Q/SZQY 古瑞瓦特新能源股份公司企业标准

Q/SZQY—20002—2018

Growatt BMS CAN-Bus-protocol -low-voltage

Rev.	Change	Author
V1.01	2018/6/1:我司协议BMS Protocol_CAN_20180601	魏巍
V1.02	2018/11/13: 1. CAN ID: 0x312 增加电池节数； 2. CANID:0x315~0x318 增加单体 1~16 的电压； 3. CAN ID:0x320 增加电池型号为 6532； 2018/12/6: 1. CANID: 0x319 增加电池类型定义 Byte0 bit0-bit1 (00: 磷酸铁锂电池/01: 三元电池/10: 钛酸锂电池/11: 保留)； 2.CAN ID:0x320 去掉电池型号 6532，Byte6-Byte7 用作 Date & Time；	王敏
V1.03	2019/02/19: 1、 CAN ID：0x0319 添加上报单体最高和最低电压 2、 添加储能机 CAN 接线端口定义描述 3、 CANID:0x315~0x318 定义为非必选项,电池可选择上报； 4、 CAN ID：0x0319 添加并联时上报故障保护的电池 ID	Demon
V1.04	2019/02/22: 1、CAN ID：0x321 添加远程升级上报信息（ATL）	Demon

1、 CAN 通讯方式

➢ CAN 总线规格 CAN Bus

采用标准帧，总线传输速率为 500kbps

➢ 数据模式

大端方式，数据高字节存放地址低字节.协议中会用到以下数据类型，定义如下：

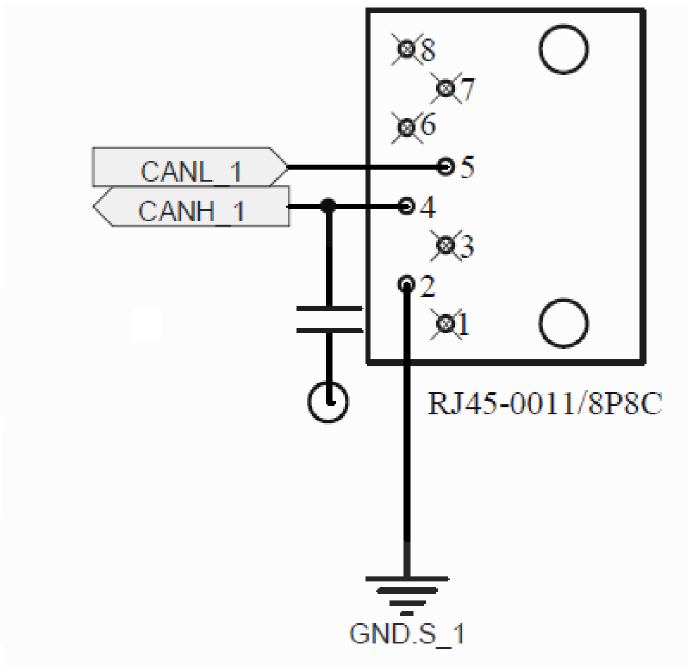
序号	数据类型	类型定义	数据长度（字节）
1	Byte	unsigned char	1
2	Uint16	unsigned short int	2
3	Uint32	unsigned int	4
4	Sint8	signed char	1
5	Sint16	signed short int	2
6	Sint32	signed int	4
7	FP32	float	4

➢ 通信模式

储能机设备发送查询指令或者控制指令帧后，电池组设备响应数据；

逆变器每秒回复数据（标准帧/10 进制）：0x301: 11-22-33-44-55-66-77-88；

➢ 接口定义



➢ 名词解释

SP：储能机

Cell：电池电芯

Pack：封装了 BMS 系统的电池组，一般包含多个电芯

FCC：电池满负荷容量

RM：剩余容量

2、 CAN 报文

CAN ID: 0x311

Byte 0 Byte 1	Battery charge voltage 建议充电电压（CV）	Unit: 0.1V	Uint16, 2`s complement
Byte 2 Byte 3	Charge current limit 充电限流	Unit: 0.1A	Uint16, 2`s complement
Byte4 Byte 5	Discharge current limit 放电限流	Unit: 0.1A	Uint16, 2`s complement
Byte 6 Byte 7	Status	Bit0~11	**Table1**

