Product specification

Created: Dec. 1, 2009

This specification applies to embedded DC stabilized power supply, mNSP3-450P-S20-H0V, used for backup at power failure, mNSP3-450P-S20-H7V equipped with a special RS232C signal unit, SU-RS, mNSP3-450P-S20-H2V equipped with a special buzzer unit, SU-BU, and mNSP3-450P-S20-H6V equipped with a special USB signal unit, SU-US2.SB.
This unit provides DC output power with a special battery pack (DC 24V) connected even at AC power failure.
Items marked with "*1" in this specification apply to mNSP3-450P-S20-H7V.
Items marked with "*2" in this specification apply to mNSP3-450P-S20-H2V.
Items marked with "*3" in this specification apply to mNSP3-450P-S20-H6V.

General Specification

(Items shall be provided at normal temperature and humidity unless otherwise specified).

	Items	Specification	Measurement conditions, etc.
AC input	Nominal voltage	AC 100V to 240V	Worldwide range Load factor shall be 90 to 100% at AC85 to 90V. (Refer to output specification.)
	Voltage range	AC 85V to 264V	
	Nominal frequency	50 / 60 Hz	Range: 47 to 63Hz
	Inrush current	31A peak max. at AC 100V/75Apeak 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
		679VA max. at AC 100V/643VA 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	
DC input	Nominal voltage	DC 24V compatible with special battery pack	(Note 1)
	Battery discharge cut-off voltage	17V typical (battery circuit cut-off)	
	Efficiency	73% typical	at nominal input and rated output power
Environment	Operating temperature	0 to 60℃	Except batter pack 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:
Note 1: When the power switch of power supply is turned off at PS_ON# signal 'L' during AC operation, battery backup operation starts. To stop battery backup operation, conduct "battery cut-off signal (SHUT DOWN signal)" or "output ON/OFF control signal (PS_ON# signal)."
(※1)Battery backup operation can be stopped by hand to press the stop switch on the dedicated RS-232C signal unit SU-US3. (Refer to appearance drawing for the location of the stop switch.)

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Drawn by	Ishibashi	Checked by	Yamada	Approved by	Yamamoto	Model: mNSP3-450P-S20-H*V (*:0,2,6,7,)	Drawing No. 3002-01-4-520

Insulation	Dielectric strength	AC 1.5kV for one min. between AC input and FG/DC output/DC input (Note 2)	
	Insulation resistance	50MΩ min. between AC input and FG/DC output/DC input	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	
		CCC △B △C	
		CE marking (IEC62368-1) △C	
	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 3)
		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	1.8 Kg 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 2: 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 3: 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.

C: △C ×2:2020.06.15 Nakagawa I-320510
B: △B ×1:2015.11.19 Yodo I-230714
A: △A ×1:2012.04.06 Yodo I-240345

Drawn by	Ishibashi	Checked by	Yamada	Approved by	Yamamoto	Model: mNSP3-450P-S20-H*V (*:0,2,6,7,)	Drawing No. 3002-01-4-520 C

Output specification (All items shall be provided at normal temperature and humidity unless otherwise specified.)

	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: 450.5W 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	
			432W max.					

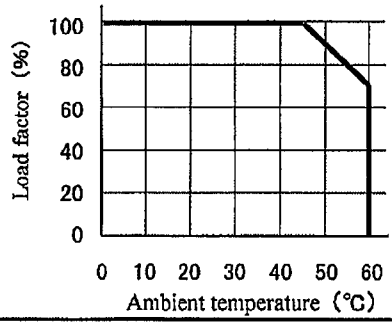
Applicable battery packs and its backup time (UOM: minute)

(Note) Backup time in the right table is just a reference, not guaranteed.

