



## NOVUS LogBox-DA Electronic Data Logger Instruction Manual

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NOVUS LogBox-DA Electronic Data Logger Instruction Manual



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## Introduction

LogBox-DA is an electronic data logger with two input channels: one analog and one digital. 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-DA 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.

## MEMORY CAPACITY

- 64 k Model: It allows up to 64,000 logs, The memory capacity is divided between the enabled channels. When there are two 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 1:** Identification label

## INPUT SIGNALS

Channel 1 (IN 1) counts digital electrical pulses, which can be of the following types: Voltage Pulse, Dry Contact (switch) or Open Collector, according to the configuration made.

Channel 2 (IN 2), in turn, measures analog electrical signals, which can be of the following types: 0-20 mA, 4-20 mA, 0-50 mV, or 0-5 V, according to the configuration made.

**Note:** For the channel 2, in addition to performing the configuration via software, you must properly position the internal jumper.

## DATA ACQUISITION (LOGGING)

Data can be acquired by means of two different modes.

For channel 1, which counts electrical pulses, the recorder counts the number of pulses received in a programmed period. At the end of each period, the measured count value is stored in the memory of the logger, creating a log. The maximum number of logs that can be stored depends on the memory capacity.

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

## OPERATION

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

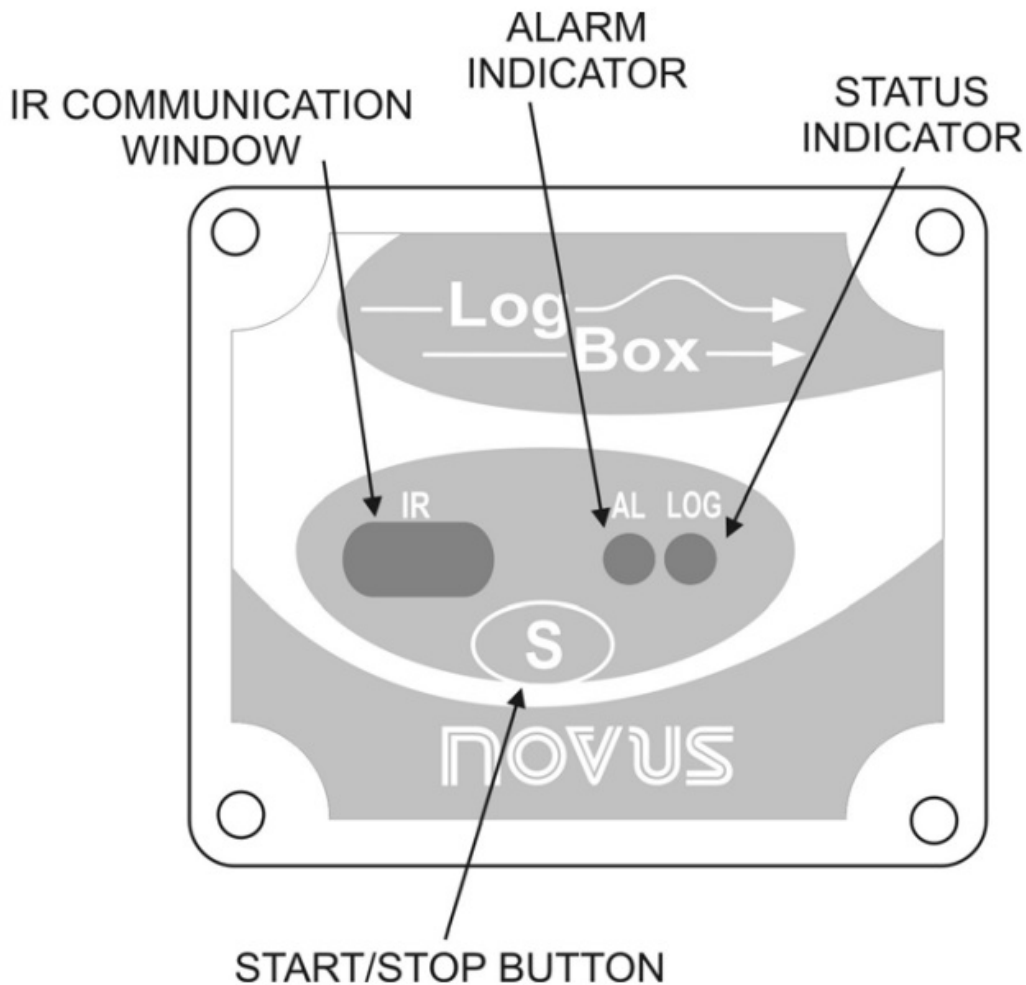
Once the device has been configured and the electrical input connections have been made, it is ready to measure and log the signals applied to the input channels. Status indicators display the current condition of the logger.

## STATUS INDICATORS (LEDS)

The Status Indicators (see Figure 2), located on the front of the logger, serve to indicate the current operating condition of the device:

**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 four seconds. If it is performing acquisitions, it blinks twice every four seconds.

**AL Indicator (Alarm):** This indicator informs about alarm situations. Whenever an alarm situation occurs, it blinks once every four seconds. It remains in this condition until a new setting is applied to the logger.



**Figure 2** – LEDs and IR communication

## CHANNEL 1 MULTIPLICATION FACTOR

Channel 1 was designed to count electric pulses from liquid flow meters (litters per pulse, for example). You can set the amount of liquid that corresponds to each received pulse. You can also easily change the adopted flow rate unit.

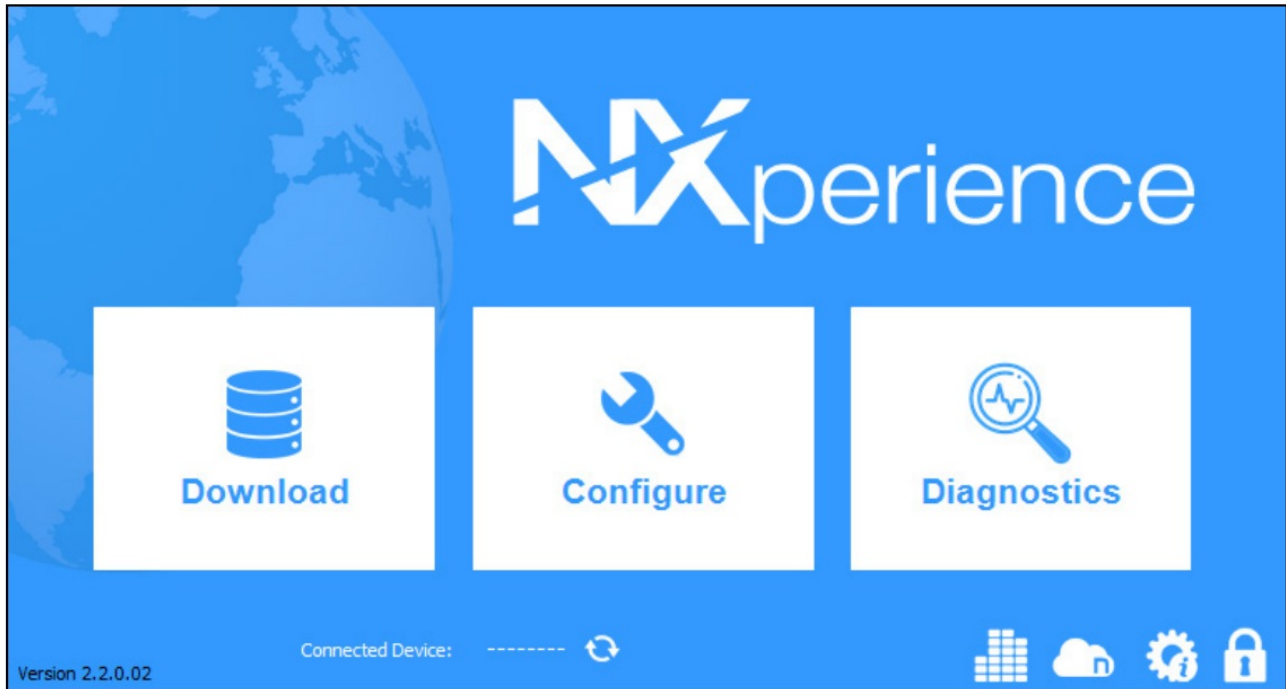
Although adapted for flow rate, it is possible to monitor other quantities. In this case, you must disregard the expression l/pulse (litters per pulse) in the Sensor Factor field.

