



Battery Energy Storage System

Modbus Communication Protocol


Product Model:

C215L-A-EU

C279L-D-EU

C326L-D-EU

C372L-D-EU

	Name	Communication Protocol	Version	V2.7
	ID		Level	Foreign


Revision History

No.	Version	Revision Date	Overview	Revised By
1	V2.4	2024.05.08	1. Adjustment of some content formats 2. EMU real-time: the switching input and output increase the bit correspondence	Jason LUO
2	V2.5	2024.09.18	1. Fire protection real-time and fault query table: added fire protection 2. expansion board information: added expansion board information point table	Jason LUO
3	V2.6	2024.09.23	1. battery cluster data 2. pcs fault mapping	Liangliang CAO
4	V2.7	2025.05.26	1. Add detailed descriptions for bit position. 2. correct some errors.	Keke Mai

	Name	Communication Protocol	Version	V2.7
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1 Overview

This protocol use communication between the EMU energy storage system and the background monitoring system. It can read the operation information of the EMU in real time, the fault status, and the operation of the system for control.

2 Physical Interface

Transmission mode: Modbus Tcp

Nic type: 10M/100M

IP address: 192.168.200.100 (default, modifiable).

Port number: 502

Frame interval time: 10ms

Modbus station address: 1 by default

3 Protocol Description

EMU real-time data, EMU manual configuration, remote host, scheduling fitting, scheduling settings, hardware configuration, historical data, operation logs, fault logs, battery cluster data, battery pack voltage data, battery pack temperature data, PCS real-time data, liquid-cooled host, fire protection real-time, lighting control real-time, expansion board information.

3.1 Data Type

Table 3-1 Data Type

Data Type	Description
i8	8-bit signed integer
i16	16-bit signed integer
i32	32-bit signed integer, two consecutive Modbus addresses for transmission.
u8	8-bit unsigned integer
u16	16-bit unsigned integer
u32	32-bit unsigned integer, two consecutive Modbus addresses for transmission.

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3.2 Floating-Point

Floating-point numbers are transmitted by amplifying floating-point numbers into integers

For example, a value of 1000 with a coefficient of 0.01 transmits a value of 10

3.3 Endian Order

The data transfer order of the two bytes is as follows: the high byte first, and then the low byte

For example, 0x1234 is sent in the following order: 0x12 and 0x34

The order in which the four bytes are transmitted is: LH-LL-HH-HL

For example, 0x12345678 is sent in the following order: 0x56, 0x78, 0x12, and 0x34

3.4 Function Code

Table 3-2 Function Code

Feature code	function	Corresponding address type
0x03	Read multiple holding registers, byte operation	4x
0x06	Write single holding register, byte operation	4x
0x10	Write multiple holding registers, byte operation	4x

3.5 Error Return Frame

Table 3-3 Error Return Frame

Modbus handles identification	Protocol identifier	PDU data length	Access the ID of the target slave	Feature codes	Fault codes
2 bytes	2 bytes	2 bytes	1 byte	1 byte	1 byte


Fault code 01 = Unsupported function code

Fault code 02 = Invalid address

Fault code 03 = Invalid write data length

Fault code 04 = Invalid read/write data length

Fault code 05 = read/write data length out-of-bounds


	Name	Communication Protocol	Version	V2.7
	ID		Level	Foreign


4 Register Address Information

4.1 EMU Real Time Data

Table 4-1 EMU Real Time Data

ModBus address	Name	Privilege	Type	Coefficient	Offset	Unit	Description
4	DI	R	u32	1	0		0: Normal 1: Fault Bit0: Emergency stop Bit1: PCS fault Bit2: BMS fault Bit3: Fire fault Bit4: Fire alarm signal Bit5: UPS fault
5							
6	DO	R	u32	1	0		0: Normal 1: Fault Bit0: PCS shutdown Bit1: BMS shutdown Bit2: Fire start Bit3: primary master switch Bit4: fault output
7							
25	EX-Board communication Status	R	u16	1	0		Reference table 5-2
26	Device communication Status	R	u16	1	0		Reference table 5-3
28	EMU L1 Warning	R	u32	1	0		Reference table 5-4
29							
30		R	u32	1	0		


		Name	Communication Protocol		Version	V2.7
		ID			Level	Foreign
	EMU L2 Protection					Reference table 5-5
31						
32	EMU L3 Fault	R	u32	1	0	Reference table 5-6
33						
34	EMU H-Fault	R	u32	1	0	Reference table 5-7
35						
56	EMU status	R	u16	1	0	1: standby 2: Manual 3: automatic 4: test 5: upgrade
59	EMU Boot Ver	R	u16	0.01	0	
60	EMU S-Ver	R	u16	0.01	0	EMU software version. For example, 100 means 1.00
61	EMU H-Ver	R	u16	0.01	0	EMU hardware version. For example, 100 means 1.00
62	EMU upgrade success flag	R	u16	1	0	0:fail 1:success Bit0:transmission complete Bit1:ex-board1 success Bit2:ex-board2 success Bit3:ex-board3 success Bit4:ex-board4 success Bit5:ex-board5 success

		Name	Communication Protocol		Version	V2.7	
		ID			Level	Foreign	
							Bit6:ex-board6 success Bit7:emu success Bit8:all upgrade success Bit9:upgrade failed
63	upgrading device	R	u16	1	0		3:EMU 21:ex-board1 22:ex-board2 23:ex-board3 24:ex-board4 25:ex-board5 26:ex-board6
64	device upgrade status	R	u16	1	0		1: prepare for upgrade 2: prepare for transmission 3: in transit 4: in data verification 5: success
65	upgrade process	R	u16	1	0		corresponding file transfer progress
66	NA						
67	charge power limit value	R	i32	0.1	0	kW	
68							
69	discharge power limit value	R	i32	0.1	0	kW	
70							

4.2 EMU Manual

Table 4-2 EMU Manual


ModBus address	Name	Privilege	Type	Coefficient	Offset	Unit	Description
200	Running Command	R/W	u16	1	0		1: Standby 2: Manual 3: Automatic 4: Test 5: Upgrade
201	Fault Clean	R/W	u16				0: No action 1: Clear the fault


	Name		Communication Protocol		Version	V2.7
	ID				Level	Foreign
	Command					

4.3 Extended Board Information

Table 4-3 Extended Board Information

ModBus address	Name	Privilege	Type	Coefficient	Offset	Unit	Description
600	Board 1 Hardware version	R	u16	0.01	0		100 means version 1.00
601	Board 1 Software version	R	u16	0.01	0		100 means version 1.00
602	Board 1 device code	R	u8	1	0		
	Board 1 manufacturer code	R	u8	1	0		
603	Board 1 Hardware type	R	u8	1	0		0: unknow 1: CAN to CAN 2: CAN to RS485
	Board 1 Boot version	R	u8	0.01	0		100 means version 1.00
604	Board 2 Hardware version	R	u16	0.01	0		100 means version 1.00
605	Board 2 Software version	R	u16	0.01	0		100 means version 1.00
606	Board 2 device code	R	u8	1	0		
	Board 2 manufacturer code	R	u8	1	0		
607	Board 2 Hardware type	R	u8	1	0		0: unknown 1: CAN to CAN 2: CAN to RS485


