

15KW, 500V Power Supply

I. General

The model DT15AD02M is a compact, 15KW Power Supply with an Input range of 323-437Vac from a three-phase, three-wire AC input. There is a single output with an adjustable range of 200 to 500Vdc and active power factor correction. It is highly suitable as a building block for modular DC Fast Charger for Electric Vehicles.

The main features of the module are:

- Input over/under voltage protection
- Lost phase alarm
- Output over current protection
- Output over voltage protection
- Output short circuit protection
- Over temperature protection
- Alarm function
- Supports N+1 redundancy



II. Main Specifications

Rated power	Input voltage range	Output voltage range	Output current range	Ripple(p-p) (Rated Load, Width Limited 20MHz)
15KW	323—437Vac	200—500Vdc	0—50A	≤±1%Vo

III. Environmental Conditions

No.	Items	Technical Specifications	Unit	Remarks
1	Operating Temperature	-40 — +60	°C	+50~ +60°C derating 20% in linearity.
2	Storage Temperature	-40 — +70	°C	
3	Relative Humidity	Operation	%	40°C ±2°C
		Storage		
4	Altitude	≤4000	m	The unit should be derated according to the rules of GB/T 3859.2 when it exceeds 4000m.

5	Cooling	Forced cooling, Draw air from the front and exhausts heat from the behind and this module has temperature-sensing timing function.		
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Remarks: when it is 50°C—60°C, the module derates the power. The derating mode is auto linear derating.

IV. Electrical Characteristics

No.	Item	Technical Requirements	Unit	Remarks
1. Input Characteristics				
1.1	Rated input voltage	323—437 (typical value 380)	Vac	Can endure the effective value 530Vac for long time without damage.
1.2	AC input grid frequency range	45—65	Hz	
1.3	AC input rated frequency	50/60	Hz	
1.4	PFC	≥0.99		Rated input, rated load
1.5	Max input current	<30	A	
1.7	Inrush current	Not exceeding the Max. stable 150% of input peak current	-	
2. Output Characteristics				
2.1	Output voltage range adjustable	200—500	Vdc	Operate through the monitoring unit (testing condition: half load)
2.2	Rated output voltage	500	Vdc	Rated input
2.3	Output current range	50	A	Output voltage range:200-300Vdc
		15KW	KW	Output voltage range:300-500Vdc
2.4	Efficiency	≥95	%	Rated input, half load output
2.5	Ripple and noise	≤±1%Vo	mVp-p	Width 20MHz. Parallel with 10u+104 Capacitor
2.6	Starting up output delay	3-10	S	Rated input voltage starting up till output voltage rise to 190V.

2.7	Turn on/off overshoot amplitude		$\leq \pm 5$		
2.8	Dynamic response	Overshoot range	$\Delta V: \leq \pm 5$	%	Load change at 25%—50%—25% or 50%—75%—50%, jumping rate is 0.1A/us; and the jumping period is 4ms;
		Recovery time	$\Delta t: \leq 200$	μS	
2.9	Combined regulation		$\leq \pm 1$	%	
2.10	Source effect		$\leq \pm 0.1$	%	
2.11	Load regulation		$\leq \pm 1$	%	
2.12	Current sharing imbalance		$\leq \pm 5$	%	304—502Vac, at the range of 50~100% load
2.13	Input current harmonic		≤ 5	%	Rated input, rated load
2.14	Temperature coefficient		$\leq \pm 0.02$	%/°C	
3. Protection Characteristics					
3.1	Input under voltage protection point		≤ 310	Vac	Can auto recover, test with 5A load.
3.2	Input under voltage recovery point		≤ 323	Vac	
3.3	Input over voltage protection		≥ 450	Vac	Can auto recover, test with 5A load.
3.4	Input over voltage recovery point		≥ 437	Vac	
3.6	Output over voltage protection point		510-530	Vdc	1.The module internal fault lead to over voltage, the module locked itself. 2. add the voltage within the range of output over voltage protection to the external module, then the module can operate normally;
3.7	Output over current protection point		The over current is available, Can auto recover	—	
3.8	Short circuit protection		Endure long time short circuit without damage and auto recover.		
3.9	Over temperature protection		> 60	°C	Auto-recoverable when temperature is less than 60°C

