

2-in-1 Integrated all in one machine Specifications

Main features:

Full potting process, air cooling.

It can work reliably at - 40 °C - 85 °C

Built in temperature sensor

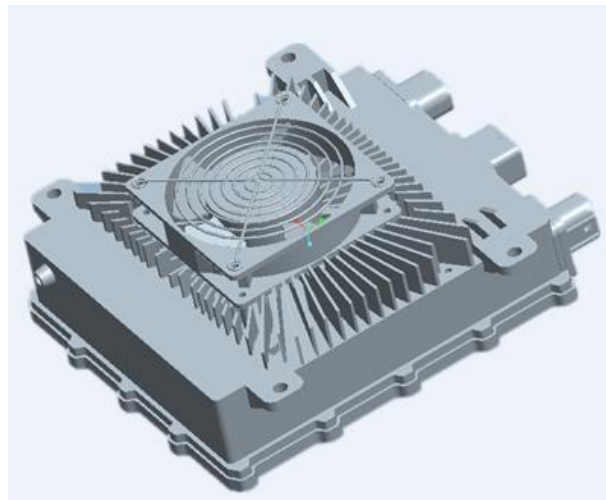
The output can be switched off under hazardous operating conditions (internal 90 °C)

Protection grade IP67

6. It can work safely under short-time immersion conditions



Liquid cooled



Air cooled

● **Model definition**

Model	Voltage platform	Charger Hardware	Charger power	DC-DC Hardware	DC-DC power	cooling method	Weight KG
CD-LW01	144V	HK-LW-202-46	6K6W	TDC-JH-144-12	1K5W	Liquid Cooling	
CD-LW02	312V	HK-LW-450-20	6K6W	TDC-JH-320-12	1K5W	Liquid Cooling	
CD-LW03	540V	HK-LW-680-14	6K6W	TDC-JH-540-12	1K5W	Liquid Cooling	
CD-LW04	108V	HK-LW-177-60	6K6W	TDC-JH-108-12	1K5W	Liquid Cooling	
CD-LW05	216V	HK-LW-290-28	6K6W	TDC-JH-216-12	1K5W	Liquid Cooling	
CD-LF01	144V	HK-LF-202-46	6K6W	TDC-JH-144-12	1K5W	Air Cooling	
CD-LF02	312V	HK-LF-450-20	6K6W	TDC-JH-320-12	1K5W	Air Cooling	
CD-LF03	540V	HK-LF-680-14	6K6W	TDC-JH-540-12	1K5W	Air Cooling	
CD-LF04	108V	HK-LF-177-60	6K6W	TDC-JH-108-12	1K5W	Air Cooling	
CD-LF05	216V	HK-LW-290-28	6K6W	TDC-JH-216-12	1K5W	Liquid Cooling	

● **Technical Specification OBC Section**

Voltage platform		108V	144V	216V	312V	540V
Output	Output voltage range	45~ 177V	50~ 202V	70~ 290V	110~4 50V	170~6 80V
	Output current	60A	46A	28A	20A	14A
	Output power	6600W@220VAC 3300W@110VAC				
	Output mode	constant voltage / constant current				
	Constant voltage accuracy	±1%				
	Constant current accuracy	±2%				
	Ripple voltage coefficient	5%				

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2-in-1 Integrated all in one machine Specifications

Input	Input voltage range	AC 90~265V
	Frequency	45-65Hz
	Input current	32A
	Power factor	≥ 0.99 More than half a load
	Efficiency	$\geq 93\%$ the full load
	Standby power	$\leq 5W$

Low voltage output	Output mode	constant voltage
	Output voltage	13.8V
	Rated current	5A
	Constant voltage accuracy	$\pm 2\%$
	output power	$\geq 62.5W$
	Ripple voltage coefficient	1%

Protection function	Input overvoltage protection	AC $270 \pm 5V$
	Input undervoltage protection	AC $85 \pm 5V$
	Output overvoltage protection	When the maximum output voltage exceeds 2%, stop the output
	Output undervoltage protection	When it is lower than - 5% of the minimum output voltage, stop the output
	Output overcurrent protection	When the maximum output current exceeds 5%, stop the output
	Over temperature protection	Power drops at 85 degrees and shuts down at 90 degrees
	Short circuit protection	Stop output
	Battery reverse connection protection	yes
	Grounding protection	$\leq 100m\Omega$
	CAN Communication protection	CAN Automatically stop output in case of communication failure

	Power off protection	yes
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Signal interface	C C signal detection	100 Ω - 3.3k - Infinity
	C P signal detection	0%—100%, 5V—15V Vpp
	C C signal output	220 Ω or 680 Ω
	Temperature detection	Two way input, 1K and 10K supported
	12V wake-up input	≤ 10mA
	12V wake-up signal output	maximum 0.2A
	12V normal	Sleep current ≤ 1mA, peak current ≤ 5A
	Electromagnetic lock drive	Maximum peak current 5A
	Electromagnetic lock in place signal	Switching value
	CAN signal communication	Yes
	Baud rate	125Kbps/ 250Kbps/ 500Kbps
	Terminal resistance	/