Table1: Status bits

Bit Index	Content	Comment
0 1	status	00 : soft_starting 01 : stand by 10 : charging 11 : discharging
2	Error bit flag	1 : “Error” byte valid 0 : “Error” byte Invalid
3	Cell balance status	0 : unbalance 1 : balance
4	Sleep status	0 : disable 1 : enable
5	Output Discharge status	0 : disable 1 : enable
6	Output Charge status	0 : disable 1 : enable
7	Battery terminal status	0 : terminal connected 1 : terminal open
8 9	Master box Operation Mode	00:单机 01:并联 10:并联准备
10 11	SP Status	00 : none 01 : stand by 10 : charging 11 : discharging

“Master box Operation Mode”： There is no special control in the current SP program , All controls are performed by the BMS itself , SP is only identify the state. 在目前的储能机程序中没有做特殊的控制，所有的控制由电池 BMS 自己完成，储能机只是用来识别该状态.

CAN ID: 0x312

Byte 0	保护	**Table 1**	
Byte 1	保护	**Table 2**	
Byte 2	告警	**Table 3**	
Byte 3	告警	**Table 4**	
Byte4	Pack Number 电池并联数	1~254	Uint8
Byte 5	“X”	Example：0xAA	厂商代码
Byte 6	“X”	Example：0xBB	
Byte 7	Total Cell Number 总电池节数	1~254	Uint8

Table 1

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
DisCharge over current	Charge over current	SCD(Short Circuit Discharge) protection	Cell over voltage	Cell under voltage	module over voltage	module under voltage	Soft start fail

Table 2

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
OTD(Over Temperature Discharge) protection	OTC (Over Temperature Charge)protection	UTD (Under Temperature Discharge)protection	UTC (Under Temperature Charge)protection	System error	Delta V Fail		

Table 3

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
DisCharge over current	Charge over current		Cell over voltage	Cell under voltage	module over voltage	module under voltage	

Table 4

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
OTD(Over Temperature Discharge) protection	OTC (Over Temperature Charge)protection	UTD (Under Temperature Discharge)protection	UTC (Under Temperature Charge)protection		Delta V Fail	Pack before turn off	Internal communication fail

CAN ID: 0x313

Byte 0 Byte 1	Voltage of single module or average module voltage of system 单模块的电压或系统平均电压	Unit: 0.01V	Sint16, 2`s complement
Byte 2 Byte 3	Module or system total current 单台或系统总电流	Unit: 0.1A	Sint16, 2`s complement
Byte4 Byte 5	Cell maximum temperature 电池最高温度	Unit: 0.1℃	Sint16, 2`s complement
Byte 6	SOC of single module or average value of system	Unit: 1%	Uint8
Byte 7	SOH		Bit 0~ Bit6 SOH Counters Bit7:SOH Flag

CAN ID: 0x314

Byte 0 Byte 1	Gauge RM	10mAh	Current capacity
Byte 2 Byte 3	Gauge FCC	10mAh	Normal fully charged capacity
Byte4 Byte 5	Delta V	1mV	Difference between the max Cell voltage and the min
Byte 6 Byte 7	Cycle Count	h	

CAN ID: 0x319

Byte 0	Request& battery type	**Table 5**	
Byte 1	Maximum cell voltage	1mV	Uint16
Byte 2			
Byte 3	Minimum cell voltage	1mV	Uint16
Byte4			
Byte 5	Maximum cell voltage number	1	Uint8
Byte6	Minimum cell voltage number	1	Uint8
Byte7	Protect pack ID 故障电池地址	1	Uint8

