PCS-CANBUS
Protocol V3.2

Version History

Date	Version	Chapter	Remark	Author
2021/9/28	1.0		Modified based on "CAN-Bus-protocol-DY-low-voltage-V1.5-20210629"	Cheng Liang
2021/10/8	1.1		The reporting method of temperature and current has been changed to uniformly use signed short reporting, without the need for offset	Cheng Liang
2021/10/13	1.2		0x300 conflicts with 0x305 sent by PCS, so the start ID of summary information 3 is changed to 0x400	Cheng Liang
2021/10/21	1.3		Add OCC fault reporting	Cheng Liang
2021/11/3	1.4		Added parallel status reporting	Jin Bingnan
2021/11/8	1.5		1. Supplement the fault frame content to synchronize the actual fault; 2. Modify the byte occupied by SOH of 0x150 and 0x200 and the single voltage resolution	Jin Bingnan
2021/11/16	1.6		1. Modify the content sending bit position of 0x100x frame	Jin Bingnan
2021/12/3	1.7		1. Modify the content of 0x371; 2. Add content description; 3. Add SCDL fault reporting;	Jin Bingnan
2021/12/21	1.8		1. Modify 0x100 and 0x359 to add fault reporting of OCD1, OCD2, and OCDL	Jin Bingnan
2022/1/17	1.9		Added software version and battery SN code reporting	Cheng Liang
2022/1/17	1.10		Update the software version by referring to 0x363 report	Cheng Liang
2022/2/25	2.1		Fault and MOS information ID changed from 0x100 to 0x110	Cheng Liang
2022/8/25	2.2.		Add the last 32 bits of 0x250 as the maximum allowable charging current and maximum allowable discharge current. Modify the last 16 bits of 0x400 as the system sub-state and reserve 8 bits. Add 0x700 to report the cumulative charge and discharge amount Added 0x750 and 0x800 to report the cumulative number of faults Organize the fault list fault code	Jin Bingnan
2022/8/26	2.3		Modify 0x700 to 0x550, 0x750 to 0x700, 0x800 to 0x750	Jin Bingnan
2022/9/06	2.4		Modify 0x500, cancel the hardware version number reporting, and report the Boot version information instead	Jin Bingnan
2022/9/14	2.5		The current direction in 0x356 and 0x150 is increased: discharge is positive, charge is negative	Jin Bingnan
2023/3/23	2.6		Added fuse blown fault, heating MOS adhesion fault, and heating fault reporting in 0x359 and 0x110x	Jin Bingnan
2023/5/03	2.7		Added fuse blown fault, heating MOS adhesion fault, and heating fault reporting in 0x359 and 0x110x	Jin Bingnan
2023/5/22	2.8		Modify the fault definition sequence number in 0x359 and 0x110x	Li Xiangyang
2023/5/26	2.9		Add voltage disconnection fault, temperature disconnection fault, and charging voltage too low fault to 0x359 and 0x110x	Li Xiangyang
2023/12/28	3.0		Added information function for USB board	Liang Yubo
2024/02/26	3.1		Only the host retains USB information, deletes 045 single packet information frame, 306 frames are fixedly sent to the host, and TABLE 8 storage connector and terminal failure is added	Liang Yubo

2024/04/11	3.2		Modify the 0x359 and 0x110 frame information content to only report important faults	Liang Yubo
2024/05/25	3.3		Further optimize the 0x359 and 0x110 frame information content to adapt to cloud and all-in-one LCD display	Liang Yubo

CAN Bus SpecificationsCAN Bus:

Inter format

Use standard frame, rate: 500kbps, data sending cycle 1s.

Use standard frame, communication rate: 500kbps, data transmission cycle: 1s. The inverter replies data every second:

Inverter reply every second:**0x305**: 00-00-00-00-00-00-00-00 (**Add time data**)

PCS sends frame ID to BMS CAN ID: 0x300 ----0x30F reserved for PCS downlink data frame segment

0x305 **【PCS heartbeat frame】**

Byte 0	Sec		0-59
Byte 1	Minute		0-59
Byte 2	Hour		0-23
Byte 3	Day		1-31
Byte 4	Mon		1-12
Byte 5	Year		0-100, offset 2000
Byte 6	-		
Byte 7	-		

Little endian.

