

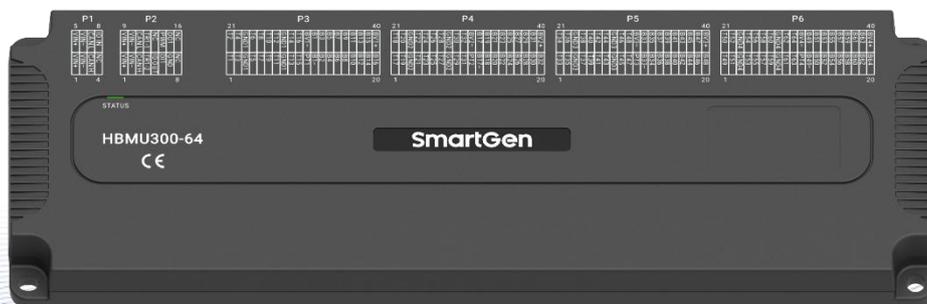
SmartGen

MAKING CONTROL SMARTER

HBMU300-64

BMS SLAVE CONTROL MODULE

USER MANUAL



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Table 1 Software Version

Date	Version	Content
2024-05-06	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

HBMU300-64 is the slave control module of BMS. Up to 64 strings of battery voltage, 64-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 64-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 32-64 strings of single battery voltage detection;
- Up to 64-channel temperature detection is supported, NTC for temperature sensor,
- 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 port with built-in optional 120Ω terminal resistor, it can be used for communication with BCU module, also for firmware upgrade;
- Support 1500VDC energy storage system;
- Modular design, screw installation, flame retardant ABC/PC shell, compact structure and easy installation.

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3 SPECIFICATION

Table 2 Specification Parameters

Item	Content
Operating Voltage Range	DC8V ~ DC35V, DC reverse connection protection
Overall Consumption	<0.5W
Cell Voltage Sampling	Range: (0~5)VDC Resolution: 1mV Accuracy: ±5mV
Temp. Sampling Input	Range: -40°C~+125°C Resolution: 1°C Accuracy: ±1°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=±7.5mm 8Hz~500Hz: a=±2g IEC 60068-2-6
Shock	50g, 11ms, half-sine, IEC 60068-2-27
Bump Test	25g, 16ms, half-sine IEC 60255-21-2
Overall Dimensions	287mmx95mmx25mm
Installation Dimensions	274.5mmx82.5mm
Working Temperature	(-40~+70)°C
Working Humidity	(20~93)%RH
Storage Temperature	(-40~+80)°C
Protection Level	IP20
Weight	0.36kg

4 MODULE PANELS

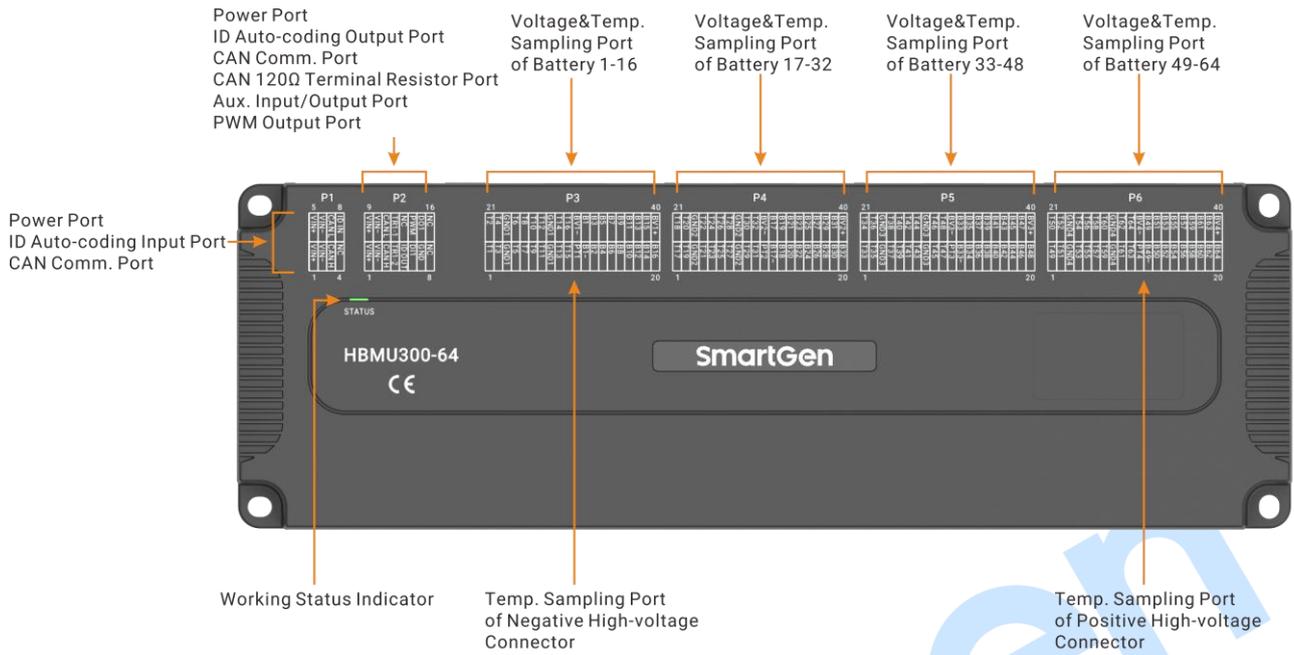


Fig.1 Panel Drawing

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 0.5s)

