

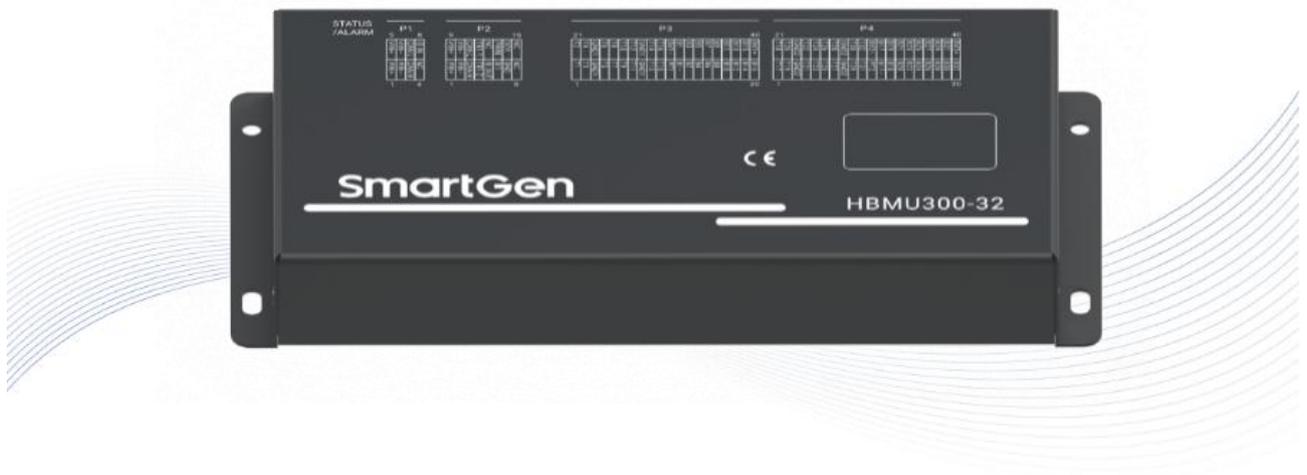
SmartGen

MAKING CONTROL SMARTER

HBMU300-32

BMS SLAVE CONTROL MODULE

USER MANUAL



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Table 1 Software Version

Date	Version	Content
2025-07-24	1.0	Original release.

Glossary and List of Abbreviations

BMS: Battery Management System

BAU: Battery Array Unit

BCU: Battery Control Unit

BMU: Battery Management Unit

1 OVERVIEW

HBMU300-32 is the slave control module of BMS. Up to 32 strings of battery voltage, 32-channel temperature and 2-channel temperature of high-voltage connector can be collected, voltage and temperature sampling numbers can be flexibly configured, and passive balance function of 32-channel battery is supported. The module can monitor the working status of the battery (voltage, temperature and etc.) to perform the real-time detection and give feedback to BCU via CAN communication, so as to alarm for the under/over voltage, under/over temperature. It is suitable for energy storage system or power station using lithium iron phosphate, ternary lithium, lithium titanate and other materials as medium.

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2 PERFORMANCE AND CHARACTERISTICS

- Support 16-32 strings of single battery voltage detection;
- Up to 34-channel temperature detection is supported, temperature sensor type is NTC 10K-3950;
- With passive balance function, max. balance current is 100mA;
- With power-on ID auto-coding function, ID range: 1-30;
- With voltage sampling wire disconnect detection function;
- With temperature sampling wire disconnect detection function;
- With three-color status indicator;
- With 1-channel Aux. output port, 1-channel PWM output port;
- With 1-channel Aux. input port;
- With 1-channel non-isolated CAN module with built-in optional 120Ω terminal resistor, it can be used for communication with BCU module, also for firmware upgrade;
- Support 1000VDC energy storage system;
- Modular design, screw installation, metal shell, compact structure and easy installation.

