Bestgo li-ion battery modules

Aluminum Block type

Overview

Bestgo Battery Co., Ltd. makes aluminum block battery modules which can hold many cells in one case with different arrangement for series and parallel config, like 1S12P, 2S6P, 3S4P, 4S3P etc., The top part of battery module is a plastic frame with several metal sheet bars built in, the pouch cell tabs will go through them and lay down, to have laser welding on metal sheet bars for the parallel and series config. Among battery modules here are soft-link busbars with screws for further connection. We build aluminum case for battery modules, because it has light weight, nice protection towards outside force, and good heat conduction when cells are in some high charge and discharge conditions. Bestgo makes well designed battery modules with unified shape and nice isolation considered, it could be used in 3D design software to simplify the whole pack design process, also make production quality checking more easier and reliable.

Sample picture
BAB110-N-1S12P

Scope

This specification describes the detail parameters of li-ion battery modules that are supplied by Bestgo Battery Company Limited, the products mentioned in the specification accord with GB/T18333.1-2001 Standard.

Battery modules with Li-NCM chemistry, 3.7V 37Ah cells,

BAB110-N Series, can hold up to 12 cells with 3.7V 37Ah Li-NCM cells.

Module frame	Volt	Capacity	Number of cells	Cell config	Weight	Size	Chemistry	Cell type
BAB110-N-1S12P	**3.7V**	**444Ah**	12 cells	1S12P	8.6 kg	161*__110__*268 mm	Li-NCM	3.7V 37Ah
BAB110-N-2S06P	**7.4V**	**222Ah**	12 cells	2S6P	8.6 kg	161*__110__*268 mm	Li-NCM	3.7V 37Ah
BAB110-N-3S04P	**11.1V**	**148Ah**	12 cells	3S4P	8.6 kg	161*__110__*268 mm	Li-NCM	3.7V 37Ah
BAB110-N-4S03P	**14.8V**	**111Ah**	12 cells	4S3P	8.6 kg	161*__110__*268 mm	Li-NCM	3.7V 37Ah
BAB110-N-6S02P	**22.2V**	**74Ah**	12 cells	6S2P	8.6 kg	161*__110__*268 mm	Li-NCM	3.7V 37Ah

BAB74-N Series, can hold up to 8 cells with 3.7V 37Ah Li-NCM cells.

Module frame	Volt	Capacity	Number of cells	Cell config	Weight	Size	Chemistry	Cell type
BAB74-N-1S08P	**3.7V**	**296Ah**	08 cells	1S8P	5.8 kg	161*__74__*268 mm	Li-NCM	3.7V 37Ah
BAB74-N-2S04P	**7.4V**	**148Ah**	08 cells	2S4P	5.8 kg	161*__74__*268 mm	Li-NCM	3.7V 37Ah
BAB74-N-4S02P	**14.8V**	**74Ah**	08 cells	4S2P	5.8 kg	161*__74__*268 mm	Li-NCM	3.7V 37Ah
BAB74-N-7S01P	**25.9V**	**37Ah**	07 cells	7S1P	5.2 kg	161*__74__*268 mm	Li-NCM	3.7V 37Ah

Battery modules with Li-NCM chemistry, 3.7V 32Ah cells,

BAC110-N Series, can hold up to 14 cells with 3.7V 32Ah Li-NCM cells.

Module frame	Volt	Capacity	Number of cells	Cell config	Weight	Size	Chemistry	Cell type
BAC110-N-1S12P	**3.7V**	**384Ah**	12 cells	1S12P	8.0 kg	161***110***268 mm	Li-NCM	3.7V 32Ah
BAC110-N-2S06P	**7.4V**	**192Ah**	12 cells	2S6P	8.0 kg	161***110***268 mm	Li-NCM	3.7V 32Ah
BAC110-N-3S04P	**11.1V**	**128Ah**	12 cells	3S4P	8.0 kg	161***110***268 mm	Li-NCM	3.7V 32Ah
BAC110-N-4S03P	**14.8V**	**96Ah**	12 cells	4S3P	8.0 kg	161***110***268 mm	Li-NCM	3.7V 32Ah
BAC110-N-6S02P	**22.2V**	**64Ah**	12 cells	6S2P	8.0 kg	161***110***268 mm	Li-NCM	3.7V 32Ah
BAC110-N-7S02P	**25.9V**	**64Ah**	14 cells	7S2P	9.0 kg	161***110***268 mm	Li-NCM	3.7V 32Ah

BAB74-N Series, can hold up to 8 cells with 3.7V 32Ah Li-NCM cells.

