

Jikong BMS RS485 Modbus general protocol (V1.1)

Version History			
Date version	number	describe	author
2023.02	V1.0	1. Write communication protocol;	Zhang Peng
2024.01	V1.1	1. Fixed some errors and added some register support	Zhang Peng

Jikong BMS RS485 Modbus general protocol (V1.1)

The Jikong BMS RS485 Modbus general protocol uses a master-slave response method for data communication. The host can only initiate a request through a unique slave address, and the BMS (slave) responds according to the host request, that is, half-duplex communication. This protocol only allows the host to initiate a request and the slave to respond passively, so the slave will not actively occupy the communication line to cause data conflicts.

1. Physical interface

communication The electrical characteristics of the physical

interface are as	UART
follows:	RS485
Communication	115200bps
interface level	
standard Baud	8 1
rate Data bit Stop bit Parity bit	none

2. Protocol Format

Information transmission is asynchronous, using hexadecimal for communication, information frame format:

Address code function	code data area		CRC check 1
byte 1 byte 1 byte 2 bytes			

1) Address

code The address code is the first byte of each communication information frame and supports 1 to 247. The address of each slave on the bus must be unique. Only the slave that matches the address code sent by the host can respond and return data.

2) Function

Code The function code is the second byte of each communication information frame. The host sends and informs the slave device through the function code.

What operation is to be performed. The function code is

defined as follows: Function	
Read	Definition Operation reads data from one or more registers
10H Register 03H Write Register	Data written to one or more registers

3) Data area

The data area varies with the function code and data direction. These data can be different combinations of "register first address + read register number", "register address + operation data", "register first address + operation register number + data length + data", etc. The data area of different function codes is explained in detail in "Function Code Analysis".

3) CRC check

CRC check is used to ensure the correctness and integrity of data transmission.

3. Error feedback

Address and CRC check errors will not receive data feedback from the slave, and other errors will return error codes to the host. The second bit of the data frame plus 0x80 indicates that an error has occurred in the request (illegal function code, illegal data value, etc.). The error data frame is as follows:

address code	function code	Error code area CRC check
The 1-byte	1 byte	1 byte 2 bytes

error code is defined as follows:

value	Function	illustrate
01H	code with illegal name	This function code does not support register operation
02H	Register address error	A register that is prohibited from being accessed by the slave is accessed
03H	Illegal data	The data logic is illegal or exceeds the limit
04H	CRC check error	CRC check error

4. Information Transmission Process

When the communication command is sent from the host to the slave, the slave that matches the address code sent by the host receives the communication command.

If the CRC check is correct, the corresponding operation is executed, and then the execution result (data) is returned to the host. Return information

The address code, function code, executed data and CRC check code are included.

If an error occurs, no information will be returned.

5. Function code analysis

1) Function code 03H: Read register

For example: the host wants to read the data of two holding registers whose slave address is 01H and the starting register address is 05H.

According to the host, it sends:

Host sends		Data (HEX)
address code		01H
function code		03H
Starting register address	High Byte	00H
	Low Byte	05H
Number of registers	High Byte	00H
	Low Byte	02H
CRC Check	Low Byte	D4H
	High Byte	0AH

If the slave holds the data of registers 05H and 06H as 1122H and 3344H, the slave returns:

Slave return data (HEX)		
address code		01H
function code		03H
Number of bytes		04H
Register 05 data	High byte	11am
	low byte	22H
Register 06 data	high byte	33H
	low byte	44H
CRC Check	low byte	4BH
	high byte	C6H

2) Function code 10H: write register

For example: the host wants to save the data 0005H, 2233H to the slave address 01H, the starting register address is

In the 2 registers of 0020H, the host sends:

The host sends		Data (HEX)
the address		01H
code function code		10H
Starting register address	High byte	00H
	low byte	20H
Number of registers	high byte	00H
	low byte	02H
number of bytes		04H
0000H register to be written	written high byte	00H
	Low byte	05H
0001H register to be written	High byte	22H
	Low Byte	33H
CRC check	Low Byte	B9H
	high byte function code	03H

10H operation, slave returns:

Slave returns		Data (HEX)
address code		01H
function code		10H
Starting register address	High Byte	00H
	Low Byte	20H
Number of registers	High Byte	00H
	Low Byte	02H
CRC Check	Low Byte	40H
	High Byte	02H

Register Map								
Starting address	code offset Index	type of data	length	R/W	Content	Unit	Note	
Address Field	HEX DEC	Type	Length					
		0 UINT32	4 RW		Enter sleep voltage VolSmartSleep 0x0000	mV		
0x0004	4	UINT32	4 RW		Cell undervoltage protection VolCellUV	mV		
0x0008	8	UINT32	4 RW		Cell undervoltage protection recovery VolCellUVPR	mV		
0x000C	12	UINT32	4 RW		Cell overcharge protection VolCellIOV	mV		
0x0010	16	UINT32	4 RW		Cell overcharge protection recovery voltage VolCellOVPR	mV		
0x0014	20	UINT32	4 RW		Trigger balanced voltage difference VolBalanTrig	mV		
	24	UINT32	4 RW		SOC-100% voltage VolSOC100% 0x0018	mV		
28	UINT32		4 RW		SOC-0% voltage VolSOC0% 0x001C	mV		
0x0020	32	UINT32	4 RW		Recommended charging voltage VolCellRCV	mV		
0x0024	36	UINT32	4 RW		Float charge voltage VolCellRFV	mV		
0x0028	40	UINT32	4 RW		Automatic shutdown voltage VolSysPwrOff	mV		
0x002C	44	UINT32	4 RW		Continuous charging current CurBatCOC	mA		
0x0030	48	UINT32	4 RW		Charge overcurrent protection delay TIMBatCOCPRDly	s		
0x0034	52	UINT32	4 RW		Charge overcurrent protection release TIMBatCOCPRDly	s		
0x0038	56	UINT32	4 RW		Continuous discharge current CurBatDcOC	mA		
0x003C	60	UINT32	4 RW		Discharge overcurrent protection delay TIMBatDcOCPRDly	s		
0x0040	64	UINT32	4 RW		Discharge overcurrent protection release TIMBatDcOCPRDly	s		
0x0044	68	UINT32	4 RW		Short circuit protection release TIMBatSCPRDly	s		
0x0048	72	UINT32	4 RW		Maximum balancing current CurBalanMax	mA		
TMPBatCOT	0x004C	76 INT32	4 RW		Charging over-temperature protection	0.1ÿ		
0x0050	80	INT32	4 RW		Charge over temperature recovery TMPBatCOTPR	0.1ÿ		
TMPBatDcOT	0x0054	84 INT32	4 RW		Discharge over temperature protection	0.1ÿ		
0x0058	88	INT32	4 RW		Discharge over temperature recovery TMPBatDcOTPR	0.1ÿ		
TMPBatCUT	0x005C	92 INT32	4 RW		Charging low temperature protection	0.1ÿ		
0x0060	96	INT32	4 RW		Charge low temperature recovery TMPBatCUTPR	0.1ÿ		
TMPMosOT	0x0064	100 INT32	4 RW		MOS over temperature protection	0.1ÿ		
0x0068	104	INT32	4 RW		MOS over temperature protection recovery TMPMosOTPR	0.1ÿ		
			4 RW		CellCount 0x006C 108 UINT32	string		
0x0070	112	UINT32	4 RW		Charging switch BatChargeFN		1: On; 0: Off	
0x0074	116	UINT32	4 RW		Discharge switch BatDisChargeFN		1: On; 0: Off	
		120 UINT32	4 RW		BalanEN 0x0078		1: On; 0: Off	