## SOFTWARE NXPERIENCE


You must use NXperience software to configure and download data from LogBox-DA. To install the software, simply run the file NXperience\_Setup.exe, available on our website.

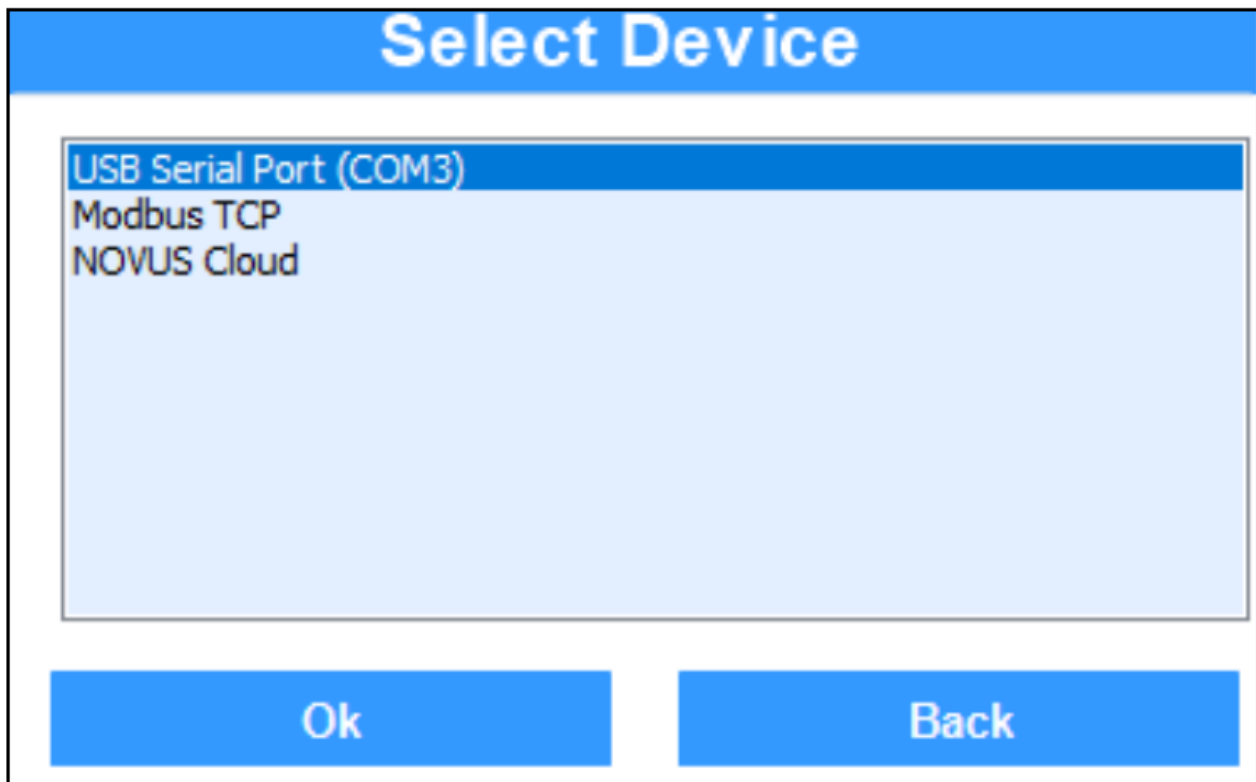
## RUNNING NXPERIENCE

When you start NXperience, the home screen will appear:



**Figure 3** – NXperience home screen

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:



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.

**Note:** This manual provides basic information on how to configure the device. For more specific information about other features, please refer to the NXperience manual, available on our website.

## 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).

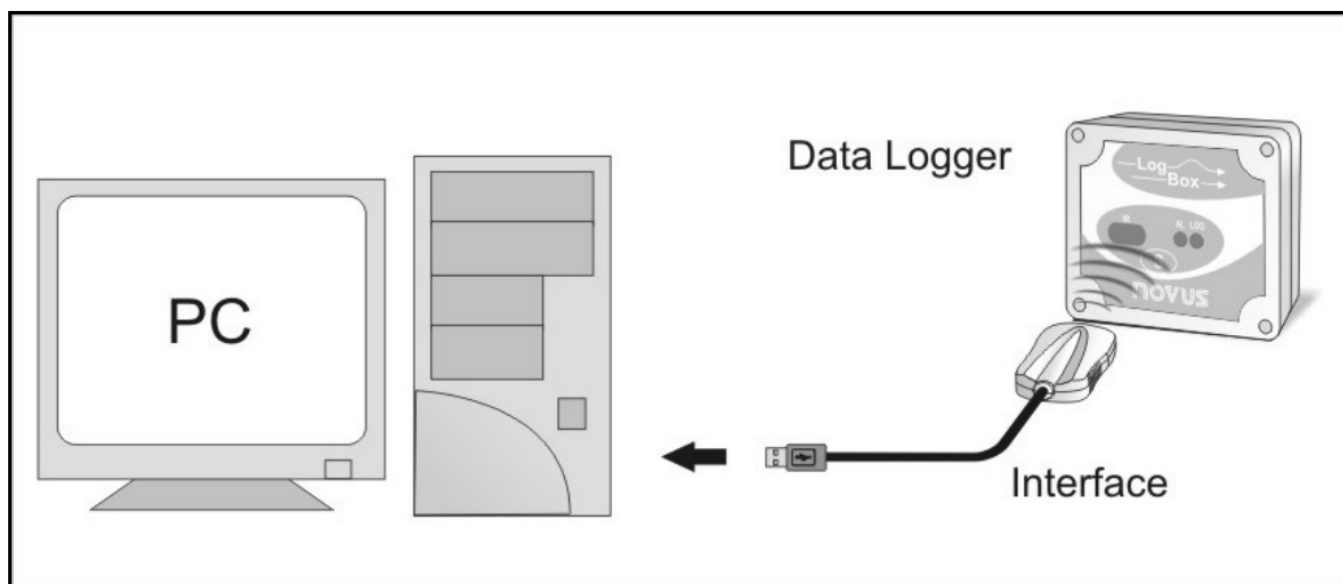
IR-LINK3 acts as an intermediary between the device and the computer being used and allows you to transmit and receive data from the logger via infrared signals.

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.

## LOGGER CONFIGURATION

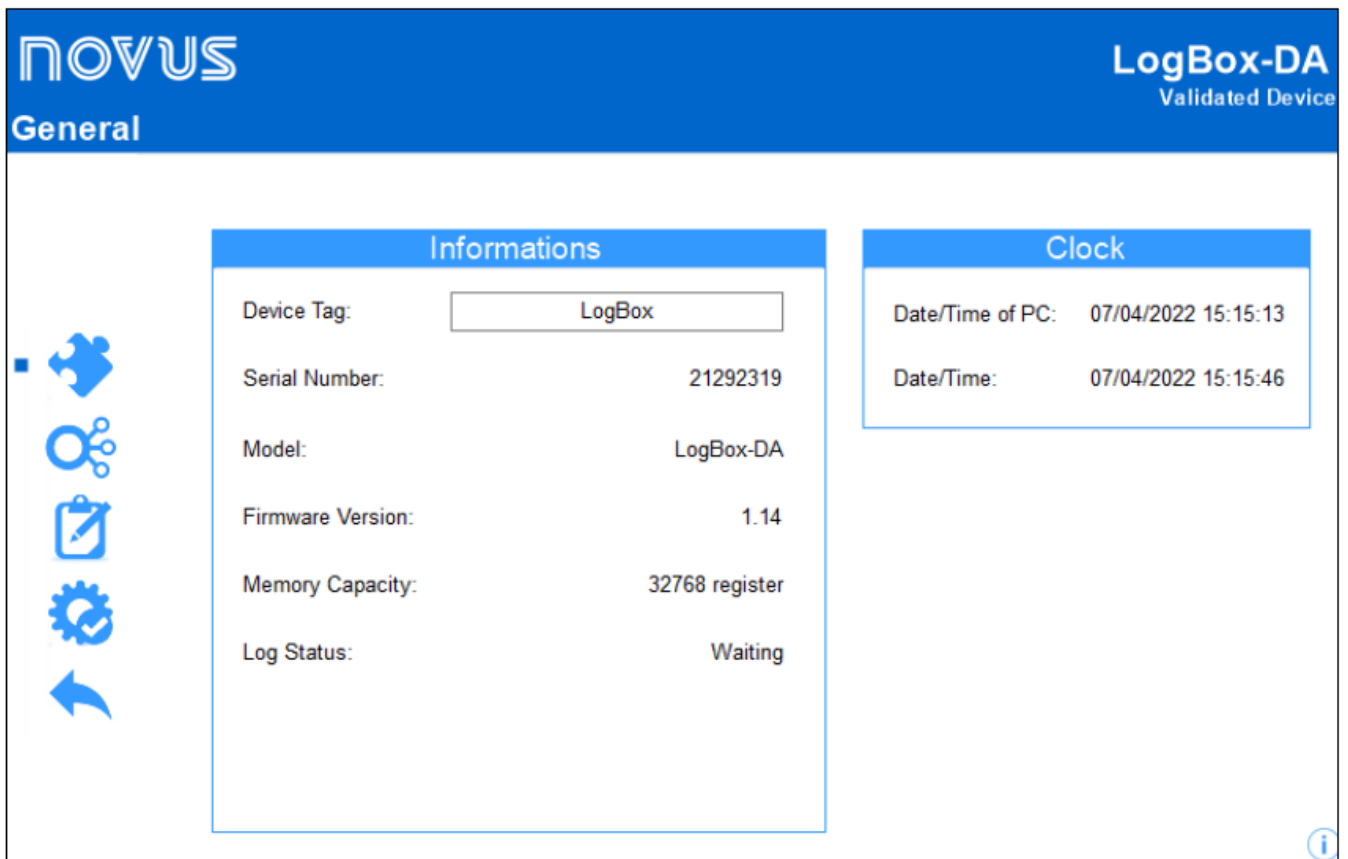
To configure the logger, IR-LINK3 Communication Interface must be connected to the computer being used.

