



# BMS-CAN Protocol V2.1

## 1. Historical changes

Version		Remark
V2.0	Description Compared with the V1 version, various data commonly used by Jikong BMS have been added. And it is compatible with version V1.0.	
V2.1	Remove the reception of the charger information frame (0x18FF50E5)	

## 2. Overview

This protocol specifies the communication protocol between BMS and other nodes in the vehicle CAN network.

## 3. Physical interface

The physical interface adopts the CAN2.0A/B standard. The communication baud rate is 250kbps.

## 4. Data Agreement

For multi-byte data in this protocol data transmission, unless otherwise specified, the low byte is in front and the high byte is in the back (little end). The default ID address of the Jikong BMS CAN frame is F4.



When multiple BMS are used at the same time, set the device address (default is 0) through the Jikong BMS APP to change the CAN frame ID sent by the BMS. CAN frame ID + device address = sent Frame ID; for example: CAN frame ID is 0x02F4, device address is 2,  $0x02f4+2 = 0x02F6$ , the frame ID sent by BMS is 0x02f6.

5. Parameter group number

The parameter group codes are assigned as follows:

Serial Number	Name Frame Format ID	describe			sender	Receiver	Message cycle
1	BATT_ST1 Battery status	information 1 Standard frame 0x02F4			BMS		20ms
3	CELL_VOLT Cell voltage	standard frame 0x04F4			BMS		100ms
4	CELL_TEMP Cell temperature	standard frame 0x05F4			BMS		500ms
6	ALM_INFO alarm information	standard frame 0x07F4			BMS		100ms
2	BATT_ST2 Battery status	information 2 Extended frame 0x18F128F4	BMS				100ms
5	ALL_TEMP All cell temperatures	extended frame 0x18F228F4	BMS				500ms
7	BMSERR_INFO BMS fault	information extended frame 0x18F328F4	BMS				100ms
8	BMS_INFO	BMS information extended frame 0x18F428F4	BMS				500ms
9	BMSSwSta	BMS switch status extended frame 0x18F528F4	BMS				500ms
10	CELLVOL Battery cell voltage	extended frame 0x18E028F4	BMS				1000ms
11	BMSChg_INFO BMS charging request	extended frame 0x1806E5F4	BMS			peripherals	500ms
12	Ctrl_INFO control information	extended frame 0x18F0F428	peripherals			BMS	



6. Message Definition

6.1 Battery Status 1 (BATT\_ST) ID: 0x02F4

Serial number	parameter	Start Bit	Bit Length	Range	Resolution	Offset	Unit	Remarks
1	BattVolt	0	16	0~1000	0.1	0	V	Total battery voltage
2	BattCurr 3	16	16	-400~1000	0.1	0~1	A	total battery pack current
	SOC 4	32	8			1	%	The remaining capacity
Retention								

0x02F4 13 01 D7 11 33 XX XX XX

express:

13 01 Voltage 27.5V

D7 11 Current 56.7A (accuracy: 0.1A) (charging is positive, discharging is negative)

33 SOC 51%

6.2 Cell voltage (CELL\_VOLT) ID: 0x04F4

This message defines the cell voltage information. The specific format is as follows:

Serial number	parameter	Start Bit	Bit Length	Range	Resolution	Offset	Unit	Remarks
1	MaxCellVolt	0	16	0~5000		1	mV	Maximum single cell voltage
2	MaxCvNO	16	8	1~250		1		Highest single position
3	MinCellVolt	24	16	0~5000		1	mV	Minimum cell voltage
4	MinCvNO	40	8	1~250		1		Highest single position



Example: 0x04F4 8c 0a 05 92 09 08 XX XX

express:

8c 0a Maximum single cell voltage 2700mV

05 corresponds to monomer number 5

92 09 Minimum single cell voltage 2450mV

08 corresponds to monomer number 8

### 6.3 Cell temperature (CELL\_TEMP) ID: 0x05F4

This message defines the battery cell temperature information. The specific format is as follows:

Serial number		Start Bit	Bit Length	Range	Resolution	Offset	Unit	Remarks
1	parameter	0	8		8		-50~200	1
2	MaxCellTemp	8	8		8		1~250	1
3	MaxCtNO	16	8		8		-50~200 1~250	1
4	MinCellTemp	24	8		8		-50~200	1
5	MinCtNO AvgCellTemp	32	8		8			1

0x05F4 48 06 2F 01 3F XX XX XX

express:

48 Maximum battery cell temperature 22

06 corresponds to monomer number 6

2F Minimum battery cell temperature -3

01 corresponds to monomer number 1

3F average battery cell 13



6.4 Fault Information (ALM\_INFO) ID: 0x07F4

The alarm information is sent in an event-triggered manner. When there is an alarm, the BMS sends the message periodically. If there is no alarm information, it will not be sent. When multiple alarms occur at the same time, the instrument