0x306 USB board control information frame 1

Byte 0	Usb_Switch_Sta USB slave board switch status		0Close 1Open
Byte 1	USB slave board disabled time_L	Unit: 1S	3000~18000 Default 5min Maximum 30min
Byte 2	USB slave board disabled time_H		
Byte 3			
Byte 4			
Byte 5			
Byte 6			
Byte 6			

CAN ID: 0x359

Byte 0	Protection	**Table 1**	Each bit represents a fault, 1 means there is a fault, 0 means there is a fault. none.
Byte 1	Protection	**Table 2**	
Byte 2	Protection	**Table 3**	
Byte 3	Protection	**Table 4**	
Byte 4	Protection	**Table 5**	
Byte 5	Protection	**Table 6**	
Byte 6	System Error	**Table 7**	
Byte 7	**Not Enabled**	**Not Enabled**	

Table 1

Bit7	Bit6	Bit5	Bit4	Bit	Bit2	Bit1	Bit 0
Cell under temperature (Charge) Charge/discharge low temperature protection (**Errcode:8**)	Cell over temperature (Charge) Charge/discharge high temperature protection (**Errcode:7**)	Discharge Over Current Discharge overcurrent protection (**Errcode:6**)	Charge over Current Charging overcurrent protection (**Errcode:5**)	Module under Voltage Total voltage undervoltage protection (Errcode:4)	module over Voltage Total pressure overvoltage protection (Errcode:3)	Cell under voltage Monomer/total pressure/UVUndervoltage protection (**Errcode:2**)	Cell over Voltage Monomer/total pressure/OVOvervoltage protection (**Errcode:1**)

Table 2

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit 0
AFE-OCD2 (Errcode:16)	AFE-OCD1 (Errcode:15)	heating film over Temperature Heating film high temperature protection (**Errcode:14**)	Mos over temperature MOSHigh temperature protection (**Errcode:13**)	cell temperature over Difference Too large temperature difference protection (**Errcode:12**)	cell voltage over difference Single cell pressure difference too large protection (**Errcode:11**)	Cell under temperature (Discharge) Discharge low temperature protection (**Errcode:10**)	Cell over temperature (Disharge) Discharge high temperature protection (**Errcode:9**)

Table 3

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit 0
AFE-SCDL (**Errcodetwenty four**)	AFE-OT (Errcode:23)	AFE-UT (Errcode:22)	AFE-SCD (Errcode:twenty one)	AFE-OCC (**Errcode:20**)	**AFE-OCDL/OCD1/OCD2** **(Errcode:19)**	AFE-OV (**Errcode:18**)	AFE-UV (**Errcode:17**)

Table 4

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit 0
Master Address Repeat Duplicate host address (**Errcode:31**)	PCScommunication Fail PCS communication failure (**Errcode:**)	Internal communication Fail Internal communication failure (**Errcode:30**)	EEPROM error EEPROMFault (**Errcode:29**)	Mosfet short circuit MOSFETShort Circuit (**Errcode:28**)	temperature Sampling fail Temperature acquisition failure (Errcode:27)	Cell voltage sampling fail Single cell voltage acquisition failure (Errcode:26)	AFE communication Fail AFECommunication failure (**Errcode:25**)

Table 5

Bit7	Bit6	Bit5	Bit4	Bit	Bit2	Bit1	Bit 0
Cell low temperature (Charge) Charging low temperature alarm (Errcode:8)	Cell high temperature (Charge) Charging high temperature alarm (Errcode:7)	Discharge High Current Discharge overcurrent alarm (Errcode:6)	Charge high Current Charging overcurrent alarm (Errcode:5)	Module low voltage Total pressure too low alarm (Errcode:4)	module high voltage Total pressure too high alarm (Errcode:3)	Cell low voltage Single cell undervoltage alarm (Errcode:2)	Cell high voltage Single overpressure alarm (Errcode:1)

Table 6

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit 0
HeatError Heating abnormality (Errcode:2)	HeatMosAdhesion Heating Mos bonding (Errcode:1)	heating film high Temperature Heating film high temperature alarm (Errcode:14)	Mos high temperature MOSHigh temperature alarm (Errcode:13)	cell temperature High difference Temperature difference too large alarm (Errcode:12)	cell voltage High difference Single cell pressure difference is too large alarm (Errcode:11)	Cell low temperature (Discharge) Discharge low temperature alarm (Errcode:10)	Cell High temperature (Disharge) Discharge high temperature alarm (Errcode:9)