Table 4 P1 Terminal Definition

P1(8PIN)			
1	2	3	4
VIN+	VIN-	CANH	NC
5	6	7	8
VIN+	VIN-	CANL	ID IN

Table 5 P2 Terminal Definition

P2(16PIN)							
1	2	3	4	5	6	7	8
VIN+	VIN-	CANH	TR1-2	ID OUT	D11	GND	NC
9	10	11	12	13	14	15	16
VIN+	VIN-	CANL	TR1-1	NC	PWM	DO1	NC

Table 6 P3 Terminal Definition

P3(40PIN)																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
T1	T3	GND1	T5	T7	T9	T11	GND1	T13	T15	PT1	B1-	B2	B4	B6	B8	B10	B12	B14	B16
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
T2	T4	GND1	T6	T8	T10	T12	GND1	T14	T16	BV1-	B1	B3	B5	B7	B9	B11	B13	B15	BV1+

Table 7 P4 Terminal Definition

P4(40PIN)																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
T17	T19	GND2	T21	T23	T25	T27	GND2	T29	T31	PT2	B17-	B18	B20	B22	B24	B26	B28	B30	B32
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
T18	T20	GND2	T22	T24	T26	T28	GND2	T30	T32	BV2-	B17	B19	B21	B23	B25	B27	B29	B31	BV2+

Table 8 P5 Terminal Definition

P5(40PIN)																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
T33	T35	GND3	T37	T39	T41	T43	GND3	T45	T47	PT3	B33-	B34	B36	B38	B40	B42	B44	B46	B48
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
T34	T36	GND3	T38	T40	T42	T44	GND3	T46	T48	BV3-	B33	B35	B37	B39	B41	B43	B45	B47	BV3+

Table 9 P6 Terminal Definition

P6(40PIN)																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
T49	T51	GND4	T53	T55	T57	T59	GND4	T61	T63	PT4	B49-	B50	B52	B54	B56	B58	B60	B62	B64
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
T50	T52	GND4	T54	T56	T58	T60	GND4	T62	T64	BV4-	B49	B51	B53	B55	B57	B59	B61	B63	BV4+

Table 10 Terminal Model Comparison

No.	Board Model	Cable Model	Pin Model	Remark
P1(8PIN)	IMSA-13065B-2-08Y 900	IMSA-13065S-2-08Y 500	IPS-13065T-01A-T	Wire diameter 0.3mm ² AWG22
P2(16PIN)	IMSA-13065B-2-16Y 900	IMSA-13065S-2-16Y 500	IPS-13065T-01A-T	Wire diameter 0.3mm ² AWG22
P3(40PIN)	IMSA-13065B-2-40Y 900	IMSA-13065S-2-40Y 500	IPS-13065T-01A-T	Wire diameter 0.3mm ² AWG22
P4(40PIN)	IMSA-13065B-2-40Y 900	IMSA-13065S-2-40Y 500	IPS-13065T-01A-T	Wire diameter 0.3mm ² AWG22
P5(40PIN)	IMSA-13065B-2-40Y 900	IMSA-13065S-2-40Y 500	IPS-13065T-01A-T	Wire diameter 0.3mm ² AWG22

No.	Board Model	Cable Model	Pin Model	Remark
P6(40PIN)	IMSA-13065B-2-40Y 900	IMSA-13065S-2-40Y 500	IPS-13065T-01A-T	Wire diameter 0.3mm ² AWG22

Table 11 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 HBMU300-64.
7	CANL	
8	ID IN	ID auto-coding input, which is connected to ID output of HBCU300 or the last HBMU300-64.
4	NC	It must be hung in the air.

Table 12 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 HBMU300-64.
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 input of the next HBMU300-64.
6	DI1	Aux. input port, connecting to low electric level signal (GND connected for active)
14	PWM	PWM output, high electric level 5V, low electric level 0V (reserved function).
7	GND	Common terminal negative.
15	DO1	Active output port, continuous current 1A, max. current 5A@1s.
Others	NC	It must be hung in the air.

