

1. GENERAL DESCRIPTION

The **SPY-BATT** is a device that allows to monitor the state of your battery.

The **SPY-BATT** stores over time the performance of the various voltages, currents and temperature of the battery in use. It can be installed on 24V to 96V nominal battery voltage and it is capable of measuring both currents of charge or discharge from 1A to 800A. Once installed, the maximum absorption from battery is 200mW.

The device stores 5 years of general data regarding charge, discharge and pause events.

It shows detailed data of the last 165 days recorded every five minutes, that will allow to do an in-depth analysis of all stored values.

You can access the internal memory and download all the data stored by the **SPY-BATT** by removing the top panel and connecting a PC to the internal USB port.

Data will be kept permanently stored in the device even in absence of power.

An internal battery guarantees the internal clock working for at least 12 hours if the **SPY-BATT** is removed from the battery.

The **LadeLight Manager** program allows you to view and analyze easily and intuitively all downloaded data and to perform an in-depth and accurate analysis of the battery status, the mode of use and efficiency of your whole energy system. For the specific use of the **LadeLight Manager** program, see the relevant Software **LadeLight Manager** manual.

Please note: to access the installation and programming functions of the SPY-BATT device you must install the Lade Light Manager program on your PC and request the activation password to the manufacturer.

To ensure proper functioning, the installation must be performed only by properly trained qualified personnel and the specifications described below must be followed carefully.

The staff with the SPY-BATT device assumes full responsibility for the installation.

The manufacturer shall in no event be liable for any damage or loss of data resulting from incorrect installation or improper use.

2. CONTENT OF THE PACKAGE

- **SPY-BATT** wired with plugs and electrolyte probe.
- **Acid resistant cable Ties** to secure the wiring to the battery.



Check the package contents. If there any doubts contact your supplier.

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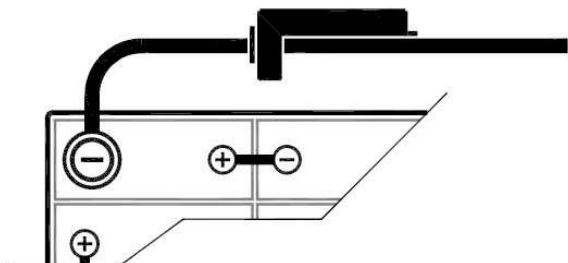
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3. PLACEMENT ON BATTERY CABLE

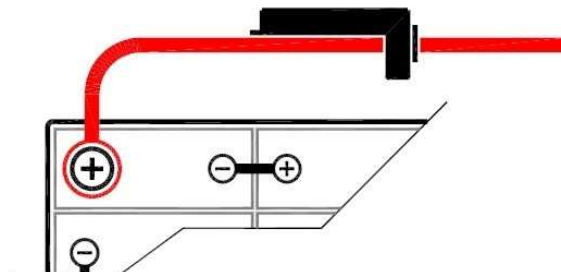
Slide a battery cable into the **SPY-BATT** front hole.
The device can be installed **ONLY** in one of the ways below:

WARNING! *Respect the indicated direction*

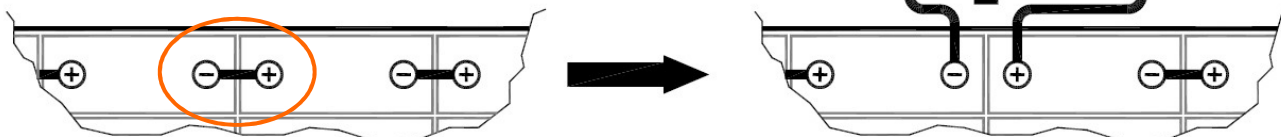
A) On NEGATIVE battery terminal:



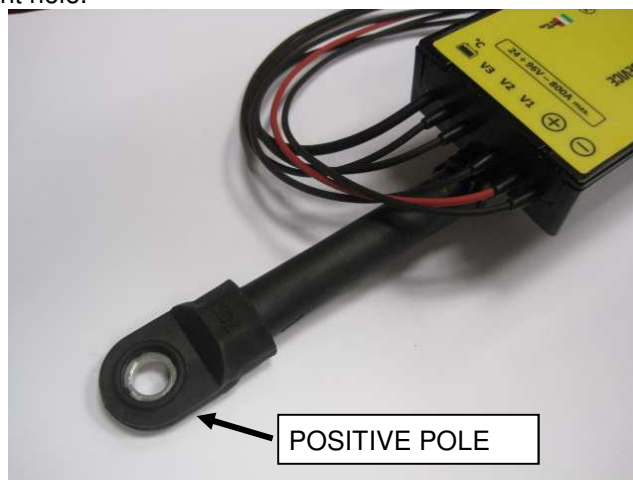
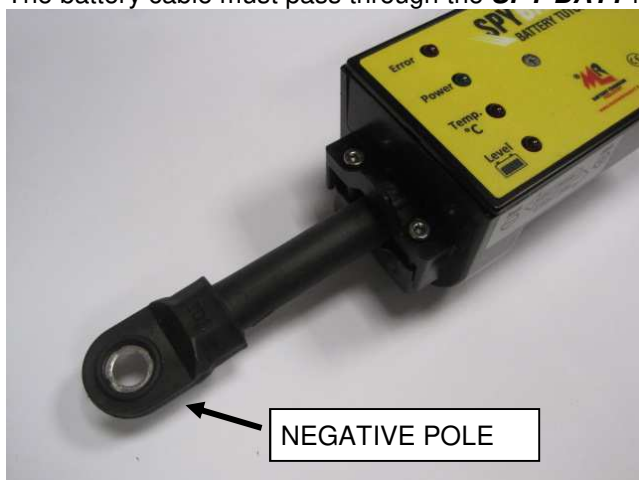
B) On POSITIVE battery terminal:



C) Between two adjacent elements:



The battery cable must pass through the **SPY-BATT** front hole.



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Block **SPY-BATT** on the cable in the desired position:

NOTE: Select the right side of cable block according to the cable diameter to be tightened:

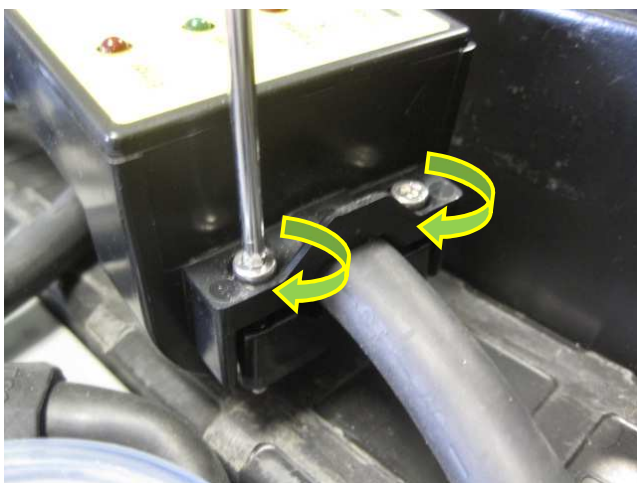
Till 25mm² (ø9mm max.)



Over 25mm² (ø 10 to 22mm max.)



Tighten the two screws to secure the cable block.



Secure with cable tie on the peg anchoring the cable.



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4. VOLTAGE PLUGS CONNECTION

The **SPY-BATT** has 5 plugs with insulation piercing pin. These plugs have to be connected on the output cables and connection cables between the various elements of the battery corresponding to the relative tensions.

WARNING:
CONNECT THE VARIOUS PLUGS RESPECTING THE ORDER INDICATED.
A wrong sequence might cause damage to the device.

