C7 Series Master iBMS Specification

AUTOREV ENGINEERING PRIVATE LIMITED

Revision record

S/N	Edition	Revision date	Type	Revised content
1	V1.0	2022-03-25	A	First edition

A-Add，M-Modification，D-Delete

1. Product overview

C7 intelligent battery management system is a new generation of intelligent battery management system developed by Autorev technology based on the requirements of high safety, high reliability and long life of new energy vehicles. The system has rich interface definitions, integrates 5-way high voltage detection, battery positive / negative insulation detection, 2-way current detection, 8-way relay control and adhesion detection, 4G transmission, etc., enriches hardware self diagnosis circuit and key circuit redundancy design, and ensures application safety. It supports lithium iron phosphate, ternary, lithium titanate and other battery types, and is suitable for all kinds of battery application scenarios such as pure electric and hybrid passenger vehicles, buses, logistics vehicles and so on.

- Integrated insulation detection, high-voltage detection, charging port temperature detection, electronic lock drive, high-voltage interlock, data storage, wireless data transmission and other rich functions, supplemented by dozens of hardware self-test circuits;
- CAN network communication and UDS service based on ISO14229 standard, software architecture design conforming to AUTOSAR specification and strict Misra C code specification ensure software safety;
- System level reliability design, IPD R & D process management, CNAS laboratory supporting support, IATF 16949 quality management system to ensure product quality;
- The industry's unique calibration working mode, online firmware upgrading and OTA air upgrade system, together with Autorev software background management platform, easily realize the closed management and traceability of product software;
- The battery data cloud platform provides powerful data monitoring, status query, alarm warning, data analysis and parameter recalibration functions to complete the full life cycle management of the battery system.

2. C70 Series master BMS model list

Table 1-C700 series master BMS list

NO.	Product name	Model	Notes
1	Standard version	C700	/
2	CAT 1 4G version	C700-D	Support 4G comm. and online management platform
3	CAT 4 4G version	C700-G	Support 4G comm. and management platform(English)

3. Functional parameters

Table 2-C7 series Master BMS parameter list

Item		C700	C700-D/C700-G
working temperature		-40℃~85℃	
Storage temperature		-40℃~105℃	
Working humidity		5~95%	
High voltage detection accuracy		±0.5%	
Current detection accuracy		±0.5%FSR	
Insulation detection accuracy		10K or 10%	
SOC estimation accuracy		≤5%	
Charging port temperature detection accuracy		±1℃ (10K NTC)	
Support protocols and standards		CCP、UDS、OBD-ii、GB/T 32960	
System power supply		Voltage range: 6 ~ 36V (typical value: 12V, 24V)	
Power consumption	Working	200mA@12V	
	Working	3mA@12V	
	Power off	100uA@12V	
Comm. unit	CAN BUS	3 channel (charging / whole vehicle / master-slave)	
	4G Comm.	/	support
Acquisition units	High voltage detection	0~800V	
	Hall Current Sensor	Support (5V, single / dual range, ± 500A range optional)	
	Shunt	Support (± 500A range optional)	
	Insulation detection	Support (battery pack B + / B -, range 0-6MΩ)	
	Relay adhesion detection	Support maximum 5-channel high voltage Relay adhesion detection(H port and P- dedicated to adhesion detection of main negative relay)	
	Charging port temperature detection	5-channel (temperature sensing model optional)	
	Charging connection detection	CC、CP、CC2（GB/T 20234.2-2015）	
	Level input signal detection	2 channel (support high voltage interlock detection)	
	Switch signal detection	2 channel	
	Wake up signal source detection	KL15/OBC/DCC/CP/RTC	
Execution unit	High side switch	7 channel，2A	
	Low side switch	2 channel，2A	
	Electronic lock drive	Support	
	BMU power enable	Support	
Data storage	Board storage	128MB SLC NAND FLASH	

