Manual
Software Installation
and
Operating Instructions

Diagnostic Tool

Stiga 48V Battery System

1. Index

STIGA

2. Introduction

This manual has been draw up in order that you may feel much confident to the DIAGNOSTIC TOOL and give all the necessary instructions for using.

Diagnostic Tool supports connection both to appliance and battery with the main purpose of supporting you with the troubleshooting, in case of malfunction of the machine (Battery or appliance)

2.1 Supported products

The Diagnostic Tool can handle connection to:
Battery HH – 500-700-900 series
(Just an example below for STIGA 500 series)

PRODUCT	*Lawn trimmer*	*Brushcutter*	*Hedge cutter*	*Axial blower*	*Chainsaw*	*Multi-Tool*
MODEL NAME	**SGT 500 AE**	**SBC 500 AE**	**SHT 500 AE**	**SAB 500 AE**	**SPR 500 AE**	**SMT 500 AE**

*and **Lawnmower – 500-700-900 series – SLM models***
(Just an example below for STIGA 500 series and SLM Series)

PRODUCT	Lawn Mower				
MODEL NAME	*Twinclip 50 SQ DAE*	*Combi 43/48/50....*	*Multiclip 50....*	*Multiclip 47....*	*SLM 536/540/544 AE*

2.2 Functionality

The STIGA Diagnostic Tool for 48V Battery System allows the following operations:

- diagnosis status of BATTERY and APPLIANCE;
- access working data and error/warning logs recorded by both electronic cards (Battery and Appliance);
- service report generation (PDF downloadable document).

2.3 Kit components

The Diagnostic Tool for the 48V lithium-ION rechargeable battery system is composed by the following parts:
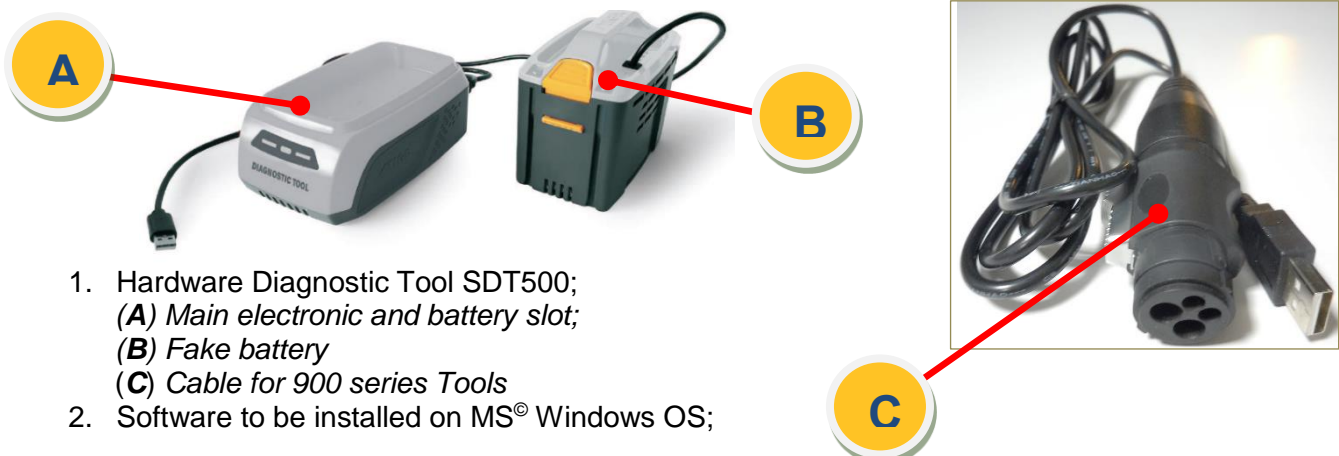
1. Hardware Diagnostic Tool SDT500;
   *(**A**) Main electronic and battery slot;*
   *(**B**) Fake battery*
   (**C**) *Cable for 900 series Tools*
2. Software to be installed on MS© Windows OS;

STIGA

2.4   Minimum System Requirements

The following prerequisites are requested in order to properly operate the system:

- PC with USB 1.1/2.0/3.0/3.1 Host Controller (USB Port) and Microsoft © Windows OS rev. 7/8/8.1/10: both 64 and 32 bit (x86) versions are supported;
- Prolific © PL2303 USB-to-Serial Bridge Chip Family Windows Driver;
- Microsoft ©Visual C++ 2017 Redistributable Packages (x64/x86);

3.   Software Download

The software can be downloaded through our portal STIGA Connect:
https://stiga.ev-portal.com/LogIn/Stiga

3.1   Connection to STIGA Connect

Connect to STIGA Connect web site https://stiga.ev-portal.com/LogIn/Stiga
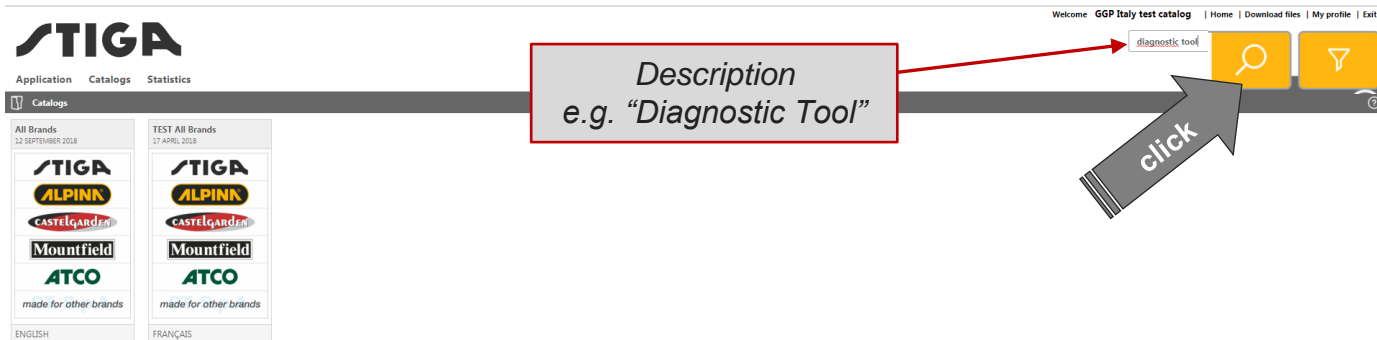

Log in with your user name and password:

Once Catalog (All Brands) and language has been selected, the release package can be retrieved by *3.2 Dowload by the description* and *3.3 Dowload with a search by type of document.* instructions.

3.2   Dowload by the description

- click on the "lens" button;

Description
e.g. "Diagnostic Tool"

click

- click on the software you are looking for;

search result ...... choose the software you are looking for.
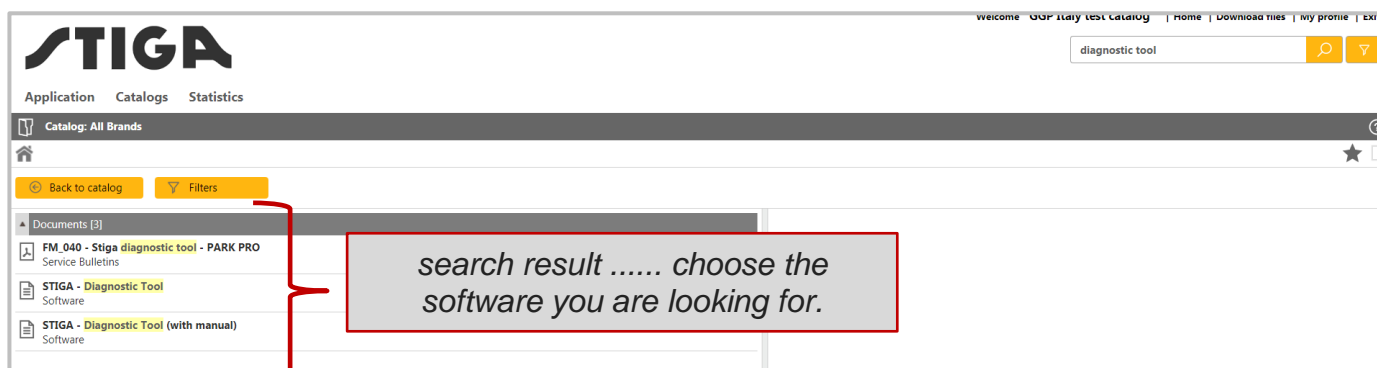
- click one of the products selected;

Products selected

click

- click on "*click here*";

