

# BYD Battery-Box HV Service Guideline

Version 2.0

Valid for H 5.1 / 6.4 / 7.7 / 9.0 / 10.2 / 11.5



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

This manual is a shortened assistance for the installation of the Battery-Box High Voltage and does not replace the original manual, which can be found on [www.alpspower.com.au](http://www.alpspower.com.au) or [www.byd.com](http://www.byd.com). The installation must be carried out by a trained and qualified electrician. Attention: High Voltage! Improper handling can cause danger and damage.

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# 1. CHECK INSTALLATION

Please proceed first with the installation steps by:

No.	Name	Description
0	Inverter installed correctly?	Please make sure that the connection between the Battery-Box and the inverter and the installation of the inverter have been carried out correctly. If in doubt, follow the instructions of the inverter manufacturer. <b>IMPORTANT:</b> Please install the latest software on the inverter.
1	Configuration	SMA: 4 -8 Battery modules KOSTAL: 4-9 Battery modules FRONIUS: 5-9 Battery modules GOODWE: 4-9 Battery modules INGETEA: 4-5 Battery modules
2	DC Power Cable	Make sure that + and - are properly connected. Check the imprint <b>and</b> the board!
3	Communication cables	Please check: - CAT5 or higher; - check the cables and replace them if necessary - remove not necessary jumpers (see step 20)
4	Grounding	Battery-Box connected directly to the ground-bus of the house. <b>The battery must not be earthed via the inverter! Otherwise, communication problems are possible. Correct grounding is absolutely necessary!</b>
5	Installation in the Web Interface	- Installation Config: <b>Number of Modules + Inverter Manufacturer</b> - Update: <b>install the latest released software</b> ( <a href="http://www.alpspower.com.au">www.alpspower.com.au</a> )
6	State of charge (SOC)	When installed for the first time, the battery will show a predefined SOC of 19%. This does not correspond to the actual SOC and the battery corrects the eSOC at the first full charge or discharge. The actual SOC of new modules is about 35%. Therefore, only perform a module extension if the battery system is close to 35% SOC. For details see the extension manual ( <a href="http://alpspower.com.au/download/">http://alpspower.com.au/download/</a> ).
7	Connect to the Internet (recommended)	Connect the battery to the Internet using an Ethernet cable.
8	Checking the correct operation	The system runs properly if: - <i>Home</i> shows RUN and <i>Current Alarm</i> shows no entries - No error messages on the inverter - Inverter displays voltage and battery charge correctly - System charges / discharges
9	Web interface: Error description	If there are any errors in the section <i>Current Alarm</i> , please follow the instructions on the following pages.
10	<b>IMPORTANT: If you can not complete the commissioning, then turn off the battery via the system switch on the BCU before you leave the site.</b>	

## 2. ERROR ANALYSIS

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

### 2.1 BCU can not be switched on

No reaction, LEDs on the BCU board do not light up, although the system switch is switched on.

No.	Name	Description
11	Voltage measurement	Please measure the voltage as shown in <b>step 2.10</b> .
12	Visual check	See <b>step 2.11</b>
13	BCU exchange	Only if voltage <b>and</b> visual examination look good: Test another BCU, if available.

### 2.2 BCU system switch falls after a few seconds

Battery does not stay on for more than 30 seconds. Therefore you can not enter the web interface to read the event codes.

No.	Name	Description
14	Voltage measurement	Please measure the voltage as shown in <b>step 2.10</b> .
15	Check the individual modules (variant 2)	See <b>step 2.13</b>

### 2.3 Current Alarm: BatteryCommErr

Error probably caused by a communication failure between two modules or within a module.

No.	Name	Description
16	Visual check	See <b>step 2.11</b>
17	Check the individual modules (variant 2)	See <b>step 2.12</b>

### 2.4 Current Alarm: MonitorCommErr

Error probably caused by the battery module on top or the BCU.

No.	Name	Description
18	Visual check	See <b>step 2.11</b>
19	Check BCU and top module	Remove the top module from the tower. - If the "MonitorCommError" error is <b>no longer displayed</b> in Current Alarm, the topmost module may be faulty. If available, exchange the module with another one. - If the error "MonitorCommError" <b>continues to be displayed</b> , the error could be due to the BCU. If available, exchange the BCU as a test.

## 2.5 Communication problem

Inverter reports **communication problem**

Battery-Box System State under Home shows **STANDBY / IDLE**

Current Alarm: **InverterCommError**

No.	Name	Description
20	Jumper	<b>See short instructions - please check:</b> SMA: only jumper JP1 KOSTAL: only jumper JP2 FRONIUS: leave both jumpers (except for variant 2, see quick guide) GOODWE: leave both jumpers connected
21	Grounding	Connected Battery-Box directly to the ground-bus of the house. Only with a correct grounding of the battery, a trouble-free and secure data transmission can be guaranteed. <b>The battery must not be earthed via the inverter! Otherwise, communication problems are possible. Correct grounding is absolutely necessary!</b>
22	Communication cable	Replace the communication cable (min. CAT5!)
23	Use other communication port (J5 instead of J2)	The BCU has two identical communication ports, labeled J2 and J5. The short guide show the wiring at J2. If there are any communication problems, try to connect the PINs to J5 instead.
24	Disconnect from the network	Please check the local network and completely disconnect the system from the network in order to exclude communication interference caused by switches or WLAN repeaters (multicasting).
25	Restart the entire system	Generally: - Switch off: Battery off > Inverter off - wait at least 10minutes! - Switch on: inverter on > battery on  Kostal (the order is important): - unplug Ethernet cable from inverter - turn off the system: battery off > inverter DC switch off > AC off > unplug PV strings - wait at least 10 minutes - turn on system: plug in PV strings > AC on > inverter DC switch on > battery on - connect Ethernet cable once system is running again

