

JEON BMS RS485 Modbus General Protocol(V1.0)

Pole Air BMS RS485 Modbus general protocol uses master-slave response method for data communication. Requests can only be initiated by the master through a unique slave address, and the BMS (slave) responds to the master's request, i.e., half-duplex communication.

. The protocol only allows the host to initiate a request and the slave to respond passively, so the slave does not actively occupy the communication line causing data conflicts.

I. Physical connection

The electrical characteristics of the communication physical connection are as follows:

Communication connection Level Standards	UART
baud	115200bps
data bit	8
stop bit	1
check digit	not have

II. Form of agreement

Message transmission is asynchronous, using hexadecimal for communication and message frame format:

address code byte	function code byte	data area byte	CRC check 2 bytes

1)address code

The address code is the first byte of each communication information frame, supporting 1 to 247, each slave must be unique in its address on the bus, and only slaves that match the address code sent by the host can respond with return data.

2)function code

The function code is the second byte of each communication message frame. The host sends, by means of the function code, to inform the slave device what action should be performed. The function code is defined as follows:

functionality	define	manipulate
03H	registers	Reads data from one or more registers
10H	Write registers	Data written to one or more registers

3)data area

The data area varies according to the function code and the direction of the data, which can be different combinations of *"register*

first address + number of read registers ", "*register* address + operation data ", "*register* first address + operation register number + data length + data" and so on. These data can be "register first address + number of registers read", "register address + operation data", "register first address + operation register + length of data + data ", etc. The data areas of different function codes are explained in detail in "Function Code Analysis ".

3) CRC checksum

CRC checksums are used to ensure the correctness and integrity of data transmission.

III. Error Feedback

Address and CRC checksum errors do not receive data feedback from the slave, and other errors will return error codes to the master . The second bit of the data frame plus 0X80 indicates that an error (illegal function code, illegal data value, etc.) has occurred in the request, and the error data frame is as follows:

address code	function code	error code area	CRC check
1 byte	1 byte	1 byte	2 bytes

The error codes are defined below:

(be) worth	name (of a thing)	clarification
01H	Illegal function codes	This function code is not supported to operate the registers
02H	Register address error	Accessed a register that is forbidden to be accessed by the slave.
03H	Illegal data	Data logic not legal or out of limits
04H	CRC Checksum Error	CRC Checksum Error

IV. Information transfer process

When a communication command is sent from the host to a slave, the slave that matches the address code sent by the host receives the communication command, performs the corresponding operation if the CRC check is correct, and then returns the result (data) to the host. The return message contains the address code, function code, data after execution, and CRC check code. If the address does not match or the CRC check is wrong, no information is returned.

V. Function code analysis

1) Function code 03H: Read registers

For example, if the master wants to read the data of 2 holding registers with slave address 01H and start register address 05H, the master sends:

Host sends		Data (HEX)
address code		01H
function code		03H
Start Register Address	high byte (computing)	00H
	low byte	05H
Number of registers	high byte (computing)	00H
	low byte	02H
CRC check	low byte	D4H
	high byte (computing)	0AH

If the slave holds the data in registers 05H and 06H as 1122H and 3344H, the

Slave Return		Data (HEX)
address code		01H
function code		03H
byte count		04H
Register 05	high byte (computing)	11H

2)Function code 10H: Write to registers

For example, the master wants to save the data 0005H, 2233H to the slave at address 01H, and the start register address is 0020H of the 2 registers in which the host sends:

Host sends		Data (HEX)
address code		01H
function code		10H
Start Register Address	high byte (computing)	00H
	low byte	20H
Number of registers	high byte (computing)	00H
	low byte	02H
Number of bytes written		04H
0000H Registers to be written	high byte (computing)	00H
	low byte	05H
0001H Registers to be written	high byte (computing)	22H
	low byte	33H
CRC check	low byte	B9H
	high byte (computing)	03H

Function code 10H operates and the slave returns:

