



PROCEDURE

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|------------|---------------|-----------|---|
| 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 | |

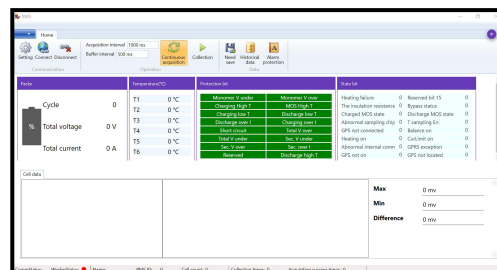
TITLE

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



- Laptop (Win 7 or up)
- Data transfer cable for Lithium battery interface software
- Lithium battery interface software



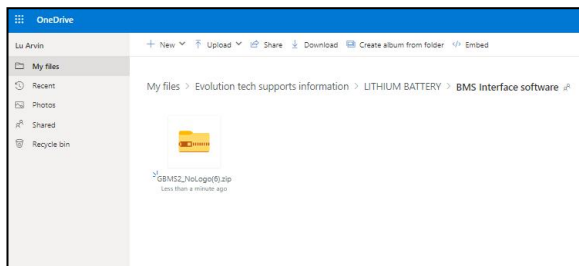
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HOW TO RUN THE INTERFACE SOFTWARE

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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The screenshot displays the BMS software interface with the following sections:

- Communication:** Setting, Connect, Disconnect.
- Operation:** Acquisition interval: 1000 ms, Buffer interval: 500 ms, Continuous acquisition button.
- Data:** Collection, Need save, Historical data, Alarm protection.
- Pack:** Cycle (0), Total voltage (0 V), Total current (0 A).
- Temperature(°C):** T1 (0 °C), T2 (0 °C), T3 (0 °C), T4 (0 °C), T5 (0 °C), T6 (0 °C).
- 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.
- 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.
- Cell data:** Max (0 mv), Min (0 mv), Difference (0 mv).
- Status bar:** CommStatus, WorkerStatus (red dot), Name, BMS ID: 0, Cell count: 0, Collection times: 0, Acquisition success times: 0.

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

The screenshot shows the BMS software interface with the 'Communication configuration' dialog box open. The dialog box contains the following fields:

- COM:** CAN
- COM6:** 9600
- BMSID:** 1
- Cell Num:** 16
- Length:** 80
- Buttons:** Refresh, OK, Cancel.

The background interface shows the same monitoring parameters as the previous screenshot, with the status bar indicating BMS ID: 0, Cell count: 0, Collection times: 0, and Acquisition success times: 0.



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Reference:

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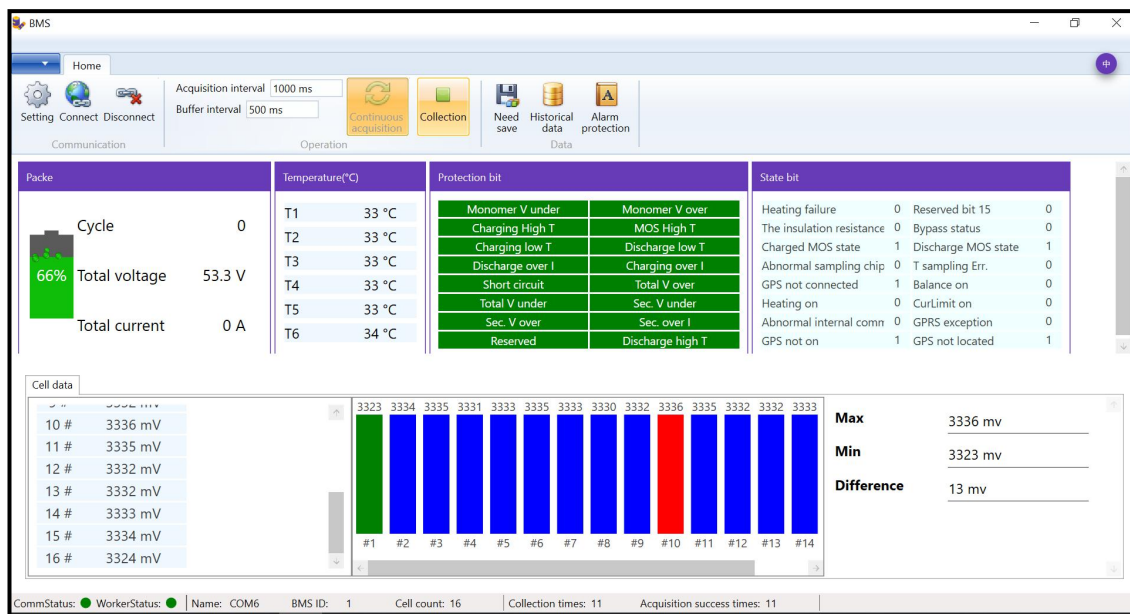
Version:

