Product Specification

Created: February 4, 2015

This specification applies to built-in DC stabilized power supplies with a backup function, eNSP4-500P-SA0-H0V, eNSP4-500P-SA0-H1V, which is combined with a special RS232C signal unit, SU-RS, and eNSP4-500P-SA0-H6V, which is combined with a special USB signal, SU-US2. These power supplies provide DC output, with a special capacitor package (DC380V) connected, when AC input fails.
*1 item in this specification applies to eNSP4-500P-SA0-H1V and *3 item to eNSP4-500P-SA0-H6V.

General Specification

(Provided at normal temperature and humidity unless otherwise specified)

	Items	Specification	Measurement conditions
AC Input	Rated voltage	AC100 to 240V	Worldwide range. The load factor shall be 90 to 100% at AC85 to 90V (refer to Output Specification). The startup voltage shall be AC80±10V.
	Voltage range	AC85 to 264V	
	Rated frequency	50 / 60 Hz	Frequency range: 47 to 63Hz
	Inrush current	31Apeak or less (AC100V), 75Apeak or less (AC240V)	At rated output and cold start (25℃).
	Input VA	513VA or less (AC100V), 487VA or less (AC240V)	At rated input with continuous max. output power.
		679VA or less (AC100V), 643VA or less (AC240V)	At rated input with instantaneous peak output power
	Efficiency	73% typical (AC100V), 77% typical (AC240V)	At rated output.
	Power factor	99% typical (AC100V), 97% typical (AC240V)	
DC Input	Rated voltage	DC380V (To comply with special capacitor package.)	Measured at primary circuit (same as the AC input circuit).
	Efficiency	80% typical	At rated input and rated output.
Insulation	Operating temperature	0 to 60℃	Thermal gradient is 15℃/H. The load factor shall be 100 to 70% between 45 to 60℃ (refer to Output Specification).
	Storage temperature	-25 to 70℃	Thermal gradient is 15℃/H.
	Relative humidity	10 to 90% at operation, 10 to 95% at no operation	There shall be no condensation.
	Vibration	It is to endure a displacement amplitude of 0.075mm with a 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 dropping	Lift 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	川政	杉原	eNSP4-500P-SA0-H*V (*:0,1,6,)	2825－01－4－520

	Items	Specification	Measurement conditions
Insulation	Dielectric withstand	AC1500V for 1 minute between AC input/DC input and FG/DC output.	
	Insulation resistance	50MΩ or more between AC input/DC input and FG/DC output.	Measured at DC500V
	Leakage current	0.5mA or less (AC100V)/1mA or less (AC200V)	YEW. TYPE3226 or equivalent (1kΩ) at operation.
Others	Electrostatic discharge	Contact discharge : ±6kV for 10 times	There shall be no malfunction. IEC61004-4-2 (test level 3) compliant.
	Line noise immunity	±2000V. Pulse width of 100nS and 1000nS, cycle period of 30 to 100Hz, normal/common mode with positive/negative polarity for 10 minutes.	To be measured with INS-410. There shall be no fluctuation of DC output or malfunction.
	Impulse voltage immunity	To apply five times each of common mode±2kV, normal mode±1kV, and the pulse width of 1.2×50 μS.	There shall be no malfunction. IEC-61000-4-5 (Installation Environment Class3 compliant).
	Disturbance voltage	It is to comply with VCCI Class B, FCC Rules Class B, and EN55022 Class B	The capacitor package and the power supply shall be connected to the same chassis.
	Harmonic current regulation	It is to comply with IEC61000-3-2 (Ver. 2.1) Class D and EN61000-3-2 (A14) Class D.	At rated input and rated output.
	Safety Standard	UL60950, CSA C22.2 No.60950 and EN62368, CE marking(IEC62368-1) △A'	Acquired
	Cooling method	Forced air cooling by an embedded fan motor. The temperature inside the power supply is detected and the fan speed is controlled accordingly.	The fan speed will be adjusted based on the operating temperature and load condition (see Note 1) .
		Fan speed can be switched between low-speed and high-speed (there is a switch on the top side of the power supply) .	The fan speed is set at low-speed mode at shipment. Fan speed at high-speed mode is fixed
	Reliability Grade	FA	To follow our standard.
	Weight	1.8kg typical	
	Warranty	Three years after delivery. However, if any faults belong to us, the defective unit shall be repaired or replaced at our cost.	The unit shall be operated under normal temperature and humidity.
	Conforming to Environmental	RoHS Compliance complied.	