0x1000	0x007C	124	UINT32	4 RW	Battery design capacity CapBatCell	I		
	0x0080	128	UINT32	4 RW	Short circuit protection delay SCPDelay	us		
	0x0084	132	UINT32	4 RW	Balanced start voltage VolStartBalan	mV		
	0x0088	136	UINT32	4 RW	Connection line internal resistance 0CellConWireRes0	uΩ		
	0x008C	140	UINT32	4 RW	Connection line internal resistance 1CellConWireRes1	uΩ		
	0x0090	144	UINT32	4 RW	Connection line internal resistance 2CellConWireRes2	uΩ		
	0x0094	148	UINT32	4 RW	Connection line internal resistance 3CellConWireRes3	uΩ		
	0x0098	152	UINT32	4 RW	Connection line internal resistance 4CellConWireRes4	uΩ		
	0x009C	156	UINT32	4 RW	Connection line internal resistance 5CellConWireRes5	uΩ		
	0x00A0	160	UINT32	4 RW	Connection line internal resistance 6CellConWireRes6	uΩ		
	0x00A4	164	UINT32	4 RW	Connection line internal resistance 7CellConWireRes7	uΩ		
	0x00A8	168	UINT32	4 RW	Connection line internal resistance 8CellConWireRes8	uΩ		
	0x00AC	172	UINT32	4 RW	Connection line internal resistance 9CellConWireRes9	uΩ		
	0x00B0	176	UINT32	4 RW	Connection line internal resistance 10CellConWireRes10	uΩ		
	0x00B4	180	UINT32	4 RW	Connection line internal resistance 11CellConWireRes11	uΩ		
	0x00B8	184	UINT32	4 RW	Connection line internal resistance 12CellConWireRes12	uΩ		
	0x00BC	188	UINT32	4 RW	Connection line internal resistance 13CellConWireRes13	uΩ		
	0x00C0	192	UINT32	4 RW	Connection line internal resistance 14CellConWireRes14	uΩ		
	0x00C4	196	UINT32	4 RW	Connection line internal resistance 15CellConWireRes15	uΩ		
	0x00C8	200	UINT32	4 RW	Connection line internal resistance 16CellConWireRes16	uΩ		
	0x00CC	204	UINT32	4 RW	Connection line internal resistance 17CellConWireRes17	uΩ		
	0x00D0	208	UINT32	4 RW	Connection line internal resistance 18CellConWireRes18	uΩ		
	0x00D4	212	UINT32	4 RW	Connection line internal resistance 19CellConWireRes19	uΩ		
	0x00D8	216	UINT32	4 RW	Connection line internal resistance 20CellConWireRes20	uΩ		
	0x00DC	220	UINT32	4 RW	Connection line internal resistance 21CellConWireRes21	uΩ		
	0x00E0	224	UINT32	4 RW	Connection line internal resistance 22CellConWireRes22	uΩ		
	0x00E4	228	UINT32	4 RW	Connection line internal resistance 23CellConWireRes23	uΩ		
	0x00E8	232	UINT32	4 RW	Connection line internal resistance 24CellConWireRes24	uΩ		
	0x00EC	236	UINT32	4 RW	Connection line internal resistance 25CellConWireRes25	uΩ		
	0x00F0	240	UINT32	4 RW	Connection line internal resistance 26CellConWireRes26	uΩ		
	0x00F4	244	UINT32	4 RW	Connection line internal resistance 27CellConWireRes27	uΩ		
	0x00F8	248	UINT32	4 RW	Connection line internal resistance 28CellConWireRes28	uΩ		
	0x00FC	252	UINT32	4 RW	Connection line internal resistance 29CellConWireRes29	uΩ		
	0x0100	256	UINT32	4 RW	Connection line internal resistance 30CellConWireRes30	uΩ		
	0x0104	260	UINT32	4 RW	Connection line internal resistance 31CellConWireRes31	uΩ		

