Scope

This specification applies to embedded DC stabilized power supply, model mPCSA-500P-X2S.
All items in the specification shall be provided at normal temperature and humidity unless otherwise specified.

General Specification

	Items	Specification	Measurement conditions, etc.
AC input	Nominal voltage	AC100 to 240V	Worldwide range Load factor shall be 90 to 100% at AC85 to 90V. (Refer to output specification.)
	Voltage range	AC85 to 264V	
	Momentary Line drop immunity	Output voltage shall not be affected when input voltage momentarily falls to AC 70V within 500ms.	at rated load (301W)
		Output voltage shall not be affected when input voltage momentarily falls to AC 40V within 100ms.	at 70% load (210W)
	Nominal frequency	50/60 Hz	Range: 47 to 63Hz
	Inrush current	31A peak max. at AC 100V/75A peak max. at AC 240V	at Cold start (25℃) with rated output
	Input VA	436VA max. at AC 100V/435VA max. at AC 240V	at nominal input and continuous max. output power
		754VA max. at AC 100V/714VA max. at AC 240V	at nominal input and peak output power
	Efficiency	73% typical at AC 100V/77% typical at AC 240V	at rated output power
	Power factor	99% typical at AC 100V/94% typical at AC 240V	
Environment	Operating temperature	0 to 60℃	Temperature gradient: 15℃/H The load factor shall be 100 to 70% at 45 to 60℃ (Refer to output specification.)
	Storage temperature	-25 to 70℃	Temperature gradient: 15℃/H
	Relative humidity	10 to 90% at operation/10 to 95% at no operation	No condensation
	Vibration	To endure displacement amplitude of 0.075mm with vibration frequency of 10 to 55Hz for 10 sweep cycles in the X-, Y- and Z-directions for 45 minutes	To follow JIS-C-60068-2-6 at no operation
	Surface drop	Lift one edge with opposite edge placed on the table 50mm high and let it fall. Repeat three times for four edges. There shall be no malfunction observed.	To follow JIS-C-60068-2-31 at no operation

Note:

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Drawn by	Ishibashi	Checked by	Yamada	Approved by	Yamamoto	Model: mPCSA-500P-X2S	Drawing No. 3003-01-4-520

Items		Specification	Measurement conditions, etc.
Insulation	Dielectric strength	AC 1.5kV for one min. between AC input and FG/DC output (Note 1)	
	Insulation resistance	50MΩ min. between AC input and FG/DC output	at DC 500V
	Leakage current	0.12mA max. at AC 100V/0.3mA max. at AC 264V	YEW. TYPE3226 (1kΩ) or equivalent
Others	Electrostatic discharge	Contact discharge: ±6kV, 10 times	No malfunction or defect shall be observed. IEC61004-4-2 (test level 3) compliant
	Line noise immunity	±2000V (Pulse width of 100/1000nS, repetitive cycle of 30 to 100Hz, Normal/Common mode for 10 minutes respectively)	To be measured with INS-410 There shall be no DC-component fluctuation in output and malfunction.
	Surge immunity	Common mode: ±2kV, Normal mode: ±1kV, Pulse width: 1.2×50μS, 5 times respectively	No malfunction or defect shall be observed. IEC-61000-4-5 (Installation environment class 3) compliant
	Conducted emission	VCCI Class B, FCC Class B, and EN55022 Class B compliant	Measured with the unit embedded to PC chassis, under 70% of load condition.
	Harmonic current	IEC61000-3-2 (Ed. 2.1) Class D, EN61000-3-2 (A14) Class D compliant	at nominal input and rated load
	Safety standard	UL60950-1, CSA C22.2 NO.60950-1	
		UL60601-1, CSA C22.2 NO.601.1 ANSI/AAMI ES60601-1 ⚠A	
		CE marking (IEC62368-1) ⚠B	
	Cooling system	Forced air cooling by internal fan To control fan speed by detecting internal temp. of power supply	Fan speed changes according to operating temp. and load condition. (Note 2)
		Fan speed selection switch equipped on top of power supply between low and high speed mode	Low speed mode is set at factory. Speed is fixed in high-speed mode.
	Reliability grade	FA	To follow our standard
	Weight	1.8kg typical	
	Warranty	Three years after delivery: If defects belong to us, the defective unit shall be repaired or replaced at our cost.	Except the operation out of the specification. Also, the unit shall be operated at normal temp. and humidity.