Table 7

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit 0
CHG_VOLT_LOW Charging voltage is too low (Errcode:8)	TEMP_OPEN_WIRE_FAIL Temperature disconnection fault (**Errcode:7**)	VOLT_OPEN_WIRE_FAIL Voltage disconnection fault (**Errcode:6**)	FUSE Blown Fuse blown (**Errcode:5**)	OverTerminalTemp Terminal high temperature protection	Charge Inversed Reverse charging (Errcode:4)	Pre Charge Failed Precharge failed (Errcode:3)	OverConnectTemp Connector high temperature protection

CAN ID: 0x351

Byte 0 Byte 1	Battery charge voltage Recommended charging voltage	Unit: 0.1V	16 bits unsigned int
Byte 2 Byte 3	Charge current limit Off-grid charging current limit	Unit: 0.1A	16 bits signed int,2 s`complement
Byte 4 Byte 5	Discharge current limit Discharge current limit in off-grid state	Unit: 0.1A	16 bits signed int,2 s`complement
Byte 6 Byte 7	Discharge voltage limit Discharge voltage limit	Unit: 0.1V	16 bits unsigned int

CAN ID: 0x355

Byte 0 Byte 1	SOC of single module or average value of system	Unit: 1%	16 bits unsigned int
Byte 2 Byte 3	SOH of single module or average value of system	Unit: 1%	16 bits unsigned int
Byte 4 Byte 5			
Byte 6 Byte 7			

CAN ID:0x356

Byte 0 Byte 1	Voltage of single module or average module voltage of system Single module voltage or system average voltage	Unit: 0.01V	16 bits signed int, 2`s complement
Byte 2 Byte 3	Module or system total current Single unit or system total current	Unit: 0.1A	16 bits signed int, 2`s complement, Discharge positive, charge negative
Byte 4 Byte 5	Average cell temperature Average cell temperature	Unit: 0.1°C	16 bits signed int, 2`s complement
Byte 6 Byte 7			

CAN ID: 0x358 [Specially used to store USB board information]

Byte 0	USB real-time total power summary_L	Unit:**0.1 W**	USB power summary USB real-time total power summary
Byte 1	USB real-time total power summary_H		
Byte 2	USB cumulative power summary L_L	Unit:**0.1 WH**	USB electricity summary USB cumulative power summary
Byte 3	USB cumulative power summary L_H		
Byte 4	USB cumulative power summary H_L		
Byte 5	USB cumulative power summary H_H		
Byte 6	USB_Switc_STA USB board switch status		0: Disable 1 Enable
Byte 7			

CAN ID:0x361

Byte 0 Byte 1	Max cell voltage Maximum single cell voltage	Unit: 0.001V	16 bits unsigned int
Byte 2 Byte 3	Min cell voltage Minimum single cell voltage	Unit: 0.001V	16 bits unsigned int
Byte 4	Max cell temperature	Unit: 0.1°C	16 bits signed int, 2`s complement

Byte 5	Maximum temperature		
Byte 6	Min cell temperature	Unit: 0.1℃	16 bits signed int, 2`s complement
Byte 7	Minimum temperature		

CAN ID:0x363

Byte 0	Software version		Take the Lord as reference
Byte 1	Software Version		
Byte 2	Hardware version		Take the Lord as reference
Byte 3	Hardware version		
Byte 4			
Byte 5			
Byte 6			
Byte 7			

CAN ID:0x364

Byte 0	Number of batteries in normal operation		Number of batteries without abnormal conditions
Byte 1	Number of modules that are prohibited from charging		
Byte 2	Number of modules that are prohibited from discharging		
Byte 3	Number of modules with communication disconnection		
Byte 4	Module numbers The number of modules successfully connected in parallel		
Byte 5			
Byte 6			
Byte 7			

CAN ID:0x371

Byte 0 Byte 1	Charging current limit in network state	Unit: 0.1A	16 bits signed int
Byte 2 Byte 3	Discharge current limiting in grid state	Unit: 0.1A	16 bit signed int
Byte 4			
Byte 5			
Byte 6			
Byte 7			

CAN ID: 0x35C

Byte 0	Request flag	Table 5	
Byte 1			

Table 5

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit 0
Charge enable	Discharge enable	Request force charge I* Strong charge mark 1	Request force charge II* Strong Charge Mark 2	Request full charge** Full charge mark			Request heat (Banned) Request heating

Please use bit 5,bit4, the SOC <20 %.SOC >23% recover;

Bit 5 is designed for inverter allows battery to shut down, and able to wake battery up to charge it.

Bit 4 is designed for inverter doesn't want battery to shut down, able to charge battery before shut down to avoid low energy. We suggest inverter to use this bit,

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.