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Table 2 Specification Parameters

Item	Content
Operating Voltage Range	DC(8~35)V, DC reverse connection protection
Overall Consumption	<0.5W
Cell Voltage Sampling	Range: DC(0~5)V Resolution: 1mV Accuracy: ± 5 mV
Temp. Sampling Input	Range: (-40 ~+125) $^{\circ}$ C Resolution: 1 $^{\circ}$ C Accuracy: ± 1 $^{\circ}$ C Temp. sensor type: NTC 10K-3950
CAN	500kbps, non-isolated, using Belden 9841 cable or equivalent.
EMC Standard	GB/T 34131-2023
Vibration	5Hz~8Hz: displacement= ± 7.5 mm 8Hz~500Hz: a= ± 2 g IEC 60068-2-6
Shock	50g, 11ms, half-sine, IEC 60068-2-27
Bump Test	20g, 16ms, half-sine IEC 60255-21-2
Overall Dimensions	223.0mmx100.0mmx31.0mm
Panel Cutout	212.0mmx68.5 mm
Working Temperature	(-40~+70) $^{\circ}$ C
Working Humidity	(20~93)%RH
Storage Temperature	(-40~+80) $^{\circ}$ C
Protection Level	IP20
Insulation Strength	Add AC2.4kV voltage between DC high-voltage terminal and low-voltage terminal, leakage current is less than or equal to 10mA within 1min.
Weight	0.58kg

4 MODULE PANELS

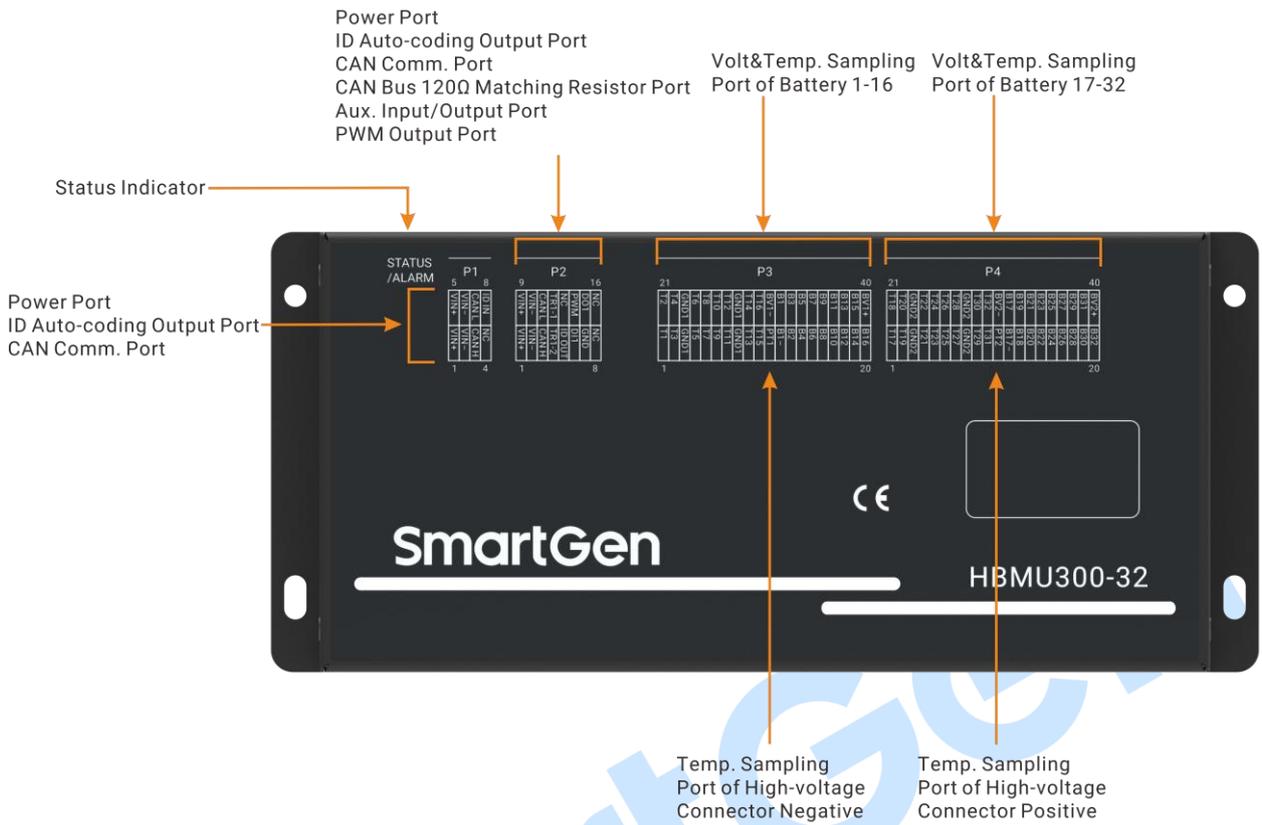


Fig.1 Panel Drawing

Table 3 Indicator Description

Indicator	Description
Status	ID to be identified: Yellow indicator flashes (once per second); Discharging: Green indicator breathes; Charging: Yellow indicator breathes; Battery pack in static status and no fault: Green indicator always illuminates; CAN communication failure: Red indicator always illuminates; Battery pack fault (single voltage and temperature sampling wire disconnected): Red indicator slowly flashes (once every 1.5s); Program upgrade: Green indicator fast flashes (once every 0.5s).

