



# BYD Battery-Box Premium LVL Service Guideline and Checklist

## Version 1.2

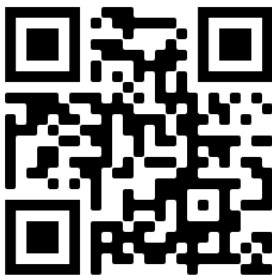
Valid for Premium LVL 15.4



LVL 15.4 (max. 64 per system)



BMU (1 x per system)



Make sure to always use the latest version of this service document,  
available at: [www.bydbatterybox.com](http://www.bydbatterybox.com)

**Important: The installation and all other kinds of works or measurements in combination with the Battery-Box Premium are only allowed by professional and qualified electricians.**

This checklist is a shortened assistance for the Battery-Box and does not replace the original manual, which can be found on [www.bydbatterybox.com](http://www.bydbatterybox.com) / [www.eft-systems.de](http://www.eft-systems.de) / [www.alpspower.com.au](http://www.alpspower.com.au). Subject to technical modifications; no responsibility is accepted for the accuracy of this information. Attention: Improper handling can cause danger and damage.



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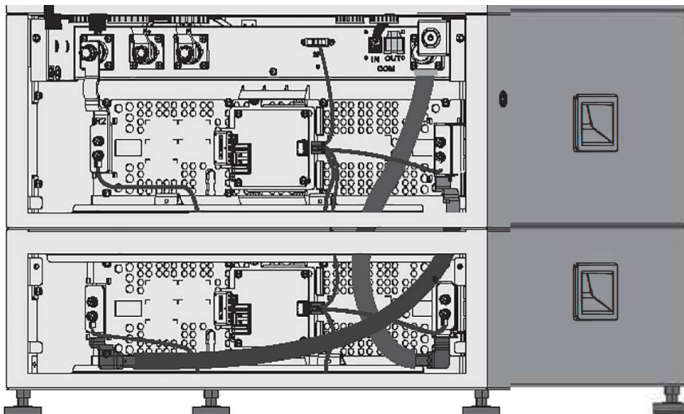
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# 1. GENERAL STEPS

Make sure to always use the latest version of this service document, available at: [www.bydbatterybox.com](http://www.bydbatterybox.com)

Please proceed first with the installation steps by:

| No. | Name                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Configuration                  | Check if the configuration is correct. Refer to latest "BYD Battery-Box Premium LVL Minimum Configuration List" (V1.8 or above) available at: <a href="http://www.bydbatterybox.com">www.bydbatterybox.com</a><br>Make sure the inverter is configured correctly.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2   | Correct internal cabling       |  <p>Please double check, referring to the manual</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3   | Correct external cabling       | <ol style="list-style-type: none"> <li>Communication to inverter <ol style="list-style-type: none"> <li>Depending on the choice of inverter the cable between the BMU port and the inverter must be specially made. Please check the specifications in the installation manual.</li> <li>Recommended CAT5 or higher;</li> <li>Check the cables and replace them if necessary</li> </ol> </li> <li>Grounding <ol style="list-style-type: none"> <li>Battery-Box connected directly to the ground-bus of the house.</li> <li>The battery must not be earthed via the inverter! Otherwise, communication problems are possible.</li> </ol> </li> <li>Ethernet-Cable for Internet (<b>strongly recommended!</b>)</li> <li>DC-Ports - Make sure that + and - are properly connected.</li> <li>Correct parallel connection cabling if applicable</li> </ol> |
| 4   | Latest Firmware                | Always update the <b>newest Firmware!</b> (with using the latest App Version)<br>Note: If not stated otherwise, wifi password is BYDB-Box                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 5   | App Configuration              | To complete the commissioning, the configuration of the battery via "BYD Be Connect" App or PC tool "Be Connect Plus" (BCP) is <b>mandatory!</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 6   | Restart                        | After app configuration, please perform a proper restart of the system by switching off the battery correctly (press LED Button on <b>BMU</b> for 5 sec). Make sure all LEDs of the battery are completely off. Then follow the correct switch on procedure (see step 7)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 7   | Switch on procedure            | Correct switch on procedure is important for a correct operation! <ol style="list-style-type: none"> <li>Switch on the fuse between Inverter and Battery (if there is any)</li> <li>Switch on the Battery-Box (button on LVL)</li> <li>Activate the inverter after the battery</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 8   | Checking the correct operation | <p>The system runs properly if:</p> <ul style="list-style-type: none"> <li>- Inverter displays battery SOC correctly</li> <li>- System charges / discharges</li> </ul> <p>Note: <b>If you can not complete the commissioning, then turn off the battery before you leave the site and make sure all LEDs are off to avoid a discharge of the battery.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

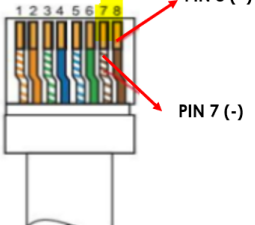


## 2. ERROR ANALYSIS

Please refer to the general steps before proceeding, see chapter 1.

