

Jikong BMS RS485 Modbus universal protocol (V1.0)

Jikong BMS RS485 Modbus general protocol adopts master-slave response method for data communication. The host can only initiate a request through the 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 and cause data conflicts.

1. Physical interface The

electrical characteristics of the communication physical interface

| | |
|-----------------------------|-----------|
| are as follows: | UART |
| Communication | RS485 |
| interface level | 115200bps |
| Standard | |
| baud rate | 8 1 |
| Data bit Stop bit Check bit | none |

2. Agreement 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. Each slave must have a unique address on the bus. Only the slave that matches the address code sent by the master can respond and return data. .

2) Function code

The function code is the second byte of each communication information frame. The host sends it and tells the slave device through the function code that it should

When to perform what operation. The definition of function

| | | |
|---------------------|-----------------------------|---|
| code is as follows: | Function | |
| 10H | definition read | Operation reads data from one or more registers |
| 0BH | 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 "register first address + number of read registers", "register address + operation data", "register first address + number of operation registers + data" Length + data" and other different combinations, the data areas of different function codes are 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. Adding 0X80 to the second bit of the data frame indicates that an error 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 byte | |

error code is defined as follows:

| value | Function | illustrate |
|-------|------------------------|---|
| 01H | code with illegal name | This function code operation register is not supported |
| 02H | Register address error | Accessed a register that is prohibited from being accessed by the slave |
| 03H | Data is illegal | 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 master to the slave, the slave that matches the address code sent by the master receives the communication command. If

If the CRC check is correct, the corresponding operation will be performed, and then the execution result (data) will be returned to the host. returned messages

It contains address code, function code, data after execution and CRC check code. If the address does not match or the CRC is correct

If the verification fails, no information will be returned.

5. Function code analysis

1) Function code 03H: Read register

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

According to the data, the host 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 data in slave holding registers 05H and 06H are 1122H and 3344H, the slave returns:

| Data returned from the slave (HEX) | | |
|------------------------------------|-----------|-----|
| address code | | 01H |
| function code | | 03H |
| Number of bytes | | 04H |
| Register 05 data | High byte | 11H |
| | 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 data 0005H and 2233H to the slave address 01H, and the starting register address is

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

| Host sends | | Data(HEX) |
|---|-------------------------|-----------|
| 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 byte register is to be written | written high byte | 00H |
| | The low | 05H |
| 0001H register to be written | High byte | 22H |
| | low byte | 33H |
| CRC check | low byte | B9H |
| | high byte function code | 03H |

10H operation, the slave returns:

| Slave return | | 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 Register Map

| Starting address | code offset | Index data | type length | | R/W | Data content | Content | Unit | Note |
|------------------|-------------|------------|-------------|---------|-----|---|--|-----------|---------------------------|
| Address Field | HEX DEC | | Type e | Len gth | | | | Unit | |
| | | 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 | Cell overcharge protection recovery voltage | VolCellOVP | mV | |
| | g 0x0014 | 20 | UINT32 | 4 | RW | trigger equalization 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 | VolSvsPwrOff | mV | |
| | 0x002C | 44 | UINT32 | 4 | RW | Continuous charging current | CurBatCOC | mA | |
| | y 0x0030 | 48 | UINT32 | 4 | RW | Charging overcurrent protection delay | TIMBatCOCPRDI | | |
| | y 0x0034 | 52 | UINT32 | 4 | RW | Charging overcurrent protection released | TIMBatCOCPRDI | | |
| | 0x0038 | 56 | UINT32 | 4 | RW | Continuous discharge current | CurBatDcOC | SS | |
| | 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 | SSS | |
| | R 0x0050 | 80 | INT32 | 4 | RW | Charging over-temperature recovery | TMPBatCOTP | mA | |
| | 0x0054 | 84 | INT32 | 4 | RW | Discharge over-temperature protection | TMPBatDcOT | 0.1 μ | |
| | R 0x0058 | 88 | INT32 | 4 | RW | Discharge over-temperature recovery | TMPBatDcOTP | 0.1 μ | |
| | TMPBatCUT | 0x005C | 92 | INT32 | 4 | RW | Charging low temperature protection | 0.1 μ | |
| | R 0x0060 | 96 | INT32 | 4 | RW | Charging low temperature recovery | TMPBatCUTP | 0.1 μ | |
| | TPMMosOT | 0x0064 | 100 | INT32 | 4 | RW | MOS over temperature protection | 0.1 μ | |
| | TPMMosOTP | R 0x0068 | 104 | INT32 | 4 | RW | MOS over-temperature protection recovery | 0.1 μ | |
| | | | | 4 | RW | Cell Count | 0x006C 108 | UINT32 | 0.1 μ 0.1 μ μ |
| | 0x0070 | 112 | UINT32 | 4 | RW | charging switch | BatChargeEN | | 1: open; 0: closed |
| | 0x0074 | 116 | UINT32 | 4 | RW | discharge switch | BatDisChargeEN | | 1: open; 0: closed |
| | 0x0078 | 120 | UINT32 | 4 | RW | Balancing switch | BalanEN | | 1: open; 0: closed |
| | 0x007C | 124 | UINT32 | 4 | RW | Battery design capacity | CapBatCell | l | |
| | y 0x0080 | 128 | UINT32 | 4 | RW | Short circuit protection delay | SCPDela | us | |

