

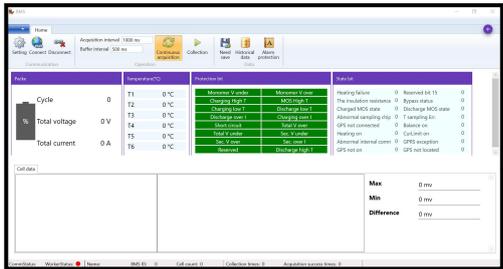
PROCEDURE			
Reference:	PR20211006-01		
Version:	02.0	Category:	E

MODEL(S)	GOAL	
ALL EVOLUTION LITHIUM BATTERY PACKS	Quality improvement	
	Performance	√
	Upgrade	√
PARTS INFO	Down time	
Data transfer cable for Lithium battery interface software	Maintenance	√
	Work around	√
	Others:	

VERSION CONTROL:			
Author:	Version:	Date:	Change/update:
Arvin Lu	02.0	2022/03/29	

TITLE
How to use Interface software for lithium battery

DESCRIPTION /PURPOSE OF THIS PROCEDURE
>Install the lithium battery interface software >Connect the interface software with lithium battery >Use the lithium battery interface software

TOOLS REQUIRED
<div style="display: flex; justify-content: space-around; align-items: center;">    </div> <ul style="list-style-type: none"> • Laptop (Win 7 or up) • Data transfer cable for Lithium battery interface software • Lithium battery interface software



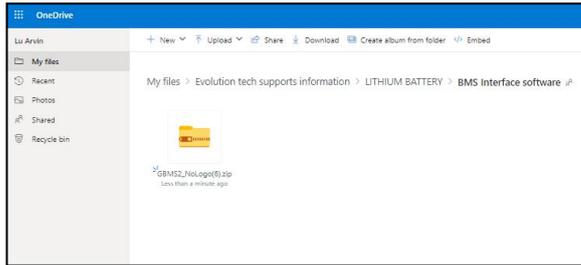
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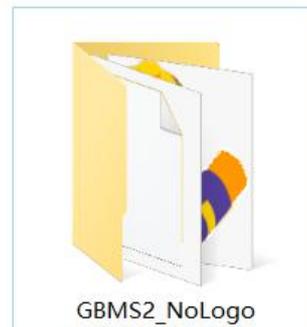
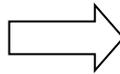
HOW TO RUN THE INTERFACE SOFTWARE

Step 1 Download the lithium battery interface software from OneDrive link:

<https://1drv.ms/u/s!ApwLN64cwzfLhCZm49Tghu9xEdl6?e=PBHIGW>



Step 2. Unzip software package .



Step 3. Click the “ GBMS” icon to run the software.



-The interface software is up working now .



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HOW TO CONNECT THE INTERFACE SOFTWARE WITH LITHIUM BATTERY

Step 1. Connect the "Data transfer cable" to your laptop.



Step 2. Connect the "Data transfer cable" to the lithium battery pack.



