

Lithium Iron Battery BMS

Modbus Protocol V1.7



1. Update records

version	Updated	update content	Author	Review
V1.0	2019.02.05	First draft release	Gao Yi	Huang Chengcheng
V1.1	2019.02.13	Add comments to the content of each line Gao Yi Huang Che		
V1.2	2019.06.28	Added:	Huang Chengch	eng Huang Feng
		1) Address 61440: ACP-Broadcast		
		2) Address 61441: ACP-Configure		
		3) Address 61442: ACP-Shake		
V1.3	2019.08.22	The broadcast address is changed from 00H to FFH	Huang Chengch	eng Huang Feng
		The default address F7H remains unchanged		
V1.4	2019.08.22	Added: Huang Chengcheng Hua		eng Huang Feng
		1) Address 5224: Lock Control		
		2) Address 5225: Test Ready		
V1.5	2019.08.23	Which registers are marked with symbols Huang Chengcheng Huang		eng Huang Feng
		2. Address change:		
		1) 5122~5129: Battery name		
		(It turned out to be 5122-5127)		
		2) 5130~5131: Software Version		
		(It turned out to be 5128-5129)		
		3) 5132~5141: Manufacturer Name		



		(It turned out to be 5122-5127)		
V1.6	2019.11.21	1. Add the definition of register 5107 (status2) bit0 ~ bit7	Huang Chengch	eng Huang Feng
		2. Increase bit0, bit4, bit5 of register 5106 (status1)		
		Definition, modify the definition of bit9 and bit10		
		Correct the unit of register 5050 and mark the type of register 5052 as signed		
V1.7	2020.3.10	Added: 5226~5227 addresses are defined as unique identification codes	Chen Jialu	Huang Feng
		New: 5228 address is defined as charging power setting		
		New: 5229 address is defined as the discharge power setting		



2. Pin definition:

	1	NC (idle, other functions are not allowed)
BIAE / Z YZ kór CZ	2	A (RS485 bus signal)
RJ45通讯接口	3	B (RS485 bus signal)
ARRESES	4	GND (power ground/communication ground)
	⑤	12V-
	6	O/F
	7	O/F (12V+) 200mA load capacity
	8	NC
	Descrip	otion: RS485 initial baud rate 9600bps
	① NO	(idle, other functions are not allowed)
RJ45通讯接口	② NO	(idle, other functions are not allowed)
	3 NC	(idle, other functions are not allowed)
	④ GN	D (power ground/communication ground)
	⑤ CA	l cascade auxiliary signal
	6 C	AN-H (CAN bus signal)
	⑦ CA	N cascade auxiliary signal
	8 C	AN-L (CAN bus signal)
	Descrip	otion: CAN initial baud rate 500Kbps



3. Agreement definition:

1. Format:

Start character	address code	function code	starting address	Data length	CRC check	Terminator
Start Criaracter	(1BYTE) (1BYTE) (2BYTE) (2BYTE)	(2BYTE)			reminator

2. Description

1) Start character: >10ms

2) Address code: 1 byte, range: 01H ~ F7H (decimal 1 ~ 247), 00H is the broadcast address, all slaves respond, but do not return commands

3) Function code: 1 byte

Command name	Access data type	function code	Error code
Read single or multiple word registers	WORD	03H	83H
Write a single word register	WORD	06H	86H
Write consecutive N word registers	WORD	10H	90H
Restore factory default	No byte access	78H	F8H
Clear history	No byte access	79H	F9H

4) Starting address: 2 bytes5) Data length: 2 bytes

6) CRC check: 2 bytes, CRC checksum of each byte of address code, function code and data

7) Terminator: >10ms

note:

- 1) The data address and data are 2 bytes, Send high byte first, then low byte; while CRC is to send low bit first, then high bit .
- 2) The error code means that there is an error in the frame data sent by the server, and the abnormal response function code returned by the client: error code = function code | 80H
- 3) Exception code description
 - a, 01H-unsupported function code
 - b, 02H-PDU start address is incorrect or PDU start address + data length is out of the legal range c, 03H-read

register data or write register data is too long

- d, 04H The client fails to read or write registers
- e, 05H The data check code sent by the server is incorrect