### 2.1 BMU does not turn on / BMU LED is off or flickering abnormally

LEDs of BMU do not light up, although the battery is ON.

| No. | Name                           | Description                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9   | Check correct cable port       | Make sure that the correct data cable port has been used at the BMU ("BMS" port. Do not mix with "inverter" or "Ethernet" port).                                                                                                                                                                                                                                                                                        |
| 10  | Replace Comm Cable             | Try a completely new communication cable between battery and BMU.<br><br>Note: Sometimes it might be necessary to unplug the communication cable and plug it again while batteries are switched on.                                                                                                                                                                                                                     |
| 11  | Voltage measurement on pin 7&8 | Measure the voltage of PIN 7 & 8 while the other side of the cable is connected to the IN port of the Battery-Box and while the Battery-Box is powered on. Voltage should be around 50V. If yes: try another BMU (if available). If no: check another cable or try another LVL if multiple batteries are installed in the system.<br> |
| 12  | Only LED faulty?               | In some rare cases, the LED of the BMU is faulty. To check that: check if there is a WIFI access point of the Battery-Box and check if there are internal LEDs inside the BMU. If so, only the external LED is inactive and a commissioning could still work.                                                                                                                                                           |
| 13  | Voltage measurement            | Check voltage of battery. See <b>Section 2.9</b>                                                                                                                                                                                                                                                                                                                                                                        |
| 14  | BMU exchange                   | If problem remains:<br>Test another BMU, if available.                                                                                                                                                                                                                                                                                                                                                                  |

## 2.2 Problem with the Firmware Update / App Configuration / Battery WiFi

The Battery Management consists of two components: the BMU and the BMS. The Firmware Update from the App will update the BMU, which will then update the BMS. **The BMS update can take up to 30 Minutes.**

| No. | Name                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15  | Correct App and Firmware             | <p>Make sure to have the latest App version (&gt;1.7.4) and Battery Firmware (download inside the App) on your mobile device before connecting the app with battery WiFi.</p> <p>If the App cannot be installed, or other general Problems occur with the App:</p> <ul style="list-style-type: none"> <li>- Try with a different mobile device (For Android: min Android version requirement is 4.4. )</li> <li>- Try with PC Tool BCP (<b>section 2.8</b>)</li> <li>- Note: If the WiFi connection is not stable you might remove the lan cable during the configuration. Once the battery has been configured correctly you can connect it again to the Internet.</li> </ul>                                                                                                                                                                                                                                                                                                              |
| 16  | WiFi cannot be found / WiFi unstable | <p>The Battery WiFi turns off 5 hours after the start of the Battery. To reactivate the WiFi, press the LED button of the BMU about 1 second or restart the system. To reset the WiFi, press the LED button of the BMU three times 1 second within 6 seconds.</p> <p>If problem remains:</p> <ul style="list-style-type: none"> <li>- remove the lan cable during the configuration. Once the Battery has been configured correctly you can connect it again to the Internet.</li> <li>- check whether other mobile devices are connected the same wifi</li> <li>- try another mobile device</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                     |
| 17  | Proper restart                       | <p>Note: Whenever the configuration via Be Connect app / Be Connect Plus tool is changed, a restart of the battery is necessary to make sure that all changes come into effect.</p> <ol style="list-style-type: none"> <li>1. Switch off the Inverter</li> <li>2. Switch off the battery (Press button on BMU for 5 seconds until all batteries switch off. All LEDs should be off)</li> <li>3. Wait for 2 Minutes</li> <li>4. Turn on the Battery (button on battery connected to BMU) and then</li> <li>5. Turn on inverter second</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 18  | Close and restart the App            | <p>If the App does not react anymore after some minutes loading during the update process, close (close the program completely) and restart the App. Or try with PC Tool BCP (<b>section 2.8</b>)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 19  | BMS Version not updated              | <p>The App will only update the BMU. The BMU will update the BMS, which <b>can take up to 30 minutes.</b></p> <p>If the BMS Version is not updated after 30min with stable inverter communication, follow the below Process:</p> <ol style="list-style-type: none"> <li>1. Update Firmware through the App again</li> <li>2. Restart the system <ol style="list-style-type: none"> <li>a. Switch off the Inverter first, then switch off the battery second (Press the LED of the BMU for 5 seconds)</li> <li>b. Wait for 2 Minutes</li> <li>c. Turn on the Battery first, then turn on the inverter second</li> </ol> </li> <li>3. Wait for 30 Minutes</li> <li>4. Check BMS Firmware Version again with App. If Version is still wrong, please do the update process again (if possible with another mobile device).</li> <li>5. Note: if Voltage of Battery is not shown in Be Connect, the update will not be transferred to BMS. Make sure the BMU recognizes BMS properly.</li> </ol> |



