

Software LADELIGHT Manager Rev. 1.10.2 User's Manual

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- New **PRINT** button in Main Menu bar and *Print functions* in File Menu. (See par. 5 for details).
 - New **EXPORT DATA** button in Main Menu Bar. (See par. 5 for details).

1. GENERAL DESCRIPTION

All devices of *Lade Light* system are managed and controlled by using the *LADELIGHT Manager* application software. This software allows you to connect and accomplish operations of programming, setup, reading and analysis of data stored in the devices of *Lade Light* system.

2. Installation of LADELIGHT Manager on the PC (Win7 OS and later)

Download the software from the website www.spybatt.it and launch the program Setup.exe.

Follow the instruction proposed by your O.S. to accomplish the installation of the software LADELIGHT Manager:

rganize 🔻 🛛 🔂 Open	Share with 🔻 Burn New folder			3 11 •	
Favorites	Name	Date modified	Туре	Size	
Marktop	🍶 Application Files	4/20/2016 1:39 PM	File folder		
Downloads	LADELIGHT Manager	3/1/2016 8:58 AM	ClickOnce Applica	6 KB	
💹 Recent Places	💐 setup	3/1/2016 8:58 AM	Application	533 KB	
Libraries	\sim				
Documents					

NOTE: If you are updating the review, the following error dialog can appear:

You can	not start applica	ation LADE LIGHT	Manager from
this loca	tion because it	is already installed	from a
different	location.		
	-		
	and the second se		

In this case, you need to uninstall the previous version from your PC before proceeding.



Proceed with the installation of the new version restarting the setup.exe program.

Accept the license terms and continue with the installation:



-0-	Download dei file richiesti in corso	
-		
Downloa	d del file 1 di 1 in corso	
		Annulla

Confirm and continue with the installation:



MORI RADDRIZZATORI s.r.l.

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Via Pietro Nenni, 17 / 19 - 25010 Colombare di Sirmione (BS) - ITALY Tel. +39 030 9906010 - Fax +39 030 9906011 - E-mail: mori@moriraddrizzatori.it - www.moriraddrizzatori.it P. IVA 02393720988

(94%) Inst	alling LADELIGHT Manager	
Installi Thi dur	ig LADELIGHT Manager may take several minutes. You can use your computer to do other ta ing the installation.	isks
	Name: LADELIGHT Manager	
	From: C:\Users\Factory\Desktop\SPY-BATT\LLm Deploy	
	Downloading: 27.9 MB of 29.4 MB	
		<u>C</u> ancel

The LADELIGHT Manager Icon will be automatically created on desktop:



3. SPY-BATT DRIVER'S INSTALLATION (and other LadeLight devices)

When a **SPY-BATT** device (or any **LadeLight** device) is connected to the PC for the first time, the driver's installation is required. All the drivers are available on the website <u>www.spybatt.it.</u>

J Installazione driver	
Installazione driver di	dispositivo in corso
SPY-BATT	Ricerca nelle cartelle driver preconfigurate in corso
	Chiudi

If the driver is correctly installed, go to paragraph 4.

If the Driver is not found, a warning window will appear:

J Driver Software Installation	×
Device driver software was not successfully installed	
USB Serial Port XNo driver found	
You can change your setting to automatically search Windows Update for drivers Change setting	
What can I do if my device did not install properly?	
	<u>C</u> lose

In this case, it is necessary to continue with the manual installation of the Driver:

In *Device Manager* of your PC, select the **SPY-BATT** device from the list, open the functions window with the right key of the mouse and select *Update Driver Software*...:

And the second second second second		
File Action View Hel		
🍋 🔿 🖬 🖬 🖬 🗖		
 WIN-PIGKIGSDRST Batteries Computer Disk drives Display adapters Display adapters DVD/CD-ROM dr Human Interface IDE ATA/ATAPI c Keyboards Memory devices Monitors Monitors Network adapters Other devices SPY-BAT Processors Sound, vide System devi Universal Se 	ves Devices ontrollers ontrollers vinting devices Update Driver Software Disable Uninstall Scan for hardware changes	

Manually look up for the driver in the computer:

•	Search automatically for updated driver software Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.
•	B <u>r</u> owse my computer for driver software Locate and install driver software manually.

Through the key **Browse...** select the folder **CDM_2_12_16_MORI** previously downloaded from the website <u>www.spybatt.it</u> and confirm:

Browse for driver software on your computer Search for driver software in this location: Image: Signature of the subfolders Browse for Folder Image: Signature of the subfolders Browse for Folder Image: Signature of the subfolder of	🚱 🗕 Update Driver Software - SPY-BATT	
Search for driver software in this location: Image: Search for driver software in this location: Image: Search for driver software in this location: Image: Search for driver software compatible with the device, and all driver software in the same category as the device. Image: Search for driver software compatible with the device, and all driver software in the same category as the device. Image: Search for driver software compatible with the device, and all driver software in the same category as the device. Image: Search for driver software compatible with the device, and all driver software in the same category as the device. Image: Search for driver software compatible with the device, and all driver software in the same category as the device. Image: Search for driver software compatible with the device, and all driver software in the same category as the device. Image: Search for driver software compatible with the device, and all driver software in the same category as the device. Image: Search for driver software compatible with the device, and all driver software in the same category as the device. Image: Search for driver software compatible with the device, and all driver software in the same category as the device. Image: Search for driver software compatible with the device, and all driver software compatible driver software compatible with the device, and all driver software compatible driver software compatible with the device, and all driver software compatible driver sof	Browse for driver software on your computer	
Include subfolders Include subfolders Include subfolders Browse For Folder Select the folder that contains drivers for your hardware. Select the folder Select the fo	Search for driver software in this location:	
 Let me pick from a list of device drivers on my computer This list will show installed driver software compatible with the device, and all driver software in the same category as the device. Let me pick from a list of device drivers on my computer Libraries Let me pick from a list of device drivers on my computer Software in the same category as the device. Rest 	☑ Include subfolders	Browse For Folder
	Let me pick from a list of device drivers on my computer This list will show installed driver software compatible with the device, and all driver software in the same category as the device.	Select the folder that contains drivers for your hardware.

