EVPT23 series 3.3KW On board Charger Specification

1. General

EVPT23 series 3.3kw charger is designed to supplement power battery according to the national standard of charger. Using PFC+ LLC expansion, high efficiency, small volume, stable work, long design life, high reliability, complete protection functions, ipx6 level waterproof, on-board, portable, is the ideal power supply for electric vehicles, electric tools and other lithium battery application.

2. Revision

S/n	Edition	Date	Revision note
1	Ver1.0	20211023	Establish a document
2			
3			
4			
5			
6			
7			

3. Model definition

① series		② output voltage	③ output	④ installation form		⑤ configuration number
EVPT 23	-	48	40	A	/	C9000

① Series: EVPT23 fixed word

② Output voltage: 48 indicates the hardware rated output voltage of 48;

③ Output current: 40 indicates the hardware rated output current 40a;

④ Installation form: No means vehicle-mounted installation, a means external, portable, with a hand

⑤ Configuration no.:

C9000-c9999 is the can control, the battery type is the lithium battery, the basic charging and heating function

C2000-C2999 is for the can control, and the battery type is for a lithium battery, with a cc / cp function

C3000-C3999 is for can control, and the battery type is a lithium battery, with a dc charging function

C4000-C4999 is can control, battery type is lithium battery, special for all-in-one machine

E5000-E6999 for enabling cable control, the battery type is a lithium battery

P7000-P8999 is the program control, the battery type is lead-acid battery / nickel-cadmium battery, etc

Product model example:

S/N	Model	Rated voltage	Rated current	Output Voltage Range	Configuration number	Installation form	Remarks
1	EVPT23-4840	48V	40A	32-64V	See Above Configuration table	On Board	Force Air cooling or Liquid Cooling
2	EVPT23-6040	60V	40A	40-80V			
3	EVPT23-7240	72V	40A	48-96V			
4	EVPT23-9635	96V	35A	64-128V			
5	EVPT23-14423	144V	23A	96-192V			
6	EVPT23-21615	216V	15A	144-288V			
7	EVPT23-32010	320V	10A	200-420V			
8	EVPT23-36009	360V	9A	240-450V			
9	EVPT23-54006	540V	6A	360-700V			

Configuration number example:

Configuration number	Baud Rate	Frame type	Transmit ID	Receive ID	Remarks
CAN9000	500k	Extended frame	0x1806e5f4	0x18ff50e5	
CAN9001	250k	Extended frame	0x1806e5f4	0x18ff50e5	
CAN9010	500k	Standard frame	0x320	0x325	
CAN9011	250k	Standard frame	0x320	0x325	

Adapt to different customer' s demands through the combination of product model + configuration numbers. Product model + configuration number should be specified as the complete ordering model.

4. Reference standard

GB/T18487.1 electric vehicle conductive charging system-part 1: General requirements

GB/T17626.3 electromagnetic compatibility test and measurement technology rf electromagnetic field radiation resistance test GB/T17626.4 electromagnetic compatibility test and measurement technology electric rapid transient pulse group resistance test GB/T17626.5 electromagnetic compatibility test and measurement technology surge (impact) resistance test

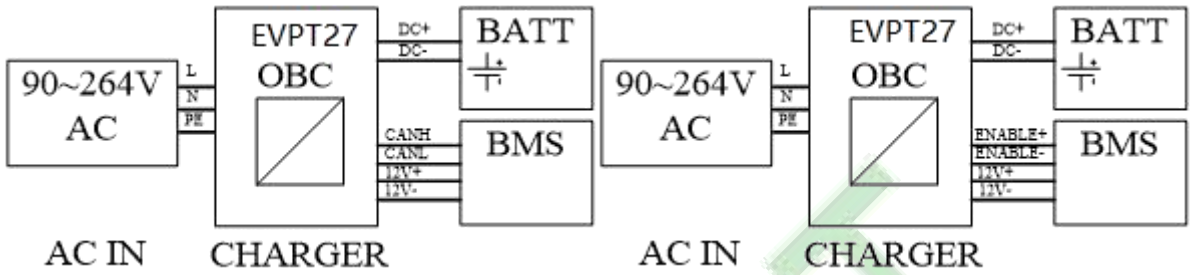
GB/T17626.11 voltage drop and short time interruption and voltage change resistance test GB/T2423.8 environmental test for electrical and electronic products-part 2: Test method test ed: Free drop

GB/T2423.1 environmental test of electronic and electrical products part ii test method test a: Low temperature