Note

Note 1: In cases where the power supply is shut down by PS_ON# signal, the fan rotates at low speed only when the temperature inside the power supply gets high.

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

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Drawn by	Yodo	Checked by	Kawamasa	Approved by	Matsubara	Model	Drawing No.
						eNSP4-500P-SA0-H*V (*:0,1,6,)	2825−01−4−520A 2/8

Output Specification (Provided at normal temperature and humidity unless otherwise specified)

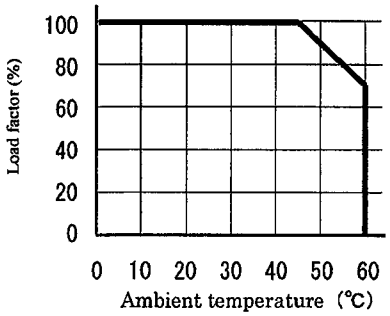
	Items	CH1	CH2	CH3	CH4	CH5 (5VSB)	Measurement conditions
Rated Output	Rated voltage	3.3V	5V	12V	-12V	5V	
	Minimum current	0A	0A	0A	0A	0A	Minimum load current to meet the rated voltage accuracy.
	Rating: Rated current	11.5A	16A	18A	0.5A	2A	Total rated output power is 350W.
	Rating: Rated Output power	38W	80W	216W	6W	10W	
	Rated max continuous: Max. Current	20A	22A	22A	0.5A	2A	Total continuous max. output power is 350W.
	Rated max continuous: Continuous max. output power	160W or less		264W or less	6W	10W	
		334W or less					
	Rated max. instantaneous: Maximum current	30A	33A	30A	0.5A	2.5A	Total instantaneous max. output power shall be 500.5W; however, the time shall be 5 seconds or less. For repetitive peak loads, the duty ratio shall be 10% or less (see the graph below) .
	Rated max. instantaneous: Instantaneous maximum output power	200W or less		360W or less	6W	12.5W	
		482W or less					

Output power and the backup time.
(Note) The backup time shown on the right is a guideline at initial use, not guaranteed.

Model of capacitor package (optional)	Output power at backup operation (at normal temperature)					
	100W	150W	200W	250W	300W	350W
BS13A-EC400/422F (5 inch bay)	1.6 sec.	1.2 sec.	0.9 sec.	0.7 sec.	0.6 sec.	0.5 sec.

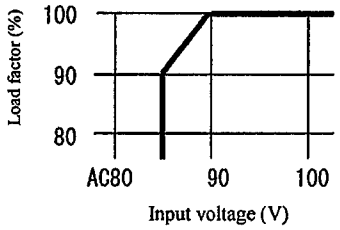
Output derating with respect to ambient temperature

When the ambient temperature around the air intake opening exceeds 45°C, follow the derating graph below to derate the rated current/power, continuous max. current/power, and instantaneous max. current/power.



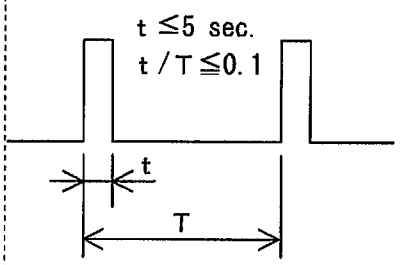
Output derating with respect to input voltage

When the input voltage is AC90V, follow the derating graph below to derate rated the current/power, continuous max. current/power, and instantaneous max. current/power.