0x0108	264	UINT32	4	RW	Device address DevAddr	H		
0x010C	268	UINT32	4	RW	Discharge precharge time TIMProdischarge	s		
0x0114	276	UINT16	2	RW	Heating switch HeatEN		1: On; 0: Off	BIT0
				RW	Temperature sensor shield Disable temp-sensor		0: Off; 1: On; 0: Off	BIT1
				RW	GPS Heartbeat			BIT2
				RW	Multiplexing port function Port Switch		1: RS485; 0: CAN 1:	BIT3
				RW	LCD Always On		open; 0: close 1:	BIT4
				RW	Special Charger		open; 0: close 1:	BIT5
				RW	SmartSleep		open; 0: close 1:	BIT6
				RW	Disable parallel current limiting DisablePCLModule		open; 0: close 1:	BIT7
				RW	Data timing storage TimedStoredData		open; 0: close 1:	BIT8
0x0118	280	UINT8	2	RW	Charging Float Mode ChargingFloatMode		open; 0: close 1: open; 0: close	BIT9
		UINT8		RW	Intelligent sleep time TIMSmartSleep	H		
				R	Data field enable control 0			
0x0000	0	UINT16	2	R	CellVol0	mV		
0x0002	2	UINT16	2	R	CellVol1	mV		
0x0004	4	UINT16	2	R	CellVol2	mV		
0x0006	6	UINT16	2	R	CellVol3	mV		
0x0008	8	UINT16	2	R	CellVol4	mV		
0x000A	10	UINT16	2	R	CellVol5	mV		
0x000C	12	UINT16	2	R	CellVol6	mV		
0x000E	14	UINT16	2	R	CellVol7	mV		
0x0010	16	UINT16	2	R	CellVol8	mV		
0x0012	18	UINT16	2	R	CellVol9	mV		
0x0014	20	UINT16	2	R	CellVol10	mV		
0x0016	22	UINT16	2	R	Cell voltage 11CellVol11	mV		
0x0018	24	UINT16	2	R	CellVol12	mV		
0x001A	26	UINT16	2	R	Cell voltage 13CellVol13	mV		
0x001C	28	UINT16	2	R	Cell voltage 14CellVol14	mV		
0x001E	30	UINT16	2	R	CellVol15	mV		
0x0020	32	UINT16	2	R	Cell voltage 16CellVol16	mV		
0x0022	34	UINT16	2	R	Cell voltage 17CellVol17	mV		
0x0024	36	UINT16	2	R	Cell voltage 18CellVol18	mV		
0x0026	38	UINT16	2	R	Cell voltage 19CellVol19	mV		
0x0028	40	UINT16	2	R	CellVol20	mV		

0x002A 42	UINT16	0x002C	2 R	Cell voltage 21CellVol21	mV	
44	UINT16	0x002E 46	2 R	Cell voltage 22CellVol22	mV	
	UINT16	0x0030	2 R	Cell voltage 23CellVol23	mV	
	48	UINT16	2 R	Cell voltage 24CellVol24	mV	
0x0032	50	UINT16	2 R	Cell voltage 25CellVol25	mV	
0x0034	52	UINT16	2 R	CellVol26	mV	
0x0036	54	UINT16	2 R	CellVol27	mV	
0x0038	56	UINT16	2 R	Cell voltage 28CellVol28	mV	
0x003A 58	UINT16	0x003C	2 R	CellVol29	mV	
60	UINT16	0x003E 62	2 R	CellVol30	mV	
	UINT16	0x0040	2 R	Cell voltage 31CellVol31	mV	
	64	UINT32	4 R	Battery status CellSta		BIT[n] is 1, indicating that the battery is present.
0x0044	68	UINT16	2 R	CellVolAve average voltage of a single cell	mV	
0x0046	70	UINT16	2 R	Maximum pressure difference CellVdifMax	mV	
0x0048	72	UINT8	2	R Maximum voltage cell number MaxVolCellNbr		
		UINT8		R Minimum voltage cell number MinVolCellNbr		
0x004A 74	UINT16	0x004C	2 R	Balance line resistance 0CellWireRes0	mΩ	
76	UINT16	0x004E 78	2 R	Balance line resistance 1CellWireRes1	mΩ	
	UINT16	0x0050	2 R	Balance line resistance 2CellWireRes2	mΩ	
	80	UINT16	2 R	Balance line resistance 3CellWireRes3	mΩ	
0x0052	82	UINT16	2 R	Balance line resistance 4CellWireRes4	mΩ	
0x0054	84	UINT16	2 R	Balance line resistance 5CellWireRes5	mΩ	
0x0056	86	UINT16	2 R	Balance line resistance 6CellWireRes6	mΩ	
0x0058	88	UINT16	2 R	Balance line resistance 7CellWireRes7	mΩ	
0x005A 90	UINT16	0x005C	2 R	Balance line resistance 8CellWireRes8	mΩ	
92	UINT16	0x005E 94	2 R	Balance line resistance 9CellWireRes9	mΩ	
	UINT16	0x0060	2 R	Balance line resistance 10CellWireRes10	mΩ	
	96	UINT16	2 R	Balance line resistance 11CellWireRes11	mΩ	
0x0062	98	UINT16	2 R	Balance line resistance 12CellWireRes12	mΩ	
0x0064 100	UINT16	0x0066	2 R	Balance line resistance 13CellWireRes13	mΩ	
	102	UINT16	2 R	Balance line resistance 14CellWireRes14	mΩ	
0x0068	104	UINT16	2 R	Balance line resistance 15CellWireRes15	mΩ	
0x006A 106	UINT16	0x006C	2 R	Balance line resistance 16CellWireRes16	mΩ	
108	UINT16	0x006E 110	2 R	Balance line resistance 17CellWireRes17	mΩ	
	UINT16		2 R	Balance line resistance 18CellWireRes18	mΩ	