Confirm the installation in the Window Security:



Wait for the installation of the driver on your PC:

) 🗕 Update Driver Software - SPY-BATT	
Installazione driver in corso	

) 🔟 Update Driver Software - SPY-BATT	
Windows has successfully updated your driver software	
Windows has finished installing the driver software for this device:	
SPY-BATT	
	Close

At the end of the installation, the restart of your PC may be required. Close all the applications and restart. It is suggested to close and restart the *LADELIGHT Manager* application anyway.

4. Initial page:

Open the LADELIGHT Manager application on the PC by double clicking the icon.



The main window opened with the Login window:

🛂 LADE LIGHT Manager (EN)	
File ?	
Login User Password Login Cancel	
	.::

Two possible levels of login exist:

- USER (default)
- POWERUSER

To execute the login at any level, the relative password must be asked to the producer.

Insert the supplied password and execute the login.

NOTE: The general description of the functions active at the POWERUSER level follows. With USER level login, some of the described functions are not available.

5. MAIN MENU BAR general description

In the main menu bar, there are the following functions:

- File
- SPY-BATT
- ? (Info)

5.1. FILE Menu:



In the FILE menu, the following functions are available:

- Printer Setting : Opens the Print Setup Window of your PC.
- Print Preview : It allows to see the print preview from any locations of the application.
- **Print**: It allows to print the various reports in according to the open section of application.
- Language : Allows to select the language used (available options: ITALIAN and ENGLISH)
- **Logout:** After the request of confirmation, the active user is disconnected by closing all the windows in use and by presenting the Login window once again.
- Exit: Closes the application LADELIGHT Manager.

5.2. SPY-BATT Menu

ile	SPY-BATT	?	
~	Device	e Connect	
~	Archiv	e	

In the SPY-BATT menu, the following functions are present:

- **Device Connect**: It connects the device **SPY-BATT** connected to the PC through the USB cable (If the **LADE LIGHT** device's driver has not been installed yet, this button is inactive). See paragraph **6** for a complete understanding of this function.
- Archive: allows access to files previously saved in archives. See paragraph 7 for a complete understanding of this function.

5.3. ? Menu (Info)

By selecting this function, the "About" window opens and shows all the information of *LADELIGHT Manager* installed version:

Pie SPY-BATT ?	🛂 LADE LIGHT Manager (EN)		
Image: Constraint of the second se	File SPY-BATT ?		
About LADE Light Manager	R 4 0 X		
LADE Light - Integrated Solution for Traction Version 1.10.1.99 Copyright © 2016 MORI Raddrizzatori ED SOLUTION traction battery	About LADE Light Manager	<u>X</u>	
		LADE Light - Integrated Solution for Traction Version 1.10.1.99 Copyright @ 2016 MORI Raddrizzatori	
in the second			

5.4. Push buttons



USB Search– Activates the search for the connected devices. (If the **LADE LIGHT** device's driver has not been installed yet, this button is inactive).



Export Data – It allows to directly export the selected file and save it in any location on your PC without enter in Archive window.



Print – Print the general Report (Summary of data present in **GENERAL** and **SUMMARY** windows with the **Dashboard** page) and/or the graphs in **STATISTICS** section if opened. The **PRINT** button is active only after connecting a *SPY-BATT* device or after you open a file from the **Archive Data**.



Refresh – If activated in **Select Device** window, updates the list of devices connected to the PC. It also operates in **Statistic graph display** to return the graph in the initial display condition.



Exit - Closes all windows open in the application

6. SPY-BATT Device connection

Once installed the driver, with the **SPY-BATT** device connected to the PC through a USB cable, it is possible to activate the connection in two of the following ways:

Click on the button **USB Search** to open the window with the list of devices connected:

LADE LIGHT Manager (EN)					_ [] :
File SPY-BATT ?					
Select Devices				<u>×</u>	
Description	D	LocId	SerialNumber		
SPY-BATT	04037a71	00000	DB006FBR		
				ATED SOLUTION	
				pr traction battery	
•					
			1	1	
Hetresh	Co	nnect	Close		

Select the device in the list and activate the connection by clicking on the button *Connect* (or by double clicking on the row of selection):

<u> L</u> ADE I	lanager (EN)
File S	?
Selec	es X
0.0	on ID Locid Serialilumber
SP	04037a71 00000 DB006FBR
	ATED SOLUTION pr traction battery
	ii.

OR:

Select the function *Device Connect* from the menu SPY-BATT:

File	SPY-BATT	?	
and a	Device	Connect	
<u> </u>	Archiv	e	

The window appears:



Confirm to open the connection to the device.

