BMS Protocol for RS485 1.1

1. Summary

This agreement is applicable to read and write operations of BCU(battery control unit).

2. Communication Parameters

Baud Rate：9600(Default, Subject to the BMS Specification)

Parity Bit：No

Data Bits：8

Stop Bit：1

Timeout: 100 ms

Interval time of the frame: > 50ms

3. CRC parity

CRC parity range is the check of all bytes before CRC field. It uses 16 bit CRC parity.

4. Read and write function table

4.1 Read registers

Send by the master EMS

Slave Address	Function Code	Starting Address(Hi)	Starting Address(Lo)	Num of register (Hi)	Num of register (Lo)	CRC (Lo)	CRC (Hi)
0x01-0x10	0x03	0x0000-0xFFFF		0x0001-0x007D		-	-

Response by slave (BMS)

Slave Address	Function Code	Byte Count	Data 1 (Hi)	Data 1 (Lo)	…	Data n (Hi)	Data n (Lo)	CRC (Lo)	CRC (Hi)
0x01-0x10	0x03	2*(Num of register)	…	…	…	…	…	-	-

4.2 Write registers

Send by the master EMS

Slave Address	Function Code	Starting Address(Hi)	Starting Address(Lo)	Num of register (Hi)	Num of register (Lo)	Byte Count
0x01-0x10	0x10	0x0000-0xFFFF		0x0001-0x007D		2*(Num of register)
Data1 (Hi)	Data1 (Lo)	…	Data n (Hi)	Data n (Lo)	CRC (Lo)	CRC (Hi)
…	…	…	…	..	-	-

Response by slave (Write success)

Slave Address	Function Code	Starting Address(Hi)	Starting Address(Lo)	Num of register (Hi)	Num of register (Lo)	CRC (Lo)	CRC (Hi)
0x01-0x10	0x10	0x0000-0xFFFF		0x0001-0x007D		-	-

4.3 Error Code

Response by slave (BMS)

Slave Address	Function Code	Error Code	CRC (Lo)	CRC (Hi)
0x01-0x10	Cmd + 0x80	…	-	-

Error Code

Error Code	Name	Remark
1	Illegal function code	Function that does not exist
2	Illegal function address	Register address that does not exist
3	Illegal data operation	Its operation is not allowed
4	CRC	CRC error

5. Data Information

5.1 Data table

Address	Content	Length	RW/Date Type	Unit	Remark
0000	Max temperature box num	2byte	R/UINT16		
0001	Max temperature	2byte	R/INT16	1℃	
0002	Min temperature box num	2byte	R/UINT16		
0003	Min temperature	2byte	R/INT16	1℃	
0004	SOC	2byte	R/UINT16	1%	

0005	SOH	2byte	R/UINT16	1%	
0006	BAT Total voltage	2byte	R/UINT16	0.1V	
0007	BAT Total Current	2byte	R/INT16	0.1A	Charge or Discharge current
0008	Charge Max current	2byte	R/UINT16	0.1A	
0009	Discharge Max current	2byte	R/UINT16	0.1A	
0010	Max voltage box num	2byte	R/UINT16		
0011	Max voltage cell num	2byte	R/UINT16		
0012	Cell Max voltage	2byte	R/UINT16	1mV	
0013	Min voltage box num	2byte	R/UINT16		
0014	Min voltage cell num	2byte	R/UINT16		
0015	Cell Min voltage	2byte	R/UINT16	1mV	
0016	Battery status	2byte	R/UINT16		0:wait;1:nocharge and nodischarge; 2:nocharge; 3:nodischarge; 4:charging;5discharging
0017	System Status	2byte	R/UINT16		See System status
0018	Warning1 flag	2byte	R/UINT16		See Warning1/2 flag
0019	Warning2 flag	2byte	R/UINT16		See Warning1/2 flag
0020	Protection flag	2byte	R/UINT16		See Protection flag
0021	Cell Mean voltage	2byte	R/UINT16	1mV	
0022	Cell Full charger voltage	2byte	R/UINT16	1mV	
0023	Cell Full discharger voltage	2byte	R/UINT16	1mV	
0024	Design capacity	2byte	R/UINT16	0.1AH	
0025	Full capacity	2byte	R/UINT16	0.1AH	
0026	Remain capacity	2byte	R/UINT16	0.1AH	
0027	Battery cycle counts	2byte	R/UINT16		
0028	Relay control	2byte	R/UINT16		0:close 1:open
0029	Total cell number	2byte	R/UINT16		
0030	Total cabinet number	2byte	R/UINT16		
0031	Max temperature group num	2byte	R/UINT16		
0032	Min temperature	2byte	R/UINT16		

	group num				
0033	Max voltage group num	2byte	R/UINT16		
0034	Min voltage group num	2byte	R/UINT16		
0035~0049	Reserved	30byte			
0050~0049+ n	Cell voltage	(2*n) byte	R/UINT16	1mV	n= Total cell number

Remark: Each register stores two bytes.

System status

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
System readying	Charge finished	Discharge finished	First alarm status	Second alarm status	Third fault status	Reserved	Reserved

Warning1 / Warning2 flag

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
Temperature high	Temperature low	Temperature different max	Total voltage high	Total voltage low	Cell voltage high	Cell voltage low	Cell voltage different max
Bit8	**Bit9**	**Bit10**	**Bit11**	**Bit12**	**Bit13**	**Bit14**	**Bit15**
Charge current Max	Discharge current Max	SOC high	SOC low	Insulation warning	Reserved	Reserved	Reserved

Protection flag

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
Temperature high	Temperature low	Temperature different max	Total voltage high	Total voltage low	Cell voltage high	Cell voltage low	Cell voltage different max
Bit8	**Bit9**	**Bit10**	**Bit11**	**Bit12**	**Bit13**	**Bit14**	**Bit15**
Charge current Max	Discharge current Max	Charge short circuit current	Discharge short circuit current	Cell open circuit	Data acquisition failure	Master-slave board communication failure	Master Communication fault

Description:

1) Logic 1 means the event is true; logic 0 means the event is false;

2) The greater the fault level, the more serious the fault (level 3).