## 2.6 Current Alarm: BatteryDiff

Error probably caused by a faulty battery extension.

No.	Name	Description
26	Battery recently extended? (new modules added)	If the battery system has recently been extended: Remove the new modules from the system and follow the instruction on how to correctly extend the system (see extension manual) If no module extension has taken place and all modules have been installed at the same time, please contact ALPS Power. Please make a screenshot of the section <i>RUN Data</i> on the web interface.

## 2.7 Current Alarm: UT / OT (e.g Cell\_UT) / SysTemp

System has detected a temperature which is too high (>50°C) or too low (<-10°C).

No.	Name	Description
27	SysTemp	If SysTemp in Run Data is OK (-10°C to +50°C): Test another BCU, if available
28	Charge_UT/OT Cell_UT/OT	If maxCellTemp or minCellTemp is outside the range -10°C to +50°C: Check temperatures under Run Data for each module. If only one module deviates, then try to remove this module or replace it, if a replacement module is available.

## 2.8 Current Alarm: Cell\_UV1 / Cell\_UV2 / Cell\_UV3

Error Probably caused by undervoltage or a faulty sensor.

No.	Name	Description
29	UV1	Recharge of the battery by the inverter is necessary. Please go through the above steps (especially: check communication, install updates, restart the entire system). If not recharge by inverter is not possible, a charger may be required. Switch off the battery and contact ALPS Power (screenshots).
30	UV2	If the battery is not being charged by the inverter immediately after restarting, then switch off the battery after a few minutes and contact ALPS Power (screenshots, voltage). Charger necessary.
31	UV3	Immediately turn off the battery and contact ALPS Power.

## 2.9 Current Alarm: DCBusFault

No.	Name	Description
32	DC Power cables	Make sure that + and - are properly connected. Check the imprint <b>and</b> the board!
33	Disconnect the battery from the inverter	For testing, please disconnect the inverter completely from the battery (communication cable and DC cable). If the error persists, then try another BCU, if available.

## 2.10 Voltage measurement

**ATTENTION: High voltage!**

The nominal voltage is obtained by multiplying the number of modules by 50V. Nominal system voltage should therefore be in the range 200V-450V.



If the measured voltage deviates significantly from the nominal value, please check the electrical voltage at the individual modules, as shown below:

**Positive**



**Negative**



**Measurement:**



## 2.11 Visual Check

The PINs should not be bent or touch each other. Otherwise, a short circuit with a damage to the BCU is possible.

Correct



defect



## 2.12 Identifying a faulty module (Variant 1)

In the web-interface of the battery, event messages and also error codes are displayed. "Current Alarm" shows current and active messages. Past messages are logged in the "History Alarm". If an error is displayed in the Current Alarm or History Alarm then Sub I shows which module is affected. Please note: The module numbering has nothing to do with the stacking order! The module numbering is based on the production date and the oldest module has the number 1. The corresponding serial number can be obtained in "RUN Data" if you select the module number there. In the example below, the message "Charge\_OT" is reported by module 3.

History Alarm								
No	Alarm Name	Main	Sub1	Sub2	Level	Alarm StartTime	Alarm EndTime	Reason
1	Charge_OT	1	3	1	4	2019-1-30 8:23:7	2019-1-30 8:23:7	PowerDown
2	BatteryBreak	1	1	1	3	2019-1-30 8:23:7	2019-1-30 8:23:7	PowerDown
3	Charge_OT	1	3	1	4	2019-1-30 8:22:5	2019-1-30 8:22:5	PowerDown
4	BatteryBreak	1	1	1	3	2019-1-30 8:22:5	2019-1-30 8:22:5	PowerDown

In *Run Data*, the correct serial number can be found for module 3:

Series Battery Num:	3	
SerialNumber:	1C041810-00484	
BattVol:	52.830	V



## 2.13 Identifying a faulty module (Variant 2)

### Important:

- The number of modules must always be adapted in the Web Interface (Installation Config) as soon as modules are added or removed from the system.
- Please perform a visual check of the communication pins according to step 2.11 for each module.

1. Build the Battery-Box with only 3 Modules (+ Base and BCU). Adjust module amount in the Web Interface under Installation Config. Note: The module amount must be adjusted whenever the number of modules is changed.

