

TP-P70



I. Overview

1、application

This high-voltage DC power supply is a specially customized unit featuring a compact size, lightweight construction, high efficiency, and built-in fan cooling; its maximum operating efficiency is $\geq 98\%$. The power module features an aluminum housing design that is lightweight and aesthetically pleasing, along with a waterproof construction – making it an ideal replacement for imported high-voltage DC module power supplies.

2、Product Features

- DC-DC isolated power converter: Isolates and converts the input 2000 V DC voltage into 116 V DC voltage; rated output power: 70 kW.
- Characterized by high power density, compact size, and light weight.
- The design meets power supply reliability requirements: the input features overvoltage/undervoltage protection, while the output includes overvoltage protection, current limiting, short-circuit protection, and overtemperature protection functions.
- DSP digital design with strong scalability and support for CAN communication.
- Dynamic autonomous current balancing supports the parallel operation of multiple devices to expand power capacity, supporting power extensions of up to 200 kW or higher.
- Key components are manufactured to automotive-grade standards, ensuring high reliability.

3、product photograph



4、Product Main Specifications

input voltage range	Rated output voltage	output rating	productiveness	Voltage regulation accuracy	Output ripple and noise
1600 ~ 2000Vdc	116 $\pm$ 1Vdc	70KW	$\geq 97\%$	$\leq \pm 1\%$	$\leq \pm 1.5\%V_o$

II. Environmental Conditions

order number	project	qualification	unit	remarks
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1	working temperature	-20°C ~ +40°C	°C	72 kW continuous only when the power-supply enclosure temperature is ≤35°C; rated power is 70 kW.
2	storage temperature	-40°C ~ +80°C	°C	/
3	relative humidity	≤95	%	No condensation (40°C ± 2°C)
4	above sea level	0-3000	m	
5	atmospheric pressure	76 ~ 106	Kpa	/
6	Heat dissipation method	Built-in air cooling	/	Fan speed regulation control
7	levels of protection	IP65	/	/

III. Electrical Characteristics

1	input characteristics			
order number	project	technical requirement	unit	remarks
1.1	Rated input voltage	1900	Vdc	
1.2	input voltage range	1600 ~ 2000	Vdc	
1.3	Maximum input current	50	A	Vin=1600Vdc; current-limit test condition
2	output characteristic			
order number	project	technical requirement	unit	remarks
2.1	Output rated voltage	116	Vdc	/
2.2	Output voltage range	110 ~ 118	Vdc	
2.3	rated output current	600	A	/
2.4	output rating	70000	W	/
2.5	Peak output power	Not published		No verified peak rating
2.6	delivery efficiency	≥97	%	Vin = 1900 VDC, 50% load
2.7	Voltage regulation accuracy	±1	%	/
2.8	Source Adjustment Rate	±1	%	/
2.9	load regulation	±1	%	/
2.10	Output ripple and noise	≤1200	mVp-p	Bandwidth limit: 20 MHz; test terminal equipped with

				a 10 μ F electrolytic capacitor and a 0.1 μ F film capacitor; rated load
2.11	temperature coefficient	± 0.02	%/ $^{\circ}$ C	/
2.12	Output rise time	≤ 1	S	/
2.13	Power-on output delay	≤ 5	S	Rated input
2.14	Power-on/Power-off Overshoot Amplitude	$\Delta V: \leq \pm 5$	%	/
2.15	Dynamic response overshoot	$\Delta V: \leq \pm 5$	%	/
2.16	Dynamic response recovery time	≤ 2	ms	Load variation: 25%–50%–25% or 50%–75%–50%; Temperature: 25 $^{\circ}$ C
3	protection feature			
order number	project	technical requirement	unit	remarks
3.1	Under-voltage protection	1540 ~ 1570	Vdc	Hysteresis greater than 10 V
3.2	Under-voltage recovery input	≤ 1600	Vdc	
3.3	Input Overvoltage Protection	2030 ~ 2050	Vdc	Hysteresis greater than 15 V
3.4	Input overvoltage recovery	≥ 2000	Vdc	
3.5	Overvoltage Protection	120 ~ 124	Vdc	Self-recovering
3.7	Output Overcurrent Protection	640 ~ 680	A	Self-recovering
3.8	Output short-circuit protection	Long-term short circuit without damage		Self-recovering
3.9	Overtemperature protection	When the casing temperature exceeds 65 $^{\circ}$ C, the current output begins to decrease; at 75 $^{\circ}$ C, overtemperature protection is activated; at 60 $^{\circ}$ C, normal operation resumes.	$^{\circ}$ C	Chassis temperature