The interface will display the alarm number in a loop, and up to 4 alarm numbers can be displayed in a loop. The alarm number display is based on the order in which the warning occurs. The specific format is as follows:

Alarm number parameters	Single	Start bit length range			Resolution Offset Unit Notes			
1	overvoltage	0	2	0~3	1	0		Alarm level
2	Single	2	2	0~3	1	0		
3	undervoltage Reserved							
4	reserve							
5	Single cell voltage difference is too large 8		2	0~3	1	0		
6	Discharge overcurrent	10	2	0~3	1	0		
7	Charge overcurrent	12	2	0~3	1	0		
8	Temperature is too	14	2	0~3	1	0		
9	high Temperature is	16	2	0~3	1	0		
10	too low Reserve							
11	SOC too low to	20	2	0~3	1	0		
12	retain							
13	reserve							
14	reserve							
15	Internal communication failure 28		2	0~3	1	0		

Alarm level: 0 is no alarm, 1 is severe alarm, 2 is important alarm, 3 is general alarm

yy0x07F4 03 00 20 00 XX XX XX XX

express:

1st byte 43 binary: 0000 0011 3rd byte 20: 0010 0000



11 Single cell overpressure, level 3 alarm

10 SOC too low, level 2 warning

6.5 Battery Status 2 (BATT\_ST) ID: 0x18F128F4

Sequence number	parameter	Start Bit	Bit Length	Range	Resolution	Offset	Unit	Remarks
1	CapRemain	0	16	0~1000	0.1	0	AH	remaining capacity
2	FulChargeCap	16	16	0~1000	0.1	0	AH	actual battery capacity
3	CycleCap	32	16	0~1000	0.1	0	AH	cycle total capacity
4	CycleCount	48	16	0~1000	1	0		Battery cycle number

Example: 0x18F128F4 2C 01 90 01 E8 03 00 64

express:

2C 01 Remaining capacity 30Ah

90 01 Actual battery capacity 40Ah

E8 03 Total cycle capacity 100Ah

64 00 Battery cycle number 100 times

6.6 Battery cell temperature (ALL\_TEMP) ID: 0x18F228F4

This message defines all the temperature information on the battery cell. The format is as follows:

Sequence number	parameter	Start Bit	Bit Length	Range	Resolution	Offset	Unit	Remarks
1	TempMaskCode	0	8					0: Not supported 1: Supported bit0: battery cell temperature 1 bit1: battery cell temperature 2 bit2: battery cell temperature 3



								bit3: battery cell temperature 4 bit4: battery cell temperature 5
2	CellTemp1		8	-50~200	1	-50 ħ Cell temperature 1		
3	CellTemp2	8	8	-50~200	1	-50 ħ Cell temperature 2		
4	CellTemp3	16 24	8	-50~200	1	-50 ħ Cell temperature 3		
5	CellTemp4	32	8	-50~200	1	-50 ħ Cell temperature 4		
6	CellTemp5	40	8	-50~200	1	-50 ħ Cell temperature 5		

Note: When the temperature is **FF** , it means that the temperature sensor does not exist; the cell temperature **3** and **the MOS** temperature of **the BMS** are the same, except that **the BMS** of the relay version indicates the cell temperature.  
Both indicate the temperature of **the MOS** inside **the BMS** .

Example: 0x18F228F4 07 48 47 50 FF FF XX XX  
express:

07 means that temperature 1, temperature 2, and temperature 3 are available, but temperature 4 and temperature 5 are not supported.  
48 Temperature 1 22ħ  
47 Temperature 2 21ħ  
50 Temperature 3 30ħ  
FF Temperature 4 does not exist  
FF Temperature 5 does not exist

6.7 Fault Information (BMSERR\_INFO) ID: 0x18F328F4

This message defines all the faults inside the BMS. The specific format is as follows:



Alarm number	parameter 1	Start bit	length	range	Resolution	Offset	Notes
Line resistance is too large	0	1	0~1	1	0	1: Fault 0: Normal	
temperature MOS over quantity does not match	2 4	1	0~1	1	0		
Current sensor abnormality	3 5	1	0~1	1	0		
Cell over voltage	4 6	1	0~1	1	0		
Battery total voltage over voltage	5 7	1	0~1	1	0		
Charging over current	6 8	1	0~1	1	0		
Charging short circuit	7 9	1	0~1	1	0		
Charging temperature is too high	8 10	1	0~1	1	0		
Charging temperature is too low	9	1	0~1	1	0		
		1	0~1	1	0		
		1	0~1	1	0		
	BMS internal communication abnormality	10 11 12	0~1	1	0		
Single cell undervoltage	10 11 12	1	0~1	1	0		
Battery total voltage undervoltage	11 13	1	0~1	1	0		
Discharge overcurrent	13	1	0~1	1	0		
Discharge short circuit protection	14 16	1	0~1	1	0		
Discharge temperature is too high	15 17	1	0~1	1	0		
Charging MOS fault	16 18	1	0~1	1	0		
Discharging MOS fault	17	1	0~1	1	0		