Table 13 P3 Terminal Function Description

Pin No. (P3)	Definition	Description
1	T1	Temp. sampling of No.1 battery.
21	T2	Temp. sampling of No.2 battery.
2	T3	Temp. sampling of No.3 battery.
22	T4	Temp. sampling of No.4 battery.
3	GND1	Common terminal 1 of temp. sampling negative
23	GND1	

Pin No. (P3)	Definition	Description
4	T5	Temp. sampling of No.5 battery.
24	T6	Temp. sampling of No.6 battery.
5	T7	Temp. sampling of No.7 battery.
25	T8	Temp. sampling of No.8 battery.
6	T9	Temp. sampling of No.9 battery.
26	T10	Temp. sampling of No.10 battery.
7	T11	Temp. sampling of No.11 battery.
27	T12	Temp. sampling of No.12 battery.
8	GND1	Common terminal 1 of temp. sampling negative
28	GND1	
9	T13	Temp. sampling of No.13 battery.
29	T14	Temp. sampling of No.14 battery.
10	T15	Temp. sampling of No.15 battery.
30	T16	Temp. sampling of No.16 battery.
11	PT1	Temp. sampling of high-voltage connector negative
31	BV1-	Total power negative input of sampling unit 1
12	B1-	No.1 battery negative
32	B1	No.2 battery negative
13	B2	No.3 battery negative
33	B3	No.4 battery negative
14	B4	No.5 battery negative
34	B5	No.6 battery negative
15	B6	No.7 battery negative
35	B7	No.8 battery negative
16	B8	No.9 battery negative
36	B9	No.10 battery negative
17	B10	No.11 battery negative
37	B11	No.12 battery negative
18	B12	No.13 battery negative
38	B13	No.14 battery negative
19	B14	No.15 battery negative
39	B15	No.16 battery negative
20	B16	No.17 battery negative
40	BV1+	Total power positive input of sampling unit 1

Table 14 P4 Terminal Function Description

Pin No. (P3)	Definition	Description
1	T17	Temp. sampling of No.17 battery.
21	T18	Temp. sampling of No.18 battery.
2	T19	Temp. sampling of No.19 battery.
22	T20	Temp. sampling of No.20 battery.
3	GND2	Common terminal 2 of temp. sampling negative
23	GND2	
4	T21	Temp. sampling of No.21 battery.

Pin No. (P3)	Definition	Description
24	T22	Temp. sampling of No.22 battery.
5	T23	Temp. sampling of No.23 battery.
25	T24	Temp. sampling of No.24 battery.
6	T25	Temp. sampling of No.25 battery.
26	T26	Temp. sampling of No.26 battery.
7	T27	Temp. sampling of No.27 battery.
27	T28	Temp. sampling of No.28 battery.
8	GND2	Common terminal 2 of temp. sampling negative
28	GND2	
9	T29	Temp. sampling of No.29 battery.
29	T30	Temp. sampling of No.30 battery.
10	T31	Temp. sampling of No.31 battery.
30	T32	Temp. sampling of No.32 battery.
11	PT2	Reserved temp. sampling
31	BV2-	Total power negative input of sampling unit 2
12	B17-	No.17 battery negative
32	B17	No.17 battery positive
13	B18	No.18 battery positive
33	B19	No.19 battery positive
14	B20	No.20 battery positive
34	B21	No.21 battery positive
15	B22	No.22 battery positive
35	B23	No.23 battery positive
16	B24	No.24 battery positive
36	B25	No.25 battery positive
17	B26	No.26 battery positive
37	B27	No.27 battery positive
18	B28	No.28 battery positive
38	B29	No.29 battery positive
19	B30	No.30 battery positive
39	B31	No.31 battery positive
20	B32	No.32 battery positive
40	BV2+	Total power positive input of sampling unit 2

Table 15 P5 Terminal Function Description

Pin No. (P3)	Definition	Description
1	T33	Temp. sampling of No.33 battery.
21	T34	Temp. sampling of No.34 battery.
2	T35	Temp. sampling of No.35 battery.
22	T36	Temp. sampling of No.36 battery.
3	GND3	Common terminal 3 of temp. sampling negative
23	GND3	
4	T37	Temp. sampling of No.37 battery.
24	T38	Temp. sampling of No.38 battery.