IV. Safety Features

order number	project		test condition	remarks
1	dielectric strength	Input to Output	4500Vdc/10mA/1min	No flyback or breakdown
		Input to the housing	3000Vdc/10mA/1min	

		Output to the housing	2000Vdc/10mA/1min	
2	insulation resistance	Input to Output	$\geq 10M\Omega @ 500Vdc$	At normal atmospheric pressure and a relative humidity of 90%, with a test DC voltage of 500 V
		Input and Housing	$\geq 10M\Omega @ 500Vdc$	
		Output to the housing	$\geq 10M\Omega @ 500Vdc$	

V. Other Features

1. Flame retardancy requirements:

The flame retardancy rating of the PCBs used in the system shall comply with the V-0 requirement specified in GB 4943.1-2011; the flame retardancy rating of the insulated cables shall comply with the requirements specified in GB/T 18380.12-2008; and the flame retardancy rating of other insulating materials shall comply with the V-1 requirement specified in GB 4943.1-2011.

2. System noise

System noise shall not exceed 65 dB(A).

3. System Reliability

MTBF $\geq$ 100Khour ;

Test conditions: 25°C, rated input, full-load output (as per the MIL-HDBK-217F Notice 2 Stress Method);

4. Protection Rating

The protection rating shall meet the IP65 requirements. No water accumulation is permitted on the top surface of the power supply housing.

5. Three-Protection (Dampness Protection, Mold Prevention, and Salt Spray Protection)

The printed circuit boards, plug-in connectors, and other circuits within the product shall be treated for moisture resistance, mold prevention, and salt spray resistance; the salt spray resistance shall comply with the requirements specified in Table 9 of GB/T 4797.6, ensuring that the product can operate normally in outdoor environments with high humidity or salt spray conditions.