IR-LINK3 must be directed constantly towards the logger communication window (see Figure 5) and kept at approximately 15 cm:




**Figure 5** – Interface directed to the logger

According to the instructions defined in the NXPERIENCE SOFTWARE item, you must click the Read Device button to start the communication between the recorder and the software. Then, the general settings screen will be presented:




**Figure 6** – General settings

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-DA. If the 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.

## CHANNELS

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

## DIGITAL CHANNEL – DIGITAL PULSES

## Channels

The screenshot displays the NOVUS LogBox-DA Channels configuration window. On the left is a sidebar with icons for Inputs, Digital, Analog, and a back arrow. The main area has two panels: 'Inputs' and 'Digital'. The 'Inputs' panel shows 'Digital' and 'Analog' options, both with green checkmarks. The 'Digital' panel is active and shows configuration fields for a digital channel named 'Vazao'.

Field	Value
Tag	Vazao
Input Type	Relay Contact
Sensor Factor	1 l/pulso
Decimal Digits	0
Unit	[Dropdown]
Scale Factor	1
Decimal Digits	0
Inferior Alarm	0
Superior Alarm	0

**Figure 7 – Digital channel**

The configuration fields for the Digital Channel are the following:

**Tag:** Set of up to 8 characters that allows you to identify the variable.

**Input Type:** Allows you to define how the pulses applied to input 1 will be measured. The list presents the following options: NPN, PNP and Dry Contact.

**Sensor Factor:** Allows you to set the quantity per pulse received. It is optimized for measuring liquid flow (liters per pulse). It can assume any value between 0.000001 and 16383.

**Decimal Digits:** Allows you to set the number of decimal places of the sensor factor.

**Unity:** Allows you to define the unit to be used for the measured variable. The options are optimized for measuring flow rate. Still, you can define other units.

**Scale Factor:** Field to measure flow rate. Allows you to define the connections between the different flow measurement units. It can assume any value between 0.000001 and 65535. For variables other than flow rate, you should configure it with a value of 1.

**Decimal Digits:** Allows you to set the number of decimal places for alarm values.

**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.



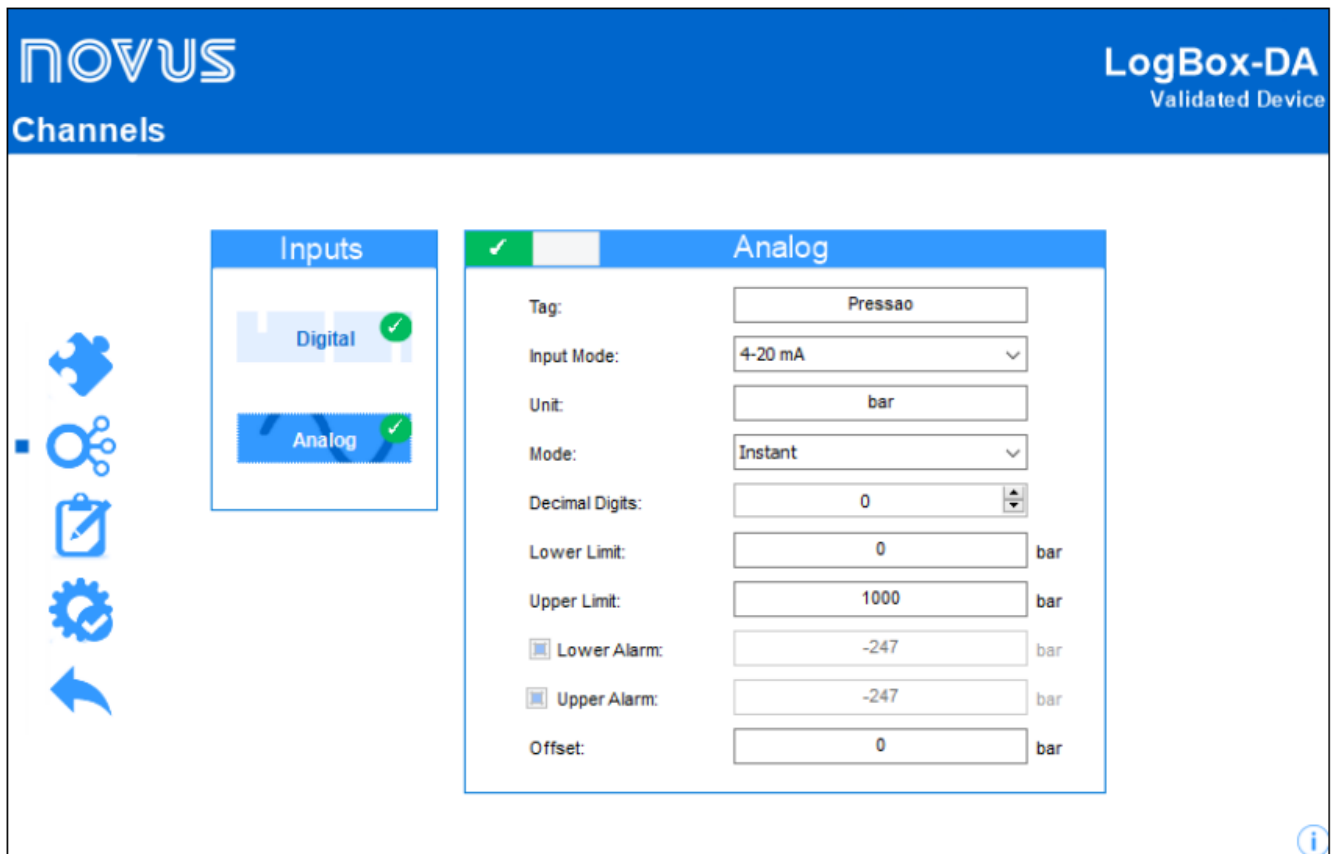


Figure 8 – Analog channel

The configuration fields for the Analog Channel are the following:

**Tag:** Set of up to 8 characters that allows you to identify the variable.

**Input Mode:** Allows you to define the signal applied to the analog input: 4-20 mA, 0-20 mA, 0-50 mV, 0-10 V. The option used must be according to the jumper configuration (see INPUT CONNECTIONS – ANALOG CHANNEL item).

**Unit:** Allows you to define the unit to be used for the measured variable.

**Mode:** Allows you to define the recording mode of the acquired data:

**Instant:** The device performs a measurement. The value is recorded at each acquisition “Interval”.

**Medium:** The device periodically takes ten measurements over each acquisition “Interval”. The recorded value is the average of these measurements.