3. Examples:

1) Read the register

request:

description	Number of byte	es command
Device address	BYTE	01H ~ F7H
function code	BYTE	03H
starting address	WORD	0000H ~ FFFFH
Number of words rea	d WORD	0001H ~ 007DH
Check code	WORD	CRC checksum of all the above bytes

Normal response:

description Number of bytes	command
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Device address	BYTE	01H ~ F7H
function code	BYTE	03H
Data length	BYTE	01H ~ FAH
Data content	WORD	Read data (high bit first, then low bit)
	WORD	Read data (high bit first, then low bit)
Check code	WORD	CRC checksum of all the above bytes

Abnormal response:

description	Number of byte	es command
Device address	BYTE	01H ~ F7H
Error code	BYTE	83H
Exception code	BYTE	N (N=1, 2, 3, 4)
Check code	WORD	CRC checksum of all the above bytes

2) Write a single register

request:

description	Number of byte	es command
Device address	BYTE	01H ~ F7H
function code	BYTE	06H
starting address	WORD	0000H ~ FFFFH
data input	WORD	0000H ~ FFFFH
Check code	WORD	CRC checksum of all the above bytes

Normal response:

description	Number of byte	es command
Device address	BYTE	01H ~ F7H
function code	BYTE	06H
starting address	WORD	0000H ~ FFFFH
data input	WORD	0000H ~ FFFFH
Check code	WORD	CRC checksum of all the above bytes

Abnormal response:

description	Number of byte	es command
Device address	BYTE	01H ~ F7H
Error code	BYTE	86H
Exception code	BYTE	N (N=1, 2, 3, 4)
Check code	WORD	CRC checksum of all the above bytes

3) Write consecutive N registers

request:

description	Number of byt	s command				
Device address	BYTE	01H ~ F7H				



function code	BYTE	10H		
starting address	WORD	0000H ~ FFFFH		
Write bytes	WORD	0001H ~ 007DH		
Number of words	Number of words BYTE 1 times the number of bytes			
Data content	WORD	Data written (high bit first, then low bit)		
	WORD	Data written (high bit first, then low bit)		
Check code	WORD	CRC checksum of all the above bytes		

Normal response:

description	Number of byt	es command
Device address	BYTE	01H ~ F7H
function code	BYTE	10H
starting address	WORD	0000H ~ FFFFH
Write bytes	WORD	0001H ~ 007DH
Check code	WORD	CRC checksum of all the above bytes

Abnormal response:

description	Number of byte	es command
Device address	BYTE	01H ~ F7H
Error code	BYTE	90H
Exception code	BYTE	N (N=1, 2, 3, 4)
Check code	WORD	CRC checksum of all the above bytes

4) Restore the factory default

request:

description	Number of byt	es command
Device address	BYTE	01H ~ F7H
function code	BYTE	78H
Supplement data	WORD	0000Н
Supplement data	WORD	0001H
Check code	WORD	CRC checksum of all the above bytes

Normal response:

description	Number of byt	es command
Device address	BYTE	01H ~ F7H
function code	BYTE	78H
Supplement data	WORD	0000Н
Supplement data WORD 0		0001H
Check code	WORD	CRC checksum of all the above bytes

Abnormal response:

description Number of bytes	command
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Device address	BYTE	01H ~ F7H
Error code	BYTE	F8H
Exception code	BYTE	N (N=1, 2, 3, 4)
Check code	WORD	CRC checksum of all the above bytes

5) Clear history

request:

description	Number of byt	es command
Device address	BYTE	01H ~ F7H
function code	BYTE	79H
Supplement data	WORD	0000Н
Supplement data	WORD	0001Н
Check code	WORD	CRC checksum of all the above bytes

Normal response:

description	Number of byt	es command
Device address	BYTE	01H ~ F7H
function code	BYTE	79H
Supplement data	WORD	0000Н
Supplement data WORD		0001Н
Check code	WORD	CRC checksum of all the above bytes

