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ANNREN TECHNOLOGIES CO., LTD.
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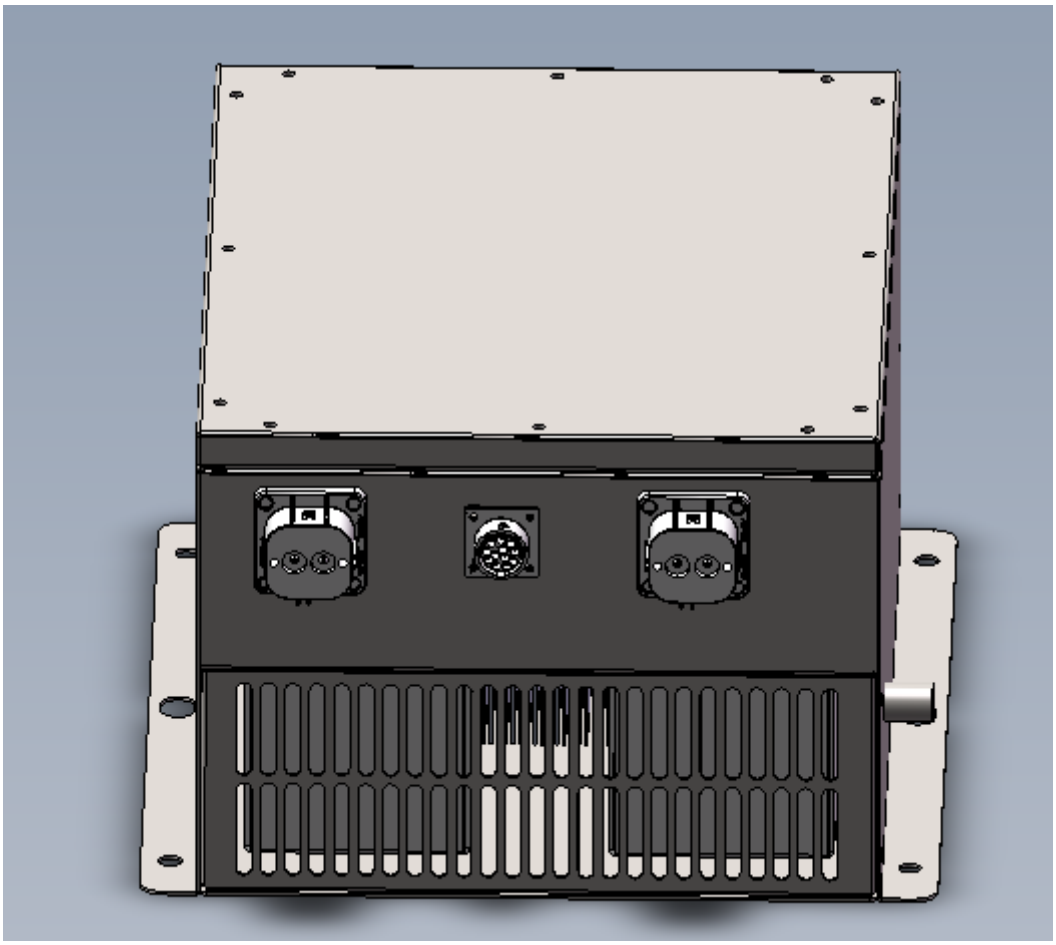
SPECIFICAITON

MODEL NO.: DDAC1-10K2P

PART NAME: 10KW DCAC HV INVERTER



1. Requirements

Comply with QC/T413-2002 "Basic Technical Requirements for Automotive Electrical Equipment" ；

Comply with GB4942.2-1993 "Enclosure Protection Grade of Low-Voltage Electrical Apparatus"

The 0KW high-precision inverter adopts DSP full digital control technology, which makes the inverter module have multiple protection functions, such as automatic derating of over temperature, over current, short circuit and other multiple protections.

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1.1 Application

The power supply is a high-reliability inverter, which is mainly used for electric vehicles to provide 220VAC AC power. Supply power to auxiliary AC equipment on electric vehicles, such as air conditioners, heaters, and medical electronic equipment. The inverter features high reliability, high efficiency, small size and low noise.。

1.2 Features

* High voltage input：280VDC～750VDC;
* Low voltage input：9VDC~30VDC;
* Output voltage: 110VAC OR 220VAC,50Hz (TWO TYPE)
* The working environment temperature range of the system is wide to -40℃～+85℃ (when the temperature is ≥65℃, the power output will be reduced)；
* Complete fault alarm and protection functions, including：
  - Input overvoltage and undervoltage protection，
  - Output over voltage, over current, short circuit protection；
  - Input anti-reverse protection；
  - Intelligent temperature derating；
  - Over temperature protection；