02.0

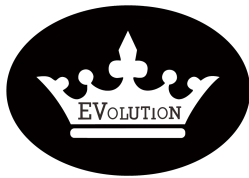
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Step 4. Click on the “Collection” icon to start reading the data from lithium battery BMS.



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



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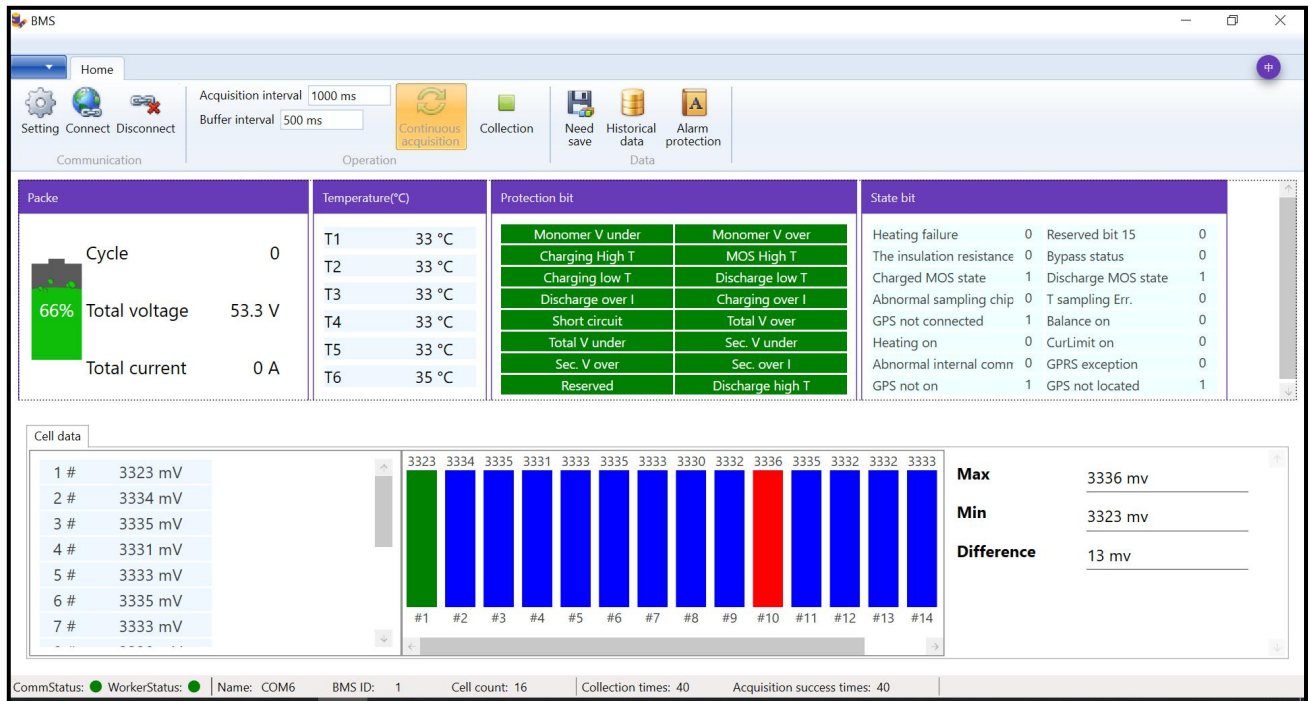
Reference: PR20211006-01

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Category:

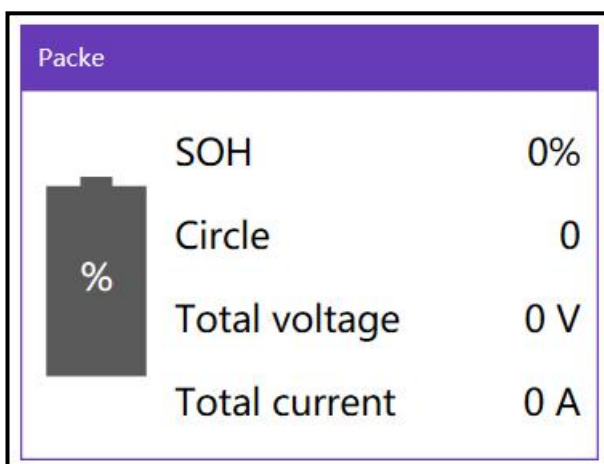
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HOW TO USE THE LITHIUM BATTERY INTERFACE SOFTWARE



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

● Pack menu



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

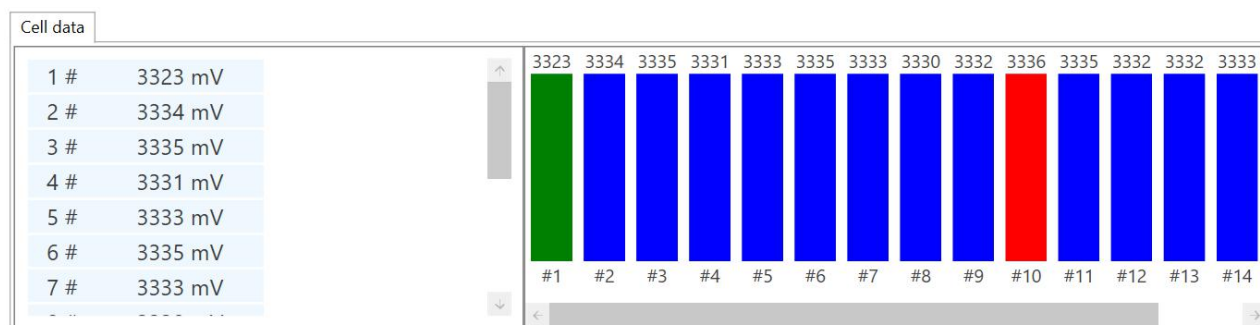
| State bit | | | |
|---------------------------|---|---------------------|---|
| Heating failure | 0 | Reserved bit 15 | 0 |
| The insulation resistance | 0 | Bypass status | 0 |
| Charged MOS state | 1 | Discharge MOS state | 1 |
| Abnormal sampling chip | 0 | T sampling Err. | 0 |
| GPS not connected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



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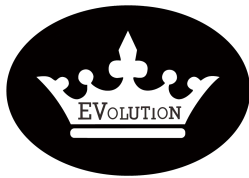
- **Cell data:** This menu shows the voltage of 16 battery cells, #1~#16
- **Max:** The highest voltage among 16 cells.
- **Min:** The lowest voltage among 16 cells
- **Difference:** The voltage difference between highest and lowest voltage.



