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# **CAN communication protocol for LP battery management system**

## **金锂鹏BMS管理系统CAN通讯协议**

## 1. Purpose

This document is designed for the software engineers using the CAN battery management systems of LP.

## 2. CAN bus specification

### 2.1 CAN bus

The battery support CAN bus communication which conforms to ISO11898-1 specifications at baud rate of 500 kbps. It may broadcast state parameters of the battery on the bus.

### 2.2 Message format

BMS broadcasts the operating conditions and fault conditions using the following IDs. All the IDs will be sent every 1 second. And the Pack and NTC number ID(0x200) will be send once every 5 seconds. It will send the version information when the corresponding command received.

CAN ID	Function	Send period	Remark
0x200	Pack and NTC number	5 second	Table2
0x201	Cell voltage 1-4	1 second	Table3
0x202	Cell voltage 5-8	1 second	Table4
0x203	Cell voltage 9-12	1 second	Table5
0x204	Cell voltage 13-16	1 second	Table6
0x205	Cell voltage 17-20	1 second	Table7
0x209	NTC temperatures	1 second	Table8
0x20A	Pack data	1 second	Table9
0x20B	Pack information	1 second	Table10
0x2f0	Version information	On demand	Table 11, note2

Table1 - CAN ID information summary

Byte0	Pack Number	Default 1
Byte1	NTC Number	Total NTC number
Byte2	0	
Byte3	0	
Byte4	0	
Byte5	0	
Byte6	0	
Byte7	0	

Table2 - 0x200 CAN frame data format

Byte0	High byte of Cell Voltage-1	Unit mV
Byte1	Low byte of Cell Voltage-1	

Byte2	High byte of Cell Voltage-2	Unit mV
Byte3	Low byte of Cell Voltage-2	
Byte4	High byte of Cell Voltage-3	Unit mV
Byte5	Low byte of Cell Voltage-3	
Byte6	High byte of Cell Voltage-4	Unit mV
Byte7	Low byte of Cell Voltage-4	

Table3 - 0x201 CAN frame data format

Byte0	High byte of Cell Voltage-5	Unit mV
Byte1	Low byte of Cell Voltage-5	
Byte2	High byte of Cell Voltage-6	Unit mV
Byte3	Low byte of Cell Voltage-6	
Byte4	High byte of Cell Voltage-7	Unit mV
Byte5	Low byte of Cell Voltage-7	
Byte6	High byte of Cell Voltage-8	Unit mV
Byte7	Low byte of Cell Voltage-8	

Table4 - 0x202 CAN frame data format

Byte0	High byte of Cell Voltage-9	Unit mV
Byte1	Low byte of Cell Voltage-9	
Byte2	High byte of Cell Voltage-10	Unit mV
Byte3	Low byte of Cell Voltage-10	
Byte4	High byte of Cell Voltage-11	Unit mV
Byte5	Low byte of Cell Voltage-11	
Byte6	High byte of Cell Voltage-12	Unit mV
Byte7	Low byte of Cell Voltage-12	

Table5 - 0x203 CAN frame data format

Byte0	High byte of Cell Voltage-13	Unit mV
Byte1	Low byte of Cell Voltage-13	
Byte2	High byte of Cell Voltage-14	Unit mV
Byte3	Low byte of Cell Voltage-14	
Byte4	High byte of Cell Voltage-15	Unit mV
Byte5	Low byte of Cell Voltage-15	
Byte6	High byte of Cell Voltage-16	Unit mV

Byte7	Low byte of Cell Voltage-16	
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Table6 - 0x204 CAN frame data format

Byte0	Low byte of Cell Voltage-17	Unit mV
Byte1	High byte of Cell Voltage-17	
Byte2	Low byte of Cell Voltage-18	Unit mV
Byte3	High byte of Cell Voltage-18	
Byte4	Low byte of Cell Voltage-19	Unit mV
Byte5	High byte of Cell Voltage-19	
Byte6	Low byte of Cell Voltage-20	Unit mV
Byte7	High byte of Cell Voltage-20	

Table7 - 0x205 CAN frame data format

Byte0	NTC temperature[0]	Send Val = Real Temp(degree C) + Offset Offset = 40. Unit = degree C.
Byte1	NTC temperature[1]	
Byte2	NTC temperature[2]	
Byte3	NTC temperature[3]	
Byte4	NTC temperature[4]	
Byte5	NTC temperature[5]	
Byte6	NTC temperature[6]	
Byte7	NTC temperature[7]	

Table8 - 0x209 CAN frame data format

Byte0	High byte of Current	Send Val = Real Current(A) ÷ Accuracy + Offset Accuracy = 0.125, Offset = 8000, Discharging is positive
Byte1	Low byte of Current	
Byte2	High byte of Voltage	Send Val = Real Voltage(V) ÷ Accuracy Accuracy = 0.125
Byte3	Low byte of Voltage	
Byte4	High byte of Remaining Capacity	Unit mAH
Byte5	Low byte of Remaining Capacity	
Byte6	High byte of FCC	Unit mAH
Byte7	Low byte of FCC	

Table9 - 0x20A CAN frame data format

Byte0	High byte of Cycle Count	
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Byte1	Low byte of Cycle Count	
Byte2	Relative Stage Of Charge	
Byte3	0	
Byte4	High byte of Battery Pack Status	See Note1 for detail
Byte5	Low byte of Battery Pack Status	
Byte6		
Byte7		

Table10 - 0x20B CAN frame data format

Byte0	'V'	Hardware version in ASCII format
Byte1	'1'	
Byte2	'.'	
Byte3	'4'	
Byte4	'V'	Firmware version in ASCII format
Byte5	'2'	
Byte6	'.'	
Byte7	'3'	

Table11- 0x2f0 CAN frame data format

Note1:

Bit definition of battery pack status, the corresponding bit will be set if the fault occurs.

Bit0: Charge over temperature

Bit1: Charge Under Temperature

Bit2: Discharge over temperature

Bit3: Discharge Under Temperature

Bit4: Open wire

Bit5: reserved

Bit6: Pack Over Voltage

Bit7: reserved

Bit8: Cell Over Voltage

Bit9: Pack Under Voltage

Bit10: Cell Under Voltage

Bit11: Charge Over Current

Bit12: Discharge Over Current

Bit13: Short Circuit



Bit14: reserved

Bit15: reserved

Note2:

The version ID will be sent when a remote frame is received, which means a read operation.



#### Document History

2016-05-09	Initial	V1.0	Charlie Yang
2016-08-10	Change 0x20B	V1.1	Charlie Yang