1.3 Technical Parameters

Description		Specification	Remark
Inverter system requirements	DC high voltage input voltage range	DC280V（Undervoltage point）~DC750V（Overpressure point）	
	Cooling method	Air Cooled	
	DC low voltage input voltage range	9VDC~30VDC; Rated 12VDC or 24VDC；	Compatible with 24VDC input。
	Range of working temperature	－40℃～＋85℃	When the temperature is ≥65℃, the power output can be reduced
	Protection level	IP65；Salt spray test requires more than 96h	The mechanical strength of the shell conforms to the technical standard QC/T 413-2002
	Rated DC input current	> 38A	
	Rated DC input voltage	350VDC	
	Maximum input power	13kW	
	Vibration resistance test	Comply with relevant standards ISO 16750-3-2012; GB/T 28046.3-2011	Meet functional level C requirements
	Resistance to mechanical shock	Comply with relevant standards ISO 16750-3-2012; GB/T 28046.3-2011；	Meet functional level C requirements
	Load capacity	Can carry inductive loads, such as household air conditioners, refrigerators, SPS loads, RCD loads, etc.。	

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	Soft start time	1~5S	
	Output voltage and frequency	Single-phase 220Vac 50Hz±1HZ sine wave	When the input voltage is 280VDC~320VDC, the output voltage is quasi-sine wave
	Rated AC output current	45A±1A	
	Maximum output current	50A	Working time 60S
	Rated output capacity	10.0kW	
	Overload capacity	110%~120% 1 minute	Set the inverter current protection point to prevent over-current protection when the air conditioner starts instantaneously, which may cause it to fail to start or be judged as a short circuit
	Maximum efficiency under rated conditions（%）	≥95%	
	Protective function	With over-temperature, over-current, over-voltage, under-voltage, short-circuit and other protection functions, it can automatically recover after the fault is cleared	
	Inverter size	384.6*327*205MM	

1.4 Other parameters

Description	Specification	Remark
Device grade	All components, including CPU, capacitors, connectors, etc. need to adopt automotive grade	
Power-on self-test	CAN initialization is completed within 120ms; all messages are sent once within 300ms; all signals are valid within 600ms	
Cooling method	Air Cooled	
Withstand voltage	≥2500VAC or 3540VDC, leakage current ≤10mA	Duration 60s
Insulation resistance	≥10MΩ	
High pressure protection	Internal live parts, such as copper bars, should be insulated	
High voltage safety	Meet GB/T 18384-2015 standard and related standards	Satisfy high-voltage safety regulations for commercial vehicles
EMC design	CISPR 25-2008	Meet CLASS 1

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Network communication	Meet Geely commercial vehicle communication and test specifications and communication protocols	
Exterior	Have a good industrial design appearance, design and install high-voltage safety, nameplates and other signs in accordance with the requirements of Geely commercial vehicles	
Package	Using hardwood boxes, cushioning foam and other measures to ensure that the product will not be damaged during transportation	
MTBF	>5000h	
Warranty	3 years	

Resource Type	Quantity	Remark
Power input	1 way	The vehicle provides 12V power supply to the power inverter
Input and output digital signal	4 way	1 channel is the control panel input signal; 1 channel is the enable signal sent by the VCU to the power supply; 1 channel is the request signal sent by the power supply to the VCU; 1 channel is the working status signal fed back to the VCU by the power supply
CAN interface	1 way	1 way for vehicle communication CAN; 1 way for module debugging internal CAN