Max 3336 mv

Min 3323 mv

Difference 13 mv



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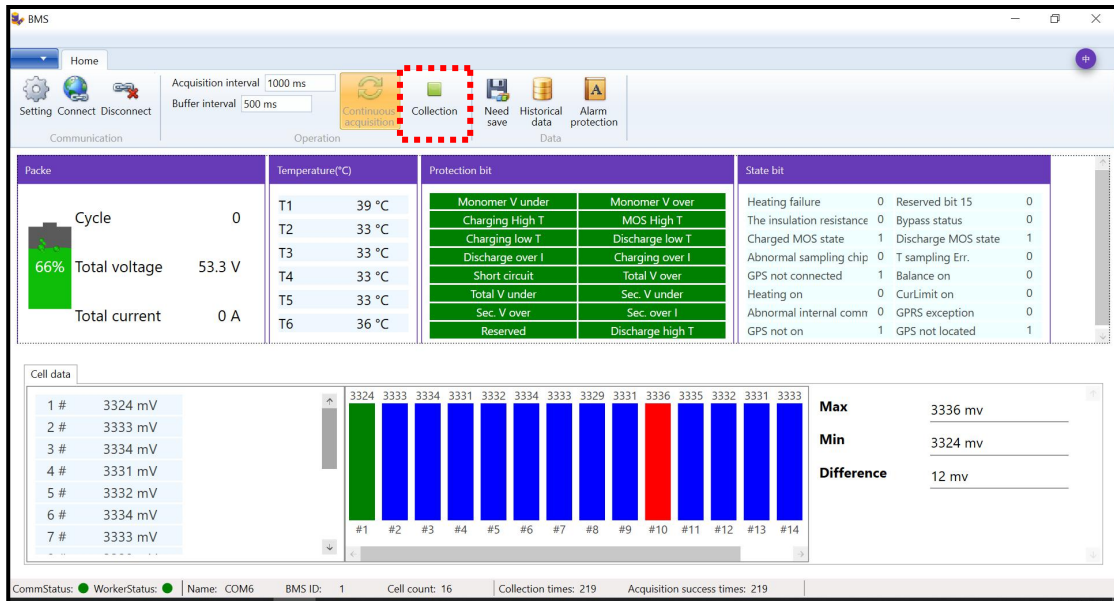
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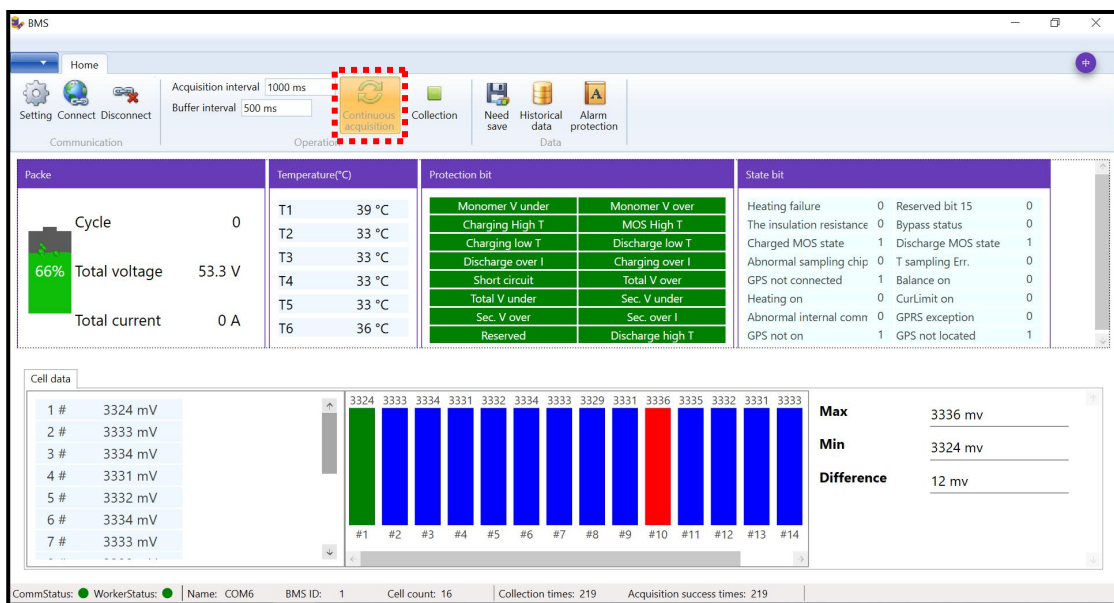
HOW TO COLLECT THE LITHIUM BATTERY DATA IN REAL-TIME?

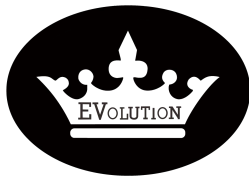
The procedures below are proceeding based on that the interface software has been connected to the lithium battery pack.

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



Step 2. Click the “Continuous acquisition” icon.





