

Jikong BMS RS485 Modbus general protocol (V1.0)

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	8 1
Baud 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 data type length			R/W	Content	Unit	Note			
Address Field	HEX DEC		Type e	Len gth						
		0	UINT32	4	RW	Enter sleep voltage VolSmartSleep 0x0000	mV			
	0x0004	4	UINT32	4	RW	Cell undervoltage protection VolCellUV	mV			
	R 0x0008	8	UINT32	4	RW	Cell undervoltage protection recovery VolCellUVP	mV			
	0x000C	12	UINT32	4	RW	Cell overcharge protection VolCellOV	mV			
	R 0x0010	16	UINT32	4	RW	Single cell overcharge protection recovery voltage VolCellOVP	mV			
	g 0x0014	20	UINT32	4	RW	Trigger balanced voltage difference VolBalanTri	mV			
		24	UINT32	4	RW	SOC-100% voltage VolSOC100% 0x0018	mV			
	28	UINT32		4	RW	SOC-0% voltage VolSOC0% 0x001C	mV			
	0x0028	40	UINT32	4	RW	Automatic shutdown voltage VolS ysPwrOff	mV			
	0x002C	44	UINT32	4	RW	Continuous charging current CurBatCOC	mA			
	0x0030	48	UINT32	4	RW	Charge overcurrent protection delay TIMBatCOCPRDI y				
	y 0x0034	52	UINT32	4	RW	Charge overcurrent protection release TIMBatCOCPRDI				
	0x0038	56	UINT32	4	RW	Continuous discharge current CurBatDcOC	S S			
	y 0x003C	60	UINT32	4	RW	Discharge overcurrent protection delay TIMBatDcOCPDI				
	y 0x0040	64	UINT32	4	RW	Discharge overcurrent protection release TIMBatDcOCPDI				
	y 0x0044	68	UINT32	4	RW	Short circuit protection release TIMBatSCPRDI				
	0x0048	72	UINT32	4	RW	Maximum balancing current CurBalanMax	mA			
	TMPBatCOT	0x004C	76	INT32	4	RW	Charging over-temperature protection	S S S		
	R 0x0050	80	INT32	4	RW	Charge over temperature recovery TMPBatCOTP	mA			
	0x0054	84	INT32	4	RW	Discharge over temperature protection TMPBatDcOT	0.1 ŷ			
	R 0x0058	88	INT32	4	RW	Discharge over temperature recovery TMPBatDcOTP	0.1 ŷ			
	TMPBatCUT	0x005C	92	INT32	4	RW	Charging low temperature protection	0.1 ŷ		
	R 0x0060	96	INT32	4	RW	Charging low temperature recovery TMPBatCUTP	0.1 ŷ			
	TMPMosOT	0x0064	100	INT32	4	RW	MOS over temperature protection	0.1 ŷ		
	TMPMosOTP	R 0x0068	104	INT32	4	RW	MOS over temperature protection recovery	0.1 ŷ		
	UINT32				4	RW	CellCount 0x006C 108	0.1 ŷ 0.1 ŷ ŷ		
	0x0070	112	UINT32		4	RW	Charging switch BatChargeEN		1: On; 0: Off1: On;	
	0x0074	116	UINT32		4	RW	Discharge switch BatDisChargeEN		0: Off1: On; 0: Off	
	UINT32				4	RW	BalanEN 0x0078 120			
	0x007C	124	UINT32		4	RW	Battery design capacity CapBatCell	I		
	0x0080	128	UINT32		4	RW	Short circuit protection delay SCPDelay	us		