**Minimum:** The device periodically takes ten measurements over each acquisition “Interval”. The recorded value corresponds to the smallest measurement.

**Maximum:** The device periodically takes ten 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.

## LOG REGISTER



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

**Figure 9** – Log register

## 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

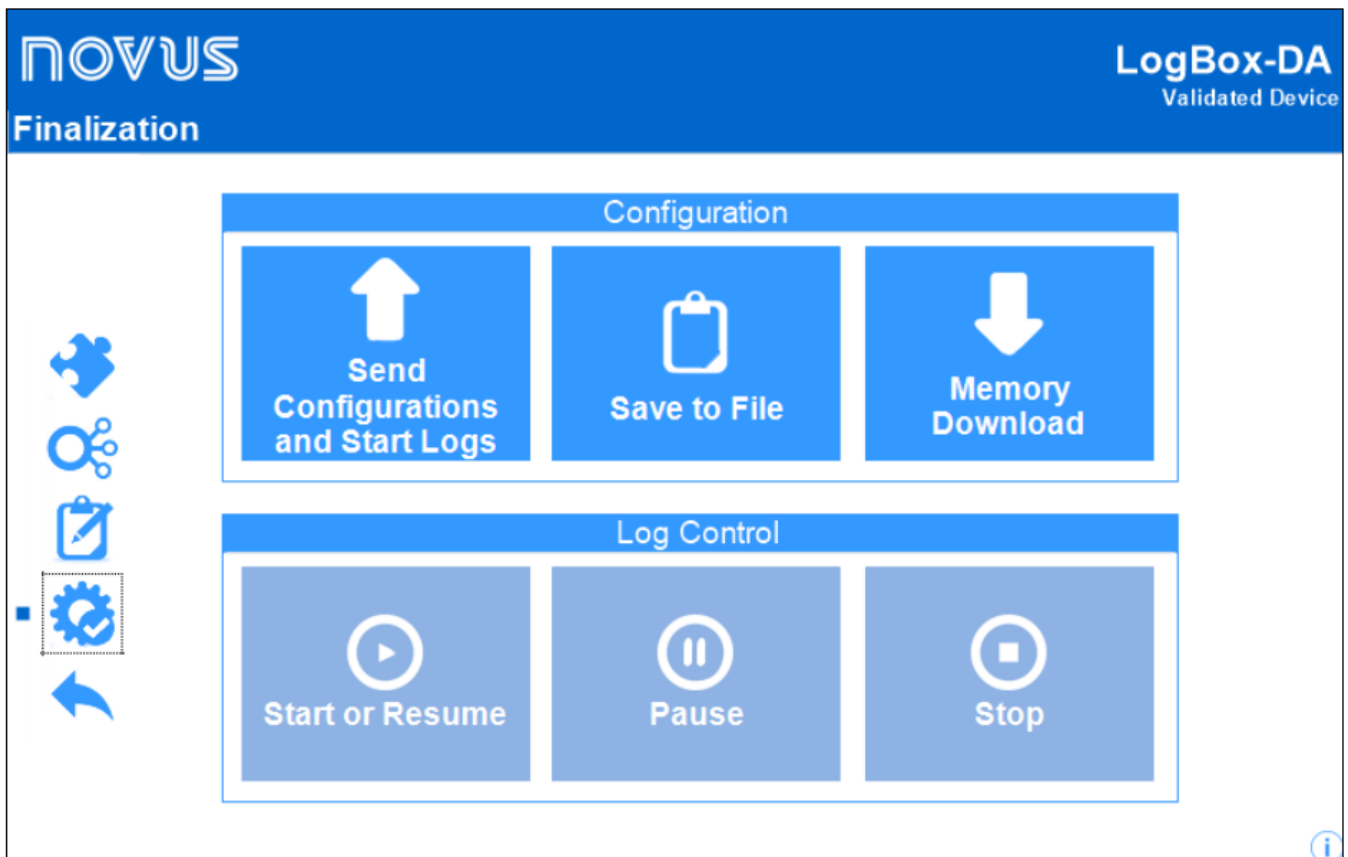
**Memory Mode Only:** Allows to link the stop mode to the memory mode of the logger. That is, the acquisitions will be interrupted if the memory limit is reached (if Full Memory mode is set) or will never be interrupted (if Circular Memory mode is set).

**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.

## FINALIZATION

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



**Figure 10 – Finalization**

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.

## **ELECTRICAL INSTALLATION**

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.

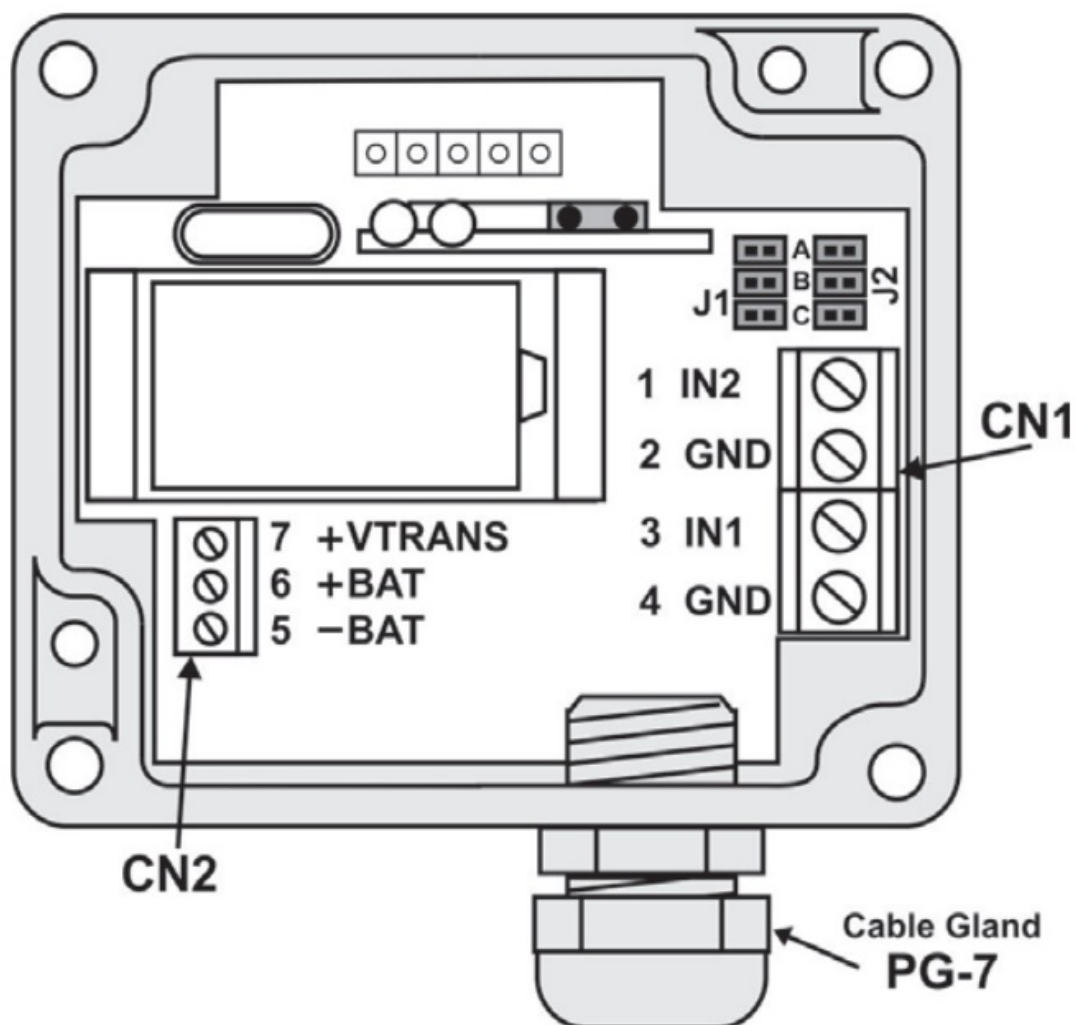
For the IP65 model, input and external trigger terminals are available internally. To make the connections, you will need to open the housing.

For the IP67 model, the terminals are outside the housing, at the connectors shown in Figure 11.

