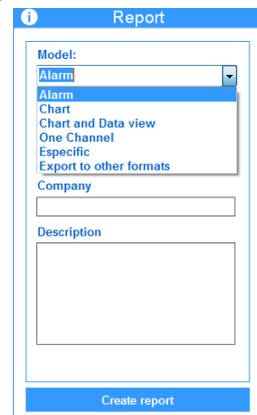
Fig. 30 – Example Report

7   WARRANTY

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

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