0x1000

0x0084 132	UINT32 0x0088 136	4 RW	Balanced start voltage VolStartBalan	mV		
UINT32 0x008C 140	UINT33	4 RW	Connection line internal resistance 0CellConWireRes0	uŷ		
0x0090 144	UINT34 0x0094 148	4 RW	Connection line internal resistance 1CellConWireRes1	uŷ		
UINT35 0x0098 152	UINT36	4 RW	Connection line internal resistance 2CellConWireRes2	uŷ		
0x009C 156	UINT37 0x00A0 160	4 RW	Connection line internal resistance 3CellConWireRes3	uŷ		
UINT38 0x00A4 164	UINT39	4 RW	Connection line internal resistance 4CellConWireRes4	uŷ		
0x00A8 168	UINT40 0x00AC 172	4 RW	Connection line internal resistance 5CellConWireRes5	uŷ		
UINT41 0x00B0 176	UINT42	4 RW	Connection line internal resistance 6CellConWireRes6	uŷ		
0x00B4 180	UINT43 0x00B8 184	4 RW	Connection line internal resistance 7CellConWireRes7	uŷ		
UINT44 0x00BC 188	UINT45	4 RW	Connection line internal resistance 8CellConWireRes8	uŷ		
0x00C0 192	UINT46 0x00C4 196	4 RW	Connection line internal resistance 9CellConWireRes9	uŷ		
UINT47 0x00C8 200	UINT48	4 RW	Connection line internal resistance 10CellConWireRes10	uŷ		
0x00CC 204	UINT49 0x00D0 208	4 RW	Connection line internal resistance 11CellConWireRes11	uŷ		
UINT50 0x00D4 212	UINT51	4 RW	Connection line internal resistance 12CellConWireRes12	uŷ		
0x00D8 216	UINT52 0x00DC 220	4 RW	Connection line internal resistance 13CellConWireRes13	uŷ		
UINT53 0x00E0 224	UINT54	4 RW	Connection line internal resistance 14CellConWireRes14	uŷ		
0x00E4 228	UINT55 0x00E8 232	4 RW	Connection line internal resistance 15CellConWireRes15	uŷ		
UINT56 0x00EC 236	UINT57	4 RW	Connection line internal resistance 16CellConWireRes16	uŷ		
0x00F0 240	UINT58 0x00F4 244	4 RW	Connection line internal resistance 17CellConWireRes17	uŷ		
UINT59 0x00F8 248	UINT60	4 RW	Connection line internal resistance 18CellConWireRes18	uŷ		
0x00FC 252	UINT61 0x0100 256	4 RW	Connection line internal resistance 19CellConWireRes19	uŷ		
UINT62 0x0104 260	UINT63	4 RW	Connection line internal resistance 20CellConWireRes20	uŷ		
0x0108 264	UINT32 0x010C 268	4 RW	Connection line internal resistance 21CellConWireRes21	uŷ		
UINT32		4 RW	Connection line internal resistance 22CellConWireRes22	uŷ		
		4 RW	Connection line internal resistance 23CellConWireRes23	uŷ		
		4 RW	Connection line internal resistance 24CellConWireRes24	uŷ		
		4 RW	Connection line internal resistance 25CellConWireRes25	uŷ		
		4 RW	Connection line internal resistance 26CellConWireRes26	uŷ		
		4 RW	Connection line internal resistance 27CellConWireRes27	uŷ		
		4 RW	Connection line internal resistance 28CellConWireRes28	uŷ		
		4 RW	Connection line internal resistance 29CellConWireRes29	uŷ		
		4 RW	Connection line internal resistance 30CellConWireRes30	uŷ		
		4 RW	Connection line internal resistance 31CellConWireRes31	uŷ		
		4 RW	Device address DevAddr	H		
		4 RW	Discharge precharge time TIMProdisharge	s		

0x0114	276	UINT16	2	RW Heating switch HeatEN		1: On; 0: Off1: On;	BIT0
				RW Temperature sensor shield Disable temp-sensor		0: Off1: 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	BIT6
0x0116	278	INT8	2	RW Battery alarm temperature TMPBatOTA	ÿ		
		INT8		RW Battery alarm recovery temperature TMPBatOTA R	ÿ		
0x0118	280	UINT8	2	RW Intelligent sleep time TIMSmartSleep	H		
		UINT8		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	2 R Cell voltage 21CellVol21	mV		
	0x002C	44	UINT16	2 R Cell voltage 22CellVol22	mV		
	0x002E	46	UINT16	2 R Cell voltage 23CellVol23	mV		

0x0030	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	2 R	CellVol29	mV		
60	UINT16	0x003E	62	UINT16	2 R	CellVol30	mV
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	2 R	Balance line resistance 0CellWireRes0	mΩ		
76	UINT16	0x004E	78	UINT16	2 R	Balance line resistance 1CellWireRes1	mΩ
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	2 R	Balance line resistance 8CellWireRes8	mΩ		
92	UINT16	0x005E	94	UINT16	2 R	Balance line resistance 9CellWireRes9	mΩ
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	2 R	Balance line resistance 13CellWireRes13	mΩ		
102	UINT16	0x0068	104	UINT16	2 R	Balance line resistance 14CellWireRes14	mΩ
	UINT16	0x006A	106	UINT16	2 R	Balance line resistance 15CellWireRes15	mΩ
0x006C	108	UINT16	2 R	Balance line resistance 16CellWireRes16	mΩ		
110	UINT16	0x0070	112	UINT16	2 R	Balance line resistance 17CellWireRes17	mΩ
	UINT16	0x0072	114	UINT16	2 R	Balance line resistance 18CellWireRes18	mΩ
0x0074	116	UINT16	2 R	Balance line resistance 19CellWireRes19	mΩ		
			2 R	Balance line resistance 20CellWireRes20	mΩ		
			2 R	Balance line resistance 21CellWireRes21	mΩ		