Note:

Note 1: Actual dielectric strength is 4 kV between AC input and DC output/DC input of final unit. However, 1.5 kV shall be applied to prevent excess voltage to basic insulation system.

Note 2: The fan speeds low only when the internal temperature of the power supply goes high while the power supply stops operation due to PS_#ON signal.

B 版⚠B× 1:2020.06.15 Nakagawa I-320510
A 版⚠A× 1:2012.04.06 Yodo I-240345

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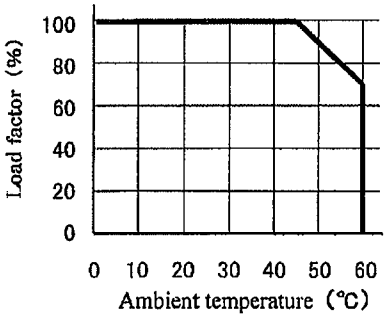
Output specification

Items			CH1	CH2	CH3	CH4	CH5 (5VSB)	Measurement conditions, etc.
Output rating	Rated voltage		3.3V	5V	12V	-12V	5V	
	Min. current		0A	0A	0A	0A	0A	Min. load current to secure voltage regulation
	Rating	Rated current	10A	12A	16A	0.5A	2A	Total rated power: 301W
		Rated power	33W	60W	192W	6W	10W	
	Continuous max	Max. current	20A	22A	22A	0.5A	2A	Total continuous max. power: 301W
		Continuous max. power	160W max.		264W max.	6W	10W	
			285W max.					
	Peak rating	Max. current	30A	33A	30A	0.5A	2.5A	Total peak power: 500.5W Peak period shall be 5 sec. max. and its duty ratio shall be 10 % max. (Refer to the figure below.)
		Peak power	200W max.		360W max.	6W	12.5W	
			482W max.					

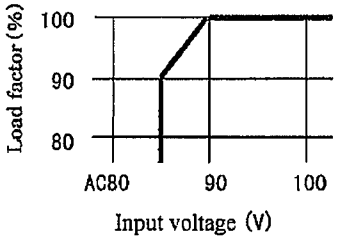
Output derating vs Ambient temperature

When ambient temp. near air intake opening exceeds 45℃, follow the derating curve below to reduce rated current/power, continuous max current/power, and peak current/power.



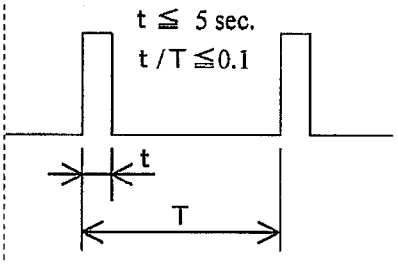
Output derating vs Input voltage

When input voltage is AC 90V or less, follow the derating curve below to reduce rated current/power, continuous max current/power, and peak current/power.



Duty ratio of Peak current/Power

Peak current/Power shall be 5 seconds max. and its duty ratio shall be 10% max.



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項 目			CH1	CH2	CH3	CH4	CH5	Measurement conditions, etc.
Output characteristics	Total voltage regulation (%)		±4 max.	±4 max.	±5 max.	±5 max.	±5 max.	Total regulation of temp., Input, and load current
	Max. ripple voltage (mVp-P)		50 max.	50 max.	120 max.	120 max.	50 max.	Connect two wires to output connector with a 10μF electrolytic capacitor and a 0.1μF ceramic capacitor connected to the other ends to measure.
	Max. spike voltage (mVp-p)		100 max.	100 max.	170 max.	170 max.	100 max.	
	Rise time		0.1ms min. 70ms max.					The time for output voltage to rise from 10% to 95%
Protection	OCP	OCP point (A)	31 min.	34 min.	31 min.	105% min. of peak current		Rated load for all other outputs at nominal input
		Method	All outputs except CH5 shut down.			Hold-down current limiting	Same as CH1 to 3	
		Recovery	Reclosing of AC input or, PS_ON# signal "H" to "L"			Automatic recovery		
	OVP	OVP point (V)	3.76 to 4.3	5.74 to 7.0	13.4 to 15.6	—	—	
		Method	All outputs except CH5 shut down			—	—	
		Recovery	Reclosing of AC input or, PS_ON# signal "H" to "L"			—	—	