Abnormal response:

description	Number of byte	es command
Device address	BYTE	01H ~ F7H
Error code	BYTE	F9H
Exception code	BYTE	N (N=1, 2, 3, 4)
Check code	WORD	CRC checksum of all the above bytes



Four, PDU address allocation table

PDU		reading	unit	description	Class	s data	Parsing	return	Analysis example
address	Festi	val /			type			Back to	
(Decimal)		write						number	
								accordin	-
5000	2	R	Integer	Number of Cell:M					M: max 16
5001	2	R	0.1V	Cell 1 voltage					
5002	2	R	0.1V	Cell 2 voltage					
5003	2	R	0.1V	Cell 3 voltage					
5004	2	R	0.1V	Cell 4 voltage					
5005	2	R	0.1V	Cell 5 voltage					
5006	2	R	0.1V	Cell 6 voltage					
5007	2	R	0.1V	Cell 7 voltage					
5008	2	R	0.1V	Cell 8 voltage					
5009	2	R	0.1V	Cell 9 voltage					
5010	2	R	0.1V	Cell 10 voltage					
5011	2	R	0.1V	Cell 11 voltage					
5012	2	R	0.1V	Cell 12 voltage					
5013	2	R	0.1V	Cell 13 voltage					
5014	2	R	0.1V	Cell 14 voltage					
5015	2	R	0.1V	Cell 15 voltage					
5016	2	R	0.1V	Cell 16 voltage					
5017	2	R	Integer	Number					max 16
				of CellTemperature: N					
5018	2	R	0.1 °C	Temperature of cell 1					
5019	2	R	0.1 °C	Temperature of cell 2					
5020	2	R	0.1 °C	Temperature of cell 3					
5021	2	R	0.1 °C	Temperature of cell 4					
5022	2	R	0.1 °C	Temperature of cell 5					
5023	2	R	0.1 °C	Temperature of cell 6					
5024	2	R	0.1 °C	Temperature of cell 7					
5025	2	R	0.1 °C	Temperature of cell 8					
5026	2	R	0.1 °C	Temperature of cell 9					
5027	2	R	0.1 °C	Temperature of cell 10					
5028	2	R	0.1 °C	Temperature of cell 11					
5029	2	R	0.1 °C	Temperature of cell 12					
5030	2	R	0.1 °C	Temperature of cell 13					
5031	2	R	0.1 °C	Temperature of cell 14					
5032	2	R	0.1 °C	Temperature of cell 15					
	2	R							
5033 5034	2	R R	0.1 °C	Temperature of cell 16 Reserve					



	1				Ι					
5035	2	R	0.1 °C	Temperature of BMS						
				board						
5036	2	R	Integer	Number of Environment						Max: 2
				Temperature						
5037	2	R	0.1 °C	Environment						
				Temperature 1						
5038	2	R	0.1 °C	Environment						
				Temperature 2						
5039	2	R	Integer	Number of Heater						Max 2
				Temperature						
5040	2	R	0.1 °C	Heater Temperature 1						
5041	2	R	0.1 °C	Heater Temperature 2						
5042	2	R	0.01A	Current	Have					
					symb	ol				
					numb	er				
5043	2	R	0.1V	Module voltage						
5044~	4		0.001A	Remain capacity						
5045		R	н							
5046~	4		0.001A	Module total capacity						
5047		R	Н							
5048	2	R	Integer	Cycle number						
5049	2	R	0.1V	Charge voltage limit						
5050	2	R	0.1V	Discharge voltage limit						
5051	2	R	0.01A	Charge current limit						
5052	2	R	0.01A	Discharge current limit	Have					
					symb	ol				
					numb	er				
5053~	9			Reserve						
5099	4	R								
5100~	4			Cell voltage Alarminfo		Bit31	Cell	16	00: normal	
5101						Bit30	voltage		01: below lower	
						Bit29	Cell	15	limit (act as	
						Bit28	voltage	10	protection)	
						Bit27	Cell	14	10: above higher	
						Bit26	voltage	14	limit (act as	
		ь				Bit25	Cell	13	protection)	
		R					1	13	11: other alarm	
						Bit24	voltage	46		
						Bit23	Cell	12		
						Bit22	voltage			
						Bit21	Cell	11		
						Bit20	voltage			
						Bit19	Cell	10		