Safety regulations and others	Withstand voltage	Input to output: 2500VAC ≤ 10mA input to ground: 2000vac ≤ 10mA output to ground: 2000vac ≤ 10mA All for 1min
	Grounding resistance	The resistance between the grounding point and the radiator is <100m Ω , and the test current 25A AC
	Insulation resistance	Input end and output end to shell ≥ 10m Ω , test voltage 1000VDC
	Electromagnetic immunity	Meet article GB/T 18487.3-2001 11.3.1
	Electromagnetic disturbance	Meet article GB/T 18487.3-2001 11.3.2
	Harmonic current	Meet article GB 17625.1-2003 6.7.1.1
	Starting impulse current	≤ 24A

Current rise time	$\leq 5S$, overshoot $\leq 5\%$
Turn off response time	100%~ 10% $\leq 50mS$, 100%~ 0% $\leq 200mS$
Degree of protection	IP67
Vibration resistance	10-25hz, amplitude 1.2mm, 25-500hz, 30m / S2, 8h in each direction
Noise	$\leq 60dB(A)$
MTBF	150000H
work environment	Relative temperature 5% - 95% no condensation
working temperature	-40 ~ 65°C
Storage temperature	-40°C ~ +85°C
Over temperature protection	The module stops working when the temperature reaches 90 °C, and the power supply automatically returns to normal operation after cooling

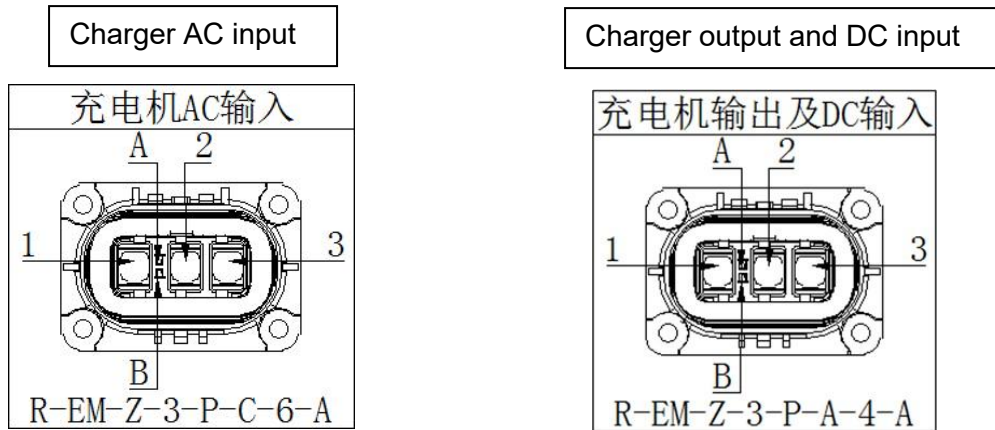
2. Technical Specifications DC/DC Section

Model	TDC-JH-108-12	TDC-JH-144-12	TDC-JH-216-12	TDC-JH-320-12	TDC-JH-540-12	
Input	Rated voltage	DC108V	DC144V	DC216V	DC320V	DC540V
	Rated current	10A	8A	5A	3.5A	2A
	Maximum current	$\leq 17A$	$\leq 13A$	$\leq 9.3A$	$\leq 6.2A$	$\leq 3.25A$
	Input voltage range	85-145V	110-200V	150-300V	220-450V	420-650V
	Input low voltage protection point	80V \pm V	105V \pm 5V	145V \pm 5V	215V \pm 5V	400V \pm 5V
	Input overvoltage protection point	150V \pm 5V	215V \pm 5V	305V \pm 5V	455V \pm 5V	660V \pm 10V
	Start Time	$\approx 0.9S$ @ VIN=108V	$\approx 0.9S$ @ VIN=144V	$\approx 0.9S$ @ VIN=216V	$\approx 0.9S$ @ VIN=320V	$\approx 0.6S$ @ VIN=540V

Output	The output voltage	$14.0V \pm 1\%$
	Rated current	110A
	peak current	135A-140A
	rated power	1500W
	peak power	1800W Lasts 6 minutes
	highest efficiency	$\geq 95\%$
	Output voltage transient response	$\leq 50ms$
	Voltage Regulation	1%
	Load Regulation	1%
	Voltage regulation accuracy	$\leq 1\%$
	Steady flow accuracy	$\leq 2\%$
	output leakage current	$\leq 5mA$
	output ripple	$\leq 276mV @ 12V$