In both cases the window **SPY-BATT** appears with the **General** window open, in which all characteristic data of the connected **SPY-BATT** are summarized (See paragraph **7** for a complete understanding):

I DATE :			
Summary Dashboard Comparisons	Statistics Phases Data Setup Real Time Clock Service	Functions Firmware	
Customer Info		Download	
Customer		Last Data Download	
9			
Battery Brand	Battery Model	1	
		Dowload SPY-BATT Data	
Battery Identifier	Expected Cycles		
	0		
Notes		а.	
I		Save Customer Info	
I		Save Customer Info	
I		Save Customer Into	
SPY-BATT		Save Customer Into	
SPY-BATT	Model	Save Customer Into	
ID ECD0:906F:1600:1500	Model	Save Customer Infro	
ID ECD0:906F:1600:1500 Rev Hardware	Model SPY_BATT Rev BootLoader Rev Firmware	Save Customer Into	
SPY-BATT ID ECD0:906F:1600:1500 Rev Hardware 4	Model SPY_BATT Rev BootLoader Rev Firmware 1.11.04	Save Customer Into	
SPY-BATT ID ECD0:906F:1600:1500 Rev Hardware 4	Model SPY_BATT Rev BootLoader I.11.04	Save Customer Into	
SPY-BATT ID ECD0:906F:1600:1500 Rev Hardware 4 Serial Number	Model SPY_BATT Rev BootLoader I.11.04 Recorded Phases Active Setup 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
SPY-BATT ID ECD0:906F:1600:1500 Rev Hardware 4 Serial Number	Model SPY_BATT Rev BootLoader I.11.04 Recorded Phases Active Setup 0 0 0 0		

7. SPY-BATT Archive

The button **Archive** in the **SPY-BATT** menu allows uploading any **Spy-Batt Data File** previously saved in **Spy-Batt** archive.

File	SPY-BATT	?
<u> </u>	Device	e Connect
	Archiv	re 🕞

The window SPY-BATT Archive appears with the list of Data Files saved.

The files are classified and named according to *Customer, Battery, Note* data (introduced at the initial device installation) and to the *ID SPY-BATT* (unique and different for every SPY-BATT):

-BATT Archive					-		
customer	Battery ID	Bardery	Model	Note	S.M.	ID/SPA	
9					C10000004	ECD090	
o Mori Baddrizzatori	Sala Prove	Zenith	zc5ozs775	80 V Sala Prove	5 10050034	ECD090	
UBS	TRILATERALE U 2	ZENITH	80V 775AH	TRILATERALE UBS		59AF0A4	

In the window, the following function buttons are available:

Open: It opens the data files of the SPY-BATT selected allowing their visualization and analysis. To open the sheet you can also double clicking on the selected row.

Delete Data: It deletes the file selected from the list. To continue, one more confirmation will be required.

Attention: Once deleted, the files will be lost forever

SPY-BATT	×
Do you really want to delete all data ? ECD0:906F:0800:1600 - 80 V Sala Prove ?	
<u>Si</u> <u>N</u> o	

Export Data: It allows exporting the selected file and saving it in any preferred location on your PC. This allows creating a customized archive structured according to personal needs.

💊 LADE LIGHT Manager (EN) - [Export D	Pata]	
🖳 File SPY-BATT ?		- 8 ×
SPY-BATT		
Code	Model	
ECD0:906F:1600:1500	SPY_BATT	
Customer	Notes	
9		
File Selection		
		1
C:\Users\grat_12\Documents\LADE	LIGHT Manager\SPY-BATT\ECD0906F160	
	Save Data Close	
1		

Fill in the SPY-BATT section fields as you like. Type the desired file name in the box File Selection.

••• Chose the destination path for the file saving with Click on Save Data button to save the file.

button in File Selection section.

Import Data: Allows importing a Data File previously saved in any location on the PC.

Customer Notes Mori Raddrizzatori 80 V Sala Prove	
Mori Raddrizzatori 80 V Sala Prove	
I:\Simone\Sala Prove 15_04_16.sbdata	

Chose the origin path of the file with the _____ button in *File Selection* section.

Click the button **Charge Data** to upload the file.

Fields in the **SPY-BATT** section will be filled in with the values found in the file uploaded.

8. GENERAL Window

൧

The connection to a **SPY-BATT** device or the upload of a Data File from the archive activates the opening of the **General** Window:

Customer lefe		- Download
Customer		Last Data Download
UBS		
Battery Brand	Battery Model	1
ZENITH	80V 775AH	Dowload SPY-BATT Data
Battery Identifier	Expected Cycles	
TRILATERALE UBS	1500	
Notes		
TOU ATERALE UDO		1
TRILATERALE UBS]	Save Customer Info
TRILATERALE UBS		Save Customer Info
TRILATERALE UBS		Save Customer Info
SPY-BATT	Model	Save Customer Info
TRILATERALE UBS	Model SPY-BATT	Save Customer Info
TRILATERALE UBS	Model SPY-BATT Rev BootLoader Rev Firmware	Save Customer Info
TRILATERALE UBS SPY-BATT ID 59AF:0A47:0E00:1F00 Rev Hardware 2	Model SPY-BATT Rev BootLoader Rev Firmware 1.07.00	Save Customer Info
TRILATERALE UBS	Model SPY-BATT Rev BootLoader Rev Firmware 1.07.00 Recorded Phases Active Setup	Save Customer Info

By enabling print button from this window, will be printed the *General report*, comprising the summary data page and the page with the image of the dashboard.

In section **Customer Info** data introduced at the moment of first installation of the **SPY-BATT** on battery are shown. (See the **SPY-BATT Installation Manual** for more information).

These data can be modified and rewritten by using the button **Save Customer Info**.

In the section **SPY-BATT**, are shown the identification data of the device (not modifiable).

The **Download SPY-BATT Data** button allows to download all data stored in the connected SPY-BATT device's memory. Automatically, the window indicating the download progression appears. Data will be automatically saved in the archive.

Acquisizione Dati	X
Fase 2 - Caricamento Eventi Brevi	
100%	
Processing100%	
Step: 1 di 1 - tempo: 0.05 s di 0.047 s	Primo Evento: step 1 - tempo: 0.05
Carica Dati Interrompi	Chiudi
	11

Data downloaded are automatically saved in the internal **Spy-Batt Archive** and will be always available for the consultation in every moment.