### **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. Figure 11 shows the polarity of these connections:



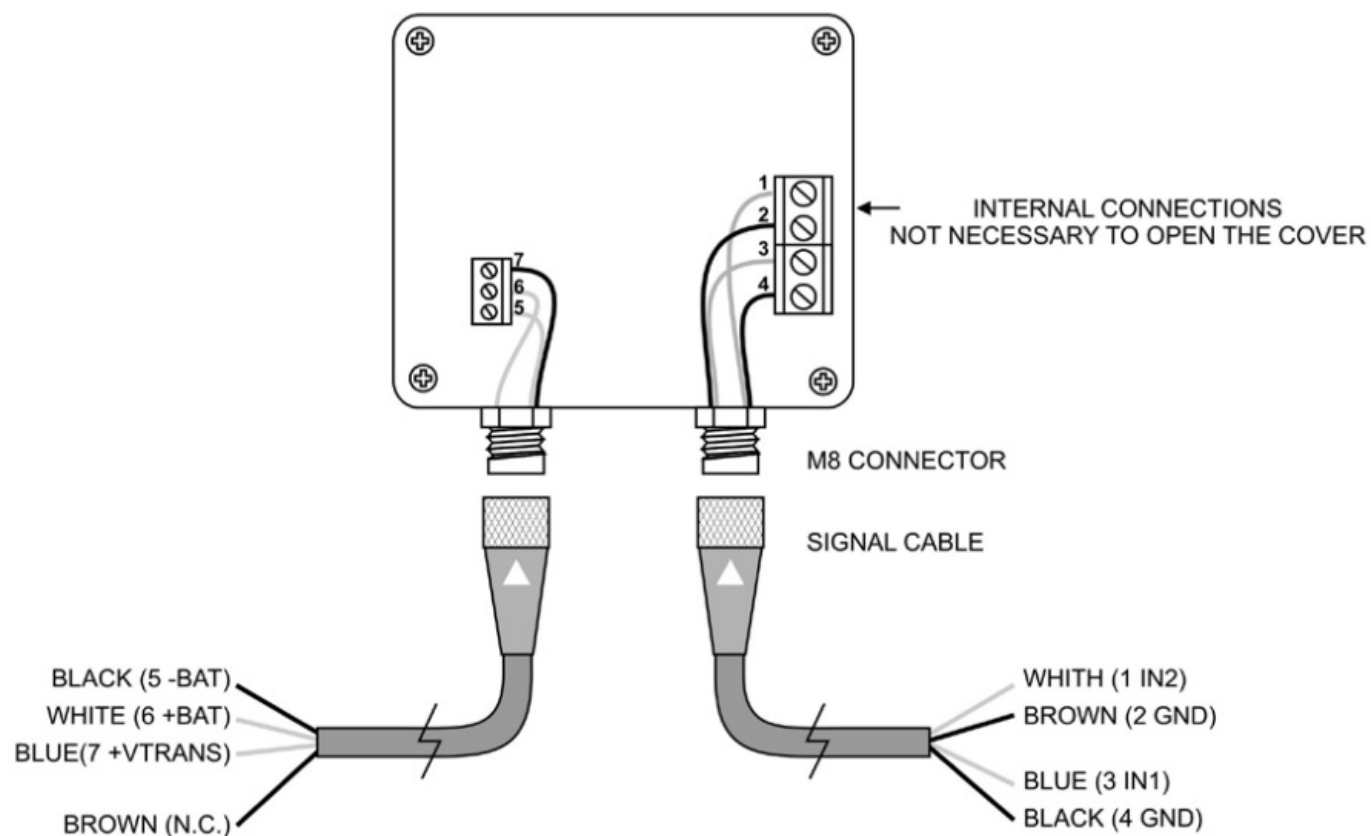
**Figure 11** – IP65 Version (Connections internal view)

**Note:** 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.

#### IP67 MODEL

In the IP67 version, a M8 connector is provided for signal input. When required, a second M8 connector can be installed to output the signal for commanding the external power supply. The cables are supplied with the logger.

**Note:** 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 12 – IP67 Version (External connectors)**

The wires have the following connections:

**Table 1 – Channels cable**

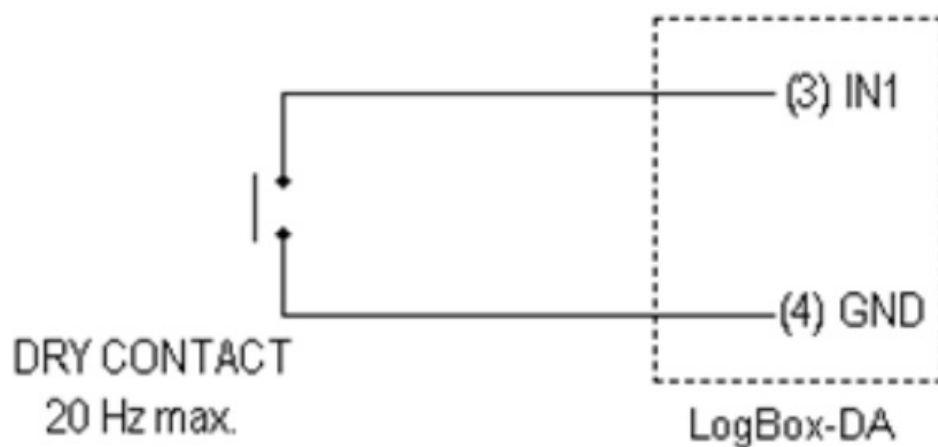
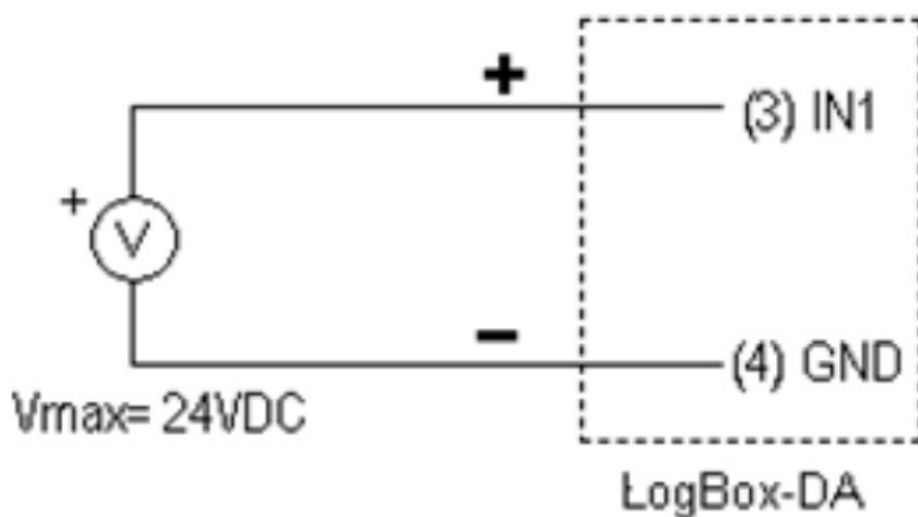
CHANNELS CABLE (RIGHT)	CONNECTION
Blue	Channel 1 – (3 IN1) – positive (+)
Black	Channel 1 – (4 GND) – negative (-)
White	Channel 2 – (1 IN2) – positive (+)
Brown	Channel 2 – (2 GND) – negative (-)

