



Technical Specification

Model:

ATD1K5-7212-F

ATD1K5-11512-F

ATD1K5-14412-F

ATD1K5-32012-F

Name: 1.5KW DC/DC Converter Fan System

Version: V1.0 Issue Date: 2019-3-6



Content

1. Overview	4
1.1 Subject	4
1.2 Main Features	4
2.Size and Appearance	4
2.1Size and Weight	4
2.2 Appearance	5
3.DC/DC Converter technical specification	5
3.1 Environment Specification	5
3.2 DC/DC Converter regulatory requirements and reference standards	6
4.DC/DC Converter safety regulation	7
5.DC/DC Converter electrical performance	7
5.1 Input	7
5.2 Output	7
5.3 Environment test	8
6.DC/DC Converter protection Functions	8
7.Interface	9
7.1High Voltage Input connector and pin definition	9
7.2 Signal connector and pin definition	10
7.2.1 Signal connector 1:	10
7.2.2 Signal connector2:	10
7.3 Low voltage output connector and pin definition	11
8. Safe Guide	11



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V1.0	Draft	Tianxiang Pan	Lizhen Tang	Hongbin Zhang	2019.3.1



1. Overview

1.1 Subject

ATD1K5 Series 1.5KW DC/DC Converter Fan System is designed by ANNREN Technologies Co., Ltd according to DC national standard, which provide 12V low voltage DC power for vehicles. The output can connect to 12V back-up battery, DC-DC converter will make the charge management to the back-up battery. This product not only has the advantages of high efficiency, small size, high stability, long-lifetime but also with the performance of high protection level, high reliability, more protection functions, it is an ideal solution for electrical vehicle. Thermal sensor is built-in the charger, has the function of over-temperature and can auto-recovery when temperature decreased. With the process of full-sealing, achieve the protection level of IP67, which make sure the excellent working under the complicated operation condition.

1.2 Main Features

1.2.1 Fully sealed process, fan forced heat dissipation

1.2.2 Built-in thermal sensor, shut off when temperature up to 110°C

1.2.3 Protection level is IP67, and it can work safely under short-term flooding conditions

1.2.4 In line with CAN2.0 communication specification, BUS display working status, fault code, etc

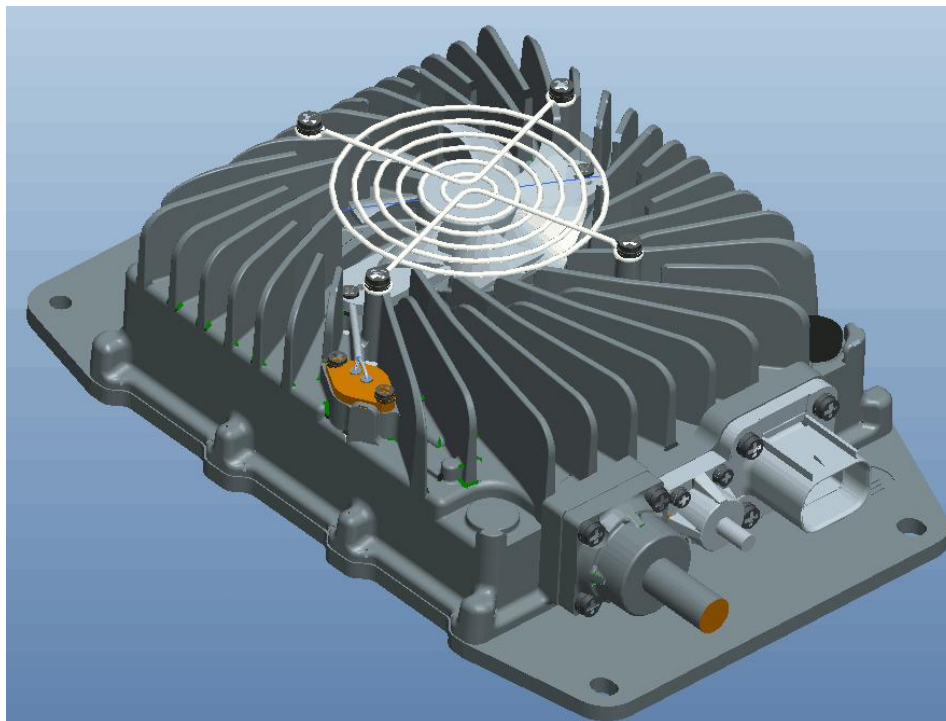
2. Size and Appearance

2.1 Size and Weight

Cool Way	Length (mm)	Width (mm)	Height (mm)	GW (KG)
Fan-Cooled	278 ± 1	182.2 ± 1	78.5 ± 2	3



2.2 Appearance



3.DC/DC Converter Technical Specification

3.1 Environment Specification

▲Working environmental temperature

Area	Lowest Temperature	Highest Temperature
Global	-40℃	60℃

▲Storage environmental temperature

Area	Lowest Temperature	Highest Temperature
Global	-40℃	105℃

▲Storage environmental temperature

▲Altitude: $\leq 2000\text{m}$

▲Working noisy: max when working $\leq 70\text{dB}$, meet China standard GB-T24347-2009