GB/T2423.2 test method of electronic electrician products part ii test method b: High temperature GB/T2423.4 environmental test procedures for electronic electrician products test db: Test method for heat and heat

QCT 413, basic technical conditions for automotive electrical equipment

5. Schematic diagram of the system application principle:



Charger Schematic diagram

The "EVPT23 OBC" in the block diagram is EVPT23 series charging product. After the AC90-264V is connected to the charger, the charger starts to output 12v signal or 12v5a power, waking up BMS or supply power to BMS and starts sending CAN message. After the BMS wakes up, the 12v charging signal or CAN signal is detected, the charging demand is determined, and sends the charging control message (or turn on the ENABLE cable) to the charger. The charger starts to output the voltage and current to charge the battery.

When required to stop charging, the BMS sends a stop command to the charger, or turn off the ENABLE cable, then the charger stops charging and maintains the 12v signal output.

6. Technical specifications:

Parameters		
INPUT	Input voltage range	AC 90-264 V
	Frequency	47-63HZ
	Input current	16 A max@110VAC , 16 A max@220VAC , full load
	Power factor	≥0.98 @110VAC ,≥0.97 @220VAC , full load
	Effect, rate	≥92%@110VAC , ≥93%@220VAC , full load
	Standby power consumption	≤10W
OUTPUT	Control method	CANbus control / ENABLE control
	Output power	3300W @220VAC; 1600W @ 110VAC
	Output leakage current	2mA max @ rated voltage
	Constant voltage accuracy	±1%
	Constant current accuracy	±3%
	Ripple voltage coefficient	≤3%

Auxiliary output A	Rated output voltage	12v±1v
	maximum output current	0.2a
	maximum output	2.4w
	Remarks	With short circuit protection
	Explain	Use to wake up the BMS, the standard configuration
Auxiliary output B	Rated output voltage	13.5v±0.5v
	maximum output current	5a
	maximum output	67.5w
	Remarks	With short-circuit protection, battery reverse connection protection, charging management functions, it can connect to 12v lead-acid battery
	Explain	Wake up BMS / power to BMS, optional

Protect the function	Model	EVPT23-4840	EVPT23-6040	EVPT23-7240	EVPT23-9635	EVPT23-12024
	Output low voltage protection	≤32V	≤40V	≤48V	≤64V	≤80V
	Output over voltage protection	≥70V	≥87V	≥102V	≥138V	≥180V
	Model	EVPT23-144-23	EVPT23-216-15	EVPT23-32010	EVPT23-36009	EVPT23-54006
	Output low voltage protection	≤96	≤144V	≤200V	≤240V	≤360V
	Output over voltage protection	≥205V	≥310V	≥450V	486V	≥750V
	Input over voltage protection	270VAC, stop output;				
	Input under-voltage protection	≤90VAC				
	Short-circuit protection	Stop output				
	Battery reverse connection protection	No output / No damage				
	Over temperature protection	At 85 degrees, 80 degrees start to reduce power				
	Communication failure protection	The can communication is unprotected for 5 seconds				

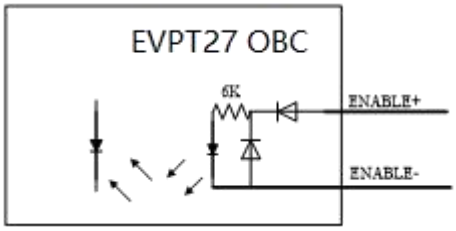
and s	Withstand voltage	Input to output: 2000VAC ≤10mA; Input to ground: 1500VAC ≤10mA; Output to ground: 500VAC≤ 10mA, all are 60s;
	Insulation resistance	Input and output to housing 10 mω and test voltage 500VDC

Ground protection	Input PE cable to the housing resistance ≤100mΩ
Leakage current	At 220VAC input, input to housing leakage current ≤0.5mA
Lightning surge	± 1kv to L and N lines with a period of 50us with an rise time of 1.2ns
Static electricity ESD	Air discharge ± 8kv, contact discharge ± 15kv, can continue to work normAlly
Electromagnetic Immunity	Meet the GB/T18487.3-2001 clause 11.3.2
Harmonic Current	Meet the GB/T 17625.1-2003 clause 6.7.1.1
Inrush Starting Current	≤6A @ 264VAC
Current rise time	≤5s, overshot ≤5%
Close response time	100% to 10% 50ms, 100% to 0% 100ms
Level of protection	IP66
Vibration resistance	The 10-25hz amplitude was 1.2mm, with 25-500 hz 30 m/s2 , 1 hour per direction
Noise	60dB (class A)
MTBF	15000h
Altitude	≤2000m
Working environment	Relative humidity 10% -90% without free
Working temperature	-40℃ ~ + 80℃
Storage environment	Relative humidity 5% -95% without free
Storage temperature	-40℃ ~ +105℃