WARNING: the download may require some minutes, according to the quantity of data in the SPY-BATT.

The buttons **Download SPY-BATT Data** and **Save Customer Info** are not active with the Data from the archive.



By enabling print button from this window, will be printed the *General report*, comprising the summary data page and the page with the image of the dashboard.

9. SUMMARY Window:

	atatua						
Activati	on	Working days	Cycle number	S.o.H.	Cell unbalancing	No electrolyte	
	07/01/2015	349	28	99.02%	0.00%	8.41%	
Charge	Territoria	Channel	Com	plete charges	6 (MD2	Partial charges	
	7g 06:59	28		9			
	from Battery					Anomalous events	
Energy t	Total anarmy (KM/b)	Cuelo Auerrae (KWh)	Quelo Auerodo (Ab)			Number	

In this window, the main data are summarized in five sections:

9.1. Battery Status section:

Activation: Date of SPY-BATT first activation.

Working days: The total amount of SPY-BATT working days

Cycle number: Number of executed cycles. As for CYCLE is meant a charge phase followed by one or more discharge phases or pause.

S.o.H (State of Health): State of health of the battery. Estimated percentage of the residual battery life.

Cell unbalancing: Percentage of time (with respect to the total time of charge and discharge) in which a displacement of cells voltage above the acceptable limit has been registered.

No electrolyte: Percentage of time (with respect to the total time of charge and discharge and pause) in which a too low level of the electrolyte has been registered.

9.2. DISCHARGE section:

Time in discharge: Total time of discharge of the battery

Discharges: Total number of discharge phases registered.

Average D.o.D (Deep of Discharge): Depth of medium discharge with respect to all executed discharges.

Over discharges: Number of excessive discharges - Above 80%

Over temperature: Number of discharges in which a high temperature of the battery has been registered.

Critical pause: Number of times in which the battery has been left discharged and inactive for a too long period of time.

9.3. CHARGE section:

Time in charge: Total time of battery charge.

Charges: Total number of charges executed on the battery.

Complete charges: About complete charges, two data are proposed:

Number: total number of complete charges.

Over temperature: number of complete charges in which a too high temperature has been registered. NOTE: A Charge is a "Complete charge" when the Charge Factor (C.F.) is equal or above 1.0.

Partial charges: About partial charges, two data are proposed as well:

Number: total number of complete charges executed partially.

Over temperature: number of complete charges in which a too high temperature has been registered. NOTE: A Charge is a "Partial Charge" when the Charge Factor (C.F.) is less than 1.0.

9.4. ENERGY from Battery section:

Total Energy (KWh): Total energy supplied by the battery, expressed in kilowatt per hour.

Cycle Average (KWh): Medium energy supplied by the battery in a single cycle, expressed in kilowatt per hour.

Cycle Average (Ah): Medium energy supplied by the battery in a single cycle, expressed in ampere per hour.

9.5. Anomalous events section:

Number: Number of anomalies or alterations registered by the SPY-BATT.



By enabling print button from this window, will be printed the *General report*, comprising the summary data page and the page with the image of the dashboard.

10. DASHBOARD Window:



In the **Dashboard** window there are eight analog indicators that shows, in an intuitive way, the following data:

% S.o.H: Percentage indicating the health status of the battery.

% D.O.D: Average Depth of discharge reached before charges.

% Over discharge: Percentage of discharges above 80% reached before charges.

% Partial Charge: Percentage of partial charges compared to the totality of the charges executed.

- % Time Cell Unbal.: Percentage of time (compared to the total time of charge and discharge) in which it was registered an imbalance of cells voltages higher than the allowable limit.
- % Overtemp Phases: Percentage of time (compared to the total time of charge and discharge) in which the battery temperature is too high.
- % Absence Electrolyte: Percentage of time (with respect to the total time of charge, discharge and pause) in which a too low level of the electrolyte has been registered.
- # Critical Pauses: Number of times in which the battery has been left discharged and inactive for a too long period of time.

The **Dashboard** basically allows to immediately evaluate the general status of the battery with a glance.

If the parameters are within the ordinary limits, the needle indicates the green area of the scale, if the parameters turn to be irregular, the needle indicates the red area of the scale, if the needle indicates the yellow area of the scale, it means that the parameter tends toward a critical worsening.



By enabling print button from this window, will be printed the *General report*, comprising the summary data page and the page with the image of the dashboard.

11. COMPARISON window:



This window shows the comparative diagrams of:

- S.o.H. (Battery Health Status)
- Number of needed electrolyte top ups
- Energy consumed by the battery charger for the charge
- Saved CO₂

Diagrams derives from data memorized according to the type of battery charger in use: LadeLight, PSW, EDM.

By enabling print button from this window, will be printed the *General report*, comprising the summary data page and the page with the image of the dashboard.

12. STATISTICS window:

◢

	rselection				ie I
Period	de selection		-		
G	Tablesia C	Daria da calcation	c	alculate	
	Total Penod	Penode selection			
		Start			
		01/05/2016			
		End			
		01/05/2016			
Selec	ction graphs		7		
Selec	ction graphs	Max temperature in Complete Charge			
Selec I	ction graphs Time chart D o D	Max temperature in Complete Charge Max temperature in Partial Charge			
Selec IZ IZ IZ	ction graphs Time chart D.o.D. Complete charge duration	Max temperature in Complete Charge Max temperature in Partial Charge Thermal increase in Complete Charge			
Selec V V V	ction graphs Time chart D.o.D. Complete charge duration Partial charge duration	 Max temperature in Complete Charge Max temperature in Partial Charge Thermal increase in Complete Charge Thermal increase in Partial Charge 			
selec হার হার হার	ction graphs Time chart D.o.D. Complete charge duration Partial charge duration Maximum temperature in Discharoe	 Max temperature in Complete Charge Max temperature in Partial Charge Thermal increase in Complete Charge Thermal increase in Partial Charge Thermal increase in Partial Charge Percentage of Electrolyte Absence 			
selec বেবেবে বিবেয়	ction graphs Time chart D.o.D. Complete charge duration Partial charge duration Maximum temperature in Discharge Minimum temperature in Discharge	Max temperature in Complete Charge Max temperature in Partial Charge Thermal increase in Complete Charge Thermal increase in Partial Charge Percentage of Electrolyte Absence Charging factor			

12.1. Period selection section:

ച്ച

With the activation of Statistics, the window Parameter Selection opens.

