LogBox-AA

USER GUIDE – V1.1x J

We Measure, We Control, We Record

⚠	**Recommended for devices with firmware versions up to V1.1x.**

Johannesburg Branch
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1. SAFETY ALERTS

The symbols below are used throughout this manual to draw the user's attention to valuable information related to device safety and use.

CAUTION Read the manual fully before installing and operating the device.	**CAUTION OR HAZARD** Risk of electric shock.	**ATTENTION** Electrostatic-sensitive device. Make sure you take the necessary precautions before handling it.

Safety recommendations must be followed to ensure personal safety and prevent damage to the equipment or system. If the equipment is used in a manner other than that specified in this manual, the safety precautions may not be effective.

2. PRESENTATION

LogBox-AA is an electronic data logger with 2 analog input channels. The values measured by these channels (data) are stored in the logger electronic memory and later sent to a computer in table or graphical form. It is possible to export them for use in programs such as spreadsheets.

To configure the logger and view or download data, you must use the **NXperience** software. When you configure it, you can set the start and end mode of the recordings, the parameters of each input, among other functions.

LogBox-AA provides an **auxiliary electronic switch**, which can be used in series with the power supply of external instruments, connected to the logger. With this feature, you can configure the logger to close the switch and power these instruments only at the instant of acquisition, extending the battery life of the external instrument.

3. IDENTIFICATION

3.1 DIMENSIONS

LogBox-AA has the following dimensions:

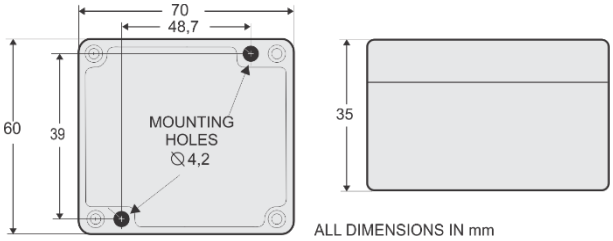


Figure 1

3.2 MEMORY CAPACITY

The 64 k model allows up to 64,000 logs.

The memory capacity is divided between the enabled channels. When there are 2 enabled channels, each has half of the available memory. When a single channel is enabled, it has all the memory at its disposal.

The available memory capacity is indicated on the identification label, attached to the housing of the logger:

Figure 2

3.3 INPUT SIGNALS

Input channels 1 and 2 of the logger measure the following analog electrical signals: Pt100, Thermocouple (J, K, T, E, N, R, S or B), voltage (0 to 50 mV or 0 to 10 V) or current (0 to 20 mA or 4 to 20 mA), depending on the configuration made.

⚠	**In addition to performing the configuration via software, you must properly position the internal jumper.**

3.4 DATA ACQUISITION

The logger can: **1)** Perform a single measurement within a defined period and log the value read or **2)** perform 10 measurements in this period and log in memory the average of the values read or log the minimum value or maximum value measured.

4. ELECTRICAL CONNECTIONS

Only the input channel connections and the internal electronic switch (when used) are required. The electrical power supply is provided exclusively by the internal battery.

For the **IP65** model, input and external trigger terminals are available internally. To make the connections, you will need to open the housing.

For the **IP67** model, the terminals are outside the housing, at the connectors shown in IP67 MODEL section.

4.1 INSTALLATION RECOMMENDATIONS

- Electronic and analog signal conductors should run through the plant separately from the output and supply conductors. If possible, in grounded conduits.
- The power supply for electronic instruments must come from a network specific to the instrumentation.
- In control and supervising applications, it is essential to consider what can happen when any part of the system fails.
- It is recommended to use RC FILTERS (noise suppressors) in contactor coils, solenoids, etc.

4.2 IP65 MODEL

In the **IP65** model, the connections are made internally. To access the terminals and the configuration jumper, it is necessary to remove the cover from the logger.

The connection wires enter the logger through the cable gland located on the bottom of the housing. The figure below shows the polarity of these connections:

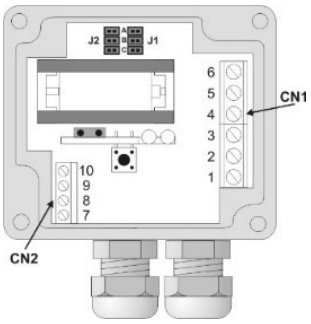


Figure 3

CHANNEL 1	CN1 Connector – Terminals 1, 2 and 3
CHANNEL 2	CN1 Connector – Terminals 4, 5 and 6
ELECTRONIC SWITCH	CN2 Connector – Terminals 7, 8 and 9
DIGITAL INPUT	CN2 Connector – Terminals 7 and 10

Table 1

⚠	**Be sure that the cable gland holds the wires, ensuring the protection level of this model: IP65 − Fully protected against the entry of dust and against water jets, according to NBR-6146 standard.**

4.3 IP67 MODEL

In the **IP67** model, the connections are external. As shown in the figure below, 2 connectors provide external access to the input channels. Cables compatible with these connectors are included with the logger.