0x1000

| | | | | | | | | | |
|--------|--------|--------|--------|-----|------|--|----|--|--|
| 0x0084 | 132 | UINT32 | 0x0088 | 136 | 4 RW | Balanced starting voltage VolStartBalan | mV | | |
| UINT32 | 0x008C | 140 | UINT33 | | 4 RW | Connection line internal resistance 0CellConWireRes0 | uÿ | | |
| 0x0090 | 144 | UINT34 | 0x0094 | 148 | 4 RW | Connection line internal resistance 1CellConWireRes1 | uÿ | | |
| UINT35 | 0x0098 | 152 | UINT36 | | 4 RW | Connection line internal resistance 2CellConWireRes2 | uÿ | | |
| 0x009C | 156 | UINT37 | 0x00A0 | 160 | 4 RW | Connection line internal resistance 3CellConWireRes3 | uÿ | | |
| UINT38 | 0x00A4 | 164 | UINT39 | | 4 RW | Connection line internal resistance 4CellConWireRes4 | uÿ | | |
| 0x00A8 | 168 | UINT40 | 0x00AC | 172 | 4 RW | Connection line internal resistance 5CellConWireRes5 | uÿ | | |
| UINT41 | 0x00B0 | 176 | UINT42 | | 4 RW | Connection line internal resistance 6CellConWireRes6 | uÿ | | |
| 0x00B4 | 180 | UINT43 | 0x00B8 | 184 | 4 RW | Connection line internal resistance 7CellConWireRes7 | uÿ | | |
| UINT44 | 0x00BC | 188 | UINT45 | | 4 RW | Connection line internal resistance 8CellConWireRes8 | uÿ | | |
| 0x00C0 | 192 | UINT46 | 0x00C4 | 196 | 4 RW | connection line internal resistance 9CellConWireRes9 | uÿ | | |
| UINT47 | 0x00C8 | 200 | UINT48 | | 4 RW | Connection line internal resistance10CellConWireRes10 | uÿ | | |
| 0x00CC | 204 | UINT49 | 0x00D0 | 208 | 4 RW | Connection line internal resistance 11CellConWireRes11 | uÿ | | |
| UINT50 | 0x00D4 | 212 | UINT51 | | 4 RW | connection line internal resistance 12CellConWireRes12 | uÿ | | |
| 0x00D8 | 216 | UINT52 | 0x00DC | 220 | 4 RW | connection line internal resistance 13CellConWireRes13 | uÿ | | |
| UINT53 | 0x00E0 | 224 | UINT54 | | 4 RW | connection line internal resistance 14CellConWireRes14 | uÿ | | |
| 0x00E4 | 228 | UINT55 | 0x00E8 | 232 | 4 RW | Connection line internal resistance 15CellConWireRes15 | uÿ | | |
| UINT56 | 0x00EC | 236 | UINT57 | | 4 RW | connection line internal resistance 16CellConWireRes16 | uÿ | | |
| 0x00F0 | 240 | UINT58 | 0x00F4 | 244 | 4 RW | Connection line internal resistance 17CellConWireRes17 | uÿ | | |
| UINT59 | 0x00F8 | 248 | UINT60 | | 4 RW | connection line internal resistance 18CellConWireRes18 | uÿ | | |
| 0x00FC | 252 | UINT61 | 0x0100 | 256 | 4 RW | Connection line internal resistance 19CellConWireRes19 | uÿ | | |
| UINT62 | 0x0104 | 260 | UINT63 | | 4 RW | connection line internal resistance 20CellConWireRes20 | uÿ | | |
| 0x0108 | 264 | UINT32 | 0x010C | 268 | 4 RW | connection line internal resistance 21CellConWireRes21 | uÿ | | |
| UINT32 | | | | | 4 RW | connection line internal resistance 22CellConWireRes22 | uÿ | | |
| | | | | | 4 RW | connection line internal resistance 23CellConWireRes23 | uÿ | | |
| | | | | | 4 RW | connection line internal resistance 24CellConWireRes24 | uÿ | | |
| | | | | | 4 RW | Connection line internal resistance 25CellConWireRes25 | uÿ | | |
| | | | | | 4 RW | connection line internal resistance 26CellConWireRes26 | uÿ | | |
| | | | | | 4 RW | connection line internal resistance 27CellConWireRes27 | uÿ | | |
| | | | | | 4 RW | connection line internal resistance 28CellConWireRes28 | uÿ | | |
| | | | | | 4 RW | connection line internal resistance 29CellConWireRes29 | uÿ | | |
| | | | | | 4 RW | connection line internal resistance 30CellConWireRes30 | uÿ | | |
| | | | | | 4 RW | connection line internal resistance 31CellConWireRes31 | uÿ | | |
| | | | | | 4 RW | device address DevAddr | H | | |
| | | | | | 4 RW | Discharge and precharge time TIMProdischarge | s | | |