3.2 DC/DC Converter Regulations requirements and reference standards

No.	Standard Code	Standard Name	Remark
1	GB/T 24347-2009	Electric vehicle DC/DC converter	/
2	GB/T 18488.1-2015	Electric motors and their controllers for electric vehicles - part 1: technical conditions	/
3	GB/T 18384.2-2015	Safety requirements for electric vehicles - part 2: functional safety and fault protection	/
4	GB/T 18384.3-2015	Safety requirements for electric vehicles - part 3: protection against shock to personnel	/
5	GB/T 18387-2008	Limits and measurement methods for electromagnetic field emission intensity of electric vehicles	/
6	GB/T 31498-2015	Post-crash safety requirements for electric vehicles	/
7	GB 9254-2008	Limits and methods for measurement of radio harassment for information technology equipment	/
8	GB/T 18655-2010	Limits and measurement methods for radio disturbance characteristics of vehicles, ships and internal combustion engines used to protect vehicle-mounted receivers	/
9	GB 29743-2013	Motor vehicle engine coolant	/
10	GB 4208	Enclosure protection level (IP code)	/
11	GB/T 28046-2	Environmental conditions and tests for electrical and electronic equipment for road vehicles - part 2: electrical loads	/
12	GB/T 28046-3	Road vehicles - environmental conditions and tests for electrical and electronic equipment - part 3: mechanical loads	/
13	GB/T 28046-4	Environmental conditions and tests for electrical and electronic equipment for road vehicles - part 4: climatic loads	/
14	GB/T 2423.34-2012	Environmental test - part 2: test method test Z/AD: combined temperature/humidity cycle test	/
15	GB/T 2423.1-2008	Environmental testing of electrical and electronic products - part 1: test methods - test B: low temperature	/
16	GB/T 2423.2-2008	Environmental tests for electrical and electronic products - part 2: test methods - test B: high temperature	/
17	GB/T 2423.3-2008	Electrical and electronic products - environmental tests - part 2: test methods - Cab: constant heat and humidity test	/
18	GB/T 2423.17-2008	Environmental tests for electrical and electronic products	/



		- part 2: test methods : salt spray	
19	GB/T 30512-2014	Prohibited substances requirements for automobiles	/
20	QC/T 413	Basic technical conditions of automotive electrical equipment	/

4.DC/DC Converter Safety Regulations Specification

	Condition	Requirement
Grounding resistance test	@25A/AC	$\leq 100\text{m}\Omega$
Input insulation test	@1000V/DC	$\geq 20\text{M}\Omega$
Input withstand test	@2000V/DC 1min	Leak current $\leq 10\text{ma}$

5.DC/DC Converter Electrical Performance

5.1 Input

Input	Nominal Voltage	DC72V	DC115V	DC144V	DC2320V	/	/
	Input voltage range	55~97V	72~138V	88~195V	206~454V	/	/

5.2 Output

Output	Nominal output voltage		14V
	Output voltage range		9~15V
	Nominal output current	110A	
	Peak current	140A	
	Nominal power	1500W	
	Peak power	1800W last 6 minutes	
	Efficiency	≥94%	
	Dynamic response time	<50ms	
	Voltage regulation	≤1%	
	Load regulation	≤1%	
	Voltage control accuracy	≤1%	



	Current control accuracy	$\leq 2\%$
	Quiescent current	$\leq 1\text{mA} @14\text{V}$
	Ripple voltage coefficient	$\leq 2\% @\text{nominal working state}$

5.3 Environment Test

Humidity test	Meet GB/T 24347-2009 6.1.2
Low temperature test	Meet GB/T 24347-2009 6.1.1.1
High temperature test	Meet GB/T 24347-2009 6.1.1.2
Salt-spray Test	Meet GB/T 24347-2009 6.1.3
EMI	Meet GB/T 18487.3-2001 11.3.1
EMD	Meet GB/T 18487.3-2001 11.3.2
Salt-spray Test	IP67
EMI	10~25Hz swing 1.2mm, 25 – 500Hz 30m/S ² , 8 hours each direction
M T B F	150000H

6. DC/DC Converter Protection Functions

Protection Functions	Input over-voltage protection	72V	115V	144V	320V	/
		>97V	>138V	>195V	>454V	/
	Input low-voltage protection	72V	115V	144V	320V	/
		<55V	<72V	<88V	<206V	/
	Output over-voltage protection	Output voltage over-voltage protection threshold is 16±0.5V, working recovery after voltage back to ≤14±0.2V				
	Output low-voltage protection	Output voltage low-voltage protection threshold is 7±1V, working recovery when voltage rise to ≥9±0.2V				
	Output over-current protection	Reduces the output voltage when the output current exceeds the maximum output current				
	Over-temperature protection	Power start to decrease when internal temperature rise to 100℃, shut off when rise to 110℃, auto-recovery when power decreased				
	Short circuit protection	Yes, auto-recovery				



7.Interface

The interface for DC/DC converter, electrical vehicle and battery include a low voltage interface and a high voltage interface, Low voltage interface includes signal connector and DC/DC output. High voltage interface include DC/DC input.