This window allows setting the criteria of choice for data that will be shows in the following statistics tools. It is possible to select the whole period of memorization (default option) or a specific time interval by setting the initial and final dates in the proper boxes *Start* and *End*.

ADE LIGHT Manager (EN) - [TRILATERALE UBS]	
File SPY-BATT ?	- é
Seneral Summary Dashboard Comparisons Statistics Phases Data Setup Real Time Clock Service Functions Firmware	
Parameter selection	
Periode selection	
Calculate	
C Total Period Periode selection	
Start	
01/05/2016	
End	
01/05/2016	
🔣 maggio 2016 💽	
lun mar mer gio ven sab dom	
25 26 27 28 29 30 1	
Selection graphs 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
☑ Time chart	
☑ D.o.D.	
Complete charge duration	
Partial charge duration Thermal increase in Partial Charge	
🔽 Maximum temperature in Discharge 🔽 Percentage of Electrolyte Absence	
🗹 Minimum temperature in Discharge 🔽 Charging factor	
Thermal increase in Discharge	

In the **Selection graphs** section, you can choose the graphs that will be displays. Once set the desired selection criteria activate the function **Calculate.**

At this point in the menu bar will appear all the windows of pre-selected graphs.

ADE LIGHT	T Manager (EN) - [TRILATERAL	UBS]		_0
File SP	Y-BATT ?			- 8
- 💽				
General S Parameter	iummary Dashboard Comparison selection Time graph D.o.D. C	Statistics Phases Data Setup Real Ti C duration CP duration T Max D. T Min D	ime Clock Service Functions Firmware D. Iner T.D. Tmax C.C. Tmax P.C. Iner T.C.C. Iner T.P.C. Ass.B. C.F.	
Period	le selection		Innonnonnonnonnonnon	- 11
Selec	Total Period C	Periode selection Start 01/05/2016 End 01/05/2016		
N	Time chart	Max temperature in Complete Charge		- 11
V	D.o.D.	Max temperature in Partial Charge		
2	Complete charge duration	Thermal increase in Complete Charge		- 11
	Partial charge duration	✓ Thermal increase in Partial Charge		- 11
M	Maximum temperature in Discharge	Percentage of Electrolyte Absence		
V	Minimum temperature in Discharge	Charging factor		
V	Thermal increase in Discharge			
<u> </u>				

Activating the print in any of the Statistics windows (excluding Time graph window) will be printed the two pages of *General report* and all statistics charts (from 12.3 to 12.14).

12.2. TIME GRAPH Window:



In the Time graph are presented the weekly graphs of all main parameters.

Use the buttons \square and \square on the right side of the bar to scroll all the weeks.

Select the desired week from the upper bar to see the related graph.

The graph shows the alternation of the phases, day by day, in the selected week.

The graph is divided into three parts:



In part **A**, values about minimum, medium and maximum temperatures are shown. In grey, the range temperature during the underlying event.

In part B are shown numbered events in ascending order from the less to the most recent.

EVENTS are divided in:

- CHARGE (highlighted in dark green)
- EQUALIZATION/Holding phase (highlighted in light green)
- **DISCHARGE** (highlighted in light yellow)
- **PAUSE** (not highlighted but counted in the events calculation)

In part C, the status bar of the presence of the electrolyte in the battery is shown.

(Light blue means electrolyte OK, Red means LOW electrolyte level)

By clicking with the left key of the mouse on any of the magnitudes represented, it's possible to see the instant value of that chosen point.



Activating the Print button from this window will be only printed the open weekly graphs.

By double clicking on any column EVENT, the first window of Graph Detail appears.

12.2.1. PHASE Chart graph (in Detail section)

By double clicking on any column EVENT of the **Time graph**, the first Phase Detail window of specific event appears.



Activating the print button from one of *Phase Detail* windows (Phase Chart, Partial Voltage, Data and Utility) will be printed the open chart with the relative Partial Voltages graph.



Example of the Charge phase event graph in Detail section:

Example of the **Discharge phase** event graph in Detail section:



NOTE: The PAUSE event contains no significant data and is therefore not represented graphically.

12.2.2. Partial voltage graph (in detail section):



In *Partial Voltage during charge* graph, are represented the partial and total battery voltages during the selected event.

In Phase Chart and Partial voltage windows, are available the following mouse commands:

- Hold the left key on any point on the graph to see the value of the dimension in that point.
- Click any point on the graph with the right key and drag to the left or to the right to go back and forward in time with the point of view.
- Hold the right key on an axis and drag to move the graph up or down.

- Position the pointer on one of the scale and rotate the mouse wheel to modify the resolution scale of the selected dimension.
- Hold the wheel of the mouse to open a specific window of selection to be enlarged on the graph.

