Product Specification

Model HNSP4-1000P-SA0-H*V	Date : Feb 23th, 2017

Scope

This specification applies to Embedded type DC stabilized power supply with backup function at blackout: HNSP4-1000P-SA0-H0V, dedicated RS232C signal unit: SU-RS set model: HNSP4-1000P-SA0-H1V, and dedicated USB signal unit: SU-US set model: HNSP4-1000P-SA0-H6V.
This unit provides DC output power with a special battery pack connected even at AC power failure.
Items marked with"*1"in this specification apply to HNSP4-1000P-SA0-H1V .
Items marked with"*2"in this specification apply to HNSP4-1000P-SA0-H6V .

General Specification

(normal temperature and humidity unless otherwise specified)

Item		Specification and Standard	Measurement condition, etc
AC input	Rated Voltage	100 to 240V AC	Worldwide range
	Voltage range	85 to 264V	(Note 1)
	Input current	9.6A typ. (at 100V input)/ 4.0A typ. (at 240V input)	
	Rated frequency	50 / 60 Hz	Frequency range 47Hz to 63Hz
	Inrush current (Note 2)	15A peak max. (at 100V input) 36A peak max. (at 240V input)	1 minute min. of reclosing interval at rated load, Cold start at 25℃
	Power factor	96% min. at 100V input / 90% min. at 240V input	At rated load, 80PLUS Silver compliant
	Efficiency	84%typ. at 100V input / 88% typ. at 240V input	
DC input	Rated voltage	DC350V (compatible with special battery pack)	
	Efficiency	80% typ.	At output power 600W
Environment	Operation temperature/humidity	0 to 60℃ / 10 to 90%RH	No condensation(Note 3)
	Storage temperature/humidity	-20 to 70℃ / 10 to 95%RH	No condensation
	Vibration	To endure Vibration acceleration of 2G, Vibration of 10 to 55Hz for 10 sweep cycles in each X, Y, and Z direction	JIS-C-60068-2-6 at no operation
	Surface dropping	Lift one bottom edge 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat 3 times for each other 3 edges, and no malfunction shall be observed.	JIS-C-60068-2-31 at no operation
Insulation	Insulation resistance	50MΩ or more between input and FG/output.	At 500V DC
	Dielectric strength	1.5kV AC for 1 minute between input and FG/output	Cut-off current 10mA
	Leakage current	0.2mA max. at 100V input, 0.4mA max. at 200V input, and 0.5mA max. at 240V input	IEC60950 compliant
EMS/EMI	Line noise test	±2,000V (pulse width of 100/1000ns, 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-Component in Voltage and no malfunction.
	Surge immunity test	IEC 61000-4-5 Installation Environment Class 3 Compliant: Common mode ±2kV and Normal mode ±1kV 5 times for each	There shall be no malfunction and no damage at 100V AC and 240V AC input.
	Electrostatic discharge immunity test	IEC 61000-4-2 Installation Environment Class 3 Contact discharge: ±6kV, 10 times	There shall be no malfunction and no damage at 100V AC and 240V AC input.
	Conducted emission	VCCI/FCC/CISPR22-B/EN55022 Class B Compliant	To be measured on the single power supply
	Harmonic current	IEC 61000-3-2 Class A Compliant	At rated input and rated load
Others	Safety standard	UL60950, CSA60950 (c-UL), ~~CE marking EN60950,~~ PSE compliant Ⓐ	Class I equipment: Embedded type power supply
	Cooling system	Forced cooling system (with a fan inside)	Fan speed changes according to operating temp. and load condition.
	Dimensions	150 (W)×85(H)×190(D)	Except protrusions; Refer to the outline drawing in another page
	Weight	2.4kg typ	
	Reliability grade	FA	To follow our standard
	Lifetime expectancy	10 years or longer (Limited lifetime Component: Electrolytic capacitors and Fan motor)	Lifetime expectancy when operated at 100V AC, rated load, and 25℃ of the ambient temperature
	M.T.B.F.	70,000h min.	EIAJ RCR-9102
	Warranty	Three years after delivery; If any defects belong to us, the defective unit shall be repaired or replaced at our cost.	Except any defects caused by the operation out of the specification

Note 1: Lower limit of input Voltage at continuous rated load.
Note 2: Charging current equal to or less than 100μs into X-capacitor in input filter circuit shall not be defined as Inrush current.
Note 3: Follow the derating condition in another page when the ambient temperature exceeds 40℃.