⚠	**You should remove the logger cover only when it is necessary to change the battery. On this occasion, the cover must be put back properly, ensuring the protection degree of this model: IP67 − Fully protected against the entry of dust and against immersion in water, according to NBR-6146 standard.**

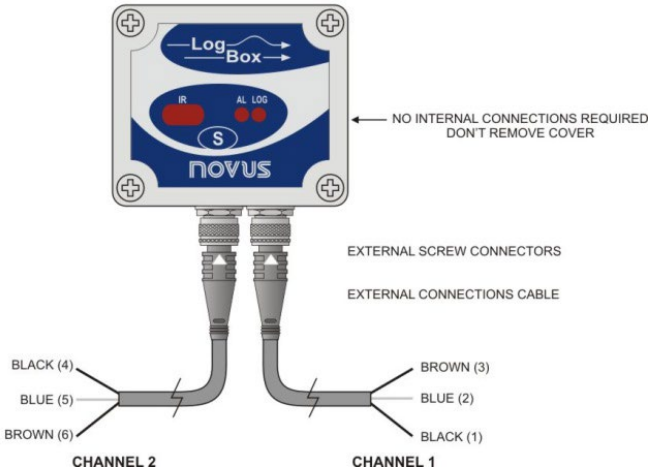


Figure 4

The wires have the following connections:

CHANNEL 1 CABLE (RIGHT)	CONNECTION
Brown wire	CN1 – 3
Blue wire	CN1 – 2
Black wire	CN1 – 1

Table 2

CHANNEL 2 CABLE (LEFT)	CONNECTION
Brown wire	CN1 – 6
Blue wire	CN1 – 5
Black wire	CN1 – 4

Table 3

4.4 INPUT CONNECTIONS

Both models have the same input connection scheme:

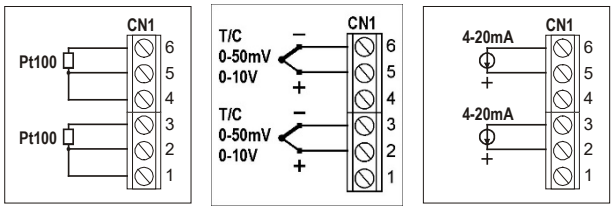


Figure 5

Before using the logger, you must set the internal jumpers, according to the input type used. The factory setting of these jumpers is to measure Pt100 / Thermocouple / 0-50 mV signals.

The figures above show the positions for the possible input types used.

INPUT SIGNAL	CHANNEL 1 POSITION J1	CHANNEL 2 POSITION J2
4-20 mA / 0-20 mA	A	A
Pt100 / Thermocouple / 0-50 mV	B	B
0-10 V	C	C

Table 4

4.5 INTERNAL ELECTRONIC SWITCH

The following figures show an example of using the internal electronic switch to drive external devices.

In this example, channel 1 is configured for a 4-20 mA signal. The transmitter that generates this signal is powered by an external battery. This power supply is commanded by the logger via the Electronic Switch, which "turns on" the power to the external transmitter seconds before the logger takes a channel 1 measurement.

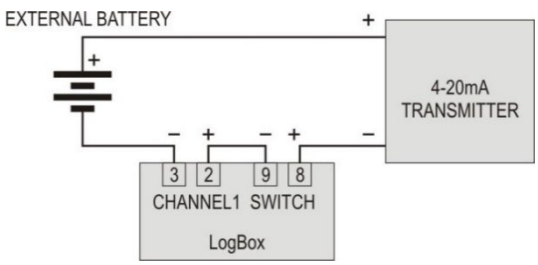
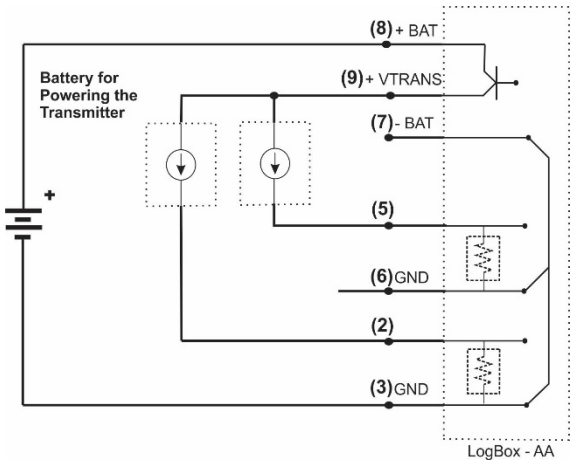
EXTERNAL DRIVE FOR 1 CHANNEL	EXTERNAL DRIVE FOR 2 CHANNELS
	

Figure 6

Figure 7

4.6 DIGITAL INPUT

The digital input, which can be used to command the acquisitions made to the logger, is available on terminals 7 (-) and 10 (+) of CN2.