12.2.3. DATA Window (in Detail section):

an origin 1 i	artial voltage	Data	Uility										
Counters					1	Setup							
Event		Start		Stop		Num	Nom. Voltag	e Nom. C	apacity	Cells	Cells V3 Cel	lls V2 Cells V1	
	301	29/10/15	5 18:21	30/10/15	09:31		3 80.	0 V 62	0.0 Ah	40	0	20 0	
													ctrob_
1	29/10/15	18:21	86.6	43.2	2.17	2.16	2.17	2.16	64.1	-0.6	67.6	18	
2	29/10/15	18:26	87.8	43.8	2.20	2.19	2.20	2.19	66.2	64.8	68.3	18	
3	29/10/15	18:31	87.6	43.7	2.19	2.19	2.20	2.19	66.2	64.8	68.3	19	
4	29/10/15	18:36	87.6	43.7	2.19	2.18	2.20	2.18	66.2	66.2	66.9	19	
5	29/10/15	18:41	87.6	43.7	2.19	2.18	2.20	2.18	66.2	66.2	66.9	19	
6	29/10/15	18:46	87.7	43.7	2.19	2.19	2.20	2.19	66.2	65.5	68.3	19	
7	29/10/15	18:51	87.8	43.8	2.19	2.19	2.20	2.19	66.2	66.2	67.6	19	
8	29/10/15	18:56	87.9	43.8	2.20	2.19	2.20	2.19	66.2	64.8	68.3	19	
9	29/10/15	19:01	88.1	43.9	2.20	2.20	2.21	2.20	66.2	64.8	68.3	19	
10	29/10/15	19:06	88.2	44.0	2.21	2.20	2.21	2.20	66.2	64.8	68.3	19	
11	29/10/15	19:11	88.4	44.1	2.21	2.20	2.22	2.20	66.2	64.8	68.3	19	
12	29/10/15	19:16	88.5	44.1	2.21	2.21	2.22	2.21	66.2	64.8	67.6	20	
13	29/10/15	19:21	88.7	44.2	2.22	2.21	2.22	2.21	66.2	64.8	67.6	20	
14	29/10/15	19:26	88.8	44.3	2.22	2.21	2.23	2.21	65.5	64.8	68.3	20	
15	29/10/15	19:31	89.1	44.4	2.23	2.22	2.23	2.22	66.2	64.8	68.3	20	
16	29/10/15	19.36	89.2	44 5	2 22	2 22	2.74	2 22	66.2	64 R	F. 83	, 20	_

On the top of the **Data** window, are presented the following tables:

Counters: number, date and hour of beginning and end of the event in detail.

- Setup: Summarizing data of the active configuration of the SPY-BATT during the registration of the event in detail.
- *Data Table*: list of all data saved by the *SPY-BATT* every 5 minutes during the whole event in detail, presented in ascending order from the less to the more recent.
- 12.2.4. UTILITY Window (in Detail section):

LADE LIGHT Manager (EN) - [Phase Detail 301]	-O×
■ File SPY-BATT ?	_ 8 ×
Phase Chart Partial voltage Data Utility	
✓ Relative time interval	
Excel data export	
Close	
	.:

In the *Utility* window is possible to generate an *Excel* file of all data about the event in detail and save it in any desired location in the PC.

To exit from any windows of *Detail section* and go back to the *Time Graph Window*, click the *Close* button.

12.3. D.o.D window (Deep of discharge)

This graph shows the distribution of the discharges respect to their depth.



12.4. CC Duration window (Complete charges duration)

12.5. PC Duration window (Partial charges duration)

These two graphs show the distribution (in absolute number of cycles and in percentage with respect to the total amount of executed cycles) of complete and partial charges with respect to their duration.



12.6. T Max D. window (Max Temperature in discharge)

12.7. T Min D. window (Min Temperature in discharge)

These two graphs show the distribution of the maximum and minimum temperatures of the battery during all the discharge cycles (in percentage and absolute number).



12.8. Incr T.D. window (Temperature increasing in discharge)

This graph shows the distribution and the entity of the temperature increasing during the phases of Discharge of the battery.



12.9. T max C.C. window (Maximum temperature in complete charges)

12.10. T max P.C. window (Maximum temperature in partial Charges)

These two graphs show the distribution of the maximum temperatures of the battery registered during the cycles of partial and complete recharge.



12.11. Incr T C.C. window (Temperature increasing in complete charge)

12.12. Incr T P.C. window (Temperature increasing in partial charges)

These two graphs show the distribution of the temperature increase registered in the cycles of charge both partial and complete:



12.13. Ass El. window (Percentage of Electrolyte Absence - N° of Phases)

This graph show number of cycle, in percentage with respect to the total number of phases, in which has been reached a too low electrolyte level in the battery.



12.14. C.F. window (Charge Factor)

This graph show the distribution in the cycles of the average charging factor as a percentage of all of the cycles performed.



NOTE:

In graph from 12.3. to 12.14. the BLUE colour indicates a "normal value", The RED colour indicates that the value is out of admitted range.



Activating the print from any of the windows from 12.3 to 12.14 will be printed the two pages of *General report* and all statistics charts (from 12.3 to 12.14, 6 total pages).

13. PHASES Data window

This window presents the complete list of all events registered, in chronological order from the more to the least recent.