**Table 2 – Switch cable**

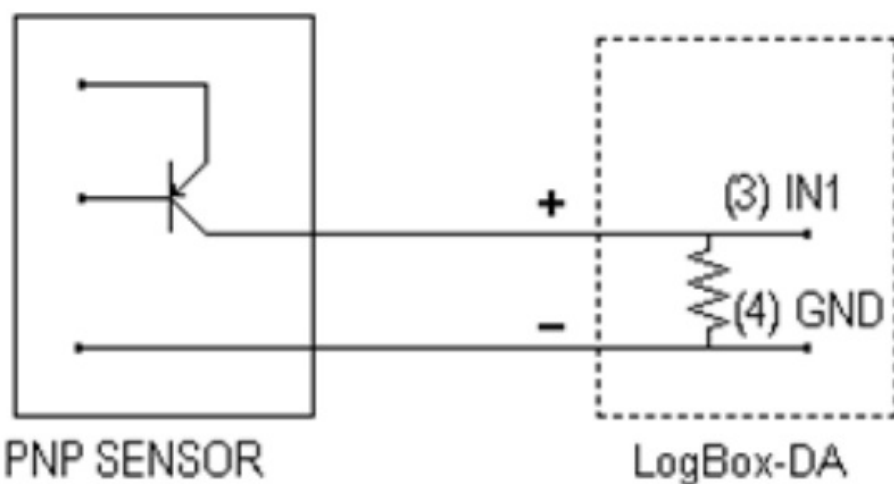
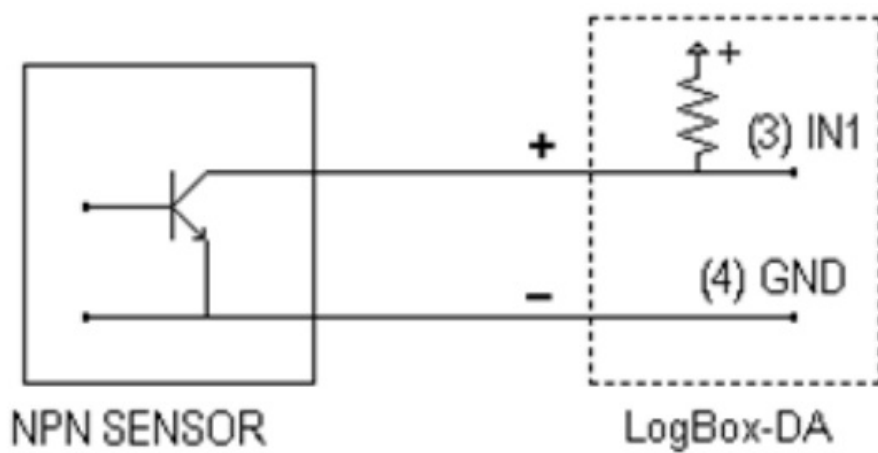
SWITCH CABLE (LEFT)	CONNECTION
Blue	Transducer (7 +VTRANS)
Black	External Battery (5 -BAT)
White	External Battery (6 +BAT)
Brown	Not connected

## INPUT CONNECTIONS – DIGITAL CHANNEL

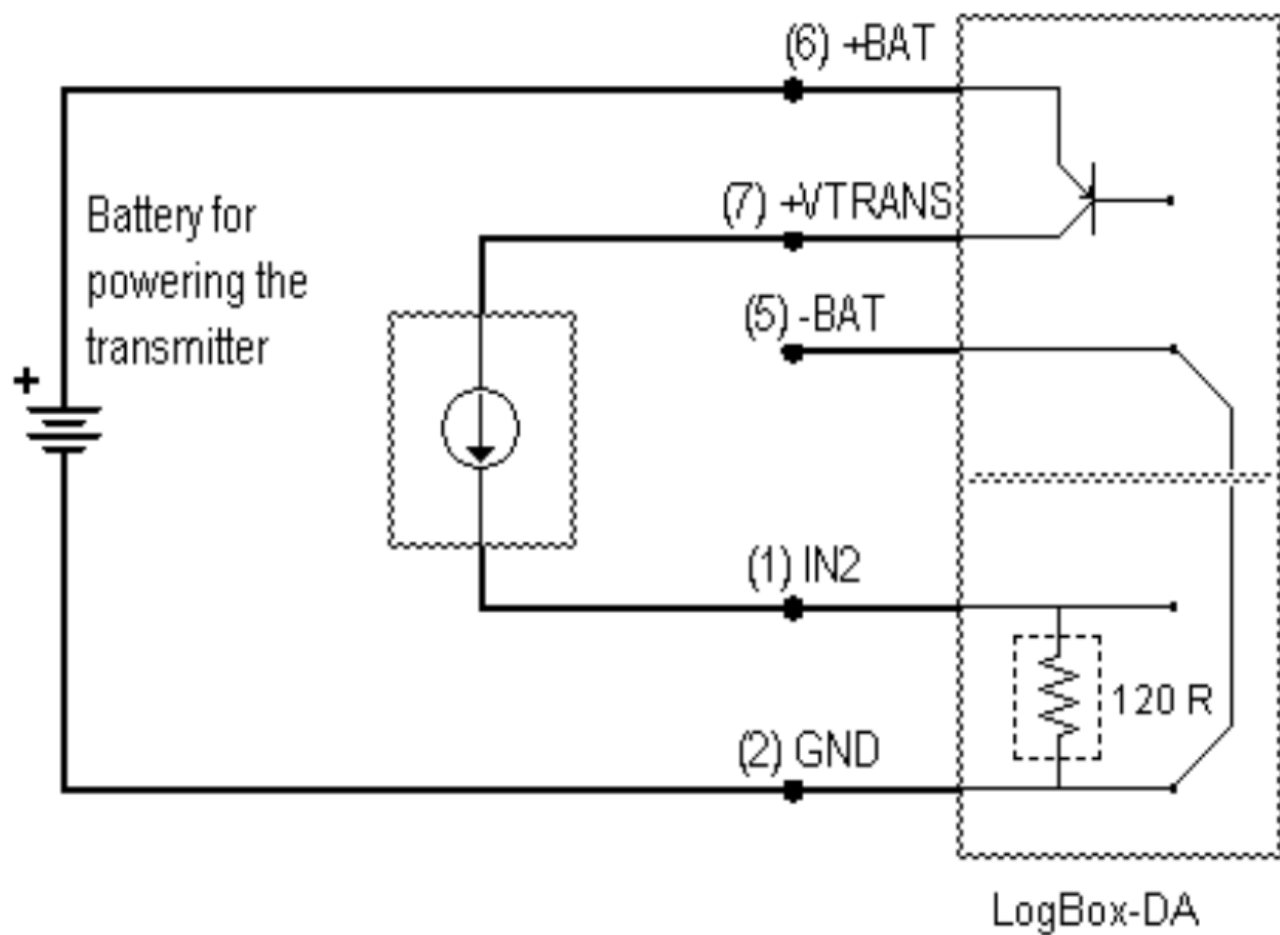
The following figures show the connections for the possible input types:



**Figure 13 – Voltage Pulse and Dry Contact**



**Figure 14** – NPN and PNP open collector input



**Figure 16** – Example of the battery switch powering a transmitter.

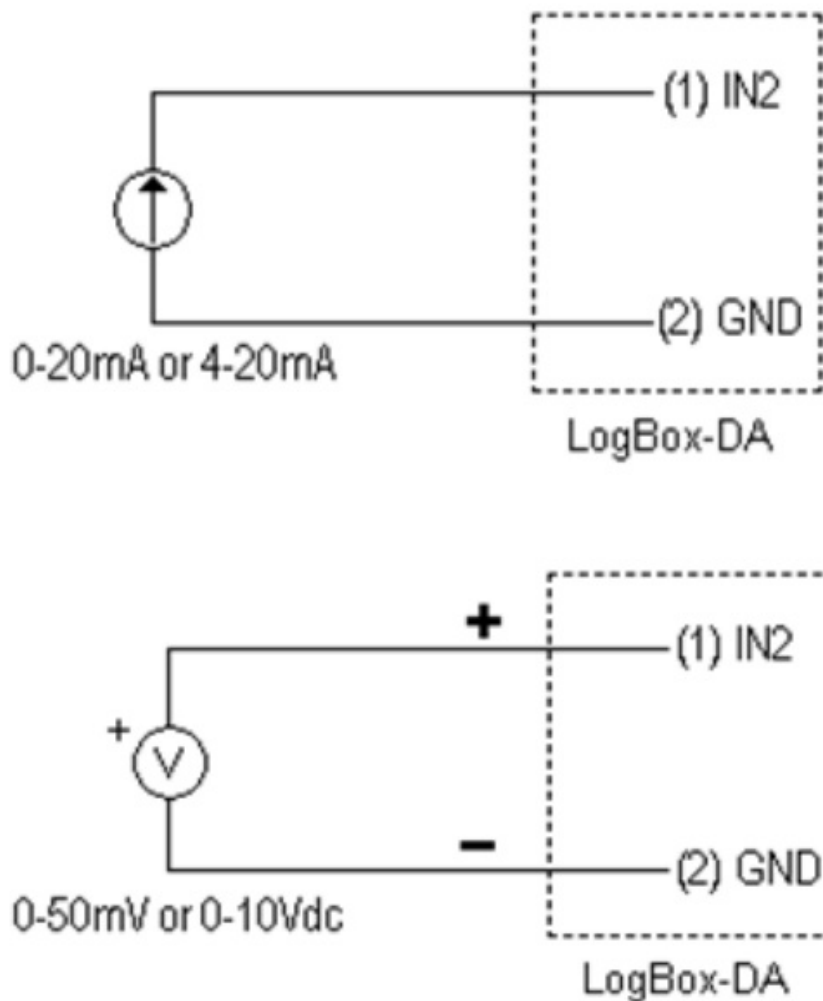


## INPUT CONNECTIONS – ANALOG CHANNEL

To use channel 2 properly, the internal jumpers J1 and J2 must be positioned according to the chosen input type, as shown in Table 3.