		Name		Communication Protocol		Version	V2.7
		ID				Level	Foreign
	Board 2 Boot version	R	u8	0.01	0		100 means version 1.00
608	Board 3 Hardware version	R	u16	0.01	0		100 means version 1.00
609	Board 3 Software version	R	u16	0.01	0		100 means version 1.00
610	Board 3 Device code	R	u8	1	0		
	Board 3 manufacturer code	R	u8	1	0		
611	Board 3 Hardware type	R	u8	1	0		0: unknow 1: CAN to CAN 2: CAN to RS485
	Board 3 Boot version	R	u8	0.01	0		100 means version 1.00
612	Board 4 Hardware version	R	u16	0.01	0		100 means version 1.00
613	Board 4 Software version	R	u16	0.01	0		100 means version 1.00
614	Board 4 Device code	R	u8	1	0		
	Board 4 manufacturer code	R	u8	1	0		
615	Board 4 Hardware type	R	u8	1	0		0: unknow 1: CAN to CAN 2: CAN to RS485
	Board 4 Boot version	R	u8	0.01	0		100 means version 1.00
616	Board 5 Hardware version	R	u16	0.01	0		100 means version 1.00
617	Board 5 Software version	R	u16	0.01	0		100 means version 1.00
618	Board 5 Device code	R	u8	1	0		

		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
	Board 5 manufacturer code	R	u8	1	0		
619	Board 5 Hardware type	R	u8	1	0		0: unknow 1: CAN to CAN 2: CAN to RS485
	Board 5 Boot version	R	u8	0.01	0		100 means version 1.00
620	Board 6 Hardware version	R	u16	0.01	0		100 means version 1.00
621	Board 6 Software version	R	u16	0.01	0		100 means version 1.00
622	Board 6 device code	R	u8	1	0		
	Board 6 manufacturer code	R	u8	1	0		
623	Board 6 Hardware type	R	u8	1	0		0: unknow 1: CAN to CAN 2: CAN to RS485
	Board 6 Boot version	R	u8	0.01	0		100 means version 1.00

4.4 Remote Host

Table 4-4 Remote Host


ModBus address	Name	Privilege	Type	Coefficient	Offset	Unit	Description
704	Remote PCS charge/discharge power	R/W	i32	0.1	0	kW	Charge: negative
705							Discharge: positive 20: 20kW discharging -20: 20kW charging
706	Remote PCS reactive power	R/W	i32	0.1	0	kVar	+: Sensibility -: Capacitive
707							
708	NA						
709	NA						
710	upgrade	R/W	u16	1	0		0: not upgrade

	Name	Communication Protocol		Version	V2.7	
	ID			Level	Foreign	
	command					1: upgrade
711	FTP server IP[0]	R/W	u8	1	0	
	FTP server IP[1]	R/W	u8	1	0	
712	FTP server IP[2]	R/W	u8	1	0	
	FTP server IP[3]	R/W	u8	1	0	

4.5 Scheduling Fitting

Table 4-5 Scheduling Fitting

ModBus address	Name	Privilege	Type	Coefficient	Offset	Unit	Description
1048	PCS Power 0h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1049							
1050	PCS Power 1h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1051							
1052	PCS Power 2h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1053							
1054	PCS Power 3h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1055							
1056	PCS Power 4h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1057							
1058	PCS Power 5h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1059							
1060	PCS Power 6h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1061							
1062	PCS Power 7h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1063							


		Name	Communication Protocol		Version	V2.7	
		ID			Level	Foreign	
1064	PCS Power 8h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1065							
1066	PCS Power 9h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1067							
1068	PCS Power 10h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1069							
1070	PCS Power 11h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1071							
1072	PCS Power 12h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1073							
1074	PCS Power 13h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1075							
1076	PCS Power 14h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1077							
1078	PCS Power 15h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1079							
1080	PCS Power 16h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1081							
1082	PCS Power 17h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1083							

		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
1084	PCS Power 18h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1085							
1086	PCS Power 19h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1087							
1088	PCS Power 20h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1089							
1090	PCS Power 21h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1091							
1092	PCS Power 22h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1093							
1094	PCS Power 23h	R/W	i32	0.1	0	kW	+: Discharge -: Charge
1095							

4.6 Hardware Configuration

Table 4-6 Hardware Configuration


ModBus address	Name	Privilege	Type	coefficient	Offset	Unit	Description
4127	EMU main board SN	R	u8	1	0		
			u8	1	0		
4128			u8	1	0		
			u8	1	0		
4129			u8	1	0		
			u8	1	0		
4130			u8	1	0		
			u8	1	0		
4131			u8	1	0		
			u8	1	0		
4132			u8	1	0		
			u8	1	0		
4133			u8	1	0		

		Name	Communication Protocol		Version	V2.7	
		ID			Level	Foreign	
4134			u8	1	0		
			u8	1	0		
4135			u8	1	0		
			u8	1	0		
4136			u8	1	0		
			u8	1	0		
4137			u8	1	0		
			u8	1	0		
4138			u8	1	0		
			u8	1	0		
4142	Product SN	R	u8	1	0		
4143			u8	1	0		
4144			u8	1	0		
4145			u8	1	0		
4146			u8	1	0		
4147			u8	1	0		
4148			u8	1	0		
4149			u8	1	0		
4150			u8	1	0		
4151			u8	1	0		
4152			u8	1	0		
4153			u8	1	0		

4.7 Historical Data

Table 4-7 Historical Data


ModBus address	Name	Privilege	Type	coefficient	Offset	Unit	Description
4600	Year	R	u8	1	2000	Y	
	Month	R	u8	1	0	M	
4601	Day	R	u8	1	0	D	
	Hour	R	u8	1	0	H	
4602	Minute	R	u8	1	0	Mins	
	Second	R	u8	1	0	Sec	
4603	Systick	R	u16	1	0	ms	
4604	PCS Charge Energy	R	i32	0.1	0	kWh	
4605							
4606	PCS Discharge Energy	R	i32	0.1	0	kWh	
4607							
4608	Battery Charge	R	i32	0.1	0	kWh	


		Name	Communication Protocol		Version	V2.7	
		ID			Level	Foreign	
4609	Energy						
4610	Battery Discharge Energy	R	i32	0.1	0	kWh	
4611							

