SAMLEX EUROPE® B.V.

Battery Data Logger (BDL)

Model No.

BDL 24
BDL 48
BDL 96

Manual

**Please read this manual before operating your BDL**

FEATURES

- Suitable for batteries up to 24/48/96 V
- Adjustable measuring intervals
- Extremely low operating current
- USB (adjustable & downloadable)
- Log the service life of a battery
- Analysis software (Windows 7 – 32 bits or higher)
- Reverse polarity protection

PURPOSE

The BDL24/48/96 (hereinafter: BDL) is a logger meant for the storage of the voltage and temperature of a battery with adjustable measuring intervals.

The BDL operates in combination with the BDL Smart View software. The BDL can be adjusted and data can be downloaded by using this software. The downloaded data can also be analysed. The BDL can log data for several years depending on the set measuring intervals.

WIRING DIAGRAM

The BDL has two functions. Measuring and saving the temperature and voltage and outputting and analysing the saved data. If the BDL is connected to a battery, it will operate as a data logger. After the BDL has been connected to a PC through a USB, the data from the BDL can be downloaded and analysed using the BDL Smart View software.

BDL Logging

FUSE 1A

+ - BATTERY

BDL Configure, download, analyse

USB

PC
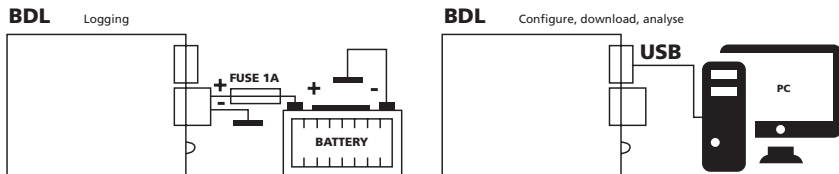
INSTALLATION

Connections	Connection method
Positive (+): Positive pole connection to the BDL.	1. Connect the positive (+) terminal of the BDL to the positive (+) terminal of the battery.
Negative (-): Negative pole connection of the BDL.	2. Connect the negative (-) terminal of the BDL to the negative (-) terminal of the battery.
USB: Micro USB connection.	

Warnings:
- The product must only be connected by skilled fitters/mechanics who are aware of the regulations for working with (high) battery voltages.
- The use of poor quality connection materials and/or excessively thin cables may result in damage to the product.
- A short circuit between the positive and negative terminals of the battery may cause severe damage to your system.
- Always use a 1 amp fuse that is connected as shown in the figure above.
- Always use the "hardware safe removal and media ejection " option in Windows before disconnecting the BDL.
- Only download data from the BDL through a USB when it is disconnected from the battery.

OPERATION

BDL24/48/96
Hardware for logging the temperature and voltage. If the BDL is connected to a battery, the LED will flash 5 times after 10 seconds and immediately take a measurement. Next, the LED will flash every 10 seconds. When measuring fast, the LED will flash every 1.875 seconds.

BDL Smart View
Software for analysing logged data and setting the measuring intervals of the BDL. The BDL can be connected to a computer running under Windows through a USB cable.
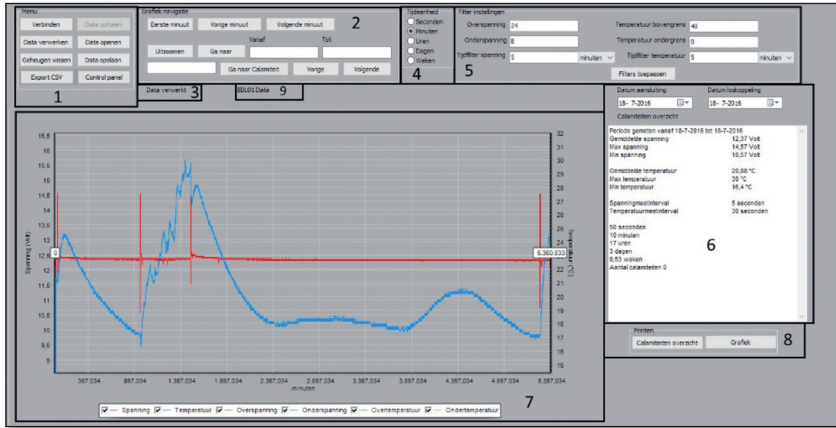
Figure 1: BDL Smart View

Figure 1 shows the full BDL Smart View software. Every component is numbered and is described below item by item.