2 Environmental conditions

2.1 Operating environment

Working temperature: -40℃～+85℃（Derating output above 65℃）

Operating relative humidity: 5%~95%。

2.2 Storage environment

Allow storage environment temperature: -25℃～+85℃

Allow storage relative humidity: 5%~95%。

2.3 Altitude

Maximum altitude: 3000 meters

3 Structure and shape

3.1 Inverter power supply outline structure and size drawing

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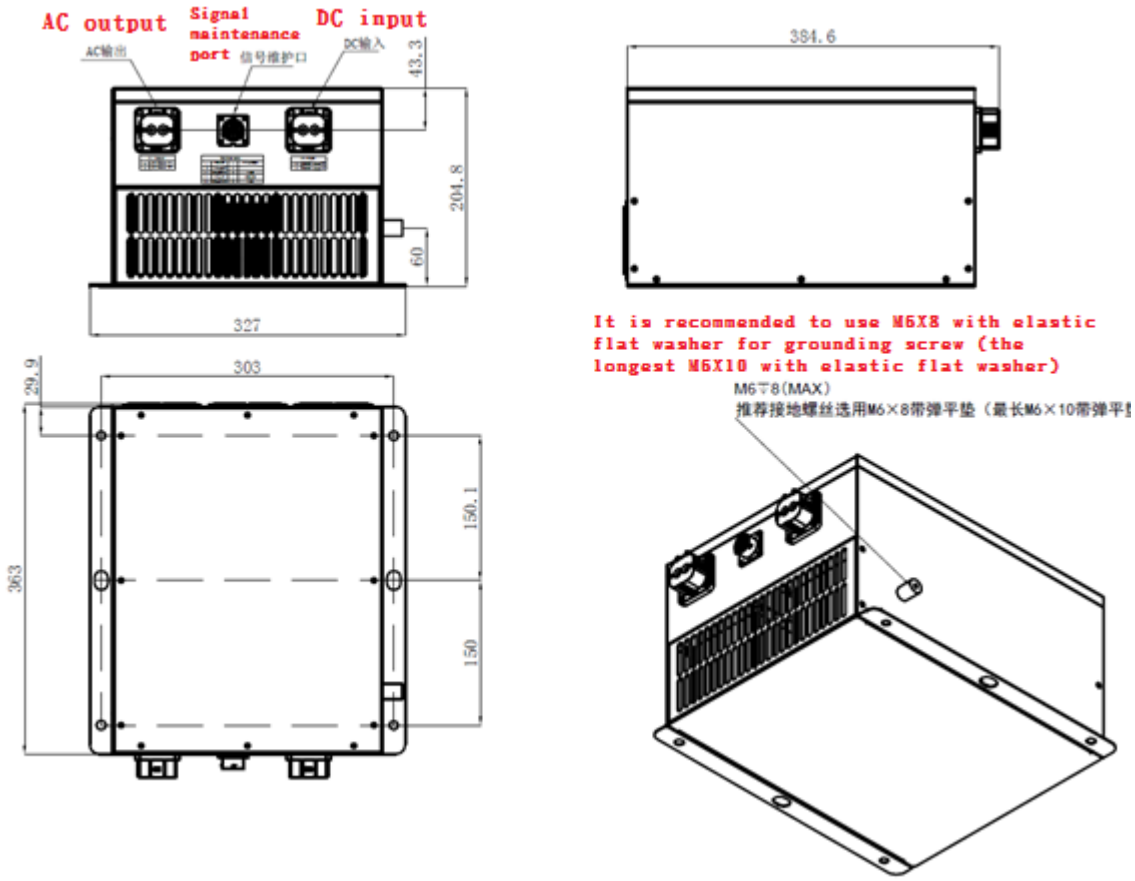
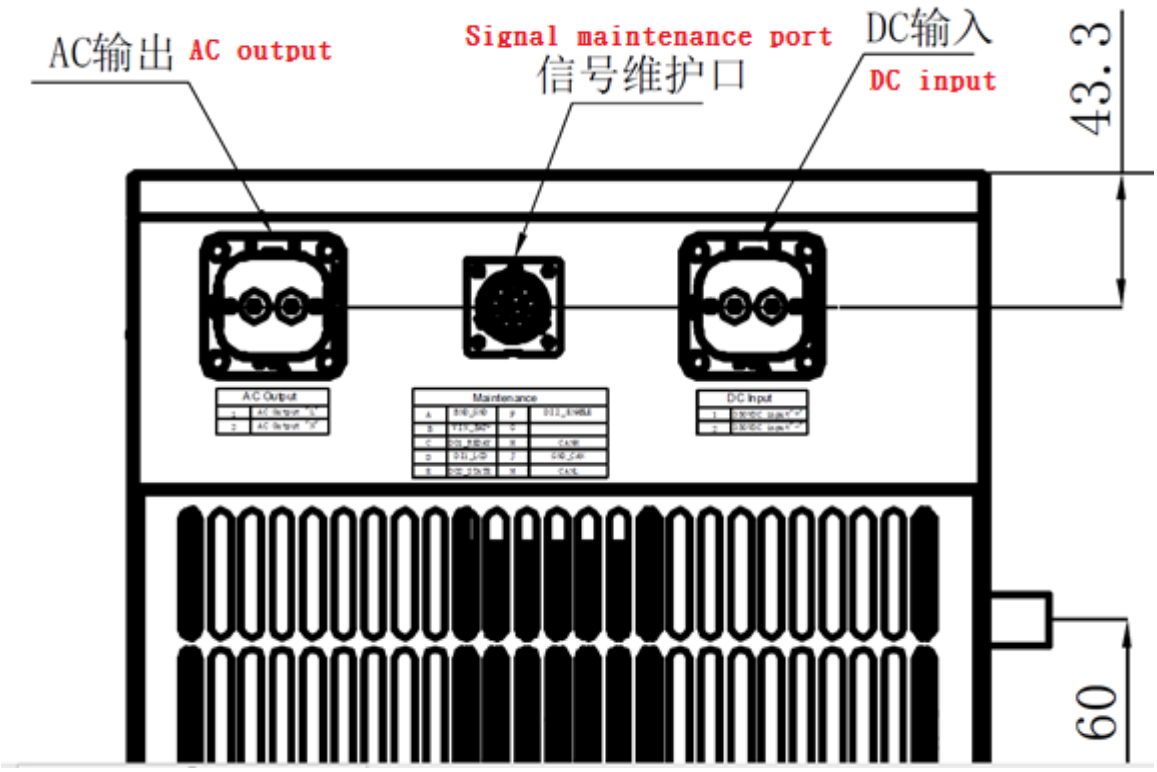