The setting of these jumpers is for measuring 4-20 mA or 0-20 mA signals.

The following figures show the connections for the possible input types:



**Figure 15** – Current and voltage inputs

**Table 3** – J1 and J2 positioning

INPUT SIGNAL	J1 POSITION	J2 POSITION
4-20 mA / 0-20 mA	A	A
0-10V	B	B
0-50 mV	C	C

## EXTERNAL BATTERY SWITCH

The figure below shows an example of using the internal electronic switch during the actuation of external devices.

In this example, channel 2 is configured for the 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 that “switches on” the power supply seconds before the logger measures channel 2. This measure allows the external battery to power the logger for a much longer time.

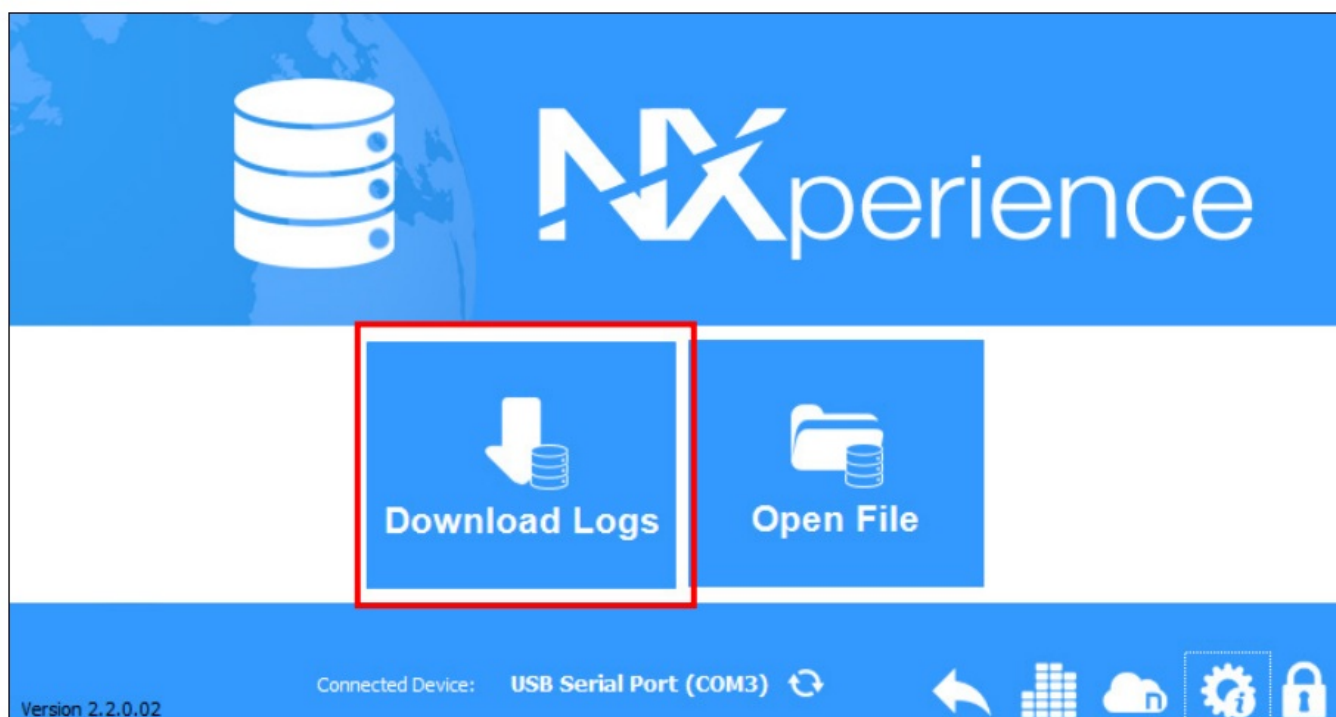
## INSTALLATION RECOMMENDATIONS

Small electrical signal conductors should run through the plant separately from drive conductors or conductors with high current or voltage values. If possible, in grounded conduits.

The instrumentation supply must come from a proper instrumentation network.

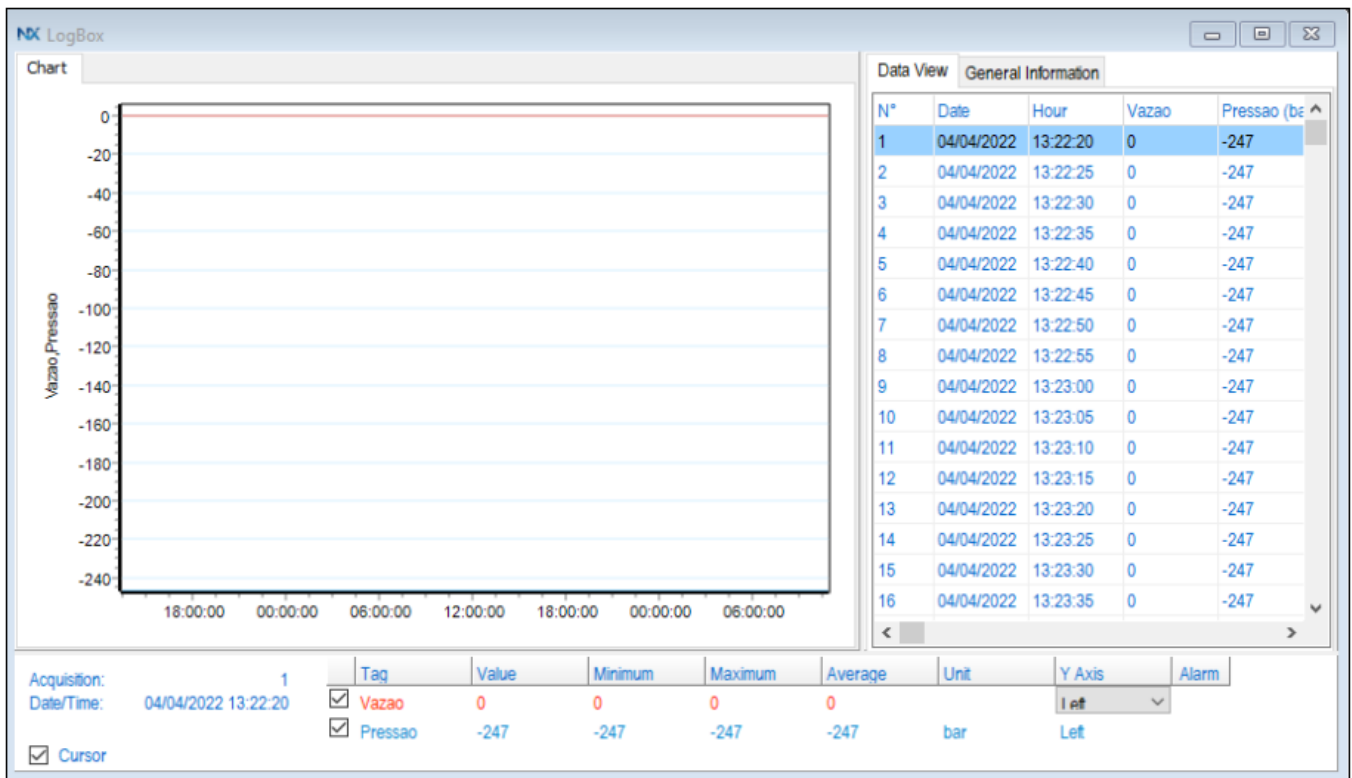
## DOWNLOADING AND VISUALIZING DATA

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 17 – Download logs**

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 18 – Graph**

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 two 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:



**Figure 19 – Toolbar**

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

## 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 20** – Data View

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.