				148			22											
I Summ	ary Dashboard Com	parisons Statistics	Phases Data Setup	Real Time	Clock Se	rvice Functio	ins Firmwa	are										
Dh-	Ubara Tuna	Charle	Ston	Dunit	IC Min	Of May	M Miles	Wildow	Floreby	-	1000	10100 C	MARK D	800	0.0	Max	No.	
CT 70	Discharge	22/10/15 10:00	22/10/15 19:12	00.04	25	40	21.4	00.7	KO	62.4	0.00	0.00	0.00	10%	Gane	0.01		
V 72	Discharge	22/10/15 10:05	22/10/15 16:13	17.00	20	40	21.4	30.7	KO	-03.4	0.00	0.00	0.00	10.4	1.00	0.01	-	
71	Disebarras	21/10/15 09:14	22/10/15 10:05	17.23	20	41	21.4	00.7	KO	62.4	0.00	0.00	0.00	100%	1.02	0.04		-
	Charge	10/10/15 00:14	21/10/15 10:55	1- 22:40	20	24	21.4	100.0	KO	10.4	0.00	0.00	0.00	10%	ND	0.02	-	
69	Paulee	19/10/15 03:00	19/10/15 09:25	10 06:24	24	JZ	21.4	100.0	NU	13.4	0.00	0.00	0.00	100%	IN.D.	0.00		
67	Chame	16/10/15 16:31	18/10/15 03:25	1a 10:29	33	46	81.8	106.7	OK	56.2	0.00	0.00	0.00	100%	1 39	0.04	100	
66	Discharge	16/10/15 09:56	16/10/15 16:31	06:34	33	39	77.1	91.6	OK	-39.7	0.00	0.00	0.00	48%	1.55	0.02	1	-
65	Chame	13/10/15 16:52	16/10/15 09:56	20 17:04	33	40	81.8	106.6	OK	60.5	0.00	0.00	0.00	100%	147	0.05	1	
64	Dischame	13/10/15 10:17	13/10/15 16:52	06:34	33	39	77.1	87.2	OK	-39.7	0.00	0.00	0.00	47%	112034	0.02	4	-
63	Charge	12/10/15 17:32	13/10/15 10:17	16:44	33	39	81.8	98.9	OK	39.0	0.00	0.00	0.00	98%	0.95	0.01	1	
62	Discharge	12/10/15 10:52	12/10/15 17:32	06:39	30	36	76.9	86.9	ОК	-39.8	0.00	0.00	0.00	48%		0.01	1	
61	Pause	11/10/15 06:32	12/10/15 10:52	1a 04:19													1	
60	Charge	10/10/15 18:03	11/10/15 06:32	12:29	34	44	82.8	103.3	ОК	45.6	0.00	0.00	0.00	100%	1.09	0.05	1	
59	Discharge	10/10/15 10:08	10/10/15 18:03	07:54	34	39	77.1	86.7	OK	-39.8	0.00	0.00	0.00	46%		0.01	1	
58	Pause	09/10/15 09:43	10/10/15 10:08	1g 00:24													1	
57	Discharge	09/10/15 09:38	09/10/15 09:43	00:05	48	49	86.3	86.7	OK	0.0	0.00	0.00	0.00	99%		0.01	1	
56	Discharge	09/10/15 05:39	09/10/15 09:38	00:13	48	49	80.7	86.7	OK	-0.3	0.00	0.00	0.00	255%		0.00	0	
55	Charge	08/10/15 13:54	09/10/15 05:39	15:44	37	57	78.8	102.7	OK	46.1	0.00	0.00	0.00	255%	1.14	0.00	0	
54	Discharge	08/10/15 06:14	08/10/15 13:54	07:39	37	57	78.2	86.4	OK	-39.8	0.00	0.00	0.00	255%		0.00	0	
53	Charge	07/10/15 12:49	08/10/15 06:14	17:24	37	63	78.8	102.8	OK	61.4	0.00	0.00	0.00	255%	1.53	0.00	0	
52	Discharge	07/10/15 06:04	07/10/15 12:49	06:44	37	51	78.0	86.4	OK	-39.5	0.00	0.00	0.00	255%		0.00	0	
51	Charge	06/10/15 14:04	07/10/15 06:04	15:59	37	56	78.8	103.1	OK	76.2	0.00	0.00	0.00	255%	1.19	0.00	0	
50	Discharge	06/10/15 06:05	06/10/15 14:04	07:59	35	41	72.9	86.4	OK	-63.4	0.00	0.00	0.00	255%		0.00	0	
I⊽ 49	Pause	05/10/15 12:00	06/10/15 06:05	18:04													0	
48	Anomalous Event	00/00/00 00:00	00/00/00 00:00	49710g													65535	
471	Anomalous Event	00/00/00 00:00	00/00/00.00.00	497100													65535	

For each event are presented the following parameters:

- Ph.: Number of event.
- Phase type: Charge (GREEN row) Discharge (YELLOW row) Pause (GREY row).
- Start: Starting date and time of the event registration.
- Stop: Ending date and time of the event registration.
- Duration: Total duration of the event (days : hours : minutes).
- °C Min.: Minimum Temperature registered during the event expressed in Celsius degrees.
- °C Max.: Maximum Temperature registered during the event expressed in Celsius degrees.
- Vmin: Minimum tension of the battery registered during the event.
- *Vmax:* Maximum tension of the battery registered during the event.
- Electrolyte: Status of the electrolyte (OK= sufficient level, KO= low level).
- **Ah:** In Discharge: Ampere-Hour ceded by the battery In Charge: Ampere-Hour charged by the battery.
- *KWh:* Total energy managed during the event expressed in kilowatts-hour.
- *KWh C.:* Energy charged in the battery during the event expressed in kilowatt-hour.
- KWh S.: Energy supplied by the battery during the event of discharge expressed in kilowatt-hour.
- S.o.C.: Index of the status of charge of the battery reached in that event.
- C.F.: Charge Factor.
- *Max. Sbil.:* Maximum recorded unbalance between the various sectors related to the battery voltage sockets.
- Setup: Type of configuration SPY_BATT in use during the registration of the event.

By double clicking on any Charge or Discharge event row, it is possible to see the detailed analysis of the selected event.