Connect it to battery positive terminal

Connect it to battery RS485 port

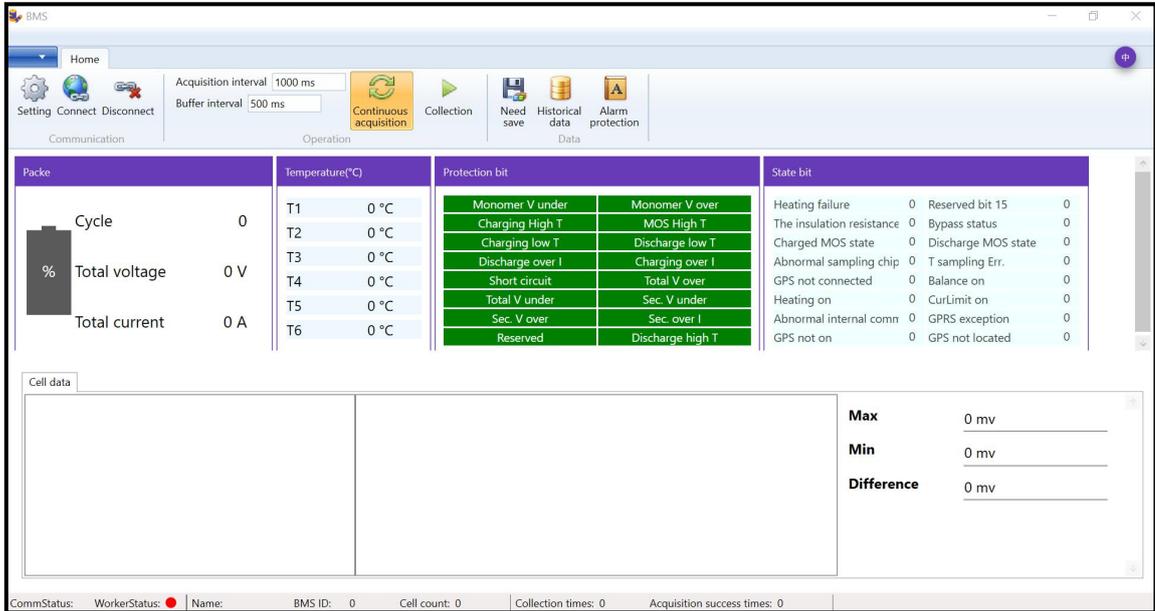
Step 3. Open lithium battery interface software: GBMS



Click on the icon

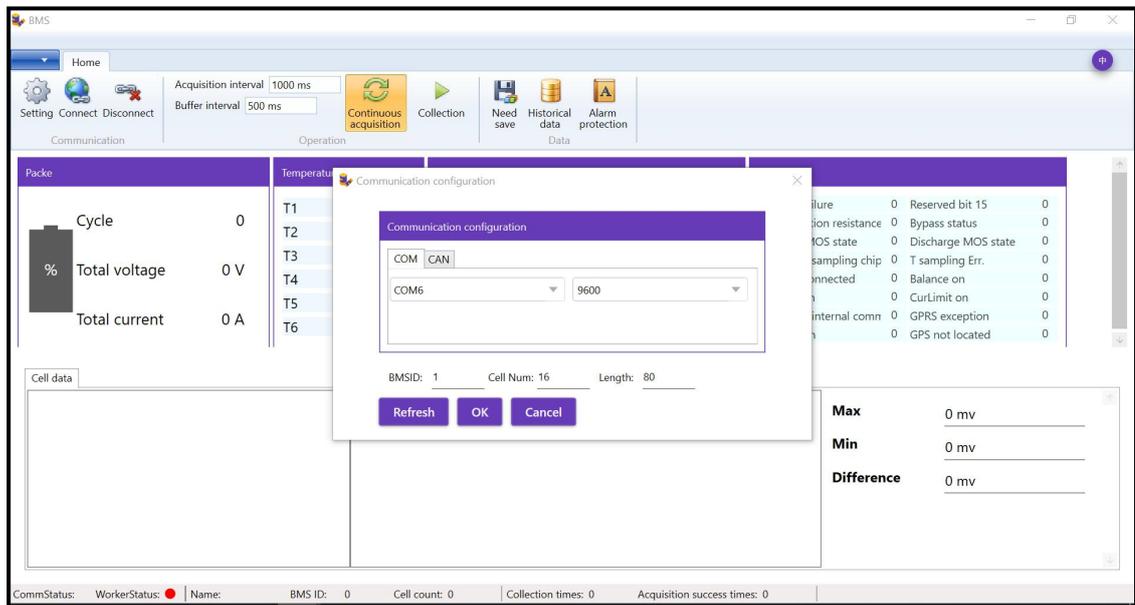


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Step 4. Set the COM /BMSID/Cell Num/Length

- **COM:** The COM # depends on the laptop you are using.
- **BMSID:** 1
- **Cell Num:** 16
- **Length:** 80