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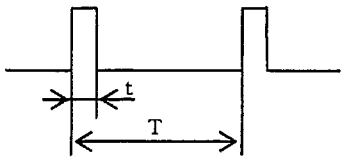
Product Specification

Model HNSP4-1000P-SA0-H*V										Date : Feb 23th, 2017
Output Specification										(normal temperature and humidity unless otherwise specified)
Items			CH1 +3.3V	CH2 +5V	CH3 12V1	CH4 12V2	CH5 12V3	CH6 12V4	CH7 -12V	CH8 5VSB	Measurement condition, etc
Output Rating	Rated Voltage (V)		+3.3	+5	+12	+12	+12	+12	-12V	5V	
	Minimum current (A)		0	0	0	0	0	0	0	0	
	Rating	Rated current (A)	10	10	15	15	15	15	0.3	3	Standard Value at measuring of input/output characteristics.
		Rated power (W)	33	50	180	180	180	180	3.6	15	
	Continuous max. rating	Max. Current (A)	25	25	18	18	18	18	1.2	3	Continuous rating. Maximum total output power is 822W (see the derating conditions on another page.)
		Max. Output Power (W)	82.5	125	216	216	216	216	14.4	15	
			207.5		792						
			822								
	Momentary max. rating	Max. Current (A)	30	30	25	25	25	25	1.2	4	Momentary rating is within 5sec. Momentary total output power is 1000W. See Figure 1 below and derating conditions on another page
		Momentary output Power (W)	99	150	264	264	264	264	14.4	20	
			249		1000						
			1000								
Output Characteristics	Total Voltage accuracy (%)		±4	±4	±4	±4	±4	±4	±4	±4	Accuracy against output voltage value including temperature and time-lapse drift as well as input/load regulation
	Ripple Voltage (mVp-p)		50 or less	50 or less	80 or less	80 or less	80 or less	80 or less	80 or less	50 or less	Connect an electrolytic capacitor (47μF) and a ceramic capacitor (0.1μF) on the test board and measure with an Oscilloscope of 100MHz bandwidth. The test board shall be separated from load wires and within 150mm from the output terminals.
	Spike Voltage (mVp-p)		100 or less	100 or less	200 or less	200 or less	200 or less	200 or less	200 or less	100 or less	
	Over current protection	OCP point (A)	31 or more	31 or more	26 or more	26 or more	26 or more	26 or more	Short circuit protection		At without loads except measured output
		Method	CH1to CH7 outputs shut down						Hold-down current limiting	All outputs shut down	All outputs shut down If CH8 is short. (Automatic recovery)
		Recovery	Re-entry of AC input or restart of PS_ON# signal						Automatic recovery		AC input re-entry time interval≧1 min after previous shut off.
	Over voltage Protection	OVP point (V)	3.8 to4.3	5.7 to7.0	13.4 to15.6				-	(5.7 to7.5)	
		Method	CH1 to CH7 outputs shut down						-	All outputs shut down	
		Recovery	Re-entry of AC input or restart of PS_ON# signal						-	Re-entry	AC input re-entry time interval≧1 min after previous shut off. When OVP operation of CH8, AC input re-entry time interval≧10min. after previous shut off.