Table 4 P1 Terminal Model Comparison

No.	Board Model	Cable Model	Pin Model	Remark
P1(8PIN)	IMSA-13065B-2-08Y900	IMSA-13065S-2-08Y500	IPS-13065T-01A-T	Wire diameter 0.3mm ² AWG22
P2(16PIN)	IMSA-13065B-2-16Y900	IMSA-13065S-2-16Y500	IPS-13065T-01A-T	Wire diameter 0.3mm ² AWG22

No.	Board Model	Cable Model	Pin Model	Remark
P3(40PIN)	IMSA-13065B-2-40Y900	IMSA-13065S-2-40Y500	IPS-13065T-01A-T	Wire diameter 0.3mm2 AWG22
P4(40PIN)	IMSA-13065B-2-40Y900	IMSA-13065S-2-40Y500	IPS-13065T-01A-T	Wire diameter 0.3mm2 AWG22

4	3	2	1
NC	CANH	VIN-	VIN+
8	7	6	5
ID IN	CANL	VIN-	VIN+

Fig.2 P1 Terminal Definition

Table 5 P1 Terminal Function Description

Pin No. (P1)	Definition	Description
1	VIN+	Power positive.
5	VIN+	
2	VIN-	Power negative
6	VIN-	
3	CANH	Non-isolated CAN port for communication between HBCU300 and HBMU300-32.
7	CANL	
8	ID IN	ID auto-coding input, which is connected to ADD2_OUT of HBCU300 or ID OUT of the last HBMU300-32.
4	NC	It must be hung in the air.

8	7	6	5	4	3	2	1
NC	GND	DIT	ID OUT	TR1-2	CANH	VIN-	VIN+
16	15	14	13	12	11	10	9
NC	DO1	PWM	NC	TR1-1	CANL	VIN-	VIN+

Fig.3 P2 Terminal Definition

Table 6 P2 Terminal Function Description

Pin No. (P2)	Definition	Description
1	VIN+	Power positive.
9	VIN+	
2	VIN-	Power negative
10	VIN-	
3	CANH	Non-isolated CAN port for communication between HBCU300 and HBMU300-32.
11	CANL	
4	TR1-2	Short connect terminal 4 and 12 for connecting 120Ω terminal matching resistor of CAN according to user site situation.
12	TR1-1	
5	ID OUT	ID auto-coding output, which is connected to ID IN of the next HBMU300-32.
6	DI1	Aux. input port, GND connected is active.
7	GND	Common terminal.
14	PWM	PWM output, high electric level 5V, low electric level 0V (reserved function).
15	DO1	Active output port, continuous current 1A, max. current 3A@1s.
Others	NC	It must be hung in the air.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
B16	B14	B12	B10	B8	B6	B4	B2	B1-	PT1	T15	T13	GND1	T11	T9	T7	T5	GND1	T3	T1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21
BV1+	B15	B13	B11	B9	B7	B5	B3	B1	BV1-	T16	T14	GND1	T12	T10	T8	T6	GND1	T4	T2

Fig.4 P3 Terminal Definition

Table 7 P3 Terminal Function Description

Pin No. (P3)	Definition	Description
1	T1	1 st temp. sampling.
21	T2	2 nd temp. sampling.
2	T3	3 rd temp. sampling.
22	T4	4 th temp. sampling.
3	GND1	Common terminal 1 of temp. sampling.
23	GND1	
4	T5	5 th temp. sampling.
24	T6	6 th temp. sampling.
5	T7	7 th temp. sampling.
25	T8	8 th temp. sampling.
6	T9	9 th temp. sampling.
26	T10	10 th temp. sampling.
7	T11	11 th temp. sampling.