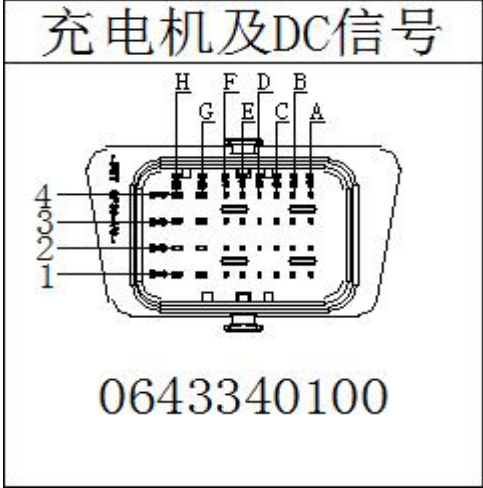
Signal	12V enable voltage	6-30V
	12V enable current	$\leq 1\text{mA}$
Protective function	Over current protection	Maximum current*110%
	Output overvoltage protection	15-16V @ 12V
	Output undervoltage protection	Output voltage*50%
	Over temperature protection	The internal temperature starts to reduce power at 85 degrees, and the protection shuts down at 90 degrees, self recover
	Input undervoltage protection	Yes,self recover
	Input overvoltage protection	Yes,self recover
	Short circuit protection	Yes,self recover
	Working temperature	-30~65 °C
	Storage temperature	-40~90°C
	Relative humidity of working environment	5%~95% non-condensing
	Protection class	GB4208-2008 IP67
	Insulation resistance	Not less than 20M Ω when the ambient temperature is (23 \pm 2) °C and the relative humidity is 80%~90%
	Electromagnetic Compatibility	The electromagnetic compatibility of DC/DC can meet the relevant requirements of Articles 12 and 14 in GB/T 18655-2002
	reliability	Reliability is derived from device failure rate as MTBF300000 H

Interface definition diagram



No.	Port name	Terminal Definition	Connector model	Plug connector model
1	Charger AC input	1-live wire, 2-ground wire, 3-neutral wire	R-EM-Z-3-P- C-6-A	R-EM-T-3-P-C-6- A
2	Charger output and DC input	Charger output positive pole Common negative pole 3-DC input positive pole	R-EM-Z-3-P- A-4-A	R-EM-Z-3-P-A-4- A
3	Charger and DC signal	see signal interface definition	/	/
4	DC output positive	M8 threaded hole	/	/
5	DC output negative	M8 threaded hole	/	/