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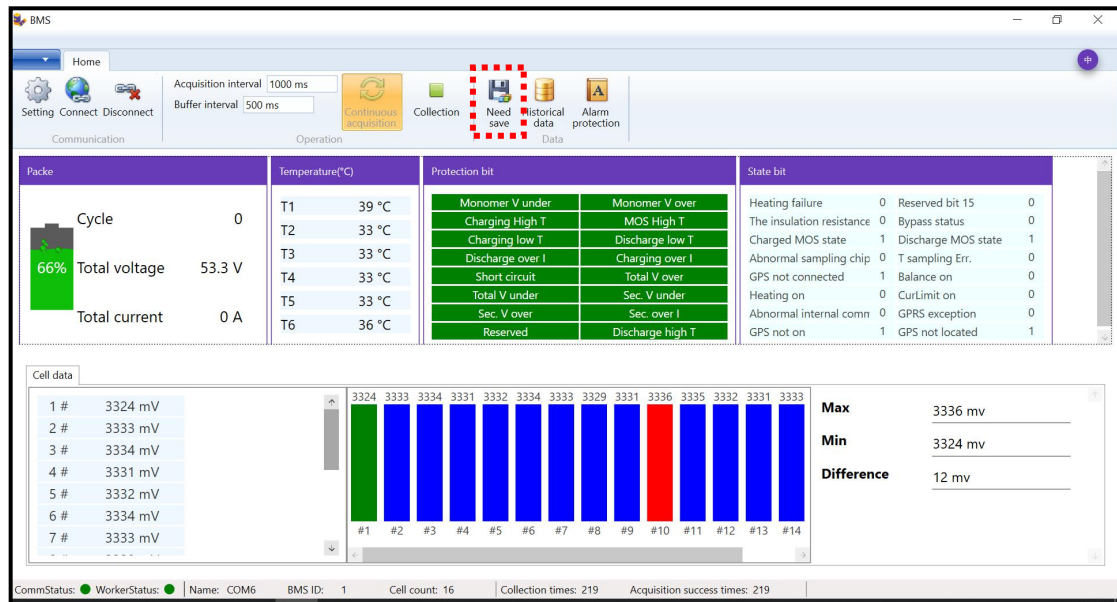
Version:

02.0

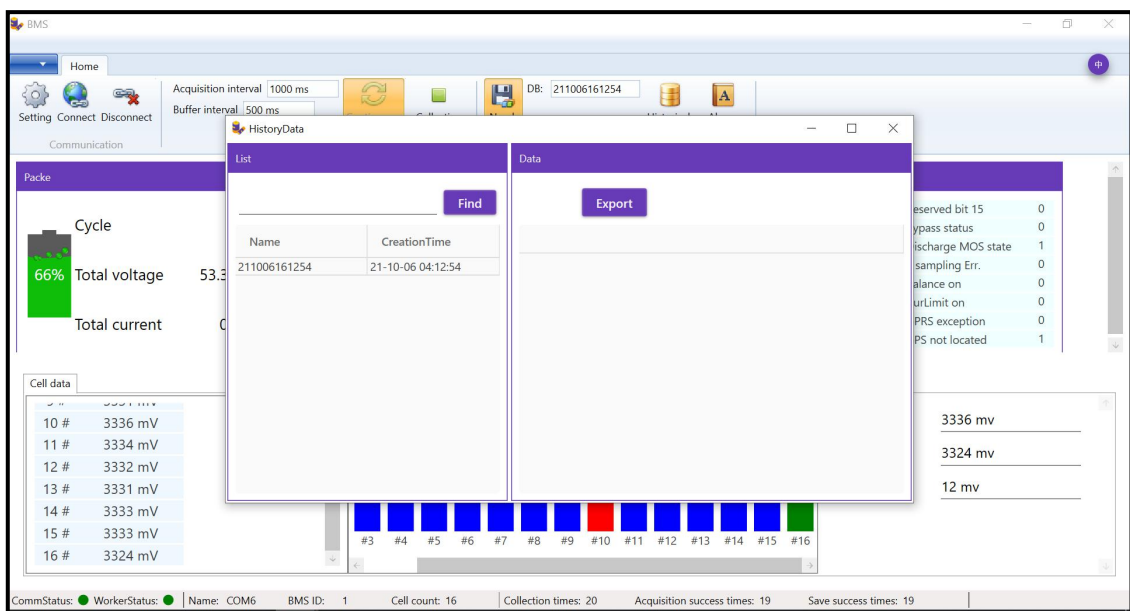
Category:

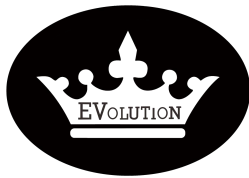
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Step 3. Click the “Need save” icon to save the real-time data from BMS.