			-		1		
				Bit18	voltage		
				Bit17	Cell 9		
				Bit16	voltage		
				Bit15	Cell 8		
				Bit14	voltage		
				Bit13	Cell 7		
				Bit12	voltage		
				Bit11	Cell 6		
				Bit10	voltage		
				Bit9	Cell 5		
				Bit8	voltage		
				Bit7	Cell 4		
				Bit6	voltage		
				Bit5	Cell 3		
				Bit4	voltage		
				Bit3	Cell 2		
				Bit2	voltage		
				Bit1	Cell 1		
				Bit0	voltage		
5102~	4		Cell Temperature	Bit31	i i i i i i i i i i i i i i i i i i i	00: normal	
5103	-		Alarminfo	Bito i	Temperat	01: below lower	
0.00			, adminio	Bit30	ure of cell	limit (act as	
				Billoo	16	protection)	
				Bit29		10: above higher	
				Bit20	Temperat	limit (act as	
				Bit28	ure of cell	protection)	
				3.120	15	11: other alarm	
				Bit27			
				DILE?	Temperat		
				Bit26	ure of cell		
				Bit20	14		
		R		Bit25			
				BitZo	Temperat		
				Bit24	ure of cell		
				DILZT	13		
				Bit23	10	-	
				סונבט	Temperat		
				Bit22	ure of cell		
				الدو	12		
				Bit21	14	-	
				ווע ו	Temperat		
				Bit20	ure of cell		
				DILZU			
					11		



	1	1				i		
					Bit19			
						Temperat		
					Bit18	ure of cell		
						10		
					Bit17			
					DICT			
						Temperat		
					Bit16	ure of cell		
						9		
					Bit15			
						Temperat		
					Bit14	ure of cell		
						8		
					Bit13			
					Bicro	Temperat		
					D:: 40			
					Bit12	ure of cell		
						7		
					Bit11			
						Temperat		
					Bit10	ure of cell		
						6		
					Bit9	Temperat		
						ure of cell		
					Bit8	5		
					Bit7	Temperat		
					DILI	†		
					Bit6	ure of cell		
						4		
					Bit5	Temperat		
					Bit4	ure of cell		
					DIL4	3		
					Bit3	Temperat		
						ure of cell		
					Bit2	2		
					Bit1	Temperat		
					БКТ	ure of cell		
					Bit0			
						1		
5104~510	4		Other Alarminfo		Bit31		00: normal	
5						Temperat	01: below lower	
					Bit30	ure of	limit (act as	
					ытзи	BMS	protection)	
		R				board	10: above higher	
					Bit29		limit (act as	
						Environme	protection)	
					Bit28	ntTempera	11: other alarm	
						ncrempera	. i. otiloi alailii	



						44		
					B.:	ture 1		
					Bit27	_		
						Environme		
					Bit26	ntTempera		
						ture 2		
					Bit25	_		
						HeaterTe		
					Bit24	mperature		
					Bitz i	1		
					Bit23			
						HeaterTe		
					Bit22	mperature		
					BILZZ	1		
					Bit21			
						Charge		
					Bit20	current		
					Bit19			
						Discharge		
					Bit18	current		
					Bit17	Reserve		
					Bit16	-		
					Bit15	Reserve		
					Bit14			
					Bit13	Reserve		
					Bit12	Teserve		
						D		
					Bit11	Reserve		
					Bit10			
					Bit9	Reserve		
					Bit8			
					Bit7	Reserve		
					Bit6			
					Bit5	Reserve		
					Bit4			
					Bit3	Reserve		
					Bit2			
					Bit1	Reserve		
					Bit0			
5106	2		Status1			Module	1: Trigger(Protect)	
		R			Bit15	under	0: Normal	
						voltage:		
					1			