Duty ratio of instantaneous max. current/power

The instantaneous max. current and power shall be 5 seconds or less. For repetitive peak loads, the duty ratio shall be 10%.



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Drawn by	Checked by	Approved by	Model	Drawing No.
Yodo	川政	松原	eNSP4-500P-SA0-H*V (*:0,1,6,)	2825－01－4－520

Nipron Co., Ltd.

Items			CH1	CH2	CH3	CH4	CH5	Measurement conditions
Output characteristics	Total voltage accuracy (%)		±4	±4	±5	±5	±5	Sum of temperature, input, and load regulations.
	Max. ripple voltage (mV_{p-p})		50	50	120	120	50	Connect two wires to the output connector. Put a 10uF electrolytic capacitor and a 0.1uF ceramic capacitor to the wires to measure.
	Max. spike voltage (mV_{p-p})		100	100	170	170	100	
	Rise time		0.1ms to 70ms					Time for the output voltage to rise from 10 to 95%.
Protection circuit	Over Current Protection	OCP Point (A)	31 or more	34 or more	28 or more *31 or more	105% min. of instantaneous max. current		Other output powers are rated loads. At rated input. *In cases where the total power of CH1 to CH3 is the instantaneous max. output power.
		System	All the output power except for CH5 will be shut down. At backup operation, all the output will be shut down.			Foldback current limiting	Same as CH1 to 3	
		Recovery Method: At AC operation	Reclose the input voltage, or switch the PS_ON# signal from 'H' to'L'			Automatic recovery		
		Recovery Method: At capacitor operation	Reclosing of input voltage			Automatic Recovery	Reclosing of input voltage	
	Over Voltage Protection	OVP Point (V)	3.76 to 4.3	5.74 to 7.0	13.4 to 15.6	—	—	
		System	All the output power except for CH5 will be shut down. At backup operation, all the power will be shut down			—	—	
		Recovery method	Reclosing of input voltage or switching the PS_ON# signal from 'H' to 'L.'			—	—	
Charging output	Charging voltage		380V typical					Primary circuit (same as the AC input circuit).
	Charging current		Current control circuit is installed on the capacitor package's side.					

Note

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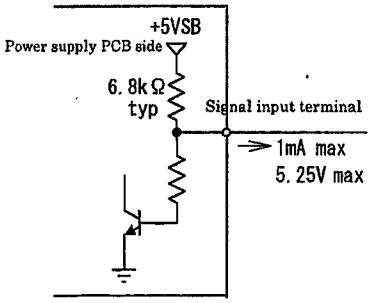
Drawn by	Yodo	Checked by	川政	Approved by	松原	Model	Drawing No.
						eNSP4-500P-SA0-H*V (*:0,1,6,)	2825－01－4－520

Signal Input/Output Specification (Provided at normal temperature and humidity unless otherwise specified.)

	Items	Specification
Input signal	Output ON/OFF control signal (PS_ON#)	With 'H' or 'OPEN' signal input, the output of CH1 to 4 will be shut down. At backup operation by the capacitor package, connection with the capacitor will be shut down with 'H' or 'OPEN' signals input.
	+3.3V SENSE	An input terminal to detect CH1 (+3.3V) output. By connecting to the load side, the +side's line drop such as the output cable is compensated.
Output signal	Normal output signal (PWR_OK)	'H' signal is delivered when the output is normal. Detection delay time is 100 to 500ms.
	Blackout detection signal for TTL (AC FAIL_T)	'H' signal is delivered at low input voltage or blackout detection. Detection voltage is AC75V typical and the detection delay time is 20 to 40ms after the AC input is shut down.
	(*1) Blackout detection signal for RS232C (AC FAIL_R)	If low AC input voltage or blackout is detected, a 'negative (-9Vtypical)' signal is delivered. Detected voltage is AC75Vtypical; detection delay time is 20to 40ms after the AC input is shut down.
	(*3) Blackout detection signal for USB (AC FAIL_U)	If low AC input voltage or blackout is detected, AC FAIL_R 'negative' signal or equivalent is delivered. Detected voltage is AC75Vtypical; detection delay time is 20 to 40ms after the AC input is shut down.)
	Fan monitor signal (FAN M)	Two cycles of square wave signals are delivered for one rotation of a fan motor.