Pin No. (P3)	Definition	Description
5	T39	Temp. sampling of No.39 battery.
25	T40	Temp. sampling of No.40 battery.
6	T41	Temp. sampling of No.41 battery.
26	T42	Temp. sampling of No.42 battery.
7	T43	Temp. sampling of No.43 battery.
27	T44	Temp. sampling of No.44 battery.
8	GND3	Common terminal 3 of temp. sampling negative
28	GND3	
9	T45	Temp. sampling of No.45 battery.
29	T46	Temp. sampling of No.46 battery.
10	T47	Temp. sampling of No.47 battery.
30	T48	Temp. sampling of No.48 battery.
11	PT3	Reserved temp. sampling
31	BV3-	Total power negative input of sampling unit 3
12	B33-	No.33 battery negative
32	B33	No.33 battery positive
13	B34	No.34 battery positive
33	B35	No.35 battery positive
14	B36	No.36 battery positive
34	B37	No.37 battery positive
15	B38	No.38 battery positive
35	B39	No.39 battery positive
16	B40	No.40 battery positive
36	B41	No.41 battery positive
17	B42	No.42 battery positive
37	B43	No.43 battery positive
18	B44	No.44 battery positive
38	B45	No.45 battery positive
19	B46	No.46 battery positive
39	B47	No.47 battery positive
20	B48	No.48 battery positive
40	BV3+	Total power positive input of sampling unit 3

Table 16 P6 Terminal Function Description

Pin No. (P3)	Definition	Description
1	T49	Temp. sampling of No.49 battery.
21	T50	Temp. sampling of No.50 battery.
2	T51	Temp. sampling of No.51 battery.
22	T52	Temp. sampling of No.52 battery.
3	GND4	Common terminal 4 of temp. sampling negative
23	GND4	
4	T53	Temp. sampling of No.53 battery.
24	T54	Temp. sampling of No.54 battery.
5	T55	Temp. sampling of No.55 battery.

Pin No. (P3)	Definition	Description
25	T56	Temp. sampling of No.56 battery.
6	T57	Temp. sampling of No.57 battery.
26	T58	Temp. sampling of No.58 battery.
7	T59	Temp. sampling of No.59 battery.
27	T60	Temp. sampling of No.60 battery.
8	GND4	Common terminal 4 of temp. sampling negative
28	GND4	
9	T61	Temp. sampling of No.61 battery.
29	T62	Temp. sampling of No.62 battery.
10	T63	Temp. sampling of No.63 battery.
30	T64	Temp. sampling of No.64 battery.
11	PT4	Temp. sampling of high-voltage connector positive
31	BV4-	Total power negative input of sampling unit 4
12	B49-	No.49 battery negative
32	B49	No.49 battery positive
13	B50	No.50 battery positive
33	B51	No.51 battery positive
14	B52	No.52 battery positive
34	B53	No.53 battery positive
15	B54	No.54 battery positive
35	B55	No.55 battery positive
16	B56	No.56 battery positive
36	B57	No.57 battery positive
17	B58	No.58 battery positive
37	B59	No.59 battery positive
18	B60	No.60 battery positive
38	B61	No.61 battery positive
19	B62	No.62 battery positive
39	B63	No.63 battery positive
20	B64	No.64 battery positive
40	BV4+	Total power positive input of sampling unit 4