1. Plug **⊖** (black wire) – Connect on NEGATIVE battery output cable
2. Plug **⊕** (red wire) – Connect on POSITIVE battery output cable
3. Intermediate Plug **V1** (black wire) – Connect on 1/4 Vbat position (**Max. 12 Elements**).
4. Intermediate Plug **V2** (black wire) – Connect on 2/4 Vbat position (**Max. 24 Elements**).
5. Intermediate Plug **V3** (black wire) – Connect on 3/4 Vbat position (**Max. 36 Elements**).

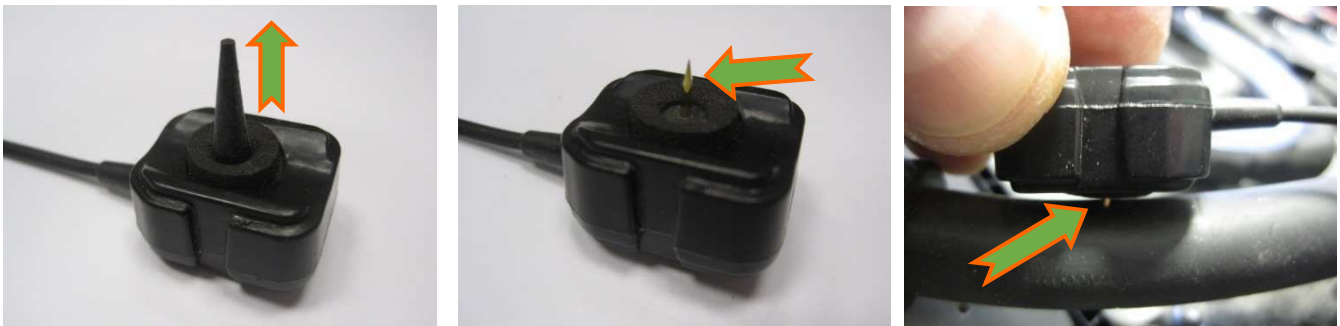
Follow these steps:

Remove the rubber protective cone to find out the grip nail.

WARNING

The nail tip becomes dangerous without protection. Handle with care to not to get injured

Connect the plug inserting the nail insulation piercing into the cable.



Lock plugs to the cable using the cable ties provided.

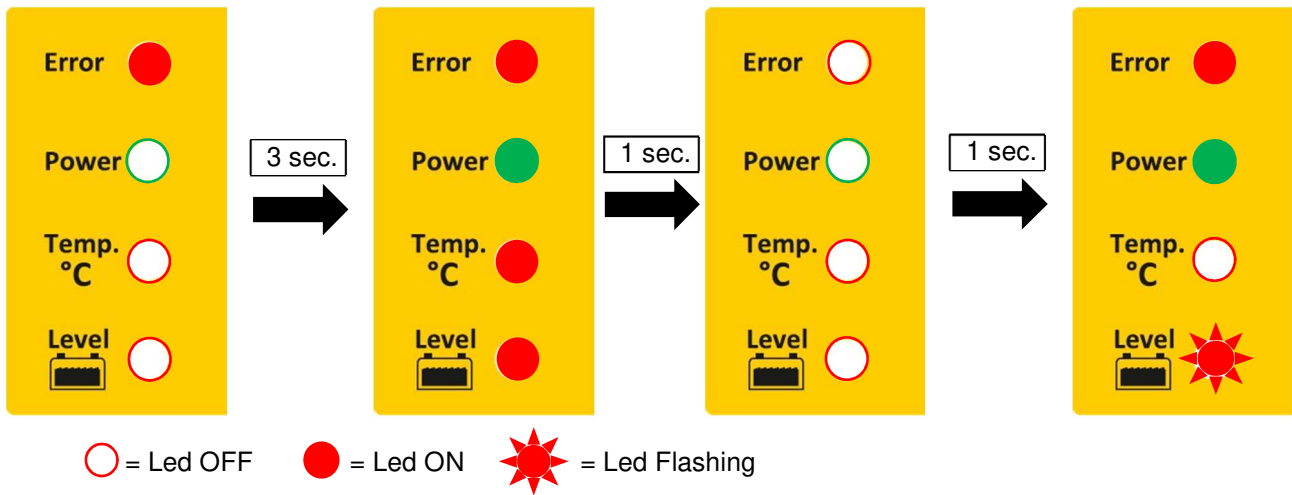


By connecting the plug on the positive terminal of the battery the **SPY-BATT** is powered.

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The device offers the following messages in sequence:

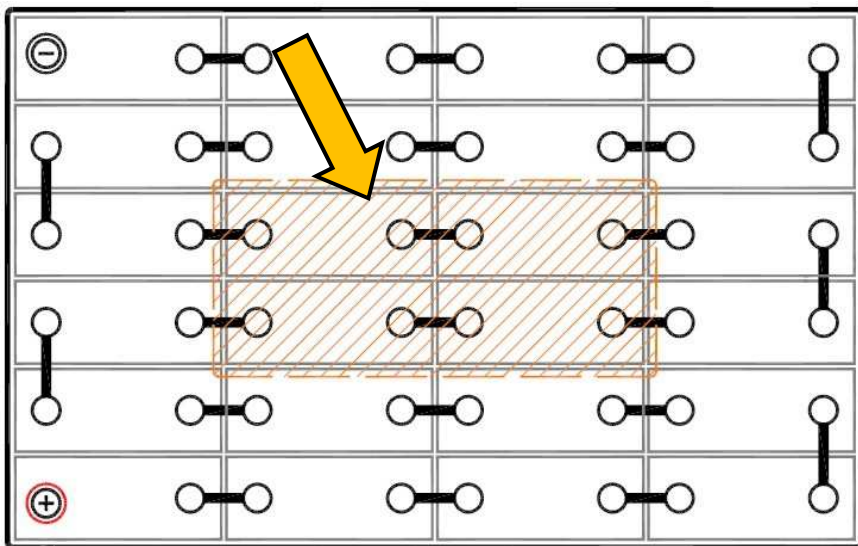


Proceed with the connection of intermediate plugs:



5. THERMAL PROBE INSTALLATION

Optimal area for probe placement (central battery elements):



