Product Specification

24 Dec, 2009

Scope

This specification shall be applied to Embedded type DC stabilized power supply ePCSA-500P-X2S.
All items in the specification shall be specified at normal temperature and humidity unless otherwise specified.

General Specification

	Items	Specification	Measurement conditions, etc.
AC Input	Rated Voltage	AC100 to 240V	Universal range Load factor shall be 90 to 100% at AC85 to 90V (refer to output specification). Startup voltage: AC80±10V
	Voltage Range	AC85 to 264V	
	Rated Frequency	50 / 60 Hz	Tolerance: 47 to 63Hz
	Inrush Current	31Apeak or less at AC100V, 75Apeak or less at AC240V	at Rated load and cold start (25℃)
	Input VA	513VA max. at AC100V, 487VA max. at AC240V	at Rated Input with continuous max. output power
		754VA max. at AC100V, 714VA max, at AC240V	at Rated Input with Peak output power
	Efficiency	73% typical at AC100V, 77% typical at AC240V	at Rated load
	Power Factor (PF)	99% typical at AC100V, 97% typical at AC240V	
Environmental specification	Operating Temperature	0～60℃	Temperature gradient: 15℃/H However, load factor shall be 70 to 100% at 45 to 60℃.
	Storage Temperature	-25 to 70℃	Temperature gradient: 15℃/H
	Relative Humidity	10 to 90% at operation, 10 to 95% at no operation	There shall be no condensation.
	Vibration	To endure for 45 minutes in each direction of X, Y, and Z under the condition of Displacement amplitude: 0.075mm、Frequency: 10-55Hz, and Sweep cycle: 10	To follow JIS-C-60068-2-6 at no operation
	Mechanical Shock (Surface dropping)	Lifting one bottom edge of the unit up to 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat 3 times for each of four bottom edges, and no malfunction shall be observed.	To follow JIS-C-60068-2-31 at no operation

Note:

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Drawn by	Checked by	Approved by	Model	Drawing No.
Yodo	Yamada	Yamamoto	ePCSA-500P-X2S	2797－01－4－520 1/8

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Product Specification

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	Items	Specification	Measurement conditions, etc.
Insulation	Dielectric withstand voltage	AC 1500V for 1 minute between AC input and FG/DC output	
	Insulation Resistance	50MΩmin. between AC input and FG/DC output	with DC500V Megger
	Leakage Current	0.5mA max. at AC100V, and 1mA max. at AC200V	YEW. TYPE3226 or equivalent (1kΩ)
Others	Electrostatic Discharge	Contact Discharge: ±6kV、10 times	No malfunction shall be observed. To follow IEC61004-4-2 (Test level 3)
	Line Noise immunity	± 2000V for 10 minutes with pulse width of 100/1000nS 、 cycle period of 30 to 100Hz, positive/negative polarity, normal/common mode pulse	Measured with INS-410 No fluctuation in DC factor and no malfunction shall be observed.
	Impulse voltage immunity	5 times for each of Common mode ±2kV, Normal mode ±1kV, and Pulse width 1.2×50μS	No malfunction shall be observed to follow IEC-61000-4-5 Installation environment Class 3)
	Conducted emission	To meet VCCI Class B, FCC Class B, and EN55022 Class B	To be measured with single power supply body
	Harmonic Current Regulation	To comply with IEC61000-3-2 (Ver. 2.1) Class D and EN61000-3-2 (A14) Class D	at Rated input and Rated load
	Safety Standards	UL60950, CSA C22.2 No.60950 EN62368, CE marking(IEC62368-1) ⚠A'	Acquired
	Cooling system	Forced air cooling with self-contained fan motor to control fan speed by detecting inside temperature	Fan speed varies due to operating temperature and load condition (Note 1).
		Equipped with function to switch modes between low speed and high speed by the slide switch on upper side of front panel.	Low speed mode is factory setting. Speed at high-speed mode is fixed.
	Reliability Grade	FA	To follow internal grade
	Weight	1.8kg typical	
	Warranty	Three years after delivery. If any fault belongs to us, we will repair or replace at our cost.	Provided that the unit shall be operated under normal temperature and humidity.
	Global Environment Conservation	RoHS compliance	

Note:

Note 1: The fan operates with low fan speed only when the inside temperature goes high while the power supply stops operation due to PS_ON# signal.