Slave Return		Data (HEX)
address code		01H
function code		10H
Start Register Address	high byte (computing)	00H
	low byte	20H
Number of registers	high byte (computing)	00H
	low byte	02H
CRC check	low byte	40H
	high byte (computing)	02H

Register Map Register Map

starting address code Address Field	Offset Index		data type Type	length hs Length	R/W	Data Content	unit (of mea sure) Unit	Note	
	HEX	DEC							
	0x0000	0	UINT32	4	RW	Enter sleep voltage VolSmartSleep	mV		
	0x0004	4	UINT32	4	RW	Monoblock undervoltage protection VolCellUV	mV		
	0x0008	8	UINT32	4	RW	Monoblock Undervoltage Protection Recovery VolCellUVPR	mV		
	0x000C	12	UINT32	4	RW	Monoblock overcharge protection VolCellOV	mV		
	0x0010	16	UINT32	4	RW	Monoblock Overcharge Protection Recovery Voltage VolCellOVPR	mV		
	0x0014	20	UINT32	4	RW	Trigger equalization differential pressure VolBalanTrig	mV		
	0x0018	24	UINT32	4	RW	SOC-100% Voltage VolSOC100%	mV		
	0x001C	28	UINT32	4	RW	SOC-0% Voltage VolSOC0%	mV		
	0x0028	40	UINT32	4	RW	Auto Power Off 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 deactivated 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 equalization current CurBalanMax	mA		
	0x004C	76	INT32	4	RW	Charge over-temperature protection TMPBatCOT	0.1°C		
	0x0050	80	INT32	4	RW	Charge Over Temperature Recovery TMPBatCOTPR	0.1°C		
	0x0054	84	INT32	4	RW	Discharge over-temperature protection	0.1°C		

					TMPBatDcOT			
0x0058	88	INT32	4	RW	Discharge overtemperature recovery TMPBatDcOTPR	0.1°C		
0x005C	92	INT32	4	RW	Charge Low Temperature Protection TMPBatCUT	0.1°C		
0x0060	96	INT32	4	RW	Charge Cryogenic Recovery TMPBatCUTPR	0.1°C		
0x0064	100	INT32	4	RW	MOS overtemperature protection TMPMosOT	0.1°C		
0x0068	104	INT32	4	RW	MOS Over Temperature Protection Recovery TMPMosOTPR	0.1°C		
0x006C	108	UINT32	4	RW	CellCount	bunch or cluster		
0x0070	112	UINT32	4	RW	Charge switch BatChargeEN		1: open ; 0: close	
0x0074	116	UINT32	4	RW	Discharge switch BatDisChargeEN		1: open ; 0: close	
0x0078	120	UINT32	4	RW	Equalization switch BalanEN		1: open ; 0: close	
0x007C	124	UINT32	4	RW	Battery Design Capacity CapBatCell	mAH		
0x0080	128	UINT32	4	RW	Short Circuit Protection Delay SCPDelay	us		