STIGA - Diagnostic Tool

click here to download the software
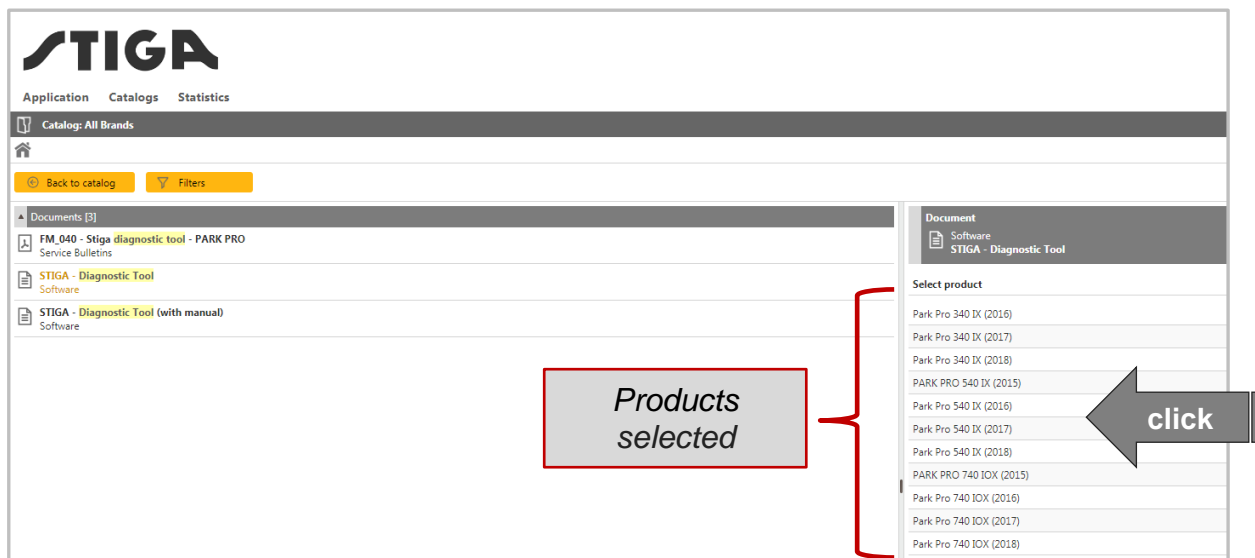
click

Now you get in the DOWNLOAD folder a .zip file with software and this manual.

3.3   Dowload with a search by type of document.

- click on the "Filter";
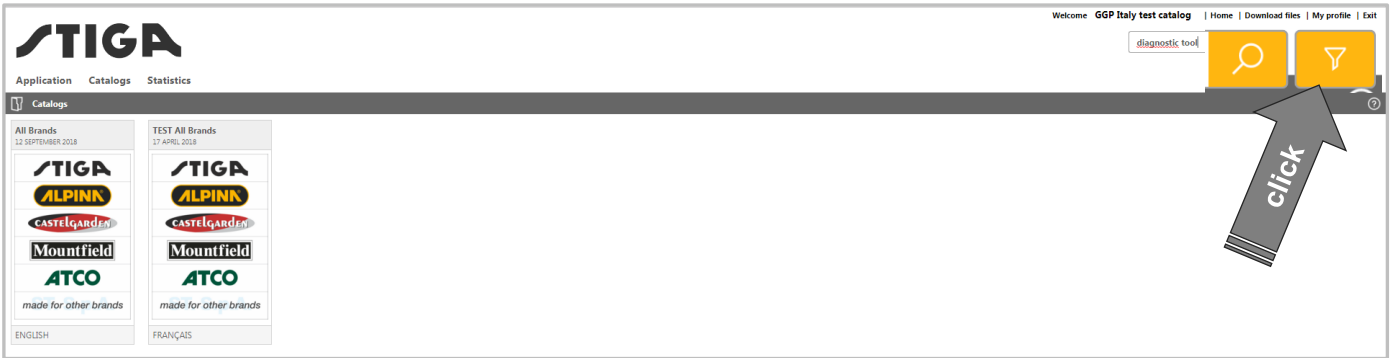
A dialog appears to ask you which kind of document you are looking for:

- select the "Documents and Type field";
- click on the "Start searching"

In the drop-down menu select "Documents"

In the drop-down menu (**Type** field) select "Software"

- click on the software you are looking for;
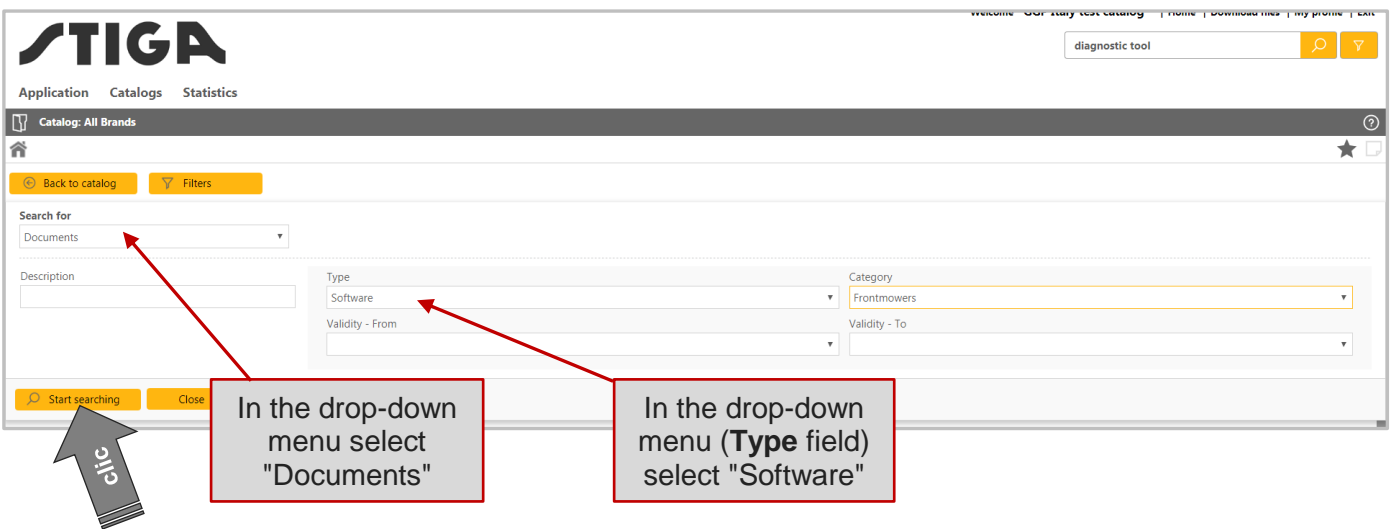
search result ...... choose the software you are looking for.

- click on "*click here*";
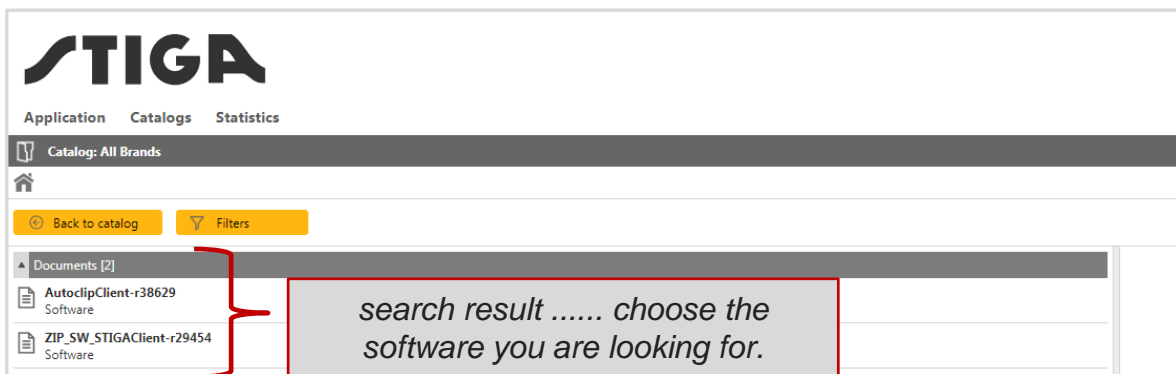
click   click here to download the software
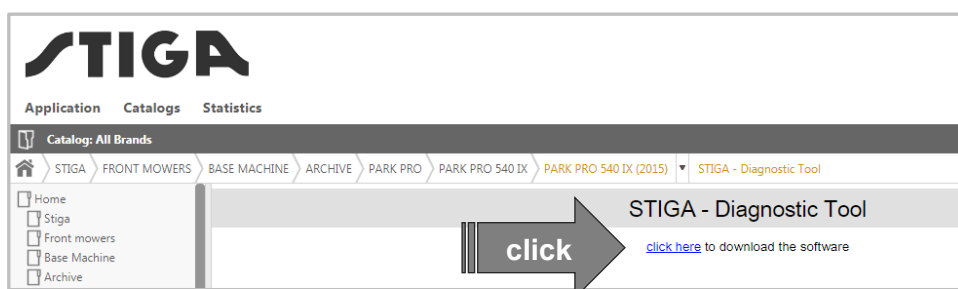
Now you get in the DOWNLOAD folder a .zip file with application installer and this manual: please extract the content to a suitable temporary folder.