Pin No. (P3)	Definition	Description
27	T12	12 th temp. sampling.
8	GND1	Common terminal 1 of temp. sampling.
28	GND1	
9	T13	13 th temp. sampling.
29	T14	14 th temp. sampling.
10	T15	15 th temp. sampling.
30	T16	16 th temp. sampling.
11	PT1	Temp. sampling of high-voltage connector negative.
31	BV1-	Total power negative input of sampling unit 1.
12	B1-	1 st battery negative.
32	B1	1 st battery positive.
13	B2	2 nd battery positive.
33	B3	3 rd battery positive.
14	B4	4 th battery positive.
34	B5	5 th battery positive.
15	B6	6 th battery positive.
35	B7	7 th battery positive.
16	B8	8 th battery positive.
36	B9	9 th battery positive.
17	B10	10 th battery positive.
37	B11	11 th battery positive.
18	B12	12 th battery positive.
38	B13	13 th battery positive.
19	B14	14 th battery positive.
39	B15	15 th battery positive.
20	B16	16 th battery positive.
40	BV1+	Total power positive input of sampling unit 1.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
B32	B30	B28	B26	B24	B22	B20	B18	B17-	PT2	T31	T29	GND2	T27	T25	T23	T21	GND2	T19	T17
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21
BV2+	B31	B29	B27	B25	B23	B21	B19	B17	BV2-	T32	T30	GND2	T28	T26	T24	T22	GND2	T20	T18

Fig.5 P4 Terminal Definition

Table 8 P4 Terminal Function Description

Pin No. (P4)	Definition	Description
1	T17	17 th temp. sampling.
21	T18	18 th temp. sampling.
2	T19	19 th temp. sampling.
22	T20	20 th temp. sampling.

Pin No. (P4)	Definition	Description
3	GND2	Common terminal 2 of temp. sampling.
23	GND2	
4	T21	21 st temp. sampling.
24	T22	22 nd temp. sampling.
5	T23	23 rd temp. sampling.
25	T24	24 th temp. sampling.
6	T25	25 th temp. sampling.
26	T26	26 th temp. sampling.
7	T27	27 th temp. sampling.
27	T28	28 th temp. sampling.
8	GND2	Common terminal 2 of temp. sampling.
28	GND2	
9	T29	29 th temp. sampling.
29	T30	30 th temp. sampling.
10	T31	31 st temp. sampling.
30	T32	32 nd temp. sampling.
11	PT2	Temp. sampling of high-voltage connector positive.
31	BV2-	Total power negative input of sampling unit 2.
12	B17-	17 th battery negative.
32	B17	17 th battery positive.
13	B18	18 th battery positive.
33	B19	19 th battery positive.
14	B20	20 th battery positive.
34	B21	21 st battery positive.
15	B22	22 nd battery positive.
35	B23	23 rd battery positive.
16	B24	24 th battery positive.
36	B25	25 th battery positive.
17	B26	26 th battery positive.
37	B27	27 th battery positive.
18	B28	28 th battery positive.
38	B29	29 th battery positive.
19	B30	30 th battery positive.
39	B31	31 st battery positive.
20	B32	32 nd battery positive.
40	BV2+	Total power positive input of sampling unit 2.