4. Interface definition

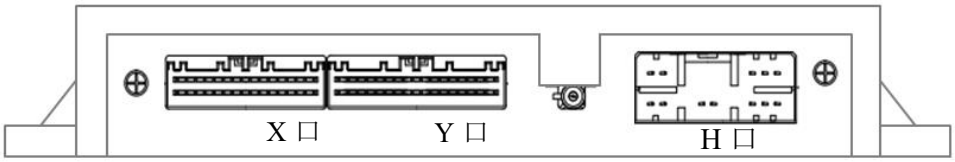
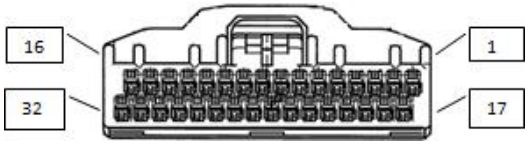
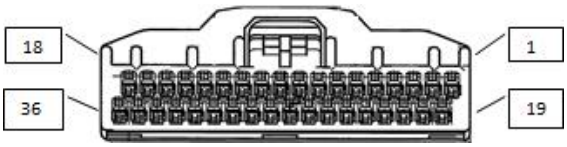
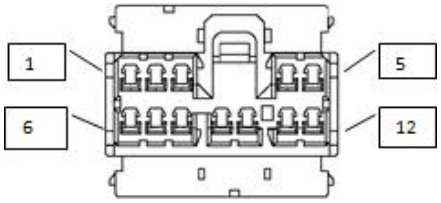


Figure 1-C700/C700-D/C700-G interface location

Table 3-Interface definition list

Location	S/N	Interface	Name	S/N	Interface	Name
X port	1	CC2	DC charging connection confirmation	17	CC	AC charging connection confirmation
	2	LSS2	Low side switch output 2	18	CP	AC charging control guidance
	3	LSS1	Low side switch output 1	19	NC	Empty
	4	MOTOR_OUT 2	Electronic lock drive signal 2	20	GND	Electronic lock position switch-
	5	MOTOR_OUT1	Electronic lock drive signal 1	21	MOTOR_POSITION	Electronic lock position switch+
	6	HSS7	High side switch output 7+	22	GND	High side switch output 7-
	7	HSS6	High side switch output 6+	23	GND	High side switch output 6-
	8	HSS5	High side switch output 5+	24	GND	High side switch output 5-
	9	HSS4	High side switch output 4+	25	GND	High side switch output 4-
	10	HSS3	High side switch output 3+	26	GND	High side switch output 3-
	11	HSS2	High side switch output 2+	27	GND	High side switch output 2-
	12	HSS1	High side switch output 1+	28	GND	High side switch output 1-
	13	DCC	DC pile auxiliary power supply	29	NC	Empty
	14	KL15	Gear on	30	OBC	Auxiliary power supply of AC charger
	15	KL30	KL30+	31	KL31	KL31-
	16	KL30	KL30+	32	KL31	KL31-

Location	S/N	Interface	Name	S/N	Interface	Name	
Y port	1	CAN0H	Master slave CAN H	19	CAN1H	CAN1 High	Isolated
	2	CAN0L	Master slave CAN L	20	CAN1L	CAN1 Low	
	3	CAN0_GND	Master slave CAN ground	21	CAN1_GND	CAN1 ground	
	4	BMU_POWER_EN	Slave power wake-up signal	22	NC	Empty	
	5	NC	Empty	23	NC	Empty	
	6	CAN2H_R+	CAN 2 high matching resistance	24	NC	Empty	
	7	CAN2L_R+	CAN2 low matching resistance	25	CAN2H	CAN2 High	Isolated
	8	DIG_IN2	Level signal input 2	26	CAN2L	CAN2 Low	
	9	DIG_IN1	Level signal input 1	27	CAN2_GND	CAN2 ground	
	10	SWITCH_IN2A	Switch signal detection 2	28	GND	Switch signal detection GND	
	11	SWITCH_IN1A	Switch signal detection 1	29	GND	Switch signal detection GND	
	12	5V_HALL	HALL power supply positive 5V	30	GND	HALL power supply negative	
	13	HALL_CURRENT1	HALL current 1 (large range)	31	HALL_CURRENT2	HALL current 2(small range)	
	14	NC	Empty	32	GND	GND	
	15	GND	TEMP sensing detection-	33	GND	TEMP sensing detection-	
	16	FCH_T2	TEMP detection+(Fast charging negative)	34	SCH_T3	TEMP detection+(slow charging interface C)	
	17	GND	TEMP detection-	35	SCH_T2	TEMP detection+(Slow charging B)	
	18	FCH_T1	TEMP detection+(Fast charging positive)	36	SCH_T1	TEMP detection+(Slow charging A)	
Location	S/N	Interface	Name	S/N	Interface	Name	
H port	1	P-	Total negative adhesion detection (connected to external terminal negative)	7	HV3	High voltage detection 3	
	2	NC	Empty	8	HV2	High voltage detection 2	
	3	HGND	High voltage detection battery total negative	9	HV1	High voltage detection 1	
	4	SHUNT_R+	Shunt+	10	BAT+	High voltage detection battery positive	
	5	SHUNT_R-	Shunt-	11	NC	Empty	
	6	HV4	High voltage detection 4	12	NC	Empty	

