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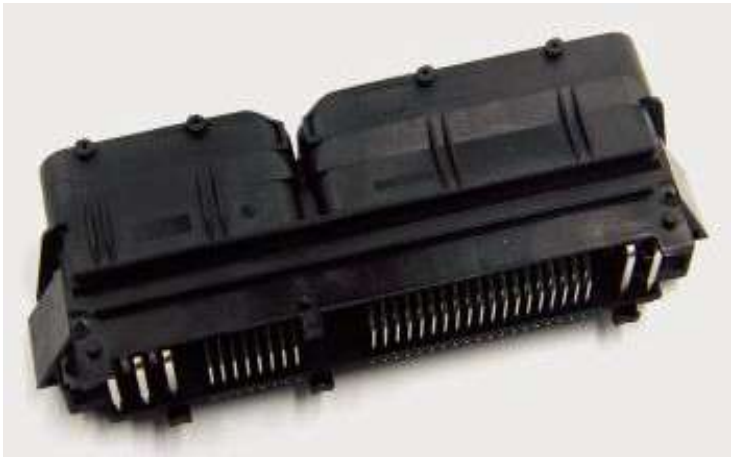
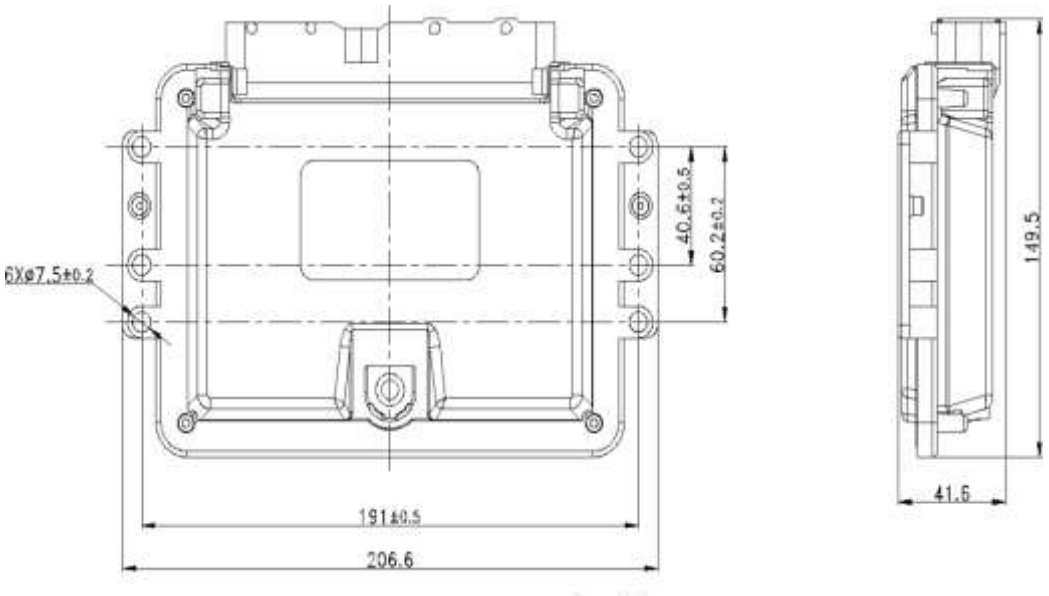
Vehicle & Battery Management System Control Unit
Model No.: AT-VBU2000-24A07
Specification



Features:

1. Voltage: 12/24VDC
2. Operation Temperature: -40℃~85℃
3. IP Protection: IP67
4. Compatible of CAN2.0B ISO11898-2003



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Modification Record

V0.1	Sun Baoyang	2021.7.30	first draft
V0.2	Sun Baoyang	2021.8.25	（1）Modify the pin definition； （2）Add a hard wire to wake up, high and low can match.
V0.3	Sun Baoyang	2021.9.1	（1）Pin definition changes with function serial number： Change P87-LS18 to LS17； Change P97-LS12 to LS14； Change P104-LS15 to LS11； Change P105-LS13 to LS15； Change P113-LS17 to LS13； Change P115-LS14 to LS18； （2）Modify the product model： “AT-VFBSSS-200” changed to “AT-VBU2000-24A07”

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1. Overview

The Model No. of AT-VBU2000-24A07 vehicle and battery management system control unit is a VCU+BMS integration solution independently developed for bus project, aiming at reducing the cost of parts and exploring the power domain controller. On the basis of VCU function, this product adds BMS control function, including SOC calculation, SOP estimation, contactor control logic, fault diagnosis, balance control, etc.