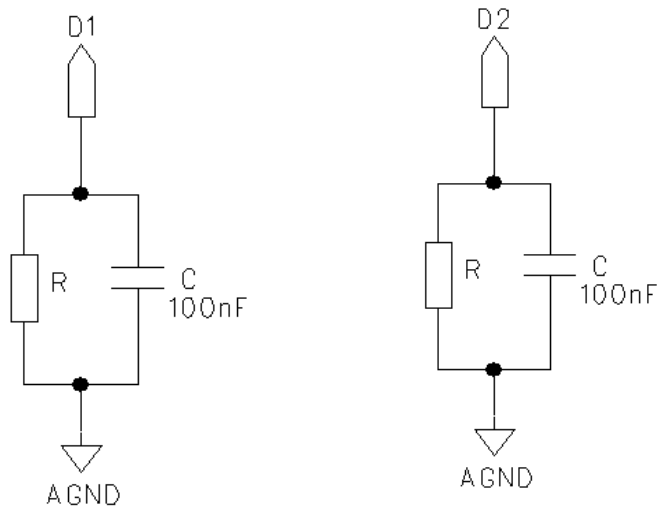
V. Safety & EMC

No.	Item	Criteria	Remark	
1	Dialectical strength	Input-output	3535Vdc/30mA/ 1min	No flashover, no breakdown.
		Input-ground	3535Vac/30mA/ 1min	
		Output-ground	2121Vdc/30mA/ 1min	
2	Isolation resistance	Input-output	$\geq 10\text{M}\Omega @ 500\text{Vdc}$	Under normal air pressure, humidity 90%,
		Input-ground	$\geq 10\text{M}\Omega @ 500\text{Vdc}$	
		Output-ground	$\geq 10\text{M}\Omega @ 500\text{Vdc}$	
3	ground resistance	$< 0.1\Omega$	50A/4min	
4	Touch current (Input-ground)	$\leq 3.5\text{mA}$	502Vac/60Hz	
5	EMC	CE	CLASS A	
		RE	CLASS A	
		EFT	LEVEL 3 criteria B	IEC61000-4-4
		SURGE	LEVEL 4 criteria C Input meet difference mode $\pm 2\text{KV}$, common mode $\pm 4\text{KV}$	IEC61000-4-5
		DIP	Drop to 70% UT, duration 10ms, at angle of $0^\circ, 45^\circ, 90^\circ, 135^\circ, 180^\circ, 225^\circ, 270^\circ, 315^\circ$, meeting class B. Drop to 40% UT, duration 100ms, at angle of $0^\circ, 45^\circ, 90^\circ, 135^\circ, 180^\circ, 225^\circ, 270^\circ, 315^\circ$, meeting class C. Drop to 0% UT, duration 5000ms, at angle of $0^\circ, 45^\circ, 90^\circ, 135^\circ, 180^\circ, 225^\circ, 270^\circ, 315^\circ$, meeting class C.	IEC61000-4-11
		ESD	For the shell which would be touched by human in the normal operation: contact discharge $\pm 6\text{KV}$; air discharge $\pm 8\text{KV}$ standard B.	IEC61000-4-2
			For the shell which would be touched by human in the normal operation, contact discharge $\pm 8\text{KV}$; air contact $\pm 15\text{KV}$ standard R.	
CS	LEVEL 3 criteria A	IEC61000-4-6		

	RS	LEVEL 3 criteria A	IEC61000-4-3
	Voltage fluctuation and flicker	$P_{st} \leq 1.0$ $P_{1t} \leq 0.65$; $dc \leq 3\%$; $d_{max} \leq 4\%$; The time of $d(t) \geq 3\%$ is no more than 200mS.	IEC61000-3-3
	Current harmonic	CLASS A	IEC 61000-3-2 [6]
6	Anti Lightning	The AC input terminal can endure surge current wave of 5kA、8/20 μ S, 5 times each for positive and negative , time cycle 1 minute. (refer to standard: YD 5098-2001) .	