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⚠A' ×1:2020.07.10 K.Nakagawa I-311222B
⚠A ×1:2020.01.29 M.Okudaira I-311222

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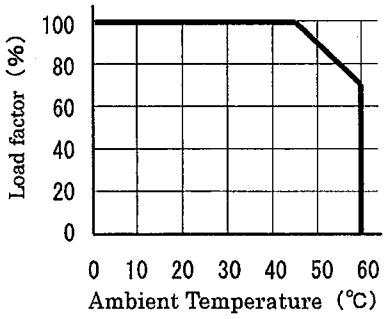
Output Specification

Items			CH1	CH2	CH3	CH4	CH5 (5VSB)	Measurement conditions, etc
DC Output	Rated Voltage		3.3V	5V	12V	-12V	5V	
	Minimum Current		0A	0A	0A	0A	0A	To secure voltage accuracy
	Rating	Rated Current	11.5A	16A	18A	0.5A	2A	Total rated output power: 350W
		Rated Output Power	38W	80W	216W	6W	10W	
	Continuous max. power	Max. Current	20A	22A	22A	0.5A	2A	Total continuous max. output power: 350W
		Continuous output power	160W max.		264W max.	6W	10W	
			334W max.					
	Peak Power	Max. Current	30A	33A	30A	0.5A	2.5A	Total peak output power: 500.5W for the duration of 5 seconds max. and duty ratio shall be 10% max. when repeatedly operated (refer to the drawing below).
		Peak output power	200W max.		360W max.	6W	12.5W	
			482W max.					

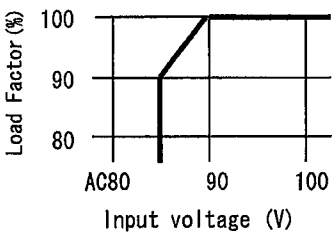
Output Derating against ambient temperature

When ambient temp. near air intake area exceeds 45℃ follow the drawing below to derate rated current/power, continuous max. current/power and peak max. current/power.



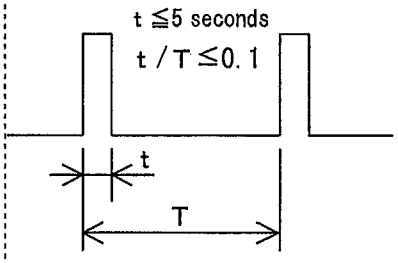
Output derating against Input voltage

When Input voltage is AC 90V or less, follow the drawing below to derate rated current/power, continuous max. current/power, and peak max. current/power.



Duty ratio at Peak max. current/power

Duration for continuous max. current/power shall be 5 seconds max., and duty cycle shall be 10% max. when repeatedly operated.



Note:

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Items			CH1	CH2	CH3	CH4	CH5	Measurement conditions, etc.
Output characteristics	Total voltage accuracy (%)		±4 max.	±4 max.	±5 max.	±5 max.	±5 max.	Total fluctuation due to change of Temp., Input voltage and Load.
	Max. Ripple voltage (mV_{p-p})		50 max.	50 max.	120 max.	120 max.	50 max.	Connect lead wires to output connector, and then connect a 10uF capacitor and a 0.1uF ceramic capacitor to the other ends to measure.
	Max. Spike voltage (mV_{p-p})		100 max.	100 max.	170 max.	170 max.	100 max.	
	Rising time		0.1ms min. to 70ms max.					Time for output voltage rises from 10% to 95% of rated voltage
Protection Circuit	Over Current protection	OCP point (A)	31 min.	34 min.	31 min.	105% min. of Peak max. current		Other outputs are to be rated load with rated input voltage.
		Method	All outputs shutdown except CH5			Foldback	Same as CH1, CH2 and CH3	
		Recovery	Reclosing of AC input, or make PS_ON# signal "H", then "L"			Automatic recovery		
	Over voltage protection	OVP point (V)	3.76 to 4.3	5.74 to 7.0	13.4 to 15.6	—	—	
		Method	All outputs shutdown except CH5			—	—	
		Recovery	Reclosing of AC input, or make PS_ON# signal "H", then "L"			—	—	

Note:

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Drawn by	Checked by	Approved by	Model	Drawing No.
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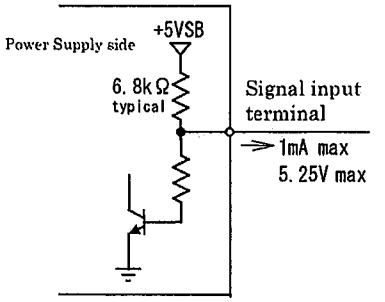
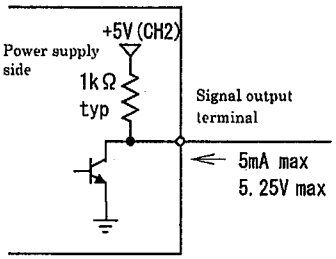
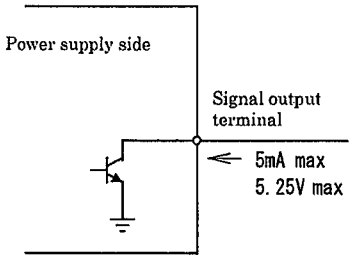
Signal Input/Output Specification