5. OPERATION

5.1 STATUS INDICATORS (LEDS)

The status indicators, located in front of the logger, serve to indicate the current operating condition of the device:

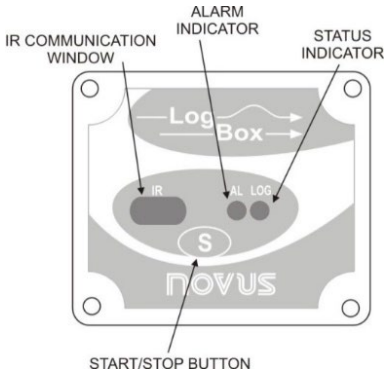


Figure 8

- **LOG Indicator (Logging)**: If it is waiting to begin acquisitions (stand-by) or after a series of acquisitions has been completed, the LED blinks once every 4 seconds. If it is performing acquisitions, it blinks twice every 4 seconds.
- **AL Indicator (Alarm)**: This indicator informs you about alarm situations. Whenever an alarm occurs, it blinks once every 4 seconds. It remains in this condition until a new setting is applied to the logger.

5.2 HOW TO CONFIGURE LOGBOX-AA

In the **NXperience** software, which must be previously installed on the computer to be used, you can configure the logger operation mode (see NXPERIENCE SOFTWARE chapter). To read or change this configuration, you must use the **IR-LINK3 Communication Interface** (see IR-LINK3 OPTICAL INTERFACE section).

Once the device has been configured and the electrical input connections have been made, it is ready to measure and record the signals applied to the input channels. Status indicators display the current condition of the logger.

5.3 IR-LINK3 OPTICAL INTERFACE

To configure, monitor, or download data from the logger through the **NXperience** software, you must use an **IR-LINK3 Communication Interface** (purchased separately).

IR-LINK3 acts as an intermediary between the device and the computer being used and allows you to transmit and receive data from the logger via infrared signals.

The driver will be installed during the **NXperience** installation process. Once this is done, **IR-LINK3** will be recognized whenever it is connected to the computer.

6. NXPERIENCE SOFTWARE

The **NXperience** software allows you to configure and collect data from **LogBox-AA**.

The software and operating manual can be downloaded free of charge from the Downloads area of our website: www.novusautomation.com.

⚠	**This manual provides basic information on how to configure the device. For more specific information on other features, please refer to the NXperience manual.**

6.1 USING THE IR-LINK3 OPTICAL INTERFACE

To configure the logger, you must connect the **IR-LINK3 Communication Interface** to the computer being used. The **IR-LINK3** must be directed constantly towards the logger communication window and kept at approximately 15 cm.

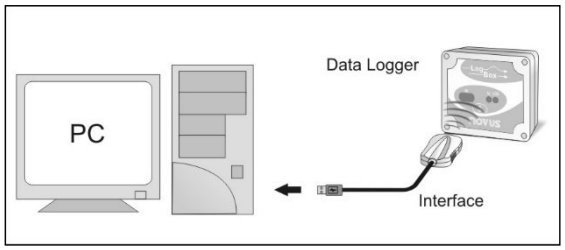


Figure 9

6.2 RUNNING NXPERIENCE

Once initialized, **NXperience** will display the following screen and buttons:

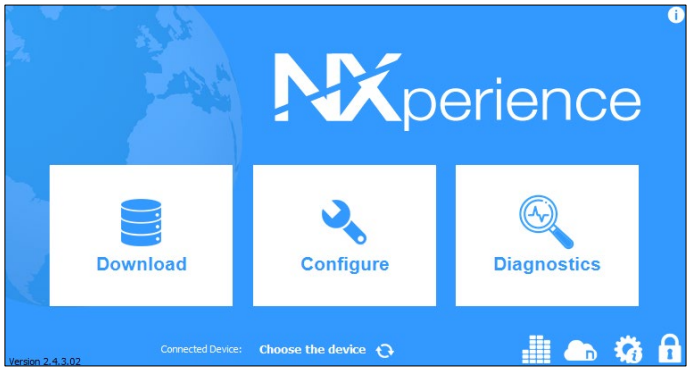


Figure 10

: Allows you to collect data from the selected device.

: Allows you to configure the connected device.

: Allows you to perform diagnostics on the connected device.

: Allows you to supervise the connected device.

: Allows you to open the **NOVUS Cloud** manager. **LogBox-AA** is not compatible with this feature.

: Allows you to change the software preferences.

: Allows you to access the **NXperience Trust** management screen.

: Allows you to access the **NXperience** manual.

Next, at the bottom of the screen, you must click on the button to indicate the serial port to be used by the **IR-LINK3 Optical Interface**, which must be connected to the computer USB:

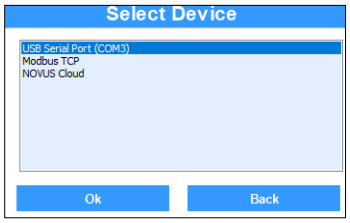


Figure 11

In the example above you should select the option **USB Serial Port (COM3)** and click **Ok**.

After that, simply click on the **Configure** button and then on **Read Device** to perform the connection process.

6.3 CONFIGURING LOGBOX-AA

Below is a description of each of the possible configuration parameters, grouped by section.