| | | | | | |
|---------------|------------------|-----|---|-----------------------|------|
| 0x0114 276 | UINT16 | 2 | RW heating switch HeatEN | 1: open: 0: closed 1: | BIT0 |
| | | | RW temperature sensor shield Disable temp-sensor | open: 0: closed 1: | BIT1 |
| | | | RW GPS Heartbeat Detection GPS Heartbeat | open: 0: closed | BIT2 |
| | | | RW multiplexed port function Port Switch | 1: RS485; 0: CAN 1: | BIT3 |
| | | | RW Display always on LCD Always On | open: 0: closed 1: | BIT4 |
| | | | RW special charger identification Special Charger | open: 0: closed 1: | BIT5 |
| | | | RW SmartSleep | open: 0: closed | BIT6 |
| 0x0116 278 | INT8 | 2 | RW battery alarm temperatureTMPBatOTA | 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 | cell voltage 0CellVol0 | mV | |
| 0x0002 | 2 UINT16 | 2 R | cell voltage 1CellVol1 | mV | |
| 0x0004 | 4 UINT16 | 2 R | cell voltage 2CellVol2 | mV | |
| 0x0006 | 6 UINT16 | 2 R | cell voltage 3CellVol3 | mV | |
| 0x0008 | 8 UINT16 | 2 R | cell voltage 4CellVol4 | mV | |
| 0x000A 10 | UINT16 0x000C | 2 R | cell voltage 5CellVol5 | mV | |
| 12 | UINT16 0x000E 14 | 2 R | cell voltage 6CellVol6 | mV | |
| UINT16 0x0010 | | 2 R | cell voltage 7CellVol7 | mV | |
| | 16 UINT16 | 2 R | cell voltage 8CellVol8 | mV | |
| 0x0012 | 18 UINT16 | 2 R | cell voltage 9CellVol9 | mV | |
| 0x0014 | 20 UINT16 | 2 R | cell voltage 10CellVol10 | mV | |
| 0x0016 | 22 UINT16 | 2 R | cell voltage 11CellVol11 | mV | |
| 0x0018 | 24 UINT16 | 2 R | cell voltage 12CellVol12 | mV | |
| 0x001A 26 | UINT16 0x001C | 2 R | cell voltage 13CellVol13 | mV | |
| 28 | UINT16 0x001E 30 | 2 R | cell voltage 14CellVol14 | mV | |
| UINT16 0x0020 | | 2 R | cell voltage 15CellVol15 | mV | |
| | 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 | cell voltage 20CellVol20 | mV | |
| 0x002A 42 | UINT16 0x002C | 2 R | cell voltage 21CellVol21 | mV | |
| 44 | UINT16 0x002E 46 | 2 R | cell voltage 22CellVol22 | mV | |
| UINT16 | | 2 R | cell voltage 23CellVol23 | mV | |