4.   Software installation

1. Check installed OS version from ***Control Panel\System and Security\System***
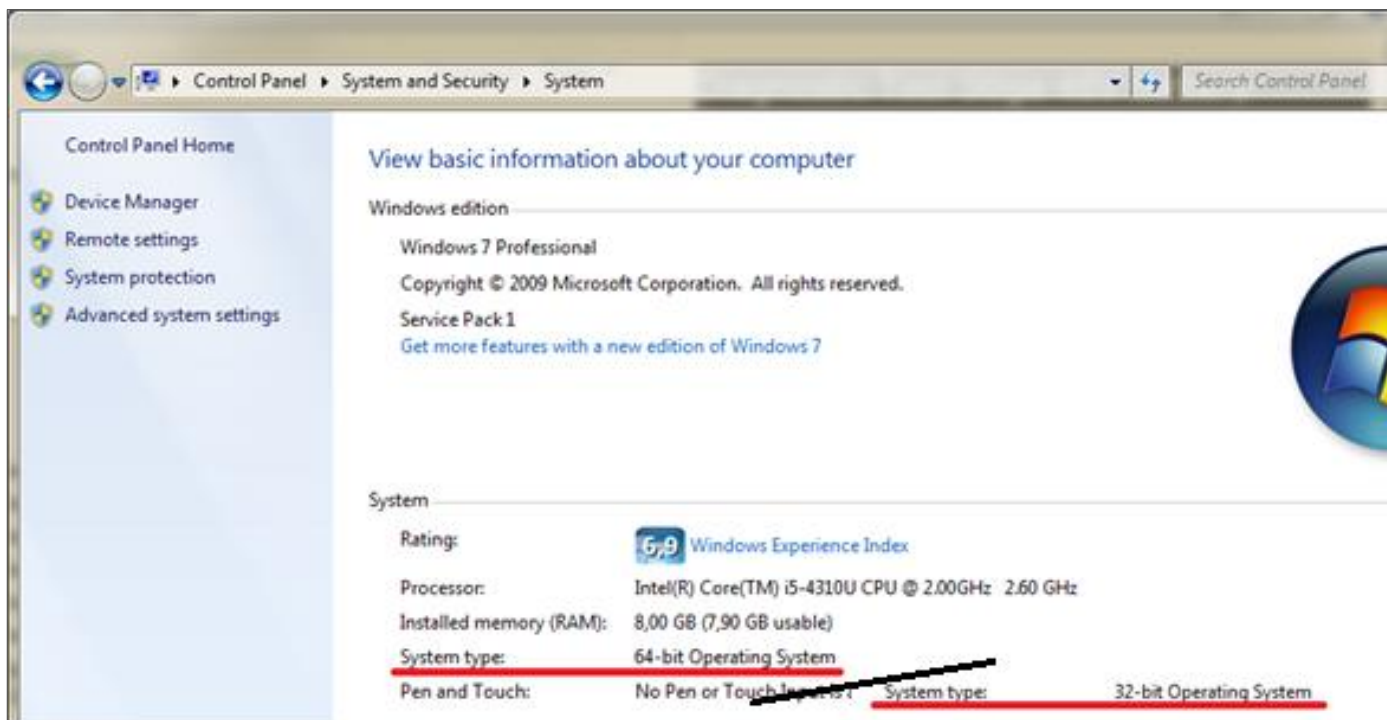
2. Launch OS-related installer executable:

    a. *x64-64bit\StigaDiagnosticToolInstaller_vXX.exe* (64bit Operating System version)

    b. *x86-32bit\StigaDiagnosticToolInstallerX86_vXX.exe* (32bit Operating System version)

3. Installer's user interface will pop-up: choose preferred destination folder if the default one doesn't fit.
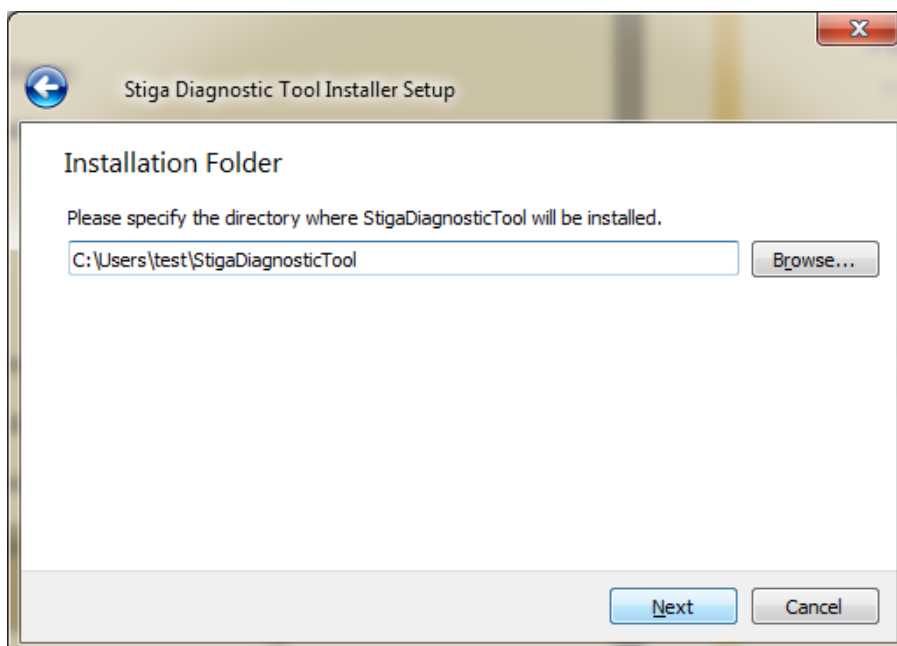
Picture 2

4. Default selected components are

   a. **PL2303 Windows driver**
   b. **Stiga Diagnostic Tool application**

Uncheck PL2303 *USB-to-Serial Bridge* component if Windows driver is already installed on the system (e.g. via *Windows Update* and/or former installation).

5. Further steps let the user select the *Start Menu* folder and review the storage requirements. Clicking *Install* starts the selected components installation.
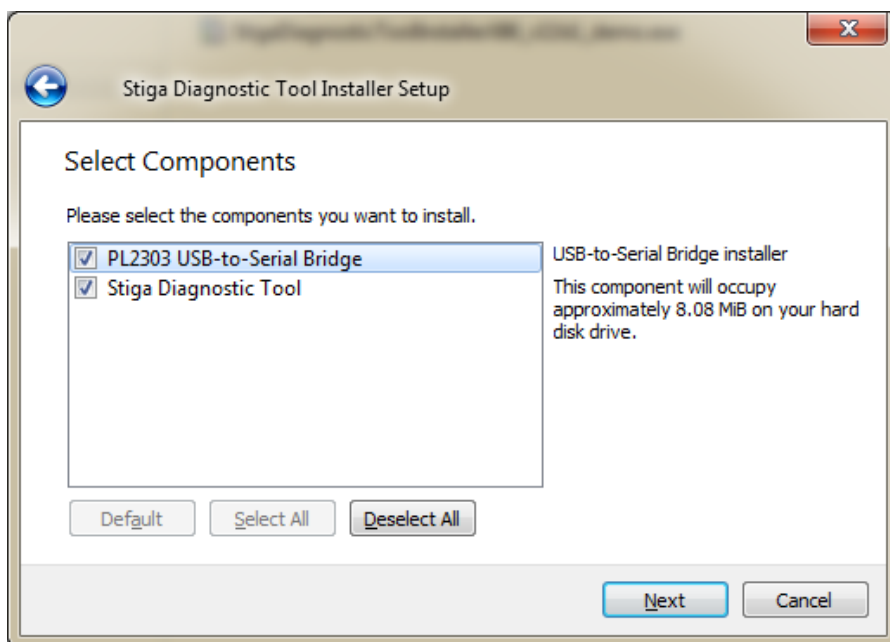6. If driver installation procedure (a) has been selected, the *InstallShield Wizard* will be displayed to inform you that the PL-2303 USB-to-Serial driver will be installed. Click *Next* to continue and follow installation steps.
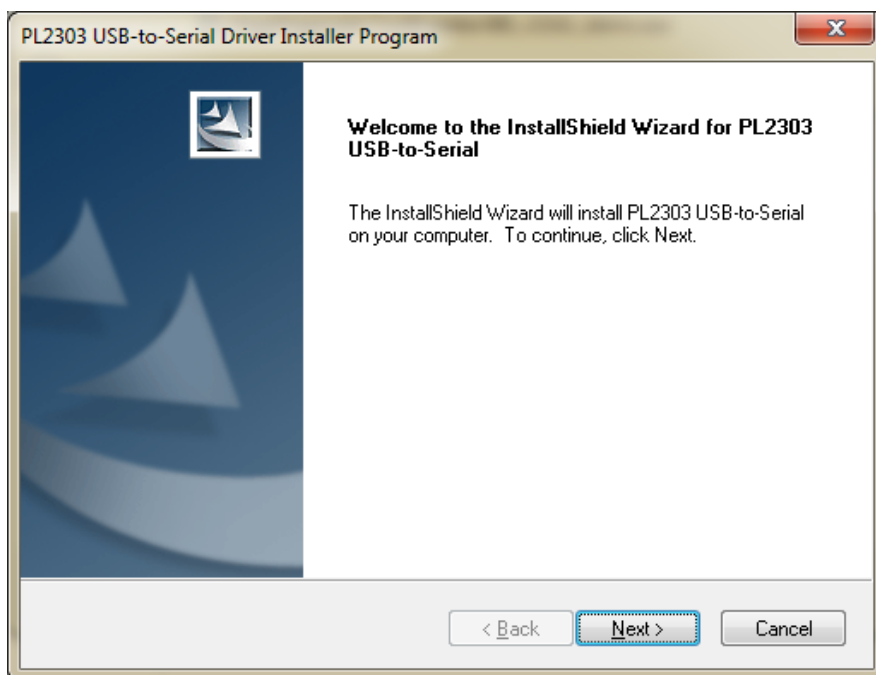
7. Completion page let the PL2303 *Installshield Wizard* close giving focus back to Stiga Diagnostic Tool installer.