Battery type	Model	conversion cable	Output power at backup operation 150W max.	200W max.	250W max.	300W max.	350W max.	450W max.	Safety standard
Lead-acid	BS05A-P24/2.2L(K) (5 inch bay)	Required	5	3	2				
	RBS01A-P24/2.2L(K) (Removable)	Required	5	3	2				
	BS11A-P24/2.3L(K) (5 inch bay)	Not required	5	3	2	1	Peak available		Planned
	RBS02A-P24/2.3L(K) (Removable)	Not required	5	3	2	1	Peak available		Planned
	BS12A-P24/5.0L	Not required	20	13	9	6.5	Peak available	Peak available	Planned
Ni-MH	BS10A-H24/2.0L (5 inch bay)	Not required	9	6	4.5	3.5	Peak available		Planned
	BS22A-H24/2.0L (5 inch bay)	Not required	9	6	4.5	3.5	Peak available		Planned

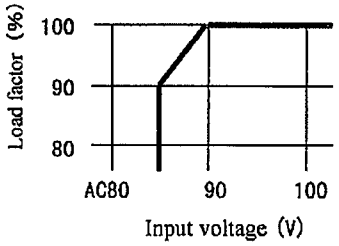
Output derating vs Ambient temperature

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.



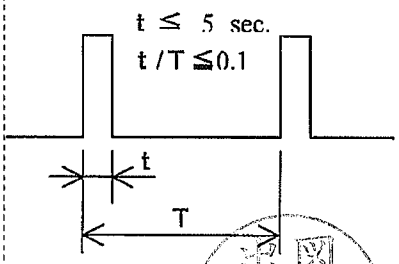
Output derating vs Input voltage

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.



Drawn by	Checked by	Approved by	Model	Drawing No.
Ishibashi	Yamada	Yamamoto	mNSP3-450P-S20-H*V (*:0,2,6,7,)	3002-01-4-520

Nipron Co., Ltd.

Product specification

Created: Dec. 1, 2009

Items				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 to 70ms max.					The time for output voltage to rise from 10% to 95%
Protection	OCP	OCP point (A)		31 min.	34 min.	28 min. ※31 min.	105% min. of peak current		Rated load for all other outputs at nominal input * the value when total power of CH1to CH3 is peak power or less
		Method		All outputs except CH5 shut down. All outputs shut down at backup operation.			Hold-down current limiting	Same as CH1 to 3	
		Recovery	at AC operation	Reclosing of AC input or, PS_ON# signal "H" to "L"			Automatic recovery		
			at battery operation	Reclosing of AC input			Automatic recovery	Reclosing of AC input	
	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. All outputs shut down at backup operation.			—	—	
		Recovery	at AC operation	Reclosing of AC input or, PS_ON# signal "H" to "L"			—	—	
			at battery operation	Reclosing of AC input			—	—	
Charging function	with a special Ni-MH battery pack connected			Charge voltage	35V max. (The voltage is automatically switched to correspond the special Ni-MH battery pack.				
				Charge current	0.7A max. (Micro computer is installed inside the special battery pack to control charge current.				
	with a special Lead-acid battery pack connected			Charge voltage	27.3V typical at full charge and 25℃, but to be compensated according to temperature				
				Charge current	0.5±0.2A (at 24V of battery voltage)				

Note:

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Input/Output signal specification (All items shall be provided at normal temperature and humidity unless otherwise specified.)