0x1000

0x0084	132	UINT32	4	RW	Equalization Start Voltage VolStartBalan	mV		
0x0088	136	UINT32	4	RW	Connection Wire Internal Resistance0CellConWireRes0	uΩ		
0x008C	140	UINT33	4	RW	Connection Wire Internal Resistance1CellConWireRes1	uΩ		
0x0090	144	UINT34	4	RW	Connecting Wire Internal Resistance2CellConWireRes2	uΩ		
0x0094	148	UINT35	4	RW	Connecting Wire Internal Resistance3CellConWireRes3	uΩ		
0x0098	152	UINT36	4	RW	Connecting Wire Internal Resistance4CellConWireRes4	uΩ		
0x009C	156	UINT37	4	RW	Connecting Wire Internal Resistance5CellConWireRes5	uΩ		
0x00A0	160	UINT38	4	RW	Connecting Wire Internal Resistance6CellConWireRes6	uΩ		
0x00A4	164	UINT39	4	RW	Connecting Wire Internal Resistance7CellConWireRes7	uΩ		
0x00A8	168	UINT40	4	RW	Connecting Wire Internal Resistance8CellConWireRes8	uΩ		
0x00AC	172	UINT41	4	RW	Connecting Wire Internal Resistance9CellConWireRes9	uΩ		
0x00B0	176	UINT42	4	RW	Connecting Wire Internal Resistance10CellConWireRes10	uΩ		
0x00B4	180	UINT43	4	RW	Connection Wire Internal Resistance11CellConWireRes11	uΩ		
0x00B8	184	UINT44	4	RW	Connecting Wire Internal Resistance12CellConWireRes12	uΩ		
0x00BC	188	UINT45	4	RW	Connection Wire Internal Resistance13CellConWireRes13	uΩ		
0x00C0	192	UINT46	4	RW	Connecting Wire Internal Resistance14CellConWireRes14	uΩ		
0x00C4	196	UINT47	4	RW	Connecting Wire Internal Resistance15CellConWireRes15	uΩ		
0x00C8	200	UINT48	4	RW	Connection Wire Internal Resistance16CellConWireRes16	uΩ		
0x00CC	204	UINT49	4	RW	Connecting Wire Internal Resistance17CellConWireRes17	uΩ		
0x00D0	208	UINT50	4	RW	Connecting Wire Internal Resistance18CellConWireRes18	uΩ		
0x00D4	212	UINT51	4	RW	Connection Wire Internal Resistance19CellConWireRes19	uΩ		
0x00D8	216	UINT52	4	RW	Connecting Wire Internal Resistance20CellConWireRes20	uΩ		
0x00DC	220	UINT53	4	RW	Connecting Wire Internal Resistance21CellConWireRes21	uΩ		

0x0114	276	UINT16	2	RW	Heat switch HeatEN		1: open ; 0: close	BIT0
				RW	Temperature sensor shielding Disable temp-sensor		1: open ; 0: close	BIT1
				RW	GPS Heartbeat Detection GPS Heartbeat		1: open ; 0: close	BIT2
				RW	Multiplexed Port Functions Port Switch		1: RS485 ; 0: CAN	BIT3
				RW	LCD Always On		1: open ; 0: close	BIT4
				RW	Special Charger RecognitionSpecial Charger		1: open ; 0: close	BIT5
				RW	SmartSleep		1: open ; 0: close	BIT6
0x0116	278	INT8	2	RW	Battery alarm temperature TMPBatOTA	°C		
		INT8		RW	Battery Alarm Recovery Temperature TMPBatOTAR	°C		
0x0118	280	UINT8	2	RW	Smart Sleep Time TIMSmartSleep	H		
		UINT8		R	Data field enable control 0			
0x0000	0	UINT16	2	R	CellVol0CellVol0	mV		
0x0002	2	UINT16	2	R	Cell Voltage1CellVol1	mV		
0x0004	4	UINT16	2	R	Cell voltage 2CellVol2	mV		
0x0006	6	UINT16	2	R	Cell Voltage3CellVol3	mV		
0x0008	8	UINT16	2	R	CellVol4CellVol4	mV		
0x000A	10	UINT16	2	R	CellVol5CellVol5	mV		
0x000C	12	UINT16	2	R	CellVol6CellVol6	mV		
0x000E	14	UINT16	2	R	CellVol7CellVol7	mV		
0x0010	16	UINT16	2	R	Cell Voltage8CellVol8	mV		
0x0012	18	UINT16	2	R	CellVol9CellVol9	mV		
0x0014	20	UINT16	2	R	CellVol10	mV		
0x0016	22	UINT16	2	R	CellVol11CellVol11	mV		
0x0018	24	UINT16	2	R	CellVol12CellVol12	mV		
0x001A	26	UINT16	2	R	CellVol13CellVol13	mV		
0x001C	28	UINT16	2	R	CellVol14	mV		
0x001E	30	UINT16	2	R	CellVol15CellVol15	mV		
0x0020	32	UINT16	2	R	CellVol16	mV		
0x0022	34	UINT16	2	R	CellVol17CellVol17	mV		
0x0024	36	UINT16	2	R	CellVol18	mV		
0x0026	38	UINT16	2	R	CellVol19	mV		
0x0028	40	UINT16	2	R	CellVol20	mV		
0x002A	42	UINT16	2	R	CellVol21CellVol21	mV		