Charger and DC signal

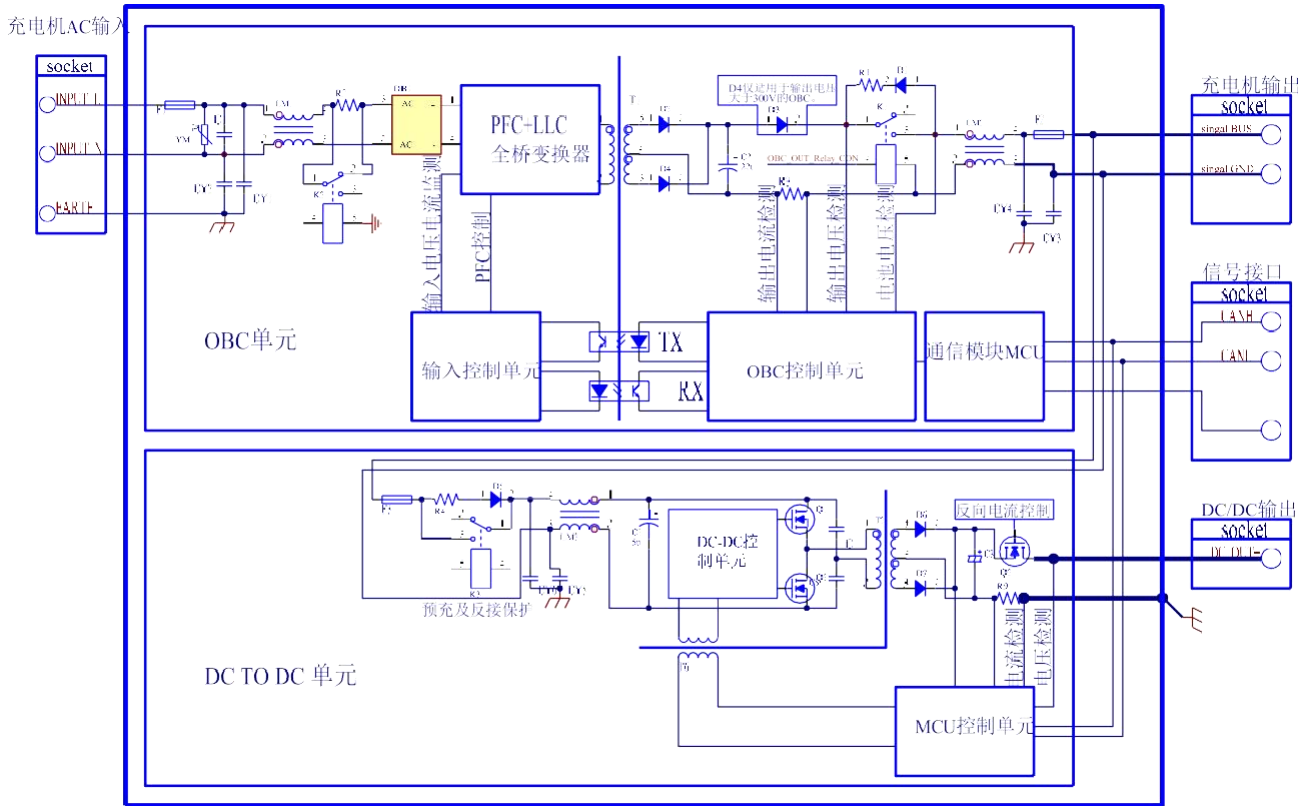


Signal Interface Definition				
Terminal number	Definition	Name	Illustrate	Remark
1A	Thermistor 1+	AC gun L line temperature sensor 1_1		
1B	Thermistor 1-	AC gun L line temperature sensor 1_2		
1C	Thermistor 2+	AC gun N line temperature sensor 2_1		
1D	Thermistor 2-	AC gun N line temperature sensor 2_2		
1E	External red indicator	Charging status indicator red light output is positive		
1F	External green indicator	Charging status indicator green light output is positive		
1G	N/A			
1H	KL30 normal power input positive	Normal power supply input positive	Normal power supply input 9- 18V	
2A	HW_wakeup_out	output wake-up signal	Rated current 200mA	

2B	IN_wakeup_EN	input wakeup signal	OBC input 12V wake-up signal	
2C	N/A	One machine	DC_EN (DC-DC enable wake-up 12V, 24V)	
2D	N/A		Fault indication (Dc)	
2E	N/A		Work Instruction (DC)	
2F	CAN/GND		(Formerly 3E)	
2G	N/A			
2H	OBC low voltage power positive	OBC low voltage power positive	Output voltage 13.8V Current 5.5A	
3A	Charging connection confirmation CC	CC signal	Used to detect whether the charging head is connected to the vehicle	
3B	Charging connection boot CP	CP signal	Used to submit the maximum current allowed by the charging station and to check the reliability of the grounding between the vehicle and the charging station	
3C	Charge lock signal (680)	Lock signal 1	Choose one of the signals according to the connection resistance of the charging gun	
3D	Charge lock signal (100)	Lock signal 2		
3E	N/A	N/A		
3F	Feedback line 3 (A)	Electric lock feedback line 3		
3G	N/A			
3H	Electronic lock power supply+	Lock the charging plug		
4A	CAH_H	CAN communication high-end	Connect to vehicle CAH_H	
4B	CAN_L	CAN communication low end	Connect to vehicle CAN_L	

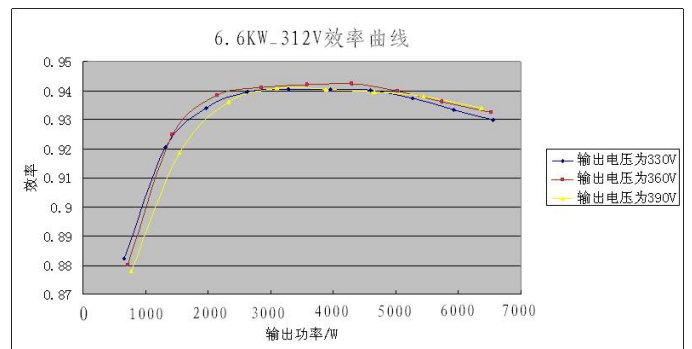
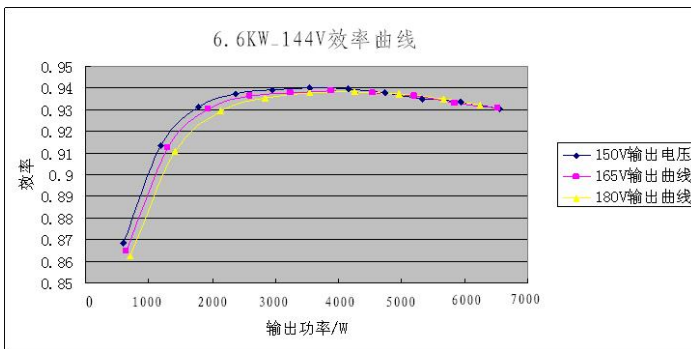
4C	Connector interlock signal HVIL+	High voltage connector interlock signal 1	Connect to the vehicle controller to check whether the HVDC connector is connected	
4D	Connector interlock signal HVIL-	High voltage connector interlock signal 2		
4E	Electronic lock feedback line 2 (K/E)	Electric lock feedback line 2		
4F	Electronic lock feedback line 1 (C)	Electric lock feedback line 1		
4G	KL31 Normal power input negative		Normal power input negative pole, can be connected to the OBC grounding position according to customer requirements	
4H	Electronic lock power supply-			