* * Request full charge:

Reason:when battery is not full charged for long time, the accumulative error of SOC calculation will be too high and may not be able to be charged or discharged as expected capacity.

Logic:if SOC never higher than 97% in 30 days, will set this flag to 1. And when the SOC is ⩾ 97%, the flag will be 0.

How to:we suggest inverter to charge the battery by grid when this flag is 1.

CAN ID: 0x35E

Byte 0 Byte 1	Manufacturer Name (same as DY above)	DEYE	ASCII
Byte 2 Byte 3 Byte 4			ASCII Battery Pack Number
Byte 5			Battery manufacturers 1. GOTION 2: CATL (CATL) 3. EVE
Byte 6 Byte 7		Unit: 0.1Ah	System battery nominal capacity

CAN ID:0x110+(BmsAddr - 1) Fault andMOSinformation

Byte 0	Refer to Table 1			Each bit represents a fault, 1 for fault and 0 for fault.
Byte 1	Refer to Table 2			
Byte 2	Refer to Table 3			
Byte 3	Refer to Table 4			
Byte 4	Refer to Table 5			
Byte 5	Refer to Table 6			
Byte 6	Refer to Table 7			
Byte 7	Parallel state、Mos state Parallel state、Mos state、			Bit0:Parallel finish 0:no 1:yes Bit4: charge mos state 0:open 1:close Bit5:discharge mos state 0:open 1:close Bit6:precharge mos state 0:open 1:close Bit7:heat mos state 0:open 1:close

Table 1

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Table 2

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit 0
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Table 3

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit 0
AFE-SCDL (**Errcode:twenty four**)	AFE-OT (Errcode:23)	AFE-UT (Errcode:22)	AFE-SCD (Errcode:twenty one)	AFE-OCC (**Errcode:20**)	**AFE-OCDL/OCD1/OCD2** **(Errcode:19)**	AFE-OV (**Errcode:18**)	AFE-UV (**Errcode:17**)

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Table 6

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit 0
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Table 7

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit 0
CHG_VOLT_LOW Charging voltage is too low (Errcode:8)	TEMP_OPEN_WIRE_FAIL Temperature disconnection fault (Errcode:7)	VOLT_OPEN_WIRE_FAI LVoltage disconnection fault (Errcode:6)	FUSE Blown Fuse blown (**Errcode:5**)	OverTerminalTemp Terminal high temperature protection	Charge Inversed Reverse charging (Errcode:4)	Pre Charge Failed Precharge failed (Errcode:3)	OverConnectTemp Connector high temperature protection

CAN ID:0x150+(BmsAddr - 1) Summary information 1

Byte 0 Byte 1	Total voltage	Unit: 0.1v/bit	16 bits unsigned int
Byte 2 Byte 3	Current	Unit: 0.1A	16 bits signed int, Discharge positive, charge negative
Byte 4 Byte 5	SOC	0.1%/bit	16 bits unsigned int
Byte 6 Byte 7	SOH	0.1%/bit	16 bits unsigned int

CAN ID:0x200+(BmsAddr - 1) Summary information 2

Byte 0 Byte 1	Maximum single cell voltage	Unit: 1mV/bit	16 bits unsigned int
Byte 2 Byte 3	Minimum single cell voltage	Unit: 1mV/bit	16 bits unsigned int
Byte 4 Byte 5	Maximum temperature	Unit: 0.1°C	16 bits signed int
Byte 6 Byte 7	Minimum temperature	Unit: 0.1°C	16 bits signed int

CAN ID: 0x250+(BmsAddr - 1) Summary information 3

Byte 0 Byte 1	Maximum MOS temperature	Unit: 0.1℃	16 bits signed int
Byte 2 Byte 3	Heating film temperature	Unit: 0.1℃	16 bits signed int
Byte 4 Byte 5	Maximum allowable charging current	Unit:1A	16 bits unsigned int
Byte 6 Byte 7	Maximum allowable discharge current	Unit:1A	16 bits unsigned int

CAN ID:0x400+(BmsAddr - 1) Summary information 3

Byte 0	System operation mode		0: Standstill; 1: Charge; 2: Discharge
Byte 1	System Failure Level		0: No fault, 1: Minor fault, 2: Major fault
Byte 2 Byte 3	Cycle times		16 bits unsigned int
Byte 4	1~8 knots balanced state		Bit 0: indicates the first battery cell 0: not balanced, 1: balanced . . . . .
Byte 5	9~16 knots balanced state		
Byte 6	System sub-state		
Byte 7			