7. Interface definition

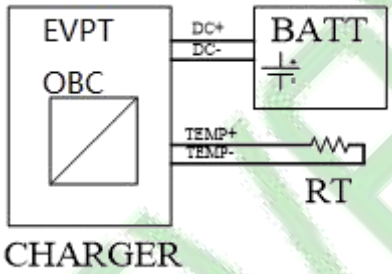
Terminal Name	Terminal Definition	Male Connector	Mating Connector
Charger's AC Input	A-Null line, B-Fire Line, D-GND	XXC103-EV-P4ZA	XXC103-EV-S4TA
Charger's DC Output	A.D-Positive; B.C-Negative	XXC103-EV-P4ZB	XXC103-EV-S4TB
Signal Control	A-CANL, B-CANH, C-CAN GND, D-12V+, E-12V-, F-Enable	XXC103-EV-P6ZC	XXC103-EV-S6TC

8. External enabling interface



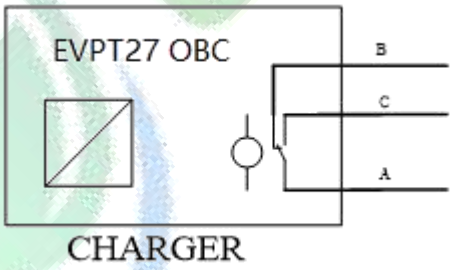
The external enabling interface uses optical coupling isolation, with an impedance of 6k, which can allow the input voltage of 5-35v, and control the charging on/off.

9. External temperature detection interface



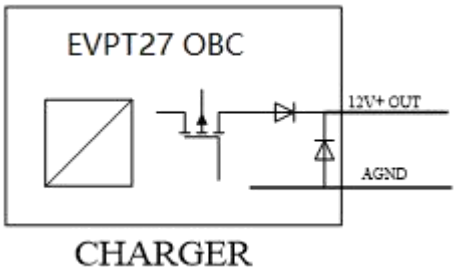
The external temperature sensor RT is a 10k NTC resistance, B value 3450, and is close to the battery pack. Note that the battery detection line forbid to contact with any other cable.

10. Relay signal output interface



The relay signal provides a set of normally open / normally closed output with a conversion capacity of 2a30v dc or 0.5a125v ac. By default, the relay is always plugged as long as there is AC power input or DC power input.

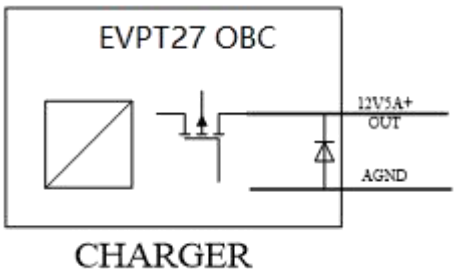
11. 12v signal output interface



The 12v output provides a controlled 12v level signal with a current capacity of 0.2a, isolated from the main output (DC-).

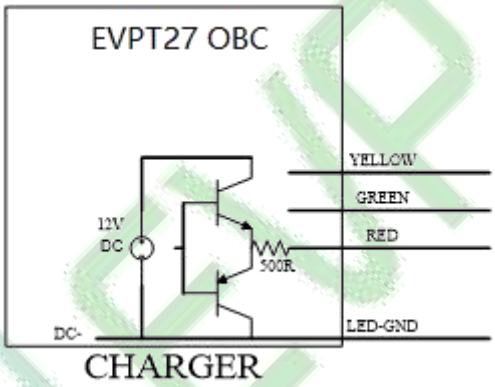
By default, there is 12V output, as long as there is AC power input or DC power input.

12. 12v power output interface (optional function)



The 12v power supply output provides a controlled 12v power supply signal with a current capacity of 5a, isolated from the main output (DC-) .Note that this feature is optional, the default is not include.