4.8 Operation Logs

Table 4-8 Operation Logs

ModBus address	Name	Privilege	Type	coefficient	Offset	Unit	Description	
9600	[R	char	/	/	/	20221123-09:15:49	
	Year		char	/	/	/		
9601	char		/	/	/			
	char		/	/	/			
9602	char		/	/	/			
	Month		char	/	/	/		
9603	char		/	/	/			
	Day		char	/	/	/		
9604	char		/	/	/			
	-		char	/	/	/		
9605	Hour		char	/	/	/		
	char		/	/	/			
9606	:		char	/	/	/		
	Minute		char	/	/	/		
9607	char		/	/	/			
	:		char	/	/	/		
9608	Second		char	/	/	/		
	char		/	/	/			
9609	-		char	/	/	/		000-255(cycle count)
	number		char	/	/	/		
9610	char	/	/	/				
	char	/	/	/				
9611]	char	/	/	/			
	[char	/	/	/			
9612	Status tag	char	/	/	/	Standby		
		char	/	/	/	Running		
9613		char	/	/	/	Manual		
		char	/	/	/	Upgrade		
9614		char	/	/	/	Test		
		char	/	/	/	Warning		


		Name	Communication Protocol		Version	V2.7	
		ID			Level	Foreign	
9615		R	char	/	/	/	Protection Fault
			char	/	/	/	
9616			char	/	/	/	
			char	/	/	/	
9617]		char	/	/	/	
	Event		char	/	/	/	cannot use escape characters
9618	Description		char	/	/	/	
			char	/	/	/	
9619			char	/	/	/	
			char	/	/	/	
9620			char	/	/	/	
			char	/	/	/	
9621			char	/	/	/	
			char	/	/	/	
9622			char	/	/	/	
			char	/	/	/	
9623			char	/	/	/	
			char	/	/	/	
9624			char	/	/	/	
			char	/	/	/	
9625			char	/	/	/	
			char	/	/	/	
9626			char	/	/	/	
			char	/	/	/	
9627			char	/	/	/	
			char	/	/	/	
9628			char	/	/	/	
			char	/	/	/	
9629			char	/	/	/	
			char	/	/	/	
9630			char	/	/	/	
			char	/	/	/	
9631			char	/	/	/	
			char	/	/	/	
9632			char	/	/	/	
			char	/	/	/	
9633			char	/	/	/	
			char	/	/	/	
9634		R	char	/	/	/	
			char	/	/	/	
9635			char	/	/	/	
			char	/	/	/	
9636			char	/	/	/	


		Name		Communication Protocol		Version		V2.7		
		ID				Level		Foreign		
				char	/		/		/	
9637				char	/		/		/	
				char	/		/		/	
9638				char	/		/		/	
				char	/		/		/	
9639				char	/		/		/	
				char	/		/		/	
9640				char	/		/		/	
				char	/		/		/	
9641				char	/		/		/	
				char	/		/		/	
9642				char	/		/		/	
				char	/		/		/	
9643				char	/		/		/	
				char	/		/		/	
9644				char	/		/		/	
				char	/		/		/	
9645				char	/		/		/	
				char	/		/		/	
9646				char	/		/		/	
				char	/		/		/	
9647				char	/		/		/	
				char	/		/		/	
9648				char	/		/		/	
		char	/		/		/			
9649	/r		char	/		/	/			
	/n		char	/		/	/			

4.9 Fault Logs

Table 4-9 Fault Logs

ModBus address	Variable Name	Privilege	Type	coefficient	Offset	Unit	Description
10600	[R	char	/	/	/	
10601	year	R	char	/	/	/	For example: 20221123-09:15:49
10602	month	R	char	/	/	/	
10603	day	R	char	/	/	/	
10604	-	R	char	/	/	/	
10605	time	R	char	/	/	/	


		Name	Communication Protocol		Version	V2.7	
		ID			Level	Foreign	
10606	:	R	char	/	/	/	
	divide		char	/	/	/	
10607	:	R	char	/	/	/	
	second	R	char	/	/	/	
10608							
10609	-	R	char	/	/	/	000-255 cycle counting
	numbering	R	char	/	/	/	
10611]	R	char	/	/	/	
	[R	char	/	/	/	
10612	Status labels	R	char	/	/	/	Fault
10613							
10614							
10615							
10616							
10617]	R	char	/	/	/	
10618	Event Representation	R	char	/	/	/	You can't use escape characters
10619							
10620							
10621							
10622							
10623							
10624							
10625							
10626							
10627							
10628							
10629							
10630							
10631							
10632							
10633							
10634							
10635							
10636							
10637							
10638							

		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
10640							
10640							
10641							
10642							
10643							
10644							
10645							
10646							
10647							
10648							
10649	/r	R	char	/	/	/	
	/n	R	char	/	/	/	


4.10 Battery Cluster Data


Table 4-10 Battery Cluster Data


ModBus address	Name	Privilege	Type	coefficient	Offset	Unit	Description
20104	Communication Status	R	u16	1	0		0: normal 1: abnormal
20105	Cluster Total voltage	R	u32	0.01	0	V	
20106							
20107	Cluster Total Current	R	i32	0.01	0	A	+: Discharge -: Charge
20108							
20109	Cluster SOC	R	u16	0.1	0	%	
20110	Cluster SOH	R	u16	0.1	0	%	
20111	Cluster positive insulation resistance	R	u16	1	0	kΩ	
20112	Cluster negative insulation resistance	R	u16	1	0	kΩ	
20113	BMU number of highest cell voltage	R	u16	1	0		
20114	Cell number of highest voltage	R	u16	1	0		
20115	Cluster highest cell voltage	R	u16	1	0	mV	
20116	BMU number of	R	u16	1	0		


		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
	lowest cell voltage						
20117	Cell number of lowest voltage	R	u16	1	0		
20118	Cluster lowest cell voltage	R	u16	1	0	mV	
20119	NA						
20120	NA						
20121	NA						
20122	NA						
20123	NA						
20124	NA						
20125	Cluster Max cell voltage difference	R	u16	1	0	mV	
20126	Cluster Aver cell voltage	R	u16	1	0	mV	
20127	NA						
20128	Cluster Aver temperature	R	i16	0.1	0	°C	
20129	Cluster cycle number	R	u16	1	0		
20130	Cluster charge limit Current	R	i32	0.01	0	A	
20131							
20132	Cluster discharge limit Current	R	i32	0.01	0	A	
20133							
20134	Cluster single charge energy	R	i32	0.1	0	kWh	
20135							
20136	Cluster single discharge energy	R	i32	0.1	0	kWh	
20137							

		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
20138	Cluster chargeable energy	R	i32	0.1	0	kWh	
20139							
20140	Cluster dischargeable energy	R	i32	0.1	0	kWh	
20141							
20142	Cluster charge total energy	R	i32	0.1	0	kWh	
20143							
20144	Cluster discharge total energy	R	i32	0.1	0	kWh	
20145							
20146	Cluster running status	R	u16	1			Bit0- Initialization state Bit1- Ready (relay closed, no charge/discharge) Bit2- Discharge Bit3- Charging Bit4- Alarm Bit5- Fault Bit6- Not enabled Other meaningless
20147	Cluster full-charge flag		u16	1	0		0 : Not full 1: Full
20148	Cluster full-discharge flag		u16	1	0		0 : Not empty 1: Empty
20149	Cluster maintain warning code 1		u32	1			Bit0- Large pressure difference between clusters Bit1- Communication with the main control is abnormal Bit2- Failed to communicate with EMS Bit3-EMS/PCS strong control relay Bit4-PCS communication timed
20150							