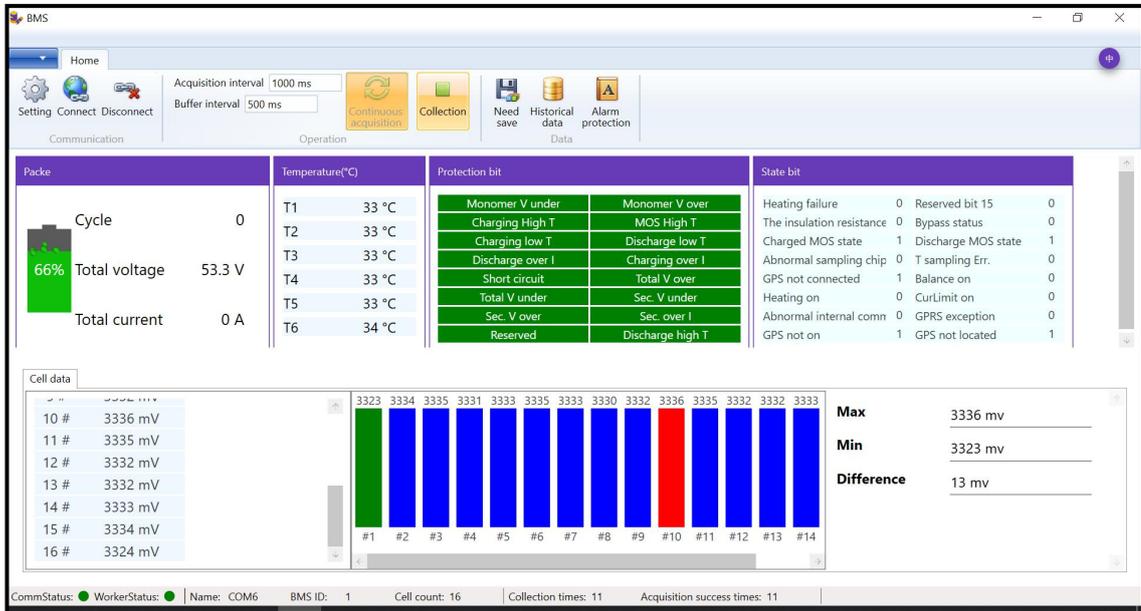




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Step 4. Click on the “Collection” icon to start reading the data from lithium battery BMS.



-The interface software is now connected with lithium battery and reading the data from lithium battery BMS in rear time.



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HOW TO USE THE LITHIUM BATTERY INTERFACE SOFTWARE

The screenshot shows the BMS software interface with the following data:

Parameter	Value
Cycle	0
Total voltage	53.3 V
Total current	0 A

Temperature(°C)	Protection bit	State bit
T1: 33 °C	Monomer V under	Heating failure: 0
T2: 33 °C	Charging High T	The insulation resistance: 0
T3: 33 °C	Charging low T	Charged MOS state: 1
T4: 33 °C	Discharge over I	Abnormal sampling chip: 0
T5: 33 °C	Short circuit	GPS not connected: 1
T6: 35 °C	Total V over	Heating on: 0
	Total V under	Abnormal internal comn: 0
	Sec. V over	GPS not on: 1
	Sec. over I	
	Reserved	
	Discharge high T	

Cell #	Cell Voltage (mV)
1 #	3323 mV
2 #	3334 mV
3 #	3335 mV
4 #	3331 mV
5 #	3333 mV
6 #	3335 mV
7 #	3333 mV

Max: 3336 mv
Min: 3323 mv
Difference: 13 mv

- Pack
- Temperature
- Protection bit
- State bit
- Cell Data

- Pack menu

The 'Packe' menu displays the following information:

- SOH: 0%
- Circle: 0
- Total voltage: 0 V
- Total current: 0 A

Battery SOC %: Shown in the “battery icon”

SOH: Battery State of health

Cycle: The lithium battery cycle times

Total voltage: Battery voltage (V)

Total current: Battery charging current or discharging current (A)



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- **Temperature**

Temperature(°C)	
T1	33 °C
T2	33 °C
T3	33 °C
T4	33 °C
T5	33 °C
T6	34 °C

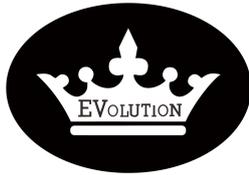
T1 : Solenoid temperature.