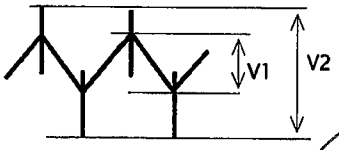
Figure 1. Duty ratio for momentary max. of output current/power

Momentary maximum output current/power shall be within 5 seconds.
For repetitive loads, duty ratio shall be 10% or less.



t≦5 sec
t/T≦0.1

Figure 2. Definition of ripple and spike



Ripple : V1 (p-p)
Spike : V2 (p-p)

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Due to the technical improvement, the specifications and functions are subject to change without notice.

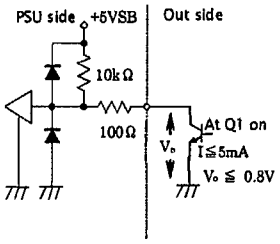
Product Specification

Model HNSP4-1000P-SA0-H*V	Date : Feb 23th, 2017

Signal Input/Output Specification

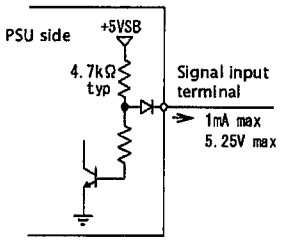
Item		Specification
Input signal	Output ON/OFF control signal (PS_ON)	CH1 to 7 shut down upon receipt of 'H' or 'OPEN'. (Battery connection shuts off when 'H' or 'OPEN' is received at backup operation)
	+3.3V SENSE	Input terminal for voltage detection of CH1 (+3.3V) output . Compensate for the voltage drop of +side cable by connecting to the +side 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)
	Fan control signal (FAN_C)	Control terminal of a fan motor. Fan motor operates at a maximum speed upon receipt of 'L'
Output signal	Normal output signal (PWR_OK)	'H' is delivered when output is normal. (Detection delay time: 100 to 500ms)
	AC failure detection signal for TTL (AC FAIL_T)	'H' is delivered at low AC input voltage or power failure detection. (Available only when the special battery package is connected. Detection voltage : AC 75V typ. Detection delay time : 16 to 40ms after AC failure)(Note 6)
	(*1)AC failure detection signal for RS232C (AC FAIL_R)	'Negative -9V typical' is delivered at low AC input voltage or power failure detection. (Available only when the special battery package is connected. Detection voltage : AC 75V typ. Detection delay time : 16 to 40ms after AC failure)(Note 6)
	(*2) 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. (Available only when the special battery package is connected. Detection voltage : AC 75V typ. Detection delay time : 16 to 40ms after AC failure)(Note 6)
	Low battery voltage signal for TTL (BATT LOW_T)	'H' is delivered when battery voltage falls down. (Available only when the special battery package is connected.)
	(*1)Low battery voltage signal for RS232C (BATT LOW_R)	'Negative -9V typical' is delivered when battery voltage falls down. (Available only when the special battery package is connected.)
	(*2) 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. (Available only when the special battery package is connected.)
	Fan monitoring signal (FAN_M)	Two pulse waves are delivered per 1 rotation of a fan motor.

PS_ON signal input circuit



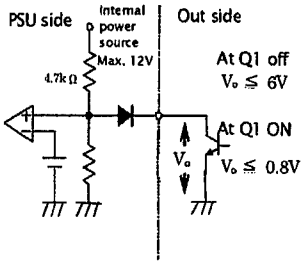
('L' ≦0.8V, 2.0V≦ 'H')

SHUT DOWN_T signal input circuit

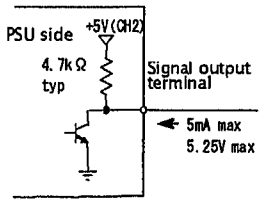


('L' ≦0.4V, 2.4V≦ 'H')

FAN_C signal input circuit

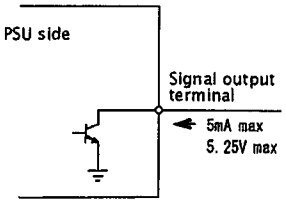


PWR_OK signal output circuit



('L' <0.4V)

AC FAIL_T, FAN M, BATT LOW_T Signal output circuit



('L' <0.4V)

(*1)AC FAIL_R, BATT LOW_R

Signal output circuit

ADM232AARN
(Analog Devices, Inc.)
or equivalent

(*2)AC FAIL_U, BATT LOW_U

USB1.1 compliant
(B type connector)

Special driver software should be installed.
(Software such as UPS service that uses current RS232C signal can be run with USB signal.)