5 CASE DIMENSIONS AND PANEL CUTOUT

Unit: mm

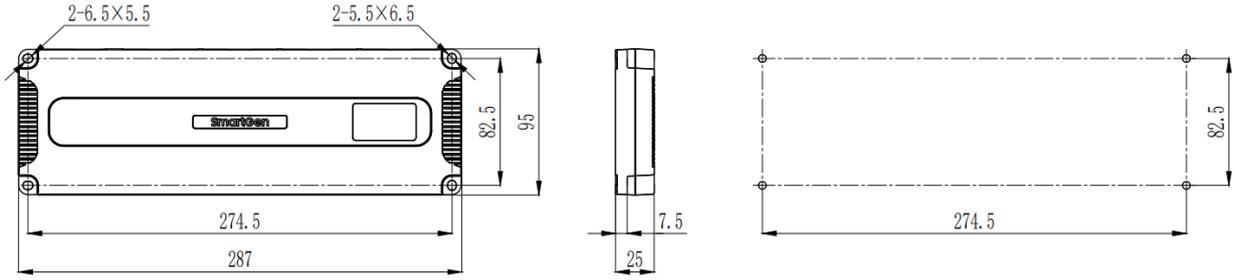


Fig.2 Case Dimensions and Panel Cutout

6 TYPICAL APPLICATION DIAGRAM

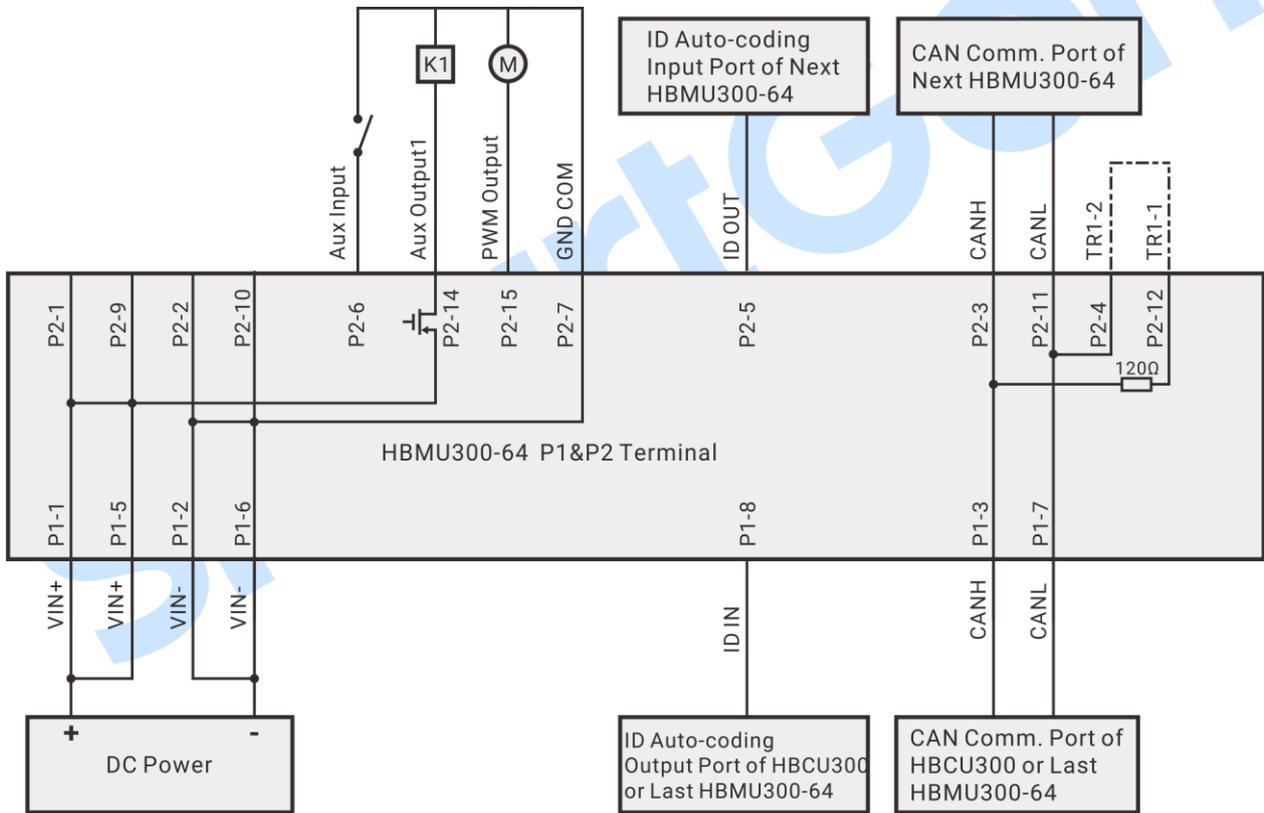


Fig.3 Terminal P1, P2 Application Diagram

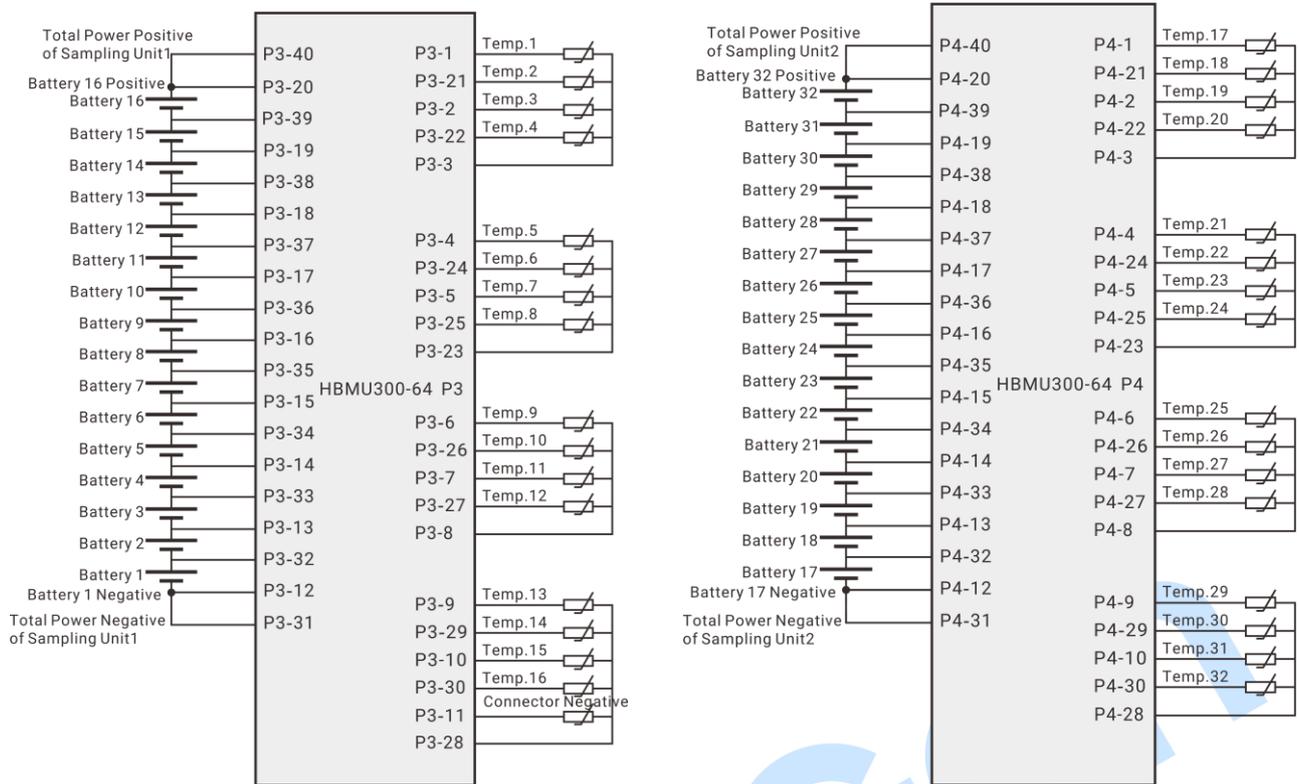


Fig.4 64-String Application Diagram of Terminal P3, P4