T2-T6: Battery cells temperature

Note: When the solenoid closes, T1 temp is higher than T2-T6 temp normally.

- **Protection bit:** This menu shows if the lithium battery pack enter into Protection mode due to over-current, over-voltage, under-voltage, over-current...etc

Protection bit	
Monomer V under	Monomer V over
Charging High T	MOS High T
Charging low T	Discharge low T
Discharge over I	Charging over I
Short circuit	Total V over
Total V under	Sec. V under
Sec. V over	Sec. over I
Reserved	Discharge high T



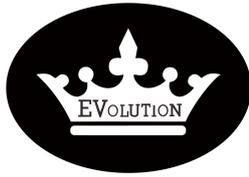
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Monomer V under	Single battery cell under-voltage protection
Monomer V over	Single battery cell over-voltage protection
Charging High T	Charging over-temperature protection
MOS High T	Non-available
Charging low T	Charging low-temperature protection
Discharge low T	Discharge low-temperature protection
Discharge over I	Discharge over-current protection
Charging over I	Charging over-current protection
Short circuit	Short circuit protection
Total V over	Battery pack over-voltage protection
Total V under	Battery pack under-voltage protection
Sec. V under	Second grade Single battery cell under-voltage protection
Sec. V over	Second grade Single battery cell over-voltage protection
Sec. Over I	Second grade Single battery cell over-current protection
Reserved	Non-available
Discharge high T	Discharge high-temperature protection

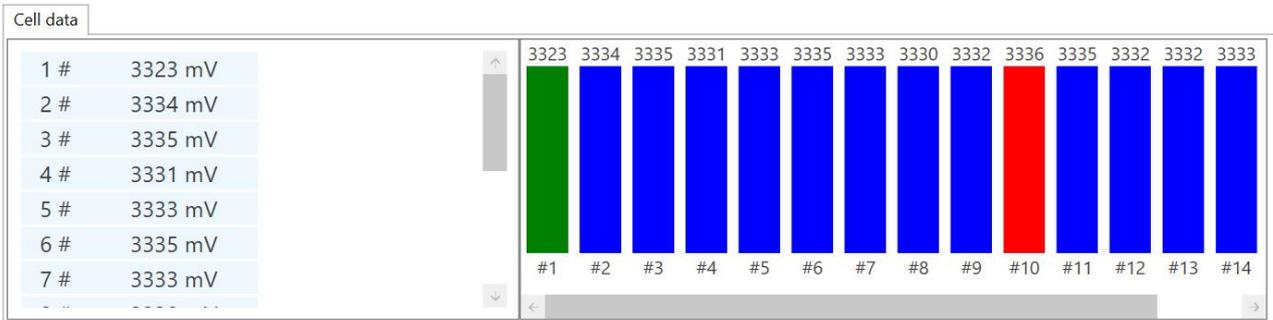
- **State bit**

State bit			
Heating failure	0	Reserved bit 15	0
The insulation resistance	0	Bypass status	0
Charged MOS state	1	Discharge MOS state	1
Abnormal sampling chip	0	T sampling Err.	0
GPS not connected	1	Balance on	0
Heating on	0	CurLimit on	0
Abnormal internal comrn	0	GPRS exception	0
GPS not on	1	GPS not located	1



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- **Cell data:** This menu shows the voltage of 16 battery cells, #1~#16
- **Max:** The highest voltage among 16 cells.
- **Min:** The lowest voltage among 16 cells
- **Difference:** The voltage difference between highest and lowest voltage.



Max	3336 mv
Min	3323 mv
Difference	13 mv



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HOW TO COLLECT THE LITHIUM BATTERY DATA IN REAL-TIME?

The procedures below are proceeding based on that the interface software has been connected to the lithium battery pack.

Step 1. Click on the “Collection” icon to start reading the data from lithium battery BMS.