	Items	Specification	Circuit diagram
Input Signal	Output ON/OFF control signal (PS_ON#)	When 'H' or 'OPEN' signal is received, CH1 to CH4 come to shutdown.	 ('L'≦0.8V,2.0V≦'H')
	+3.3V SENSE	Signal terminal for CH1(+3.3V) output voltage detection Connecting to the load end compensates the line drop of the positive side of output wires.	
Output Signal	Normal Output signal (PWR_OK)	'H' signal is delivered when output is normal. (Detection delay time: 100 to 500ms)	 ('L'<0.4V)
	Fan Monitoring signal (FAN M)	Two-cycle pulse waveform per one rotation of fan motor is delivered.	 ('L'<0.4V)

Note:

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Drawn by	Checked by	Approved by	Model	Drawing No.
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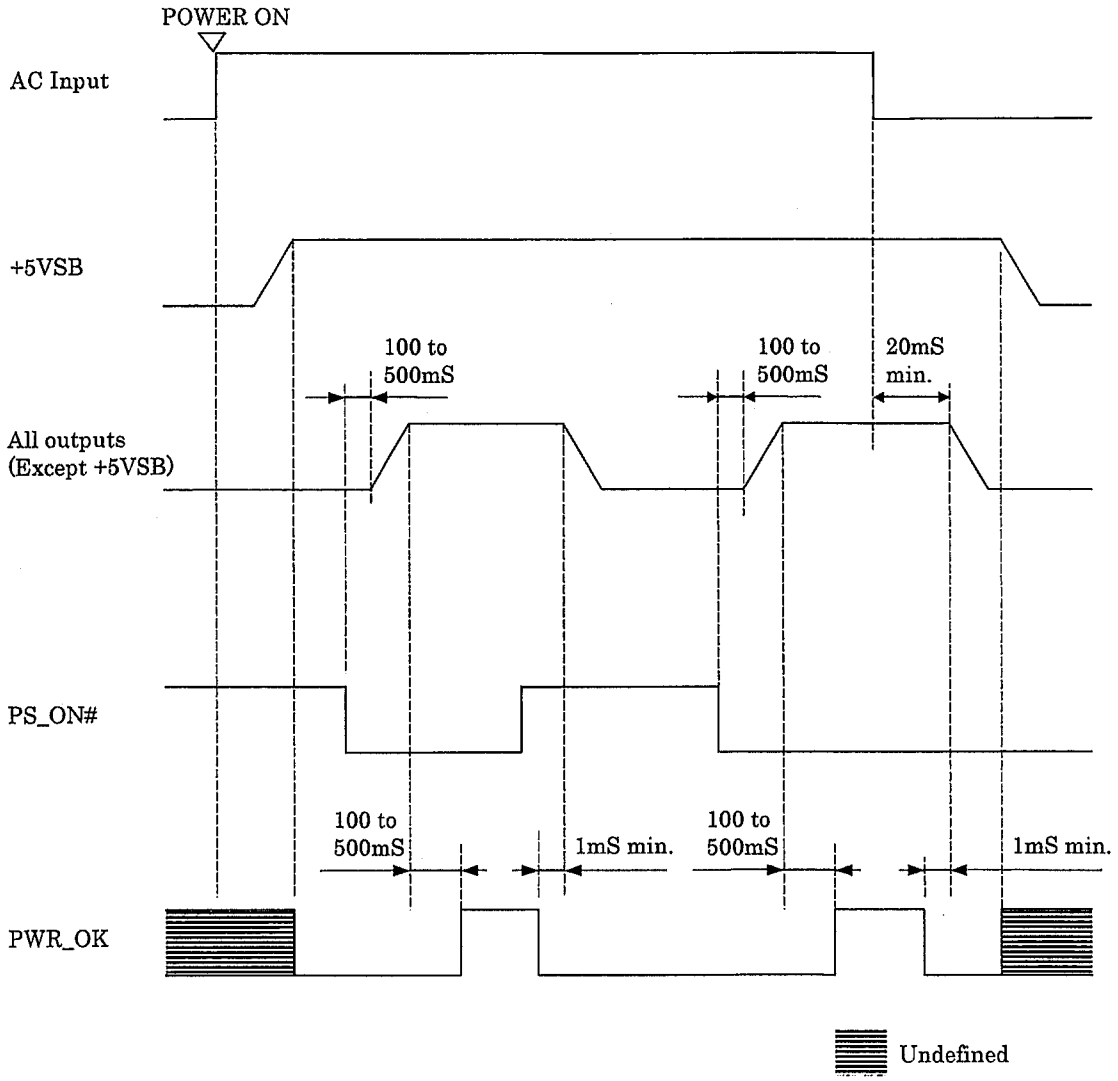
Signal Input/Output Specification