#### GENERAL INFORMATION


Data View		General Information
Data Logger		
Model	LogBox-DA	
Serial Number	21292319	
Firmware Version	1.14	
Memory Capacity	32768 Samples	
Vazao		
Input	Contato Seco	
Mode	Instantaneous	
Offset	0	
Lower Alarm	N/D	
Upper Alarm	N/D	
Pressao (bar)		
Input	4-20 mA	
Mode	Instantaneous	
Offset	0	
Lower Alarm	N/D	
Upper Alarm	N/D	
Download Information		

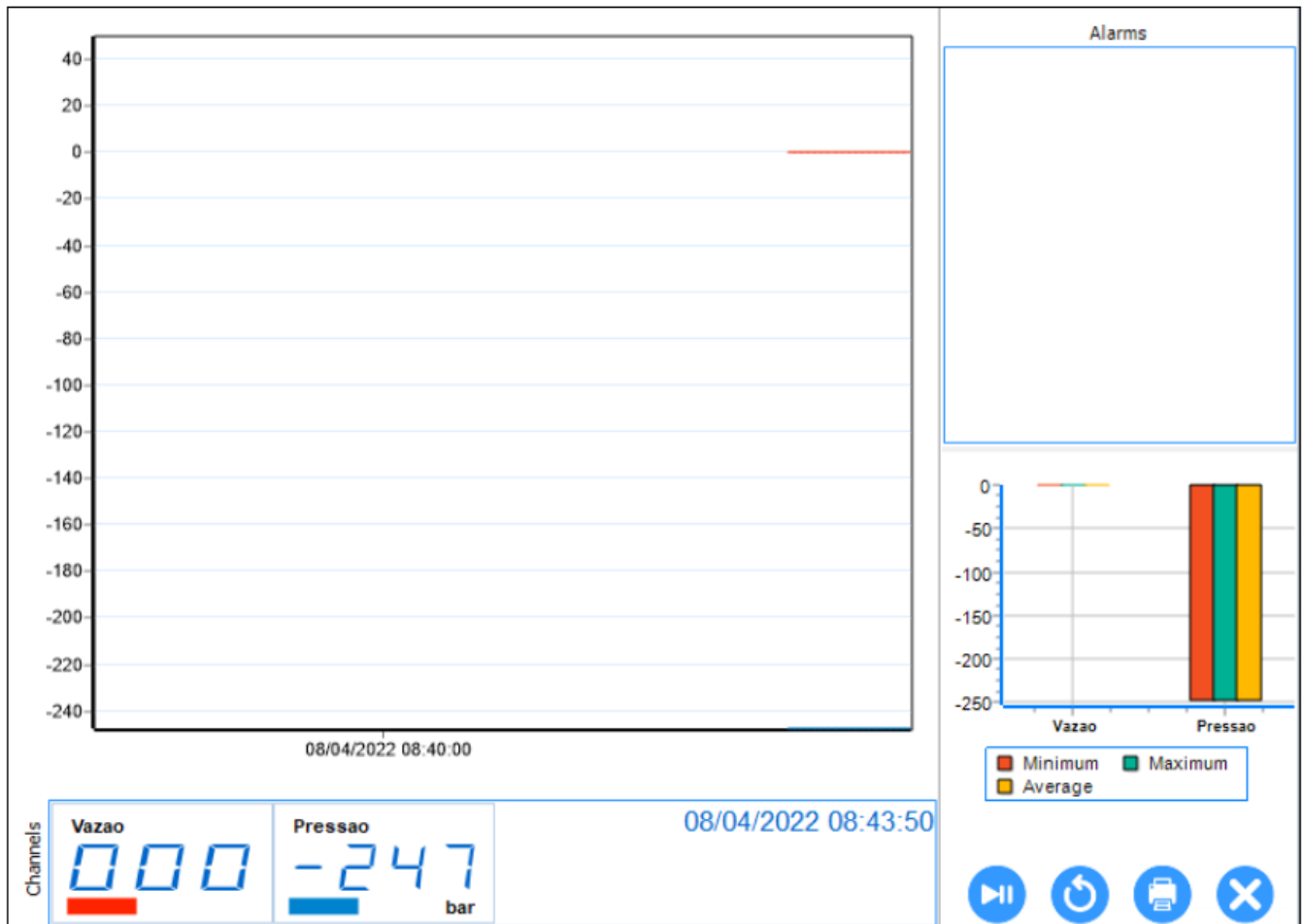
**Figure 21** – General Information

Displays information about the logger and its settings.

## 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 22 – Monitoring logs**

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.

## 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.
- When the device is opened, avoid liquid and/or dust contact.
- You should pay attention to the battery polarity. The battery should be placed with the positive terminal toward the center of the device.
- 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.
- When closing the housing, the cover must be put back on properly, ensuring the degree of protection of this model.

## TROUBLESHOOTING

### The indicator does not blink:

The indicator blinks intentionally dimly and can be difficult to see it in high-light locations. Therefore, you need to

make sure that it is not actually blinking.  
Check that the battery is correctly installed.  
Make sure that the battery is not discharged.

**It is not possible to communicate with the logger:**

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

**SPECIFICATIONS**

**Inputs:**

**Channel 1:** NPN, PNP, Pulse or Dry Contact

**Level 0:** 0.0 up to 1.0 Volts

**Level 1:** 2.0 up to 24.0 Volts

**Max. frequency:** 4000 Hz for NPN, PNP and Pulse 20 Hz for Dry Contact (internal Debounce)

**Input Impedance:**

**NPN, PNP and Pulse:** 105 k $\Omega$

**Dry contact:** Capacitance of 100 nF

**Maximum counting:** 65535 per period.

**Channel 2:** 0-20 mA, 4-20 mA, 0-50 mV and 0-10 Vdc,  
**internally selectable.**

**Input 2 resolution:** 14 bits or 16.384 levels.

**Input 2 accuracy:** 0.2% of range input signal.

**Input Impedance:**

**0-20 mA and 4-20 mA:** 120  $\Omega$

**0-50 mV:**  $\gg 10$  M $\Omega$

**0-10 Vdc:**  $> 120$  k $\Omega$

**Memory capacity:** 64000 (64k)

**Interval between readings:** Minimum: 1 second, maximum: 18 hours

**External battery switch time:** 0 to 10 s

**Power:** 3.6 V lithium battery (1/2 AA)

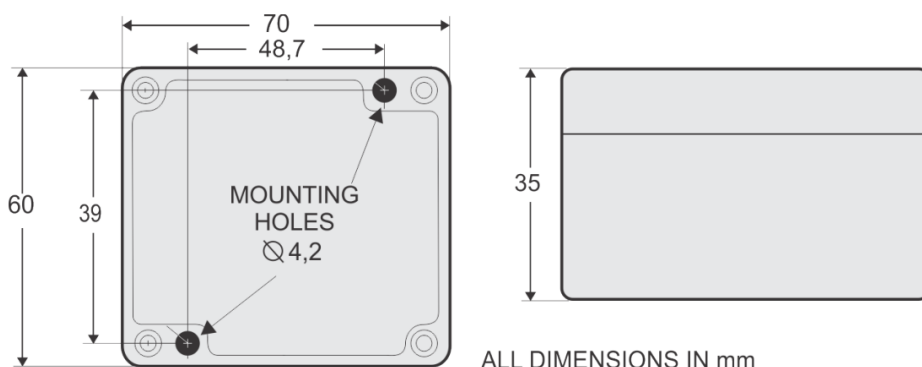
**Estimated autonomy:** 200 days with one weekly download and 5 minutes measuring interval. Battery life depends heavily on data retrieval frequency.

**Operation temperature:** From  $-40^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

**Protection Degree:** IP65 and IP67 models (see lateral label on product)

**Housing Material:** ABC + PC, Polycarbonate film.

**Dimensions:** 60 x 70 x 35 mm



## Figure 23 – Dimensions

### PACKAGE CONTENTS

When unpacking the logger, in addition to the manual, you should find:


- One LogBox-DA data logger.
- Two external connection cables (IP67 model only).

### WARRANTY

Warranty conditions are available on our website

[www.novusautomation.com/warranty](http://www.novusautomation.com/warranty).

### Documents / Resources

	<p><a href="#">NOVUS LogBox-DA Electronic Data Logger</a> [pdf] Instruction Manual LogBox-DA, Electronic Data Logger, LogBox-DA Electronic Data Logger</p>
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### References

-  [Warranty - Company - NOVUS Automation Inc.](#)