1. Menu.
2. Graph navigation.
3. Information field.
4. Time unit selection panel.
5. filter settings.

6. Overview of calamities.
7. Graph.
8. Print the log and graph.
9. BDL detection

1. Menu

The user can make a connection with the BDL, Settings, retrieve data, save and analyse from the menu panel. The user can open saved data to perform a (new) analysis. The user must connect the BDL through a USB cable to the PC to retrieve the data. The 'Retrieve data' button will become visible by, next, pressing 'Connect' provided that the connection has not failed (retrieving data may take a few minutes depending on the quantity of data that has been saved). A progress bar will be displayed when data is retrieved. The LED of the BDL will also light up during the transfer. When the transfer has been completed, the user can process the data by pressing 'Process data'. Processing data can also take several minutes depending on the quantity of data. A progress bar will indicate how long it will take. The data on the BDL can be deleted by using the 'Erase chip' button. By pressing this button, all saved data will be lost. The complete memory of the BDL can again be used. Deleting the data from the BDL memory will take approximately 40 seconds. Do not remove the BDL too early from the PC. A progress bar will give an indication of how long it will take. The 'Export CSV' button is used for exporting data to a CSV file. Where the voltage, temperature, voltage time and temperature time will be separated by the ';' symbol. The user will be able to import the data in a spreadsheet program of their choosing.
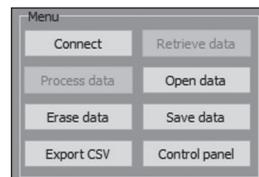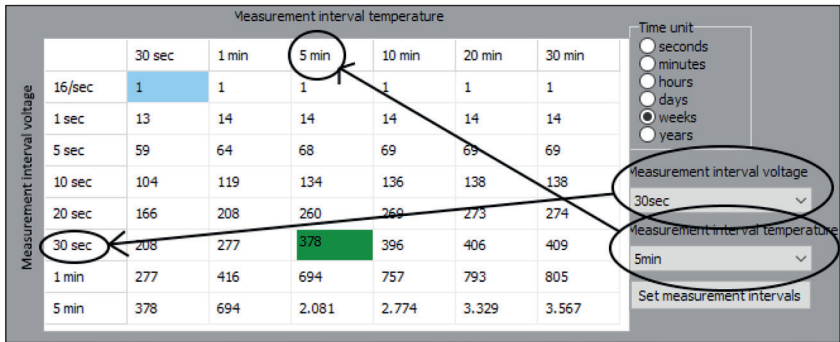

Figure 2: Menu

Figure 3: Configuration screen

The last button is 'Configuration screen'. Figure 3 will be displayed when the Configuration screen option is used. The user can set the BDL measuring intervals through this screen. A table will be displayed that shows how long you can log data with regard to the settings selected by the user. When the user has made a selection of the envisaged measuring intervals, the BDL can be set by using the 'Measuring intervals' button. The measuring intervals are set to 1 minute for the voltage and 5 minutes for the temperature ex factory. A period of 13 years can be logged.
Pay attention! Ensure that the logged data is not lost when the measuring intervals are set! Do not, therefore, forget to save the logged data!
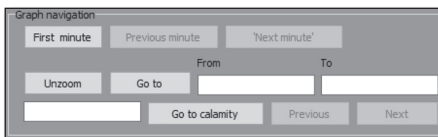
2. Graph navigation

Figure 4: Graph navigation

You can navigate through the graph in the graph navigation panel per time unit. The time unit used here can be selected in the 'time unit panel' of component 4. You can also view every calamity individually. A calamity is a moment when the voltage and/or temperature has exceeded the limit values set by the user (Figure 7). Every calamity will have its own number and the calamity will be fully displayed in the graph if this number is entered and the user presses the 'Go to calamity' button. You can also view specific periods with regard to the logged data.

3. Information field

The information field provides feedback to the user with regard to actions of the user or when a specific action has been completed.
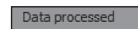

Figure 5: Information field

4. Time unit panel

The Time unit panel ensures that the user can change units around the time axis of the graph. The moments of the calamities will also be reported in the overview of calamities using this time unit. This setting is also used in the overview of calamities (Figure 6).