| | | | | | | |
|--------|-----|--------|-----|---|------------|---|
| 0x0030 | 48 | UINT16 | 2 R | cell voltage24CellVol24 | mV | |
| 0x0032 | 50 | UINT16 | 2 R | cell voltage 25CellVol25 | mV | |
| 0x0034 | 52 | UINT16 | 2 R | cell voltage 26CellVol26 | mV | |
| 0x0036 | 54 | UINT16 | 2 R | cell voltage 27CellVol27 | mV | |
| 0x0038 | 56 | UINT16 | 2 R | cell voltage 28CellVol28 | mV | |
| 0x003A | 58 | UINT16 | 2 R | cell voltage 29CellVol29 | mV | |
| 0x003C | 60 | UINT16 | 2 R | cell voltage 30CellVol30 | mV | |
| 0x0040 | | | 2 R | cell voltage 31CellVol31 | mV | |
| | 64 | UINT32 | 4 R | Battery Status CellSta | | BIT[n] is 1, indicating that the battery exists |
| 0x0044 | 68 | UINT16 | 2 R | Cell average voltage CellVolAve | mV | |
| 0x0046 | 70 | UINT16 | 2 R | Maximum voltage 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 | Balanced line resistance 0CellWireRes0 | m Ω | |
| 0x004C | 76 | UINT16 | 2 R | Balanced line resistance 1CellWireRes1 | m Ω | |
| 0x0050 | | | 2 R | Balanced line resistance 2CellWireRes2 | m Ω | |
| | 80 | UINT16 | 2 R | Balanced line resistance 3CellWireRes3 | m Ω | |
| 0x0052 | 82 | UINT16 | 2 R | Balanced Wire Resistor 4CellWireRes4 | m Ω | |
| 0x0054 | 84 | UINT16 | 2 R | Balanced Wire Resistor 5CellWireRes5 | m Ω | |
| 0x0056 | 86 | UINT16 | 2 R | Balanced Wire Resistor 6CellWireRes6 | m Ω | |
| 0x0058 | 88 | UINT16 | 2 R | Balanced Wire Resistor 7CellWireRes7 | m Ω | |
| 0x005A | 90 | UINT16 | 2 R | Balanced Wire Resistor 8CellWireRes8 | m Ω | |
| 0x005C | 92 | UINT16 | 2 R | Balanced Wire Resistor 9CellWireRes9 | m Ω | |
| 0x0060 | | | 2 R | Balanced Wire Resistor10CellWireRes10 | m Ω | |
| | 96 | UINT16 | 2 R | Balanced line resistor 11CellWireRes11 | m Ω | |
| 0x0062 | 98 | UINT16 | 2 R | Balanced Wire Resistor12CellWireRes12 | m Ω | |
| 0x0064 | 100 | UINT16 | 2 R | Balanced Wire Resistor13CellWireRes13 | m Ω | |
| 0x0066 | 102 | UINT16 | 2 R | Balanced Wire Resistor14CellWireRes14 | m Ω | |
| 0x0068 | 104 | UINT16 | 2 R | Balanced Wire Resistor15CellWireRes15 | m Ω | |
| 0x006A | 106 | UINT16 | 2 R | Balanced Wire Resistor16CellWireRes16 | m Ω | |
| 0x006C | 108 | UINT16 | 2 R | Balanced Wire Resistor17CellWireRes17 | m Ω | |
| 0x006E | 110 | UINT16 | 2 R | Balanced Wire Resistor18CellWireRes18 | m Ω | |
| 0x0070 | 112 | UINT16 | 2 R | Balanced Wire Resistor19CellWireRes19 | m Ω | |
| 0x0072 | 114 | UINT16 | 2 R | Balanced Wire Resistor20CellWireRes20 | m Ω | |
| 0x0074 | 116 | UINT16 | 2 R | Balanced Wire Resistor21CellWireRes21 | m Ω | |
| | | | 2 R | Balanced Wire Resistor22CellWireRes22 | m Ω | |