3.2 Inverter module port definition and power distribution installation



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	DC输入DC input		AC输出AC output		维护口Signal maintenance port	
	Pin 针脚号	Pin definition 针脚定义	Pin 针脚号	Pin definition 针脚定义	Pin 针脚号	Pin definition 针脚定义
插座针脚定义 Socket pin definition	1	350VDC input"+"	1	AC Output "L"	A	BND_GND
	2	350VDC input"-"	2	AC Output "N"	B	VIN_BAT+
					C	DO1_REDAY
					D	DI1_LCD
					E	DO2_STATE
					F	DI2_ENABLE
					G	
					H	CANH
					J	GND_CAN
					M	CANL

3.4 Labels and silk screen

The sine inverter label silk screen is used to identify the product name, serial number, model, basic parameters, date of manufacture and manufacturer identification, etc. The product label identification is as follows：

MODEL ： DDAC1-10K2P 10KW
INPUT ： 280-750VDC /50A
OUTPUT ： 220V/45A 50Hz; 10KW
Date ： XXXX-XX-XX
Supplier: ANNREN TECHNOLOGIES CO., LTD.

3.5 DV Testing requirements

Item	Name	Description	Specification		Standard	Requirement
1	System	Operating voltage range	Meet the requirements of technical documents		specifications	Within the required operating voltage range, the controller works normally
2		Withstand voltage test	Test the parts between the connecting pins and the conductive shell when the high-voltage equipment has no current; the test voltage frequency is: 50Hz～60Hz, the		GB/T 18384.3-2015； GB/T 18488.1-2015	Continuous 60S under 3540VDC high voltage, leakage current <10mA

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			duration is 60S, and the test voltage is 2500VAC or 3540VDC			
3		Insulation resistance test	Test the parts between the connecting pins and the conductive shell under the condition of no current in the high-voltage equipment; use 1000VDC voltage for 60S		GB/T 18384.3-2015	Requires insulation resistance> 10MΩ
4		CAN communication test	Connect the 14VDC low-voltage power supply, and monitor whether the communication data is normal through CAN		specifications	CAN normal communication, no abnormal DTC
5		Potential equalization test	Test between any two conductive housings in the case of high-voltage equipment without current; use no more than 60VDC no-load power supply, current ≥ 30A, duration 5S		GB/T 18384.3-2015	It is required that the calculated resistance value does not exceed 0.1Ω
6		Creepage distance test	Use a caliper or tape measure to measure at any part of the equipment between two different potentials or between the different potentials of the connecting terminals		IEC 60664-1-2007	According to the regulations in the standard
7		Clearance test	Using a caliper or tape measure, the shortest distance between any two different potentials inside the equipment or between the different potentials of the connecting terminals		IEC 60664-1-2007	According to the regulations in the standard
8		Protective function	Short circuit, over current, over voltage, under voltage and other protection functions		GB/T 18488-2015	GB18488-2015

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9	DCAC	DCAC output characteristic test	The output power is controlled by adjusting the load, starting from 0, increasing by 10%, to 10KW, and each point lasts for 15S		specifications	No fault is reported during operation, DCAC output power can reach 10KW
10		DCAC rated/peak power test	The output power is controlled by adjusting the load, the maximum output power is 12kW, lasting 60S		specifications	Working normally during operation
11	Environmental test	High temperature resistance test	The test temperature is 75℃, and the test time is 96h. Power on when running at high temperature, check every 8h; when in high temperature storage, do not power on, check before and after the test		ISO 16750-4-2010	满足功能等级 A 要求
12		Low temperature resistance test	The test temperature is -25℃, and the test time is 24h. Power on when running at low temperature, check once every 8h; when storage at low temperature, do not power on, check before and after the test		ISO 16750-4-2010 ； GB/T 28046.4-2011	Meet functional level A requirements
13		Combined cycle test of resistance to temperature and humidity	The test time is 240h, each cycle is 24h, a total of 10 cycles. With reference to IEC 60068-2-38, before the test, the test object is placed in an environment of 55°C and a relative humidity of not more than 20% for 24 hours, and then the initial test is performed. Perform 10 cycles, odd cycles are		ISO 16750-4-2010； GB/T 28046.4-2011	Meet functional level A requirements