Port diagram	 Direction of inlet end of plug	Model of wire end plug ： JAE，MX34032SF1 Model of wire terminal ： JAE，M34S75C4F1 Wire diameter requirements ： 20-22AWG
	 Direction of inlet end of plug	Model of wire end plug ： JAE，MX34036SF1 Model of wire terminal ： JAE，M34S75C4F1 Wire diameter requirements ： 20-22AWG
	 Direction of inlet end of plug	Model of wire end plug ： JAE，173851-1 Model of wire terminal ： JAE，173630-1 Wire diameter requirements ： 20-22AWG

5. Structure dimension

Table 4-C7 series master BMS structure dimensions

Model	Upside down (L*W) mm	Surface mounted (L*W) mm	Dimension (L*W*H) mm	Weight （Kg)	Installation torque (N.M)
C700/-D/-G	199×100	199×72	215×129.3×30.2	0.38/0.43	No more than 2.5

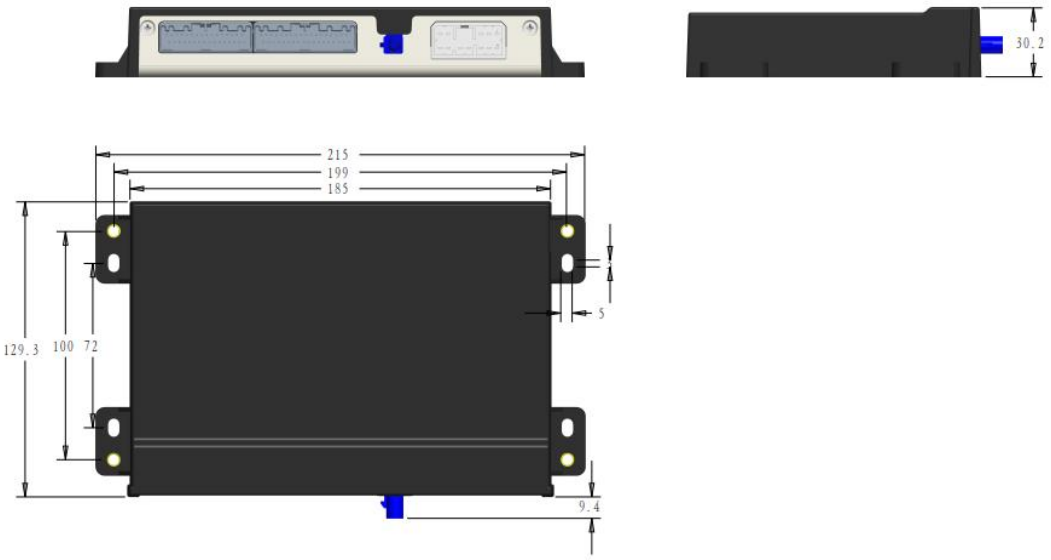


Figure 2-C700 /C700-D/C700-G outline and installation dimensions

6. AT2015B antenna

AT2015B is a special waterproof antenna developed by Autorev technology for wireless data transmission of lithium battery pack. The antenna has many advantages, such as stable signal reception, compact size, convenient installation, flame retardant, anti-aging, anti-seismic, and high waterproof grade. It works better with the iBMS module, and is suitable for various lithium ion application scenarios such as passenger cars, commercial vehicles, industrial vehicles and energy storage systems.

Table 9- Antenna parameter list

Picture	Items	Main parameters
	Frequency range	880-960MHz/1710-1880MHz
	Bandwidth	80MHz/170MHz
	Input impedance	50Ω
	Voltage standing wave ratio	≤2.0
	Gain	1.8dBi
	Power capacity	10W
	Working TEMP	-40~85℃
	Flame retardant grade	94V-0
	Waterproof grade	IP67
	Mounting dimensions	54.5mm*54.5mm* ¢ 16mm
	Overall dimension	75mm*75mm*13mm
	Length of antenna	Standard 1.5m (customization optional)
	Connector type	FAKRA D

7. Other precautions

- Hot plugging is prohibited during product operation;
- Supplier has the right to modify the specification without notifying anybody;
- It is strictly forbidden for non professional technicians to open the BMS;
- Matters not covered shall be discussed and decided by the supplier and the buyer;
- The supplier shall not be liable for any loss caused by operation not in accordance with the specifications.

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