6.3.1 GENERAL PARAMETERS

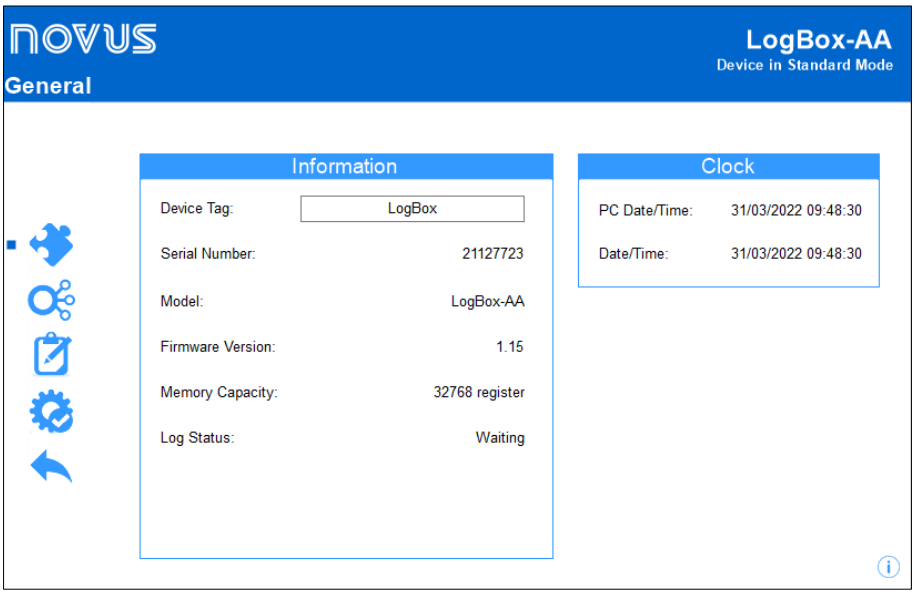


Figure 12

This screen displays general information about the device, such as serial number, firmware version, and model. In the **Device Tag** parameter, you can set a specific name for **LogBox-AA**.

If communication between the logger and the computer is established, the date and time displayed on the screen will be constantly updated.

Afterwards, if you need to return to this screen, just click on the button.

6.3.2 CHANNELS

By clicking the button, you can access the configuration fields of the logger analog channels:

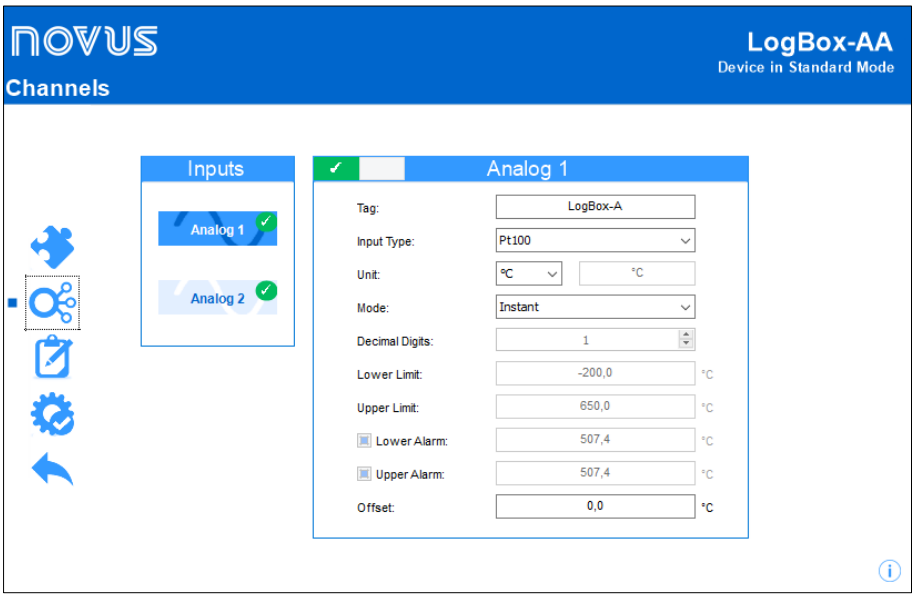


Figure 13

The configuration fields for the analog channels are the following:

- **Tag**: Set of up to 8 characters that allows you to identify the variable.
- **Input type**: Allows you to set the signal applied to the analog input of the logger. The list shows all the available input options. The option adopted must be according to the jumper configuration (see INPUT CONNECTIONS section).
- **Unit**: Allows you to set the unit to be used for the measured variable.
- **Mode:** Allows you to set the recording mode:
  - **Instant:** The device performs a measurement. The value is recorded at each acquisition "Interval".
  - **Medium:** The device periodically takes 10 measurements over each acquisition "Interval". The recorded value is the average of these measurements.

- **Minimum:** The device periodically takes 10 measurements over each acquisition "Interval". The recorded value corresponds to the smallest measurement.
- **Maximum:** The device periodically takes 10 measurements over each acquisition "Interval". The recorded value corresponds to the largest measure.