| | | | | | | | | | | |
|--------|--------|---------------------------|----------------|------------------------------|-------------------|--|-------------------|------------|---|----------|
| 0x1200 | 0x0076 | 118 | UINT16 | 0x0078 | 2 R | Balanced Wire Resistor 22 | CellWireRes22 | m Ω | | |
| | 120 | UINT16 | 0x007A | 122 | 2 R | Balanced Wire Resistor 23 | CellWireRes23 | m Ω | | |
| | UINT16 | 0x007C | 124 | UINT16 | 2 R | Balanced Wire Resistor 24 | CellWireRes24 | m Ω | | |
| | 0x007E | 126 | UINT16 | 0x0080 | 2 R | Balanced line resistance 25 | CellWireRes25 | m Ω | | |
| | 128 | UINT16 | 0x0082 | 130 | 2 R | Balanced Wire Resistor 26 | CellWireRes26 | m Ω | | |
| | UINT16 | 0x0084 | 132 | UINT16 | 2 R | Balanced Wire Resistor 27 | CellWireRes27 | m Ω | | |
| | 0x0086 | 134 | UINT16 | 0x0088 | 2 R | Balanced Wire Resistor 28 | CellWireRes28 | m Ω | | |
| | 136 | UINT16 | 0x008A | 138 | 2 R | Balanced Wire Resistor 29 | CellWireRes29 | m Ω | | |
| | INT16 | 0x008C | 140 | UINT32 | 2 R | Balanced Wire Resistor 30 | CellWireRes30 | m Ω | | |
| | 0x0090 | 144 | UINT32 | 0x0094 | 2 R | Balanced Wire Resistor 31 | CellWireRes31 | m Ω | | |
| | 148 | UINT32 | 0x0098 | 152 | 2 R | Power board temperature | TempMos | 0.1 μ | | |
| | INT32 | 0x009C | 156 | INT16 | 4 R | Balanced line resistance status | CellWireResSta | | BIT[n] is 1, indicating that the balance line is alarming | |
| | 0x009E | 158 | INT16 | | 4 R | total battery voltage | BatVol | mV | | |
| | | | | | 4 R | battery power | BatWatt | mW | | |
| | | | | | 4 R | battery current | BatCurrent | mA | | |
| | | | | | 2 R | Battery temperature | TempBat 1 | 0.1 μ | | |
| | | | | | 2 R | Battery temperature | TempBat 2 Balance | 0.1 μ | | |
| 0x00A0 | 160 | UINT32 | 4 R | | | line resistance is too large | AlarmWireRes | | 1: Fault; 0: Normal | 1: BIT0 |
| | | | | | | MOS over-temperature protection | AlarmMosOTP | | Fault; 0: Normal | 1: BIT1 |
| | | | | | | The number of cells and the setting value do not comply with the | AlarmCell | | Fault; 0: Normal | 1: BIT2 |
| | | | | | | Quantity Current sensor abnormality | AlarmCurSensorErr | | Fault; 0: Normal | 1: BIT3 |
| | | | | | | Cell over-voltage protection | AlarmCellOVP | | Fault; 0: Normal | 1: BIT4 |
| | | | | | | Battery over-voltage protection | AlarmBatOVP | | Fault; 0: Normal | 1: BIT5 |
| | | | | | | Charging over-current protection | AlarmChOCP | | Fault; 0: Normal | 1: BIT6 |
| | | | | | | Charging short-circuit protection | AlarmChSCP | | Fault; 0: Normal | 1: BIT7 |
| | | | | | | Charging over-temperature protection | | | Fault; 0: Normal | 1: BIT8 |
| | | | | | | AlarmChOTP Charging low temperature | | | Fault; 0: Normal | 1: BIT9 |
| | | | | | | protection AlarmChUTP Internal Communication abnormality | | | Fault; 0: Normal | 1: BIT10 |
| | | | | | | AlarmCPUAuxCommuErr Cell undervoltage | | | Fault; 0: Normal | 1: BIT11 |
| | | | | | | protection AlarmCellUVP Battery undervoltage | | | Fault; 0: Normal | 1: BIT12 |
| | | | | | | protection AlarmBatUVP Discharge overcurrent | | | Fault; 0: Normal | 1: BIT13 |
| | | | | | | protection AlarmDchOCP Discharge short | | | Fault; 0: Normal | 1: BIT14 |
| | | | | | | circuit protection AlarmDchSCP Discharge | | | Fault; 0: Normal | 1: BIT15 |
| | | | | | | overtemperature protection | AlarmDchOTP | | Fault; 0: Normal | 1: BIT16 |
| | | Charging tube abnormality | AlarmChargeMOS | Discharging tube abnormality | AlarmDischargeMOS | Fault; 0: Normal | 1: BIT17 | | | |