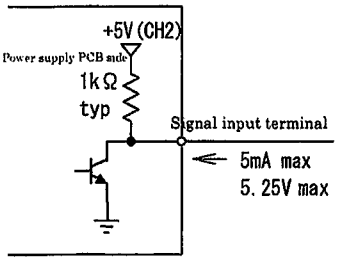
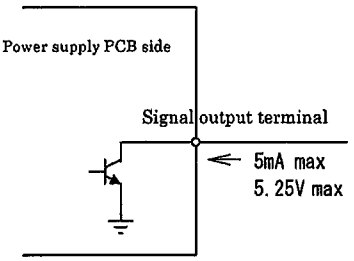
Input signal circuit

(PS_ON#)



('L'≦0.8V,2.0V≦'H')

Output signal circuit

(PWR_OK)	(AC FAIL_T) , (FAN M)	*1 (AC FAIL_R)	*3 (AC FAIL_U)
 ('L'<0.4V)	 ('L'<0.4V)	Using ADM232AARN (Analogue devices) or equivalent	USB1.1 Standard compliant (B Type connector) *A special software driver needs to be installed. (Software, such as UPS service, that normally uses RS232C signal is available with USB signal)

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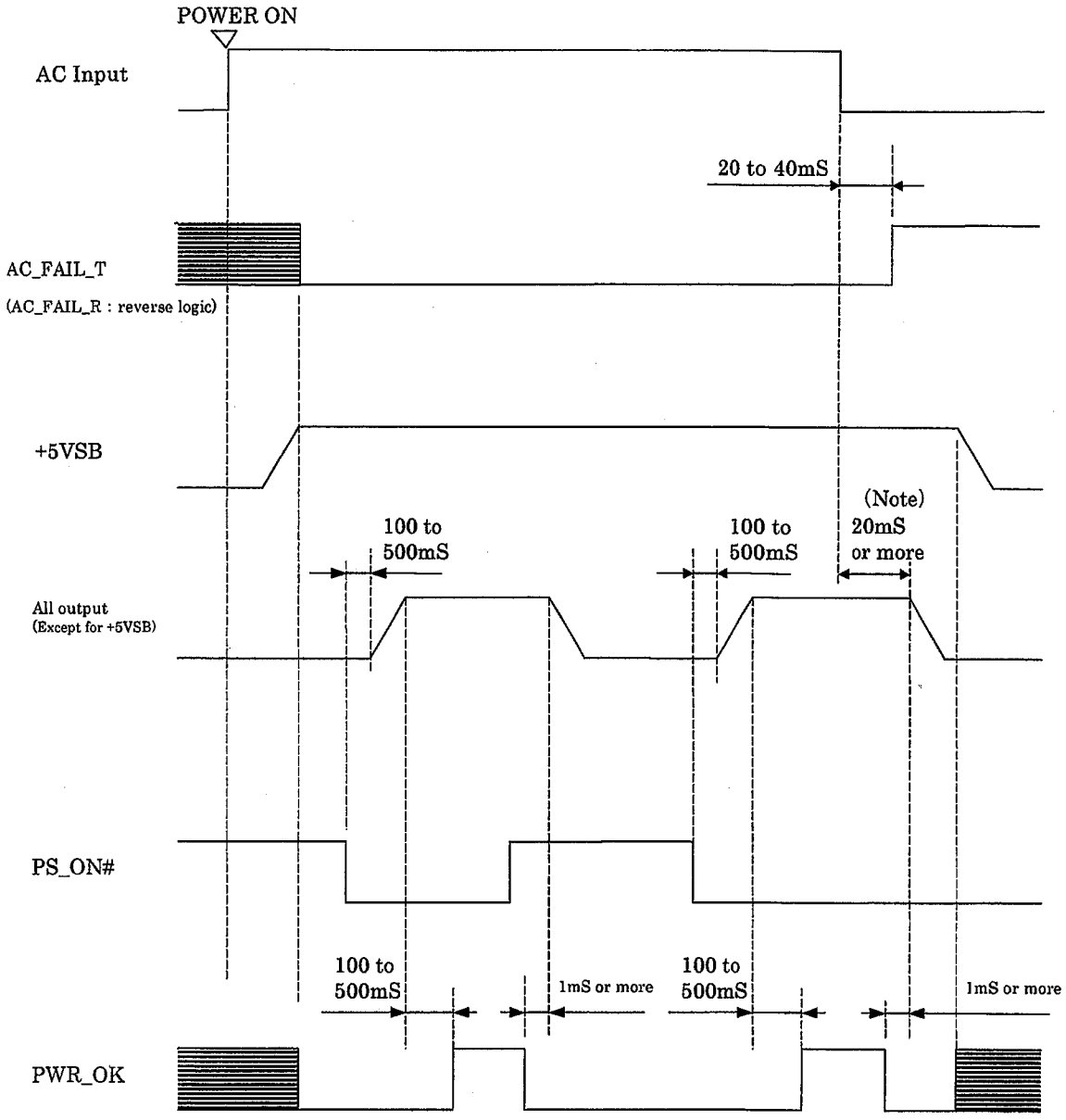
Yodo	川政	松原	eNSP4-500P-SA0-H*V (*:0,1,6,)	2825－01－4－520