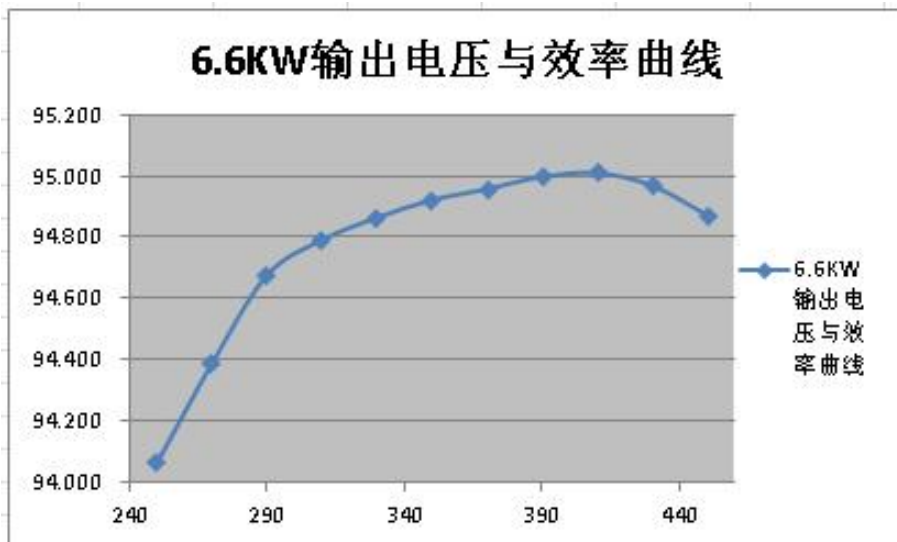
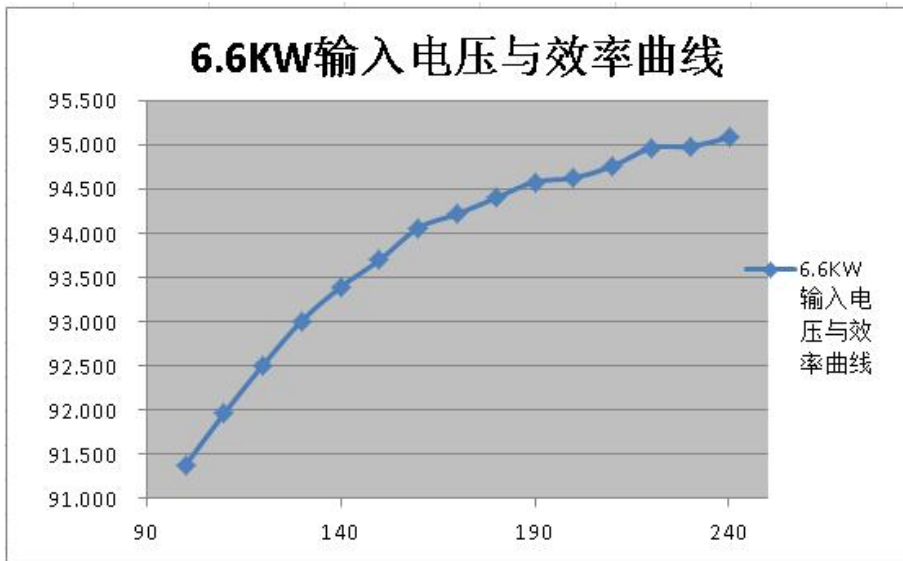
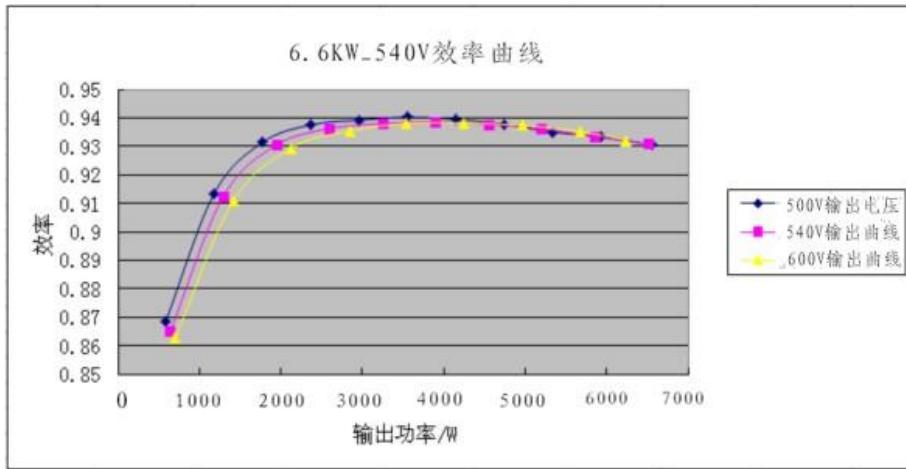
Schematic diagram