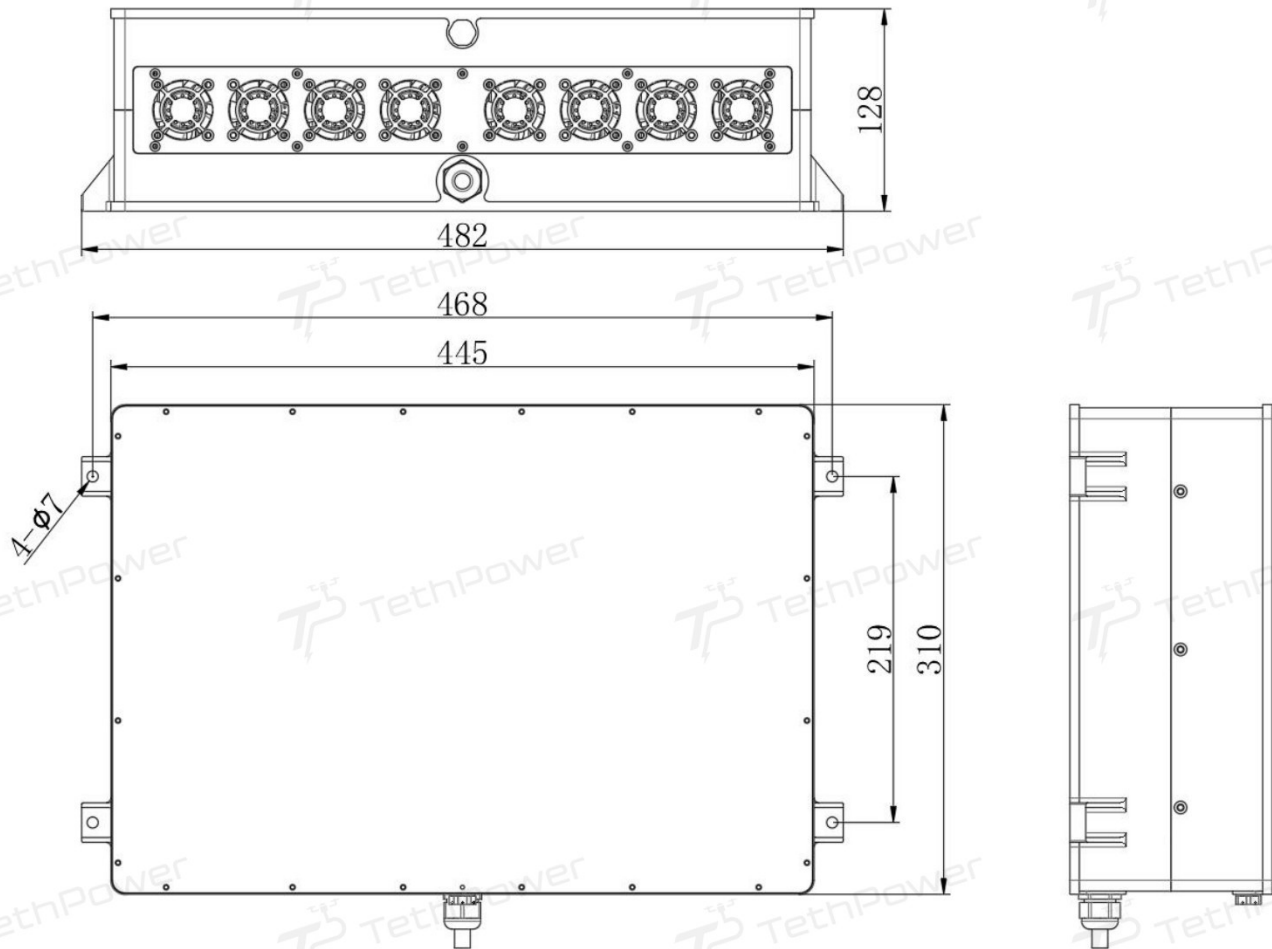
VI. Product Labeling

Made in-house or printed according to customer specifications.

VII. Mechanical Dimensions and Connector Definitions

1、Product Installation Dimensional Diagram

parameter	metric
Maximum external dimensions	442mm*308mm*128 $\pm$ 1mm



2、Connector Definition

Power Section Definition
definition table:

Function Name	definition	explanatory note
DC input	VIN+	High-voltage input positive terminal
	VIN-	High-voltage input negative terminal
DC output	OUT+	120V positive output
	OUT-	120V output (negative)

3、Weight (net weight):

Approx. 22 kg

VIII. Packaging, Transportation, and Storage

1. Packaging

The packaging box shall display the product name, model number, manufacturer's identification, the manufacturer's quality department inspection certificate, the manufacturing date, etc.; the interior of the packaging box shall contain an accessories list.

2. Transportation

Products shall be transported in securely sealed packaging boxes. The exterior of the boxes shall comply with the relevant national standards and shall bear markings such as "Handle with care" or "Moisture-proof." Packaging boxes containing products may be transported by any means of transport. During transportation, direct exposure to rain or snow, as well as mechanical impact, shall be avoided.

3. Storage

When not in use, the product shall be stored in its original packaging box under warehouse conditions where the ambient temperature ranges from -10°C to 40°C and the relative humidity does not exceed 80%. The warehouse shall be free from harmful gases, flammable or explosive materials, or corrosive chemicals; furthermore, it shall be free from severe mechanical vibration, impact, or strong magnetic fields. The packaging box shall be placed at least 20 cm above the ground and at least 50 cm away from walls, heat sources, windows, or air intake openings. The shelf life under these specified conditions is generally 2 years; after this period, the product shall be re-inspected.

IX. Safety Precautions

1. If the equipment's safety protection system is compromised, the equipment must be shut down immediately, and appropriate maintenance procedures should be followed.

2. When power supply equipment is moved from a cold environment to a warm environment, condensation may pose a risk of electrical leakage; therefore, grounding requirements must be strictly adhered to; The equipment must be connected to the power supply only by a qualified personnel.