| | | | | | | | | |
|------------|-------------------|--|---|-----------------------|---|--------|---------------------------------|-------|
| | | | | | GPS Disconnect GPSDisconnete d Please | | 1: Fault; 0: Normal 1: | BIT18 |
| | | | | | modify the authorization password in time Modify PWD. in | | Fault; 0: Normal 1: Fault; | BIT19 |
| | | | | | time Discharge On Failed Battery Over Temp | | 0: Normal 1: Fault; 0: | BIT20 |
| | | | | | Alar m | | Normal | BIT21 |
| 0x00A4 164 | INT16 | | 2 | R | Balancing current BalanCurrent | mA | | |
| 0x00A6 | 166 | UINT8 | 2 | R | equilibrium state BalanSta | | 2: Discharge; 1: Charge; 0: Off | |
| | | UINT8 | | R | remaining power SOCCStateOfchar ge | % | | |
| 0x00A8 168 | INT32 0x00AC 172 | | 4 | R | remaining capacity SOCCa pRemai n | MAH | | |
| | UINT32 0x00B0 176 | UINT32 | 4 | R | actual battery capacity SOCFullChar geCap | MAH | | |
| 0x00B4 180 | UINT32 | | 4 | R | Number of cycles SOCC ycleCount | | | |
| | | | 4 | R | total cycle capacity SOCC ycleCap | times | | |
| 0x00B8 | 184 | UINT8 | 2 | R | SOH Valuation SOCSOH | MAH % | | |
| | | UINT8 | | R | precharge status Precharge | | 1: open; 0: closed | |
| 0x00BA 186 | UINT16 0x00BC 188 | | 2 | R | User level alarm UserAlarm | | | |
| | UINT32 | | 4 | R | RunTimeRunTime | s | | |
| 0x00C0 | 192 | UINT8 | 2 | R | charging statusCharge | | 1: open; 0: closed 1: | |
| | | UINT8 | | R | discharge state Discharge | | open; 0: closed | |
| 0x00C2 194 | UINT16 0x00C4 196 | | 2 | R | User level alarm 2UserAlarm2 | | | |
| | UINT16 0x00C6 198 | UINT16 | 2 | R | Discharge overcurrent protection release time TimeDcOCP R | s | | |
| 0x00C8 200 | UINT16 0x00CA 202 | | 2 | R | Discharge short circuit protection release time TimeDcSCP R | s | | |
| | UINT16 0x00CC 204 | UINT16 | 2 | R | Charging overcurrent protection release time TimeCOCP R | s | | |
| 0x00CE 206 | UINT16 | | 2 | R | Charging short circuit protection release time TimeCSCP R | s | | |
| | | | 2 | R | Single unit undervoltage protection release time TimeUVP R | s | | |
| | | | 2 | R | Single unit overvoltage protection release time TimeOVP R | s | | |
| 0x00D0 | 208 | UINT8 | 2 | R | MOS temperature sensor MOS Tem pSensorAbsent | | | BIT0 |
| | | | | | Battery temperature sensor 1 BATTem pSensor1Absent | | 1: normal; 0: missing 1: | BIT1 |
| | | | | | Battery temperature sensor 2 BATTem pSensor2Absent | | normal; 0: missing 1: | BIT2 |