		Name	Communication Protocol		Version	V2.7
		ID			Level	Foreign
						out Bit5- Display communication failure Bit6- Fan module is alarm Bit7- High voltage interlock alarm Bit8- Fire alarm Bit9- Reserved Bit10- Reserved Bit11- Reserved Bit12- High pressure box temperature line alarm Bit13- Passive equalization failure Bit14- Active balancing alarm Bit15-QF circuit breaker is alarm
20151	Cluster maintain warning code 2		u32	1		The Bit0-SBMU hardware is alarm The Bit1-SBMU battery is alarm The Bit2-SBMU communication is alarm Bit3- Temperature break alarm Bit4- Main negative relay failure Bit5- Main positive relay alarm Bit6- Precharge failure Bit7- Reserved Bit8- crash stop Bit9- Reserved Bit10- Total pressure acquisition invalid Bit11- Abnormal increase in cell voltage
20152						

		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
							Bit12- Very high monomer Bit13- Very low monomer Bit14- Extremely high temperature Bit15- Relay mandatory control
20153							Bit0- High discharge temperature Bit1- Low discharge temperature Bit2- High cell voltage Bit3- Low cell voltage Bit4- Large unit pressure difference Bit5- Low SOC Bit6- High SOC Bit7- Reserved Bit8- High charging current Bit9- High discharge current Bit10- Large temperature difference Bit11- Low insulation Bit12- Total pressure height Bit13- Total low Bit14- High charging temperature Bit15- Low charging temperature Bit16- Fast temperature rise Bit17-Pack High voltage Bit18-Pack low voltage
20154	Cluster level 1 warning code		u32	1			
20155	Cluster level 2		u32	1			Bit0- High discharge


		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
20156	warning code						temperature Bit1- Low discharge temperature Bit2- High cell voltage Bit3- Low cell voltage Bit4- Large unit pressure difference Bit5- Low SOC Bit6- High SOC Bit7- Reserved Bit8- High charging current Bit9- High discharge current Bit10- Large temperature difference Bit11- Low insulation Bit12- Total pressure height Bit13- Total low Bit14- High charging temperature Bit15- Low charging temperature Bit16- Fast temperature rise Bit17-Pack High voltage Bit18-Pack low voltage
20157	Cluster level 3 warning code		u32	1			Bit0- High discharge temperature Bit1- Low discharge temperature Bit2- High cell voltage Bit3- Low cell voltage Bit4- Large unit pressure difference Bit5- Low SOC
20158							


		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
							Bit6- High SOC Bit7- Reserved Bit8- High charging current Bit9- High discharge current Bit10- Large temperature difference Bit11- Low insulation Bit12- Total pressure height Bit13- Total low Bit14- High charging temperature Bit15- Low charging temperature Bit16- Fast temperature rise Bit17-Pack High voltage Bit18-Pack low voltage
20159	NA						
20160	Cluster MSD warning code		u16	1	0		Bit0-PACK1 MSD Bit1-PACK2 MSD Bit2-PACK3 MSD Bit3-PACK4 MSD Bit4-PACK5 MSD Bit5-PACK6 MSD Bit6-PACK7 MSD Bit7-PACK8 MSD
20171	SBCU Software version		u16	1	0		
20172	SBMU Software version		u16	1	0		


4.11 Pack Voltage Data

Table 4-11 Pack Voltage Data

ModBus address	Name	Privilege	Type	coefficient	Offset	Unit	Description
20200	Cell 1	R	u16	1	0	mV	Pack_Voltage*N(N<=8)

		Name		Communication Protocol	Version	V2.7
		ID			Level	Foreign
						N=1(START_ADDRESS = 20200 END_ADDRESS =20251) N=2(START_ADDRESS = 20252 END_ADDRESS =20251) N=3(START_ADDRESS = 20304 END_ADDRESS =20303) N=4(START_ADDRESS = 20356 END_ADDRESS =20407) N=5(START_ADDRESS = 20408 END_ADDRESS =20459) N=6(START_ADDRESS = 20460 END_ADDRESS =20511) N=7(START_ADDRESS = 20512 END_ADDRESS =20563) N=8(START_ADDRESS = 20564 END_ADDRESS =20615)
20201	Cell 2	u16	1	0	mV	
20202	Cell 3	u16	1	0	mV	
20203	Cell 4	u16	1	0	mV	
20204	Cell 5	u16	1	0	mV	
20205	Cell 6	u16	1	0	mV	
20206	Cell 7	u16	1	0	mV	
20207	Cell 8	u16	1	0	mV	
20208	Cell 9	u16	1	0	mV	
20209	Cell 10	u16	1	0	mV	
20210	Cell 11	u16	1	0	mV	
20211	Cell 12	u16	1	0	mV	
20212	Cell 13	u16	1	0	mV	
20213	Cell 14	u16	1	0	mV	
20214	Cell 15	u16	1	0	mV	
20215	Cell 16	u16	1	0	mV	
20216	Cell 17	u16	1	0	mV	
20217	Cell 18	u16	1	0	mV	
20218	Cell 19	u16	1	0	mV	
20219	Cell 20	u16	1	0	mV	
20220	Cell 21	u16	1	0	mV	
20221	Cell 22	u16	1	0	mV	


		Name		Communication Protocol		Version	V2.7
		ID				Level	Foreign
20222	Cell 23		u16	1	0	mV	
20223	Cell 24		u16	1	0	mV	
20224	Cell 25		u16	1	0	mV	
20225	Cell 26		u16	1	0	mV	
20226	Cell 27		u16	1	0	mV	
20227	Cell 28		u16	1	0	mV	
20228	Cell 29		u16	1	0	mV	
20229	Cell 30		u16	1	0	mV	
20230	Cell 31		u16	1	0	mV	
20231	Cell 32		u16	1	0	mV	
20232	Cell 33		u16	1	0	mV	
20233	Cell 34		u16	1	0	mV	
20234	Cell 35		u16	1	0	mV	
20235	Cell 36		u16	1	0	mV	
20236	Cell 37		u16	1	0	mV	
20237	Cell 38		u16	1	0	mV	
20238	Cell 39		u16	1	0	mV	
20239	Cell 40		u16	1	0	mV	
20240	Cell 41		u16	1	0	mV	
20241	Cell 42		u16	1	0	mV	
20242	Cell 43		u16	1	0	mV	
20243	Cell 44		u16	1	0	mV	