## 2.3 Incorrect output voltage / No BMS Data / BMU EC102

Wrong PDU output voltage (e.g 16V) is normally an indicator for incorrect configuration or BMU<>BMS communication issue

| No. | Name                                                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 20  | Battery correctly configured?                              | <p>Please check if the App configuration was successful and the Firmware is the most recent one. If there are problems, please refer to <b>Section 2.2</b></p> <p><b>Note: It is important to select the correct system quantity. Else, the output voltage might be wrong!</b> The quantity you need to select refers to the overall quantity of LVL15.4 units. If you have 2xLVL15.4 connected in parallel, you need to select the system quantity of "2" in the Be Connect app / BCP tool.</p> <p>Note: Don't forget to <b>properly restart system</b> after changing configuration!</p> |
| 21  | Proper restart                                             | <p>Note: Whenever the configuration via Be Connect app / Be Connect Plus tool is changed, a restart of the battery is necessary to make sure that all changes come into effect.</p> <ol style="list-style-type: none"> <li>1. Switch off the Inverter</li> <li>2. Switch off the battery (Press button on BMU for 5 seconds until all batteries switch off. All LEDs should be off)</li> <li>3. Wait for 2 Minutes</li> <li>4. Turn on the Battery (button on battery connected to BMU) and then</li> <li>5. Turn on inverter second</li> </ol>                                            |
| 22  | BMU<>BMS communication                                     | make sure that the comm cable is connected to the right port of BMU (the one labeled as "BMS"). Replace comm cable between BMU and battery.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 23  | Check terminal resistor                                    | <p>Make sure that the terminal resistor is connected to the OUT port (Terminal resistor properties: 120 <math>\Omega</math> resistor between pin 5 and 6)</p> <p>If it was connected already, then please remove it and try without it to rule out a faulty terminal resistor. Don't forget to properly restart system afterwards.</p>                                                                                                                                                                                                                                                     |
| 24  | No output voltage / incorrect output voltage               | <p>When there is no output voltage, this typically means that the BMS relay is not closed. This can have many reasons:</p> <ul style="list-style-type: none"> <li>- Check if BMU properly detects BMS data (cell voltages, cell temperatures). If not, see following step 25.</li> <li>- Check LED codes (see <b>section 2.7</b>)</li> </ul>                                                                                                                                                                                                                                               |
| 25  | BMU<>BMS communication / No BMS data shown / BMS data is 0 | <p>make sure that the comm cable is connected to the right port of BMU (the one labeled as "BMS"). Replace comm cable between BMU and battery.</p> <p><b>Note: as long as there is a communication problem between BMU &amp; BMS, you won't be able to see any BMS data / values will appear as zero and the relay will remain open (no output voltage) In that case, redo app configuration (unit quantity must be correct!) and don't forget to properly restart system!</b></p>                                                                                                         |
| 26  | LVL Exclusion Method (for parallel connected systems)      | <p>- If multiple LVL batteries connected in parallel: Try the Exclusion Method (see <b>section 2.10</b>): Check if the system works when removing the suspected LVL unit</p> <p>Very important: don't forget to reconfigure and to restart always when changing the configuration!</p>                                                                                                                                                                                                                                                                                                     |
| 27  | Further checking                                           | <p>If problem remains:</p> <ul style="list-style-type: none"> <li>- Download all data with BCP (<b>section 2.8</b>)</li> <li>- Check the inverter</li> <li>- Try replacing the BMU, if available</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                |



## 2.4 Communication issue with Inverter / BMU EC106

Output voltage is normal and you can see BMS (cell) data in BCP, but inverter does not detect battery.

*Note: if output voltage is incorrect or BMS (cell) data cannot be seen in BCP, then go through **section 2.3** first*

| No. | Name                                      | Description                                                                                                                                                                                                                                                                   |
|-----|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 28  | Configuration                             | Check if the configuration is correct. Refer to latest "BYD Battery-Box Premium LVL Minimum Configuration List" (V1.8 or above) available at: <a href="http://www.bydbatterybox.com">www.bydbatterybox.com</a><br>Make sure the inverter is configured and working correctly. |
| 29  | Output voltage incorrect?<br>No BMS Data? | Check according to <b>section 2.3</b> . Especially make sure to configure battery via app and to properly restart afterwards.                                                                                                                                                 |
| 30  | Inverter settings                         | Make sure to configure the battery correctly on the inverter interface. Refer to inverter manual for details.                                                                                                                                                                 |
| 31  | Replace comm cable                        | Replace the communication cable (min. CAT5!). Confirm PIN cable configuration for the specific inverter model (see manual)                                                                                                                                                    |
| 32  | Further checking                          | If problem remains: Test another BMU, if available                                                                                                                                                                                                                            |

## 2.5 SOC & charging logic

| No | Name      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 33 | SOC jumps | The SOC of an LFP battery cannot be measured. It is a calculated value. In general, the state of charge (SOC) of a battery is calculated using the voltage, but other factors such as temperature, current flow and charging behavior also play a role. The calculation of the state of charge is generally more precise if the battery regularly sees full cycles. Every now and then an SOC correction / calibration might occur. That is normal. |

## 2.6 Unexpected shutdown

System has been successfully commissioned in the past and did run for some time. Later on an unexpected shutdown occurred.