- **Decimal digits:** Allows you to define how many decimal places after the comma will be displayed in the Lower and Upper Limits, Upper and Lower Alarms and Offset parameters.
- **Lower Limit and Upper Limit:** Allows you to define upper and lower limit values for the inputs.
- **Alarm:** Allows you to define limit values for the measured variable. Once they are exceeded, the alarm will be triggered. In this case, even if the alarm condition no longer occurs, the alarm indicator will remain blinking.

  The **Lower Alarm** parameter allows you to define the value below which the alarm will be triggered.

  The **Upper Alarm** parameter allows you to define the value above which the alarm will be triggered.
- **Offset**: Allows you to correct small errors presented by the input signal. Errors that occur, for example, when changing a sensor or replacing a transmitter.

6.3.3 LOG REGISTER

By clicking the button, you can access the configuration fields of the logger data:

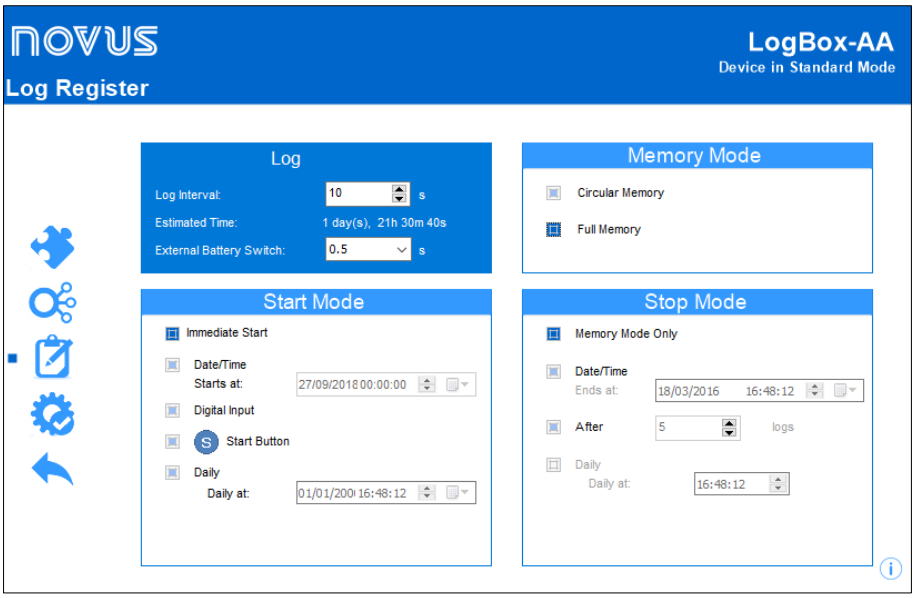


Figure 14

LOG

- **Log interval**: Allows you to determine the time interval (hh:mm:ss) between acquisitions. At the end of this period, the data will be saved in the memory of the logger.
- **Estimated time**: Based on the "Interval" of the acquisitions and the number of programmed acquisitions, it informs you how long it should take the logger to perform all the programmed acquisitions. Available if the **Memory Mode** is set to **Full Memory** mode.
- **External battery switch**: Allows you to set the time interval that the logger takes to turn on the electronic switch before each measurement. This time cannot exceed half the time between measurements (limited to 10 seconds).

MEMORY MODE

- **Circular Memory**: The logger performs acquisitions continuously. Once the logger reaches maximum memory capacity, the oldest data will be overwritten.
- **Full Memory**: The logger performs acquisitions until the available memory capacity of the logger is reached.

START MODE

- **Immediate Start**: Allows to start the acquisition process right after sending the configuration to the logger.
- **Date/Time**: Allows to start the acquisitions at a defined date and time.
- **Digital input**: Allows to perform acquisitions while the digital input is triggered (closed) and to stop acquisitions when the digital input is disabled (open).
- **Start button:** Allows to start the acquisitions using the Start button.
- **Daily:** Allows to start the acquisitions daily and at a previously defined time.

STOP MODE

- **Memory Mode Only**: Allows to link the stop mode to the memory mode of the logger. That is, the acquisitions will be interrupted if the memory limit is reached (if **Full Memory** mode is set) or will never be interrupted (if **Circular Memory** mode is set).
- **Date/Time**: Allows to stop the acquisitions at a defined date and time.
- **After a specific number of logs**: Allows to set a number of acquisitions that, when reached, will stop the acquisition process.
- **Daily:** Allows to stop the acquisitions daily and at a previously defined time.