| | | | | | Battery temperature sensor 4 BATTem pSensor4Absent | | normal; 0: missing 1: | BIT4 |
| | | Battery temperature sensor 5 BATTem pSensor5Absent | | | normal; 0: missing 1: on; | BIT5 | | |
| | UINT8 | | R | Heating stateHeatin g | | 0: off | | |
| 0x00D2 210 | UINT16 0x00D4 212 | | 2 | R | Reserved | | | |
| | UINT16 0x00D6 214 | UINT16 | 2 | R | Emergency switching time TimeEmer genc y | s | | |
| 0x00D8 216 | UINT16 0x00DA 218 | | 2 | R | Battery current correction factor BatCurCorrect | | | |
| | UINT16 | | 2 | R | Charge 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 charging PWM value ChargePWMDutyCycle | % | |
| | UINT16 0x00E4 228 | UINT16 | | 2 R | Balanced discharge PWM value DischargePWMDutyCycle | % | |
| | 0x00E6 230 | UINT16 | | 2 R | Battery voltage BatVol | 0.01V | |
| | | | | 2 R | heating current HeatCurrent | mA | |
| | 0x00EE 238 | | UINT8 | 2 | R retain RVD | | |
| | | | UINT8 | | R Charger status ChargerPlugged | | 1: inserted; 0: not inserted |
| | 0x00F0 240 | UINT32 | 0x00F4 | 4 R | system beats SysRunTicks | 0.1S | |
| | 244 | UINT32 | 0x00F8 248 | 4 R | PVD trigger timestamp PVDTriggerTimestamp | 0.1S | |
| | 0x00FA 250 | INT16 | 0x00FC | 2 R | Battery temperature TempBat 3 | 0.1ÿ | |
| | 252 | INT16 | 0x0100 256 | 2 R | Battery temperature TempBat 4 | 0.1ÿ | |
| | UINT32 0x0108 264 | UINT32 | | 2 R | Battery temperature TempBat 5 | 0.1ÿ | |
| | | | | 4 R | RTC counter RTCTicks | | Time starts from 2020-1-1 |
| | | | | 4 R | Enter sleep time TimeEnterSleepParallel | s | |
| | 0x010C 268 | | UINT8 | 2 R | current limiting module status PCLModuleStatus | | 1: open; 0: closed |
| | | | UINT8 | | Reserved 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 number SoftwareVersion | | |
| | 0x0020 | 32 | UINT32 | 4 R | Accumulated running time ODDRunTime | s | |
| | 0x0024 | 36 | UINT32 | 4 R | Power-on times PWROnTimes | times | |
| 0x1600 | 0x0000 | 0 | UINT16 | 2 W | voltage calibration VoltageCalibration | 0.1V | |
| | 0x0002 | 2 | UINT16 | 2 W | protection board shutdown Shutdown | | |
| | 0x0004 | 4 | UINT16 | 2 W | CurrentCalibration | 0.1A | |
| | 0x0006 | 6 | UINT16 | 2 W | One-click three-element LI-ION | | |
| | 0x0008 | 8 | UINT16 | 2 W | One-key lithium iron LIFEP04 | | |
| | 0x000A 10 | UINT16 | 0x000C 12 | 2 W | One-bond Lithium Titanate LTO | | |
| | UINT16 0x000E 14 | UINT32 | | 2 W | emergency start Emergency | | |
| | | | | 4 W | Timecalibration | | |