| No | Name                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 34 | Minimum Configuration fulfilled? | Check if the configuration is correct. Refer to latest "BYD Battery-Box Premium LVL Minimum Configuration List" (V1.8 or above) available at: <a href="http://www.bydbatterybox.com">www.bydbatterybox.com</a><br>Make sure the inverter is configured and working correctly.<br>Note: <ul style="list-style-type: none"><li>- if the minimum configuration list is not met, unexpected shutdown(e.g during backup) might occur.</li><li>- peak power devices can cause shutdowns. Check the peak power of your loads</li></ul> |
| 35 | Inverter Communication           | The battery only works with an compatible external inverter. If for whatever reason the communication between battery and inverter is lost, the battery will shut down itself within 30minutes. Therefore, check which one did shut down first ( battery or inverter) and check if inverter is properly detecting battery (e.g showing correct SOC or temperature). If problem remains, check according to <b>section 2.4</b> .                                                                                                 |
| 36 | Battery Logs / History Data      | Sporadic alarms are hard to detect as they only occur sometimes. Therefore, it is very important to download and provide all the historic battery log files in order to identify the root cause. See <b>section 2.8</b> for details.                                                                                                                                                                                                                                                                                            |
| 37 | Inverter Warning & Monitoring    | Unexpected Shutdown can be caused by overall system settings. Therefore, it is necessary to evaluate inverter data as well. <ul style="list-style-type: none"><li>- Which error message are shown in inverter (portal)</li><li>- Please provide access to Inverter portal (add info@eft-systems.de and tell us the name of the system in the portal)</li></ul>                                                                                                                                                                  |



## 2.7 BMU/BMS LED event code (EC)

A constant white LED refers to standby mode. White blinking means charge or discharge.

When the battery is initiating, the LED will flash white and blue with an interval time of 0.5 seconds (normal during startup).

When the LED flashes blue with an interval time of 1 second it indicates an event code. Please start to count when the white LED begins to flash, then count how many times the white and blue LED flashes. (also refer to the manual!)

**Example:** 1xwhite, 6xblue → EC 106 / 1xwhite, 11xblue → EC 111 / 3xwhite, 3xblue → EC 303

**Note:** every LVL has its own BMS. The Event Code of the BMS will therefore be shown in the LED of the individual LVL.



Most errors are caused by a faulty communication line, an incorrect app configuration or the missing restart after the app-configuration. Please go in detail through: **Section 2.2 & 2.3**

**Note:** if the system is not correctly configured with the app, the event code (EC) might be misleading.

| EC<br>BMU | EC<br>BMS | Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EC 101    | /         | <p>Initialisation Failure.</p> <ul style="list-style-type: none"> <li>- Make sure the app-configuration has been completed correctly (especially quantity!).</li> <li>- Restart the system according properly (see <b>step 17, section 2.2</b>)</li> </ul> <p>If problem remains:</p> <ul style="list-style-type: none"> <li>- Download all data with BCP (especially the historical data) (<b>section 2.8</b>)</li> <li>- replace BMU, if available</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| EC 102    | /         | <p>Incorrect module quantity / Module not detected.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| EC 105    |           | <ul style="list-style-type: none"> <li>- Make sure the app-configuration has been completed correctly (especially quantity!).</li> <li>- Check the terminal resistor. The terminal resistor (120 Ω at pin 5+6) is responsible for a clean communication between BMS and BMU. In rare cases it can be damaged and can disturb the signal. In these rare cases it is recommended to remove the terminal resistor.</li> <li>- replace communication cable between Battery and BMU</li> <li>- Restart the system according properly (see <b>step 17, section 2.2</b>)</li> <li>- If multiple LVL batteries connected in parallel: Unit Exclusion Method (<b>see section 2.10</b>): Check if the system works when removing the suspected LVL unit</li> </ul> <p>If problem remains:</p> <ul style="list-style-type: none"> <li>- Download all data with BCP (especially the historical data) (<b>section 2.8</b>)</li> <li>- replace BMU, if available</li> </ul> |