If requested, **please avoid restarting the system** until Stiga Diagnostic Tool installer shows the following completion page:
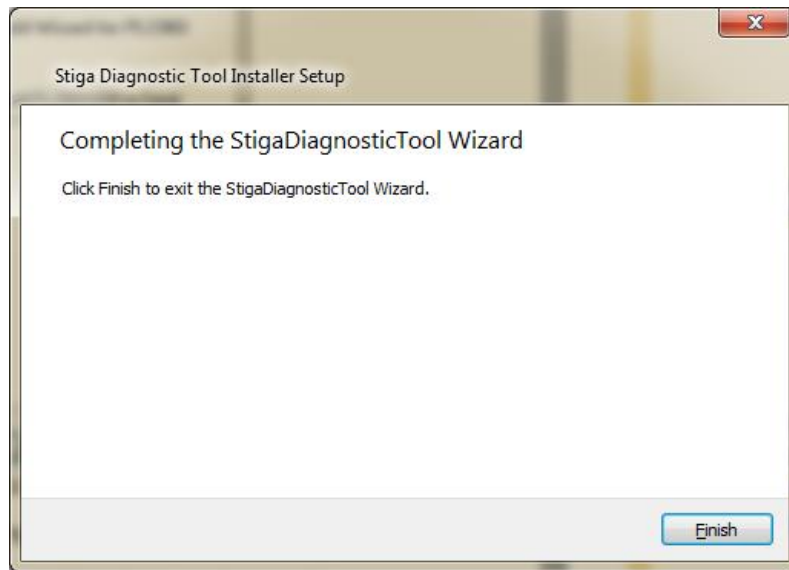
Picture 5

8. User's desktop will be populated with a shortcut in order to ease launching the application:
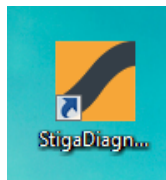
Picture 6

9. **Check if device driver are properly installed executing the following procedure:**

    a. Connect the diagnostic tool to an available USB port
    b. Wait for driver install completion if requested (usually signaled by tray's icon pop-up)
    c. Open the *Device Manager* and check if the **Prolific USB-to-Serial Comm Port** device is detected and assigned to the system:
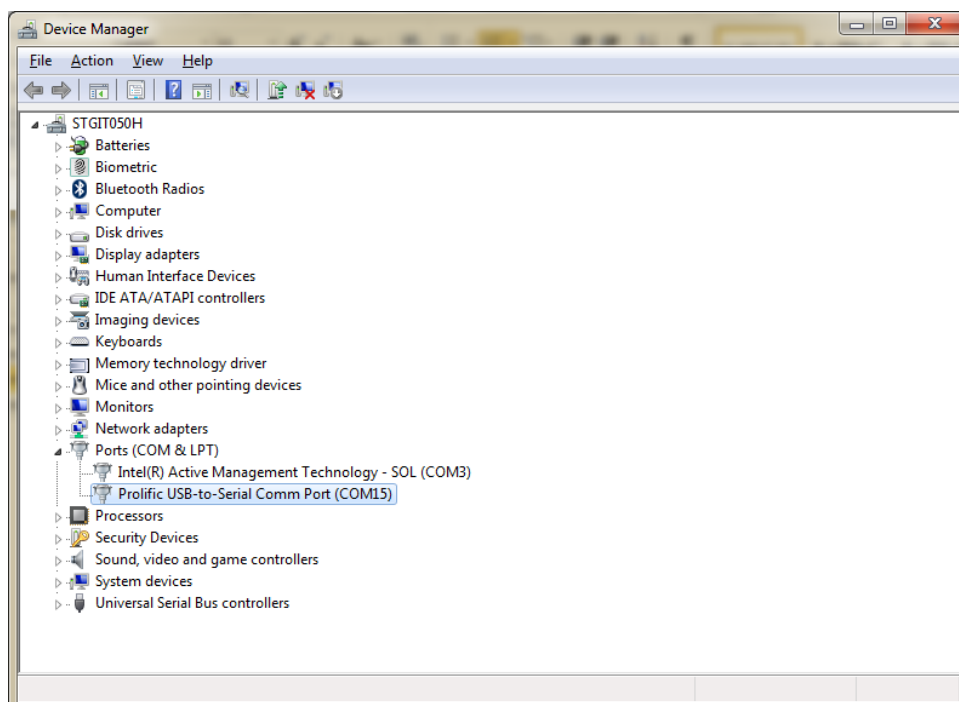
Picture 7

STIGA

d. Well note the assigned **COMx** in order to configure the desktop application (e.g. COM15 within the provided picture)

e. Stiga diagnostic Tool installation folder (e.g. C:\Users\Test\StigaDiagnosticTool) holds **PL2303 Windows Driver Manual v1.20.0.pdf Users' manual**: please refer to it in case of issues with the device detection.

4.1   Installation notes – Prolific Driver

This chapter shall give the user some hints in case a plain installation procedure cannot be completed on the system.

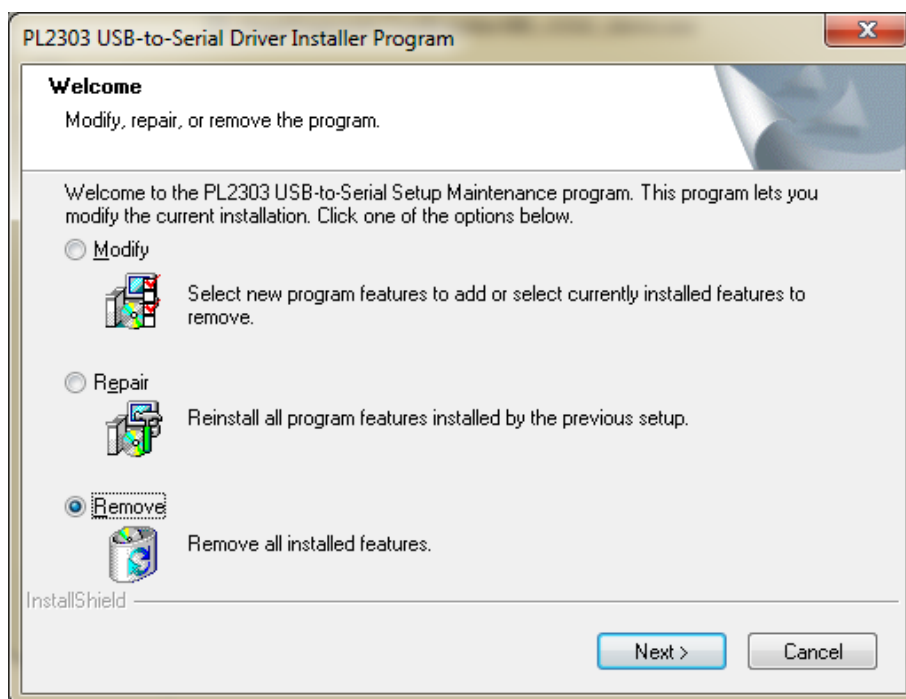- If the Prolific device driver has already been installed on the system *and* PL2303 USB-to-Serial Bridge driver component (*cfr.4.8-a*) has been selected, the *Installshield Wizard* will show a

Modify-Repair-Remove page:

Picture 8

- Select **Modify** or **Repair** and follow installation process

- **Avoid restarting the system** choosing "*Restart later*" option when prompted, in order not to terminate the Stiga Diagnostic Tool installation process until completion

- In case Prolific *Installshield Wizard* is **cancelled**, please wait until Stiga Diagnostic Tool installer asks how to handle the cancelled step: click **Ignore** and follow next steps
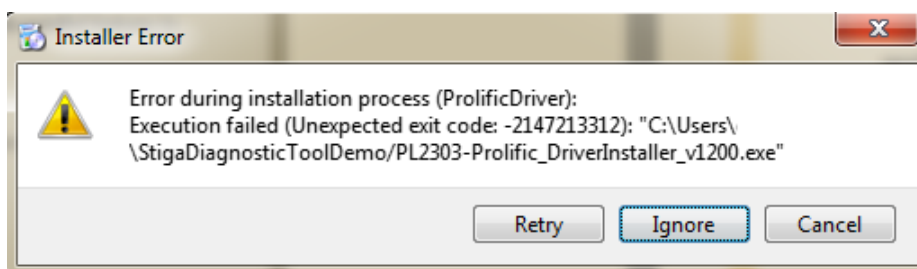
Picture 9