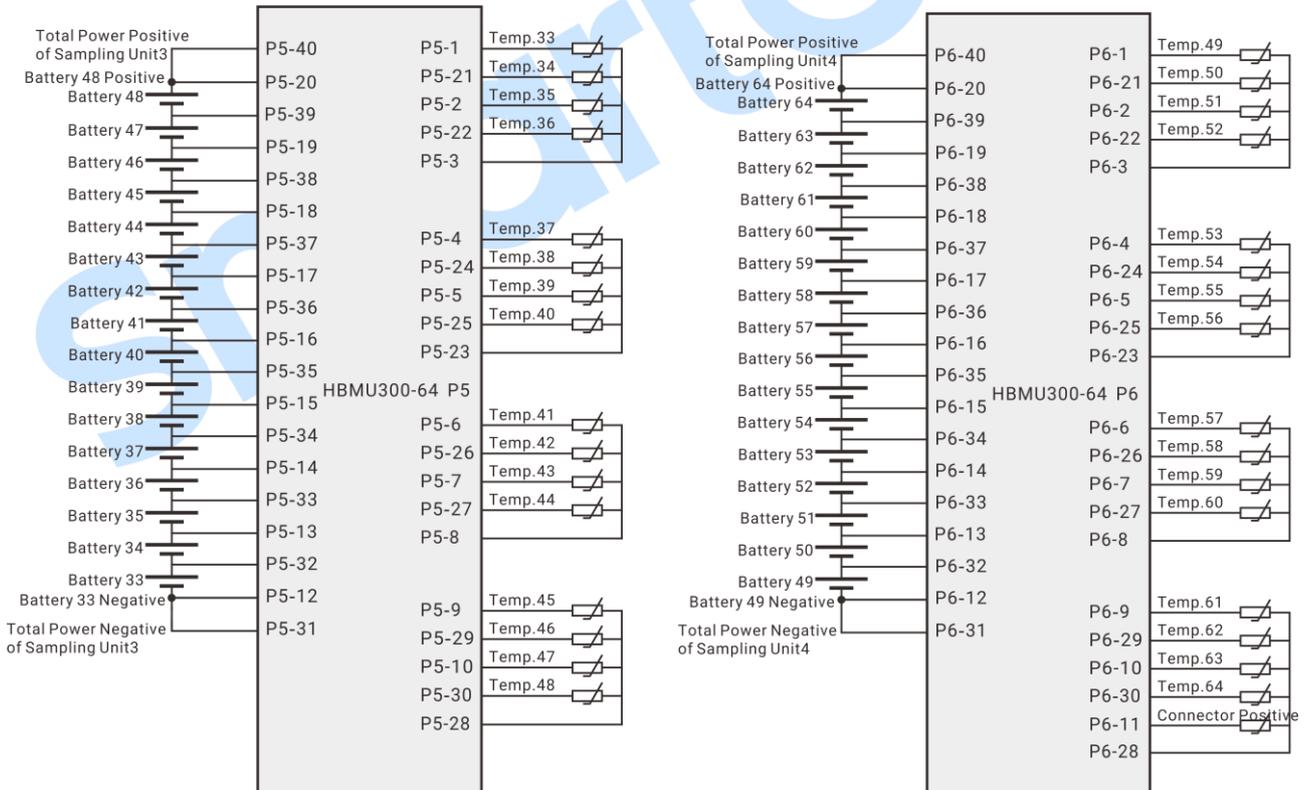


Fig.5 64-String Application Diagram of Terminal P5, P6

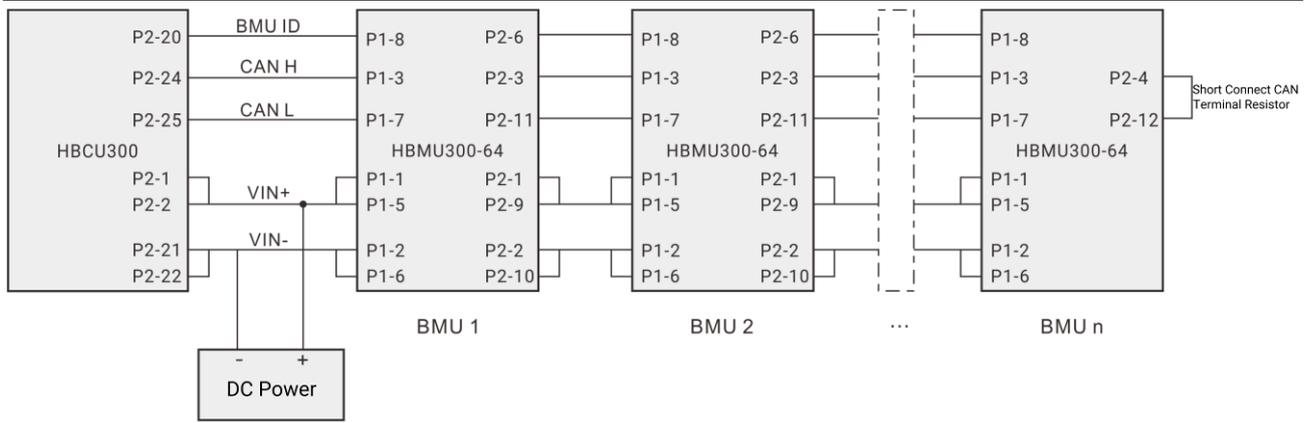


Fig.6 Communication Application Diagram Between HBCU300 and HBMU300-64

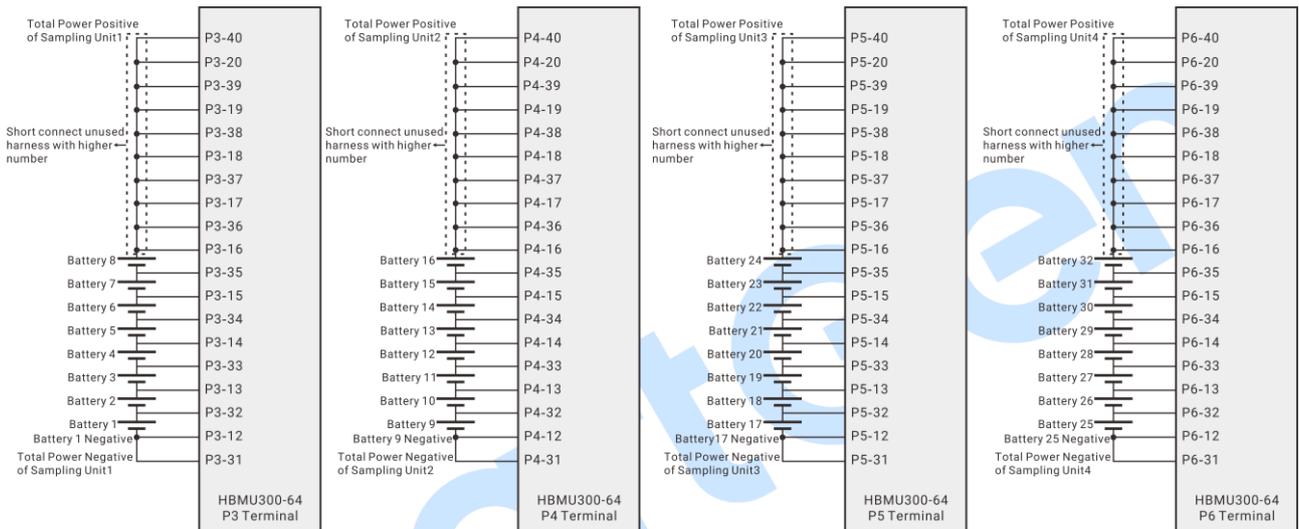


Fig.7 32-String Battery Voltage Sampling Line Connection Diagram

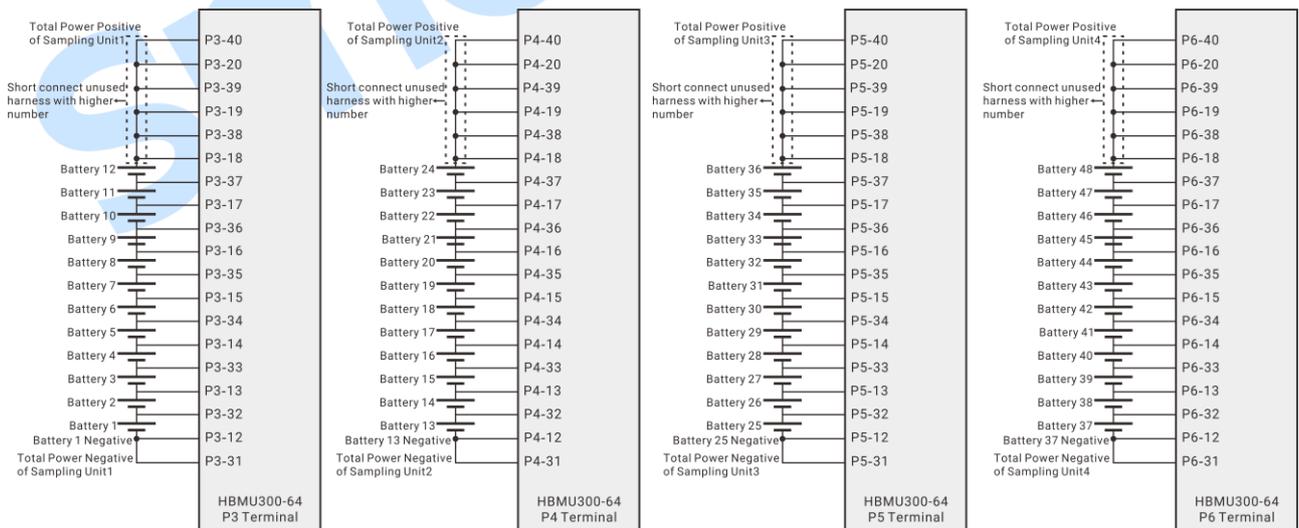