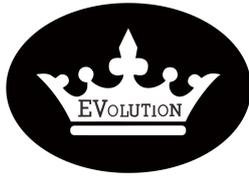
The screenshot shows the BMS software interface with the 'Collection' icon highlighted. The interface includes a top navigation bar with 'Home', 'Setting', 'Connect', and 'Disconnect'. Below this are sections for 'Communication', 'Operation', 'Data', and 'Alarm protection'. The main display area is divided into several panels: 'Packs' showing cycle and voltage information, 'Temperature(°C)' for T1-T6, 'Protection bit' with a grid of status indicators, and 'State bit' with various diagnostic flags. At the bottom, there is a 'Cell data' section with a bar chart and a table of cell voltages.

Cell #	Voltage (mV)
1 #	3324 mV
2 #	3333 mV
3 #	3334 mV
4 #	3331 mV
5 #	3332 mV
6 #	3334 mV
7 #	3333 mV

Step 2. Click the “Continuous acquisition” icon.

The screenshot shows the BMS software interface with the 'Continuous acquisition' icon highlighted. The interface is identical to the previous screenshot, but the 'Continuous acquisition' icon is now highlighted with a red dashed box. The data displayed in the various panels remains the same.

Cell #	Voltage (mV)
1 #	3324 mV
2 #	3333 mV
3 #	3334 mV
4 #	3331 mV
5 #	3332 mV
6 #	3334 mV
7 #	3333 mV



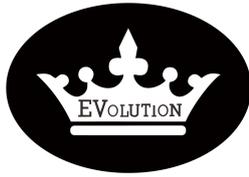
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Step 3. Click the “Need save” icon to save the real-time data from BMS.

The screenshot shows the BMS software interface. At the top, there are buttons for 'Setting', 'Connect', and 'Disconnect'. Below these are 'Acquisition interval' (1000 ms) and 'Buffer interval' (500 ms). A 'Need save' icon is highlighted with a red dashed box. Other icons include 'Historical data' and 'Alarm protection'. The main area is divided into several sections: 'Packe' (Cycle: 0, Total voltage: 53.3 V, Total current: 0 A), 'Temperature(°C)' (T1-T6), 'Protection bit' (Monomer V under/over, Charging/Discharge over I, Short circuit, Total/Sec. V under/over, Reserved), and 'State bit' (Heating failure, The insulation resistance, Charged MOS state, Abnormal sampling chip, GPS not connected, Heating on, Abnormal internal comm, GPS not on, Reserved bit 15, Bypass status, Discharge MOS state, T sampling Err., Balance on, CurLimit on, GPRS exception, GPS not located). At the bottom, there is a 'Cell data' section with a table of cell voltages and a bar chart. The status bar at the very bottom shows 'CommStatus: WorkerStatus: Name: COM6 BMS ID: 1 Cell count: 16 Collection times: 219 Acquisition success times: 219'.

Step 4. After testing for awhile, click “Historical data” button to find the data file.