Note 6. At rated input and rated output

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Product Specification

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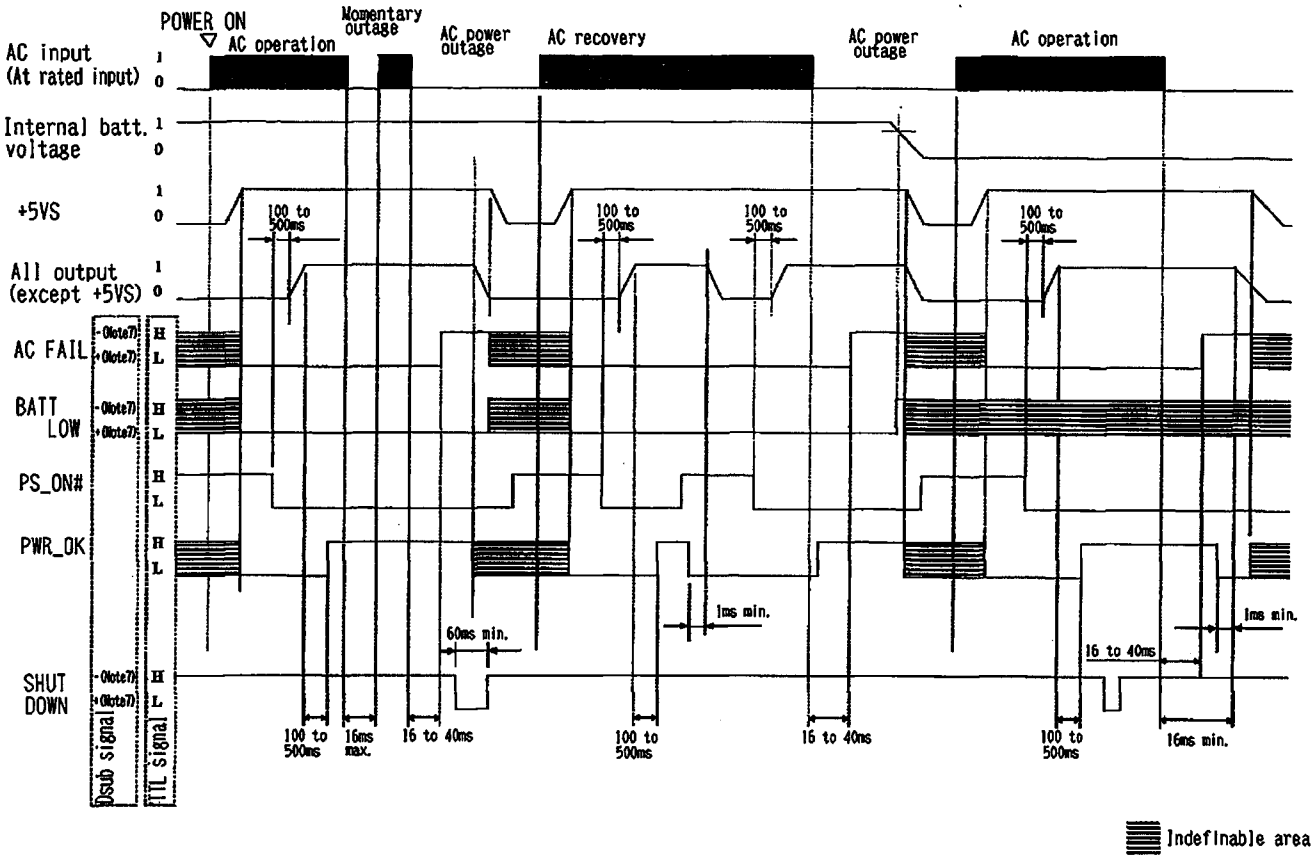
Signal input/output timing diagram(With a specified battery pack)