0x002C	44	UINT16	2	R	CellVol22CellVol22	mV	
0x002E	46	UINT16	2	R	CellVol23CellVol23	mV	
0x0030	48	UINT16	2	R	CellVol24CellVol24	mV	
0x0032	50	UINT16	2	R	CellVol25	mV	
0x0034	52	UINT16	2	R	CellVol26CellVol26	mV	
0x0036	54	UINT16	2	R	CellVol27CellVol27	mV	
0x0038	56	UINT16	2	R	CellVol28CellVol28	mV	
0x003A	58	UINT16	2	R	CellVol29	mV	
0x003C	60	UINT16	2	R	CellVol30	mV	
0x003E	62	UINT16	2	R	CellVol31CellVol31	mV	
0x0040	64	UINT32	4	R	Battery Status CellSta		A BIT[n] of 1 indicates the presence of this cell
0x0044	68	UINT16	2	R	CellVolAve, average voltage of a single unit	mV	
0x0046	70	UINT16	2	R	Maximum Differential Pressure CellVdifMax	mV	
0x0048	72	UINT8	2	R	Maximum Voltage Cell Number MaxVolCellNbr		
		UINT8		R	Minimum Voltage Cell Number MinVolCellNbr		
0x004A	74	UINT16	2	R	Equalized Wire Resistance0CellWireRes0	mΩ	
0x004C	76	UINT16	2	R	Equalized Wire Resistors1CellWireRes1	mΩ	
0x004E	78	UINT16	2	R	Equalized Wire Resistors2CellWireRes2	mΩ	
0x0050	80	UINT16	2	R	Equalized Wire Resistors3CellWireRes3	mΩ	
0x0052	82	UINT16	2	R	Equalized Wire Resistors4CellWireRes4	mΩ	
0x0054	84	UINT16	2	R	Equalized Wire Resistors5CellWireRes5	mΩ	
0x0056	86	UINT16	2	R	Equalized Wire Resistors6CellWireRes6	mΩ	
0x0058	88	UINT16	2	R	Equalized Wire Resistors7CellWireRes7	mΩ	
0x005A	90	UINT16	2	R	Equalized Wire Resistors8CellWireRes8	mΩ	
0x005C	92	UINT16	2	R	Equalized Wire Resistors9CellWireRes9	mΩ	
0x005E	94	UINT16	2	R	Equalized Wire Resistors10CellWireRes10	mΩ	
0x0060	96	UINT16	2	R	Equalized Wire Resistors11CellWireRes11	mΩ	
0x0062	98	UINT16	2	R	Equalized Wire Resistors12CellWireRes12	mΩ	
0x0064	100	UINT16	2	R	Equalized Wire Resistors13CellWireRes13	mΩ	
0x0066	102	UINT16	2	R	Equalized Wire Resistors14CellWireRes14	mΩ	
0x0068	104	UINT16	2	R	Equalized Wire Resistors15CellWireRes15	mΩ	

0x006A	106	UINT16	2	R	Equalized Wire Resistors16CellWireRes16	mΩ		
0x006C	108	UINT16	2	R	Equalized Wire Resistors17CellWireRes17	mΩ		
0x006E	110	UINT16	2	R	Equalized Wire Resistors18CellWireRes18	mΩ		
0x0070	112	UINT16	2	R	Equalized Wire Resistors19CellWireRes19	mΩ		
0x0072	114	UINT16	2	R	Equalized Wire Resistors20CellWireRes20	mΩ		
0x0074	116	UINT16	2	R	Equalized Wire Resistors21CellWireRes21	mΩ		