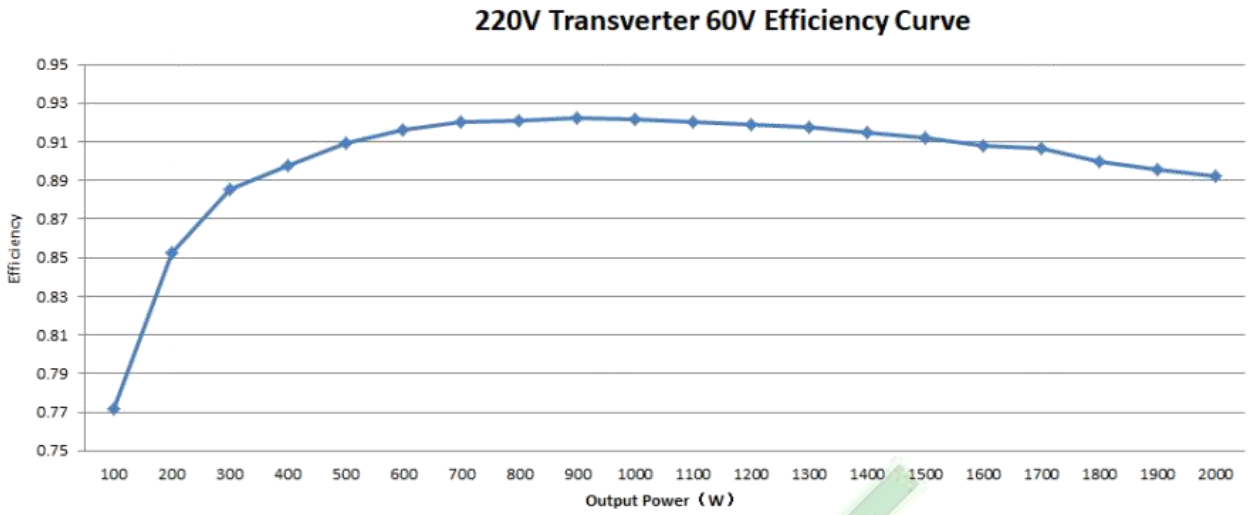
13. External led interface



The external led provides two led signals, red and green, and also a yellow signal, if it is desired. The output voltage amplitude is all 0-12v, and the impedance is 500r. Note that the ground of the led is actually connected to the main output negative pole (DC-)