		Name	Communication Protocol		Version	V2.7
		ID			Level	Foreign
20244	Cell 45	u16	1	0	mV	
20245	Cell 46	u16	1	0	mV	
20246	Cell 47	u16	1	0	mV	
20247	Cell 48	u16	1	0	mV	
20248	Cell 49	u16	1	0	mV	
20249	Cell 50	u16	1	0	mV	
20250	Cell 51	u16	1	0	mV	
20251	Cell 52	u16	1	0	mV	

4.12 Pack Temperature Data

Table 4-12 Pack Temperature Data


ModBus address	Name	Privilege	Type	coefficient	Offset	Unit	Description
20700	Copper bar temperature 1	R	i16	0.1	0	°C	Pack temperatur*N(N<=8) N=1(START_ADDRESS = 20700 END_ADDRESS =20723) N=2(START_ADDRESS = 20724 END_ADDRESS =20747) N=3(START_ADDRESS = 20748 END_ADDRESS =20771) N=4(START_ADDRESS = 20772 END_ADDRESS =20795) N=5(START_ADDRESS = 20796 END_ADDRESS
20701	Cell 1	R	i16	0.1	0	°C	
20702	Cell 2	R	i16	0.1	0	°C	
20703	Cell 3	R	i16	0.1	0	°C	
20704	Cell 4	R	i16	0.1	0	°C	
20705	Copper bar temperature 2	R	i16	0.1	0	°C	
20706	Copper bar temperature 3	R	i16	0.1	0	°C	
20707	Cell 5	R	i16	0.1	0	°C	
20708	Cell 6	R	i16	0.1	0	°C	
20709	Cell 7	R	i16	0.1	0	°C	
20710	Cell 8	R	i16	0.1	0	°C	
20711	Copper bar temperature 4	R	i16	0.1	0	°C	
20712	Copper bar	R	i16	0.1	0	°C	


		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
	temperature 5						=20819) N=6(START_ADDRESS = 20820 END_ADDRESS =20843) N=7(START_ADDRESS = 20844 END_ADDRESS =20867) N=8(START_ADDRESS = 20868 END_ADDRESS =20891)
20713	Cell 9	R	i16	0.1	0	°C	
20714	Cell 10	R	i16	0.1	0	°C	
20715	Cell 11	R	i16	0.1	0	°C	
20716	Cell 12	R	i16	0.1	0	°C	
20717	Copper bar temperature 6	R	i16	0.1	0	°C	
20718	Copper bar temperature 7	R	i16	0.1	0	°C	
20719	Cell 13	R	i16	0.1	0	°C	
20720	Cell 14	R	i16	0.1	0	°C	
20721	Cell 15	R	i16	0.1	0	°C	
20722	Cell 16	R	i16	0.1	0	°C	
20723	Copper bar temperature 8	R	i16	0.1	0	°C	


4.13 PCS Real Time Data

Table 4-13 PCS Real Time Data

ModBus address	Name	Perm iss ions	Varia b letyp e	Coeff icient	Off set	Unit	Description
40004	Communication status	R	u16	1	0		0: normal 1: abnormal
40005	PCS running status	R	u16	1	0		Bit0 Stopped state Bit1 is in standby state Bit2 Running status Bit3 Total fault status Bit4 Total alarm status Bit5 Remote/local status Bit6 Emergency stop input status Bit7 is connected to the network Bit8 Off-network status Bit9 overload capacity reduction
40006	Phase A voltage	R	u32	0.01		V	

		Name		Communication Protocol		Version	V2.7
		ID				Level	Foreign
40007							
40008	Phase B voltage	R	u32	0.01		V	
40009							
40010	Phase C voltage	R	u32	0.01		V	
40011							
40012	Phase A output current	R	i32	0.01		A	
40013							
40014	Phase B output current	R	i32	0.01		A	
40015							
40016	Phase C output current	R	i32	0.01		A	
40017							
40018	Grid frequency	R	u16	0.01		Hz	
40019	Phase A output active power	R	i32	0.1		kW	
40020							
40021	Phase B output active power	R	i32	0.1		kW	
40022							
40023	Phase C output active power	R	i32	0.1		kW	
40024							
40025	Total output active power	R	i32	0.1		kW	
40026							
40027	Phase A output reactive power	R	i32	0.1		kVar	
40028							


		Name		Communication Protocol		Version	V2.7
		ID				Level	Foreign
40029	Phase B output reactive power	R	i32	0.1		kVar	
40030							
40031	Phase C output reactive power	R	i32	0.1		kVar	
40032							
40033	Total output reactive power	R	i32	0.1		kVar	
40034							
40035	Phase A output apparent power	R	i32	0.1		kVA	
40036							
40037	Phase B output apparent power	R	i32	0.1		kVA	
40038							
40039	Phase C output apparent power	R	i32	0.1		kVA	
40040							
40041	Total output apparent power	R	i32	0.1		kVA	
40042							
40043	Phase A output power factor	R	u16	0.001			
40044	Phase B output power factor	R	u16	0.001			
40045	Phase C output power factor	R	u16	0.001			
40046	Total output power factor	R	u16	0.001			
40047	PCS input power	R	i32	0.1		kW	
40048							
40049	PCS input voltage	R	u32	0.01		V	


		Name		Communication Protocol		Version	V2.7
		ID				Level	Foreign
40050							
40051	PCS input current	R	i32	0.01		A	
40052							
40053	PCS radiator temperature	R	i16	0.1		°C	
40056	PCS AC cumulative charging energy	R	i32	0.1		kWh	
40057							
40058	PCS AC cumulative discharge energy	R	i32	0.1		kWh	
40059							
40071	General version number & version V information	R	u16	0.1			General version number & version V information
40072	Version B information	R	u16	0.1			Version B information
40073	Version D information	R	u16	0.1			Version D information
40074	Alternate version information	R	u16	0.1			Alternate version information
40103	PCS fault word 1	R	u16	1			Reference table 5-1
40104	PCS fault word 2	R	u16	1			Reference table 5-1
40105	PCS fault word 3	R	u16	1			Reference table 5-1
40106	PCS Fault Word 4	R	u16	1			Reference table 5-1

4.14 Liquid Cooler Real Time Data

Table 4-14 Liquid Cooler Real Time Data

ModBus address	Name	Privilege	Variable type	coefficient	Offset	Unit	Description
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		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
52004	Communication Status	R	u16	1	0		0: normal 1: abnormal
52005	Work Status	R	u16	1	0		0: Shutdown mode 1: Cooling mode 2: Heating mode 3: Self-circulation/self-adaptive
52006	Relay Status	R	u16	1	0		0 : disconnect 1 : engage
52007	NA						
52008	NA						
52009	Outlet temperature	R	i16	0.1	0	°C	
52010	Inlet temperature	R	i16	0.1	0	°C	
52011	Ambient temperature	R	i16	0.1	0	°C	
52012	Inlet Pressure	R	u16	0.1	0	bar	
52013	Outlet Pressure	R	u16	0.1	0	bar	
52014	Demand Power	R	u16	0.1	0	kW	
52015	Liquid cooler Fault Code	R	u32	1	0		Reference table 5-8
52016							
52017	Liquid cooler Fault Code Level	R	u16	1	0		1: Level 1 2: Level 2 3: Level 3