(Note7)
Negative(-)signal output: -9V typ. Positive(+)signal output: +9V typ.
Negative(-)signal input: +0.4V to -20V. Positive(+) signal input: +2.5V 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 don't have to use SHUT DOWN signal.

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Product Specification

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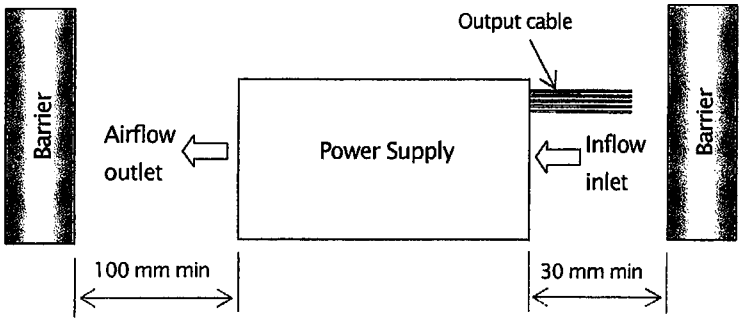
Installation

1. When installing the power supply, make sure that the distance between airflow-inlet/outlet of this unit and the adjacent barriers keeps the dimensions below at minimum.

2. Make sure to install the power supply in a position where temperature near the airflow inlet does not exceed the maximum operating temperature specified.



Derating Conditions

When using under high temperature or at low input Voltage, follow the item 1 and 2 below to derate output current/power. However, max. output power for each CH specified in the "output specification shall be 100% of load factor. Also, total of max. output power shall be 100% of load factor.

1.When the ambient temperature around the airflow inlet exceeds 40°C, both continuous and momentary ratings shall follow the derating curve in Figure 3.

2.When using with at or below 90V input, follow the solid-line of derating curve in Figure 4.
Also, if the ambient temperature exceeds 40°C, follow the load factor that is gained by multiplying the load factor in Figure 3 and the one in Figure 4.

Figure 3.Temperature Derating

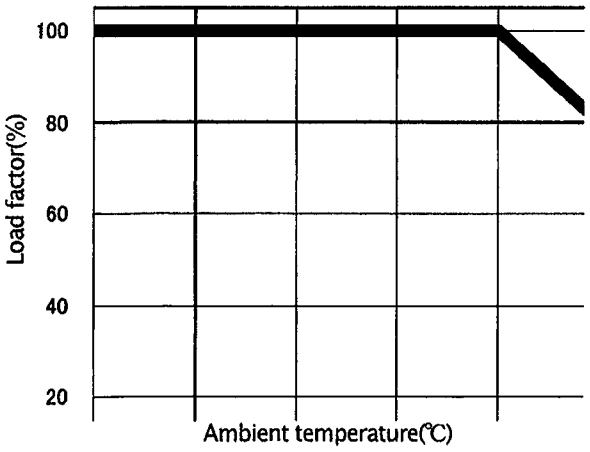
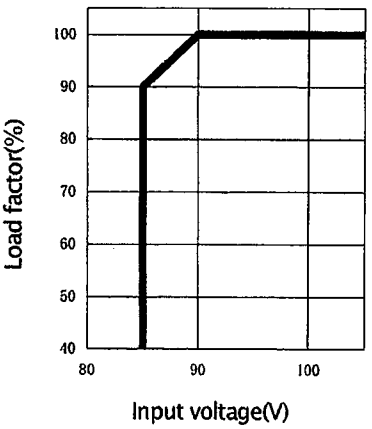


Figure 4. Low input Voltage Derating



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Product Specification

Model HNSP4-1000P-SA0-H*V	Date : Feb 23th, 2017

Current Rating Table for Load Connection Pins

The maximum current that can be drawn continuously from load connection pins is shown in the table below. However, the total current for each output shall not exceed the maximum output current specified in the output specification.