Fig.8 48-String Battery Voltage Sampling Line Connection Diagram

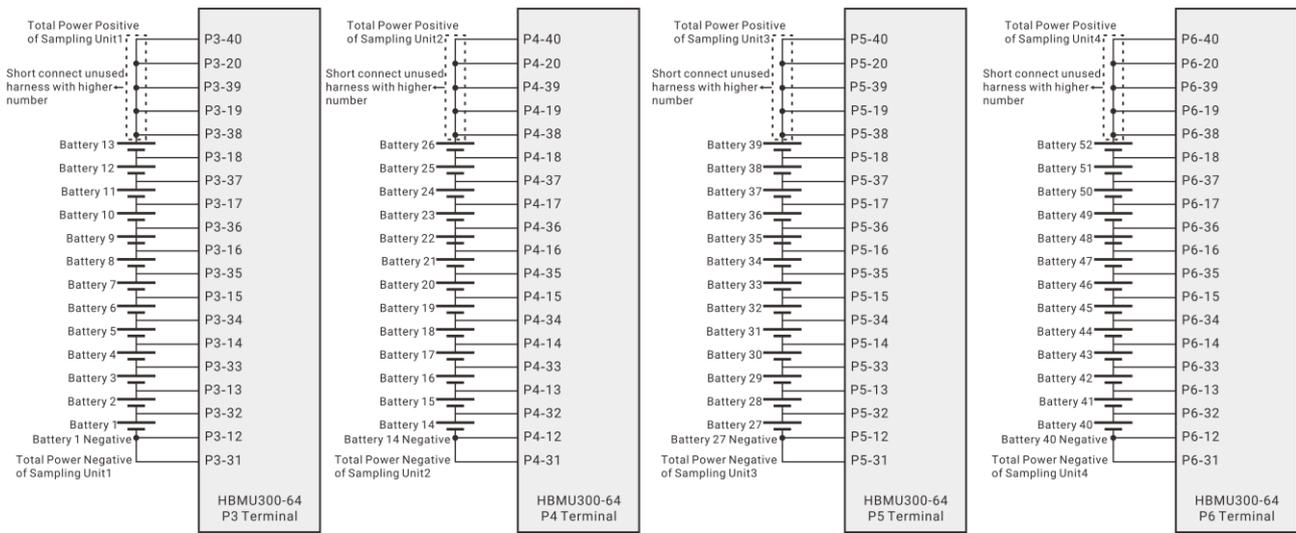


Fig.9 52-String Battery Voltage Sampling Line Connection Diagram

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 of the cell 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 17 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 wires are reversely connected; A 120Ω resistor is recommended to connect between CANH and CANL.
Battery volt. & temp data abnormal	Check the wirings; Check whether the connector is tightly inserted.

Table 18 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 4)
Pin	IPS-13065T-01A-T (One set with 184)

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