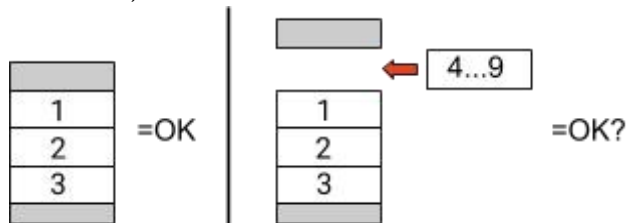
### 2. Check status:

#### Note:

The battery status is OK when battery is on (Air Switch up and WIFI available) & no errors are shown (Web Interface: Current Alarm). Otherwise, the battery status is NOT OK.

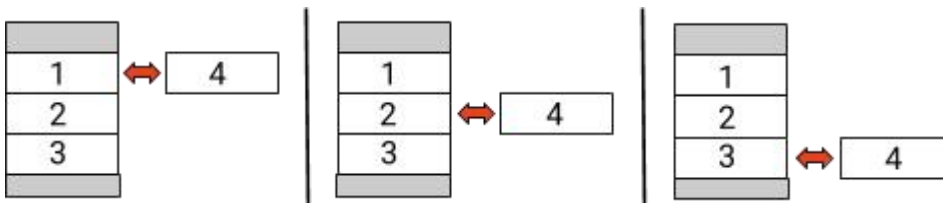
#### OK:

Add one module at a time, adjust module number in web interface and check again. If battery status turns to "NOT OK", then the defect module is identified to be the one that has been added newly.



#### NOT OK:

The defect module is probably one of the 3 modules in the tower. Take one of the spare modules and exchange each of the 3 modules with the spare module one at a time. Check the battery status after each step. If battery status turns to "OK", the defect module is the one that was exchanged.



3. If the defective module is found, it may be replaced by a new replacement module. Please contact ALPS Power.

## 3. SERVICE TASKS

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Please go through the general steps beforehand, see chapter 1.

### 3.1 BCU replacement

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

After replacing the BCU, please do not forget to re-do the configuration in the web interface (enter the number of modules and inverter brand) and install the latest BCU software approved for the inverter.

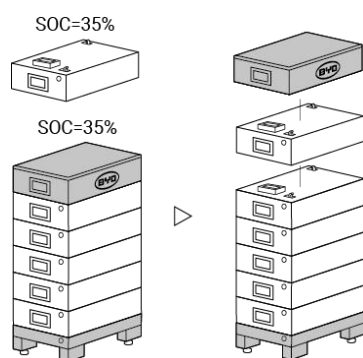
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### 3.2 Module Replacement

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

In the meantime you can use the battery system with the remaining modules and a correspondingly reduced capacity (take into account the minimum number of modules).

Please note: It is important that all modules of a battery tower have a similar state of charge (SOC) with a tolerance of 5%. New modules have about 35% SOC. If the remaining modules have not yet been put into operation (not charged / discharged), the new module can easily be added. Otherwise, it is basically a module extension. In this case, please add the new module to the system only when the system has a SOC between 30% and 40% (see extension manual).



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### 3.3 Charging with external HV charger

You will receive a charger from us (eg because of the message "Cell\_UV")?

Each module should be individually connected to the charger and charged to the same state of charge (SOC).

The charger has a display in which you can set the desired SOC. It's enough if you select 10% SOC. It is very important that all modules receive exactly the same amount of energy and come to the same SOC level. Please pay attention to the display or charging time. Before charging, the module must have been at rest for at least 30 minutes. If the charging process is interrupted, then you have to wait at least 30 minutes before the module can be recharged. (Otherwise the SOC will not be correct)

## 4. SERVICE CONTACT

Please note that this document is intended as a quick reference guide to quickly resolve common problems. Further information and detailed installation assistance can be found at [www.alpspower.com.au](http://www.alpspower.com.au)

To ensure a smooth process, please register yourself and the system under [www.alpspower.com.au](http://www.alpspower.com.au)

For further help please contact:

**ALPS Power**

**Mail: [service@alpspower.com.au](mailto:service@alpspower.com.au)**

**Phone: +61 2 8005 6688**

### IMPORTANT:

In order to be able to process a service case, it is **absolutely necessary** to get the serial number of the BCU and all error-specific information, see the table below:

No.	Name	Description
A	Serial number BCU	At the system switch or on the Web interface (Device Information)
B	Photo of the BCU	Complete BCU (inside)
C	Photos of Communication port (PIN) in the BCU and inverter.	In the BCU (detail photo) and on the inverter
D	Screenshots of the web interface:	On the web interface
D1	- <i>Device Information</i>	
D2	- <i>Installation Config</i>	
D3	- <i>Current Alarm</i>	
D4	- <i>History Alarm</i>	
D5	- <i>Run Data</i>	
E	Serial number of the faulty module (Note: only necessary, if a faulty module was found!)	On top of the module or on the side of it.
F	Inverter serial number and model	Important for BYD to analyze and resolve the problem at system level with the inverter partner.
G	If necessary: Delivery address	If replacement parts are required we need: <ul style="list-style-type: none"><li>- Complete delivery address (including country)</li><li>- Contact person</li><li>- Telephone number</li></ul>
H	Additional information	If available, please support us with additional information (eg comments / information displayed on inverter / additional photos of the system / voltages / ...).