Connector name	Pin #	Output (signal) name	Max. current per pin	Note
MAIN1 (Output1)	1	+3.3 V	6.0 A	
	2	+3.3V SENSE	–	+3.3 V Sensing input
	3	+12V	6.0 A	
	4	+5V	6.0 A	
	5	+5V	6.0 A	
	6	COM	6.0 A	
	7	COM	6.0 A	
	8	COM	6.0 A	
	9	COM	6.0 A	
	10	-12V	0.6 A	
	11	+5VSB	4.0 A	
	12	+3.3 V	6.0 A	
	13	+3.3 V	6.0 A	
	14	+12V	6.0 A	
	15	+5V	6.0 A	
	16	+5V	6.0 A	
	17	COM	6.0 A	
	18	COM	6.0 A	
	19	COM	6.0 A	
	20	COM	6.0 A	
	21	PWR_OK	5.0 mA	Signal output
	22	PS_ON	5.0 mA	Signal input
MAIN2 (Output2)	1	+5V	6.0 A	
	2	+3.3 V	6.0 A	
12V1-3 (Output3-5)	1	COM	6.0 A	
	2	COM	6.0 A	
	3	COM	6.0 A	
	4	COM	6.0 A	
	5	+12V	6.0 A	
	6	+12V	6.0 A	
	7	+12V	6.0 A	
	8	+12V	6.0 A	

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Current Rating Table for Load Connection Pins

The maximum current that can be drawn continuously from load connection pins is shown in the table below. However, the total current for each output shall not exceed the maximum output current specified in the output specification.

Connector name	Pin #	Output (signal) name	Max. current per pin	Note
HD1-2 (Output6-7)	1	+3.3V	6.0 A	
	2	+5V	6.0 A	
	3	COM	6.0 A	
	4	COM	6.0 A	
	5	+12V	6.0 A	
	6	+3.3V	6.0 A	
	7	+5V	6.0 A	
	8	COM	6.0 A	
	9	COM	6.0 A	
	10	+12V	6.0 A	
SIG (Output8)	1	AC FAIL	5.0 mA	Signal output
	2	SHUT DOWN_T	1.0 mA	Signal input
	3	BATT LOW_T	5.0 mA	Signal output
	4	FAN_C	–	Signal input
	5	FAN_M	5.0 mA	Signal output
	6	PS_ON	5.0 mA	Signal input
	7	COM	2.0 A	
	8	+3.3V SENSE	–	+3.3 V Sensing input
	9	NC	–	
	10	+5VSB	2.0 A	
(※1)D-sub	1	BATT LOW_R	–	
	2	NC	–	
	3	NC	–	
	4	SHUT DOWN_R	–	
	5	NC	–	
	6	NC	–	
	7	NC	–	
	8	AC FAIL_R	–	
	9	NC	–	

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Product Specification

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Precaution before use

1. WARNING: ⚠ Grounding

This power supply is designed and produced as Class I equipment.
Make sure to properly ground the grounding terminal (Chassis) for safe operation.

2. WARNING: ⚠ Electric shock hazards

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

3. CAUTION: ⚠ Output short circuit

Prevent shorting output. If output is shorted, capacitors inside the power supply rapidly discharge and it may lead to fire and/or sparks, resulting in a serious accident. It also shortens the lifetime of the power supply.

4. CAUTION: ⚠ Inrush current limiting circuit

Inrush prevention circuit is used to limit surge current into the smoothing capacitor when AC input is turned on.
If input is reclosed before the specified reclosing interval after input failure, inrush prevention circuit may not work, and excessive surge current may damage the power supply. Make sure to take enough reclosing interval as specified.