5 CASE DIMENSIONS AND PANEL CUTOUT

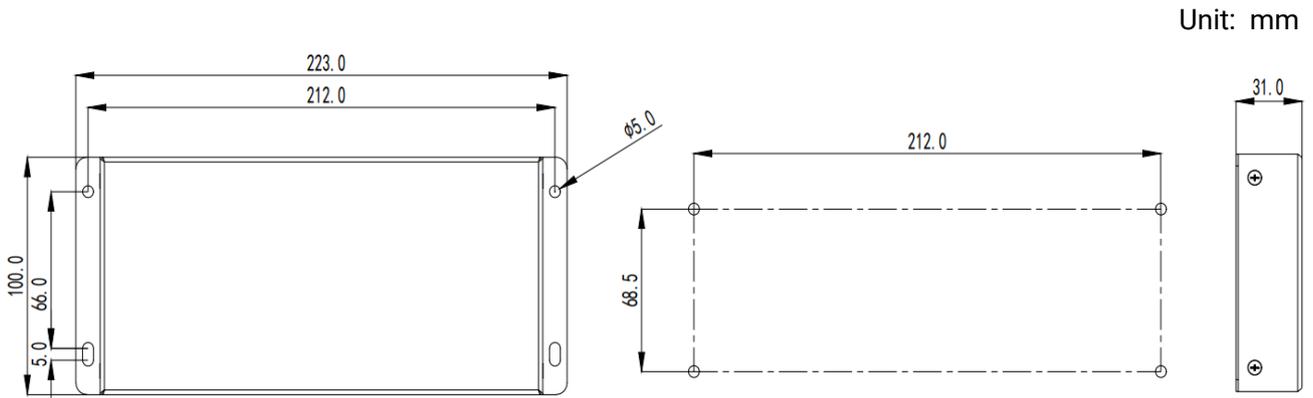


Fig.6 Case Dimensions and Panel Cutout

6 TYPICAL APPLICATION DIAGRAM

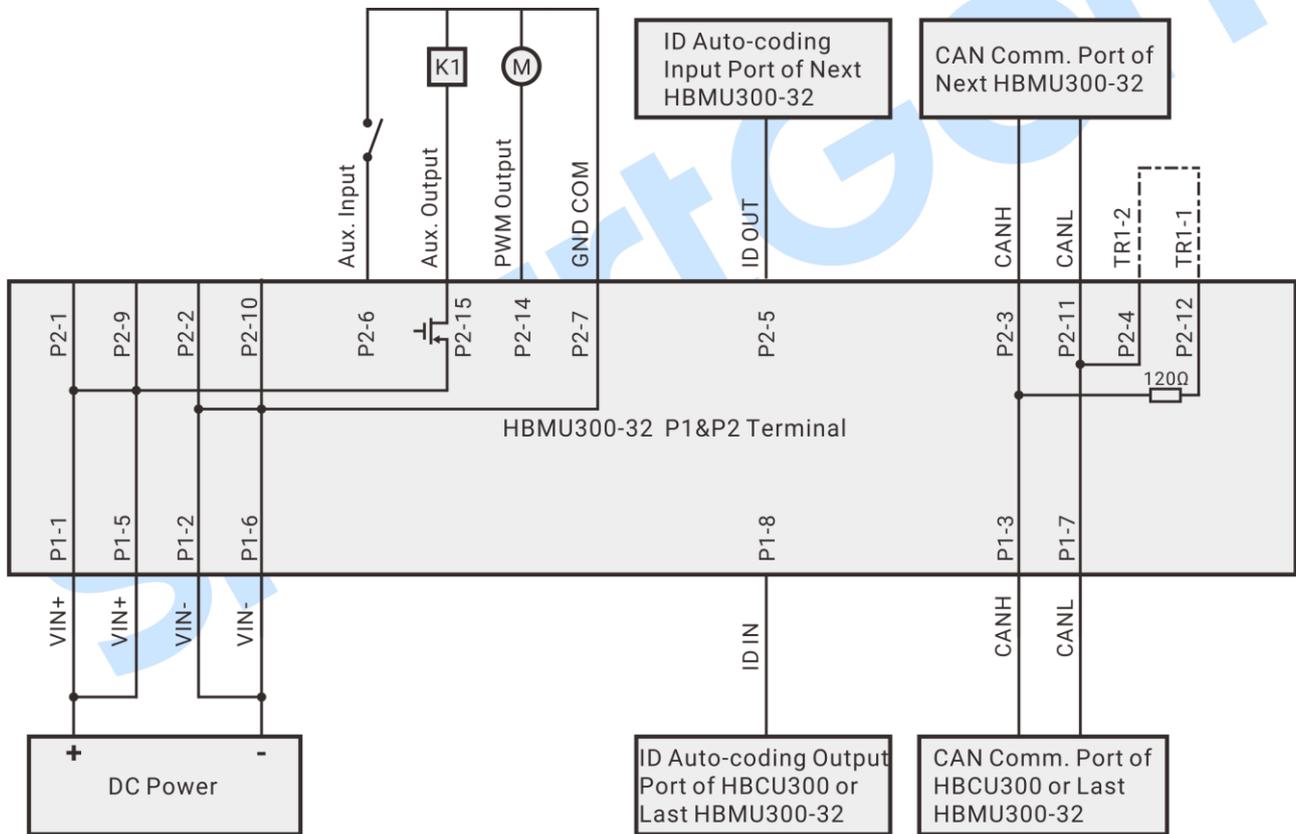


Fig.7 Terminal P1, P2 Application Diagram

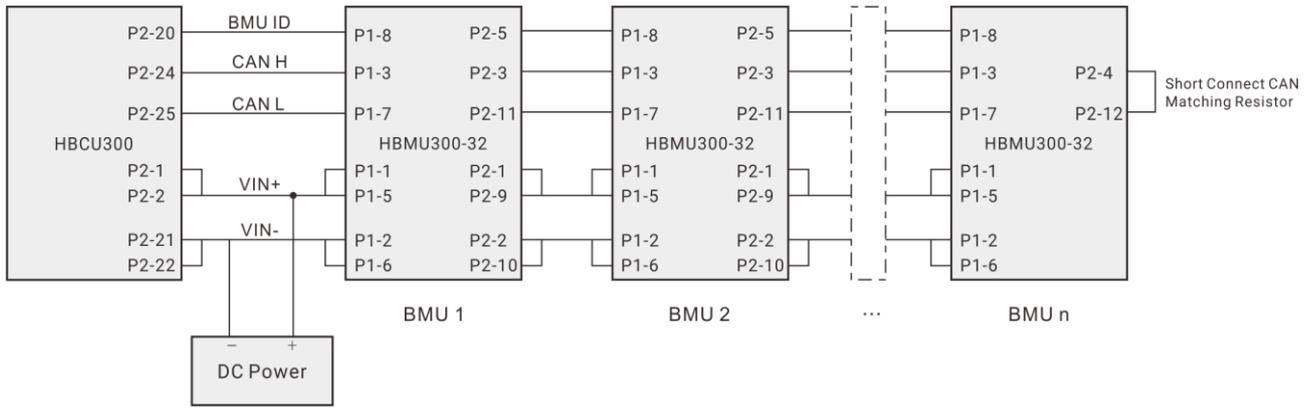


Fig.8 Communication Application Diagram Between HBCU300 and HBMU300-32

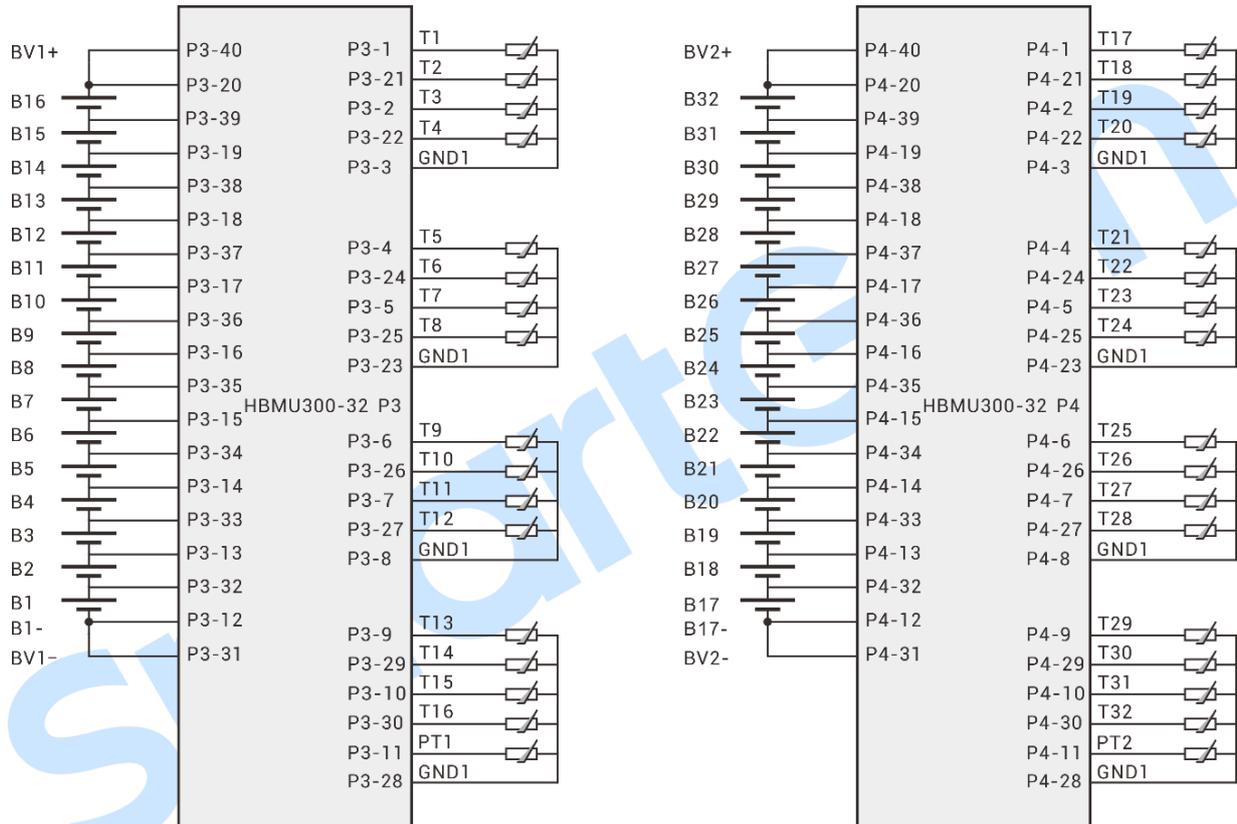


Fig.9 32-String Application Diagram of Terminal P3, P4