	Name	Communication Protocol	Version	V2.7
	ID		Level	Foreign


4.15 Fire Protection Real Time Data


Table 4-15 Fire Protection Real Time Data


ModBus address	Name	Permissions	Variab letype	Coeff icient	Offset	Unit	Description
54004	communication Status	R	u16	1	0		0: normal 1: abnormal
54005	Fire Host Status	R	u16	1			0: standby 1: Normal 2: alarm 3: Protection 4: fault 5: Fire
54006	Input Status	R	u16	1			Bit0: Temperature sensor status Bit1: Smoke sensor status
54007	Output Status	R	u16	1			Bit0: Pack1 Solenoid valve Bit1: Pack2 solenoid valve Bit2: Pack3 Solenoid valve Bit3: Pack4 solenoid valve Bit4: Pack5 Solenoid valve Bit5: Pack6 solenoid valve Bit6: Pack7 Solenoid Valve Bit7: Pack8 Solenoid valve Bit8: Aerosol bottle valve Bit9: Perfluorohexanone bottle valve
54008	Fire Warning	R	u16	1			Bit0: detector 1 Bit1: detector 2 Bit2: detector 3 Bit3: detector 4 Bit4: detector 5 Bit5: detector 6


		Name	Communication Protocol		Version	V2.7
		ID			Level	Foreign
						Bit6: detector 7 Bit7: detector 8
54009	Detector Fault	R	u16	1		Bit0: detector 1 Bit1: detector 2 Bit2: detector 3 Bit3: detector 4 Bit4: detector 5 Bit5: detector 6 Bit6: detector 7 Bit7: detector 8
54010	Fire Alarm	R	u16	1		Bit0: detector 1 Bit1: detector 2 Bit2: detector 3 Bit3: detector 4 Bit4: detector 5 Bit5: detector 6 Bit6: detector 7 Bit7: detector 8 Bit8: Cabinet overtemperature Bit9: Cabinet smoke Bit10: Cabinet firealarm
54011	Fire protection	R	u16	1		Bit0: Temperature sensor protection Bit1: Smoke sensor protection Bit2: Temperature sensor invalidation Bit3: Smoke sensor invalidation
54012	Fire Detector Model 1	R	u16			0x01: XR1000X_CAN 0x02: XR803_CAN 0x03: XR805_CAN 0x04: XR806_CAN 0x05: XR1000E_CAN 0x06: XR1000S_CAN

		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
54013	Probe1 Status	R	u16				0: standby 1: Normal 2: Alarm 3: Protection 4: Fault 5: Fire
54014	Probe1 Temperature	R	i16	1		°C	
54015	Probe1 M2 Value	R	u16	1		ppm	
54016	Probe1 M4 Value	R	u16	1		ppm	
54017	Probe1 CO-CS03 Value	R	u16	1		ppm	
54018	Fire Detector Model 2	R	u16				0x01: XR1000X_CAN 0x02: XR803_CAN 0x03: XR805_CAN 0x04: XR806_CAN 0x05: XR1000E_CAN 0x06: XR1000S_CAN
54019	Probe2 Status	R	u16				0: standby 1: Normal 2: alarm 3: Protection 4: fault 5: Fire
54020	Probe2 Temperature	R	i16	1		°C	
54021	Probe2 M2 Value	R	u16	1		ppm	
54022	Probe2 M4 Value	R	u16	1		ppm	
54023	Probe2 CO-CS03 Value	R	u16	1		ppm	
54024	Fire Detector Model 3	R	u16				0x01: XR1000X_CAN 0x02:

		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
							XR803_CAN 0x03: XR805_CAN 0x04: XR806_CAN 0x05: XR1000E_CAN 0x06: XR1000S_CAN
54025	Probe3 Status	R	u16				0: standby 1: Normal 2: alarm 3: Protection 4: fault 5: Fire
54026	Probe3 Temperature	R	i16	1		°C	
54027	Probe3 M2 Value	R	u16	1		ppm	
54028	Probe3 M4 Value	R	u16	1		ppm	
54029	Probe3 CO-CS03 Value	R	u16	1		ppm	
54030	Fire Detector Model 4	R	u16				0x01: XR1000X_CAN 0x02: XR803_CAN 0x03: XR805_CAN 0x04: XR806_CAN 0x05: XR1000E_CAN 0x06: XR1000S_CAN
54031	Probe4 Status	R	u16				0: standby 1: Normal 2: alarm 3: Protection 4: fault 5: Fire
54032	Probe4 Temperature	R	i16	1		°C	

		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
54033	Probe4 M2 Value	R	u16	1		ppm	
54034	Probe4 M4 Value	R	u16	1		ppm	
54035	Probe4 CO-CS03 Value	R	u16	1		ppm	
54036	Fire Detector Model 5	R	u16				0x01: XR1000X_CAN 0x02: XR803_CAN 0x03: XR805_CAN 0x04: XR806_CAN 0x05: XR1000E_CAN 0x06: XR1000S_CAN
54037	Probe5 Status	R	u16				0: standby 1: Normal 2: alarm 3: Protection 4: fault 5: Fire
54038	Probe5 Temperature	R	i16	1		°C	
54039	Probe5 M2 Value	R	u16	1		ppm	
54040	Probe5 M4 Value	R	u16	1		ppm	
54041	Probe5 CO-CS03 Value	R	u16	1		ppm	
54042	Fire Detector Model 6	R	u16				0x01: XR1000X_CAN 0x02: XR803_CAN 0x03: XR805_CAN 0x04: XR806_CAN 0x05: XR1000E_CAN


		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
							0x06: XR1000S_CAN
54043	Probe6 Status	R	u16				0: standby 1: Normal 2: alarm 3: Protection 4: fault 5: Fire
54044	Probe6 Temperature	R	i16	1		°C	
54045	Probe6 M2 Value	R	u16	1		ppm	
54046	Probe6 M4 Value	R	u16	1		ppm	
54047	Probe6 CO-CS03 Value	R	u16	1		ppm	
54048	Fire Detector Model 7	R	u16				0x01: XR1000X_CAN 0x02: XR803_CAN 0x03: XR805_CAN 0x04: XR806_CAN 0x05: XR1000E_CAN 0x06: XR1000S_CAN
54049	Probe7 Status	R	u16				0: standby 1: Normal 2: alarm 3: Protection 4: fault 5: Fire
54050	Probe7 Temperature	R	i16	1		°C	
54051	Probe7 M2 Value	R	u16	1		ppm	
54052	Probe7 M4 Value	R	u16	1		ppm	
54053	Probe7 CO-CS03 Value	R	u16	1		ppm	