|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EC 103 | EC 108           | <p>PreCharge Fault.</p> <ul style="list-style-type: none"> <li>- Check the DC cabling and make sure that the Minimum Configuration is met.</li> <li>- Restart the system according properly (see <b>step 17, section 2.2</b>)</li> <li>- If multiple LVL batteries connected in parallel: Exclusion Method (<b>see section 2.10</b>): Check if the system works when removing the suspected LVL unit</li> </ul> <p>If problem remains:</p> <ul style="list-style-type: none"> <li>- Download all data with BCP (especially the historical and the cell data) (<b>section 2.8</b>)</li> <li>- provide the SN and voltage of the suspected LVL unit (see checklist on last page)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| EC 104 | EC 101           | <p>Short circuit / DC reverse connection.</p> <ul style="list-style-type: none"> <li>- Check DC cabling (is there any short circuit? Is the fuse between battery and inverter closed?)</li> <li>- Disconnect the battery system from the inverter and restart the battery system alone (battery isolated), to evaluate if the error is being caused externally (i.e. short circuit in inverter or MPPT). If the Event Code remains, the error might be in the battery. If the Event Code has changed, there might be an error in the inverter side.</li> <li>- If multiple LVL batteries connected in parallel: Exclusion Method (<b>see section 2.10</b>): Check if the system works when removing the suspected LVL unit</li> </ul> <p>If problem remains:</p> <ul style="list-style-type: none"> <li>- Download all data with BCP (especially the historical and the cell data) (<b>section 2.8</b>)</li> <li>- provide the SN and voltage of the suspected LVL unit (see checklist on last page)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                             |
| EC 104 | EC 103           | <p>BIC Communication Failure.</p> <p>Turn on battery and check whether the blueLED lights on the two BIC boards are on (BIC = circuit boards directly on the two battery modules inside LVL - see <b>section 3.3</b>).</p> <ul style="list-style-type: none"> <li>- If blue LED on BIC boards are on: <ul style="list-style-type: none"> <li>- try to exchange the upper BIC with the lower one.</li> <li>- if problem remains: BIC replacement might be necessary</li> </ul> </li> <li>- If blue LED on BIC boards are off: <ul style="list-style-type: none"> <li>- Check if there is any sign of short circuit in the BICs (e.g. component damage).</li> <li>- Check the sampling cables connection: B2+ up left / B1+ bottom left / B2- up right / B1- bottom right</li> <li>- if problem remains: BIC replacement might be necessary</li> </ul> </li> <li>- If multiple LVL batteries connected in parallel: Exclusion Method (<b>see section 2.10</b>): Check if the system works when removing the suspected LVL unit. Try swapping the BIC boards of two different LVL units.</li> </ul> <p>If problem remains:</p> <ul style="list-style-type: none"> <li>- Download all data with BCP (especially the historical and the cell data) (<b>section 2.8</b>)</li> <li>- Measure the cell voltage according to <b>section 2.9</b></li> <li>- provide the SN and voltage of the LVL with the EC (see checklist on last page)</li> </ul> |
| EC 104 | EC 107<br>EC 113 | <p>Undervoltage.</p> <ul style="list-style-type: none"> <li>- Shut down the system quickly to avoid further discharge. Check whether the system can shut down normally (by pressing the LED button in BMU for 5s).</li> <li>- Follow <b>section 2.9</b> (Voltage measurement of cells)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



|        |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EC 104 | EC 102<br>up to<br>EC112<br><br>(All other than<br>101, 103, 107,<br>113) | <p>One of the BMS (LVL units) reports an event message.</p> <p>- If multiple LVL batteries connected in parallel: Exclusion Method (<b>see section 2.10</b>):<br/>Check if the system works when removing the suspected LVL unit</p> <p>If problem remains:</p> <ul style="list-style-type: none"> <li>- Check the voltage of the batteries according to <b>section 2.8</b>Download all data with BCP (especially the historical and the cell data) (<b>section 2.8</b>)</li> <li>- provide the SN and voltage of the suspected LVL (see checklist on last page)</li> </ul> |
| EC 106 | /                                                                         | <p>No communication with Inverter.</p> <p>- Make sure the inverter is on, configured and working correctly.</p> <p>- Check according to <b>section 2.4</b></p>                                                                                                                                                                                                                                                                                                                                                                                                              |



## 2.8 Be Connect Plus (BCP)

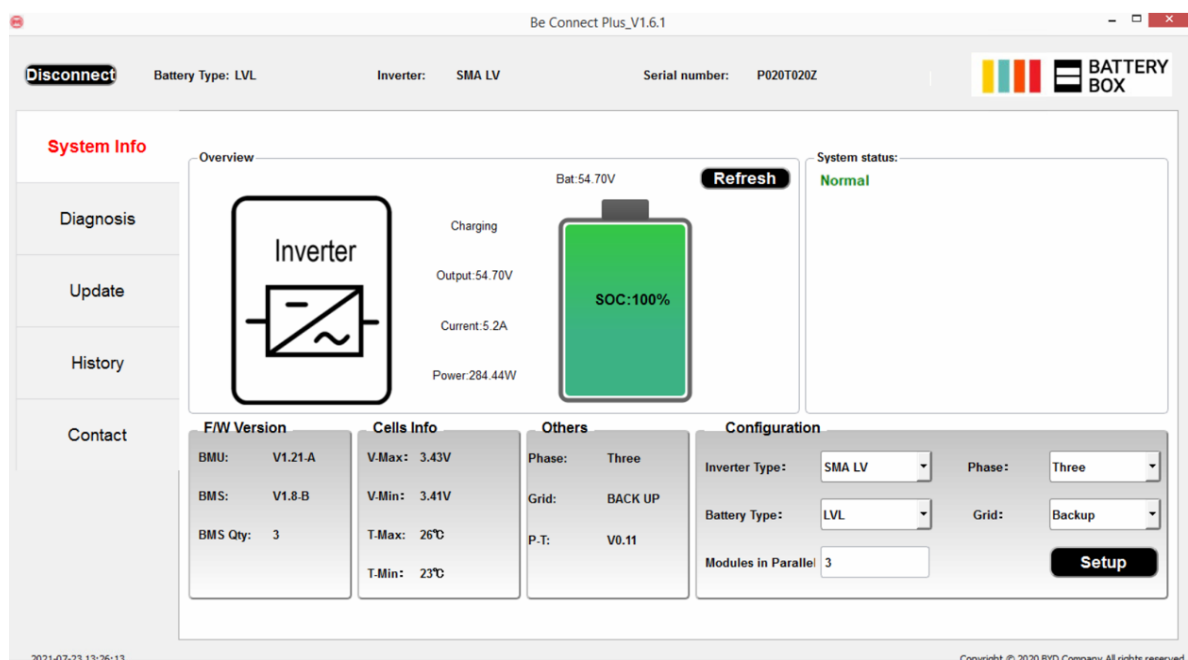
Be Connect Plus is a Windows-PC tool. With Be Connect Plus (BCP) you can:

- read the battery information,
- configure the battery system
- update BMU & BMS firmware
- Export / download battery logs (From BMU and all BMS)

BCP is constantly being improved and updated. **Make sure to use the latest program version. You can download the latest version of the Tool on [www.bydbatterybox.com](http://www.bydbatterybox.com) / [www.eft-systems.de](http://www.eft-systems.de) / [www.alpspower.com.au](http://www.alpspower.com.au).**

For the service analysis, please download and provide the data / logs as described in the program instructions (see PDF manual inside of program ZIP archive).

Note: You need a computer with Windows that will be connected to the battery Wifi.  
Login as Installer to Be Connect Plus, the password is the same as for WiFi: BYDB-Box

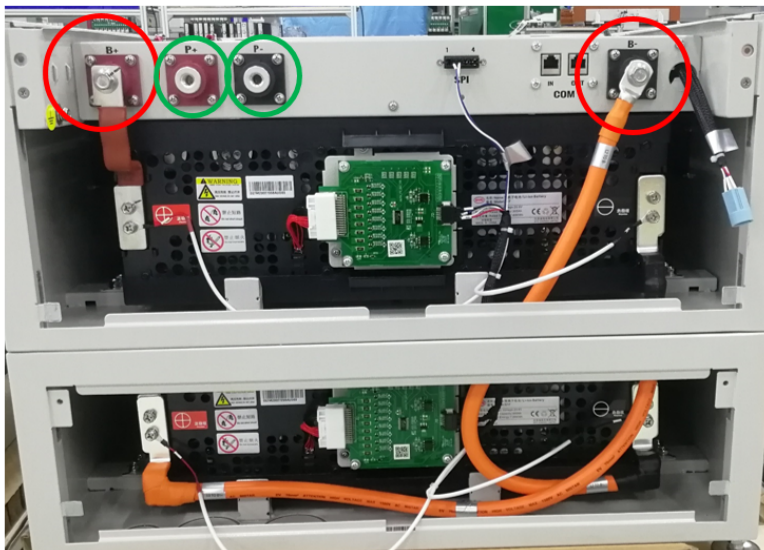


## 2.9 Voltage measurement and undervoltage

**Attention:** Make sure not to create a short circuit!

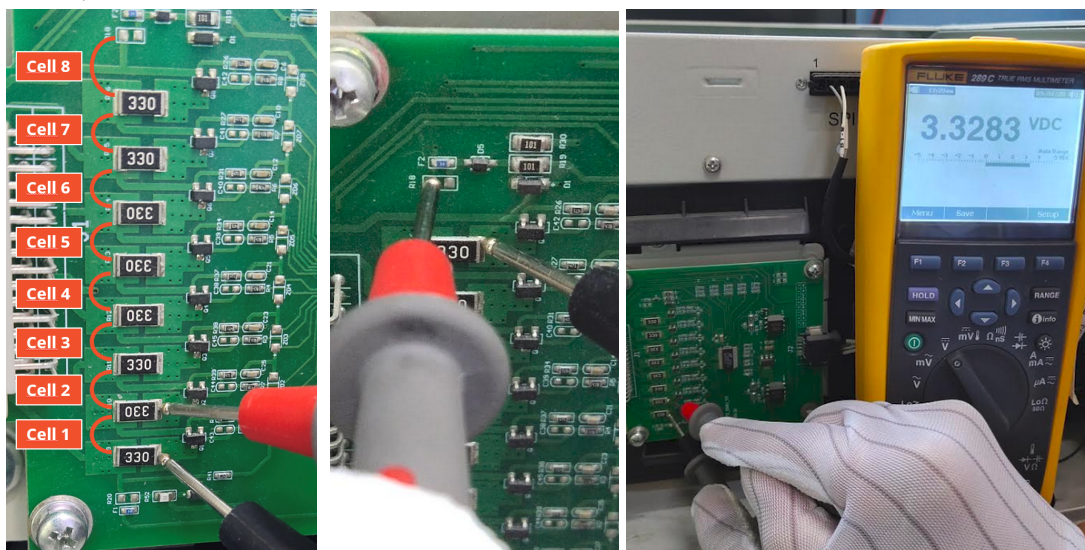
- You can see the max. and min. cell voltage in the BeConnect App or in PC Tool Be Connect plus (BCP)
- You can get the detailed module and cell voltage in the BCP Program (section 2.8)
- or measure it manually according to the below description:

**Measure the module voltage:** Open the front door and measure the tower voltage between **B+/B-** (red circle). Measure also between **P+/P-** (green circle) on the BMS as shown below.