0x1200

0x0076	118	UINT16	2	R	Equalized Wire Resistors22CellWireRes22	mΩ		
0x0078	120	UINT16	2	R	Equalized Wire Resistors23CellWireRes23	mΩ		
0x007A	122	UINT16	2	R	Equalized Wire Resistors24CellWireRes24	mΩ		
0x007C	124	UINT16	2	R	Equalized Wire Resistors25CellWireRes25	mΩ		
0x007E	126	UINT16	2	R	Equalized Wire Resistors26CellWireRes26	mΩ		
0x0080	128	UINT16	2	R	Equalized Wire Resistors27CellWireRes27	mΩ		
0x0082	130	UINT16	2	R	Equalized Wire Resistors28CellWireRes28	mΩ		
0x0084	132	UINT16	2	R	Equalized Wire Resistors29CellWireRes29	mΩ		
0x0086	134	UINT16	2	R	Equalized Wire Resistors30CellWireRes30	mΩ		
0x0088	136	UINT16	2	R	Equalized Wire Resistors31CellWireRes31	mΩ		
0x008A	138	INT16	2	R	Power Plate Temperature TempMos	0.1°C		
0x008C	140	UINT32	4	R	Equalized Wire Resistance Status CellWireResSta		A BIT[n] of 1 indicates an alarm on this equalization line	
0x0090	144	UINT32	4	R	Total Battery Voltage BatVol	mV		
0x0094	148	UINT32	4	R	Battery Power BatWatt	mW		
0x0098	152	INT32	4	R	Battery Current BatCurrent	mA		
0x009C	156	INT16	2	R	Battery temperature TempBat 1	0.1°C		
0x009E	158	INT16	2	R	Battery temperature TempBat 2	0.1°C		
0x00A0	160	UINT32	4	R	Equalization wire resistance is too high AlarmWireRes		1: fault ; 0: normal	BIT0
					MOS Over Temperature Protection AlarmMosOTP		1: fault ; 0: normal	BIT1
					The number of monomers does not match the set value AlarmCellQuantity		1: fault ; 0: normal	BIT2
					Current Sensor Exception AlarmCurSensorErr		1: fault ; 0: normal	BIT3
					Monoblock Overvoltage Protection AlarmCelloVP		1: fault ; 0: normal	BIT4
					Battery Overvoltage Protection AlarmBatOVP		1: fault ; 0: normal	BIT5
					Charge Overcurrent Protection AlarmChOCP		1: fault ; 0: normal	BIT6
					Charge Short Circuit Protection AlarmChSCP		1: fault ; 0: normal	BIT7
					Charge Over Temperature Protection AlarmChOTP		1: fault ; 0: normal	BIT8
					Charge Cold Protection AlarmChUTP		1: fault ; 0: normal	BIT9
					Internal communication exception AlarmCPUAuxCommuErr		1: fault ; 0: normal	BIT10
					Monoblock Undervoltage Protection AlarmCellUVP		1: fault ; 0: normal	BIT11
Battery Undervoltage Protection		1: fault ; 0: normal	BIT12					