					1.07		
					UV		
				Bit14	Charge	1: Trigger(Protect)	
					over temp	0: Normal	
					Charge	1: Trigger(Protect)	
				Bit13	under	0: Normal	
					temp		
				Bit12	Discharge	1: Trigger(Protect)	
					over temp	0: Normal	
					Discharge	1: Trigger(Protect)	
				Bit11	under	0: Normal	
					temp		
					Discharge	1: Trigger(Protect)	
				Bit10	over	0: Normal	
					current1		
					Charge	1: Trigger(Protect)	
				Bit9	over	0: Normal	
					current1		
				D:10	Cell over	1: Trigger(Protect)	
				Bit8	voltage	0: Normal	
					Cell under	1: Trigger(Protect)	
				Bit7	voltage	0: Normal	
					Module	1: Trigger(Protect)	
				Bit6	over	0: Normal	
					voltage		
					Discharge	1: Trigger(Protect)	
				Bit5	over	0: Normal	
					current 2		
					Charge	1: Trigger(Protect)	
				Bit4	over	0: Normal	
					current 2		
					Using	1: Using	
					battery	0: Not	
				Bit3	module		
					power		
					Discharge	1: On	
				Bit2	MOSFET	0: Off	
					Charge	1: On	
				Bit1	MOSFET	0: Off	
					Short	1: Trigger(Protect)	
				Bit0		0: Normal	
E407			OL-1O		circuit		
5107	2		Status2	Ditt	Effective	1: Effective	
		R		Bit15	charge	0: Normal	
					current		



					Effective	1: Effective	
				Bit14	discharge	0: Normal	
					current		
				Bit13	Heater on	1: On	
				ысто		0: Off	
				Bit12	Reserve		
				D::44	Fully	1: Full	
				Bit11	charged	0: Normal	
				Bit10	Reserve		
				Bit9	Reserve		
					Buzzer	1: On	
				Bit8		0: Off	
					Discharge	1: Trigger(Warn)	
				Bit7	high temp	0: Normal	
					Discharge	1: Trigger(Warn)	
				Bit6	low temp	0: Normal	
					Charge	1: Trigger(Warn)	
				Bit5	high temp	0: Normal	
					Charge	1: Trigger(Warn)	
				Bit4	low temp	0: Normal	
					Module	1: Trigger(Warn)	
				Bit3	high	0: Normal	
				ыз	voltage	o. Normai	
					Module	1: Trigger(Warn)	
				Bit2		0: Normal	
				DILZ	low	u: Normai	
					voltage	A. Tris no sellate ma	
				Bit1	Cell high	1: Trigger(Warn)	
					voltage	0: Normal	
				Bit0	Cell low	1: Trigger(Warn)	
	_				voltage	0: Normal	
5108	2	R	Status3	Bit15	Cell	1: Error	
					voltage 16	0: Normal	
				Bit14	Cell	1: Error	
					voltage 15	0: Normal	
				Bit13	Cell	1: Error	
					voltage 14	0: Normal	
				Bit12	Cell	1: Error	
					voltage 13	0: Normal	
				Bit11	Cell	1: Error	
					voltage 12	0: Normal	
				Bit10	Cell	1: Error	
				=•	voltage 11	0: Normal	
				Bit9	Cell	1: Error	



							voltage 10	0: Normal		
							voltage 10			
						Bit8	Cell	1: Error		
							voltage 9	0: Normal		
						Bit7	Cell	1: Error		
							voltage 8	0: Normal		
						Bit6	Cell	1: Error		
							voltage 7	0: Normal		
						Bit5	Cell	1: Error		
						Бію	voltage 6	0: Normal		
						Bit4	Cell	1: Error		
						Dit	voltage 5	0: Normal		
						Bit3	Cell	1: Error		
						סונס	voltage 4	0: Normal		
						D:10	Cell	1: Error		
						Bit2	voltage 3	0: Normal		
							Cell	1: Error		
						Bit1	voltage 2	0: Normal		
							Cell	1: Error		
						Bit0	voltage 1	0: Normal		
5109	2			Charge, discharge status			Charge	1: Yes		
				<i>5</i>		Bit7	enable	0: Request st	go	
								charge		
							Discharge	1: Yes		
						Bit6	enable	0: Request st	go	
								discharge		
							Charge	1: Yes		
						Bit5	immediate	0: Normal		
							ly	o. Normal		
		R					Charge	1: Yes		
						Bit4	immediate	0: Normal		
						Dit4	ly	o. Normai		
							Fullcharge	1: Yes		
						Bit3				
						D:#0	request	0: Normal		
						Bit2	Reserve			
						Bit1	Reserve			
						Bit0	Reserve			
5110~	1	R	ASIC II	SN Number						
5117	6									
5118	2	R	ASIC II	Manufacture version						
5119~	4	R	ASIC II	Main line version						
5120										
5121	2	R	ASIC II	Communication protocol						
0121	_	1	AUIU II	version						