		Name	Communication Protocol			Version	V2.7
		ID				Level	Foreign
54054	Fire Detector Model 8	R	u16				0x01: XR1000X_CAN 0x02: XR803_CAN 0x03: XR805_CAN 0x04: XR806_CAN 0x05: XR1000E_CAN 0x06: XR1000S_CAN
54055	Probe8 Status	R	u16				0: standby 1: Normal 2: alarm 3: Protection 4: fault 5: Fire
54056	Probe8 Temperature	R	i16	1		°C	
54057	Probe8 M2 Value	R	u16	1		ppm	
54058	Probe8 M4 Value	R	u16	1		ppm	
54059	Probe8 CO-CS03 Value	R	u16	1		ppm	
54110	Fire Boot version	R	u16	0.01			
54111	Fire Software version	R	u16	0.01			
54112	Fire hardware version	R	u16	0.01			

4.16 Light Control Real Time Data

Table 4-16 Light Control Real Time Data

ModBus address	Name	Privilege	Type	Coefficient	Offset	Unit	Description
57004	communication Board Addr	R	u8	1	0		
	communication Status	R	u8	1	0		0: normal 1: abnormal
57005	Input IO bit	R	u16	1	0		


	Name	Communication Protocol			Version	V2.7	
	ID				Level	Foreign	
57006	Output IO bit	R	u16	1	0		
57007	Software version	R	u16	0.01	0		
57008	hardware version	R	u16	0.01	0		


5 Register Bit Query


5.1 PCS Fault Map

Table 5-1 PCS Fault Map

General fault term	variable type	Name	Bit	Description
PCS fault word 1	u16	FPGA hardware over current fault	0	0: Normal 1: Fault
		FPGA hardware IGBT fault	1	0: Normal 1: Fault
		FPGA hardware over temperature fault	2	0: Normal 1: Fault
		ARM software A-phase output over current	3	0: Normal 1: Fault
		ARM software A-phase output shutdown	4	0: Normal 1: Fault
		ARM software B-phase output over current	5	0: Normal 1: Fault
		ARM software B-phase output shutdown	6	0: Normal 1: Fault
		ARM software C-phase output over current	7	0: Normal 1: Fault
		ARM software C-phase output shutdown	8	0: Normal 1: Fault
		ARM software AC over voltage	9	0: Normal 1: Fault
		ARM software AC under voltage	10	0: Normal 1: Fault
		ARM software AC over frequency	11	0: Normal 1: Fault
		ARM software AC under frequency	12	0: Normal 1: Fault
		ARM software THDU overrun	13	0: Normal 1: Fault

		Name	Communication Protocol	Version	V2.7
		ID		Level	Foreign
		ARM software failure - system phase sequence error	14	0: Normal 1: Fault	
		ARM software failure - reverse DC polarity	15	0: Normal 1: Fault	
PCS fault word 2	u16	ARM software failure - DC bus software overvoltage	0	0: Normal 1: Fault	
		ARM software failure - DC bus software undervoltage	1	0: Normal 1: Fault	
		ARM software failure - DC overcurrent	2	0: Normal 1: Fault	
		ARM Software failure - Island Protection	3	0: Normal 1: Fault	
		ARM Software failure - AC Main Engagement Failure	4	0: Normal 1: Fault	
		ARM Software failure - AC Main Opening Failure	5	0: Normal 1: Fault	
		ARM Software failure - DC Main Engagement Failure	6	0: Normal 1: Fault	
		ARM Software failure - DC Main Opening Failure	7	0: Normal 1: Fault	
		ARM software failure - DC soft start Engagement failure	8	0: Normal 1: Fault	
		ARM Software failure - DC Soft-Start Opening Fault	9	0: Normal 1: Fault	
		ARM software failure - ferroelectric parameter storage error	10	0: Normal 1: Fault	
		ARM Software failure - DC Softstart Failure	11	0: Normal 1: Fault	
		ARM software failure - boot conditions are not met	12	0: Normal 1: Fault	
		ARM Software failure - Operational switch failure	13	0: Normal 1: Fault	
		ARM software failure - inverter startup timeout	14	0: Normal 1: Fault	
		ARM software failure - Parameter delivery setting error	15	0: Normal 1: Fault	
PCS fault word 3	u16	ARM software failure - BMS communication failure	0	0: Normal 1: Fault	
		ARM software failure - BMS temperature abnormal	1	0: Normal 1: Fault	
		ARM software failure - BMS crash	2	0: Normal 1: Fault	
		ARM Software failure - BMS Battery Alert	3	0: Normal 1: Fault	

		Name	Communication Protocol	Version	V2.7
		ID		Level	Foreign
		ARM Software failure - EMS communication failure	4	0: Normal 1: Fault	
		ARM software failure - E-STOP or core failure	5	0: Normal 1: Fault	
		Lack of phase in communication	6	0: Normal 1: Fault	
		The AC voltage is abnormal	7	0: Normal 1: Fault	
		The AC side current is abnormal	8	0: Normal 1: Fault	
		The lock-in phase is out of sync	9	0: Normal 1: Fault	
		The output leakage current is abnormal	10	0: Normal 1: Fault	
		The DC component of the inverter voltage is abnormally detected	11	0: Normal 1: Fault	
		The insulation resistance is abnormal	12	0: Normal 1: Fault	
		The battery is fused	13	0: Normal 1: Fault	
		DC surge protector failure	14	0: Normal 1: Fault	
		AC surge protector malfunction	15	0: Normal 1: Fault	
PCS Fault Word 4	u16	The control power supply is abnormal	0	0: Normal 1: Fault	
		Bus hardware overvoltage	1	0: Normal 1: Fault	
		The inverter voltage is abnormal	2	0: Normal 1: Fault	
		Wave-by-wave throttling alarm/protection	3	0: Normal 1: Fault	
		The drive wave is abnormal	4	0: Normal 1: Fault	
		The scheduling information is abnormal	5	0: Normal 1: Fault	
		Dispatch CAN communication failures	6	0: Normal 1: Fault	
		Fast module communication failure	7	0: Normal 1: Fault	
		The fast SCI communication is abnormal	8	0: Normal 1: Fault	
ModbusTCP communication is interrupted	9	0: Normal 1: Fault			

	Name	Communication Protocol	Version	V2.7
	ID		Level	Foreign
		Remote EPO	10	0: Normal 1: Fault
		Monitor power supply anomalies	11	0: Normal 1: Fault
		Fan fault	12	0: Normal 1: Fault
		Other	13	0: Normal 1: Fault
		NA	14	
		NA	15	

