

The Communication Protocol Between 48V-15S/16S Lithium Battery Module and Inverter (CAN)

1 Documentation

Documentation purpose:

1. Technology exchange.
2. File archives

Glossary:

BMS: battery management system

2 Communication norm

The communication rate is 100kbps; the communication protocol of the data link layer mainly refers to the relevant provisions of CAN2.0B.

2.1 CAN Identification

The 29-bit identifier of the CAN extended frame is used and defined in detail. The following is the allocation table of the 29-bit identifier.

Frame ID (Bit28-0)					
Priority	Transmission direction	Reserve	Data set No.	Reserve	BMS address
P	DIR	MA	PDU	MA	BMA
Bit 28~26	Bit 25	Bit 24	Bit 23~12	Bit11-6	Bit5-0

Priority P: From the highest 0 to the lowest 7, in this standard, the priority is set to 6, and the unused priority is reserved.

Transmission direction DIR: 0: BMS receive.

1: BMS send.

Reserved bit R: this standard is fixed to 0

Data group number PDU: PGN has a total of 12 bits

	PDU group No.	PGN frame No.
Tag No.	Bit 12~4	Bit 3-0
Bits in CANID	Bit 23~16	Bit 15~12

A frame number of 0 indicates that the entire set of data is queried.

BMS address: The address of the BMS device (that is, the address set by the DIP switch).

2.2 Data field

The data length of each frame is fixed to 8 bytes. If the length of the data group is less than 8 bytes, the subsequent data will be aligned with 0s.

2.3 Communication process

For all communication frames, no ACK acknowledgement is required.

The data query request is the same as the data frame ID (except for the transmission direction bit).

After receiving the data query request, reply according to the data format.

3 Message grouping

No.	Receive	Send	PGN	Frame name	Remark
1	Inquire	Data	12xH	Basic information of battery module	/
2	Inquire	Data	14xH	Battery module real-time data	/
3	Inquire	Data	16xH	Detailed data of battery module	/

Remark:

Unless otherwise specified, multi-byte data is sent first low byte, then high byte.

4 Message format

4.1 Basic information of battery module

PDU.B	Length	Definition
121H.1	1	Battery cell type 1: LFP
121H.2	1	Battery cell packing, 1: soft case; 2: hard case
121H.3	1	Number of parallel cells of battery module
121H.4	1	The number of battery cells in series
121H.5	2	Battery rated voltage (mV)
121H.7	2	Rated capacity of battery cell (AH)
122H.1	2	Battery module rated voltage (0.1V)
122H.3	2	Rated capacity of battery module (AH)
128H.1	4	Name of software, ASCII
128H.5	1	Software major version number
128H.6	1	Software minor version number
128H.7	2	Software upgrade serial number
129H.1	8	Production Serial Number <should not be used>

4.2 Basic data of battery module

PDU.B	Length	Definition
141.1.1	2digits	BMMU running state 0: Initialization 1. Normal working mode
141.1.3	2digits	BMS charging tube closing status 0-indeterminate, 2-opening 3-closed
141.1.5	2digits	BMS discharge tube closing status 0-indeterminate, 2-opening 3-closed
/	/	/
141.5.5	2digits	Single battery overvoltage alarm: <00> no alarm, <01> Level 1, <02> Level 2, <03> Level 3
141.5.7	2digits	Single cell under-battery voltage alarm: <00> No alarm, <01> Level 1, <02> Level 2, <03> Level 3
141.6.1	2digits	Cell high temperature alarm: <00> No alarm, <01> Level 1, <02> Level 2, <03> Level 3

141.6.3	2digits	Cell low temperature alarm: <00> No alarm, <01> Level 1, <02> Level 2, <03> Level 3
141.6.5	2digits	Module charging overcurrent alarm: <00> no alarm, <01> Level 1, <02> Level 2, <03> Level 3
141.6.7	2digits	Module discharge overcurrent alarm: <00> no alarm, <01> Level 1, <02> Level 2, <03> Level 3
/	/	/
142.1	2	Total voltage of battery module (0.1V)
142.3	2	Total current of battery module (0.1A)
142.5	2	Maximum battery voltage (mV)
142.7	2	Minimum battery voltage (mV)
143.1	1	Highest battery voltage serial number
143.2	1	Minimum battery voltage serial number
143.3	1	SOC
143.4	1	SOH
143.5	2	Cycles
143.7	1	Reserve
143.8	1	Reserve

4.3 Detailed data of battery module

PDU.B	Length	Definition
161.1	2	1# Cell voltage (mV)
161.3	2	2# Cell voltage (mV)
161.5	2	3# Cell voltage (mV)
161.7	2	4# Cell voltage (mV)
162.1	2	5# Cell voltage (mV)
162.3	2	6# Cell voltage (mV)
162.5	2	7# Cell voltage (mV)
162.7	2	8# Cell voltage (mV)
163.1	2	9# Cell voltage (mV)

163.3	2	10# Cell voltage (mV)
163.5	2	11# Cell voltage (mV)
163.7	2	12# Cell voltage (mV)
164.1	2	13# Cell voltage (mV)
164.3	2	14# Cell voltage (mV)
164.5	2	15# Cell voltage (mV)
164.7	2	16# Cell voltage (mV)
168.1	1	1# temp. (°C), Signed number (BMS heatsink temperature)
168.2	1	2# temp. (°C), Signed number (cell temperature)
168.3	1	3# temp. (°C), Signed number (cell temperature)
168.4	1	4# temp. (°C), Signed number (cell temperature)
168.5	1	5# temp. (°C), Signed number (cell temperature)
169	8	Reserve
16A	8	Reserve
16B	8	Reserve
16C	8	Reserve