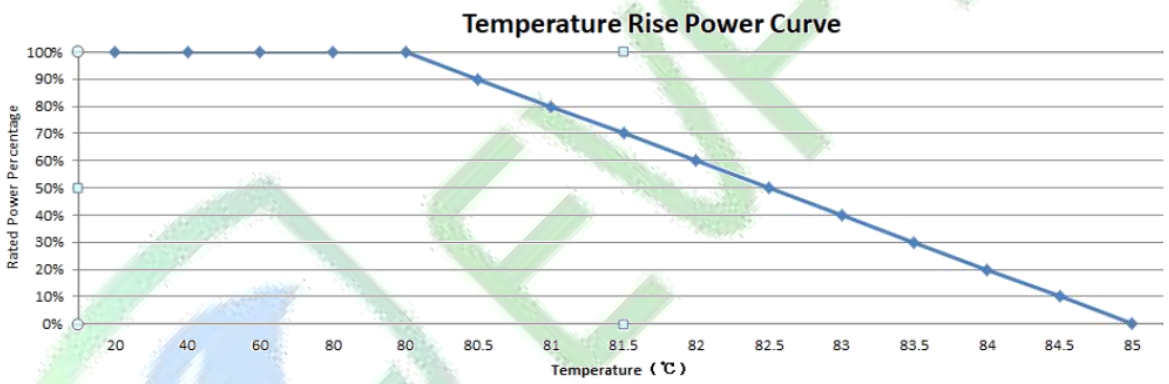
14. Efficiency curve

A curve of 220v to 60v efficiency

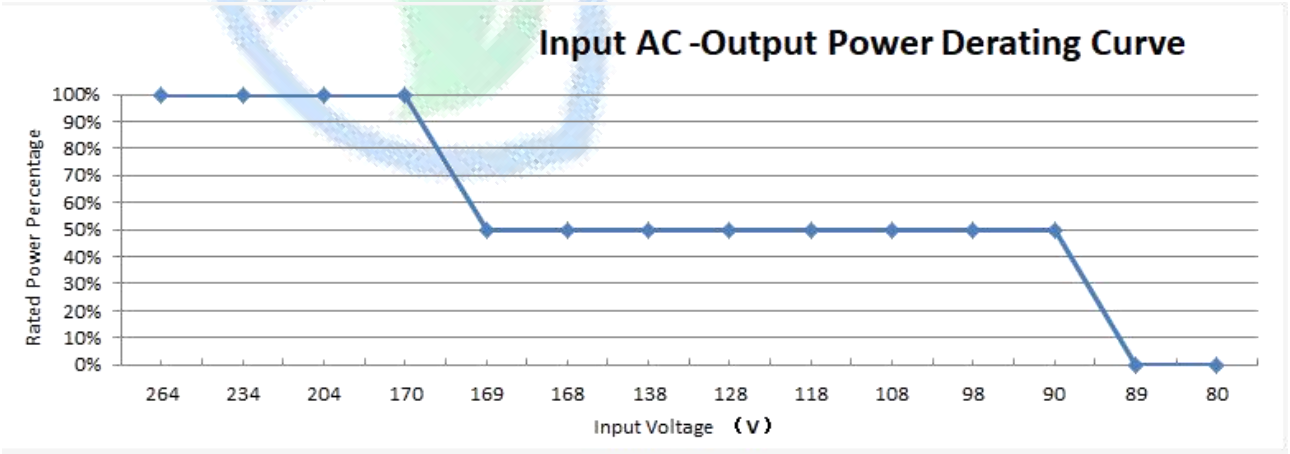


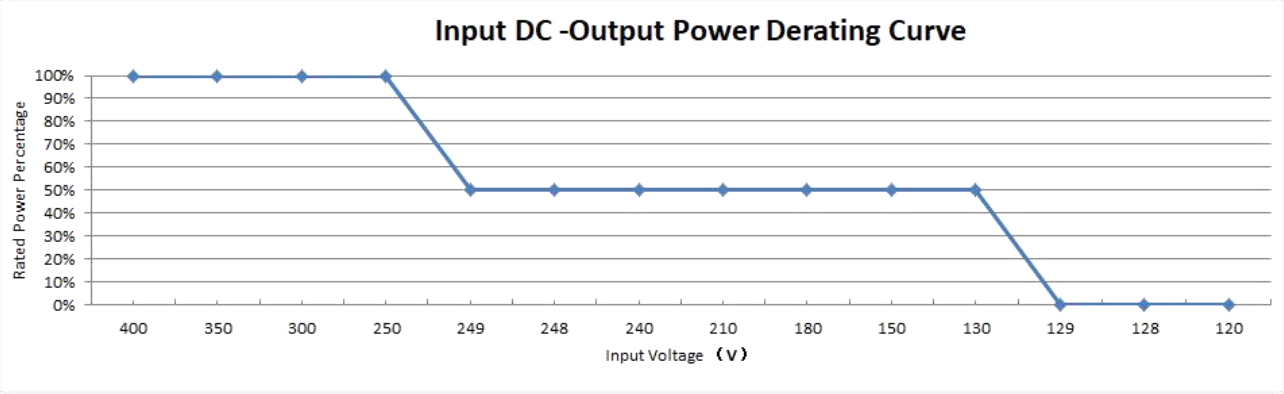
15. Characteristic Curve

Temperature drop curve



Input-Output Derating Curve

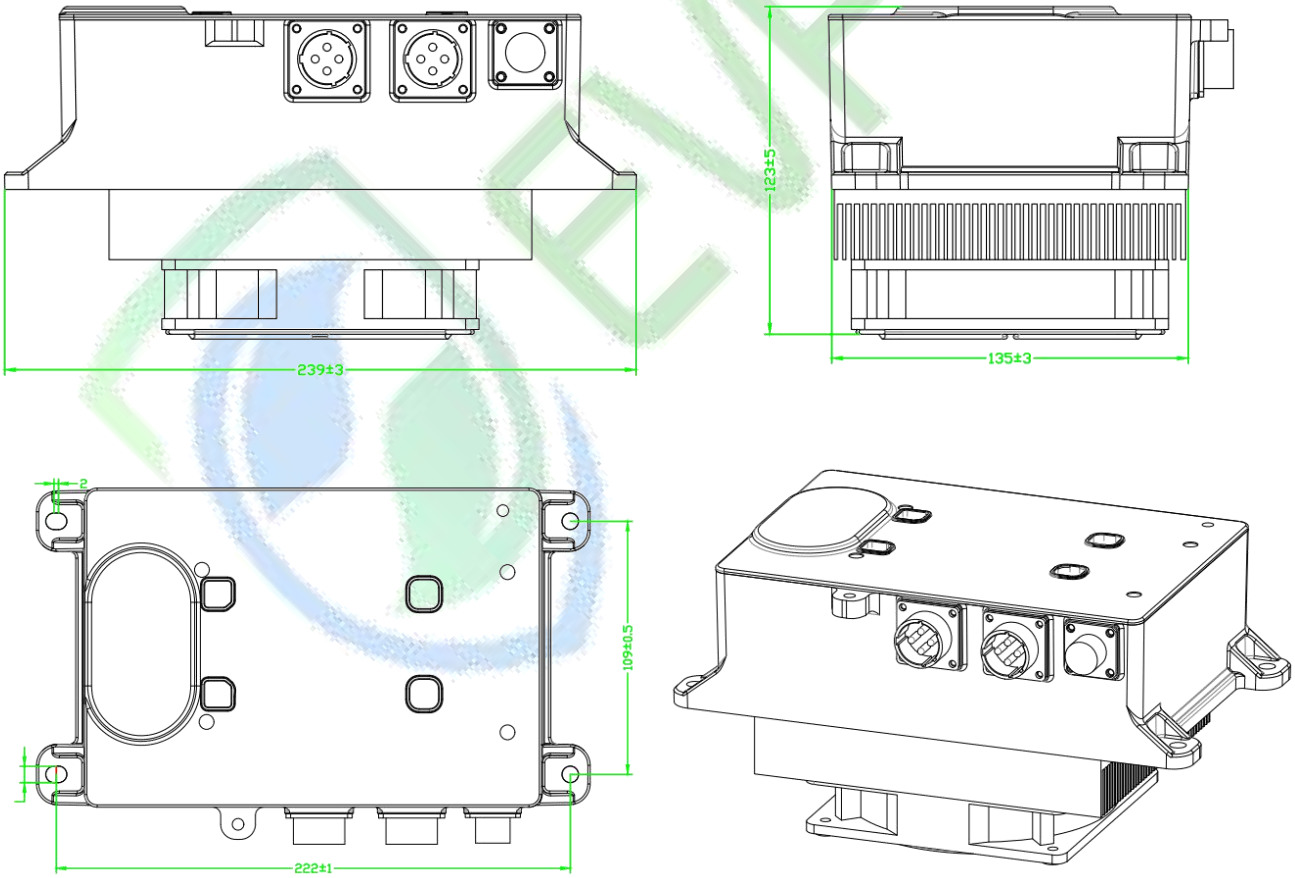




16. Installation and Weight