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





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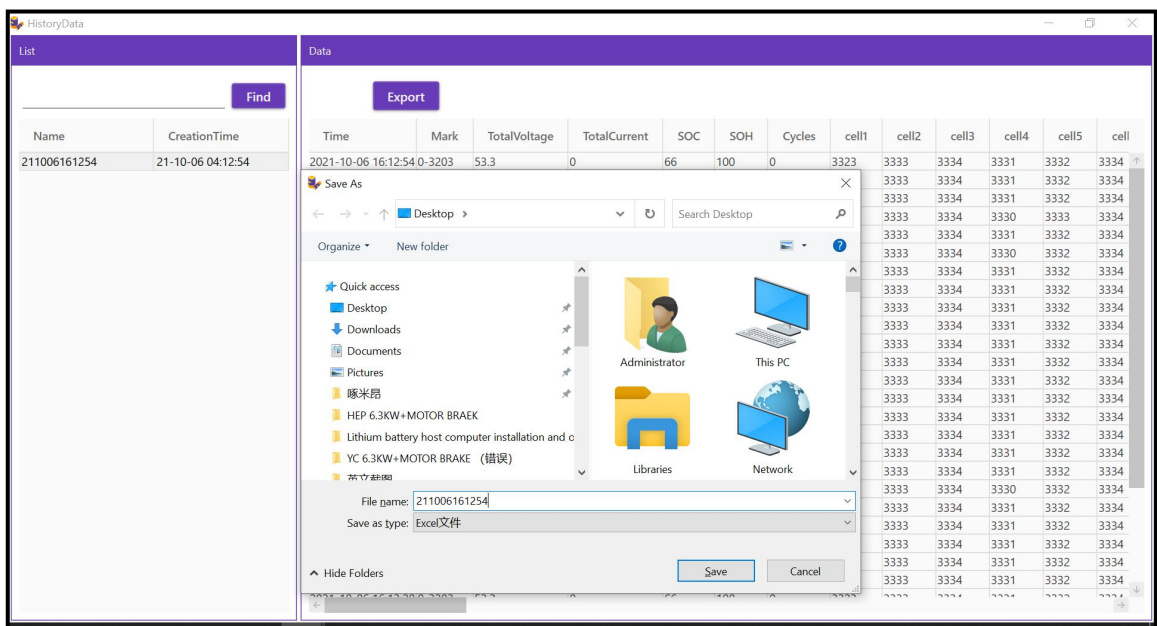
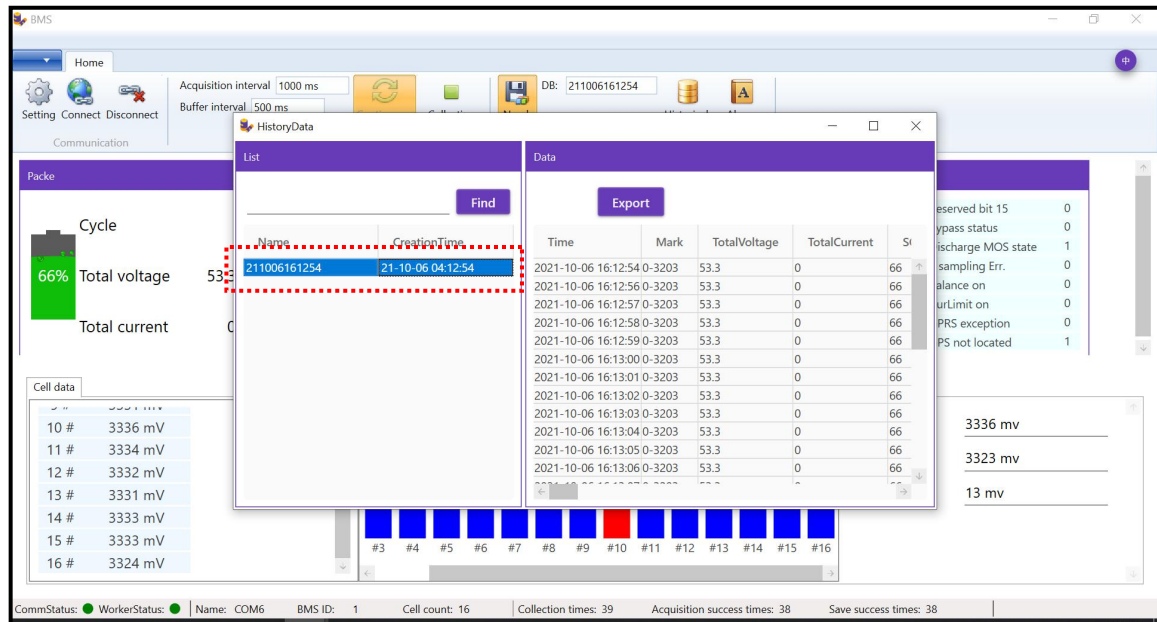
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Step 5. Select the file name "21100xxxxxx" and click the "Export" to save the data as Excel file.



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