5122~	1							
5129	6	R	ASIC II	Battery name				
5130~								
5131	4	R	ASIC II	Software Version				
5132~	2							
5141	0	R	ASIC II	Manufacturer Name				
	1							
5142~	1	R		Reserve				
5199	6							
5200	2	R	0.1V	Cell over voltage limit				
0200	_	W	0	oon over verage min				
5201	2	R	0.1V	Cell high voltage limit				
0201	_	W	0.10	Och mgm voltage innit				
5202	2	R	0.1V	Cell low voltage limit				
0202	_	W	0.10	Och low voltage minic				
5203	2	R	0.1V	Cell under voltage limit				
0200	_	W	0.10	Och ander voltage mint				
5204	2	R	0.1 °C	Charge over temperature				
0204	_	W	0.1 0	limit				
5205	2	R	0.1 °C	Charge high temperature				
0200	_	W	0.1 0	limit				
5206	2		0.1 °C	Charge low temperature	Have			
0200	_	R	0.1 0	limit	symb			
		W			numb			
5207	2		0.1 °C	Charge under	Have			
	_	R	0	temperature limit	symb			
		W		tomporataro inini	numb			
5208	2	R	0.01A	Charge over2 current limit				
	_	W						
5209	2	R	0.01A	Charge over1 current limit				
		w						
5210	2	R	0.01A	Charge high current limit				
		w						
5211	2	R	0.1V	Module over voltage limit				
		W		, and the second				
5212	2	R	0.1V	Module high voltage limit				
		w						
5213	2	R	0.1V	Module low voltage limit				
		w		-				
5214	2	R	0.1V	Module under voltage				
		w		limit				
5215	2	R	0.1 °C	Discharge over				
·	1	L	_			<u> </u>	L	I



		W		temperature limit				
5216	2		0.1 °C	Discharge high				
5210	2	R W	0.1 C					
5047		VV	0.4.00	temperature limit				
5217	2	R	0.1 °C	Discharge low	Have			
		W		temperature limit	symb			
					numb	er		
5218	2	R	0.1 °C	Discharge under	Have			
		W		temperature limit	symb	pl 		
					numb	er		
5219	2	R	0.01A	Discharge over2 current	Have			
		W		limit	symb	ol		
					numb	er		
5220	2	R	0.01A	Discharge over1 current	Have			
		W		limit	symb	pl		
					numb	er		
5221	2	R	0.01A	Discharge high current	Have			
		W		limit	symb	pl		
		VV			numb	er		
5222	2	R	Integer	Shutdown command			0: Don't care	
		W					1: Shutdown	
5223	2	R	Integer	Device ID			Range: 3~247	
		W						
5224	2		Integer	Lock Control			Lock:0x5a5a	
		W					Unlock:0xa5a5	
5225	2		Integer	Test Ready			Test begin:0x5a5a	
		W					Test over:0xa5a5	
5226~	4	R	Integer	Unique identification			Unique identifier	
5227		W		code			recognize: 0XFFFFFFF	
5228	2	R	%	Charge powe%			Charging power setting	
		W					default 0X64	
5229	2	R	%	Discharge powe%			Discharge power setting	
		W					default 0X64	
5230~	1			Reserve			Reserved	
5299	4	R						
0200	1	W						
	<u> </u>							
61440	2	W	Intoger	ACP-Broadcast		0		
			Integer			U	Danger4 : 254	
61441	2	W	Integer	ACP-Configure			Range:1~254	
61442	2	W	Integer	ACP-Shake			Range:1~254	