Module frame	Volt	Capacity	Number of cells	Cell config	Weight	Size	Chemistry	Cell type
BAC74-N-1S08P	**3.7V**	**256Ah**	08 cells	1S8P	5.4 kg	161***74***268 mm	Li-NCM	3.7V 32Ah
BAC74-N-2S04P	**7.4V**	**128Ah**	08 cells	2S4P	5.4 kg	161***74***268 mm	Li-NCM	3.7V 32Ah
BAC74-N-4S02P	**14.8V**	**64Ah**	08 cells	4S2P	5.4 kg	161***74***268 mm	Li-NCM	3.7V 32Ah
BAC74-N-7S01P	**25.9V**	**32Ah**	07 cells	7S1P	4.9 kg	161***74***268 mm	Li-NCM	3.7V 32Ah

Explain the model names for modules

For the BAB series battery modules,

B means **B**attery module, A mean **A**luminum, B means 3.7V 37Ah, C means 3.7V 32Ah.

110 means the width of module is 110mm, 74 means thickness is 74mm.

N means the chemistry is Li-**N**CM, F means Li**F**ePO4.

2S06P means the cells in module has 2S6P config.

(2S6P means 6 cells in parallel to form one unit to increase capacity, then 2 units in series to raise the voltage)

How to prepare the right battery modules in battery pack ?

1. Decide the right capacity for battery modules in battery pack.
2. Check the series number of battery pack, then adjust the series number of cells in the last module.

For example,

If we need to make a 51.8V 111Ah Li-NCM battery pack,

we decided to use the 3.7V 37Ah cells and BAB110-N series module frame,

51.8V111Ah pack means 14S3P config of 3.7V37Ah cells,

We will prepare 4 of BAB110-N-4S03P module frames. 3 of them have 12 cells as 4S03P config, 1 of them will only have 6 cells inside as 2S03P config, remain space is filled with foams.

Then we connect those modules together with busbars, it will be 3 of 14.8V111Ah modules and 1 of 7.4V 111Ah module. Battery pack has voltage of 14.8*3+7.4=51.8V, capacity of 111Ah.

If we need to make a 25.9V 185Ah Li-NCM battery pack,
we decided to use the 3.7V 37Ah cells and BAB110-N series module frame,
25.9V 185Ah means 7S5P config,
We will prepare 3 of BAB110-N-2S06P module frames, 3 of them will just have 10 cells inside as 2S5P config (rest space fill with foams),
Then we will prepare 1 of BAB74-N-1S08P module frame, just have 1 cells inside as 1S5P config,
(rest space fill with foams))
We connect those modules together with busbars, it will be 3 of 7.4V 185Ah modules and 1 of 3.7V 185Ah module. Battery pack has voltage of 7.4*3+3.7=25.9V, capacity of 185Ah.

We can also use BAB110-N-2S06P, if need to keep all 4 modules have same size for the better fix in package structure.

Note:
Module frames can hold less cells and have remain space filled with foams.
If the quantity of cells in the last module frame is too small, can change to a smaller module.
We suggest to let our engineers to select the suitable battery modules for customer according to the available space of battery pack.

Cells used in BAB/BAC series battery modules

The Li-NCM 3.7V 37Ah cells as below,

Specifications (BCPNE37K)	
Cell Dimensions (L*W*H)	155*8.5*242 mm (without tab) 155*8.5*265 mm (with tab)
Cell Weight	620 grams ± 10 g (1.36 Lbs.)
Rated Capacity (C/3, CC/CV, 23°C)	38,500 mAh (Typical) 37,000 mAh (minimum)
Charge Voltage	4.2 V (CC/CV mode) 4.15 V (for longer cycle life)
Operating Voltage	3.7 V @ C/3, 23°C/73°F (3.0 V Cut-off)
Standard Charging Current	≤ 18 A (C/2, 23°C/ 77°F)
Max Charging Current	≤ 37 A (1C, 23°C/ 77°F)
Standard Discharge Current	≤ 37 A (1C, 23°C/ 77°F)
Max Discharging Current	111 A @continuous (3C, 23°C) 185 A @10sec (5C, 23°C)
Internal Resistance	≤ 1.5 mΩ
Operating Temperature	Charge: 0°C ~ 45°C Discharge: -20°C ~ 50°C
Cycle Life (23°C, at +/- C/3 rate)	≥ 3,000 times @ 80%DOD
Standard Charging Method (CC / CV mode)	C/5 Constant Current to 4.2V Limit, then Constant 4.2V Volt with Current Taper to C/20.

