

Version	Change Description	Signature	Date dd/mm/yyyy
1	First edition		14/05/2020

Item	Charging standard	Product name	Annren Part Number
1	GB	2 in 1 2.5kWDCDC+11kW OBC GB charging Standard	AR2K5D11KB-220S400W-G

11 KW OBC + 2.5 KW DCDC

Water-cooling 2-in-1 product technical specifications

1 Product Overview

1.1 Description

The 2-in-1 product assembly consists of OBC and DCDC.

OBC obtains energy from the AC grid and transforms it into high-voltage DC power to charge the vehicle's power battery. The vehicle can monitor the charging process throughout the process. At the same time, OBC has an inverter function to achieve the transfer of energy from the power battery to the AC side. The on-board DCDC converter converts the high-voltage DC power into the required low-voltage DC power, provides 12V low-voltage power for the entire vehicle, and charges the battery.

OBC and DCDC report the output voltage and output current through the CAN bus, and communicate with the BMS and VCU through CAN communication.

Interaction and working status feedback.

1.2 Product Features

The two-in-one product has the characteristics of small size, light weight, high efficiency, stable charging, long life, high protection level, high reliability, strong shock resistance, etc. The product is widely used in new energy automobile three power systems.

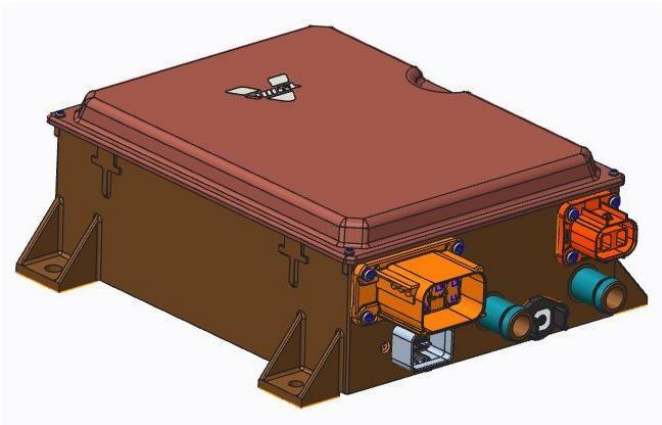
The product also has the following various protection functions:

- Input over and under voltage protection
- Output over and under voltage protection
- Output short circuit protection
- Over temperature protection

2 Structural information

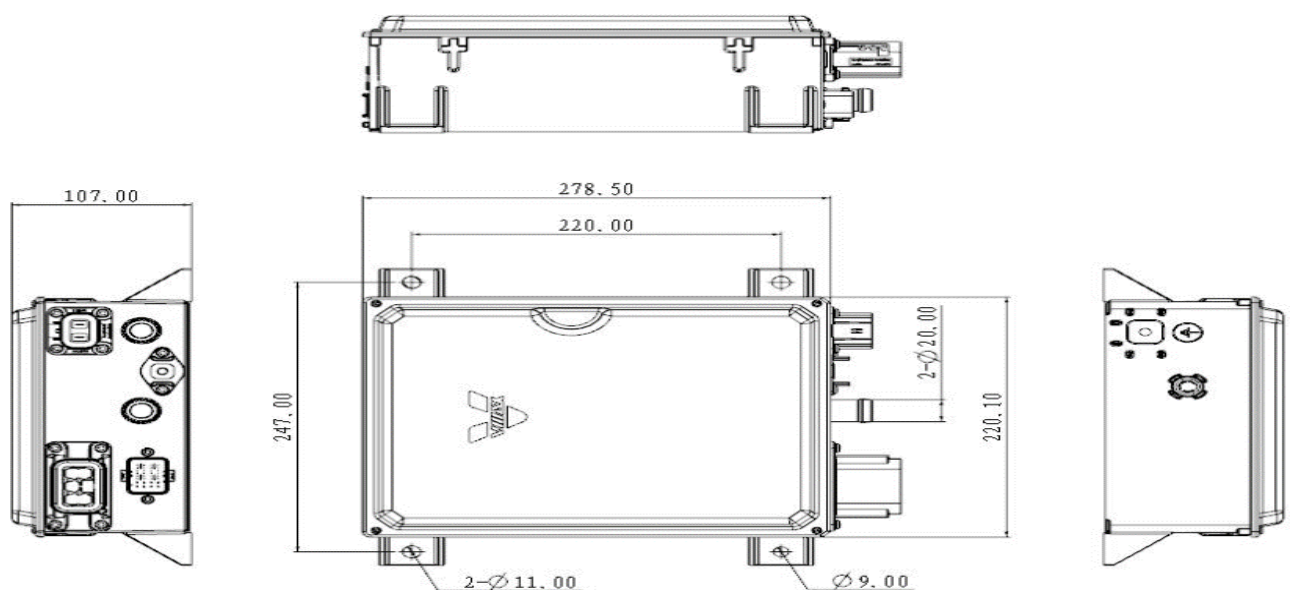
2.1 Structural appearance

Weight : 8.5KG



2.2 Structural dimensions

Dimensions : 280x220x107mm (No water nozzle, connector and mounting foot)