5. 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.
Very little low-frequency sound could occur during operation (at start-up or/and standby).
It is also caused by low frequency transient vibration of choke coils for harmonic measures.
These noises, however, do not cause any damage to the characteristics and lifetime of the power supply.

6. Handling of the output cable

Do not grab the output cables solely when you move or carry the power supply.
Hold the body of the supply when you move or carry.

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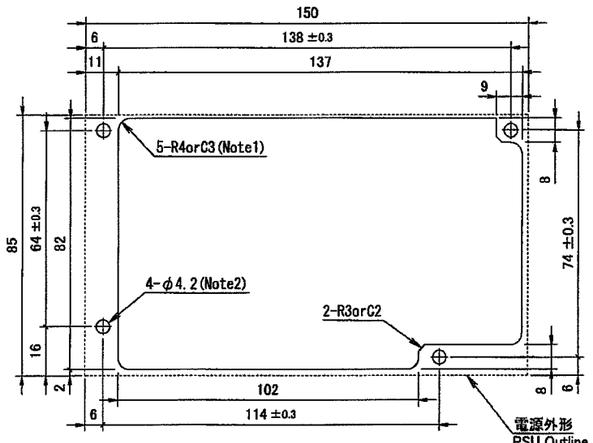
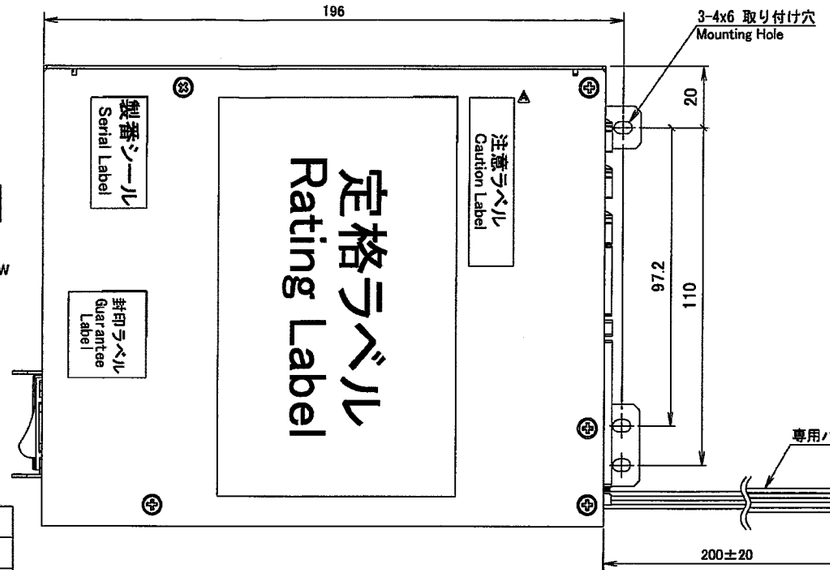
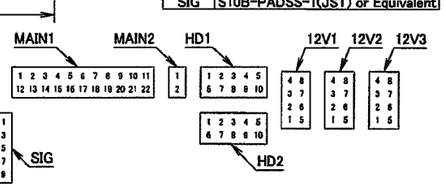
推奨電源取り付け穴加工図
How to process the mounting holes(Recommended)