4.2   Installation notes – Microsoft Visual C++ 2017 Redistributable Package

Stiga Diagnostic Tool desktop application relies on *Microsoft Visual C++ 2017 Redistributable Package*. If this is not installed on the host system, or the installer is not able to detect it, an information **message box** will pop-up during installation sequence.
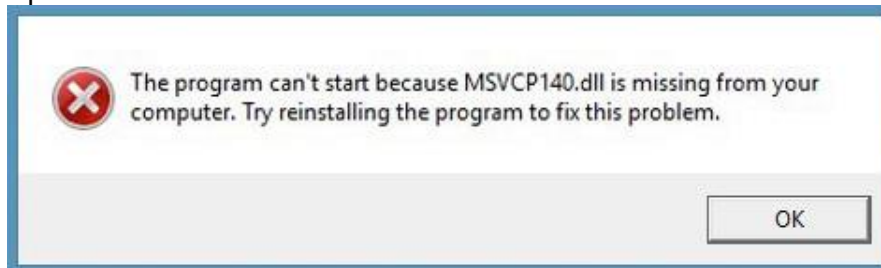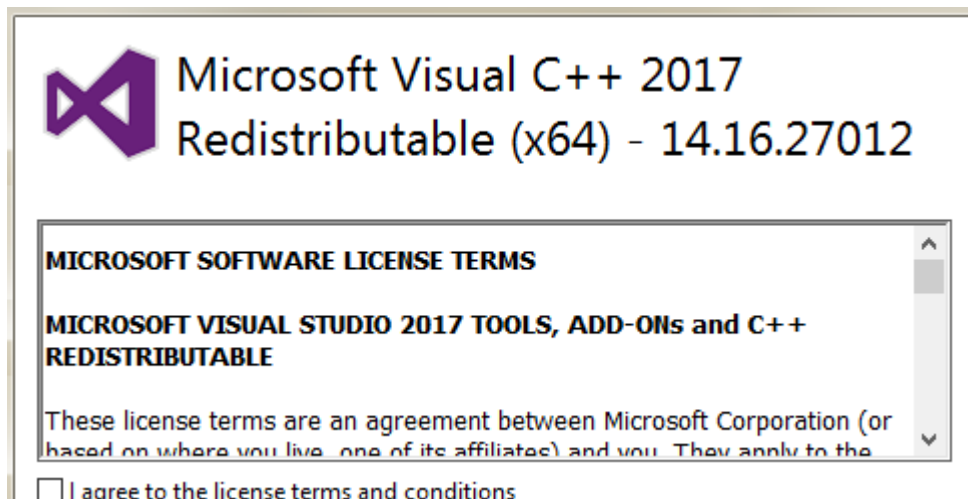
If MS VC++ is not installed on the system, **the application launch will fail with missing MSVCP140.dll message box** as depicted here:

The program can't start because MSVCP140.dll is missing from your computer. Try reinstalling the program to fix this problem.

OK

Picture 10

To fix the problem, please execute the provided installer:
- Locate Stiga Diagnostic Tool installation path (default *C:\Users\%user%\stigaDiagnosticTool*);
- Execute **vc_redist.x64.exe** on 64 bit host or **vc_redist.x86.exe** on 32 bit host;
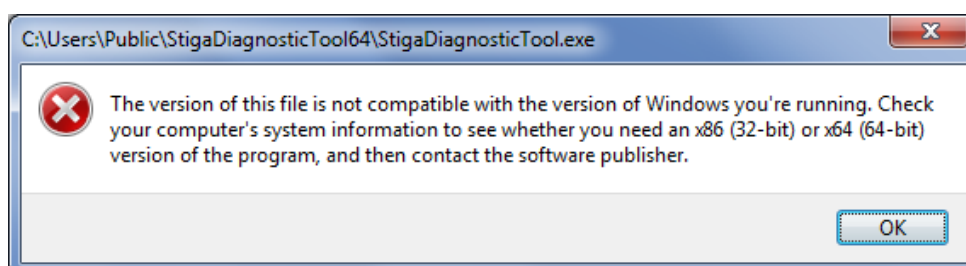- *InstallShield Wizard* user's interface will pop-up. Follow installation steps as requested:

Microsoft Visual C++ 2017
Redistributable (x64) - 14.16.27012

MICROSOFT SOFTWARE LICENSE TERMS

MICROSOFT VISUAL STUDIO 2017 TOOLS, ADD-ONs and C++ REDISTRIBUTABLE

These license terms are an agreement between Microsoft Corporation (or based on where you live, one of its affiliates) and you. They apply to the

☐ I agree to the license terms and conditions

Picture 11

4.3   Compatibility note (64/32bit)

Please note that 64 bit OS-based systems are backward compatible with x86 applications: this means that Stiga Diagnostic Tool – x86 version can be executed on 64 bit hosts.
Otherwise **x86 systems are not forward compatible with 64 bit applications**: if Stiga Diagnostic Tool - 64 bit version is installed on x86 host, the following error message box will pop-up:


C:\Users\Public\StigaDiagnosticTool64\StigaDiagnosticTool.exe

The version of this file is not compatible with the version of Windows you're running. Check your computer's system information to see whether you need an x86 (32-bit) or x64 (64-bit) version of the program, and then contact the software publisher.

OK

Picture 12

Refer to *4 Software installation* for OS version checking guidelines

STIGA

4.4   Application launch and Update check

When the installation is complete, shortcuts to installed program are created in the start menu and on the desktop.
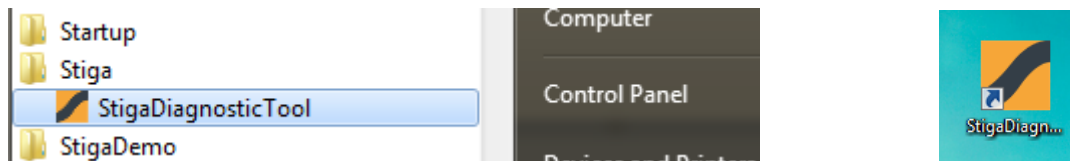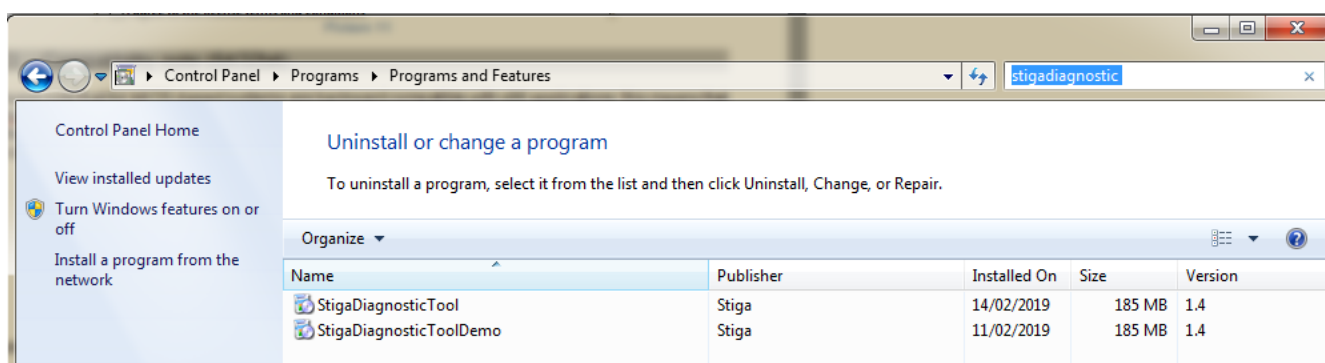
Whenever the host PC can access the web, a software update check is performed at application launch: in case a newer version is available, a message-box will pop-up.
Clicking **OK** button leads the user to STIGA Connect login page as per par.3.1.
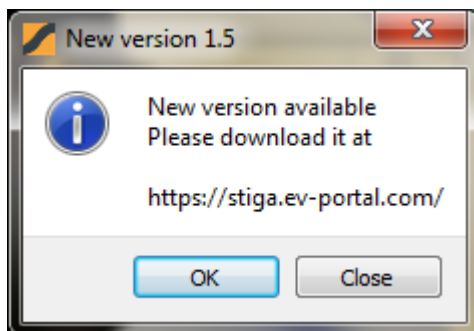
If this is the case, proceed with application update:

- Uninstall current application version through OS control panel

- Download and install new version following *3 Software Download* instructions.

5.   Diagnostic Tool connections

The diagnostics tool can communicate with control unit of the appliance or with control unit of the battery.
In the rear part of the "base" there is a switch to select which of the machine component (Battery or Appliance) you want to do diagnostics.

If through the switch is selected "TOOL", the Diagnostics Tool will be able to communicate with control unit of the appliance and the battery has to be inserted into the slot just to supply feed to the appliance itself. If through the switch is selected "BATTERY", the diagnostics tool will be able to communicate with control unit of the battery instead.

5.1   Battery diagnostics

1. Plug the battery into the diagnostic tool's slot (BASE);
2. Set the Battery/Appliance switch to the proper position (Battery);
3. Connect the usb cable to the host computer;
4. Launch Diagnostic Tool Application and start data transmission/reception.

5.2   Appliance (Tool) diagnostics

As regards the appliance *Stiga Lawnmower - TT 500 Synchronized* you are requested to remove both batteries from the base and check that both "slots" are working before proceeding with following connection STEPS.