3. After disconnecting the power supply, the equipment must be shut down for five minutes to allow the capacitors sufficient time to discharge before performing any maintenance on the power supply equipment.

4. Pay attention to safety precautions: In areas with safety warning signs or high-voltage warning signs, avoid touching these objects with your hands to prevent electric shocks or burns.

X. Referenced Standards and Specifications

GB/T 2423.1-2001 Environmental testing of electrical and electronic products – Part 2: Test methods / Test A: Low temperature

GB/T 2423.2-2001 Environmental Testing of Electrical and Electronic Products – Part 2: Test Methods / Test B: High Temperature

GB/T 2423.3-1993 Basic Environmental Test Methods for Electrical and Electronic Products – Test Ca: Constant Humidity and Heat Test Method;

GB/T 2423.4-1993 Basic Environmental Test Methods for Electrical and Electronic Products – Test Db: Alternating Wet-Humid Heat Test Method

GB/T 2423.5-1995 – Environmental testing of electrical and electronic products – Part 2: Test methods / Test Ea and Guidelines: Impact

GB/T 2423.6-1995 – Environmental testing of electrical and electronic products – Part 2: Test methods / Test Ea and Guidelines: Impact

GB/T 2423.8-1995 – Environmental testing of electrical and electronic products – Part 2: Test methods / Test – Free fall

GB/T 2423.10-1995 – Environmental testing of electrical and electronic products – Part 2: Test methods / Test Fc and Guidelines: Vibration (Sine)

GB/T 2423.11-1997 – Environmental testing of electrical and electronic products – Part 2: Test methods / Test Fd: Wideband random vibration – General requirements

GB/T 2423.22-2002 – Environmental testing of electrical and electronic products – Part 2: Test N – Temperature variation

GB/T 14508-93 – Environmental conditions for freight transport machinery on graded highways

EN55022:1998 – Information technology equipment – Wireless interference characteristics – Limits and measurement methods;

EN55024:1998 – Information technology equipment – Electromagnetic compatibility – Limits and measurement methods;

CEI IEC 61000-4-2 (2001) – Electromagnetic compatibility – Test and measurement techniques – Electrostatic discharge immunity test

CEI IEC 61000-4-3 (2002) – Electromagnetic compatibility testing and measurement techniques – Immunity test for radio frequency electromagnetic field radiation disturbance

CEI IEC 61000-4-4 (1998) – Electromagnetic compatibility – Test and measurement techniques – Immunity test to electrical fast transient pulse trains

CEI IEC 61000-4-5 (1999) – Electromagnetic Compatibility Testing and Measurement Techniques – Surge (Impulse) Immunity Test

CEI IEC 61000-4-6 (2001) – Electromagnetic compatibility – Test and measurement techniques – Immunity to conducted disturbances induced by radio frequency fields

CEI IEC 61000-4-8 (1993) – Electromagnetic Compatibility Testing and Measurement Techniques – Power Frequency Magnetic Field Immunity Test

CEI IEC 61000-4-11 (1994) – Electromagnetic compatibility testing and measurement techniques – Resistance to voltage sag, short-term interruption and voltage variation tests

CEI IEC 61000-4-29 (2000): Electromagnetic Compatibility Testing and Measurement Techniques – Immunity Test for Voltage Sags, Short-Term Interruptions and Voltage Transients at DC Input Ports

IEC 61000-3-2:2001 – Electromagnetic compatibility – Limits – Limit values for harmonic current emission (for equipment with per-phase input current ≤ 16 A)

IEC 61000-3-3:1994 – Electromagnetic compatibility – Limits – Voltage fluctuations and flicker in low-voltage power supply systems (Equipment rated current ≤ 16 A)

GB4943-2001 – Safety of information technology equipment

YD/T 282-2000 – General Test Methods for the Reliability of Communication Equipment

GB/T 13722-92 – Technical requirements and test methods for mobile communication power supplies

YD/T 732-95 – Testing Method for DC–DC Converters for Telecommunications Applications

YD/T 731-2002 High-Frequency Switching Rectifier for Telecommunications

GB14287.1-2005 Electrical Fire Monitoring Systems – Part 1: Electrical Fire Monitoring Equipment