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			temperature/humidity cycles including low temperature, and even cycles are temperature/humidity cycles not including low temperature			
14		High and low temperature impact test	The test is performed without power-on, 100 cycles, each cycle is kept at a low temperature of -25°C for 20 minutes, and a high temperature of 75°C for 20 minutes, and the conversion time is not more than 30s. Test before and after the experiment.		ISO 16750-4-2010	Meet functional level C requirements
15		Vibration resistance test	Random vibration, three directions, 8h vibration in each direction. The acceleration is 27.8m/s2. It is not powered on, and it is tested before and after the experiment		ISO 16750-3-2012 ； GB/T 28046.3-2011	Meet functional level C requirements
16		Resistance to mechanical shock	Complete the impact test in the uncharged state, and then power on the test. Acceleration 500m/s2, duration 6ms, 10 tests in each direction		ISO 16750-3-2012 ； GB/T 28046.3-2011	Meet functional level C requirements
17		Drop resistance test	Drop height 0.5m, 2 times for each coordinate axis, 6 times in total		ISO 16750-3-2012 ； GB/T 28046.3-2011	Meet functional level C requirements
18		Salt spray corrosion resistance	Salt spray concentration 5%, test temperature 35℃, PH value, 6.5~7.2, test time 96h		GB/T 2423.17	It should be able to work normally after recovering 1-2h after the experiment

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19		Waterproof test	Test according to "Enclosure Protection Level (IP Code)"		GB 4208-2008	Meet IP5X requirements
20		Dust test	Test according to "Enclosure Protection Level (IP Code)" ，		GB 4208-2008	Meet IPX4 level requirements
21	Power protection	Supply voltage undervoltage test	Provide a minimum power supply voltage of 9V for testing ；		ISO 16750-2-2012 ； GB/T 28046.2-2011	Meet functional level A requirements
22		Supply voltage overvoltage test	Test temperature is 65℃, input 16V power supply voltage, time is 60min		ISO 16750-2-2012 ； GB/T 28046.2-2011	Meet functional level C requirements
23		The supply voltage drops instantly	Simultaneously input test pulses to the relevant ports of the object to be tested, and the pulse rise and fall time shall not exceed 10ms		ISO 16750-2-2012 ； GB/T 28046.2-2011	Meet the requirements of functional class B
24		Supply voltage reverse voltage	Input 14V reverse voltage to the relevant port of the object to be tested, and the time is (60±6) s		ISO 16750-2-2012 ； GB/T 28046.2-2011	Meet functional level C requirements
25		Power supply short circuit test	Connect the related ports of the DUT to 16V and ground in sequence for (60±6)s, and keep the other ports open. Test under the following conditions: Connect the supply voltage and ground wire: The output is valid; The output is invalid; Disconnect the power supply; Disconnect the ground connection; Keep the other unused input pins open		ISO 16750-2-2012 ； GB/T 28046.2-2011	Meet functional level C requirements
26	EMC	External harassment	Including conducted harassment and radiation harassment		CISPR 25-2008	Meet class1

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27		Electrostatic discharge	Power-on state	Contact discharge ±15kV	ISO 10605-2008	A
				Air discharge ±25kV		A
			Not powered on	Contact discharge ±8kV		C
				Air discharge ±15kV		C
28		Transient immunity	Transient immunity test along the power line	Pulse 1 L2	ISO 7637-2-2011	C
				Pulse 2a L2	ISO 16750-2-2010	A
				Pulse 2b L2		C
				Pulse 3a L2		A
				Pulse 3b L2		C
				staring profile		B
				load dump		C
			Transient immunity test of signal/control line	Pulse a	ISO 7637-3	C
				Pulse b		C
29		High current injection	Test frequency band: 1MHz--400MHz, test severity level 75mA, 100mA		ISO 11452-4-2005	75mA test, function level reaches A, 100mA test, function level reaches A
30		Radiation immunity	Test frequency band: 400MHz--1000MHz, test severity level 75V/m, 100V/m		ISO 11452-2-2004	75V/m test, function level reaches A, 100V/m test, function level reaches A