3 Electrical specifications

3.1 Charging mode

item	Specification
AC input	
Input voltage range	Single-phase : 85 ~ 265 Vac Three phase : 304-458Vac
Rated input voltage	Single-phase : 220 Vac Three phase : 380Vac
Input frequency range	45-65 Hz
Input Current	Single-phase : 32 A max Three phase : 16A max
Power factor	≥0.98@ rated input, output more than half load
High voltage output	
Output voltage range	230V ~ 450Vdc
Rated output voltage	350 Vdc
Max Output current	Single-phase : 24 A ; Three phase : 31A
Output voltage accuracy	≤±1%
Output current accuracy	≤±3%@ > 10A ; ≤±0.3A @ < 10A
Output voltage ripple coefficient	≤±5%
Output Power	Single-phase : 6.6 kW max ; Three phase : 9.9kw max
Efficiency	Single-phase : 92.5%@ Rated input and output Three phase : 94%@ Rated input and output

3.2 Inverter mode

Item	Specification
High voltage input	
Input voltage range	300V ~ 450 Vdc
Input Current	24 A max
AC output	
The output voltage	220 AC (±5%)
Output voltage frequency	50 Hz (±2%)
Output Power	6.6kVA max
Output efficiency	92% @350Vdc, Full load

3.3 DCDC mode

Item	Specification
High voltage input	
Input voltage range	230V ~ 450Vdc
Rated input voltage	350 Vdc
Max Input current	12 A
Low voltage output	
Output voltage range	9 ~ 16Vdc
Output rated voltage	14 Vdc
Output current	180 A Continued
Output Power	2.5 KW Continued
Under Charging / inverting state DCDC output power	2 KW max
Efficiency	92%@ Rated input and output ; 95% max
Output voltage accuracy	≤±1%
Output voltage ripple coefficient	≤500 mVpp@20 MHz
Output voltage overshoot	≤5% Vout

3.4 Low-voltage system

Item	Specification
Low voltage input voltage range	9 ~ 16Vdc (normal work) ; 6~28Vdc (Communication is normal)
Quiescent Current	≤0.5Ma (whole system)
Communication method	CAN2.0 (The product hardware shares one CAN, no terminal 120Ω resistor)
High-voltage interlock function	Interlock status software reported to the vehicle
Charging wake-up method	CAN specific frame wake
Inverter wake-up mode	CAN specific frame wake
DCDC wake-up method	Hard-wired wake
V2L function	Support
UDS function	Support
Boot loader function	Support

3.5 Environmental conditions

Item	Specification
Working temperature	-40 ~ +85°C
Environmental storage temperature	-40 ~ +105°C
Working environment humidity	5% ~ 95% No condensation, no condensation
cooling method	Liquid cooling
Protection class	IP67

3.6 Cooling requirements

Item	Specification
Cooling water outlet	Cooling water inlet and outlet diameter 20mm
Coolant requirements	50% water and 50% glycol
Coolant temperature	Normal work : -40 ~ +65 °C ; Derating work : +65 ~ +85 °C
Coolant flow	≥6L/min

3.7 Safety Features

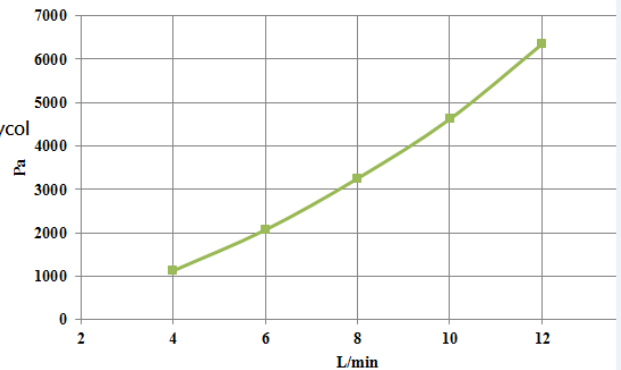
Item	Specification
Dielectric strength	AC input side to high voltage output side : 2800 Vdc AC input side to low voltage output side (housing) : 2800 Vdc High voltage output side to low voltage output side (housing) : 2800 Vdc
Insulation characteristics	Test voltage 500 Vdc AC input side to high voltage output side : ≥10 MΩ AC input side to low voltage output side (housing) : ≥10 MΩ High voltage output side to low voltage output side (housing) : ≥10 MΩ
Grounding characteristics	Resistance between charger case and PE < 0.1 Ω