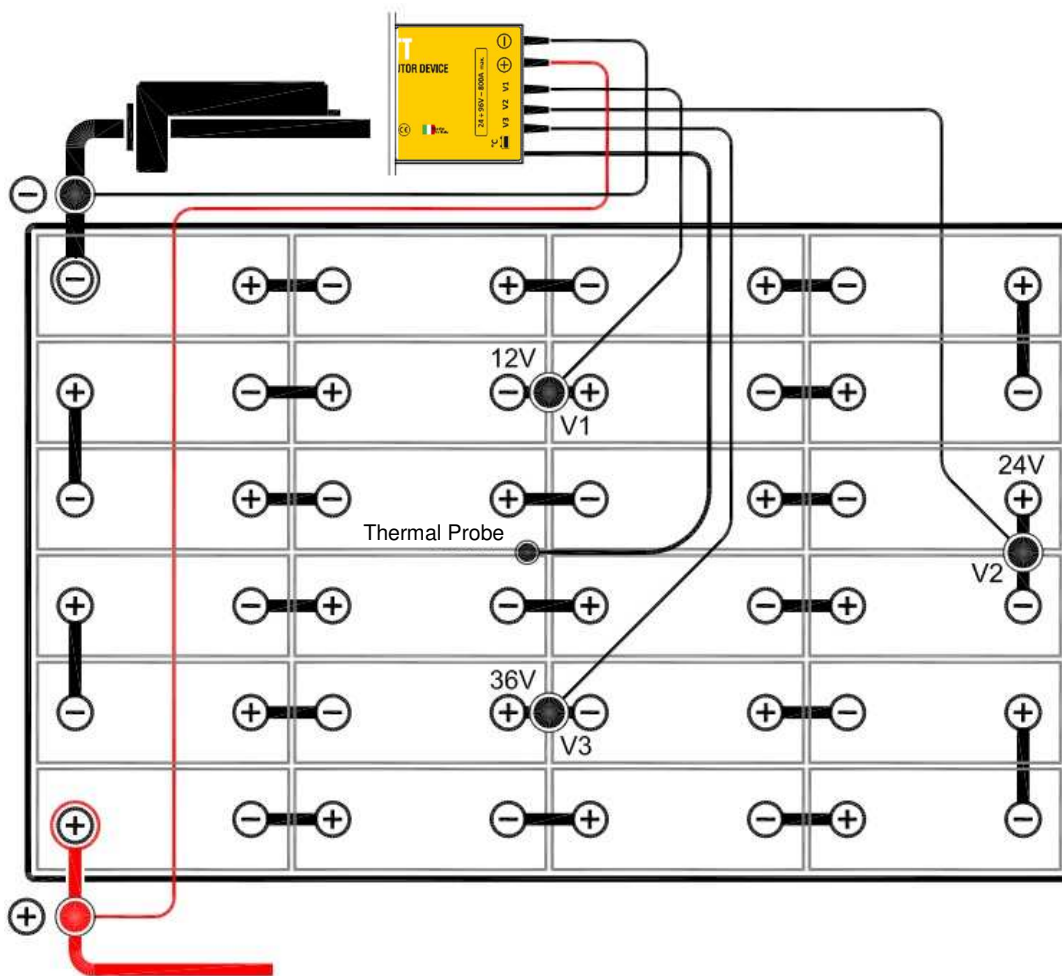
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Insert the thermal probe into the interstices between the battery elements by inserting it as far as possible:



Example of a full installation to a 48V battery:



NOTICE: the layout of the example shown may not match the actual layout of your battery

6. SPY-BATT INITIALIZATION:

The initialization of a new **SPY-BATT** requires three simple operations:

- a) Introduction of master data
- b) Internal clock set-up
- c) Setup and configuration test

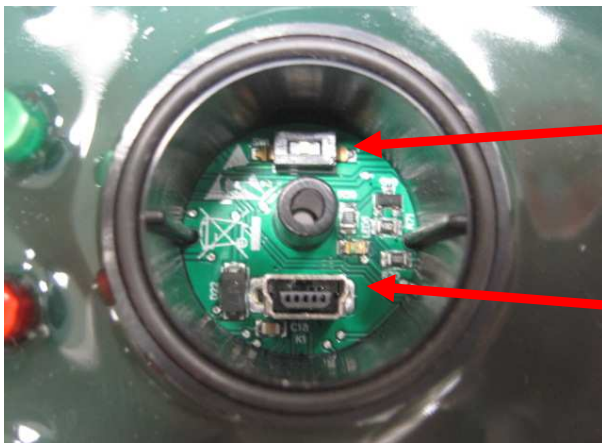
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Remove the screw and open the **SPY-BATT** cover:



Now it is possible to access the internal area:

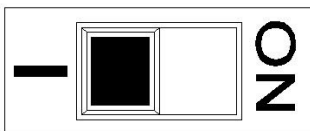


Battery Buffer activation switch

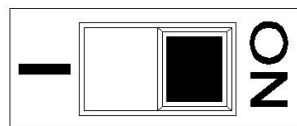
USB plug for PC connection

WARNING: BEFORE PROCEEDING WITH THE DEVICE INITIALIZATION, YOU MUST ACTIVATE THE BATTERY BUFFER SWITCH:

BUFFER BATTERY OFF



BUFFER BATTERY ON



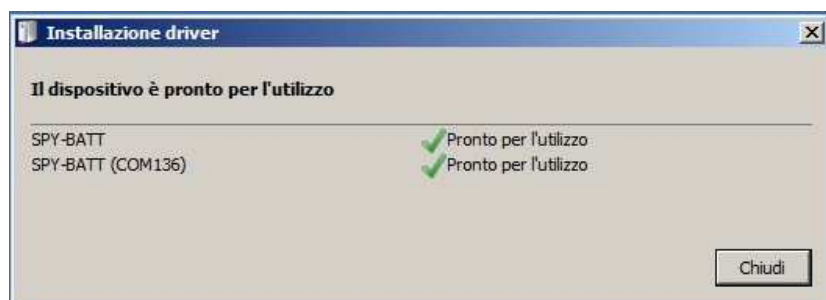
Connect the **SPY-BATT** to PC with USB cable. If the connection is active the internal red led starts to flashing :



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If your **SPY-BATT** is connected to the PC for the first time, the necessary drivers will be automatically installed. The SPY-BATT Drivers can be downloaded from site www.spybatt.it. (See **LADELIGHT Manager Software - User manual** for specifications)
Wait until the installation is complete:



Note: the language of this window depends of PC OS

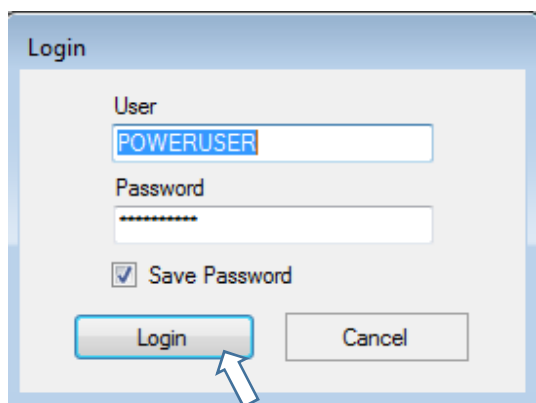
Open **LADE LIGHT MANAGER** program on your PC, using the icon:



The MAIN window appears:



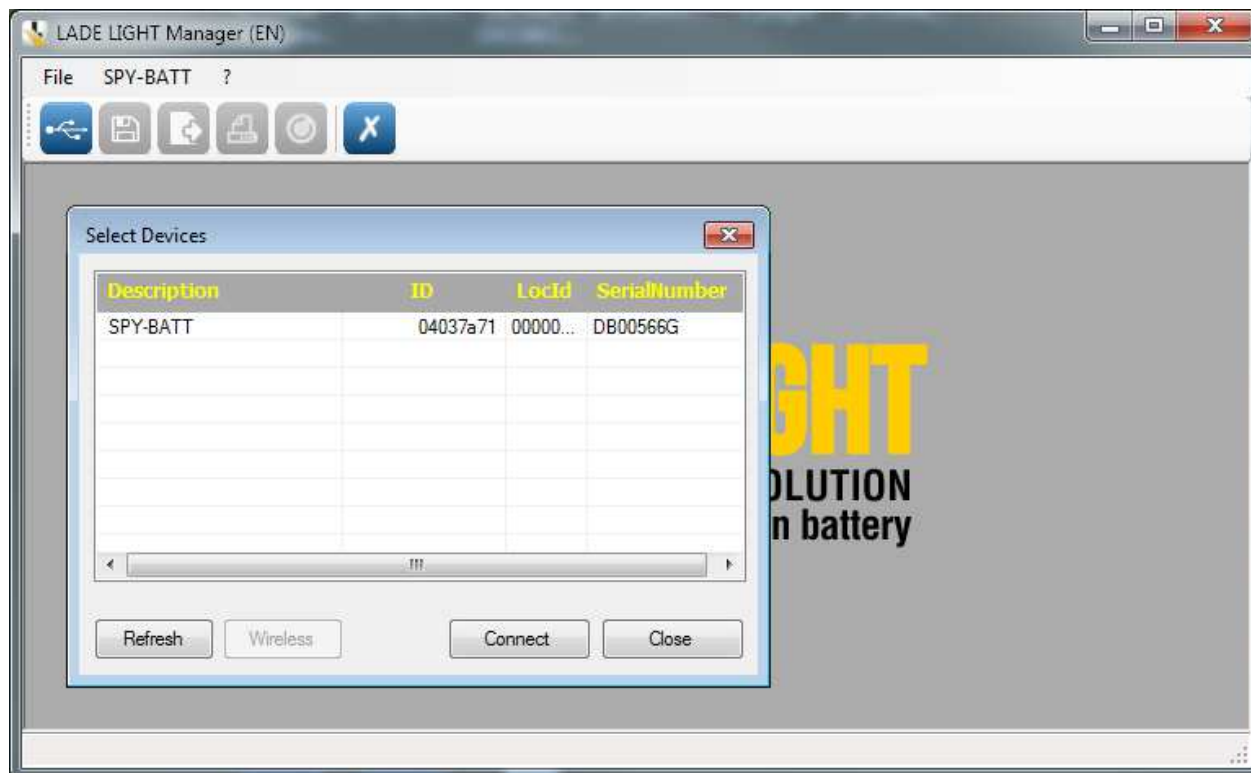
Type text **POWERUSER** in **User** field (default selection) and type the password provided by the manufacturer in **Password** field. Note: all fields are case sensitive.
Select "**Save Password**" option and Login.



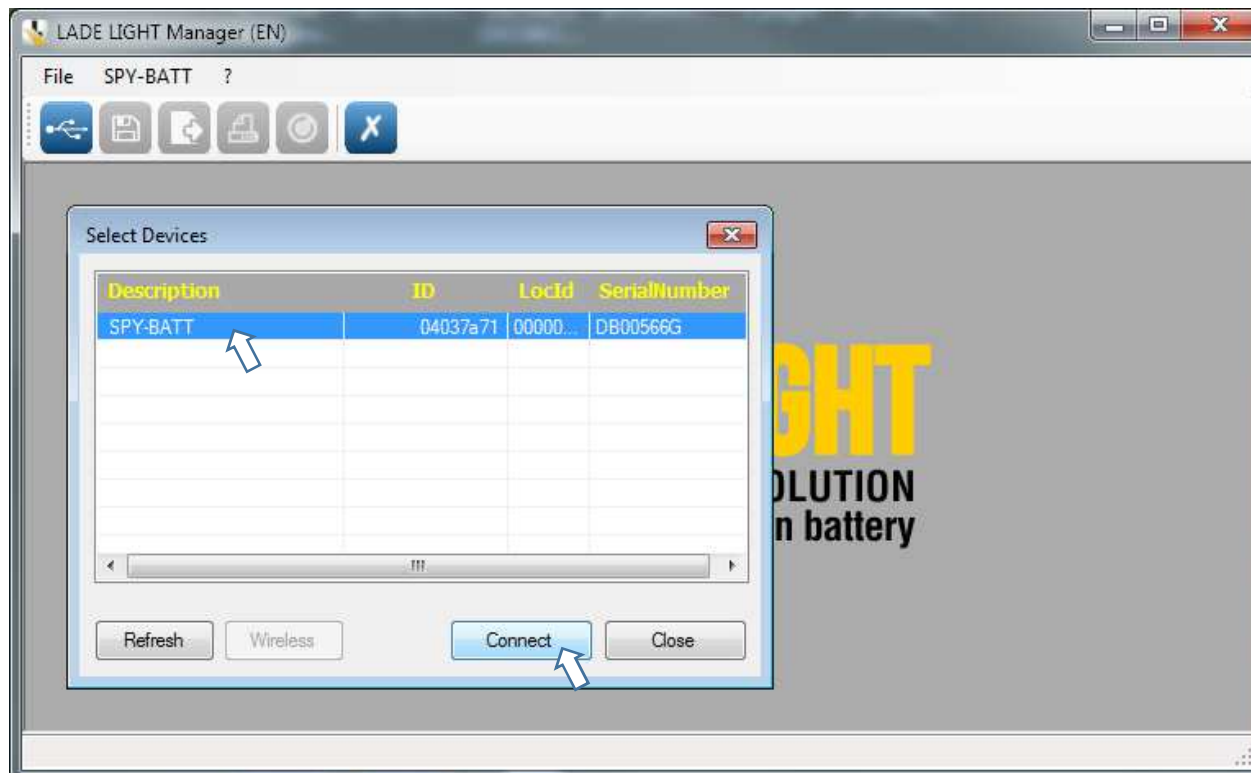
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Select the USB Search button:  to open the CONNECTED DEVICE LIST:



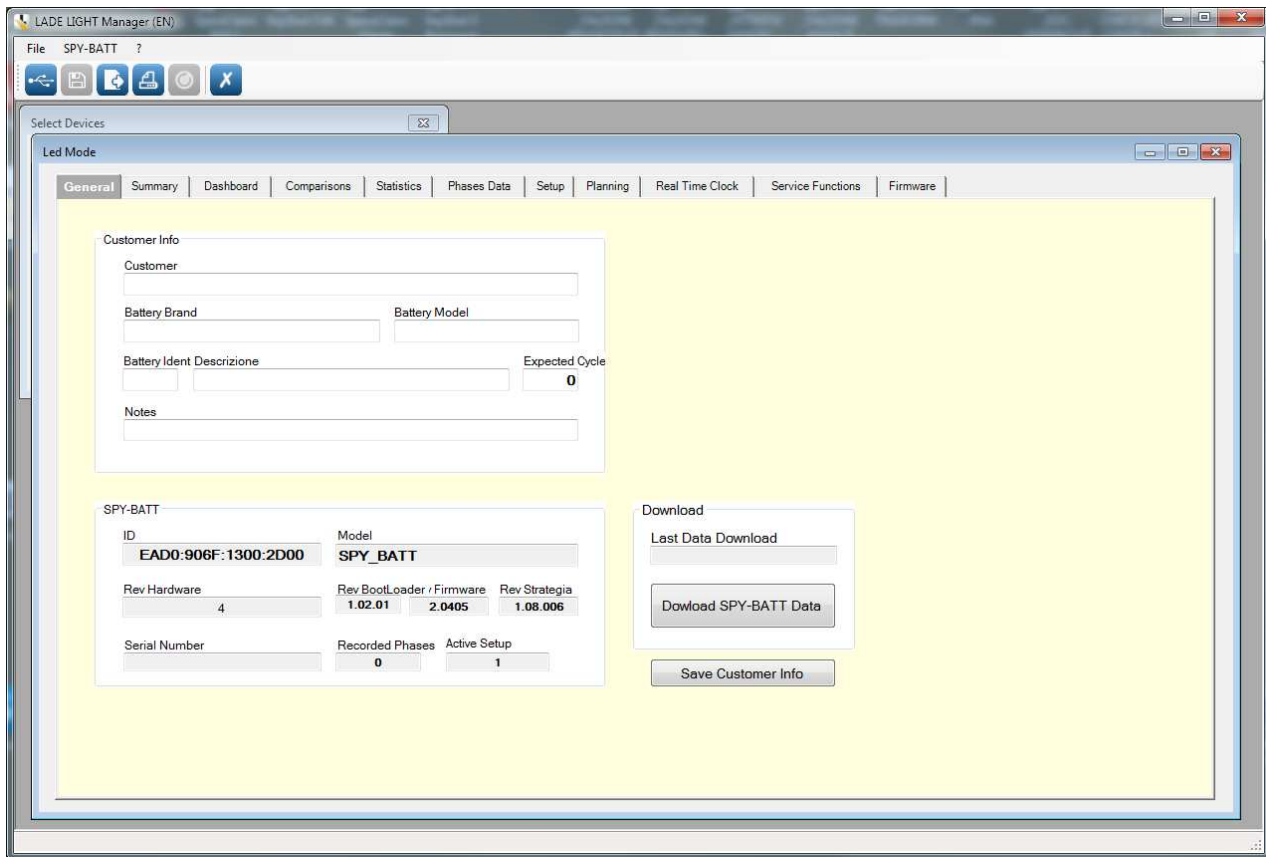
Select **SPY-BATT** in list and click on “**Connect**” button:



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The **SPY-BATT** main window opens and the General device data are shown:

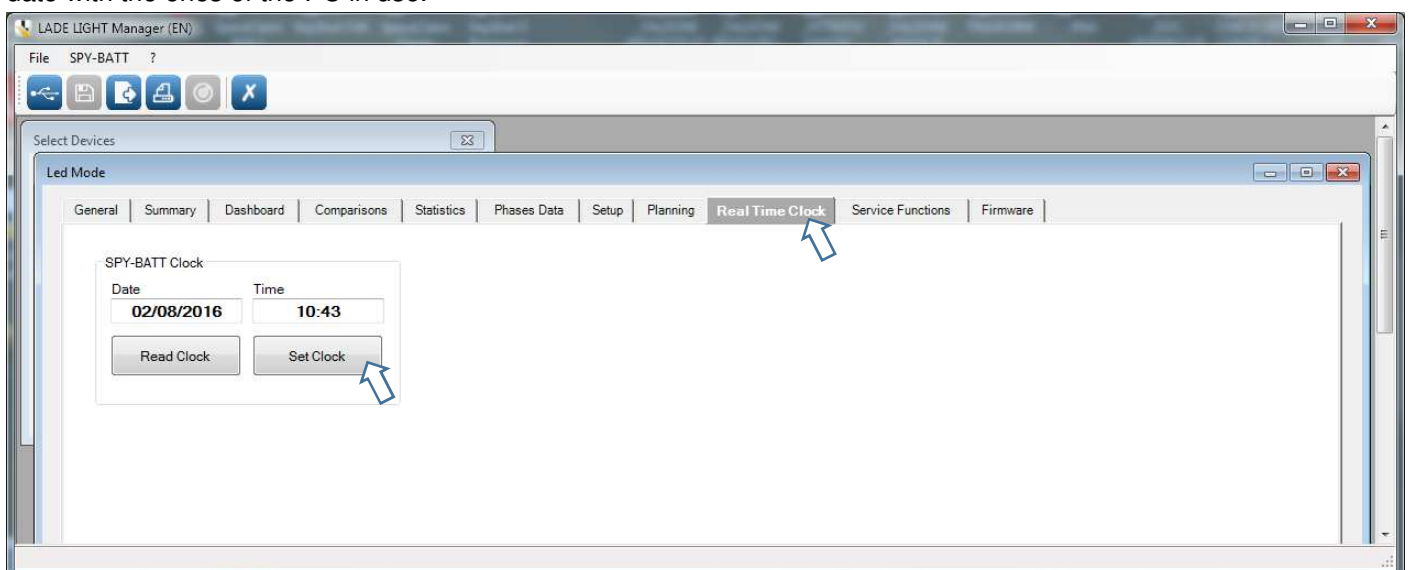


Fill in all the **Customer** and **Battery** fields in **CUSTOMER INFO** section and select “**Save Customer Info**” button. These data will be stored in **SPY-BATT** and will be shown in future device readings.

IMPORTANT: It is critical for the operation to insert the value of “**Expected Cycles**”.

Introduce in this field the number of life cycles at 25 °C indicated by the battery manufacturer. All other data are non-essential for the operation, but important for traceability.

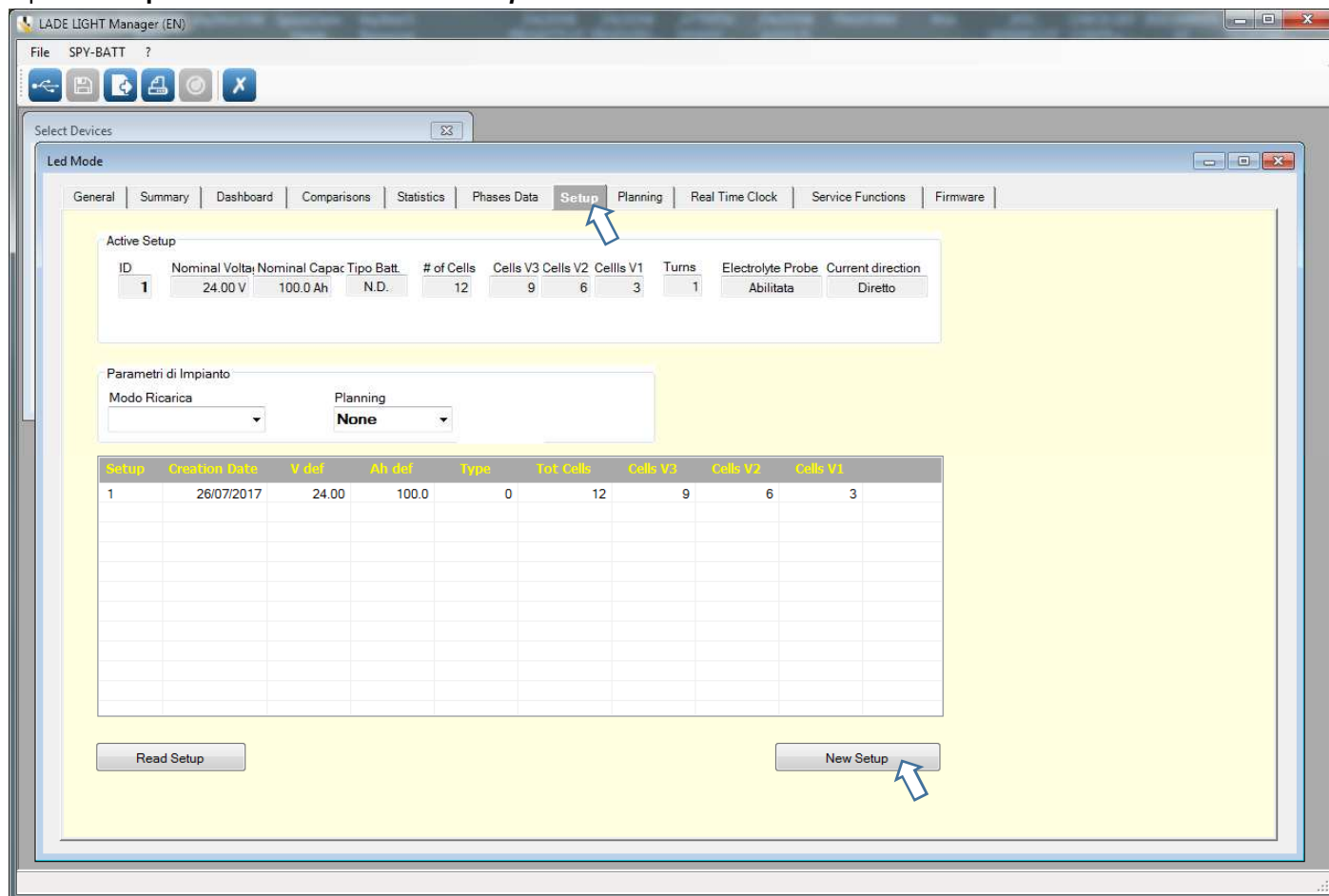
Open the “**Real Time Clock**” window and select **Set Clock** function to automatically update the **SPY-BATT** time and date with the ones of the PC in use.