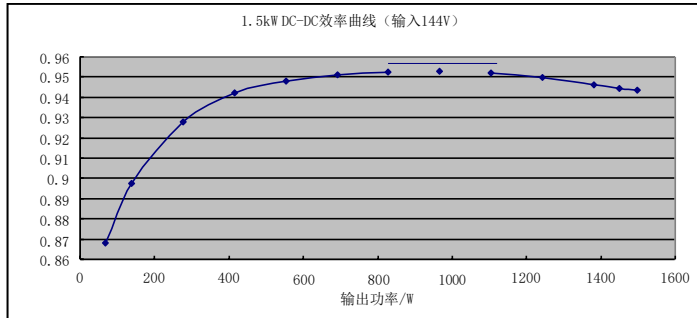
OBC与DC/DC二合一原理框图

Data chart Efficiency curve OBC part

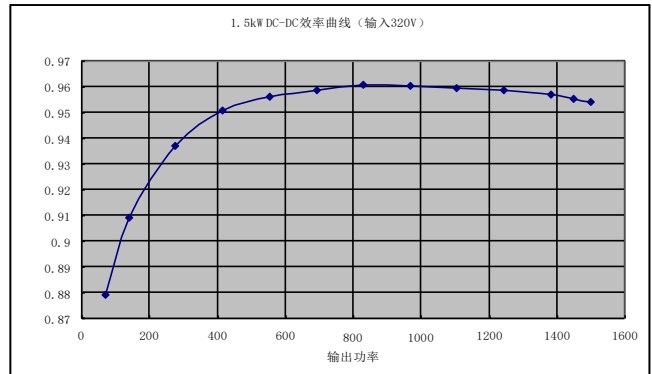




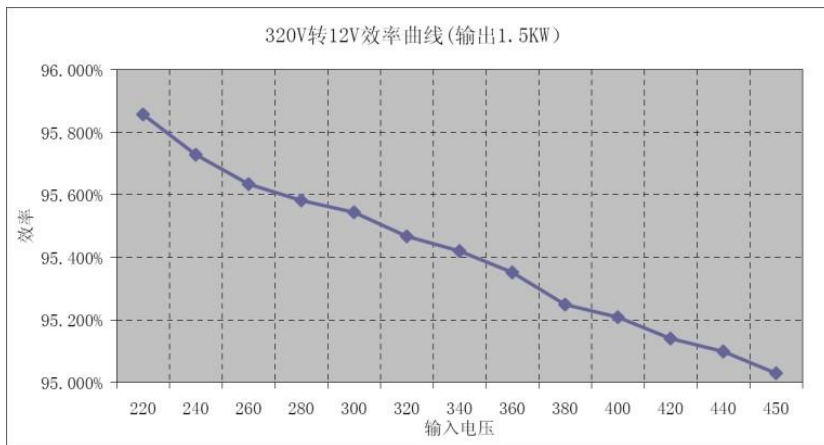
Efficiency curve DC/DC part



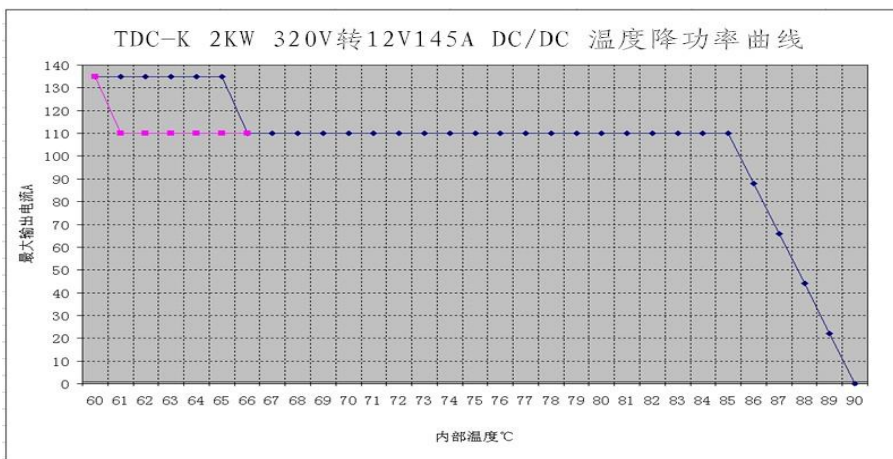
144V to 12V efficiency curve



320V to 12V efficiency curve



320v to 12V efficiency curve (input voltage and efficiency)



Temperature derating curve from 320v to 12V
The blue line is the derating curve when the temperature rises, and the red line is the recovery curve when the temperature drops

Power density

	质量	体积	质量单位密度	体积密度
Unit	kg	L	kw/kg	Kw/l
water-cooling	8	8	0.83	0.8
Air-Cooling	7	11	0.94	0.6