VI. Communication address setup.

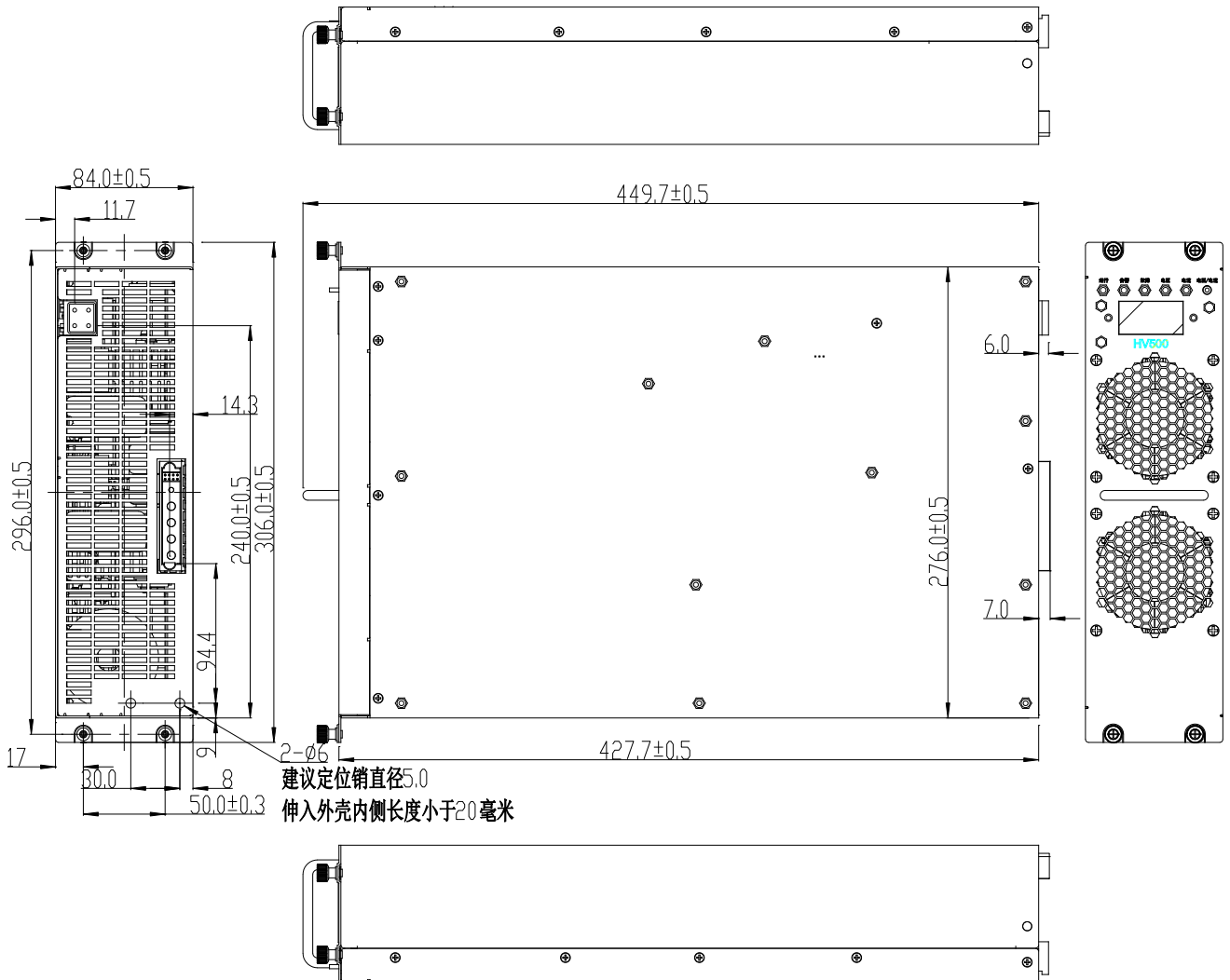
With the microcontroller internal power supply module, can communicate with monitoring system via CAN bus, each power module connected to a backplane, set a unique address by installing a different resistor on the backplane, as shown below. To realize the communication and current sharing capability, maximum 36 addresses are settable, the module address lines 1 (D1) and the module address lines 2 (D2) connect the module address ground (AGND) respectively to connect a resistor and a 100nF / 25V capacitor a resistor represents a value, 0 Ω representatives 0, 270 Ω representatives 1, 680 Ω representatives 2, 1.5K Ω 3, 3.9K Ω representatives 4, NC representatives of 5, calculation method of the address is: $D1 * 6 + D2$, for example: D1 and AGND connect the resistance of 680 Ω , D2 and AGND connect the resistance of 3.9K Ω , then the address is: $2 * 6 + 4 = 16$.