Figure 6: Time unit panel

5. Filter settings

The filter settings panel can be used to filter the logged data in an easy manner. Filters can be created for both the undervoltage and overvoltage as well as a temperature that is (too) low or (too) high. An independent time filter can also be set for the voltage and temperature.
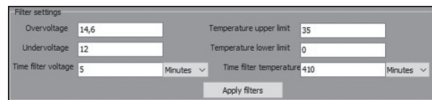

Figure 7: Filter settings

Example: the user wants to filter all instances where the voltage has been higher than 13 V for longer than 3 minutes. This can be achieved by entering 13 V in 'Overvoltage' and 3 minutes in 'Time filter voltage'. To ensure that the 'Overvoltage', 'Temperature upper limit' and 'Temperature lower limit' filters are not used, values must be selected here that do not occur in the situation of the user.
Figure 8 shows the results of such a filter setting.

Figure 8: Calamities

6. Overview of emergencies

Figure 9 shows an example of an event log. First, general information related to the BDL will be shown. If the filter(s) of the BLD Smart View have been used, all traced calamities will be shown here. Every calamity is given a number. This number can be used to display the relevant calamity in the graph through the graph navigation panel. For more information, also see item 5: filter settings.
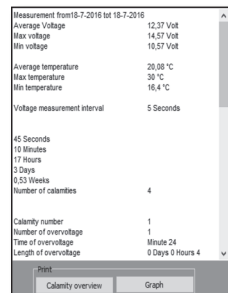

Figure 9: Calamity overview

6

7. Graph

Figure 10 shows a graph example. The red line with the related left axis shows the voltage within this context. The blue line with the related right axis shows the temperature. The other lines show the set limit values. The time is indicated through the horizontal axis. The unit that is displayed here can be adjusted by using the 'Time unit panel' (Figure 6). The user can select which lines must be displayed in the graph below the graph. *Note! The graph may have a delayed response if many data items have been collected.*
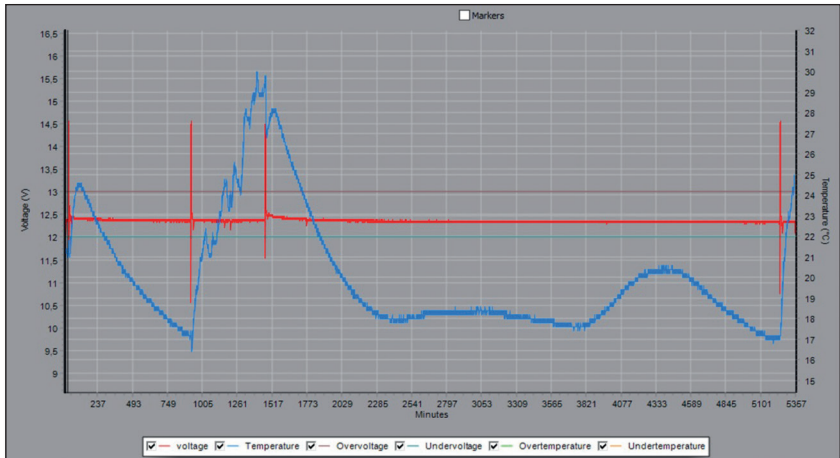

Figure 10: Graph

8. Print the overview of emergencies and the graph

You can print/save the overview of emergencies and the graph with these two buttons.

  Figure 11: Over and graph printing

9. BDL24/48/96 detection

When processing data. This section will tell the user which BDL has been connected.
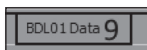
  Figure 12: BDL detection

ANALYSIS EXAMPLE

We include a short example of an analysis here. The user will be able to trace emergencies after completion. Emergencies are values that are too high or too low for the voltage and temperature that last for more than a period as set by the user.

Step 1. Connect the BDL to the PC.
Step 2. Start BDL Smart View.
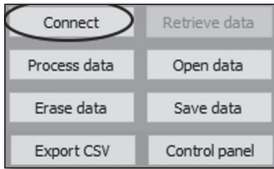Step 3. Press 'connect'.
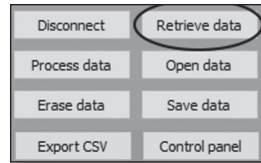Step 4. Press 'Retrieve data'.