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Drawn by	Checked by	Approved by	Model	Drawing No.
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Current ratings of output connector pins

The maximum allowable continuous current for each of output connector pins is shown in the following table. The sum of the shared currents for the same output must be less than the maximum current specified for eacth output.

Connector	Pin	Output	Max. current
MAIN	1	+3.3V SENSE	10mA
	2	+3.3V	6.0A
	3	GND	6.0A
	4	+5V	6.0A
	5	GND	6.0A
	6	+5V	6.0A
	7	GND	6.0A
	8	PWR_OK	5mA
	9	+5VSB	2.5A
	10	+12V	6.0A
	11	+12V	6.0A
	12	+3.3V	6.0A
	13	+3.3V	6.0A
	14	-12V	0.5A
	15	GND	6.0A
	16	PS_ON#	1mA
	17	GND	6.0A
	18	GND	6.0A
	19	GND	6.0A
	20	NC	—
	21	+5V	6.0A
	22	+5V	6.0A
	23	+5V	6.0A
	24	GND	6.0A

Connector	Pin	Output	Max. Current
12V	1	GND	7.0A
	2	GND	7.0A
	3	GND	7.0A
	4	GND	7.0A
	5	+12V	7.0A
	6	+12V	7.0A
	7	+12V	7.0A
	8	+12V	7.0A
HD	1	+3.3V	7.0A
	2	+5V	7.0A
	3	GND	7.0A
	4	GND	7.0A
	5	+12V	7.0A
	6	+3.3V	7.0A
	7	+5V	7.0A
	8	GND	7.0A
	9	GND	7.0A
	10	+12V	7.0A
SIG	1	NC	—
	2	NC	—
	3	NC	—
	4	NC	—
	5	FAN M	5mA
	6	PS_ON#	1mA
	7	GND	2.0A
	8	+3.3V SENSE	10mA
	9	NC	—
	10	+5VSB	2.0A

Note: +3.3 V SENSE input signal at pin 8 of SIG connector is detected prior to the same signal at pin 1 of Main connector when both inputs are used. When the pin 8 of SIG connector is not used, the signal status at pin 1 of MAIN connector is detected.

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Warnings and Cautions on operation

1. WARNING: Grounding
   This power supply is designed safety class I apparatus. For operator safety, be sure to ground the power supply by connecting the Earth terminal to earth ground.
2. WARNING: Electrical shock hazards
   This power supply is designed as embedded products for system. High potentials exist inside the power supply. When integrating the power supply into an instrument or system, use appropriate safe procedure to avoid electrical shock hazards.
3. CAUTION: Do not short the DC outputs of the power supply. Shorting the outputs makes internal Capacitors quickly discharge and cause dangerous spark and heat generation that may result in Serious accident such as fire. Furthermore, it will shorten the operating life of power supply.

4. CAUTION: Power on procedure to prevent harmful inrush current.
   To restrict the surge current into smoothing capacitor, a power thermistor is used inside the Unit. If AC input is re-entered soon without allowing the power thermistor to cool down after The AC input was disconnected before, and excessive surge current may flow into the power supply. Be sure to allow at least 60 seconds before the re-entry of AC input.

5. Note: Audible power-on noise
   There is possibility that, when the power supply starts up by remote ON/OFF signal, it generates Audible noise for a moment. This noise is caused by a low frequency transient vibration of choking inductor (used for harmonic current suppression) or of another component. The noise does not affect the operating characteristics and operating life of the power supply.

6. Note: Hold the main unit for carrying the power supply.
   Do not grasp the output cables to hand the unit when carrying the power supply. Doing so will Damage the output cables and connectors. Hold the main unit when carrying the power supply.

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Yodo	Yamada	Yamamoto	ePCSA-500P-X2S	2797-01-4-520 8/8