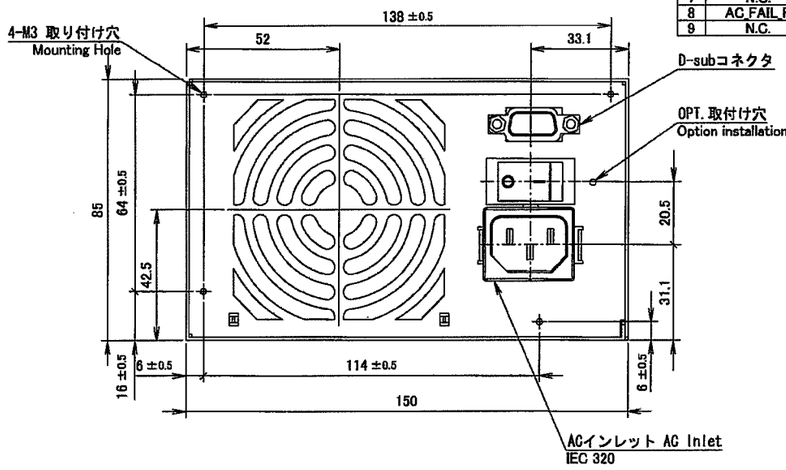
Note1:R4 or C3 の値は小さくても可
The value for R4 or C3 can be smaller
Note2:取付用ねじ穴
Mounting hole

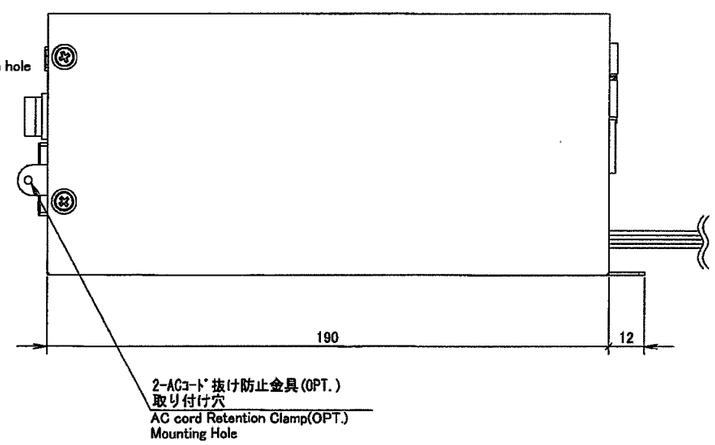


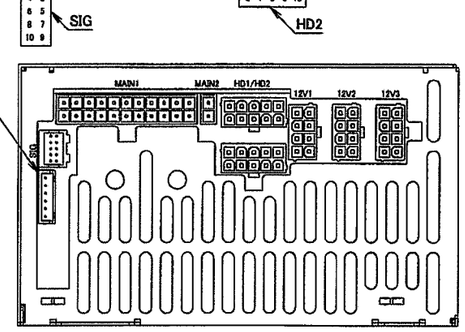
CN	Type
MAIN1	CP-01422150(CviLux) or Equivalent
MAIN2	CP-01402150(CviLux) or Equivalent
HD1-2	CP-01310130(CviLux) or Equivalent
12V1-3	CP-01308130(CviLux) or Equivalent
SIG	S10B-PADSS-1(JST) or Equivalent



D-sub	
PIN No.	FUNCTION
1	BATT_LOW_R
2	N.C.
3	N.C.
4	SHUT_DOWN_R
5	N.C.
6	N.C.
7	N.C.
8	AC_FAIL_R
9	N.C.







出図
'14.12.16
㈱ニプロン
技術管理

A版⚠×1:2014.07.03 注意ラベル追加 I-280705 内田

*1 特に指示がない寸法公差は ±1mm とする
Dimensional tolerance shall be ±1mm unless otherwise specified.
*2 取り付けビスの電源内部長さは 5mm MAX.
The screw depth of penetration into PSU is 5mm MAX.

DRAWN BY	CHECKED BY	CHECKED BY	APPROVED BY	SCALE		MATERIALS		HNSP4-1000Pシリーズ
石川	森	有野	有野	UNITS	m/m	FINISH	TITLE	外形図/Outline Drawing
ISSUED	2014.01.18			3RD ANGLE PROJECTION			DRAWING NO.	6193-01-3-050 A

株式会社 ニプロン

Due to the technical improvement, the specifications and functions are subject to change without notice.