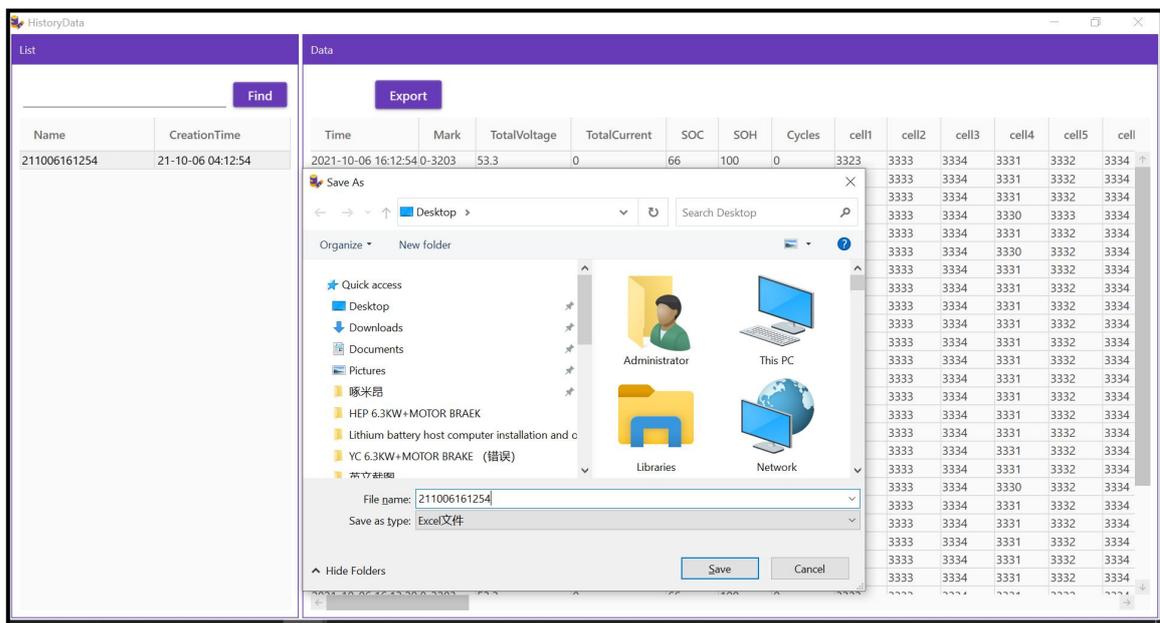
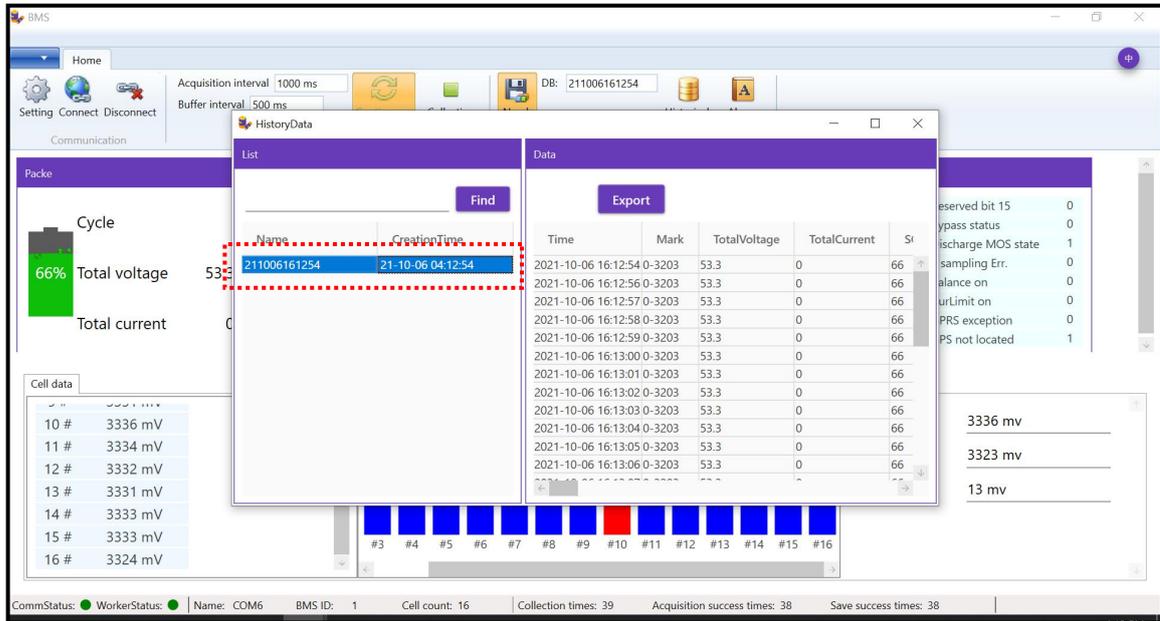
The screenshot shows the BMS software interface with the 'Historical data' dialog box open. The dialog box has a 'List' tab and a 'Data' tab. The 'List' tab shows a table with columns 'Name' and 'CreationTime'. The 'Data' tab has an 'Export' button. The background interface is partially visible, showing the same battery parameters as in Step 3. The status bar at the bottom shows 'CommStatus: WorkerStatus: Name: COM6 BMS ID: 1 Cell count: 16 Collection times: 20 Acquisition success times: 19 Save success times: 19'.



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Step 5. Select the file name "21100xxxxx" and click the "Export" to save the data as Excel file.



- **Collect battery real-time data information when encountering the battery issue, send the data excel file to Evolution technician for further investigating.**