In order to ensure the high safety of the battery system, the product adopts the following high safety design:

- Adopt functional safety requirements and development processes;
- Perfect fault diagnosis and protection mechanism, including: contactor adhesion detection, insulation, over voltage, under voltage, over current, short circuit (internal and external), over temperature, etc ;

2. Technical parameter

2.1 Parameters

type	parameter
Input Voltage Class	12/24VDC
Operating Voltage Range	9V~32V
Current Of Operation	<0.2A
Static Current	<1mA
Bus Clock Frequency	200Mhz
EEPROM	128k
Flash	2048k
RAM	184K
RAM	8k
range of working temperature	-40℃~+85℃
Working Humidity RH	20%~90%
Protection class	IP67
Installation Position	Cab, Passenger Compartment Or Chassis
Life Cycle	8 years / 120,000 km for passenger vehicles, 5 years / 200,000 km for commercial vehicles whichever comes first

Table 1 Technical parameter list

2.2 Interface Definition

Table 2 Interface Definition List

NO.	Function			Qty	Note
1	Power out (5V)			4	Two independent power outputs, each with a rated output current of 50mA. (The connector leads two power outputs respectively for a total of four power outputs.)
				5	Two independent power outputs, each with a rated output current of 250mA (the connector leads two and three power outputs respectively for a total of five).
2	CAN			5	There are 5 channels; one of which has wake-up function and the other CAN isolate and support CANFD.
3	Input	40	I/O Input	18	Adjust the resource quantity by adjusting the hardware BOM
4			Analog acquisition	12	12 channels analog quantity collection
6			Internal/External Wake Up	6	The interior contains 1 CAN activation, 1 RTC activation, There are four external high level activations, two of which can be configured with low level activation
8			PWM Input	4	
9	Output	32	PWM Output	4	Frequency:1Hz-1KHz，Duty Cycle:0%-100%
10			High Side Drive	8	<0.8A，Can be configured as PWM.
11			Low Side Drive	18	Four channels have anti-reverse protection function，<0.5A；Two channels<0.75A； Six channels<1A,Two of them can be configured as PWM； Four channels<1.5A，Two of them can be configured as PWM；Two channels<1.7A；
12			24V Power Supply Output	1	Rated total current 5A
13			H-bridge Power Driver	1	<3A

2.3 Implement standards QC/T 413-2015 Basic technical requirements for automotive electrical equipment
GB/T 28046.2-2011 Road vehicles Environmental conditions and tests for electrical and electronic equipment Part 2: Electrical load

GB/T 28046.3-2011 Road vehicles Environmental conditions and tests for electrical and electronic equipment Part 3: Mechanical load
GB/T 28046.4-2011 Road vehicles Environmental conditions and tests for electrical and electronic equipment Part 4: Climate load
GB/T 30038-2013 Road vehicles Protection Class of Electrical and Electronic Equipment (IP code)
GB/T 19951-2005 Road vehicles Test method for electrical disturbance generated by electrostatic discharge
GBT 21437.2-2008 Road vehicles Electrical disturbance caused by conduction and coupling Part 2: Electrical transient conduction along power lines
GB/T 21437.3-2012 Road vehicles Electrical disturbance caused by conduction and coupling Part 3:Conductors other than power lines pass capacitive and inductive coupled electrical transient emission transient voltage immunity test (signal line)
GB/T 18655-2010 Vehicles, ships and internal combustion engines Radio disturbance characteristic Limits and measurement methods for the protection of vehicle mounted receivers
GB/T 33014.4-2016 Road vehicles Test method for immunity of electrical/electronic components to narrowband radiated electromagnetic energy Part 4: High Current injection (BCI) method
GB/T 33014.2-2016 Road vehicles Test method for immunity of electrical/electronic components to narrowband radiated electromagnetic energy Part 2: Anechoic chamber method
ISO 11452-9:2012 Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 9: Portable transmitters

3. Connector Type

The Tyco 121 pin connector (model 1241434-1) is used on the VBU vehicle and the battery system control unit, as shown in Figure 1.

Figure 1 1241434-1 Connector

Tyco socket models for connecting to 121PIN connectors: 1473244-1(81P) and 1473252-1(40P).