1. Plug the **fake battery** into the appliance's battery slot;
    NOTE: as for "Dual Battery" lawnmower it is all the same in which "slot" the "fake battery" is set.
2. Connect the USB cable of fake battery to the base of Diagnostic Tool
3. Set the Battery/Appliance switch to the proper position (TOOL);
4. Plug a battery into the diagnostic tool's slot to supply the appliance;
5. **Switch ON the appliance**;
    NOTA: as for lawnmower please keep in mind that after 15 seconds of "inactivity" the appliance switches off; in that case you have just to switch the lawnmower on again and proceed with subsequent connection "steps".
6. Connect the usb cable to the host computer;
7. Launch Diagnostic Tool Application and start data transmission/reception.
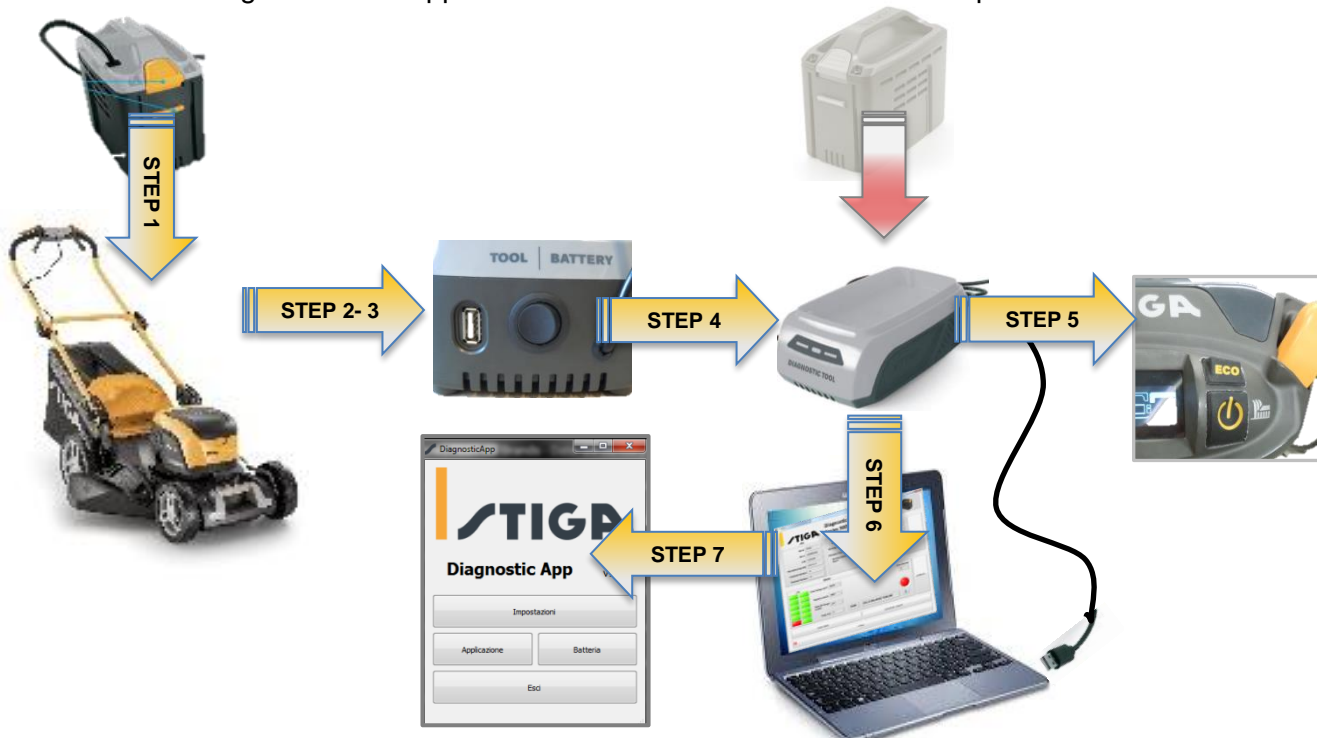
ATTENTION: during the diagnostics on appliances (lawnmowers, brushcutters, blowers, ...) the machines are started up but they are not working due to obvious safety reasons.

6.   Software dialogs user's guide

The user interface of the application is made by four main dialog windows:
- Main dialog;
- Settings dialog;
- Battery dialog;
- Appliance dialog

Through these windows the user will be able to:
- Select the communication interface with host PC and set the main options of the program
- Choose the communication with control unit of the appliance or with control unit of the battery and check related identification data
- As for the battery: access to service and recharge data and to data related to status of battery pack and cells;
- As for the appliance: access to data related to working sessions and to errors revealed

For both (Battery and Appliance) it's possible to print a PDF Report with all data mentioned above.

6.1   Main dialog

This is the dialog window that the programm shows when starting and the same you can find after closing each window of next level.
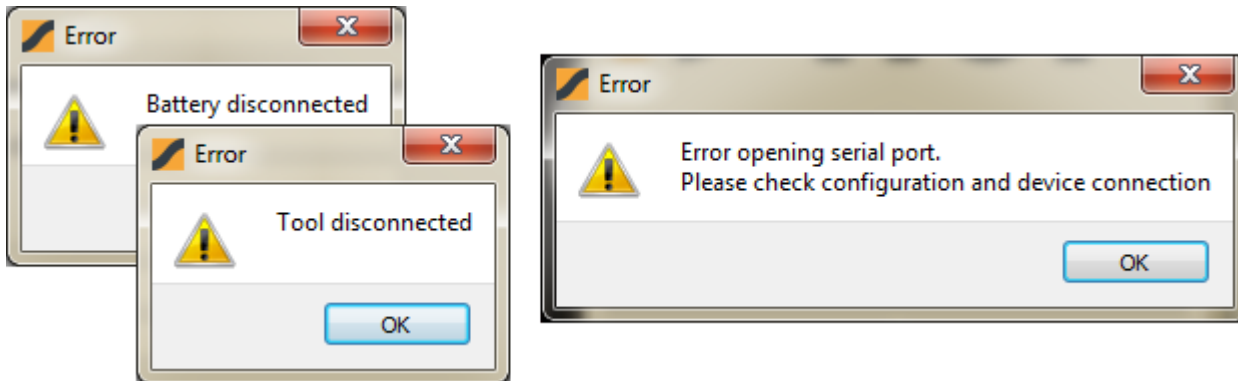
Controls:
- *Settings*: trigger Settings dialog display (*6.2 Settings dialog*);
- *Tool*: trigger Appliance dialog display;
- *Battery*: trigger Battery dialog display;
- *Exit*: quit application;

6.1.1 Communication error

The application will show an error message box whenever a communication error occurs:

- communication to the battery or tool failure: check device status and connection and retry;
- selected COM port not available or not properly set: check **Prolific USB-to-Serial Comm Port** device availability through control panel and selected COM port on **settings dialog**;


6.2 Settings dialog

Through the provided controls, this dialog allows the user to set main options.

Controls:

- *Serial Port*: serial port selection. Be sure to set this control to the system COM port assigned to the **Prolific USB-to-Serial Comm Port** device (*cfr. par 4*);
- *Default folder*: *default folder for report and data log files storage;*
- *Save to default folder:* tick this checkbox to disable "Choose target folder" dialog pop-up when generating report or exporting data logs. Un-check it to manually specify the target folder for each "Generate report/Save data" operation;
- *Language:* Choose a language from the pop-up menu. Restart the application for the changes to take effect, as well-noted by the pop-up message-box;
- *Cancel: discard changes and close dialog;*
- *Save: save settings and activate main dialog;*
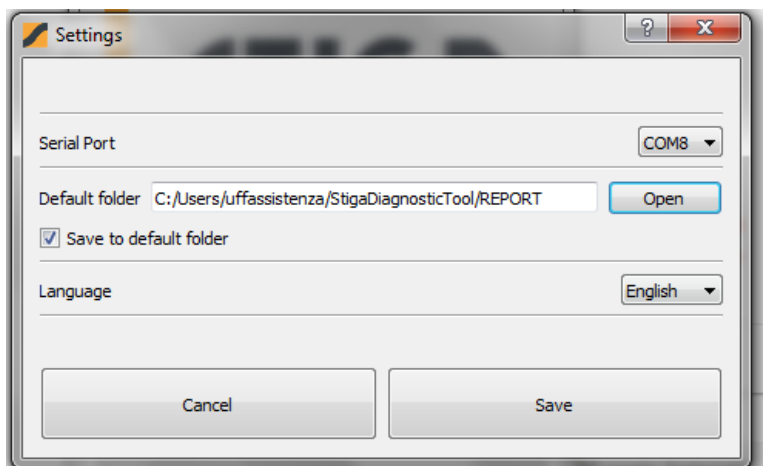
6.3   Appliance (Tool) dialog

This is the dialog window with appliance, here below you can find the descriptions of fields and controls.

Product's IDs

Work and error status of the Appliance

HELP Troubleshooting service guide

Export tool's black-box data to an encrypted file

Generate plain PDF service report

6.3.1 Product's IDs field

Base Model

Serial number

Date of production

Revision identifiers

6.3.2 Work and Error status

"Last Error Code" and "Description" fields are red-highlighted in case of serious errors (cfr. troubleshooting guides).