					GPS DisconnectedGPSDisconnected		1: Fault; 0: Normal1:	BIT18
					Please modify the authorization password in timeModify		Fault; 0: Normal1: Fault:	BIT19
					PWD. in timeDischarge On FailedBattery		0: Normal1: Fault; 0:	BIT20
					Over Temp AlarmBattery Over Temp Alarm		Normal	BIT21
0x00A4 164	INT16		2	R	BalanCurrent	mA		
0x00A6	166	UINT8	2	R	Balanced state BalanSta		2: discharge; 1: charge; 0: off	
		UINT8		R	Remaining power SOCStateOfchar ge	%		
0x00A8 168	INT32	0x00AC	4	R	Remaining capacity SOCCa pRemai n	MAH		
172	UINT32	0x00B0 176	4	R	Battery actual capacity SOCFullChargeCap	MAH		
UINT32	0x00B4 180	UINT32	4	R	Cycle Count	ÿ		
			4	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	User layer alarm UserAlarm			
188	UINT32		4	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	User layer alarm 2UserAlarm2			
196	UINT16	0x00C6 198	2	R	Discharge overcurrent protection release time TimeDcOCP R	s		
UINT16	0x00C8 200	UINT16	2	R	Discharge short circuit protection release time TimeDcSCP R	s		
0x00CA 202	UINT16	0x00CC	2	R	Charge overcurrent protection release time TimeCOCP R	s		
204	UINT16	0x00CE 206	2	R	Charging short circuit protection release time TimeCSCP R	s		
UINT16			2	R	Single cell undervoltage protection release time TimeUVP R	s		
			2	R	Single cell overvoltage protection release time TimeOVP R	s		
0x00D0	208	UINT8	2	R	MOS temperature sensor MOS Tem pSensorAbsent			BIT0
				R	Battery temperature sensor 1 BATTem pSensor1Absent		1: Normal; 0: Missing1:	BIT1
				R	Battery temperature sensor 2 BATTem pSensor2Absent		Normal; 0: Missing1:	BIT2
				R	Battery temperature sensor 4 BATTem pSensor4Absent		Normal; 0: Missing1:	BIT4
				R	Battery temperature sensor 5 BATTem pSensor5Absent		Normal; 0: Missing1:	BIT5
		UINT8		R	Heating status		Open; 0: Close	
0x00D2 210	UINT16	0x00D4	2	R	Reserved			
212	UINT16	0x00D6 214	2	R	Emergency switch time TimeEmer genc y	s		
UINT16	0x00D8 216	UINT16	2	R	Battery current correction factor BatCurCorrect			
0x00DA 218	UINT16		2	R	Charging current sensor voltage VolChar gCur	mV		
			2	R	Discharge current sensor voltage VolDischar gCur	mV		

	0x00DC 220	FLOAT 0x00E0	4 R	Battery voltage correction factor BatVolCorrect			
	224	UINT16 0x00E2 226	2 R	Balanced charge PWM value Charge PWMDuty Cycle	%		
	UINT16 0x00E4 228	UINT16	2 R	Balanced discharge PWM value DischargePWMDuty Cycle	%		
	0x00E6 230	UINT16	2 R	Battery voltage BatVol			
			2 R	Heating current HeatCurrent	0.01VmA		
	0x00EE 238	UINT8	2	R Retain RVD			
		UINT8		R Charger statusChargerPlugged		1: inserted; 0: not inserted	
	0x00F0 240	UINT32 0x00F4	4 R	System Beat SysRunTicks	0.1S		
	244	UINT32 0x00F8 248	4 R	PVD trigger timestamp PVDTriggerTimestamps	0.1S		
	INT16 0x00FA 250	INT16	2 R	Battery temperature TempBat 3	0.1 °C		
	0x00FC 252	INT16 0x0100	2 R	Battery temperature TempBat 4	0.1 °C		
	256	UINT32 0x0108 264	2 R	Battery temperature TempBat 5	0.1 °C		
	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			
0x1600	0x0000	0	UINT16	4 W Voltage Calibration	times 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 0x000E 14	2 W	One-click Lithium Iron LIFEPO4			
	UINT16		2 W	One-click Lithium Titanate LTO			
	0x0010	16	UINT16	2 W Emergency start Emergency			
	0x0012	18	UINT32	4 W Timecalibration			