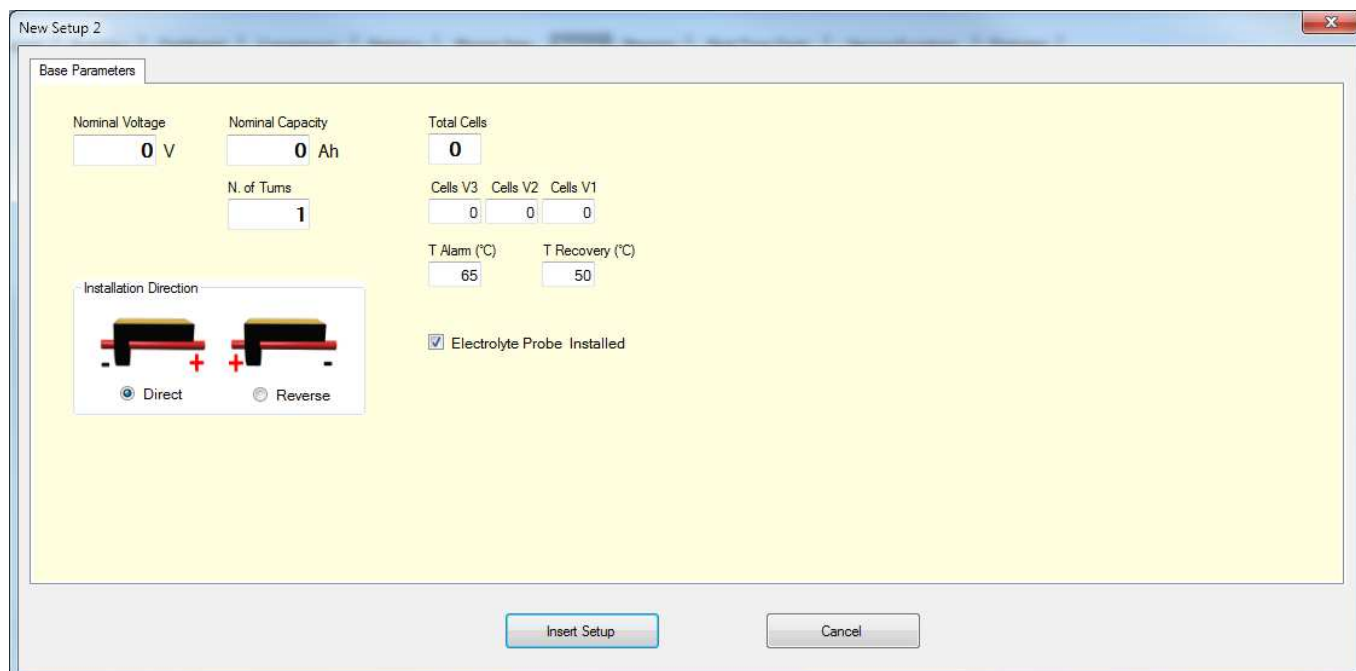
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Open **“Setup”** window and select **New Setup**:



The Device configuration window opens:

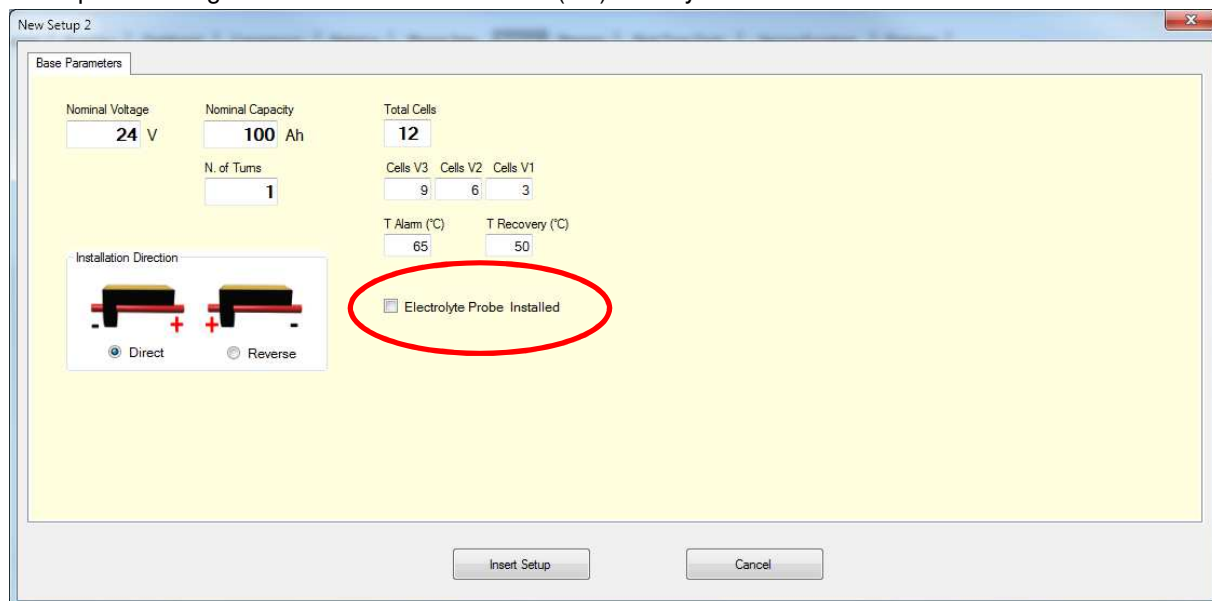


Fill in all the fields with the battery options.

IMPORTANT:

Remove the tick from the "Electrolyte Probe Installed" box to avoid anomalous device signals.

Example of configuration for a 24V - 100Ah (C5) battery:



Warning: In the field "Nominal capacity" the capacity value expressed in C5 must be inserted, see the data sheet of the battery.