**Measure the cell voltages** in case of BMS EC 107, EC 103, or if BCP shows cells with <1.5 V / does not show cell voltages. This will help us to understand if the issue is in the cell or in the BICs.

The voltage has to be measured in pairs as shown below. If the voltage is 0, in most cases this value is not correct and the measuring device is not in correct contact with the PINs. (please establish a correct and good contact)



Please record these measurements of 16 cells in total. (Cell Number 1-8 for button module, 9-16 for upper module)

## Undervoltage

A LVL in which one of the 16 cells has a voltage of  $<1.5\text{ V}$  is in undervoltage (check with BCP (**section 2.8**) / BC if possible).

- LVL with  $>45\text{ V}$  should be fine and you can continue to check other points according to this service guideline.  
- If the LVL voltage is  $<45\text{ V}$  but the single cell voltage is  $>1.5\text{ V}$ , the battery needs to be charged quickly while avoiding any further discharge. Therefore shutdown the system and search the problem according to the guideline, while the battery is completely off. Also check on the inverter side why the force charge doesn't work. Do not turn on the battery before making sure the inverter should be able to charge the battery.

- If only one LVL is in undervoltage: remove that one and try commissioning without it. Otherwise, make sure to avoid further overdischarge. (Turn off the system completely)

- If one, or all LVL are in undervoltage: Contact the service as stated below and make sure to avoid any further discharge of the battery (Turn off the system completely)

When contacting the service, make sure to fill the service checklist completely and add the following information:

- Serial Numbers (of the BMU and all (affected) LVL)
- Individual LVL voltages of all LVL (related to Serialnumber)
- Logs from the battery using BCP (**section 2.8**) and Screenshots showing the cell voltages, or manual cell voltage measurements
- Initial Firmware (FW) Version of the Battery when the UV happened (BMU and BMS)
- Detailed description how and why the system reached Undervoltage if known. Information when the system was installed and commissioned and in which circumstance and when the undervoltage happened. If the battery was never running before: Why did it never work before, and what was the Batteries status when the battery was left (on / off / LED).
- Inverter Model, Serial Number and Inverter Logs
- Access to Inverter portal (add [info@eft-systems.de](mailto:info@eft-systems.de) and tell us the name of the system in the portal)

## 2.10 Unit Exclusion Method (only when at least 2 LVLs / parallel connection)

- Normally a faulty LVL unit can be identified with the Be Connect Plus Program or by the LED Code of the corresponding LVL unit. In this case, remove the suspicious LVL unit with the Event Code from the system, and commission the remaining system (if it still complies with the minimum configuration list) and check if it runs properly.
- Otherwise, try the each LVL one by one  
**Important: The unit quantity must be adjusted in the app whenever the number of modules has been changed! Don't forget to perform a proper restart after a new configuration!**
  1. Switch off the Inverter
  2. Switch off the battery (Press button on BMU for 5 seconds until all batteries switch off. All LEDs should be off)
  3. Wait for 2 Minutes
  4. Turn on the Battery (button on battery connected to BMU) and then
  5. Turn on inverter second



## 3. SERVICE TASKS

Please go through the general and error specific steps beforehand, see chapter 1 and 2.

### 3.1 BMU Replacement

**Have you detected a faulty BMU?:**

After replacing the BMU, please do not forget to re-do the configuration and firmware-update with the app or BCP.

---

### 3.2 BMS Replacement

Refer to Manual "*BMS Drawer Replacement Guide*"

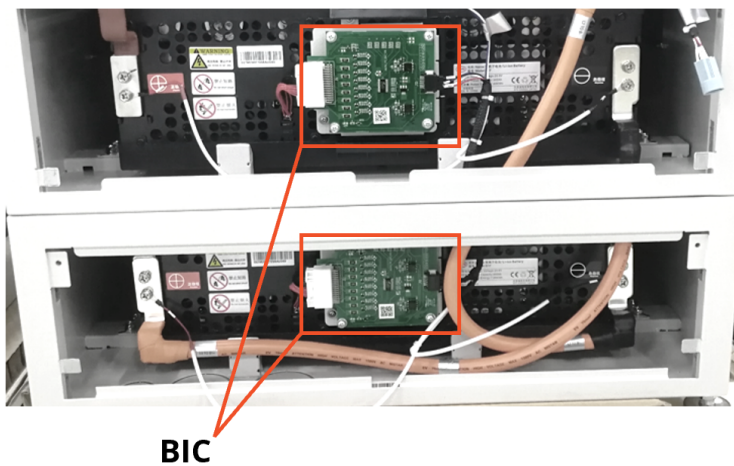
After replacing the BMS, please do not forget to re-do the configuration and firmware-update with the app or BCP.

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### 3.3 BIC Replacement

Refer to Manual "*BIC Board Replacement Guide*"

After replacing the BICs, please do not forget to re-do the configuration and firmware-update with the app or BCP.