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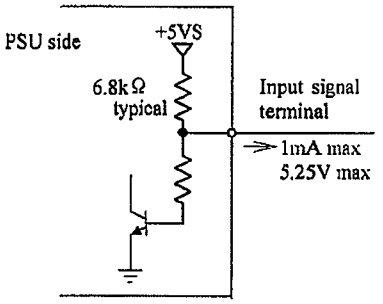
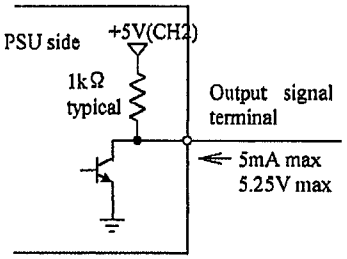
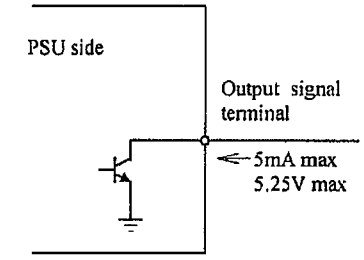
Input/Output signal specification

	Items	Specification	Circuit
Input signal	Output ON/OFF control signal (PS_ON#)	CH1 to CH4 shut down at 'H' or 'OPEN' input (Battery connection shuts off when 'H' or 'OPEN' is received at backup operation.)	 ('L'≦0.8V,2.0V≦'H')
	+3.3V SENSE	Input terminal for voltage detection of CH1 (+3.3V); voltage drop of +side output cable is compensated when connected to load end.	
Output signal	Normal output signal (PWR_OK)	'H' is delivered at normal output. (Detection delay time: 100 to 500ms)	 ('L'<0.4V)
	Fan monitoring signal (FAN M)	Two pulses per rotation of individual motors are delivered.	 ('L'<0.4V)