Note : When the batteries are connect in parallel ,Cell number starts with the mainfram ,and then the slave .When reporting the highest or lowest voltage of a cell , all the cells should be counted.
说明：电池并联时，电池单体编号从主机开始，然后依次第一从机、第二从机等，并联上报单体单最高或最低电压是所有的单体一起做统计。

Table 5

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Charge enable	Discharge enable	Request force charge I* 强充标记1	Request force charge II* 强充标记2			00：磷酸铁锂电池 01：三元电池 10：钛酸锂电池 11：保留	

Please use bit 5, the SOC range is: 5~10%. Bit 4 is NULL.
In this case, inverter itself should set a threshold of SOC: after force charge, only when battery SOC is higher than this threshold then inverter will allow discharge, to avoid force charge and discharge status change frequently.

CAN ID：0x320

Byte 0 Byte 1	Manufacturer Name	XX	ASCII *1 Byte 0 =”0x00” Byte 1=”0x01”
Byte 2	Hardware version		range：1~9
Byte 3	Software version		range：1~9
Byte 4	Date & Time 1		See **Date & Time bits**
Byte 5	Date & Time 2		See **Date & Time bits**
Byte 6	Date & Time 3		See **Date & Time bits**
Byte 7	Date & Time 4		See **Date & Time bits**

*1 Note: Manufacturer Name 电池厂家缩写的大写字母；

Date & Time bits Table

Bit Index	Content	Comment
0 ~ 5	Second	0~59
6 ~ 11	Minute	0~59
12 ~ 16	Hour	0~23
17 ~ 21	Day	1~31
22 ~ 25	Month	1~12
26 ~ 31	Year	2000~2063

CAN ID：0x321

Byte 0	Update status 升级状态	Table6	
Byte 1	Update schedule of single pack 单个电池升级进度		range：0~100
Byte 2	programming ID of pack 升级中的电池地址		
Byte 3	Update Successful count 升级成功个数		
Byte 4			
Byte5			
Byte 6			

Table6

Bit 5~Bit7	Bit 3 ~Bit 4	Bit 1 ~ Bit 2	Bit 0
	00: Slave normal 01: Slave programming 10: Slave update successful 11: Slave update fail	00: Master normal 01: Master programming 10: Master update successful 11: Master update fail	0 : normal 正常运行 1: programming 升级中

The following parameters do not need to be reported when the battery is connected in parallel, but can be reported when it single .

以下参数在电池并联时不用上报，单个电池时可以选择上报；

CAN ID:0x315

Byte 0 Byte 1	Cell 1 Voltage	1mV	Uint16
Byte 2 Byte 3	Cell 2 Voltage	1mV	Uint16
Byte 4 Byte5	Cell 3 Voltage	1mV	Uint16
Byte 6 Byte 7	Cell 4 Voltage	1mV	Uint16

CAN ID:0x316

Byte 0 Byte 1	Cell 5 Voltage	1mV	Uint16
Byte 2 Byte 3	Cell 6 Voltage	1mV	Uint16
Byte 4 Byte5	Cell 7 Voltage	1mV	Uint16

Byte 6	Cell 8 Voltage	1mV	Uint16
Byte 7			

CAN ID:0x317

Byte 0	Cell 9 Voltage	1mV	Uint16
Byte 1			
Byte 2	Cell10 Voltage	1mV	Uint16
Byte 3			
Byte 4	Cell 11 Voltage	1mV	Uint16
Byte5			
Byte 6	Cell 12 Voltage	1mV	Uint16
Byte 7			

CAN ID:0x318

Byte 0	Cell 13 Voltage	1mV	Uint16
Byte 1			
Byte 2	Cell14 Voltage	1mV	Uint16
Byte 3			
Byte 4	Cell 15 Voltage	1mV	Uint16
Byte5			
Byte 6	Cell 16 Voltage	1mV	Uint16
Byte 7			