Connectors can be appointed by customer if quantity order is more than 5000pcs.

Note: Configure high voltage fuse with 1.5 times maximum voltage/current for the DCDC input, which located in high voltage distribution box.

7.1 High Voltage Input Connectors and Pins Definition

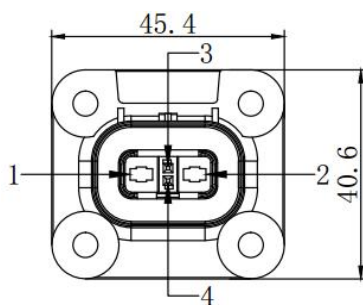


Chart 1 DC/DC Input

The product End: 2103124-4		Client End: 4-2103177-4	
Brand	Pin	Definition	Wire diameter(mm ²)
TaiKe	1	Positive Pole	Red/2.5
	2	Negative Pole	Black/2.5
	3	/	/
	4	/	/



7.2 Signal Connector and Pins Definition

7.2.1 Signal Connector form 1:

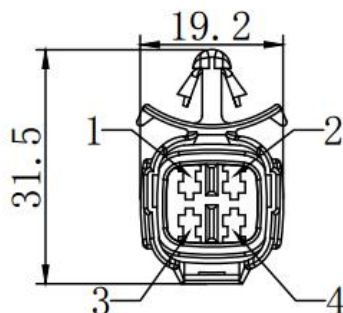
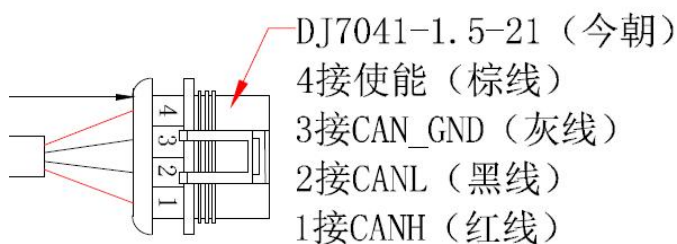


Chart 1 DC/DC Signal

The product End: PP0427303		Client End: PP0144904	
BRAND	Pin 脚	Definition	mm ²
TIANHAI	1	ENABLE	Blue/0.5
	2	Fault signal output	Yellow/0.5
	3	HVIL 1	Grey/0.5
	4	HVIL 2	Brown/0.5

7.2.2 Signal Connector form 2:



The product End: DJ7041-1.5-21		Client End: DJ7041-1.5-11	
Brand	Pin 脚	Definition	mm ²
TianHai	1	CAN/H	Red/0.5
	2	CAN/L	Black/0.5
	3	CAN/GND	Grey/0.5
	4	ENABLE	Brown/0.5



7.3 Low voltage Output Connector and Pins Definition



The product End: M6 Nut		Client End: M6 Screw	
Brand	Pin 脚	Definition	mm ²
TC	DC Output	14V	Red/25

8. Safety Guidelines

Warning: Remind users of the danger of operating with power on:

- * Strictly prohibited to disassemble and modify the device for repair or debugging.
- * Do not place the parts in a rainy location.
- * Before installation, please confirm that the shell is in good condition. If there is any damage, please replace it immediately or contact the after-sales service.
- * Each plug and socket should be securely connected. If damaged or loose, please replace immediately.



* Do not plug or remove the connector when the product is powered on.
Otherwise, personal injury may occur.

* Do not open the shell when the product is powered on. Otherwise,
personal injury may be caused.

* Do not touch the high-voltage live parts of the product with bare hands.
Please wear insulation gloves, shoes and clothes when testing and
maintaining the product. Electrical live maintenance and testing are strictly
prohibited.

* When replacing the fuse or contactor, do not operate recklessly to avoid
damaging the product and causing potential safety risks.

*Select a three-core AC power cable with a ground cable, and install
theground cable correctly.

*Any abnormal sound or odor during the operation of the charger, please
pullout the power plug.

*When charging the battery normally, please keep away from fire sources and
flammable and explosive materials.

*Do not charge damaged or non-rechargeable batteries

**Note: Remind the user that the operations below are important
operations of the product.**

*Do not block the air inlet and outlet of the product to prevent overheating.

*Ensure that the output cable is not too long to avoid the impact of line voltage
drop on charging.

*Disconnect the power cord and charging plug when moving this product

*The battery voltage must be consistent with the nominal voltage of the charger.

*Avoid collision, compression, and do not pull, twist or shake the charging cable.

*Products should be placed in a safe, draft-free and rain-free environment.

*Long-term non-use, please pack and store.