# BYD Battery-Box Premium LVL Service Checklist - V1.2 EN



Important: The installation and all other kinds of works or measurements in combination with the BYD Battery-Box are only allowed by professional and qualified electricians. Improper handling can cause danger and damage. This document does not replace the official BYD manuals and documents. No responsibility is accepted for the accuracy of the information.

## 1. GENERAL STEPS

Please carefully check **all** „General Steps“ from page 3 of the Service Guideline and confirm this in the boxes below

- |                                                       |                                                |                                                  |
|-------------------------------------------------------|------------------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> 1.1 Configuration            | <input type="checkbox"/> 1.4 Latest Firmware   | <input type="checkbox"/> 1.7 Switch on procedure |
| <input type="checkbox"/> 1.2 Correct internal cabling | <input type="checkbox"/> 1.5 App Configuration | <input type="checkbox"/> 1.8 Correct Operation   |
| <input type="checkbox"/> 1.3 Correct external cabling | <input type="checkbox"/> 1.6 Restart           |                                                  |

## 2. ERROR RELATED ANALYSIS

Please mark the **error related** Analysis from Chapter 2 of the Service Guideline that you checked, and collect all the information related to those Sections

- |                                                                                             |                                                            |                                                                   |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------------|
| <input type="checkbox"/> 2.1 BMU does not turn on / BMU LED is off or flickering abnormally | <input type="checkbox"/> 2.5 SOC & charging logic          | <input type="checkbox"/> 2.8 Be Connect Plus (BCP)                |
| <input type="checkbox"/> 2.2 Problem with the FW Update / App Configuration / WiFi          | <input type="checkbox"/> 2.6 Unexpected shutdown           | <input type="checkbox"/> 2.9 Voltage measurement and undervoltage |
| <input type="checkbox"/> 2.3 Incorrect output voltage / No BMS Data / BMU EC102             | <input type="checkbox"/> 2.7 BMU / BMS LED event code (EC) | <input type="checkbox"/> 2.10 Unit Exclusion Method (≥ 2 x LVL)   |
| <input type="checkbox"/> 2.4 Communication issue with Inverter / BMU EC106                  |                                                            |                                                                   |

## 3. SERVICE INFORMATION

Please fill all available information in below table. Some information like the Serial Number of the BMU is mandatory to receive service.

• **Service Ticket Number or System ID:**

• **Installer / Delivery Address / Contact:**

|                |                      |            |                      |
|----------------|----------------------|------------|----------------------|
| Company        | <input type="text"/> | ZIP / City | <input type="text"/> |
| Contact Person | <input type="text"/> | Phone      | <input type="text"/> |
| Street / Nr.   | <input type="text"/> | Email      | <input type="text"/> |

• **System Information**

|                                 |                                                          |                                             |                      |
|---------------------------------|----------------------------------------------------------|---------------------------------------------|----------------------|
| Battery Configuration (X x LVL) | <input type="text"/>                                     | BMU Firmware                                | <input type="text"/> |
| BMU Serial Number               | <input type="text"/>                                     | BMS Firmware                                | <input type="text"/> |
| BMU Connected to Internet       | Yes <input type="checkbox"/> No <input type="checkbox"/> | Inverter Firmware                           | <input type="text"/> |
| Inverter Brand + Model          | <input type="text"/>                                     | System Name on Inverter Portal              | <input type="text"/> |
| Inverter Serial Number          | <input type="text"/>                                     | ( Provide access for: info@eft-systems.de ) |                      |
| Commissioning Date              | <input type="text"/>                                     |                                             |                      |

• **Service Information**

|                                                                                                        |                      |                              |                             |
|--------------------------------------------------------------------------------------------------------|----------------------|------------------------------|-----------------------------|
| BMU EventCode (EC)                                                                                     | <input type="text"/> | Inverter Error Code          | <input type="text"/>        |
| BMS EventCode(s) and related LVL Serial Number(s) <input type="text"/>                                 |                      |                              |                             |
| Was the battery charging / discharging before (was the system working normally before?)                |                      | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Take pictures of open communication port in the Battery and Inverter clearly showing connection cables |                      | <input type="checkbox"/>     |                             |
| Get Data of the Battery-Box with the Be Connect Plus (BCP) Programm (see chapter 2.8)                  |                      | <input type="checkbox"/>     |                             |

Description of the Problem

Please provide any additional information that is necessary or could help in the analysis of the service case (e.g. serial number of a wrong module, video of a special behaviour; pictures; app screenshots; module voltages... )

By contacting us you confirm, that a qualified person has done the necessary control and collected all available information above.

Service Contact: Europe: EFT-Systems GmbH  
www.eft-systems.de  
service@eft-systems.de  
+49 9352 8523999 +34 9106 02267 (ES)  
+44 2037 695998 (UK) +39 0287 368364 (IT)

Australia: Alps Power Pty Ltd  
www.alpspower.com.au  
service@alpspower.com.au  
+61 02 8005 6688

For Europe only: Register Ticket directly in the Online Service Center: <https://support.eft-systems.de/>

BATTERY BOX