6.3.4 FINALIZATION

Once the settings have been made, you must click the button to open the finalization screen:

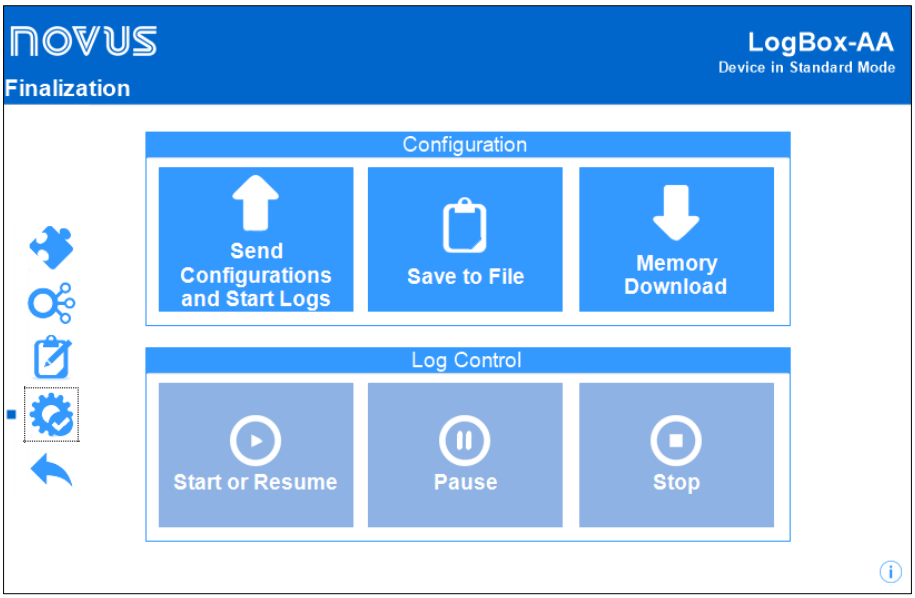


Figure 15

From this screen you can send and start logs, save the configuration to file, download data from memory, and start, pause, or stop the logging control.

6.4 COLLECTING AND VIEWING DATA

Through **NXperience**, you can view the data acquired by the logger. To do this, you click on the **Download** button on the software home screen, and then on **Download Logs**:

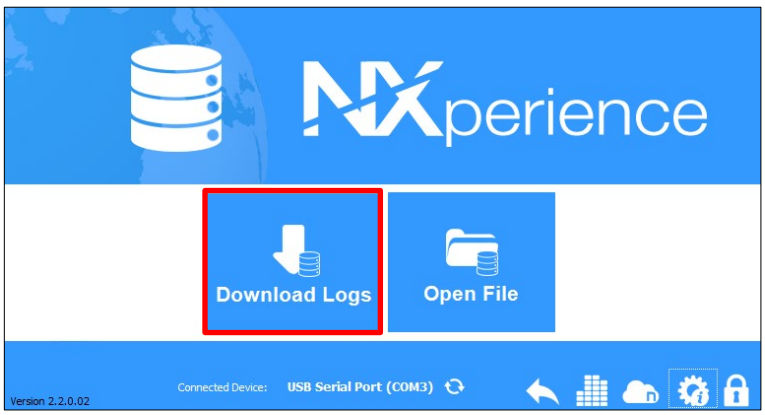


Figure 16

You can also click on the **Open File** button to view files of previously downloaded logs.

Once **NXperience** has downloaded the logs, it will display a graph of these values:

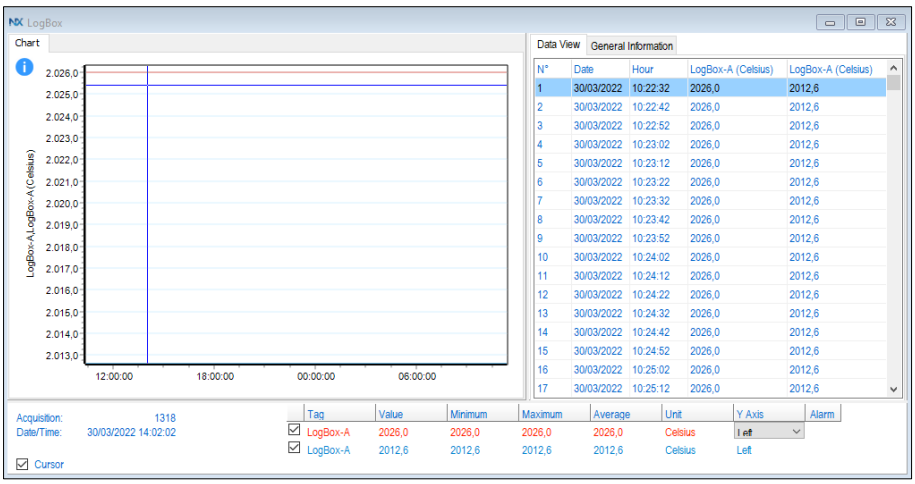


Figure 17

The graph allows you to see the acquisitions made by the logger in the form of a '*values x time*' graph. Scrolling with the mouse pointer over the graph area will display the information at the bottom of the window.