Thermal Performance Parameters

11KW热性能参数

11KW thermal performance parameters

流阻曲线 Flow resistance curve



- 模块满载发热量：702W

Module full load heat generation: 702W

- 水冷流道流阻曲线：65°C @50%水+50%乙二醇

Flow resistance curve of water-cooled runner: 65 °C @ 50% Water + 50% ethylene glycol

- 水冷换热面积：82605mm²

Water-cooled heat exchange area: 82605mm²

- 换热系数：130W/m²·K

Heat transfer coefficient: 130W / m².K

- 水道容积：0.1L

Water channel volume: 0.1L

- 最高进口水温≤65°C

Maximum inlet water temperature ≤ 65 ° C

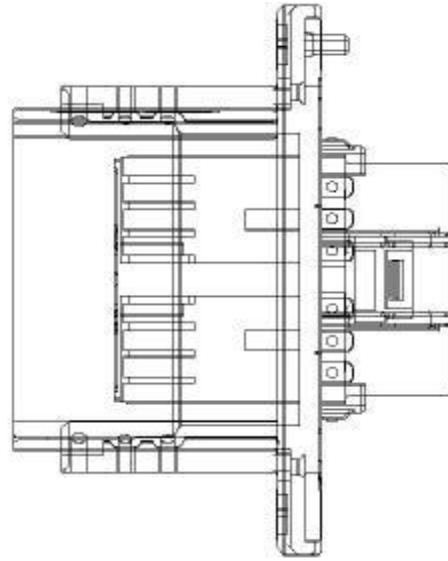
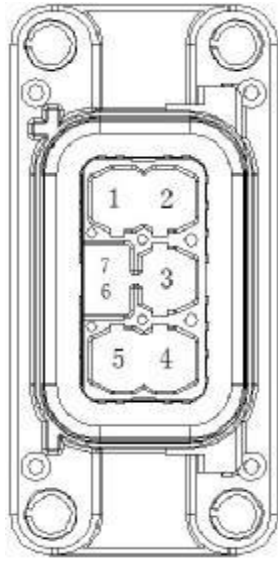
4 Product interface requirements

4.1 Connector Information Sheet

Connector function	Product side		
	Model no.	Maker	Quantity
AC input	HVC5P63MV105	Amphenol	1
High voltage output	HVC2P63MV106	Amphenol	1
14V positive	GH01-F200-1NNB-T02	Guoweitong	1
Signal	64334-1001	Molex	1

4.2 Connector pin definition (product side)

4.2.1 AC input connector



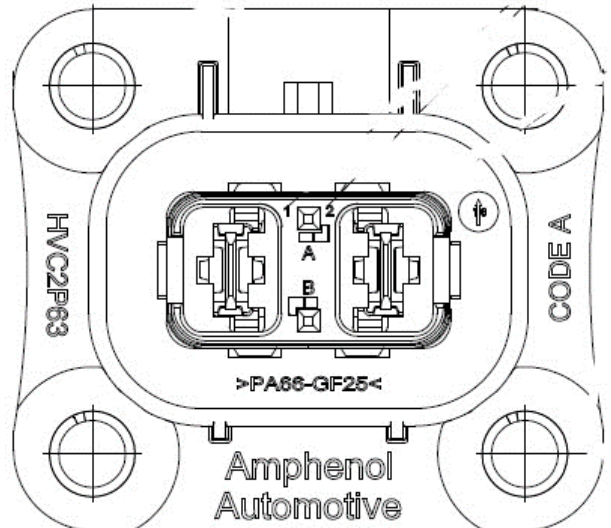
视图方向



Pin definition:

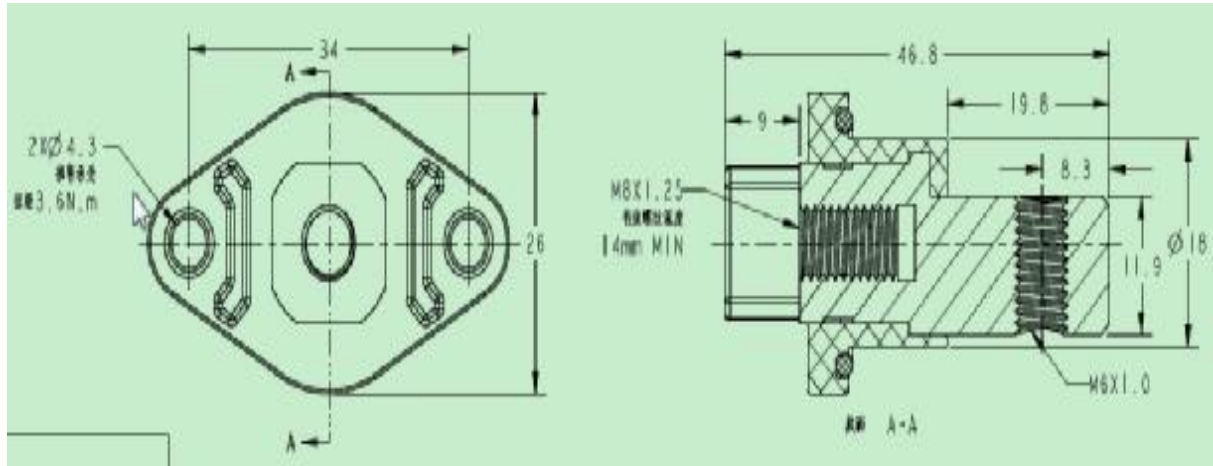
Port number	Name	Description
1	AC input N line	N
2	AC input PE cable	PE
3	AC input L2 cable	L2
4	AC input L3 cable	L3
5	AC input L1 cable	L1
6	High-voltage interlock interface is positive	HVIL1
7	High-voltage interlocking interface negative	HVIL2

4.2.2 High-voltage output connector



Pin definition:

Port number	Name	Description
1	HV+	High voltage output is positive
2	HV-	High voltage output negative
3	High-voltage interlock interface is positive	Interlock signal
4	High-voltage interlocking interface negative	Interlock signal

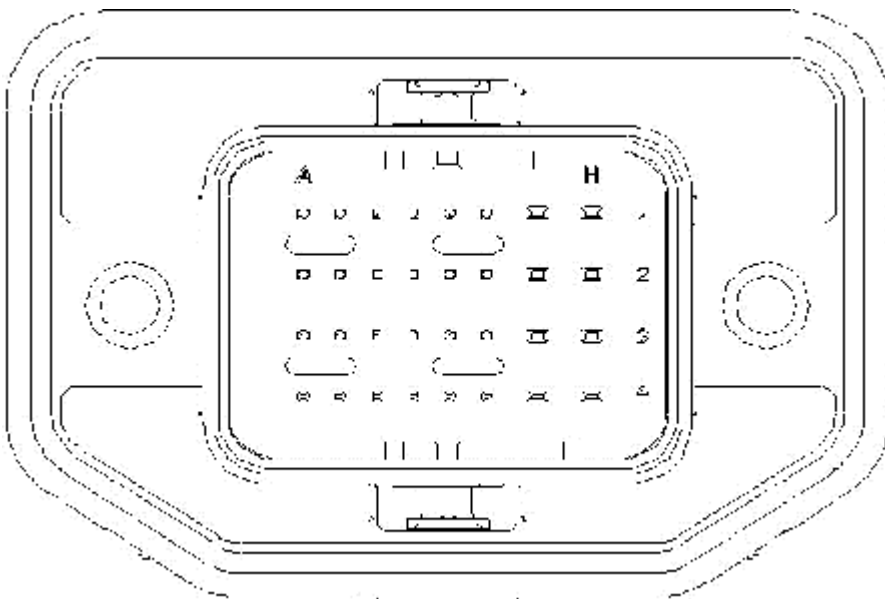


4.2.3 Positive low voltage output

Pin definition:

Port number	Name	Description
1	14V+	14V Output positive

4.2.4 Low voltage signal





Pin definition:

Port number	Name	Description
1A	NC	
1B	NC	
1C	NC	
1D	NC	
1E	NC	
1F	NC	
1G	NC	
1H	KL30(12V+)	Normally positive
2A	NC	
2B	NC	
2C	NC	
2D	NC	
2E	NC	
2F	NC	
2G	NC	
2H	NC	
3A	NC	
3B	NC	
3C	NC	
3D	DC-Wakeup-in	DCDC Wake-up input
3E	NC	



Port number	Name	Description
3F	NC	
3G	NC	
3H	NC	
4A	CAN-H	CAN communication
4B	CAN-L	CAN communication
4C	NC	
4D	NC	
4E	NC	
4F	NC	
4G	KL31(12V-)	Reference ground
4H	NC	

Note: The above valid high-level voltage range is 9 ~ 16Vdc.