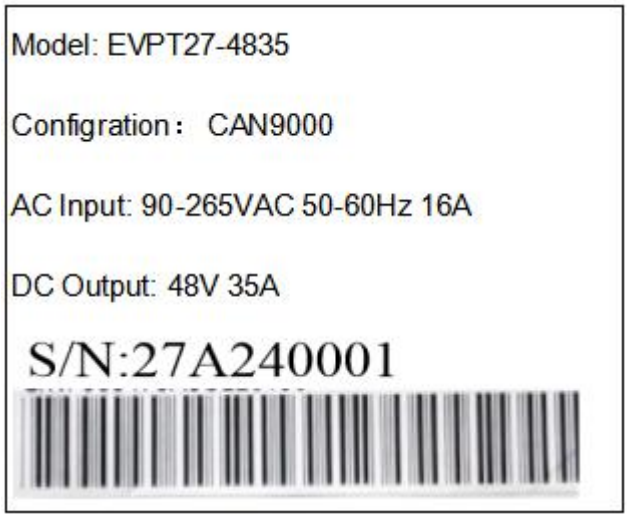
On Board : Size (length * width * height) 222mm * 123mm * 135mm(L*W*H).

Weight: NET Weight : 5.2kg; Gross Weight 6KG(with package).



17. Label

CAN-controlled lithium battery:



Complete product' s label affixed on the top fixed position, 80mm long, 40mm wide, pet copper plate paper

Product serial number:

S/n: 23 A 24 0001

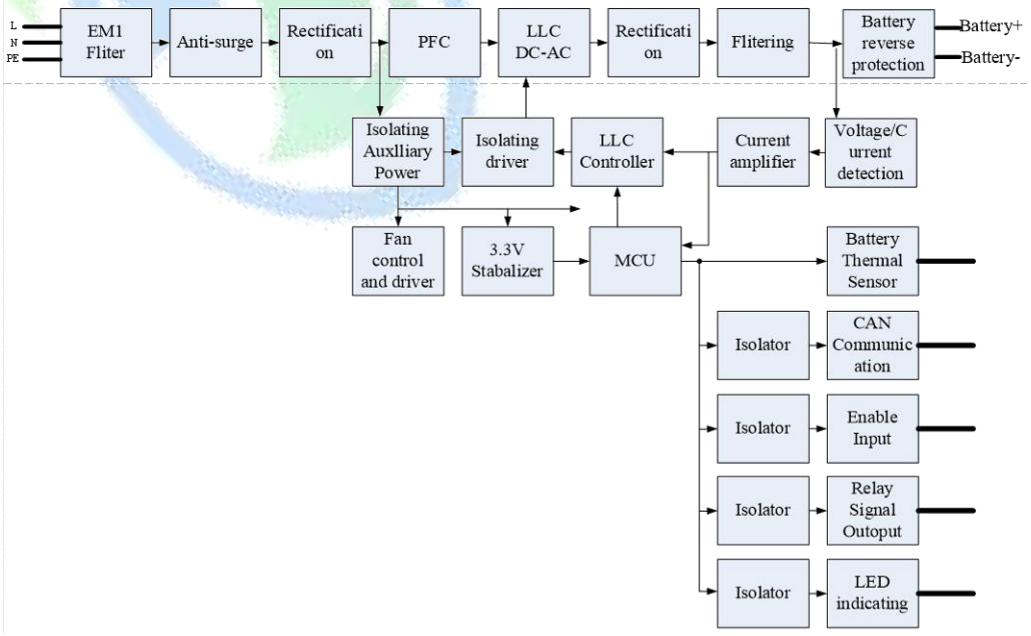
S /n :	Serial number fixed word
27	The EVPT 23 series of products
A	A represents 2022, B represents 2023, C represents 2024, and D represents …… 2025
24	Number of weeks
0001	Serial number 0001-9999

Material number: Fill in the finished ERP Material number;

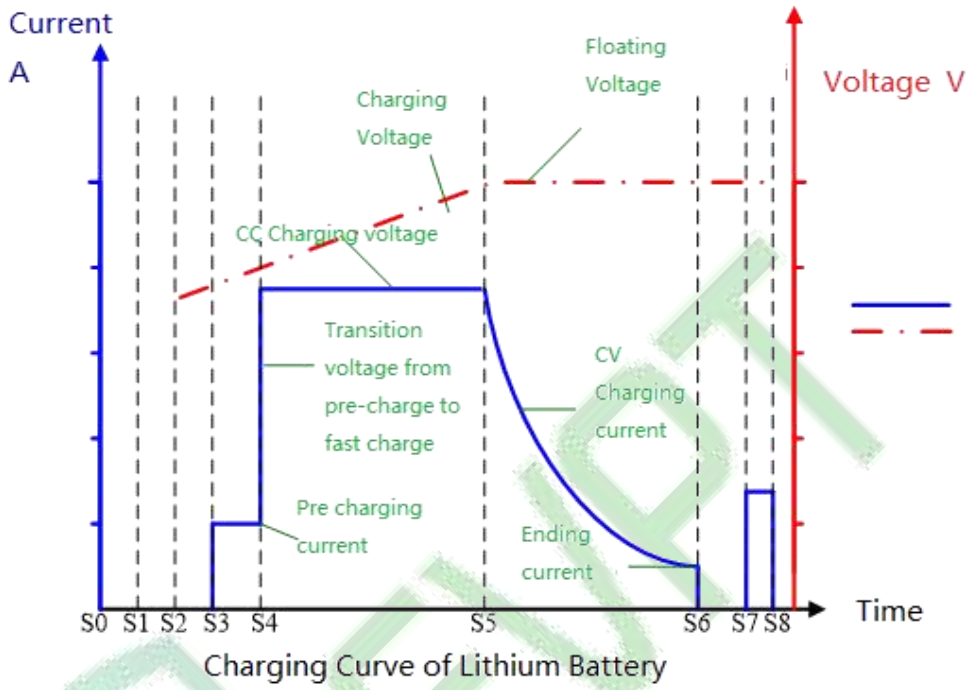
Part number: Leave it blank if the customer does not specify it

Bar codes, using the code-39

18. Principle block diagram



19. Typical charging curve (lithium battery)



Charging Curve of Lithium Battery

Note:

1. Each conversion voltage, current point, protection point and limit point can be customized;

2. Unless the customer requires, the filled supplementary power function (s7) is closed by default;

3. If the charging time timeout (exceeds the total time limit), the filled supplementary power function will not enter (s7);