The Li-NCM 3.7V 32Ah cells as below,

Specifications (BCPNE32K)	
Cell Dimensions (L*W*H)	155*7.5*242 mm (without tab) 155*7.5*265 mm (with tab)
Cell Weight	565 grams ± 10 g (1.25 Lbs.)
Rated Capacity (C/3, CC/CV, 23°C)	33,500 mAh (Typical) 32,000 mAh (minimum)
Charge Voltage	4.2 V (CC/CV mode) 4.15 V (for longer cycle life)
Operating Voltage	3.7 V @ C/3, 23°C/73°F (3.0 V Cut-off)
Standard Charging Current	≤ 16A (C/2, 23°C/ 77°F)
Max Charging Current	≤ 32A (1C, 23°C/ 77°F)
Standard Discharge Current	≤ 32 A (1C, 23°C/ 77°F)
Max Discharging Current	96 A @continuous (3C, 23°C) 160 A @10sec (5C, 23°C)
Internal Resistance	≤ 1.5 mΩ
Operating Temperature	Charge: 0°C ~ 45°C Discharge: -20°C ~ 50°C
Cycle Life (23°C, at +/- C/3 rate)	≥ 3,000 times @ 80%DOD
Standard Charging Method (CC / CV mode)	C/5 Constant Current to 4.2V Limit, then Constant 4.2V Volt with Current Taper to C/20.

The Notices of battery modules in battery pack

The performance of battery module is mainly depended on the model and amount of cells used in module.

If battery module need to offer quite big continuous current for a long time, it should have BMS to closely watch the temperature raise and make sure the cells are in a nice temperature condition. If necessary can design some clean air cooling conduct to the battery modules, modules can be modified to accept fresh air accordingly.

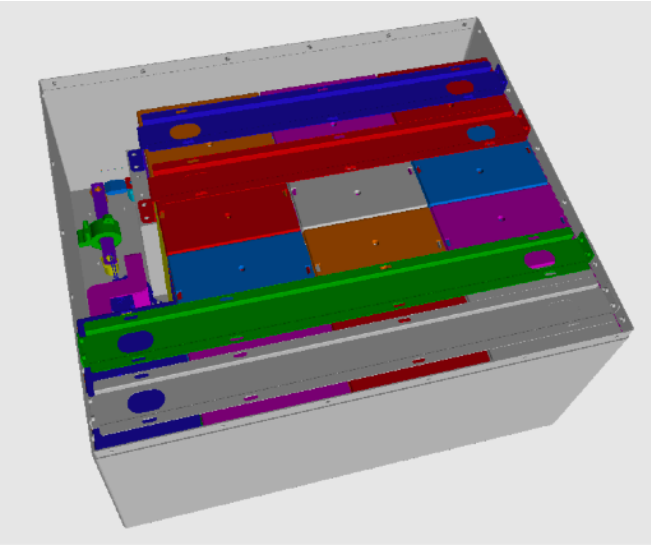
For most of battery packs application, if the average current/power is not very big, it do not need to consider the air cooling for the battery pack. For example if battery pack will be used from full to empty in no less than 1 hour, we do not need to consider the air cooling method. Cells we used in module have good enough performance to keep temperature under the range. It simplifies the design of battery pack, and can realize some special requirements like reach IP67 level etc.

When modules been put into metal case, it should have about 1mm distance among every modules for the assembly tolerance in 3D design, the real tolerance in assembly can be covered by filling with foam sheets.

In order to eliminate the vibration, we always put 2mm foam sheet at the bottom of modules, and 2mm foam sheet on top of modules, then pressing those modules with metal frame fix bars then fixed with screws.

Battery modules in metal case can be put as up towards direction or lay down direction, so the size of battery pack is flexible and inside package can be adjusted accordingly. Here are battery modules, BMS, fuse, (relays and current sensor if equipped with advanced BMS), battery terminals inside metal case, We suggest to let our engineers evaluate the size of battery pack, based on the available space that customer offered. Since our cells have quite nice energy density, the overall size of battery pack should be small in size and light in weight.

The 3D design file of battery pack (with battery modules and BMS built inside metal case)



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