4. Interface Definition

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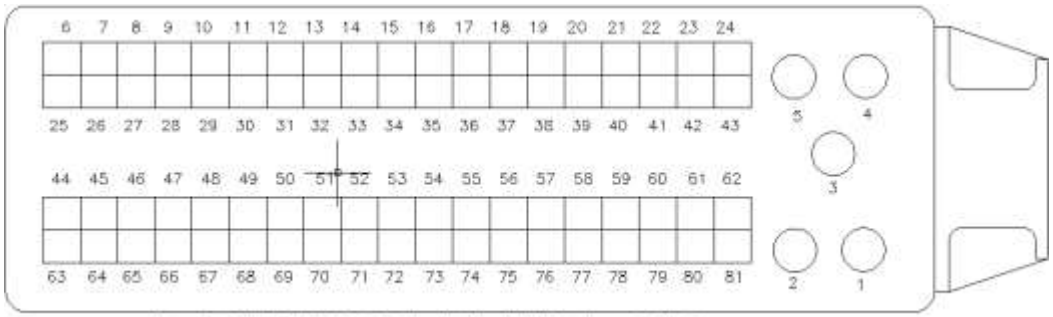
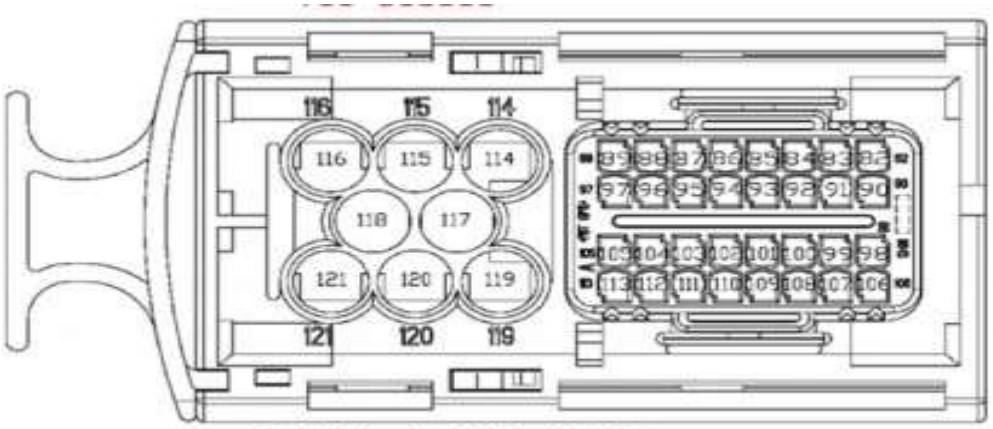


注：图中插件视图方向均为出线方向（正视）

Figure 2 1473244-1(81P)121 Pin Distribution



注：图中插件视图方向均为出线方向

Figure 3 1473252-1(40P)121 Pin Distribution

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Table 3 : 81 Pin Definition

81Pin											
No	**Type**	**Note**	**No**	**Type**	**Note**	**No**	**Type**	**Note**	**No**	**Type**	**Note**
6	CANH4		25	CAN4_SHLD		44	DRIVERPOWER_24V		63	EXT_D_IN18	
7	CANL4		26	GND		45	EXT_A_CC2_2		64	EXT_D_IN17	
8	+5V_sensor4		27	EXT_A_CC2_1		46	+5V_sensor4		65	+5V_sensor4	
9	CANH1		28	EXT_D_IN13		47	EXT_D_IN15		66	EXT_D_IN16	
10	CANL1		29	GND		48	CAN1_SHLD		67	EXT_D_IN14	
11	CANH3		30	GND		49	CANL3		68	CAN3_SHLD	
12	GND		31	EXT_A_TEMP_INPUT5		50	P_24V		69	GND	
13	+5V_sensor3		32	EXT_A_TEMP_INPUT3		51	+5V_sensor3		70		
14	GND		33	EXT_A_TEMP_INPUT2		52	EXT_A_TEMP_INPUT6		71		
15	EXT_V_CRR_LO_0		34	EXT_A_TEMP_INPUT1		53	EXT_A_TEMP_INPUT4		72		
16	+5V_sensor2		35	EXT_V_CRR_HI_0		54	+5V_sensor2		73		
17	CANH0	CANB	36	EXT_D_IN11		55	EXT_D_IN12		74		
18	CANL0		37	GND		56	EXT_D_IN10		75	EXT_D_IN9	
19	CAN0/2_SHLD		38	EXT_V_CRR_HI_1		57	EXT_V_CRR_LO_1		76	GND	
20	GND		39	+5V_sensor1		58	+5V_sensor1		77	GND	
21	CANH2		40	DC_CHG_24V		59	EXT_D_IN8		78	CC/CC2_CHG	

22	CANL_2	CANA	41	EXT_D_IN6		60	DBG		79	EXT_D_IN7	
23	EXT_D_IN5		42	EXT_D_IN4		61	DC/DC_24V		80	EXT_D_IN2	
24	EXT_D_IN3		43	OBC_24V		62	EXT_D_IN1		81	DC/DC_24V	