	Items	Specification
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.)
	+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.
	Battery shutdown signal for TTL (SHUT DOWN_T)	Battery connection shuts off at 'L' input with 60ms or longer. (valid only at battery backup operation)
	(*1) Battery shutdown signal for RS232C (SHUT DOWN_R)	Battery connection shuts off at 'positive 2.4V or higher input with 60ms or longer. (valid only at battery backup operation)
Output signal	Normal output signal (PWR_OK)	'H' is delivered at normal output. (Detection delay time: 100 to 500ms)
	AC failure detection signal for TTL (AC FAIL_T)	This signal goes to 'OPEN,' at low input voltage or power failure. (Detection voltage: AC 75V typical, Detection delay time: 20 to 40ms after power failure.)
	(*1) AC failure detection signal for RS232C (AC FAIL_R)	'Negative 9V typical' is delivered at low AC input or power failure detection. (Detection voltage: AC 75V typical, Detection delay time: 20 to 40ms after power failure)
	(*3) AC failure detection signal for USB (AC FAIL_U)	Data signal equivalent to 'Negative' of AC FAIL_R signal is delivered at low AC input or power failure detection. (Detection voltage: AC 75V typical, Detection delay time: 20 to 40ms after power failure)
	Low battery voltage signal for TTL (BATT LOW_T)	This signal goes to 'OPEN' when battery voltage falls down to 18V typical. ('L' is delivered when battery pack is not connected.)
	(*1) Low battery voltage signal for RS232C (BATT LOW_R)	'Negative 9V typical' is delivered when battery voltage falls down to 18V typical. ('Positive 9V typical' is delivered when battery pack is not connected.)
	(*3) Low battery voltage signal for USB (BATT LOW_U)	Data signal equivalent to 'Negative' of BATT LOW_R signal is delivered when battery voltage falls down to 18V typical. (Data signal equivalent to 'Positive' of BATT LOW_R signal is delivered when battery pack is not connected.)
	(*2) Buzzer sound	Buzzer goes off at power failure. (Sound level is adjustable by a variable resistor.) (Note) Buzzer may goes off for several seconds at AC power-on and AC power-off.
	Fan monitoring signal (FAN M)	Two pulses per rotation of individual motors are delivered.

Note:

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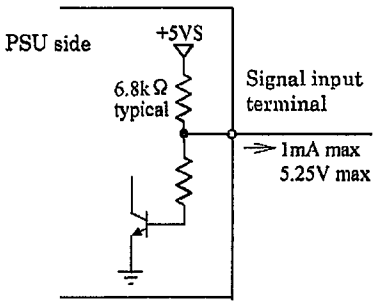
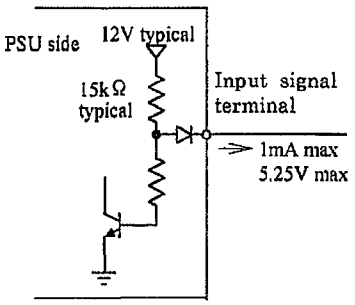
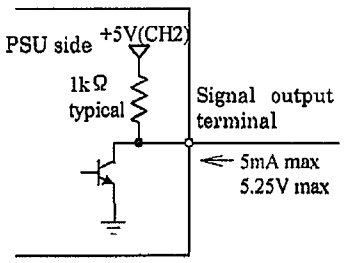
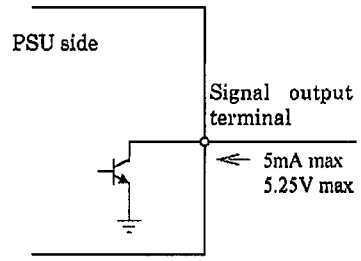
Input signal circuit	(PS_ON#)	(SHUT DOWN_T)	※1 (SHUT DOWN_R)	
	 ('L'≦0.8V,2.0V≦'H')	 ('L'≦0.4V,2.4V≦'H')	ADM232AARN (Analog devices) or equivalent	
Output signal circuit	(PWR_OK)	(AC FAIL_T), (FAN M) (BATT LOW_T)	※1 (AC FAIL_R) (BATT LOW_R)	※3 (AC FAIL_U) (BATT LOW_U)
	 ('L'<0.4V)	 ('L'<0.4V)	ADM232AARN (Analog devices) or equivalent	USB1.1 compliant (B type connector) * Special driver software is required. (Software such as UPS service that uses current RS232C signal can be run with USB signal.