5.2 Board Communication Bit


Table 5-2 Board Communication Bit

Board communication	Bit	Description(0: normal,1: abnormal)
	Bit0	Communication adapter board 1
	Bit1	Communication adapter board 2
	Bit2	Communication adapter board 3
	Bit3	Communication adapter board 4
	Bit4	Communication adapter board 5
	Bit5	Communication adapter board 6
	Bit6	Communication adapter board 7
	Bit7	Communication adapter board 8
	Bit8	Communication adapter board 9
	Bit9	Communication adapter board 10
	Bit10	Communication adapter board 11
	Bit11	Communication adapter board 12
	Bit12	Communication adapter board 13
	Bit13	Communication adapter board 14
	Bit14	Communication adapter board 15
	Bit15	Communication adapter board 16

5.3 Device Communication Bit

Table 5-3 Device Communication Bit

Device communication	Bit	Description(0: normal,1: abnormal)
	Bit0	ECU communication
	Bit1	PCS Communication
	Bit2	BMS communication
	Bit3	Liq-cooling communication
	Bit4	Meter communication
	Bit5	LED communication
	Bit6	Fire communication
	Bit7	


	Name	Communication Protocol	Version	V2.7
	ID		Level	Foreign

	Bit8	
	Bit9	
	Bit10	
	Bit11	
	Bit12	
	Bit13	
	Bit14	
	Bit15	

5.4 EMU Operation Level 1 Alarms Bit

Table 5-4 EMU Operation Level 1 Alarms Bit

EMU operation Level 1 alarms	Bit	Description(0: normal,1: abnormal)
	Bit0	PCS warning
	Bit1	BMS warning
	Bit2	Liq-cooling warning
	Bit3	Fire warning
	Bit4	Fire warning2
	Bit5	UPS warning
	Bit6	SOC low warning
	Bit7	SOC high warning
	Bit8	Access warning
	Bit9	Cluster total over voltagewarning
	Bit10	Cluster total under voltage warning
	Bit11	Cluster cell over voltage warning
	Bit12	Cluster cell under voltage warning
	Bit13	
	Bit14	
	Bit15	
	Bit16	
	Bit17	
	Bit18	
	Bit19	
	Bit20	
	Bit21	
	Bit22	
	Bit23	
	Bit24	
	Bit25	
	Bit26	
	Bit27	
	Bit28	
	Bit29	
	Bit30	

	Name	Communication Protocol	Version	V2.7
	ID		Level	Foreign
	Bit31			

5.5 EMU Operation Level 2 Protect Bit


Table 5-5 EMU Operation Level 2 Protect Bit

EMU operation Level 2 protect	BIT	Description(0: normal,1: abnormal)
	Bit0	PCS protect
	Bit1	BMS protect
	Bit2	Liq-cooling protect
	Bit3	Fire protect
	Bit4	Fire protect2
	Bit5	UPS protect
	Bit6	SOC low protect
	Bit7	SOC high protect
	Bit8	Access protect
	Bit9	Liquid cooler out of control
	Bit10	pack copper bar overtemperature protection
	Bit11	The addresses of the pcs primary and secondary machines are incorrect
	Bit12	
	Bit13	
	Bit14	
	Bit15	
	Bit16	
	Bit17	
	Bit18	
	Bit19	
	Bit20	
	Bit21	
	Bit22	
	Bit23	
	Bit24	
	Bit25	
	Bit26	
	Bit27	
	Bit28	
	Bit29	
	Bit30	
	Bit31	

5.6 EMU Operation Level 3 Fault Bit

Table 5-6 EMU Operation Level 3 Fault Bit

EMU operation Level 3	Bit	Description(0: normal,1: abnormal)
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	Name	Communication Protocol	Version	V2.7
	ID		Level	Foreign

fault	Bit0	PCS fault
	Bit1	BMS fault
	Bit2	Liq-cooling fault
	Bit3	Detector fault
	Bit4	fire alarm
	Bit5	UPS fault
	Bit6	SOC low fault
	Bit7	SOC high fault
	Bit8	Access fault
	Bit9	Emergency stop fault
	Bit10	
	Bit11	
	Bit12	
	Bit13	
	Bit14	
	Bit15	
	Bit16	
	Bit17	
	Bit18	
	Bit19	
	Bit20	
	Bit21	
	Bit22	
	Bit23	
	Bit24	
	Bit25	
	Bit26	
	Bit27	
	Bit28	
	Bit29	
	Bit30	
	Bit31	

5.7 EMU Hardware Fault Bit

Table 5-7 EMU Hardware Fault Bit

EMU hardware protect	Bit	Description(0: normal,1: abnormal)
	Bit0	RTC
	Bit1	FLASH
	Bit2	EEPROM
	Bit3	ETH PHY
	Bit4	USB
	Bit5	Board type incorrect
	Bit6	liquid cooling parameters incorrect


	Name	Communication Protocol	Version	V2.7
	ID		Level	Foreign

	Bit7	Missing profile
	Bit8	The SN code is missing
	Bit9	
	Bit10	
	Bit11	
	Bit12	
	Bit13	
	Bit14	
	Bit15	
	Bit16	
	Bit17	
	Bit18	
	Bit19	
	Bit20	
	Bit21	
	Bit22	
	Bit23	
	Bit24	
	Bit25	
	Bit26	
	Bit27	
	Bit28	
	Bit29	
	Bit30	
	Bit31	

5.8 Liquid Cooler Fault Code Bit

Table 5-8 Liquid Cooler Fault Code Bit

Liquid Cooler Fault Code	Bit	Description(0: normal,1: abnormal)
	Bit0	BMS communication fault
	Bit1	Low voltage fault
	Bit2	Low pressure fault
	Bit3	High pressure fault
	Bit4	PTC over-temperature alarm
	Bit5	Evaporative temperature sensor fault
	Bit6	The main relay is fault
	Bit7	Compressor failure
	Bit8	Anti-freeze protection
	Bit9	The anti-freeze temperature sensor is abnormal
	Bit10	Fan fault
	Bit11	Cooling compressor communication fault
	Bit12	High voltage fault
	Bit13	Exhaust over-temperature alarm

	Name	Communication Protocol	Version	V2.7
	ID		Level	Foreign
	Bit14	Pump fault		
	Bit15	Outdoor environmental sensor fault		
	Bit16	Exhaust gas temperature sensor fault		
	Bit17	The return water temperature sensor is fault		
	Bit18	The effluent temperature sensor is fault		
	Bit19	The water is at a high temperature		
	Bit20	Low temperature of the effluent		
	Bit21	PTC fault		
	Bit22	The water-cooled battery tank has a low liquid level		
	Bit23	Phase loss locked		
	Bit24	Other fault locks		
	Bit25	The sub-controller communication is fault		
	Bit26	When heating, the inlet water temperature of the pack is too high by 65°C		
	Bit27	When refrigerating, the inlet water temperature of the pack is below 5°C		
	Bit28	The pattern is incorrect		
	Bit29	Inlet and outlet water pressure sensors are fault		
	Bit30	The water level sensor is fault		
	Bit31	DCDC fault		