In this way, the first window of *PHASE Chart graph* (*in Detail section*) automatically appears. (See par. *12.2.1.* : *PHASE Chart graph*).

This function is not available on PAUSE phase, because these phases not contain meaningful data.

In the table, it is also possible to find the registrations of *Anomalous Event* that will be highlighted in red.

14. SETUP Window:

In the **Setup** window, it is possible to create a new **Setup** for the connected **SPY_BATT**. This function is mainly used to perform the first installation of the **SPY-BATT** (See the **SPY-BATT** installation *manual*), but also to create a new setup of the same device.

Active Set	y Dashboard Compariso up I Voltage Nominal Capacit 80.0 V 775.0 Ah	ty # of Ce	Phases Data S Is Cells V3 40 31	Cells V2	Fime Clock Servic	e Functions Fi	mware	Setup	
Setup	Creation Date	V def	Ah def	Туре	Tot Cells	Cells V3	Cells V2	Cells V1	Catur
2	01/01/2014	80.0	775.0	1	40	30	20	10	Setup

NOTE: The first configuration in the list is the one in current use. Other configurations present in the list cannot be reactivated on the SPY-BATT. If you want to revert to an earlier configuration, although already present in the table, you will have to redefine it as new.

To create a new configuration, fill in all the fields of the section *Active Setup* and click the button *New Setup*. (This operation is possible only if a **SPY-BATT** is connected).

In the summary table, are presented all the configurations saved on the **SPY-BATT**. If a **SPY-BATT** is connected to the PC, by click the button *Read Setup*, the table will be updated with the setups present in the device memory.

15. REAL TIME CLOCK Window:

Click the button Read Clock to verify the date and time of the connected device.

Click the button **Set Clock** to automatically update the date and time of the device with the date and time of the PC in use.

LADE LIGHT Manager (EN) - [SPY-BATT]	
File SPY-BATT ?	- 8 ×
General Summary Dashboard Comparisons Statistics Phases Data Setup Real Time Clock Service Functions Firmware	
SPY-BATT Clock	
Date Time	
Bead Clock Set Clock	
	:

16. SERVICE FUNCTIONS Window:

To verify all the connections of the **SPY-BATT** on the battery, open the window **Service Functions**.

neral Summar	y Dashboar	d Comparison	s Statistics	Phases Data Se	tup Real Time	Clock Service	Functions	imware		
Variables red	cord V3	V2	V1	IE	Batt	Battery t	emperature	Electrolyt	e	Read
0		0	(0		0		0	Automatic read
Ah dischar	ged	Ah charged	0	KWh discharged	KWh ch	arged	S.o.C.	C.F.	0	
Vbackup	battery			SPY_BATT	T status					Memory Clean
0				- Connecti	ion staus					Erase
				🗹 V Ba	tt 🕅 V 3/4	₩ V 2/4	V 1/4			Keep Customer Data

By activating the button **Read**, the values in section **Variables record**, are updates with the real values read in that moment from the **SPY-BATT**:

- Voltage V Batt.
- Voltage of the intermediate sockets V3 V2 V1.
- Current of charge or discharge I Batt.
- Battery temperature.
- Electrolyte presence.
- By select the box *Automatic read*, the values will be read and update every 5 seconds.

This function is basically used to verify the correct sequence of the connections of the **SPY-BATT** after the first installation. (See the **SPY-BATT** installation manual).

The button *Erase,* in the Memory Clean box, can be used to delete all data present on the connected SPY-BATT.

You can erase only the *Data memory* and preserve the *Customer data* selecting *Keep Customer data* function in *Memory clean* section.

<u>I!! WARNING !!!</u> <u>Data cancelled will be permanently lost. To execute this operation,</u> <u>a specific deletion code may be asked by the system. Ask for this code to the producer.</u>

17. FIRMWARE Window:

In Record status section, are shows the Bootloader and Firmware revisions of the connected SPY-BATT.

🕌 LADE LIGHT Manager (EN) - [SPY-BATT]		_0×
P File SPY-BATT ?		- 8 ×
General Summary Dashboard Comparisons Statistics Phases Data Setup	Real Time Clock Service Functions Firmware	
Record status	Update	
Rev Bootloader Rev Firmware Area	File Firmware	
1.01.09 1.11.03 A1	C\\SPY-BATT\TCM0001 4 SpyBat 1.11.04	pad file
	Rev Firmware	
	1.11.04	
	Release date	
	23/03/2016	
	Area Result	
		d
		,d

In the section **Update** it is possible to update the Firmware of the connected device with a more recent version, available for download from the website <u>www.spybatt.it.</u>

WARNING: It is suggested to save the data of the SPY-BATT before executing the Firmware update, as a sudden odd interruption of the download may delete data in the memory.

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To execute the update of the firmware:

- Download and save the new Firmware on the PC.
- Select the origin path of the file through the button
- Upload the file by activating the button Load file
- Update the firmware by clicking the button Send.

Wait for the download....

<u> A</u> ggiorna	amento Firmware	X
Fase	2 - Invio Dati	
25%		
Γ	.	
	Processing	
	Step: 66 di 263 - tempo: 4.15 s di 16.535 s	Primo Evento: step 3 - tempo: 0.27
	Carica Dati Interrompi	Chiudi
		11

The fields of the section *Record status* will be updated with the new version of the Firmware.

🛂 LADE LIGHT Manager (EN) - [SPY-BATT]	
File SPY-BATT ?	_ & ×
]
General Summary Dashboard Comparisons Statistics Phases Data Setup Re	al Time Clock S₊ ◀ ▶
Record status	Update
Rev Bootloader Rev Firmware Area	File Firmware
1.01.09 1.11.04 A1	
	, Rev Firmware
	Release date
, 	.::

NOTES