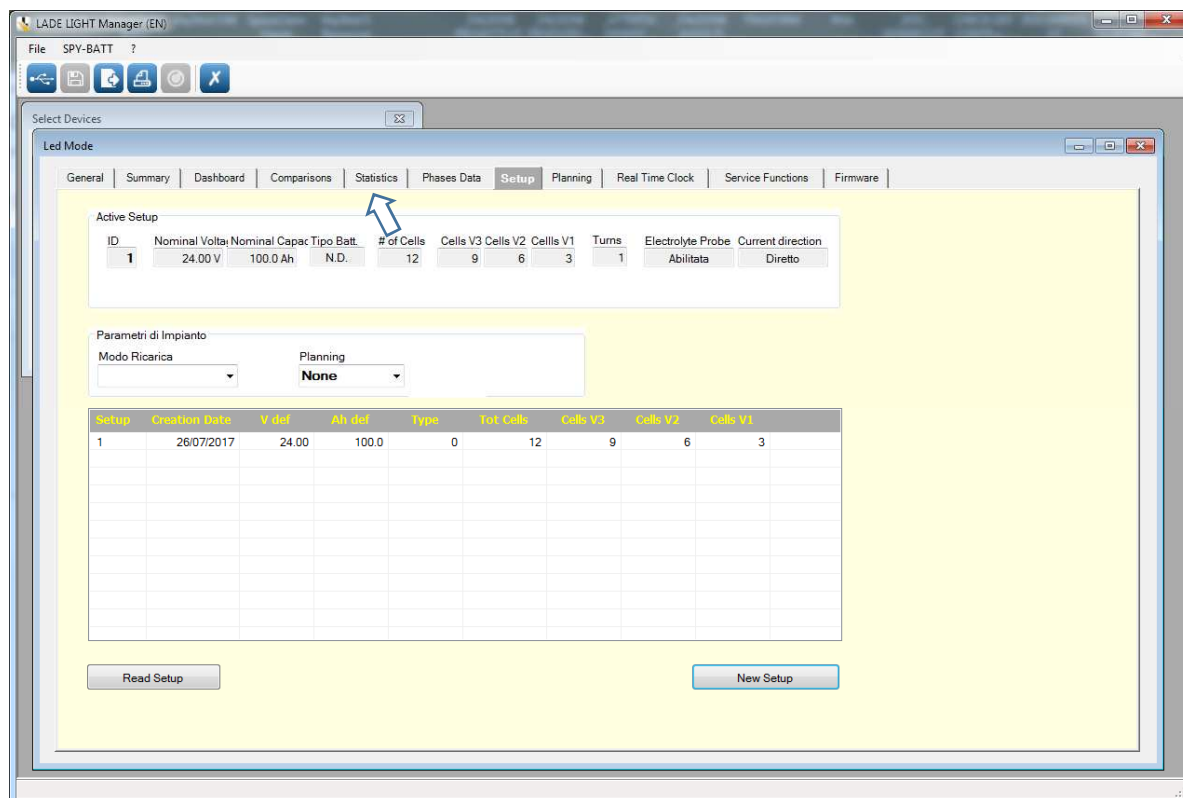
In **Cells V3**, **Cells V2** e **Cells V1** fields the number of cells between the negative pole of the battery and the socket relative must be inserted.

The intermediate sockets **MUST** be connect with tensions rising from V1 to V3.
(See par. 4: **VOLTAGE PLUGS CONNECTION**).

Confirm the configuration by pressing the **"Insert Setup"** button. Wait for the finalization of the configuration window.

Select the button **"Read Setup"**:

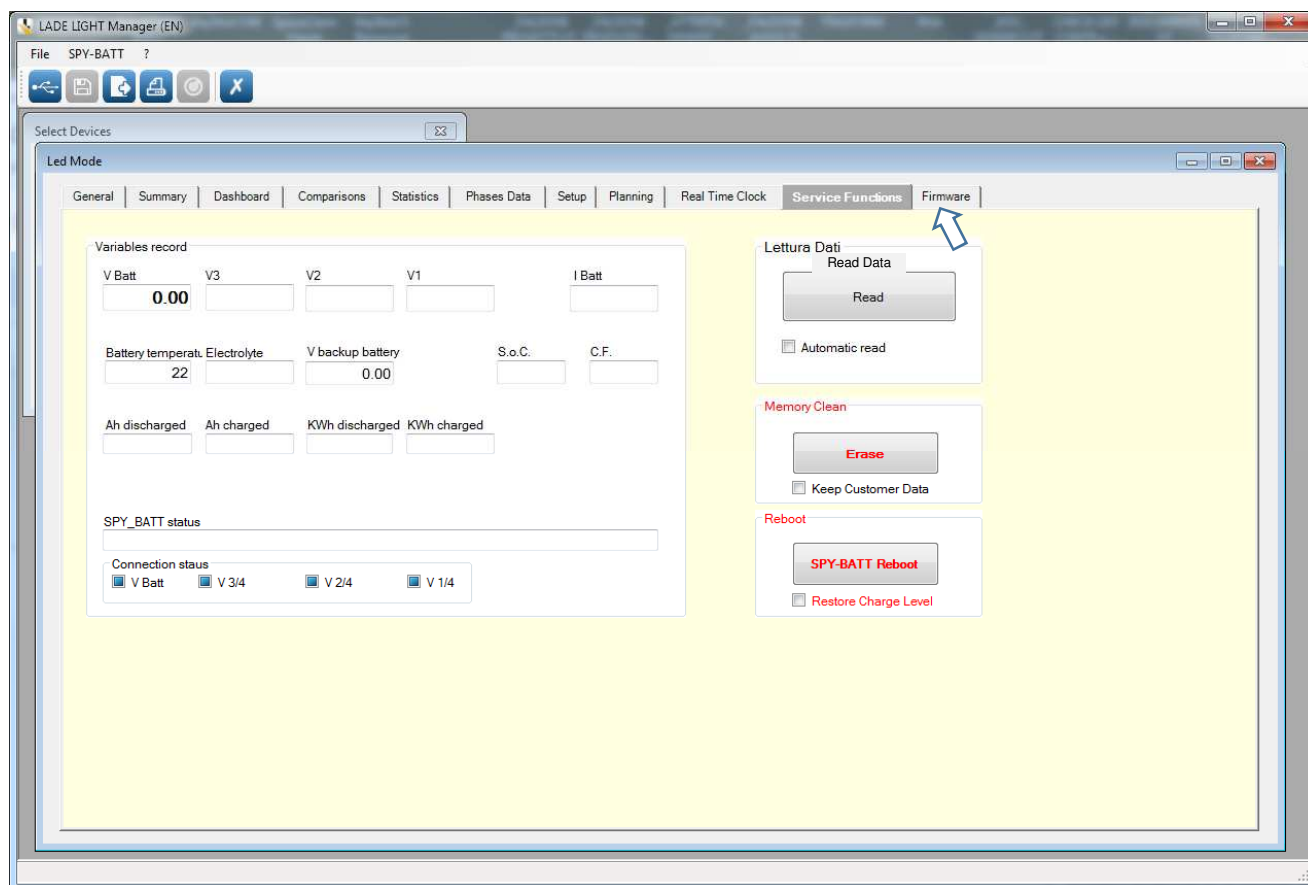
The new configuration will appear in the first row of the table and will be the configuration used.