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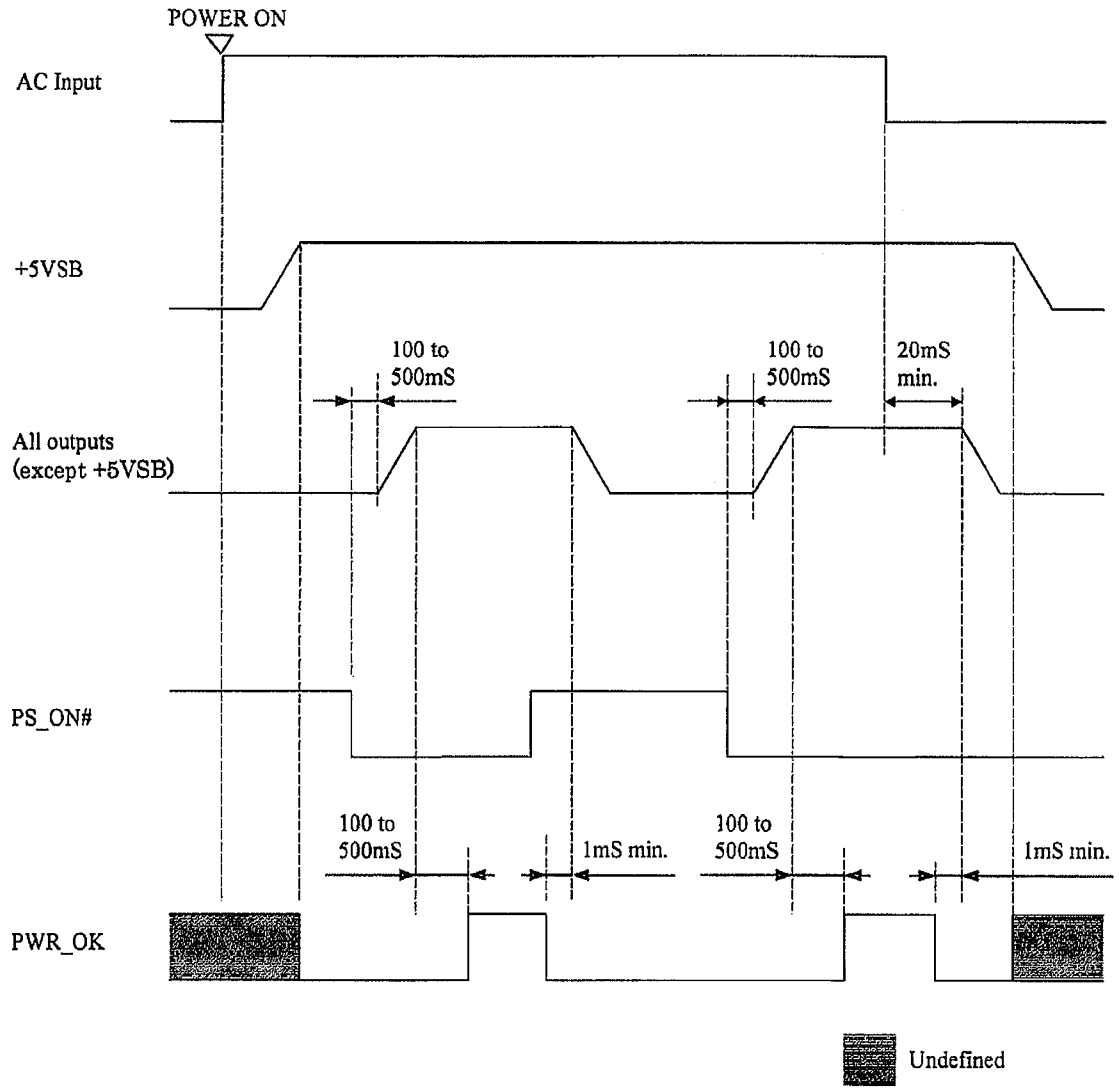
Input/Output signal specification



Drawn by	Ishibashi	Checked by	Yamada	Approved by	Yamamoto	Model: mPCSA-500P-X2S	Drawing No. 3003-01-4-520

Output connector acceptable current

Acceptable current for each pin of output connectors shall follow the table below. However, total current per each output shall not exceed the max. current specified in the output specification.

Connector	Pin No.	Output (signal)	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 No.	Output (signal)	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) +3.3V SENSE is provided on 1 pin of MAIN connector and 8 pin of SIG connector. When both pins are used, 8 pin of SIG connector has the priority to detect. When 8 pin of SIG connector is not connected, 1 pin of MAIN connector works for detection.

Precaution before use

1. Grounding ⚠ Warning
   This unit is designed and manufactured as Class I equipment. For safety, make sure to connect the earthing terminal to the ground before use.
2. Application ⚠ Warning
   Do not install this unit to equipments such as dialyzer, mechanical ventilation, pace maker, that bring high risk to human body, or may lead to direct threat to life when troubled.
3. Electric shock ⚠ Warning
   This unit is designed and manufactured as embedded type equipment. As high-voltage part exists inside, make sure to mount the unit properly onto the system to avoid electric shock.
4. Output shortage ⚠ Caution
   Do not get output terminals shorted. When shorted, internal capacitors discharge at once to cause serious accident due to spark, etc. resulting in shortening lifetime of this unit.
5. Inrush current limiting circuit ⚠ Caution
   Power thermistor is used to limit surge current to smoothing capacitors when AC input is turned on. When AC input is turned on shortly after AC input is turned off, excess surge current may flow as the power thermistor is still hot Make sure to turn on AC input 60 seconds or longer after AC input is turned off.
6. Acoustic noise at power-on
   Low frequency acoustic noise may be heard at turn-on of input or power-on by REMOTE ON/OFF signal. This noise is caused by low frequency transient vibration of choke coils for harmonic measures. This will not affect performance or lifetime at all.
7. Output cable handling
   Do not grab only output cables to move or carry this unit. Make sure to hold the main body while moving or carrying.

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