Figure 13:
Menu click connect

Figure 14:
Menu click Retrieve data

Step 5. The user can set filters if required. The user can apply the filters by using the 'Apply filters' button. The data will also be processed immediately and a graph will be created. Step 6 can then be skipped.
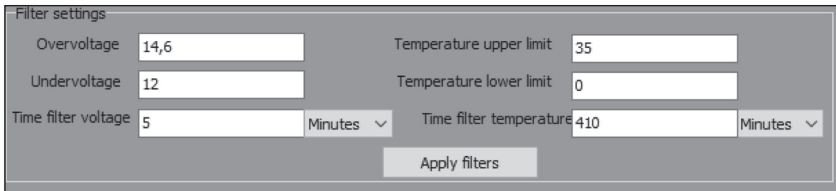

Figure 15: Filter settings

Step 6. Press 'Process data'. The data will now be processed by the software and a graph will be displayed.
Step 7a. Navigate through the graph to find details. Also see item 2: Graph navigation from the Operation section.
Step 7b. In addition to the 'Graph navigation panel', you can also use your mouse to navigate through the graph. You can zoom into the selected area by dragging from the left at the top to the right at the bottom over the area to be inspected while keeping the left mouse button pressed. You can zoom out by dragging from the right at the bottom to the left at the top while keeping the left mouse button pressed or by pressing the 'Zoom out' button. Figure 19 displays an example of zooming in.

Figure 16: Click process data

Figure 17: Graph navigation

Step 8. The user can determine how long a specific period has lasted in the graph by using the markers that can be found to the left and right of the graph. The markers will be activated if the user selects the markers at the top in the graph. When the markers are no longer required, the user can deactivate them by removing the check mark (by deselecting). The system will indicate how long the period is between two markers at the top of the graph (Figure 18) by dragging the markers. The time unit is determined through the time unit panel (Figure 6).
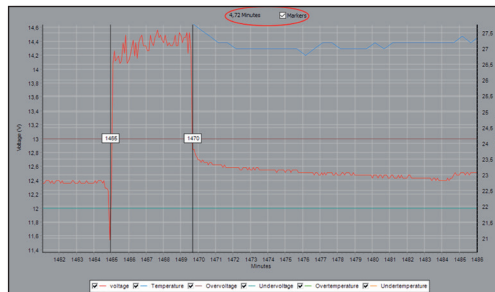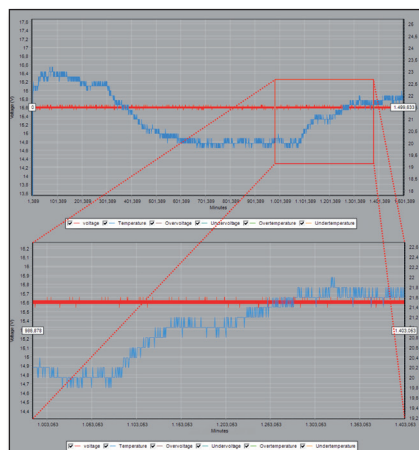

Figure 18: Markers

Figure 19: Zooming in

TECHNICAL DETAILS

HARDWARE	
Supply voltage BDL24	3.3 ... 35.0V DC
Supply voltage BDL48	12.0 ... 75.0V DC
Supply voltage BDL96	30.0 ... 120.0V DC
Power consumption BDL24	256 µA at 12V
Power consumption BDL48	460 µA at 48V
Power consumption BDL96	500 µA at 80V
USB	2.0
Temperature range	-20 to 80 °C
Voltage accuracy	<1%
Timing accuracy	<0.1%
Temperature accuracy	+/-1 °C @ 25 °C
Measuring resolution	10 bits
BDL erasability	Can be erased 100,000 times
BDL data retention	20 years
GENERAL	
Operational ambient temperature	-20 to 80 °C
Storage temperature	-30 to 90 °C
Galvanic insulation USB	No
SOFTWARE SMART VIEW	
OS	Windows 7 – 32 bits or higher
Disk space	30.7 Mb
PROTECTION	
Polarity protection	Yes, input through adiode
MECHANICAL	
Dimensions	45x35x16 mm
Connections	Micro USB 2 pole connector with a screw fitting
Installation	Screw or stick
Watertight housing	Yes
Housing material	Polyurethane
Housing colour	Black
Meets the following standards	CE

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