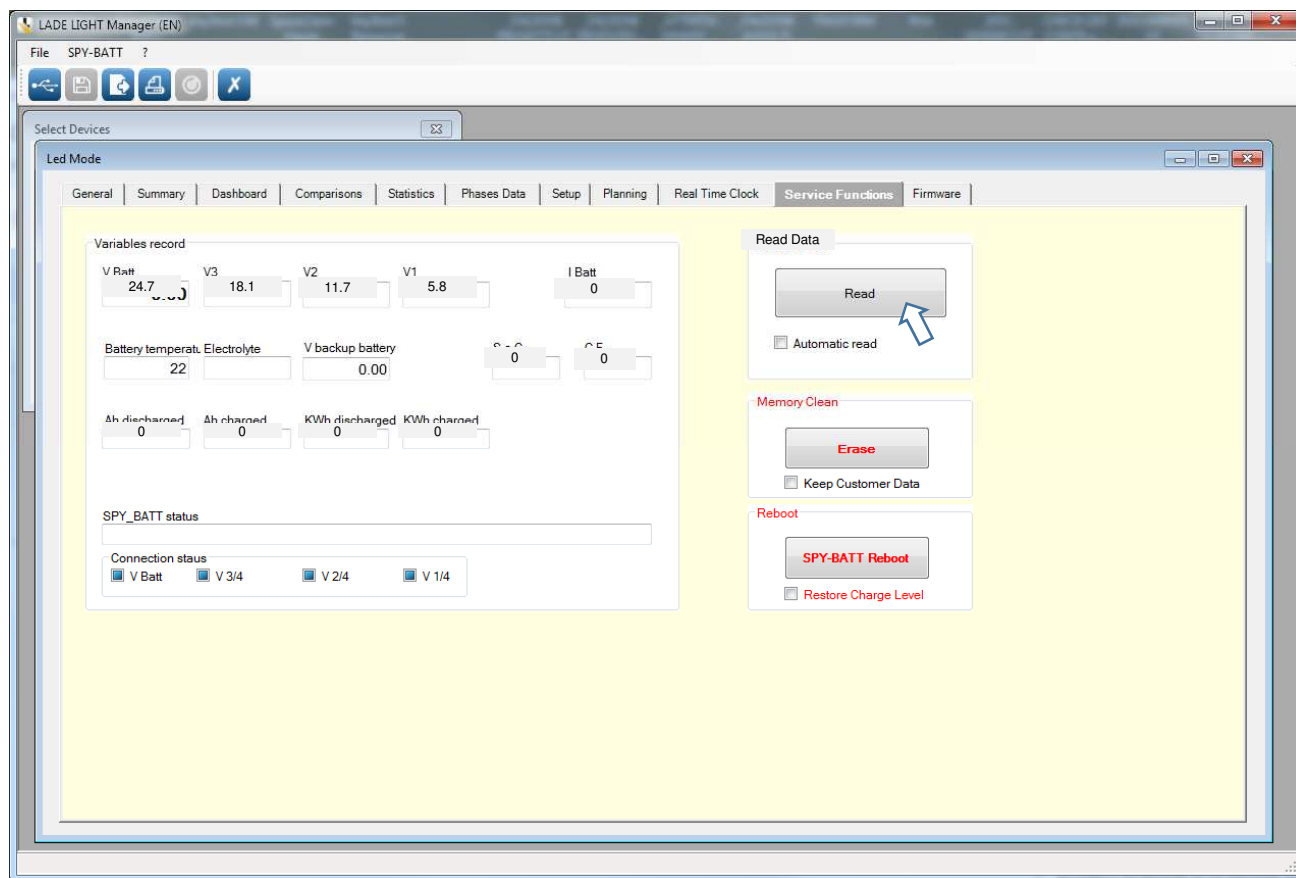
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To check all the connections of the **SPY-BATT** to the battery, open the **"Service Functions"** window:



Select **"Read"** button:



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The **Variable record** section displays real magnitudes read from **SPY-BATT: V Batt (Total Battery voltage)**, **V3 – V2 – V1 (intermediate voltages)**, **I Batt (charge or discharge current)**, **Battery temperature**.

If the connections of the sockets are correct, all the check boxes in the **Connection status** section will be popped. If some of the variables are abnormal, check the connections and repeat the initialization procedure.

With a new device, only the fields with voltage measurement, temperature and electrolyte will contain significant values, all other fields will be empty.

The section **SPY_BATT status** indicates the actual device working conditions:
Possible indications are:

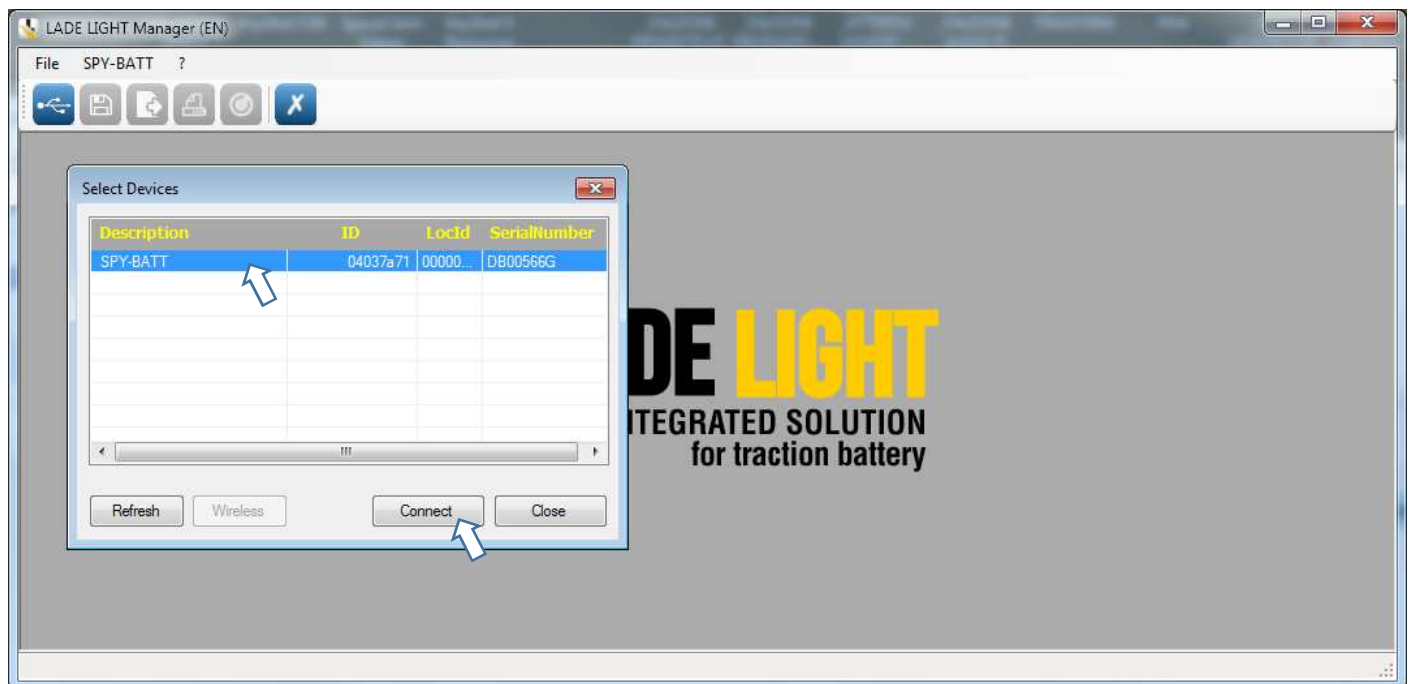
- “Setup NOT READY”: It means that no configuration is programmed.
- “Setup READY”: It means that a valid configuration is programmed.
- “Recording DISABLED”: It means that the device is not connected to a battery to be monitored.
- “Recording ENABLED”: It means that the device is connected to a battery and is recording.

The device is fully operational when the box says: ““Setup READY, Recording ENABLED”

See **Lade Light Manager** Software manual for **Memory Erase** function.

It is recommended to verify that all the settings have been made correctly, then:

- a) Close all active windows.
- b) Update the Connected device list with “**Refresh**” function.
- c) Re-select **SPY-BATT** device and re-connect it using “**Connect**” button.



Reopen the various windows and verify:

- a) All the data in Customer Info (**General** window)
- b) The Internal real clock (**Real time clock** window)
- c) The Setup (**Setup** window – Read Setup button)

Now the device is active and begins to store all the data of the battery.

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Disconnect the USB cable from **SPY-BATT** and close the panel.



The installation is complete.

7. LED INDICATIONS

Possible led indications during normal working:



- Led **Power** flashing: **SPY-BATT** is active and is recording data
- Led **Error** flashing: Connection error or generic error.
- Led **Temp**°C flashing: HIGH battery temperature.
- Led **Level** flashing: NOT Enabled.

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