0x18F328F4 02 30 01 XX XX XX XX XX

express:

02 MOS overheating

30 Single cell undervoltage Battery total voltage undervoltage

01 Discharge temperature is too high





6.8 BMS information (BMS\_INFO) ID: 0x18F428F4

Sequence number	parameter	Start Bit	Bit Length	Range	Resolution	Offset	Unit	Remarks
1	BMSRunTime	0	32			1	0	BMS operating time
2	HeatCur	32	16	0~5000		1	0	S mA Heating current
3	SOH	48	8	0~100		1	0	% Battery Health

Example: 0x18F428F4 C8 00 00 00 28 0A 64 XX

express:

C8 00 00 00 BMS running time 200S

28 0A Heating current 2.6A

64 Battery health 100%

6.9 Switch status (BmsSwSta) ID: 0x18F528F4

MOS switch status, BMS actively sends the protection board control switch status to the outside in a cycle of 500ms.

Sequence number	parameter	Start Bit	Bit Length	Range	Resolution	Offset	Unit	Remarks
1	ChgMosSta	0	1	0~1				Charging MOS state 0: open 1: closed
2	DchgMosSta	1	1	0~1				Discharge MOS state 0: open 1: closed
3	BalanSta	2	1	0~1				Balance status, 0: not balanced 1: balancing
4	HeatSta	3	1	0~1				Heating MOS state, 0: open 1: closed
5	ChgDevPlugSta	4	1	0~1				Charger status, 0: Not plugged in 1: Plugged in
6	ACCSta	5	1	0~1				ACC status, 0: closed 1: open



ÿÿ0x018F528F4 3D XX XX XX XX XX XX XX

3D binary 0011 1101 means charging MOS is closed, discharging MOS is open, equalizing heating MOS is closed, charger is plugged in ACC is open

## 7.0 Cell voltage (CellVol) ID: 0x18E028F4~0x18E628F4

Reports the voltage of all battery cells. The frame ID range is 0x18E028F4~0x18E628F4. Each frame only represents 4 cell voltages, and the insufficient ones are padded with 00. Currently supports up to 25  
The voltage of the string monomers, the frame ID number changes with the number of monomers. For example, if there are 12 strings of monomers, the frame ID is 0x18E028F4~0x18E228F4, and if there are 17 strings of monomers, the frame ID is 0x18E028F4~0x18E428F4, the last frame has only one single voltage, and the rest are padded with 00. The format is as follows:

CAN frame ID: 0x18E028F4

Sequence number	parameter	Start bit length range			Resolution	Offset	Unit	Notes
1	Single cell voltage 1	0	16	0~10000	1	0	mV	Cell voltage
2	Single cell voltage 2	16	16	0~10000	1	0	mV	Cell voltage
3	Single cell voltage 3	32	16	0~10000	1	0	mV	Cell voltage
4	Single cell voltage 4	48	16	0~10000	1	0	mV	Cell voltage

example:

0x18E028F4 AD 0E AB 0E A3 0E A6 0E

AD 0E 1st string voltage: 3757mV

AB 0E 2nd string voltage: 3755mV

A3 0E 3rd string voltage: 3747mV

A6 0E 4th string voltage: 3750mV



CAN frame ID: 0x18E128F4

Sequence number	parameter	Start bit length range			Resolution	Offset	Unit	Notes
1	Single cell voltage 5	0	16	0~10000	1	0	mV	Cell voltage
2	Single cell voltage 6	16	16	0~10000	1	0	mV	Cell voltage
3	Single cell voltage 7	32	16	0~10000	1	0	mV	Cell voltage
4	Single cell voltage 8	48	16	0~10000	1	0	mV	Cell voltage

example:

0x18E128F4 AC 0E AC 0E A4 0E A7 0E  
AC 0E 5th string voltage: 3756mV  
AC 0E 6th string voltage: 3756mV  
A4 0E 7th string voltage: 3748mV  
A7 0E 8th string voltage: 3751mV

CAN frame ID: 0x18E228F4

Sequence number	parameter	Start bit length range			Resolution	Offset	Unit	Notes
1	Single cell voltage	0	16	0~10000	1	0	mV	Cell voltage
2	9 Single cell voltage	16	16	0~10000	1	0	mV	Cell voltage
3	10 Single cell voltage 11	32	16	0~10000	1	0	mV	Cell voltage
4	Single cell voltage 12	48	16	0~10000	1	0	mV	Cell voltage

example:

0x18E228F4 AD 0E AB 0E A3 0E A6 0E  
AD 0E No. 09 string voltage: 3757mV  
AB 0E 10th string voltage: 3755mV  
A3 0E 11th string voltage: 3747mV  
A6 0E 12th string voltage: 3750mV



CAN frame ID: 0x0x18E328F4

Sequence number	parameter	Start bit length range			Resolution	Offset	Unit	Notes
1	Single cell voltage 13	0	16	0~10000	1	0	mV	Cell voltage
2	Single cell voltage 14	16	16	0~10000	1	0	mV	Cell voltage
3	Single cell voltage 15	32	16	0~10000	1	0	mV	Cell voltage
4	Single cell voltage 16	48	16	0~10000	1	0	mV	Cell voltage

example:

0x18E328F4 AC 0E AC 0E A4 0E A7 0E  
AC 0E 13th string voltage: 3756mV  
AC 0E 14th string voltage: 3756mV  
A4 0E 15th string voltage: 3748mV  
A7 0E 16th string voltage: 3751mV

CAN frame ID: 0x18E428F4

Sequence number	parameter	Start bit length range			Resolution	Offset	Unit	Notes
1	Single cell voltage 17	0	16	0~10000	1	0	mV	Cell voltage
2	Single cell voltage 18	16	16	0~10000	1	0	mV	Cell voltage
3	Single cell voltage 19	32	16	0~10000	1	0	mV	Cell voltage
4	Single cell voltage 20	48	16	0~10000	1	0	mV	Cell voltage

example:

0x0x18E428F4 AC 0E AC 0E A4 0E A7 0E  
AC 0E 17th string voltage: 3756mV  
AC 0E 18th string voltage: 3756mV  
A4 0E 19th string voltage: 3748mV  
A7 0E 20th string voltage: 3751mV



CAN frame ID: 0x18E528F4

Sequence number	parameter	Start bit length range			Resolution	Offset	Unit	Notes
1	Single cell voltage 21	0	16	0~10000	1	0	mV	Cell voltage
2	Single cell voltage 22	16	16	0~10000	1	0	mV	Cell voltage
3	Single cell voltage 23	32	16	0~10000	1	0	mV	Cell voltage
4	Single cell voltage 24	48	16	0~10000	1	0	mV	Cell voltage

example:

0x18E528F4 AC 0E AC 0E A4 0E A7 0E  
AC 0E 21st string voltage: 3756mV  
AC 0E 22nd string voltage: 3756mV  
A4 0E 23rd string voltage: 3748mV  
A7 0E 24th string voltage: 3751mV

CAN frame ID: 0x18E628F4

Sequence number	parameter	Start bit length range			Resolution	Offset	Unit	Notes
1	Single cell voltage 25	0	16	0~10000	1	0	mV	Cell voltage
2								
3								
4								

example:

0x18E628F4 AC 0E XX XX XX XX XX XX  
AC 0E 25th string voltage: 3756mV



### 7.1 Control Information (Ctrl\_INFO) ID: 0x18F0F428

The charge and discharge switch information is information sent by the peripheral device. It is the peripheral device that sends instructions to the BMS to achieve the purpose of configuring the BMS parameters.

Serial number	parameter	Start bit length	range	0 8	Resolution	Offset	Unit	Notes
1	MaskCode							1: Allow control 0: Disable control bit0: charging control bit1: discharge control bit2: balance control
2	ChgSw	8	8	0~1				Charging switch, 0: off 1: on
3	DchgSw	16	8	0~1				Discharge switch, 0: off 1: on
24	0x18F0F428 05 01 01 XX XX XX XX		8	0~1				Balance switch, 0: off 1: on

05 Binary 0000 0101 Allow charging control Disable discharging control Allow balancing control

01 Turn on the charging switch

01 Discharge switch control is invalid

01 Turn on the equalizer switch

### 7.2 Charging request (BMSChgINFO) ID: 0x1806E5F4

Charging information is sent in an event-triggered manner. When the charger is plugged in or receives a message (0x18FF50E5) from the charger, the BMS sends charging information at a cycle of 500ms.

If the appliance is not plugged in, it will not be sent. Note: In this frame communication process, the data uses the big endian format, as follows:

Sequence number	parameter	Start bit length	range	Resolution	Offset	Unit	Notes
1	ChgVol	0	16	0~2000	0.1	0	V Charging voltage
2	ChgCur	16	16	0~2000	0.1	0	A Charging current



3	ChgDevSw	32	8	0~1				Charger switch, 0: on 1: off
4	ChgAndHeat	40	8	0~1				Charging and heating mode, 0: charging 1: heating hot

Example: 0x1806E5F4 03 48 00 C8 00 00 XX XX

03 48 Charging voltage 84V

00 C8 Charging current 20A

00 Charger on

00 Charging mode