0x1200	0x0070 112	UINT16	0x0072	2 R	Balance	line resistance 19CellWireRes19	m Ω		
		114	UINT16	2 R	Balance	line resistance 20CellWireRes20	m Ω		
	0x0074 116	UINT16	0x0076	2 R	Balance	line resistance 21CellWireRes21	m Ω		
		118	UINT16	2 R	Balance	line resistance 22CellWireRes22	m Ω		
	0x0078	120	UINT16	2 R	Balance	line resistance 23CellWireRes23	m Ω		
	0x007A 122	UINT16	0x007C	2 R	Balance	line resistance 24CellWireRes24	m Ω		
	124	UINT16	0x007E 126	2 R	Balance	line resistance 25CellWireRes25	m Ω		
	UINT16 0x0080 128	UINT16		2 R	Balance	line resistance 26CellWireRes26	m Ω		
	0x0082			2 R	Balance	line resistance 27CellWireRes27	m Ω		
		130	UINT16	2 R	Balance	line resistance 28CellWireRes28	m Ω		
	0x0084 132	UINT16	0x0086	2 R	Balance	line resistance 29CellWireRes29	m Ω		
		134	UINT16	2 R	Balance	line resistance 30CellWireRes30	m Ω		
	0x0088	136	UINT16	2 R	Balance	line resistance 31CellWireRes31	m Ω		
	0x008A 138	UINT16	0x008C	2 R	Power board temperature	TempMos	0.1 $^{\circ}$ C		
	140	UINT32	0x0090 144	4 R	Balance	line resistance status CellWireResSta		BIT[n] is 1, indicating that the balance line alarm	
	UINT32 0x0094 148	UINT32		4 R	Total battery voltage	BatVol	mV		
	0x0098			4 R	Battery power	BatWatt	mW		
		152	INT32	4 R	Battery current	BatCurrent	mA		
	0x009C 156	INT16	0x009E	2 R	Battery temperature	TempBat 1	0.1 $^{\circ}$ C		
	158	INT16		2 R	Battery temperature	TempBat 2 Balancing	0.1 $^{\circ}$ C		
	0x00A0 160		UINT32 4		R	line resistance is too large AlarmWireRes		1: Fault; 0: Normal	BIT0
						MOS overtemperature protectionAlarmMosOTP		Fault; 0: Normal	BIT1
						The number of cells does not match the set valueAlarmCellQuantity		1: Fault; 0: Normal	BIT2
						Current sensor abnormalityAlarmCurSensorErr Cell		1: Fault; 0: Normal	BIT3
						overvoltage protectionAlarmCellOVP Battery		1: Fault; 0: Normal	BIT4
						overvoltage protectionAlarmBatOVP Charging		1: Fault; 0: Normal	BIT5
						overcurrent protectionAlarmChOCP Charging		1: Fault; 0: Normal	BIT6
						short circuit protectionAlarmChSCP		1: Fault; 0: Normal	BIT7
						Charging overtemperature		1: Fault; 0: Normal	BIT8
						protectionAlarmChOTP Charging low		1: Fault; 0: Normal	BIT9
						temperature protectionAlarmChUTP Internal communication		1: Fault; 0: Normal	BIT10
						abnormalityAlarmCPUAuxCommuErr Cell		1: Fault; 0: Normal	BIT11
						undervoltage protectionAlarmCellUVP Battery		1: Fault; 0: Normal	BIT12
						undervoltage protectionAlarmBatUVP		1: Fault; 0: Normal	BIT13
						Discharge overcurrent protectionAlarmDchOCP Discharge short circuit protectionAlarmDchSCP		1: Fault; 0: Normal	BIT14