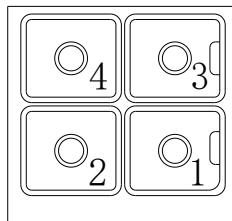
VII. Mechanical Characteristics and Connector Definition

1. Outline dimensions (unit : mm)

Height x Width x Depth = 84mm x 306mm x 450mm

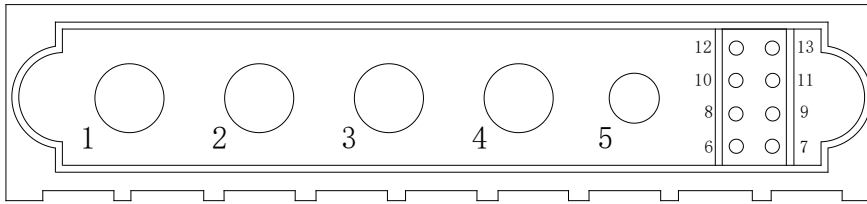


2. Input Connector PIN definition



1	PSU AC input	Input phase A
2	PSU protected ground	CHGND
3	PSU AC input	Input phase B
4	PSU AC input	Input phase C

3. Output connector PIN definition



1	PSU output negative	OUT-
2	NC	
3	PSU output positive	OUT+
4	NC	
5	NC	
6	PSU address ground	AGND
7	PSU address wire 2	D2
8	NC	
9	PSU address wire 1	D1
10	NC	
11	PSU communication wire	CANL
12	PSU communication ground	CANGND
13	PSU communication wire	CANH

4. Others

No.	Item	Criteria	Remarks
1	Placement	Vertical	
2	Connection to ground	Through case, front plane, consolidate screw and rack.	
3	Weight	11Kg	

VIII. Reliability requirement

MTBF≥250 Khour; test condition: 25°C, rated input, full load output.

IX. Packaging, Transportation & Storage

Packaging

The product name, model, logo of manufacturer, safety approval, manufacturing date are present on the packaging box. The specifications manual and packing list are included in the packaging box.

Transportation

Suitable for transportation by truck, ship, and plane. The products should be shielded by a cover from direct sunshine and loaded and unloaded carefully.

Storage

The Products should be stored in packaging box when it is not in use. The warehouse temperature should be between 40°C—85°C with the relative humidity between 10%—90%. Within the warehouse, there should be no harmful gases, inflammable, explosive, corrosive chemical products, or strong mechanical vibration. Shock and strong magnetic fields should be avoided.

The packaging box should at least 20cm height above the ground, and 50cm away from walls, thermal sources or vents.

Under these conditions, the product has a 2-years storage period, and should be rechecked after these 2 years.

X. Remarks

Dangerous power output. keep safe space when in operation.



High Temperature Alarm Label