Signal Input/Output Specification (Provided at normal temperature and humidity unless otherwise specified.)

Signal Input/Output Specification (With a special RS232C signal unit, SU-RS and a special capacitor package connected.)



(Note) Refer to 'Output power and the backup time' when the capacitor package is connected.

Undefined

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Total maximum current for each connector

The continuous max. current drawn from the output connector shall follow the charts below. However, the total current for each output shall not exceed the maximum output current defined in the 'output specification' section.

Connector name	Pin No.	Output signal name	Max. current
CAP (DC input)	1	380V(Primary)	—
	2	N.C.	—
	3	0V(Primary)	—
MAIN (Output)	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	1.0A
	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 name	Pin No.	Output signal name	Max. current
12V (Output)	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 (Output)	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	AC FAIL_T	5mA
	2	NC	—
	3	COM	1A
	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' signal is provided at #1 terminal of the MAIN connector and #8 terminal of the SIG connector. If connected to both terminals, #8 terminal of the SIG connector will be of the primary detection for the '+3.3V SENSE' signal. If #8 terminal of the SIG connector is disconnected, it will be detected at #1 terminal of the MAIN connector.

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Precaution before use

1. Grounding ⚠ Warning
   This power supply is designed and produced as Class I equipment. Make sure to properly ground the grounding terminal for safe operation.

2. Electric shock ⚠ Warning
   This power supply is designed and produced as built-in equipment, and contains a high-voltage part. Make sure to securely install the supply into an equipment to prevent electric shock.

3. Output short circuit ⚠ Caution
   Prevent shorting output. When the output is shorted, capacitors inside the power supply rapidly discharge and lead to fire and/or sparks, resulting in a serious accident. It also shortens the lifetime of the power supply.

4. Inrush current control circuit ⚠ Caution
   A power thermistor is used to limit inrush current into the smoothing capacitors when AC input is turned on. If you re-close the input voltage before the temperature of power thermistor goes down, it can cause excessive surge current. Wait for at least 60 seconds before re-closing the input voltage

5. Noise at power-on and power-off
   A low frequency sound may be observed at AC input or power-on/off by REMOTE ON/OFF signal; this noise is caused by low frequency vibration of chokes that are designed for harmonic current regulation. The noise, however, does not cause any damage to the function and lifespan of the power supply.

6. Handling of the output cable
   Do not grab the output cable as you move or carry the power supply. Hold the body of the supply when you move or carry.

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