					Discharge over temperature protection		1: Fault; 0: Normal1:	BIT15
					AlarmDchOTP Charging tube abnormality		Fault; 0: Normal1: Fault;	BIT16
					AlarmChargeMOS Discharge tube abnormality		0: Normal1: Fault; 0:	BIT17
					AlarmDischargeMOS GPS disconnected		Normal1: Fault; 0:	BIT18
					GPSDisconnecte d Please modify the authorization		Normal1: Fault; 0:	BIT19
					password in time Modify PWD. in time		Normal1: Fault; 0:	BIT20
					Discharge on Failed Discharge on Failed Battery over		Normal1: Fault; 0: Normal	BIT21
					temperature alarm Battery Over Temp Alar m Temperature			
					sensor anomaly Parallel module failure PLCModule anomaly			
0x00A4 164	INT16		2 R	Balan	Current	mA		
0x00A6	166	UINT8	2	R	Balanced state BalanSta	% 2: discharge; 1: charge; 0: off		
		UINT8			R Remaining power SOCStateOfchar ge			
0x00A8 168	INT32 0	0x00AC	4 R	R	Remaining capacity SOCCa pRemai n	MAH		
172	UINT32	0x00B0 176	4 R	R	Battery actual capacity SOCFullChargeCap	MAH		
UINT32 0x00B4 180	UINT32		4 R	R	Cycle Count	ÿ		
			4 R	R	Total cycle capacity SOCC ycleCap	MAH		
0x00B8	184	UINT8	2	R	SOH Valuation SOCSOH	%		
		UINT8			R Precharge state Precharge		1: On; 0: Off	
0x00BA 186	UINT16	0x00BC	2 R	R	User layer alarm UserAlarm			
188	UINT32		4 R	R	RunTime	s		
0x00C0 192		UINT8	2	R	Charge status		1: On; 0: Off1: On; 0: Off	
		UINT8			R Discharge state Dischar ge			
0x00C2 194	UINT16	0x00C4	2 R	R	User layer alarm 2UserAlarm2			
196	UINT16	0x00C6 198	2 R	R	Discharge overcurrent protection release time TimeDcOCP R	s		
UINT16 0x00C8 200	UINT16		2 R	R	Discharge short circuit protection release time TimeDcSCP R	s		
0x00CA 202	UINT16	0x00CC	2 R	R	Charge overcurrent protection release time TimeCOCP R	s		
204	UINT16	0x00CE 206	2 R	R	Charging short circuit protection release time TimeCSCP R	s		
UINT16			2 R	R	Single cell undervoltage protection release time TimeUVP R	s		
			2 R	R	Single cell overvoltage protection release time TimeOVP R	s		
0x00D0 208		UINT8	2 R		MOS Temperature SensorMOS Tem pSensorAbsent			BIT0
					Battery Temperature Sensor 1 BATTem pSensor1Absent		1: normal; 0: missing1:	BIT1
					Battery Temperature Sensor 2 BATTem pSensor2Absent		normal; 0: missing1:	BIT2
					Battery Temperature Sensor 3 BATTem pSensor3Absent		normal; 0: missing1:	BIT3
					Battery Temperature Sensor 4 BATTem pSensor4Absent		normal; 0: missing1:	BIT4
					Battery Temperature Sensor 5 BATTem pSensor5Absent		normal; 0: missing1: normal; 0: missing	BIT5