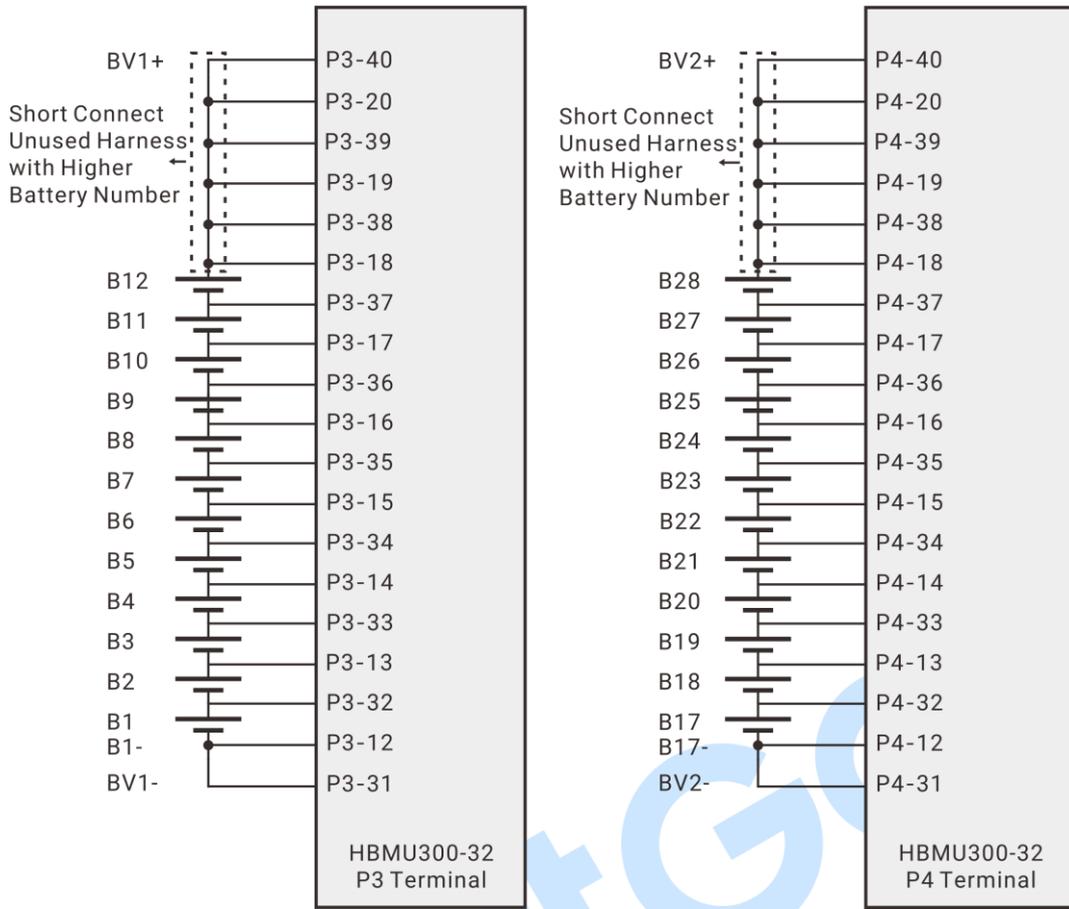


Fig.10 Connection Diagram of 24-String Battery Voltage Sampling Line

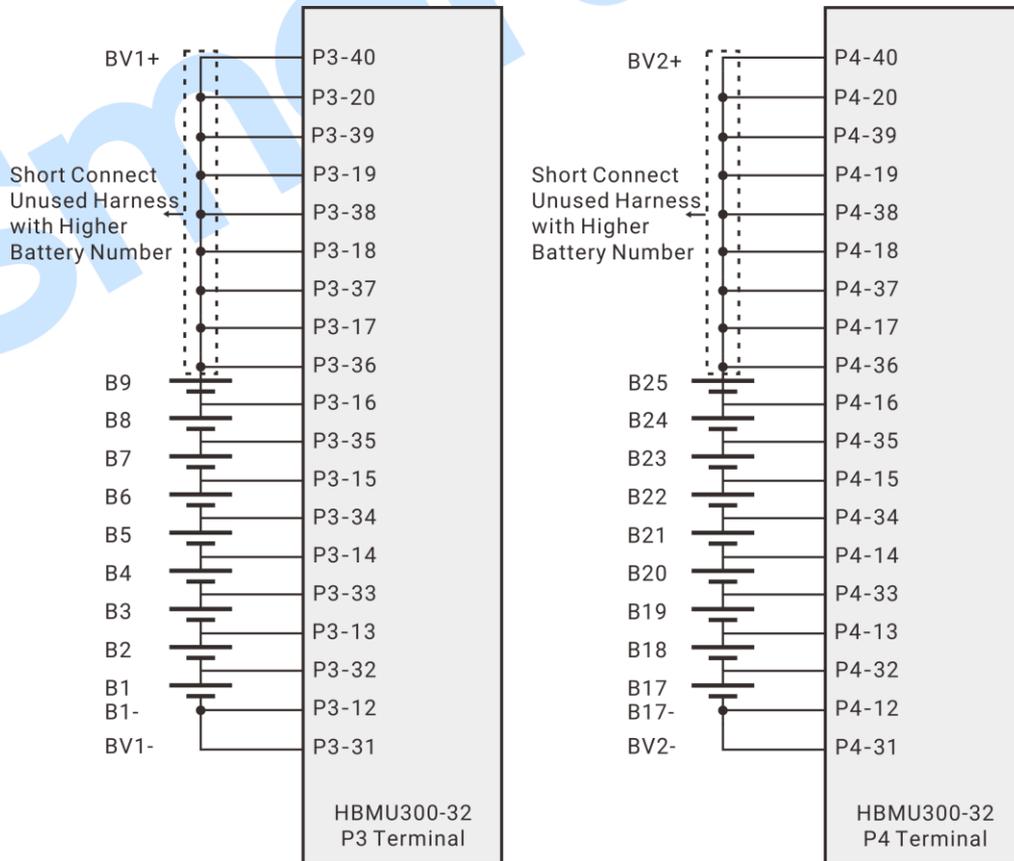


Fig.11 Connection Diagram of 18-String Battery Voltage Sampling Line

7 COMMISSIONING

It is recommended to do the following checks before the system is operating:

- Check all the wirings are correct and the diameters are suitable;
- Test a single battery module to ensure that the voltage and temperature data are within the normal range;

- After the system is power on, the status indicator is normal;

Please contact our service personnel in time if there is any question.

8 FAUT FINDING

Table 9 Fault Finding

Fault Symptom	Possible Measures
Controller no response when power on	Check controller wirings; Check if there is voltage output of power supply module;
CAN communication failure	Check whether ID is identified successfully; Check whether CANH and CANL are reversely connected; A 120Ω resistor is recommended to connect between CANH and CANL.
Abnormal battery voltage & temperature data	Check the wirings; Check whether the connector is tightly inserted.

9 OPTIONAL ACCESSORIES

Table 10 Optional Accessories

Material Name	Name
Wire Connector	IMSA-13065S-2-8Y500 (One set with 1)
Wire Connector	IMSA-13065S-2-16Y500 (One set with 1)
Wire Connector	IMSA-13065S-2-40Y500 (One set with 2)
Pin	IPS-13065T-01A-T (One set with 104)