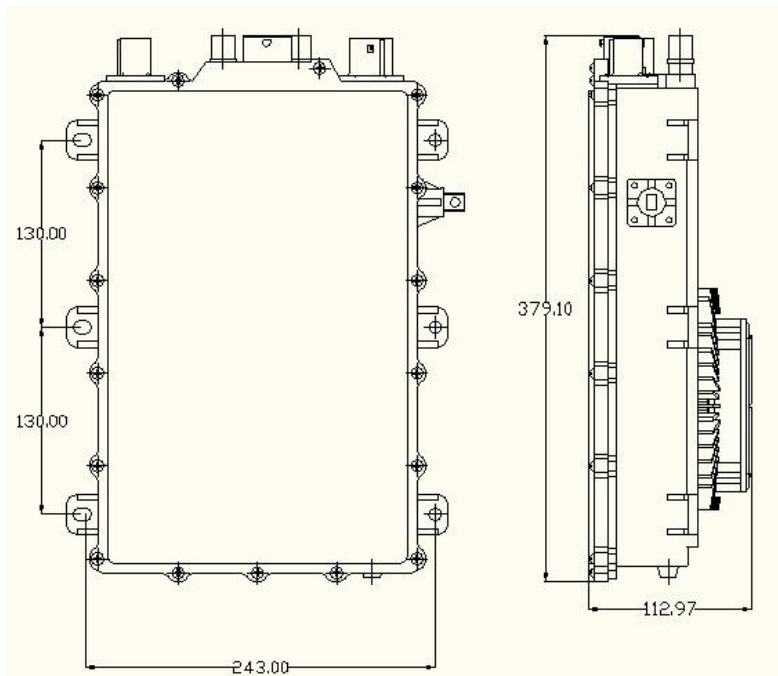
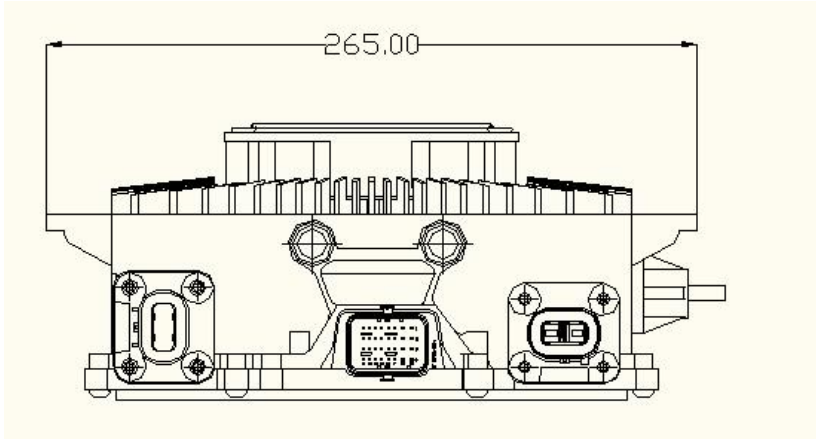
Water cooling parameters

- Outlet pipe size: $\phi 20\text{mm}$
- Flow rate: greater than or equal to 5L/min
- Pressure: less than or equal to 200Kpa 4. Water capacity: 0.25L
- Maximum inlet water temperature: 60°C

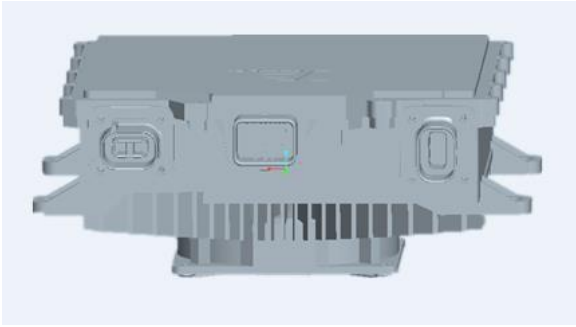
Thermal parameters:

	流量 (L/MIN)	功耗 (W)	进水温度 (°C)	温升 (°C)	热阻 (°C/W)	压降 (kpa)
1	5	395	20	17.2	0.044	1.6
2	10	395	20	14.7	0.037	6.8
3	15	395	20	13.4	0.034	15.0
4	20	395	20	12.6	0.032	27.0

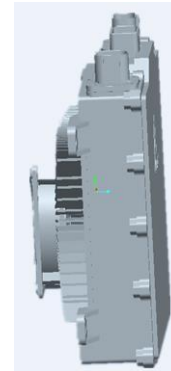
Installation size
Installation size (air-cooled)



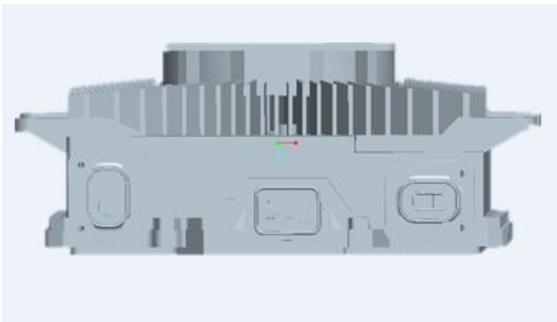
Air-cooled installation method:



Best way to install

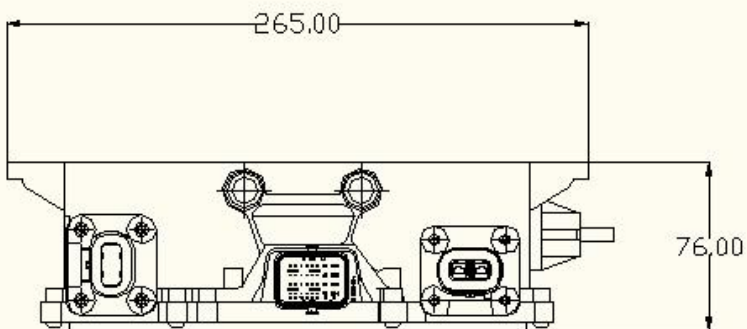


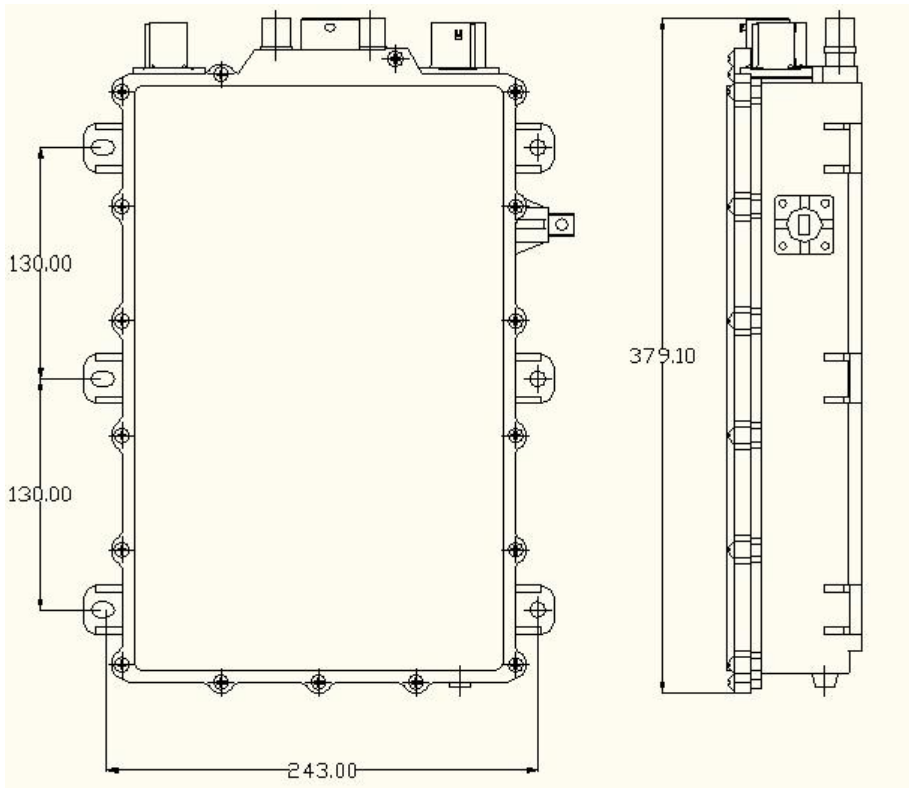
Installation method 2



Prohibited installation method

Installation size (water-cooled)





Standard program fault codes correspond to charger faults

Agreement No 2100:

Bit	Identification	Description
Bit0	Hardware failure	0: normal 1: Hardware failure
Bit1	Temperature protection	0: normal 1: Charger over temperature protection (stop output)
Bit2	input voltage	0: The input voltage is normal 1: Input voltage error, charger stops working
Bit3	Battery status	0: The charger detects that the battery voltage is normal 1: The charger detects that the battery voltage is abnormal (the battery voltage is too low or the battery is connected reversely) Note: after the charger is powered on, it defaults to the charging mode. After the BMS works, the charging opportunity reports the status before

		<p style="text-align: center;">the output relay is not closed 1 Battery status in heating mode 0</p>
Bit4	Communication failure	<p style="text-align: center;">0: Normal communication 1: Communication receiving timeout</p>
Bit5	CC fault	<p style="text-align: center;">0: normal 1: fault</p> <p>Note: this fault bit ignores the default value. As long as CC signal is not detected, it is a fault</p>
Bit6	CP fault	<p style="text-align: center;">0: normal 1: fault</p> <p>If the automobile manufacturer requires that the charger can also charge under mode (I), it is recommended to treat it as the maximum current of 13A by default when the CP signal is not detected.</p> <p>Note: this fault bit ignores the default value. As long as the CP signal is not detected, it is a fault.</p>
Bit7	Electronic lock failure	<p style="text-align: center;">0: normal 1: fault</p> <p>Fault judgment of electronic lock: when the electronic lock is closed, it is judged that the electronic lock is unlocked, and when the electronic lock is disconnected, it is judged that the electronic lock is locked.</p> <p>If there is no electronic lock, it is considered that the electronic lock is faulty</p>

Agreement No 1430:

STATUS	identification	describe
Bit0	Hardware failure	0: normal. 1: Hardware failure
Bit1	Charger temperature	0: normal. 1: Charger over temperature protection
Bit2	input voltage	<p style="text-align: center;">0: the input voltage is normal. 1: Input voltage error, charger stops working</p>

Bit3	Battery access status	<p style="text-align: center;">0: the battery is connected normally.</p> <p>1: The battery is not connected or the battery is connected reversely At the beginning, because BMS did not close the relay between the charger and the battery, fault 1 will be reported after the charger is powered on. If there is no battery voltage after receiving the heating mode command sent by BMS, it is considered that the battery is connected normally</p>
Bit4	Communication status	<p style="text-align: center;">0: communication is normal.</p> <p style="text-align: center;">1: Communication receiving timeout</p>
Bit5		
Bit6		
Bit7		