		UINT8		R Heating status		1: On; 0: Off	
0x00D2 210	UINT16 0x00D4		2 R	Reserved			
212	UINT16 0x00D6 214		2 R	Emergency switch time TimeEmergency	s		
UINT16 0x00D8 216	UINT16		2 R	Discharge current correction factor BatDisCurCorrect			
0x00DA 218	UINT16 0x00DC		2 R	Charging current sensor voltage VolChargeCur	mV		
220	FLOAT 0x00E4 228		2 R	Discharge current sensor voltage VolDischargeCur	mV		
UINT16 0x00E6 230	INT16		4 R	Battery voltage correction factor BatVolCorrect			
			2 R	Battery voltage BatVol	0.01VmA		
			2 R	Heating current HeatCurrent			
0x00EE 238		UINT8	2	R Retain RVD			
		UINT8		R Charger statusChargerPlugged		1: inserted; 0: not inserted	
0x00F0 240	UINT32 0x00F8		4 R	System Beat SysRunTicks	0.1S		
248	INT16 0x00FA 250		2 R	Battery temperature TempBat 3	0.1 °C		
INT16 0x00FC 252	INT16		2 R	Battery temperature TempBat 4	0.1 °C		
0x0100 256	UINT32 0x0108		2 R	Battery temperature TempBat 5	0.1 °C		
264	UINT32		4 R	RTC counter RTCTicks		Starting from 2020-1-1	
			4 R	Enter sleep time TimeEnterSleepParallel	s		
0x010C 268		UINT8	2 R	current limiting module status PCLModuleStatus		1: On; 0: Off	
		UINT8		Reserve RVD			
0x1400	0x0000	0 ASCII	16 R	Manufacturer Model ManufacturerDeviceID			
	0x0010	16 ASCII	8 R	Hardware version number HardwareVersion			
	0x0018	24 ASCII	8 R	Software Version			
	0x0020	32	UINT32	4 R	Accumulated running time ODDRunTime	s	
	0x0024	36	UINT32	4 R	Power-on times PWROnTimes	times	
	0x00B2 178		UINT8	2	RW Serial port 1 protocol UART1MPRTOLNbr		
			UINT8		RW CAN protocol CANMPRTOLNbr		
	0x00B4 180	UINT8 0x00C4	16 R	Serial port 1 protocol control UART1MPRTOLEnable			
	196	UINT8	16 R	CAN protocol control UARTMPRTOLEnable[0-15]			
	0x00D4	212	UINT8	2	RW Serial port 2 protocol UART2MPRTOLNbr		
			UINT8		R Serial port 2 protocol control UART2MPRTOLEnable[0]		
	0x00E4 228		UINT8	2 RW	LCD buzzer trigger source LCDBuzzerTrigger		
			UINT8		Dry node 1 trigger source DRY1Trigger		
	0x00E6 230		UINT8	2	RW Dry node 2 trigger source DRY2Trigger		
			UINT8		R UART protocol library version UARTEMPTLVer		
0x00E8 232	INT32		4 RW	LCD buzzer trigger value LCDBuzzerTriggerVal			

	0x00EC 236	INT32	0x00F0	4	RW	LCD buzzer recovery value LCDBuzzerReleaseVal			
	240	INT32	0x00F4 244	4	RW	Dry node 1 trigger value DRY1TriggerVal			
	INT32 0x00F8 248	INT32		4	RW	Dry node 1 trigger value DRY1ReleaseVal			
	0x00FC 252	INT32	0x0100	4	RW	Dry node 2 trigger value DRY2TriggerVal			
	256	INT32		4	RW	Dry node 2 recovery value DRY2ReleaseVal			
				4	RW	Data storage period DataStoredPeriod			
	0x0104	260	UINT8	2	RW	Charging time RCVTime	0.1H		
						Floating charge time RFVTime	0.1H		
	0x0106	262	UINT8	2	R	CAN protocol library version CANMPTLVer			
						Preserve RVD			
0x1600	0x0000	0	UINT16	4	W	Voltage Calibration	mV		
	0x0004	4	UINT16	2	W	protection board shutdown			
	0x0006	6	UINT16	4	W	Current Calibration	mA		
	0x000A 10	UINT16	0x000C	2	W	one-button ternary LI-ION			
	12	UINT16		2	W	One-click Lithium Iron LIFEPO4			
	0x000E	14	UINT16	2	W	One-click Lithium Titanate LTO			
	0x0010	16	UINT16	2	W	Emergency start			
	0x0012	18	UINT32	4	W	Timecalibration			