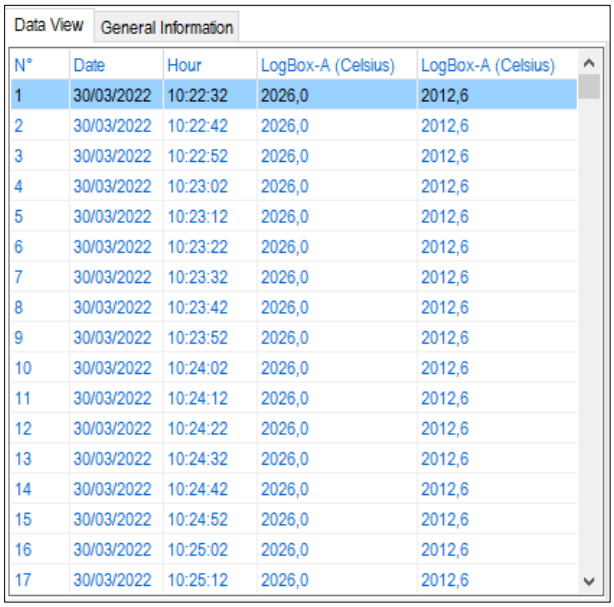
Using the zoom commands on the toolbar, you can select a region of the graph to view in detail. You can also use the left mouse button to select an area of the graph to view in detail or drag the curves vertically with the right mouse button.

On the right side of the graph there are 2 tabs: **Data View** and **General Information**.

Through the toolbar at the bottom of the download screen, **NXperience** allows you to save, save to file, merge graphs, filter, and even export this information to several types of reports.

Specific information about each of these features can be found in the **NXperience** manual, available on our website.

6.4.1 DATA VIEW



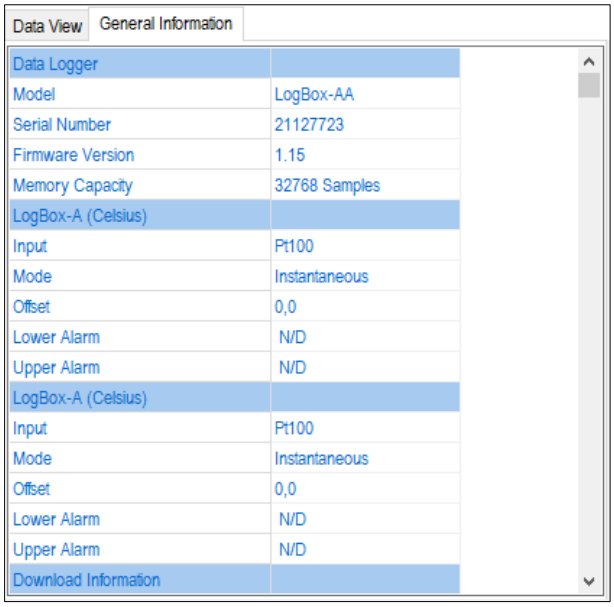
Data View | General Information

N°	Date	Hour	LogBox-A (Celsius)	LogBox-A (Celsius)
1	30/03/2022	10:22:32	2026,0	2012,6
2	30/03/2022	10:22:42	2026,0	2012,6
3	30/03/2022	10:22:52	2026,0	2012,6
4	30/03/2022	10:23:02	2026,0	2012,6
5	30/03/2022	10:23:12	2026,0	2012,6
6	30/03/2022	10:23:22	2026,0	2012,6
7	30/03/2022	10:23:32	2026,0	2012,6
8	30/03/2022	10:23:42	2026,0	2012,6
9	30/03/2022	10:23:52	2026,0	2012,6
10	30/03/2022	10:24:02	2026,0	2012,6
11	30/03/2022	10:24:12	2026,0	2012,6
12	30/03/2022	10:24:22	2026,0	2012,6
13	30/03/2022	10:24:32	2026,0	2012,6
14	30/03/2022	10:24:42	2026,0	2012,6
15	30/03/2022	10:24:52	2026,0	2012,6
16	30/03/2022	10:25:02	2026,0	2012,6
17	30/03/2022	10:25:12	2026,0	2012,6

Figure 18

This table provides in engineering units the values acquired by one or both input channels (depending on the configuration made). Each occurrence of this table consists of the log number, the time, the date, and the log values.

6.4.2 GENERAL INFORMATION



Data View | General Information

Data Logger	
Model	LogBox-AA
Serial Number	21127723
Firmware Version	1.15
Memory Capacity	32768 Samples
LogBox-A (Celsius)	
Input	Pt100
Mode	Instantaneous
Offset	0,0
Lower Alarm	N/D
Upper Alarm	N/D
LogBox-A (Celsius)	
Input	Pt100
Mode	Instantaneous
Offset	0,0
Lower Alarm	N/D
Upper Alarm	N/D
Download Information	

Figure 19

It displays information about the logger and its configuration.

6.5 MONITORING LOGS

By clicking the button located at the bottom of the **NXperience** home screen, you can monitor the real-time operation of the logger:

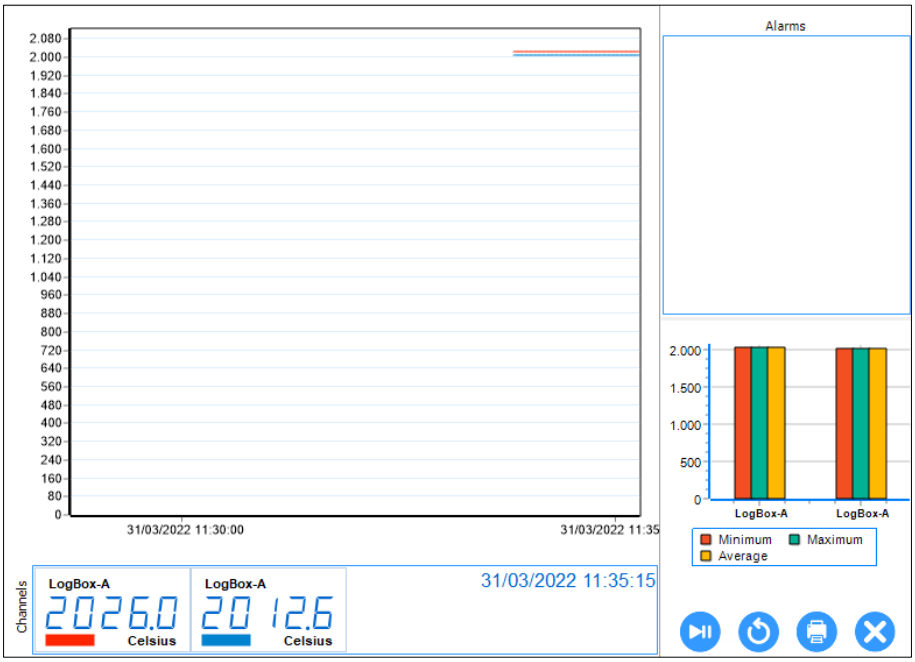


Figure 20

This screen presents information about the configured channels, the values currently logged, the occurrence of alarms, among other data, and allows you to pause and print the displayed graph.

Specific information about each of these features can be found in the **NXperience** manual, available on our website.

7. TROUBLESHOOTING

7.1 SPECIAL PRECAUTIONS

Because it is an electronic device, the logger requires some basic precautions:

- When opening the unit to change the battery or attach sensors, you should avoid contact with the circuitry due to the risk of damage from static electricity.
- You should pay attention to the battery polarity. The battery should be placed with the positive terminal toward the center of the device.
- When closing the housing, the cover must be put back on properly, ensuring the degree of protection of this model.
- Used batteries must not be recharged, disassembled, or incinerated. After use, they must be collected according to local legislation or sent back to the supplier.

7.2 TROUBLESHOOTING

The indicator does not blink:

1. The indicator blinks intentionally dimply and can be difficult to see it in high-light locations. Therefore, you need to make sure that it is not actually blinking.
2. Make sure that the battery is correctly installed.
3. Make sure that the battery is not discharged.

It is not possible to communicate with the logger:

1. Make sure that there are no obstacles blocking the infrared signal.
2. Make sure that the cable is properly connected to the computer port.
3. Make sure that the selected port is working properly.

8. SPECIFICATIONS

8.1 LOGBOX-AA

FEATURES	LOGBOX-AA
Input	Thermocouples according NBR 12771/99 standard; Pt100 RTD's NBR 13773/97. See the table below.
Input resistance	• 0-50 mV, Pt100 and thermocouples: > 10 MΩ • 0-10 V: > 1 MΩ • 0 to 20 mA and 4 to 20 mA: 100 Ω + 2 Vdc
Accuracy	• Thermocouples J, K, T: 0.25 % of max. range ±1 °C • Thermocouples N, R, S, B: 0.25 % of max. range ±3 °C • Pt100: 0.2 % of max. range • mA, mV, V: 0.2 % of max. range
Memory capacity	64.000 (64 k) logs.
Log interval	• Minimum: 1 second. • Maximum: 18 hours.
Logger power supply	Lithium battery 3.6 Volts (1/2 AA).
Typical battery life	200 days with one weekly download and 5 minutes measuring interval. Battery life depends heavily on data retrieval frequency.
Operation temperature	From -40 °C to 70 °C (Except for thermocouples | 0 to 70 °C).
Protection degree	Models IP65 and IP67 (see label).
Housing material	ABS with polycarbonate film case. Polycarbonate film.
Dimensions	60 x 70 x 35 mm.

Table 5

8.2 INPUT

TYPE	FEATURES
T/C J	Range: -50 to 760 °C (-58 to 1400 °F)
T/C K	Range: -90 to 1370 °C (-130 to 2498 °F)
T/C T	Range: -100 to 400 °C (-148 to 752 °F)
T/C N	Range: -90 to 1300 °C (-130 to 2372 °F)
T/C R	Range: 0 to 1760 °C (32 to 3200 °F)
T/C S	Range: 0 to 1760 °C (32 to 3200 °F)
T/C B	Range: 150 to 1820 °C (32 to 3308 °F)
Pt100	Range: -200.0 to 650.0 °C (-328 to 1202 °F)
0-50 mV*	Linear. Programmable range of -32768 to 32767
4-20 mA*	Linear. Programmable range of -32768 to 32767
0-20 mA*	Linear. Programmable range of -32768 to 32767
0-10 Vdc*	Linear. Programmable range of -32768 to 32767

Table 6

(*) **Software ranges allowed**: 0 to 65535, 65535 to 0, -32768 to 32767, 32767 to -32768.

9. WARRANTY

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

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