6.3.3 Controls (Refresh, Close and Save Data)

- **Refresh**: refresh IDs and status fields with proper communication sequences.
- **Close**: quit tool dialog and return to main dialog.
- **Save data**: export full black-box data to an encrypted log file. Clicking this button leads to the following alert pop-up
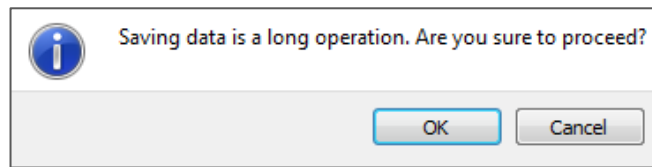

NOTE: the file will be saved in the folder named "Default folder" *(6.1 Main dialog)* if option "Save to default folder" is on. The file is not legible and has to be sent to *STIGA Service HQ for data analysis.*

6.3.4 Generate Report

Through this control a PDF file is generated including:
- details of appliance data;
- the total working time;
- the detailed list of all errors occured;
- the number of working sessions of machine;
- a chart showing the lenght of the working sessions;
- a chart indicating the average absorption and the current peaks during working sessions.

Choosing the control a dialog window will appear that allows to select to download the complete data or to limit the recovery to period of time specified (starting from present date):
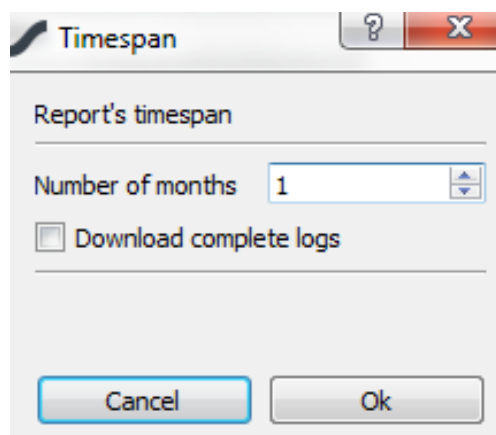
Here below an example of report generation:

Appliance Diagnostic Report

Base Model	S/N	Manufacturing Date
HT 500 Li 48	20JC5HTR100661	2020-10-14

ID

UUID	LG60HT01
Hardware Revision	0
Firmware Revision	0

Status

Total Time [min]	0
Working Session Counter	0
Error Counter	0
Last Error Code	0
Description	-

ERROR/WARNING LOG
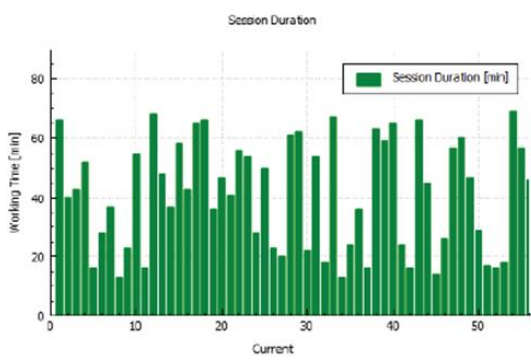
ID	Date	Error Code	Error Message	Error/Warning
20	2019/01/25 08:53:41	12	COMMUNICATION ERROR	
19	2019/01/15 00:54:00	11	SUPPLY VOLTAGE FAILURE	
18	2019/01/10 10:51:00	11	SUPPLY VOLTAGE FAILURE	
17	2019/01/05 08:48:00	11	SUPPLY VOLTAGE FAILURE	
16	2018/12/31 06:45:00	11	SUPPLY VOLTAGE FAILURE	
15	2018/12/26 04:42:00	11	SUPPLY VOLTAGE FAILURE	
14	2018/12/21 02:39:00	11	SUPPLY VOLTAGE FAILURE	
13	2018/12/16 00:36:00	11	SUPPLY VOLTAGE FAILURE	
12	2018/12/11 10:33:00	11	SUPPLY VOLTAGE FAILURE	
11	2018/12/06 08:30:00	11	SUPPLY VOLTAGE FAILURE	
10	2018/12/01 06:27:00	11	SUPPLY VOLTAGE FAILURE	
9	2018/11/26 04:24:00	11	SUPPLY VOLTAGE FAILURE	
8	2018/11/21 02:21:00	11	SUPPLY VOLTAGE FAILURE	
7	2018/11/16 00:18:00	11	SUPPLY VOLTAGE FAILURE	
6	2018/11/11 10:15:00	11	SUPPLY VOLTAGE FAILURE	
5	2018/11/06 08:12:00	11	SUPPLY VOLTAGE FAILURE	
4	2018/11/01 06:09:00	11	SUPPLY VOLTAGE FAILURE	
3	2018/10/27 04:06:00	11	SUPPLY VOLTAGE FAILURE	
2	2018/10/22 02:03:00	11	SUPPLY VOLTAGE FAILURE	
1	2018/10/17 00:00:00	11	SUPPLY VOLTAGE FAILURE	
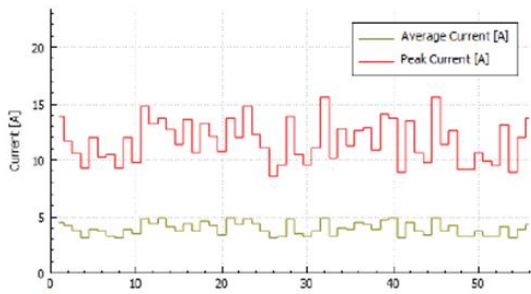
HISTORY

Session Duration

Average Current [A]
Peak Current [A]

6.3.5 HELP (Troubleshooting)

Through this control you have access to a PDF file containing a troubleshooting table; it helps to understand the meaning of error codes and provide a suggestion on possible checks to be performed.
Here below you can find an example of the table:

ERROR CODE	LED* ⚠ Flashing/ Steady	ERROR MESSAGE	ERROR NOTE	PROBABLE CAUSE	HINTS
			Troubleshooting – APPLIANCE – BRUSHLESS MOTOR		
ER11	Flashing	SUPPLY VOLTAGE FAILURE	Under and over voltage protection. Low Voltage: 32.4V Over Voltage: 55V	Abnormal supply Voltage	Perform diagnosis of batteries in use; check the operation with reference batteries (that surely work) NOTE: The recurring error with working batteries shows an issue to electronics (ECU).
ER12	Flashing	COMUNICATION ERROR	Communication cable cut off or has wrong decode	Communication failure	Since DT comunication is working properly, appliance's interface has no issues: check batteries in use.
ER13	Flashing	ECU HIGH TEMPERATURE	MOS temperature abnormal: 85°C	MOS temperature abnormal	Check working/use conditions supported by data indicated in the REPORT (Sessions and charts table).
ER14	Steady	ECU FAILURE	MOS burned by short circuit or motor phase line short circuit	Over current protection	• If the machine doesn't work, faulty card probably, check also the wiring; • If already happened in the past please consider it as overload warning, (Check working/use conditions supported by data indicated in the REPORT Sessions and charts table)
ER15	Flashing	MOTOR LOCKED	Too much load or motor is stuck	Lock protection	Check working/use conditions supported by data indicated in the REPORT (Sessions and charts table).
ER16	Steady	ECU/MOTOR FAILURE	MOS burned which caused cut off or phase line cut off	Start failure	• If the machine doesn't work, faulty card probably, check also the wiring; • If already happened in the past please consider it as overload warning, (Check working/use conditions supported by data indicated in the REPORT Sessions and charts table)

NOTE:
- **ER12** - Diagnostic Sessions could cause a false positive ER12
- *(LED/Display) behaviour when error appears, please check the current state of the machine and also refer to Troubleshooting of the appliance.

The following abbreviations are used in this table:

ECU = *Electronic Control Unit*
MOS = *Power Transistor*

6.4 Battery dialog

This is the dialog window with battery, here below you can find the descriptions of fields and controls.

Battery's IDs

Statistics / Counters

Generate plain PDF report

Export battery's black-box data to an encrypted file

Cells and Battery Pack status

HELP Troubleshooting

6.4.1 Battery's IDs field

Base model of the Battery

Serial number

Date of production

Revision identifiers

6.4.2 Working and Charging session

| Delivered energy | Total discharge time | Total charge time [standard + fast mode] | Number of connection to tools | Number of full charge cycles |

Statistics

Total Delivered Energy [Wh]	451.4	Working Sessions Count	24
Working Time [min]	41	Charging Cycles Count	5
Charging Time [min]	325	Charging Start-ups Count	17
Fast Charging Time [min]	0	Fast Charging Start-ups Count	0
Last Charging Session Date	2018-10-21		

1

2

| Charge time [fast mode only] | Date of last charge session | Number of partial charge cycles [standard and fast mode] |

Number of partial charge cycles [fast mode only]

1
- The field is highlighted in red if, with the battery pack low voltage and/or unbalanced, more than 180 days have passed since the "**Last recharge session date**"
- The field is highlighted in red if, with the battery pack low voltage and/or unbalanced, more than 90 days have elapsed from the "Last recharge session date" plus subsequent use.

| Last Charging Session Date | 2017-04-23 |

2
- The field is highlighted in red if, with the battery pack low voltage and/or unbalanced, more than 800 recharge cycles are counted.

| Charging Cycles Count | 850 |

6.4.3 Cells and Battery Pack status

| Pack configuration and cells current voltage status: full/mid/low charge + error | Battery current voltage | Battery current temperature |

Status

Cells - 12S1P

| Pack Voltage [mV] | 45721 | Temperature [°C] | 24 |
| Capacity [mAh] | 1833 | State of Charge [mAh] | 1434 |

| Battery actual capacity | Battery current capacity |

"Last Error Code" and "Description" fields are red-highlighted in case of serious errors (cfr. troubleshooting guides).