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0x1000	0x0074	UINT32	4	Discharge switch BatDisChargeEN	00 02 04 00 00 00 38 ED 50 01 10 10 7C 00 02 04	01 10 10 74 00 02 05 12		
					00 00 01 C3 50 69 D2 140 01 10 10 80 00 02 04 00	01 10 10 74 00 02 05 12		
0x1000	0x0078	UINT32	4	Balancing switch BalanEN	00 00 38 B8 On: 01 10 10 78 00 02 04 00 00 00 01	01 10 16 20 00 01 04 4B		
					F9 2D Off: 01 10 10 78 00 02 04 00 00 00 38 ED 50	01 10 16 20 00 01 04 4B		
0x1000	0x007C	UINT32	4	Designed battery capacity CapBatCell	01 10 10 7C 00 02 04 00 00 C3 50 69 D2 140 01 10	01 10 10 7C 00 02 84 D0		
0x1000	0x0080	UINT32	4	Short circuit protection delay SCPDelay	10 80 00 02 04 01 10 10 80 00 02 44 E0			
0x1000	0x0084	UINT32	4	Balancing start voltage VolStartBalan 0x1000	3.1 01 10 10 84 00 02 04 00 00 0C 1C 33 35 01			
0x0088	UINT32	4	Connection line internal resistance 0 CellConWireRes0		0.1 01 10 10 88 00 02 04 00 00 00 64 36 42			
0x1000	0x008C	UINT32	4	Connection line internal resistance 1	0.1 01 10 10 8C 00 02 04 00 00 00 64 37 B1			
CellConWireRes1	0x1000	0x0090	UINT32	4	Connection line internal	0.1 01 10 10 90 00 02 04 00 00 00 64 36 E8		
resistance 2	CellConWireRes2	0x1000	0x0094	UINT32	4	Connection line	0.1 01 10 10 94 00 02 04 00 00 00 64 37 1B	
internal resistance 3	CellConWireRes3	0x1000	0x0098	UINT32	4	Wire	0.1 01 10 10 98 00 02 04 00 00 00 64 37 4E	
resistance 4	CellConWireRes4	0x1000	0x009C	UINT32	4	Wire resistance	0.1 01 10 10 9C 00 02 04 00 00 00 64 36 BD	
5	CellConWireRes5	0x1000	0x00A0	UINT32	4	Wire resistance	0.1 01 10 10 A0 00 02 04 00 00 00 64 35 FC	
6	CellConWireRes6	0x1000	0x00A4	UINT32	4	Wire resistance	0.1 01 10 10 A4 00 02 04 00 00 00 64 34 0F	
7	CellConWireRes7	0x1000	0x00A8	UINT32	4	Wire resistance	0.1 01 10 10 A8 00 02 04 00 00 00 64 34 5A	
8	CellConWireRes8	0x1000	0x00AC	UINT32	4	Wire resistance	0.1 01 10 10 AC 00 02 04 00 00 00 64 35 A9	
9	CellConWireRes9	0x1000	0x00B0	UINT32	4	Wire resistance	0.1 01 10 10 B0 00 02 04 00 00 00 64 34 F0	
10	CellConWireRes10	0x1000	0x00B4	UINT32	4	Connection line internal	0.1 01 10 10 B4 00 02 04 00 00 00 64 35 03	
resistance 11	CellConWireRes11	0x1000	0x00B8	UINT32	4	Connection line	0.1 01 10 10 B8 00 02 04 00 00 00 64 35 56	
internal resistance 12	CellConWireRes12	0x1000	0x00BC	UINT32	4	Connection	0.1 01 10 10 BC 00 02 04 00 00 00 64 34 A5	
line internal resistance 13	CellConWireRes13	0x1000	0x00C0	UINT32	4		0.1 01 10 10 C0 00 02 04 00 00 00 64 33 D4	
Connection line internal resistance 14	CellConWireRes14	0x1000	0x00C4	UINT32	4	Connection line internal resistance 15	0.1 01 10 10 C4 00 02 04 00 00 00 64 32 27	