20. Standard can message (extended frame)

Message 1: (ID: 0x1806e5f4)

Out	In	ID				Period
BMS	VCU(BMS)	P	R	DP	PF	100ms
		0x06	0	0	0x06	
Data data (Motorola format)						
Position	Data name			Explain		
Byte 1	maximum allowable charging terminal voltage high bytes			0.1v/bit		
Byte 2	maximum allowable charging terminal voltage low bytes					

Byte 3	maximum allowable charge current terminal high bytes	0.1a/bit
Byte 4	maximum allowable charge current low bytes	
Byte 5	Control	0x00: Charger is on charging; 0x01: The charger turns off the output. 0x02: The charger works in the resistive load mode. Others: The charger turns off the output and delay 5 seconds to turn off the 12v output.
Byte 6	Reserved	Reserved
Byte 7	Reserved	Reserved
Byte 8	Reserved	Reserved

Note 1: After the charger is powered on, the charging control message of BMS cannot be received for 5 seconds, the charger reports with a communication error. During charging, if the message was not receives in 1s , the charger stops the output and reports a communication error;

Message 2: (id: 0x18ff50e5)

Out	In	ID				Period
Vcu(bms)	Bca broadcasting	P	R	Dp	Pf	500ms
		0x06	0	0	0xff	
Data (in Motorola format)						
Position	Data name	Explain				
Byte 1	Charger output voltage is high byte	0.1v/bit				
Byte 2	Charger output voltage is low bytes					
Byte 3	Charger output current is high bytes	0.1a/bit				
Byte 4	Charger output current is low bytes					
Byte 5	Status_flag2 State 2 Fault status information	Bit7:0= normal 1= too high battery voltage; Bit6:0= normal 1= fan fault; Bit5:0= normal 1=VCC output failure; Bit4:0= normal 1= communication timeout failure; Bit3:0= normal 1= battery reverse connection protection; Bit2:0= normal 1=ac voltage over protection; Bit1:0= normal 1= charger over-temperature protection; Bit0:0= normal 1= hardware failure;				
Byte 6	Status_flag3 State 3 Work status information	Bit7:0= normal voltage, 1= no battery voltage; Bit6:0= normal 1= charger limit current; Bit5:0=VCC off, 1=vcc output; Bit4:0= enabled invalid, 1= valid; Bit3:0= in constant current, 1= in constant voltage;				

		Bit2:0= charging mode, 1= discharge mode; Bit1:0= battery load, 1= resistance load; Bit0:0= stop charging, 1= in charging;
Byte 7	Charging machine temperature	1℃ / bit, offset-40
Byte 8	Reserved	

Note 1: The charger is powered on. When the internal circuit is stable, the 12v signal VCC will have an output, and the broadcast message will be sent by cycle. Charger do not received the message from BMS in 5s, it will report an error.

21. Application instructions

1、 Please check that the lithium battery voltage and capacity match the charger. The wrong battery type, voltage, and capacity may cause failure or damage, fire, and electric shock risk

2、 Please check that the input ac voltage is matched with the charger, and that the wrong ac power supply may cause failure or damage, fire, and electric shock risk.

3、 Lithium batteries shall be charged and discharged by the protection plate or BMS, and the unprotected battery pack shall not be charged with this charger

4、 During charging, the user should first reliably connect the battery plug, and then plug in the ac power plug for power supply. When stopping charging in reverse order, remove the ac power plug first and then disconnect the battery.

5、 When replacing the battery pack for charging, please disconnect the ac power plug first, and then replace the battery pack after all the led lights are out of the battery pack .The operation of replacing the battery pack directly on ac power may lead to no charging or not full charging.

6、 Pay attention to the charging temperature range of lithium battery, which generally requires 0-40 degrees. Although the charger can also work normally outside of this temperature, it may cause serious damage to the lithium battery, or lead to battery damage and risk of fire

7、 the charger will be heated when charging. Please put the charger in the air circulation of indoor. Do not cover it. In the limit, the shell temperature is normal within 75 degrees, please do not touch to prevent scald .

8、 When not using the charger, remove the charger to AC power and the charger to battery.(Portable Type Charger)

9、 Please use this charger indoors, beware of rain and sun exposure.

10、 Do not open the charger privately, there is a risk of electric shock .

11、 Children shall not operate the charger.

12、 Please do not insert a other staff into the charger heating sink.