No	Type	Note	No	Type	Note	No	Type	Note
5	KL30_24V	Frequently-used Power Supply	3	GND	Power grounding	2	KEY_ON_2 4V	DINH Activation
4						1	GND	Power grounding

Table 4：40 Pin Definition

40Pin

No	Type	Note	No	Type	Note	No	Type	Note
121	HS7_OUTPUT		118	HS6_OUTPUT		116	HS5_OUTPUT	
120	HS8_OUTPUT					115	LS18_OUTPUT	
119	LS12_OUTPUT		117	HS1_OUTPUT		114	GND	

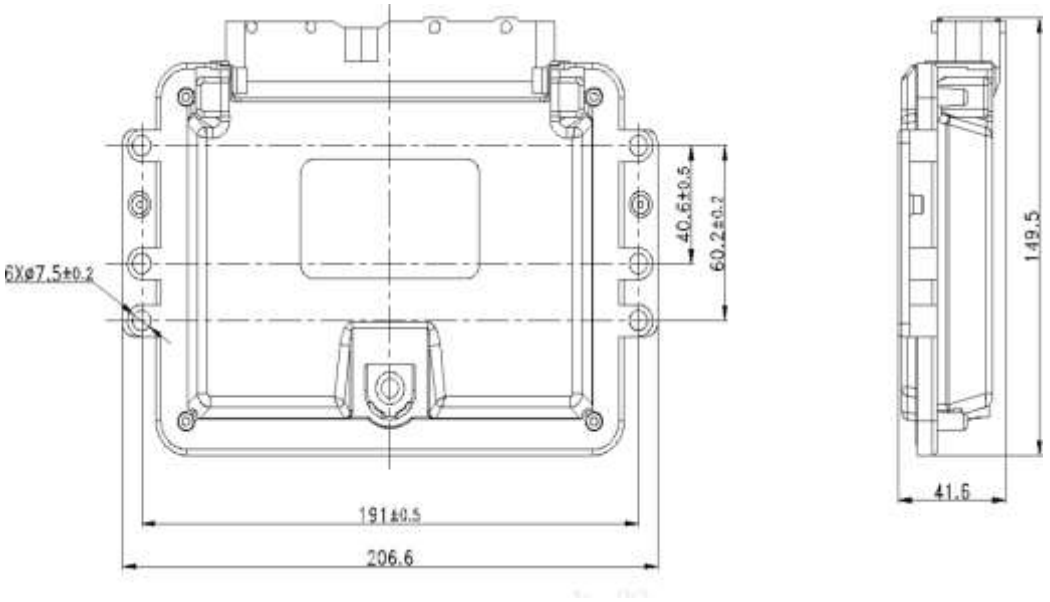
No	Type	Note	No	Type	Note	No	Type	Note	No	Type	Note
113	LS13_OUTPUT		105	LS15_OUTPUT		97	LS14_OUTPUT		89	LS16_OUTPUT	
112	EXT_PWM_CH0		104	LS11_OUTPUT		96	HS2_OUTPUT		88	TL6209_OUT 1	
111	EXT_PWM_CH2		103	EXT_PWM_CH1		95	TL6209_OUT2		87	LS17_OUTPUT	
110	LS9_OUTPUT		102	EXT_PWM_CH3		94	LS10_OUTPUT		86	GND	
109	LS6_OUTP		101	HS4_OUTPU		93	GND		85	GND	

	UT			T							
108	LS3_OUTPUT		100	LS4_OUTPUT		92	HS3_OUTPUT		84	EXT_PWM_OUT4	
107	LS1_OUTPUT		99	LS2_OUTPUT		91	EXT_PWM_OUT3		83	EXT_PWM_OUT2	
106	LS8_OUTPUT		98	LS5_OUTPUT		90	EXT_PWM_OUT1		82	LS7_OUTPUT	

5. Product Dimensions

The AT-VBU2000-24A07 can be arranged in the cockpit or passenger compartment, and its product shape is shown in Figure 4.

3 Product Size Drawing



6. Precautions For Use

1. Please read the technical parameters and pin definition of the vehicle controller carefully before use. Incorrect or out-of-range wiring harness access may result in abnormal function of the vehicle controller.
2. The installation position must be waterproof, moisture-proof, dust-proof, and well cooled. No DC/DC high-power inductive devices are nearby.
3. The controller of the vehicle must be plugged in and out when the vehicle is powered off.
4. Non-professional personnel are forbidden to remove the vehicle controller shell, shall not touch the internal circuit board, so as not to cause damage.
5. Without the confirmation of the manufacturer's technical personnel, it is prohibited to modify or transplant this system in other projects, in order to avoid serious accidents.