					GPS Disconnected GPSDisconnected		1: fault ; 0: normal	BIT18
					Please modify the authorization password Modify PWD. in time		1: fault ; 0: normal	BIT19
					Discharge On FailedDischarge On Failed		1: fault ; 0: normal	BIT20
					Battery Over Temp Alarm		1: fault ; 0: normal	BIT21
0x00A4	164	INT16	2	R	BalanCurrent	mA		
0x00A6	166	UINT8	2	R	Equilibrium BalanSta		2: Discharge; 1: Charge ; 0: Off	
		UINT8		R	SOCStateOfcharge	%		
0x00A8	168	INT32	4	R	Remaining Capacity SOCCapRemain	mAH		
0x00AC	172	UINT32	4	R	Battery Actual Capacity SOCFullChargeCap	mAH		
0x00B0	176	UINT32	4	R	Cycle Count SOCCycleCount	subst andar d		
0x00B4	180	UINT32	4	R	Total Cycle Capacity SOCCycleCap	mAH		
0x00B8	184	UINT8	2	R	SOH valuation SOCSOH	%		
		UINT8		R	Precharge		1: open ; 0: close	
0x00BA	186	UINT16	2	R	UserAlarm			
0x00BC	188	UINT32	4	R	RunTime	S		
0x00C0	192	UINT8	2	R	Charge status Charge		1: open ; 0: close	
		UINT8		R	Discharge		1: open ; 0: close	
0x00C2	194	UINT16	2	R	UserAlarm2UserAlarm2			
0x00C4	196	UINT16	2	R	Discharge overcurrent protection release time TimeDcOCPR	S		
0x00C6	198	UINT16	2	R	Discharge short circuit protection release time TimeDcSCPR	S		
0x00C8	200	UINT16	2	R	Charge overcurrent protection release time TimeCOCPR	S		
0x00CA	202	UINT16	2	R	Charge short circuit protection release time TimeCSCPR	S		
0x00CC	204	UINT16	2	R	Single unit undervoltage protection release time TimeUVPR	S		
0x00CE	206	UINT16	2	R	Monoblock overvoltage protection release time TimeOVPR	S		
					MOS TempSensorMOS TempSensorAbsent			BIT0
					Battery Temperature Sensor1 BATTempSensor1Absent		1: Normal ; 0: Missing	BIT1

0x00D0	208	UINT8	2	R	Battery Temperature Sensor2 BATTempSensor2Absent		1: Normal ; 0: Missing	BIT2
				R	Battery Temperature Sensor4 BATTempSensor4Absent		1: Normal ; 0: Missing	BIT4
				R	Battery Temperature Sensor 5 BATTempSensor5Absent		1: Normal ; 0: Missing	BIT5
		UINT8		R	Heating		1: open ; 0: close	
0x00D2	210	UINT16	2	R	Reserved			
0x00D4	212	UINT16	2	R	Emergency switching timeTimeEmergency	S		
0x00D6	214	UINT16	2	R	Battery Current Correction Factor BatCurCorrect			
0x00D8	216	UINT16	2	R	Charge Current Sensor Voltage VolChargCur	mV		
0x00DA	218	UINT16	2	R	Discharge Current Sensor Voltage VolDischargCur	mV		
0x00DC	220	FLOAT	4	R	Battery Voltage Correction Factor BatVolCorrect			
0x00E0	224	UINT16	2	R	Equalize Charge PWM Value ChargePWMDutyCyle	%		
0x00E2	226	UINT16	2	R	Equalized Discharge PWM Value DischargePWMDutyCyle	%		
0x00E4	228	UINT16	2	R	Battery Voltage BatVol	0.01V		
0x00E6	230	UINT16	2	R	HeatCurrent	mA		
0x00EE	238	UINT8	2	R	Retention of RVD			
		UINT8		R	Charger Status ChargerPlugged		1: inserted ; 0: not inserted	
0x00F0	240	UINT32	4	R	SysRunTicks	0.1S		
0x00F4	244	UINT32	4	R	PVD Trigger Timestamps PVDTrigTimestamps	0.1S		
0x00F8	248	INT16	2	R	Battery temperature TempBat 3	0.1°C		
0x00FA	250	INT16	2	R	Battery temperature TempBat 4	0.1°C		
0x00FC	252	INT16	2	R	Battery temperature TempBat 5	0.1°C		
0x0100	256	UINT32	4	R	RTC Counter RTCTicks		Starting from 2020-1-1	
0x0108	264	UINT32	4	R	Enter Sleep TimeEnterSleep	S		
0x010C	268	UINT8	2	R	Parallel Current Limiting Module Status PCLModuleSta		1: open ; 0: close	
		UINT8		R	Retention of RVD			
0x0000	0	ASCII	16	R	Manufacturer model ManufacturerDeviceID			
0x0010	16	ASCII	8	R	HardwareVersion			