Last Error Code	2	Description	CHARGE OVER TEMPERATURE

Cells - 12S2P

Pack Voltage [mV]   46845   **4**   Temperature [°C]   25

Capacity [mAh]   4862   State of Charge [mAh]   4570

Last Error Code   6   Description   CELLS BALANCE FAILURE
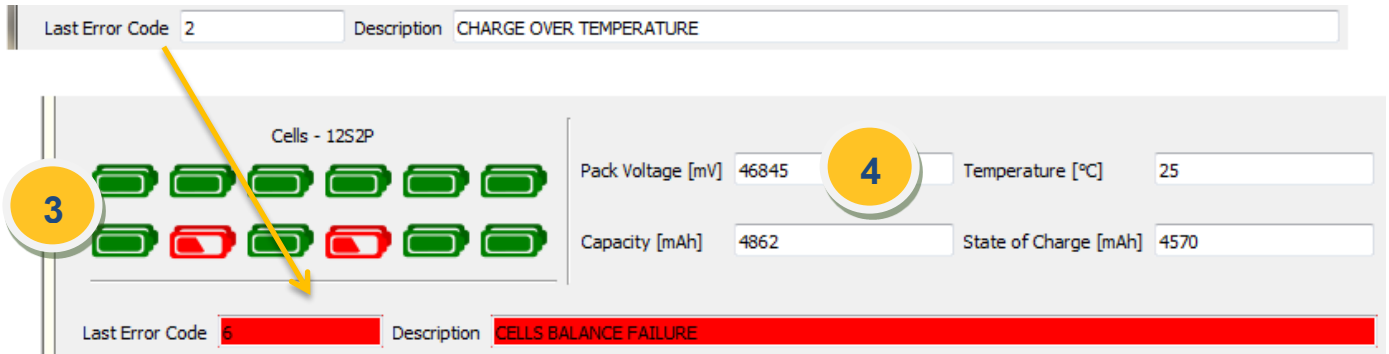
3 • When the imbalance of the single cell is more than 1000 mV, the cell is highlighted in red.

4 • The field is highlighted in red when the voltage of the battery pack is less than 24 V.

Pack Voltage [mV]   23587

6.4.4 Controls (Refresh, Close and Save Data)

- *Refresh*: refresh IDs and status fields with proper communication sequences.
- *Close*: quit battery dialog and return to main dialog.
- *Save data*: export full black-box data to an encrypted log file. Clicking this button leads to the following alert pop-up
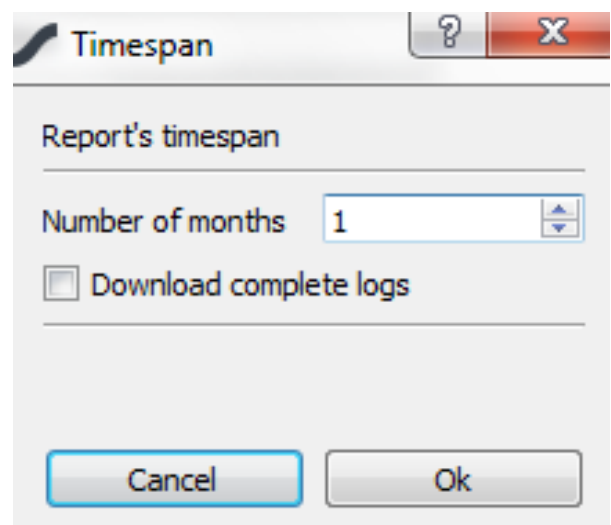
Saving data is a long operation. Are you sure to proceed?

OK   Cancel
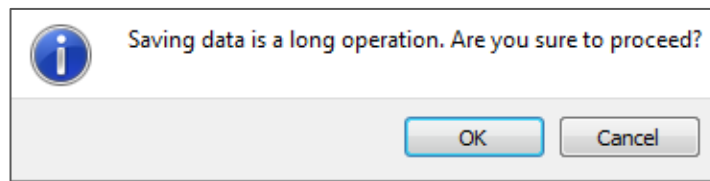
NOTE: the file will be saved in the folder named "Default folder" *(6.1 Main dialog)* if option "Save to default folder" is on. The file is not legible and has to be sent to *STIGA Service HQ for data analysis.*

6.4.5 Generate Report

Through this control a PDF file is generated including:
- details of battery data;
- the status of the battery
- the total working time and charge time (partial and complete)
- details of last error traced;
- the dates of working sessions kept separate according to different appliances (TOOL);
- the charge value of single cells.

Choosing the control a dialog window will appear that allows to select to download the complete data or to limit the recovery to period of time specified (starting from present date):

Timespan

Report's timespan

Number of months   1

☐ Download complete logs

Cancel   Ok

Here below an example of report generation:

STIGA

Battery Diagnostic Report		
Base Model	**S/N**	**Manufacturing Date**
SBT 520 AE	1123456789	2018-08-30

ID

UUID	LG6020SA
Hardware Revision	0
Firmware Revision	0

Statistics

Total Delivered Energy [Wh]	465.8
Charging Time [min]	355
Fast Charging Time [min]	0
Working Time [min]	41
Charging Cycles Count	5
Charging Start-ups Count	19
Fast Charging Start-ups Count	0
Discharge Events	25
Last Charge Duration [min]	29
Last Charging Session Date	2020-04-30
Working Sessions Count	21
Last Error Code	-
Description	-

ALPINK Mountfield ATCO CASTELGARDEN

STIGA

BATTERY STATUS

Nominal Capacity [mAh]	0
Actual Capacity [mAh]	1833
Capacity [mAh]	1437
State Of Charge [%]	78
Temperature [°]	25
Pack Voltage [mV]	45733

BATTERY CELLS [mV]

0	1	2	3	4	5	6	7	8	9	10	11
3810	3810	3810	3810	3816	3810	3804	3810	3810	3810	3817	3816

ALPINK Mountfield ATCO CASTELGARDEN

STIGA

WORK LOG

ID	Date	Article Number	Description
9	2019/01/17 17:42:00	278300008/ST1	Hedge trimmer
8	2018/09/26 14:27:00	278500008/ST1	Axial blower
7	2018/08/30 17:48:00	278500008/ST1	Axial blower
6	2018/08/30 17:42:00	278500008/ST1	Axial blower
5	2018/08/30 17:31:00	278500008/ST1	Axial blower
4	2018/08/30 17:28:00	278500008/ST1	Axial blower
3	2018/08/30 13:32:00	278500008/ST1	Axial blower
2	2018/08/29 09:16:00	278500008/ST1	Axial blower
1	2018/08/29 09:08:00	278500008/ST1	Axial blower

ALPINK Mountfield ATCO CASTELGARDEN

6.4.6 HELP (Troubleshooting)

Through this control you have access to a PDF file containing a troubleshooting table; it helps to understand the meaning of error codes and provide a suggestion on possible checks to be performed.
Here below you can find an example of the table:

STIGA

Troubleshooting - BATTERY

ERROR CODE	LED * ⚠ Flashing/ Steady	ERROR MESSAGE	ERROR NOTE	PROBABLE CAUSE	HINTS
ER01	Steady	OPERATING OVER TEMPERATURE	70°C, defined on BMS specification	Discharge over Temperature	Check use conditions (*Working Time, discharge events,.....*) and compare with history of the application, if possible.
ER02	Steady	CHARGE OVER TEMPERATURE	50°C, defined on BMS specification	Charge over Temperature	• Check recharging conditions (environment, temperature) with user; • Check the length of recharging and cycle conditions (*Complete/Partial Charging Cycles*); • Check the functionality of the charger.
ER03	Steady	CHARGE UNDER TEMPERATURE	0°C, defined on BMS specification	Charge Under Temperature	
ER04	OFF	CELLS OVERVOLTAGE	4.2V, defined on BMS specification	Over Voltage cell error	Check the functionality of the charger.
ER05	OFF	CELLS UNDERVOLTAGE	2.5V, defined on BMS specification	Under Voltage cell error	• Check the *Last charging date*; try to recharge the battery and perform a new diagnostics: check the state of the battery and possible recurrence of errors; • Check the functionality of the charger.
ER06	Flashing	CELLS BALANCE FAILURE	Cell voltage mismatch higher than 1V	• Cell failure. • Too much time since last charge.	

NOTE: *(LED) behaviour when error appears, please check the current state of the Battery and, also refer to its manual.

The following abbreviations are used in this table:

BMS = *Battery Management System*

ALPINA   **Mountfield**   **ATCO**   **CASTELGARDEN**