

---

## MODBUS Protocol between UPS(SMPS) and BMS

(Version V01.02)

Version	Modify	Date	
V01.01	Init	11-30-2018	
V01.02	Modify the description of Master and Slave	09-19-2019	

---

## 1. Data format

### 1.1 Data byte format

Start bit(1)	Data bits (8bits,LSB->MSB)	Stop bit(1)
--------------	----------------------------	-------------

### 1.2 Baud rate

Baud rate: 9600~19200. (Default baud rate: 9600)

Reading time interval: 300mS

### 1.3 Packet format

Master : UPS/SMPS

Slave: Battery BMS

Battery module ID: Battery BMS ID, set by the DIP switch on the battery panel. 0x01~0x10.

No.	Module Address	Battery Module ID	ID Arrangement			
1	0x01	1	ON	ON	ON	OFF
2	0x02	2	ON	ON	OFF	ON
3	0x03	3	ON	ON	OFF	OFF
4	0x04	4	ON	OFF	ON	ON
5	0x05	5	ON	OFF	ON	OFF
6	0x06	6	ON	OFF	OFF	ON
7	0x07	7	ON	OFF	OFF	OFF
8	0x08	8	OFF	ON	ON	ON
9	0x09	9	OFF	ON	ON	OFF
10	0x0a	10	OFF	ON	OFF	ON
11	0x0b	11	OFF	ON	OFF	OFF
12	0x0c	12	OFF	OFF	ON	ON
13	0x0d	13	OFF	OFF	ON	OFF
14	0x0e	14	OFF	OFF	OFF	ON
15	0x0f	15	OFF	OFF	OFF	OFF
16	0x10	16	ON	ON	ON	ON

### 1.3.1 Packet send from master

Slave Address	Function code	Starting address(Hi)	Starting address(Lo)	Numbers of data(Hi)	Numbers of data(Lo)	CRC (Lo)	CRC (Hi)
8bit	8bit	8bit	8bit	8bit	8bit	8bit	8bit

### 1.3.2 Packet response by slave

Slave Address	Function code	Byte count	Data 1 (Hi)	Data1 (Lo)	Data n (Hi)	Data n: (Lo)	CRC (Lo)	CRC (Hi)
8bit	8bit	8bit	8bit	8bit	8bit	8bit	8bit	8bit

## 2.Function Code

### 2.1 Read registers

Send by the master SMPS/UPS

Slave Address	Function Code	Address (Hi)	Address (Lo)	Num of register(Hi)	Num of register(Lo)	CRC (Lo)	CRC (Hi)
0x01-0x10	0x03	0x00	0x00-0xff	0x00	0x00-0xff	-	-

Response by slave (Battery BMS)

Slave address	Function Code	Byte Count	Data1 (Hi)	Data1 (Lo)	...	Data N (Hi)	Data (Lo)	CRC (Lo)	CRC (Hi)
0x01-0x10	0x03	2*(Num of register)	...-	...	...	...	...	..-	-

### 2.2 Write registers

Send by the master SMPS/UPS

Slave Address	Function Code	Address (Hi)	Address (Lo)	Num of register(Hi)	Num of Register(Lo)	Byte Count	
0x01-0x10	0x10	0x00	0x00-0xf f	0x00	0x00-0xff	2*(Num of register)	
Data1 (Hi)	Data1 (Lo)	.....		DataN (Hi)	DataN (Lo)	CRC (Lo)	CRC (Hi)

...	....		...	...	-	-
-----	------	--	-----	-----	---	---

Response by slave (Write success )

Slave Address	Function Code	Address (Hi)	Address (Lo)	Num of register(Hi)	Num of register(Lo)	CRC (Lo)	CRC (Hi)
0x01-0x10	0x10	0x00	0x00-0xff	0x00	0x00-0xff	-	-

Response by slave (Write Error)

Slave address	Function Code	Error num	CRC (Lo)	CRC (Hi)
0x01-0x10	0x090	...	-	-

### 3.Register

ULONG : Unsigned long,4 bytes

LONG: Signed long, 4 bytes

USHORT: Unsigned int, 2 bytes

**SHORT: signed int, 2bytes**

Address	Content	Length	RW/Data type	Unit	Comment
0000	Voltage	2byte	R/USHORT	10mV	0~9000*10mV
0001	Current	2byte	R/SHORT	10mA	0~32767 : Charge -32768~0:Discharge
0002-0017	Cell Voltage	32byte	R/USHORT	mV	Voltage of 16 Cells, 2 byte for each cell
0018	Temp of PCB	2byte	R/SHORT	°C	Temperature
0019	Temp Avg	2byte	R/SHORT	°C	Temperature
0020	Temp Max	2byte	R/SHORT	°C	Temperature

0021	Cap Remaining	2Byte	R/USHORT		
0022	Max charging Current	2Byte	R/USHORT		
0023	SOH	2byte	R/USHORT		0-100%
0024	SOC	2byte	R/USHORT		0-100%
0025	Status	2byte	R/USHORT		<p>0x0000:加热关/Stand by  0x0001:加热关/Charging  0x0002:加热关/Discharging  0x0004:加热关/Protect  0x0008:加热关/Charging Lmt  0x8000:加热开/Stand by  0x8001:加热开/Charging  0x8002:加热开/Discharging  0x8004:加热开/Protect  0x8008:加热开/Charging Lmt</p> <p>高位字节为 0x00 : 加热状态--关  高位字节为 0x80 : 加热状态--开</p>
0026	Warning	2byte	R/USHORT		<p>0x0001 : Pack OV  0x0002 : Cell OV  0x0004 : Pack UV  0x0008 : Cell UV  0x0010 : Charge OC  0x0020 : Discharge OC  0x0040: 环境温度异常  0x0080: MOS 温度高  0x0100 : Charge OT  0x0200 : Discharge OT  0x0400 : Charge UT  0x0800 : Discharge UT  0x1000 : Low capacity  0x2000: 浮充停止/Float Stopped  0x4000:</p>

0027	Protection	2byte	R/USHORT		0x0001 : Pack OV 0x0002 : Cell OV 0x0004 : Pack UV 0x0008 : Cell UV 0x0010 : Charge OC 0x0020 : Discharge OC 0x0040: 环境温度异常 0x0080: MOS 温度高 0x0100 : Charge OT 0x0200 : Discharge OT 0x0400 : Charge UT 0x0800 : Discharge UT 0x1000 : Low capacity 0x2000 : Discharge SC
0028	Error Code	2byte	R/USHORT		0x0001 : Voltage error 0x0002 : Temperature error 0x0004: 电流检测 Error 0x0010 : Cell unbalance
0029	Cycle counts	4byte	RW/ULONG		1 ~ 65535
0030					
0031 0032	Full Capacity	4byte	RW/ULONG	mAS	=mAh/3600
0033 0034 0035	Temp	6Byte			Temperature for 6 sensor , 1byte/1Sensor
0036	Cell Num	2byte	RW/USHORT		电池串数
0037	Designed Capacity	2Byte		0.1AH	电池标准容量
0038	Cell Balance Status	2Byte			0001 : Cell 1 均衡开 0002 : Cell 2 均衡开 0004 0008  8000 : Cell 16 均衡开

---

0105-0116	Model	24Byte	R		产品型号
0117-0119	FW Version	6Byte	R		BMS 软件版本(如：6 字节字符串 V03R04)
0120-0127	Serial No.	16Byte	RW		产品序列号. 16 字节字符串