Requirements for the Matching of the TBB Inverter and Lithium Battery

Version Change Record

Date	Version	Summary	Author
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1. General Description

This installation guide is used for the installation and settings of the lithium battery module and TBB inverter. When using this installation guide, please also refer to the user manuals of both products.

To ensure stable and continuous operation of the energy storage system, it is necessary to consider the ratio requirements for the combination of the TBB inverter and lithium battery module, as follows:

1. When the energy storage system operates in off-grid situations (including unstable grid power situations), the total continuous discharge power of the lithium battery BMS connected to the TBB inverter must be greater than or equal to the inverter's rated power. For example, TBB RiiO Sun 5KVA-S requires a battery with a continuous discharge power of 5kW, so for a battery with a discharge rate of 0.5C, its capacity should reach 10kWh.
2. When the energy storage system operates with stable AC input for ESS applications, the total continuous discharge power of the lithium battery BMS connected to the TBB inverter only needs to be greater than or equal to half of the inverter's rated power. For example, TBB Apollo Matrix 5.0S requires a battery with a continuous discharge power of 2.5kW, so for a battery with a discharge rate of 0.5C, its capacity only needs to reach 5kWh.
3. In ESS scenarios where the AC input source of the energy storage system is stable, the lithium battery must be able to communicate with the TBB system.

2. Compatibility Requirements for TBB Inverter Software Version

Inverter	Display	Powerctrl	Mppt	Note
RIIO SUN	V1.11	V2.06	V1.10	or Newer
RIIO SUN II	V1.03	V1.02	/	or Newer
Apollo Maxx	V1.11	V1.11	V1.10	or Newer
Apollo Matrix	V1.13	V1.24	V1.10	or Newer
Kinergier Pro	V1.28	V1.30	/	or Newer
Kinergier Pro II	/	/	/	or Newer

Note: If the inverter's software version is lower than the version listed in the table, its software can be upgraded using the TBBLink upper computer. Please refer to the upgrade guide: *TBB Inverter Program Update Guide V1.0 and User Manual of Updating Internal MPPT Charger Software for Apollo Matrix RiiO Sun and Apollo Maxx V1.2.*

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3. Battery Capacity Requirements for Matching TBB Inverter with Battery

3.1 Matching with TBB ES100

3.1.1 ES100 performance parameter

Item	ES100
Nominal Voltage (V)	48
Nominal Capacity (Ah)	105
Nominal Energy (kWh)	5.04
Standard charge current (A)	50
Maximum charge current (A)	105
Standard charge voltage(V)	53.5
Max. charge voltage(V)	54.75
Standard discharge current (A)	52.5
Maximum discharge current (A)	105

3.1.2 Recommended Minimum Battery Capacity

Calculate the number of lithium battery modules based on the load requirements and inverter's rated power:

Number of lithium battery modules (N) = Load power (or inverter's rated power) / 2520W（in off-grid system）.
Total continuous charging or discharging current = N * 52.5A.

For TBB inverter, the recommended minimum battery capacity is shown in the table below.

Model	Off-grid or unstable grid application	ESS application where the AC input is stable
RiiO Sun 2KVA-S	1	1
RiiO Sun 3KVA-S	2	1
RiiO Sun 4KVA-S	2	1
RiiO Sun 5KVA-S	2	1
RiiO Sun 6KVA-S	2	2
RiiO Sun II 3KVA-S	2	1
RiiO Sun II 5KVA-S	2	1
RiiO Sun II 6KVA-S	2	2
RiiO Sun II 8KVA-S	3	2

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Apollo Maxx 2.0S	1	1
Apollo Maxx 3.0S	2	1
Apollo Maxx 5.0S	2	1
Apollo Matrix 3.0S	2	1
Apollo Matrix 5.0S	2	1
CK4.0S	2	1
CK5.0S	2	1
CK6.0S	2	2
CK8.0S	3	3

3.2 Matching with Pylontech US3000C

3.2.1 US3000C performance parameter

Item	US3000C
Nominal Voltage (V)	48
Nominal Capacity (Ah)	74
Nominal Energy (kWh)	3.55
Standard charge current (A)	37
Maximum charge current (A)	74
Standard charge voltage(V)	/
Max. charge voltage(V)	/
Standard discharge current (A)	37
Maximum discharge current (A)	74

3.2.2 Recommended Minimum Battery Capacity

Calculate the number of lithium battery modules based on the load requirements and inverter's rated power:

Number of lithium battery modules (N) = Load power (or inverter's rated power) / 1776W （in off-grid system）.

Total continuous charging or discharging current = N * 37A.

For TBB inverter, the recommended minimum battery capacity is shown in the table below.

Model	Off-grid or unstable grid application	ESS application where the AC input is stable
RiiO Sun 2KVA-S	1	1
RiiO Sun 3KVA-S	2	1
RiiO Sun 4KVA-S	2	1
RiiO Sun 5KVA-S	3	2
RiiO Sun 6KVA-S	4	2

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RiiO Sun II 3KVA-S	2	1
RiiO Sun II 5KVA-S	3	2
RiiO Sun II 6KVA-S	4	2
RiiO Sun II 8KVA-S	5	2
Apollo Maxx 2.0S	1	1
Apollo Maxx 3.0S	2	1
Apollo Maxx 5.0S	3	2
Apollo Matrix 3.0S	2	1
Apollo Matrix 5.0S	3	2
CK4.0S	2	1
CK5.0S	3	2
CK6.0S	4	2
CK8.0S	5	3

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