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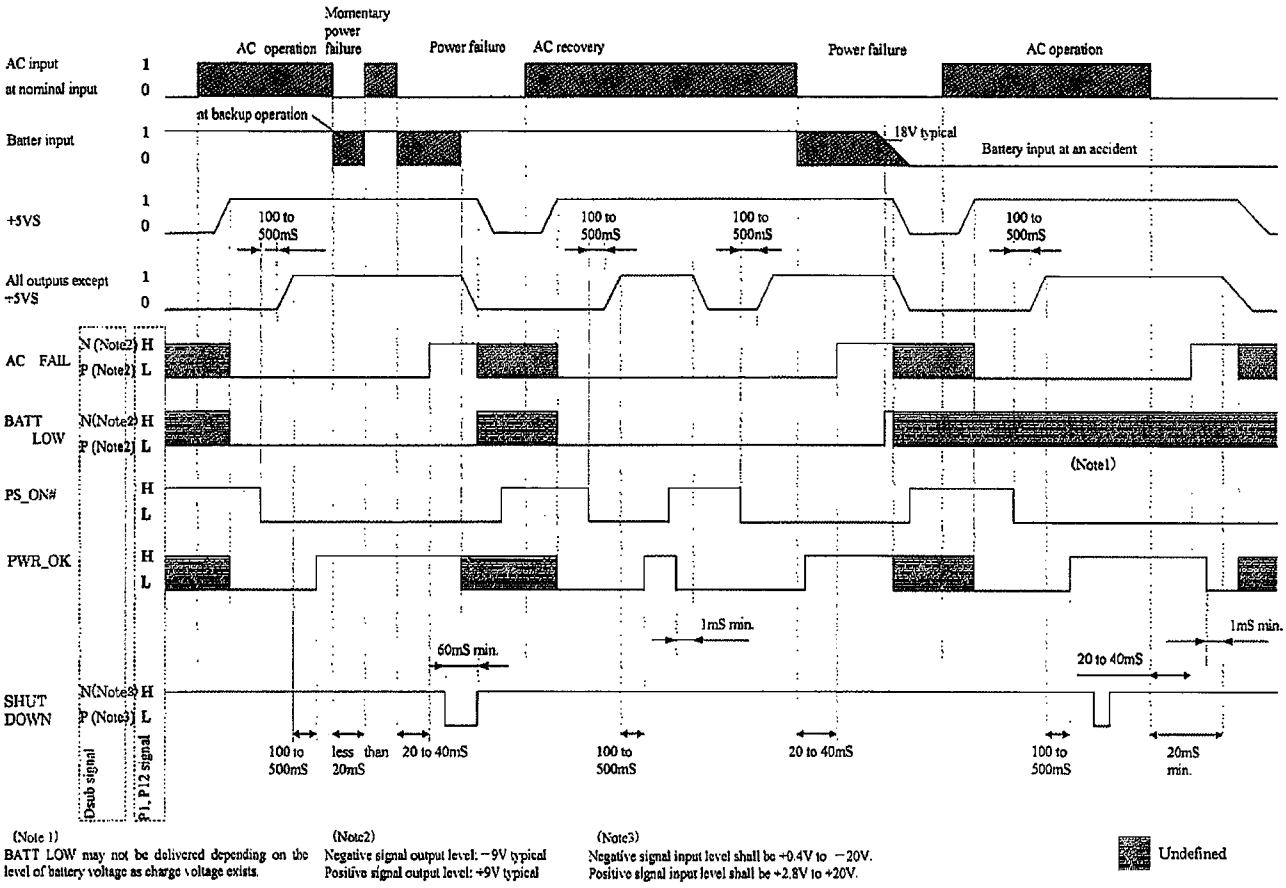
Input/Output signal specification (All items shall be provided at normal temperature and humidity unless otherwise specified.)

Signal Input/Output specification (with special RS232C signal unit 'SU-RS" and battery pack connected)



(Note 1)
BATT LOW may not be delivered depending on the level of battery voltage as charge voltage exists.

(Note2)
Negative signal output level: −9V typical
Positive signal output level: +9V typical

(Note3)
Negative signal input level shall be +0.4V to −20V.
Positive signal input level shall be +2.8V to +20V.

(NOTE)
Automatic power supply shutdown on Windows2000/XP
Provided that OS standard UPS service is running, power supply shutdown is automatically conducted by PS_ON# (Remote OFF) after OS shuts down following APM or ACPI. You do not have to use SHUT DOWN signal.

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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	AC FAIL_T	5mA
	2	SHUT DOWN_T	1mA
	3	BATT LOW_T	5mA
	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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