CAN ID:0x500+(BmsAddr - 1) Software version

Byte 0 Byte 1	Software version Software Version		For reporting methods, refer to 0x363 (pcs reports the version number of this frame packet according to the 0x363 compares the host version number reported by Check whether the software version is consistent. Be sure to update the version number)
Byte 2	0xAA		
Byte 3	BootVersion[0]	Ascii	
Byte 4	BootVersion[1]	Ascii	
Byte 5	BootVersion[2]	Ascii	
Byte 6	BootVersion[3]	Ascii	
Byte 7	BootVersion[4]	Ascii	

CAN ID: 0x550+(BmsAddr - 1) Accumulated charge and discharge amount

Byte 0	Accumulated charge capacity LL	Unit: 0.001Kwh	Unsigned int 32
Byte 1	Cumulative charge capacity LH		
Byte 2	Accumulated charge capacity HL		
Byte 3	Cumulative charging capacity HH		
Byte 4	Cumulative discharge capacity LL		Unsigned int 32
Byte 5	Cumulative discharge capacity LH		
Byte 6	Cumulative discharge capacity HL		
Byte 7	Cumulative discharge capacity HH		

CAN ID:0x600+(BmsAddr - 1) Battery SN code

Byte 0	Battery PACK_num SN1		ASCII
Byte 1	Battery PACK_num SN2		ASCII
Byte 2	Battery PACK_num SN3		ASCII
Byte 3	Battery PACK_num SN4		ASCII
Byte 4	Battery PACK_num SN5		ASCII
Byte 5	Battery PACK_num SN6		ASCII
Byte 6	Battery PACK_num SN7		ASCII

Byte 7	Battery PACK_num SN8		ASCII

CAN ID:0x650+(BmsAddr - 1) Battery SN code

Byte 0	Battery PACK_num SN9		ASCII
Byte 1	Battery PACK_num SN10		ASCII
Byte 2	Battery PACK_num SN11		ASCII
Byte 3	Battery PACK_num SN12		ASCII
Byte 4	Battery PACK_num SN13		ASCII
Byte 5	Battery PACK_num SN14		ASCII
Byte 6	Battery PACK_num SN15		ASCII
Byte 7	Battery PACK_num SN16		ASCII

CAN ID: 0x700+(BmsAddr - 1) Accumulated number of faults

Byte 0	Overcharge times	Unit: 1	16 bits unsigned int
Byte 1			
Byte 2	Over discharge times	Unit: 1	16 bits unsigned int
Byte 3			
Byte 4	Short circuit times	Unit: 1	16 bits unsigned int
Byte 5			
Byte 6	Mos over temperature times	Unit: 1	16 bits unsigned int
Byte 7			

CAN ID: 0x750+(BmsAddr - 1) Accumulated number of faults

Byte 0	Charging overcurrent times	Unit: 1	16 bits unsigned int
Byte 1			
Byte 2	Discharge overcurrent times	Unit: 1	16 bits unsigned int
Byte 3			
Byte 4	Charging over-temperature times	Unit: 1	16 bits unsigned int
Byte 5			
Byte 6	Discharge over-temperature times	Unit: 1	16 bits unsigned int
Byte 7			

软件版本号映射					
CANID	软件版本号	报文		1.设备类型	映射
Byte0	设备类型	0x01		LVESS	0x01
Byte1	软件版本	0x01		LvCtrlBox	0x04
Byte2	BMS软件版本差异	0x01			
Byte3	温度采集点个数	6			
Byte4	Table 4				
Byte5	预留			2.软件版本	映射
Byte6	预留			01	0x01
Byte7	预留			02	0x02
				03	0x03
				04	0x04
				05	0x05
				3.软件版本差异	映射
				V1	0x01
				V2	0x02

Table 4:

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
							Whether with heating (0 no 1 yes)

Hardware version mapping table:

硬件版本号映射					
CANID	硬件版本号	报文		1.设备类型	映射
Byte0	设备类型	0x01		LVESS	0x01
Byte1	硬件版本	0x01		LvCtrlBox	0x04
Byte2	BMS硬件版本差异	0x01			
Byte3	PCS协议ID				
Byte4	预留				
Byte5	预留			2.硬件版本	映射
Byte6	预留			01	0x01
Byte7	预留			02	0x02
				03	0x03
				04	0x04
				05	0x05
				3.硬件版本差异	映射
				V1	0x01
				V2	0x02