Product Specification

Created:December 7th, 2011

This specification applies to Embedded type DC stabilized power supply with backup function at blackout: HNSP9-520P-S20-H0V, dedicated RS232C signal unit:SU-RS set model:HNSP9-520P-S20-H1V, dedicated buzzer unit:SU-BU set model:HNSP9-520P-S20-H2V, and dedicated USB signal unit:SU-US set model: HNSP9-520P-S20-H6V.
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 HNSP9-520P-S20-H1V.
Items marked with "*2" in this specification apply to HNSP9-520P-S20-H2V.
Items marked with "*3" in this specification apply to HNSP9-520P-S20-H6V.

General specification

(Provided at normal temperature and humidity unless otherwise specified)

Items		Specifications	Measurement conditions, etc.
AC Input	Rated voltage	100 - 240V AC	Worldwide range
	Voltage range	85 - 264V AC	(Note 1)
	Current	4.8A typical at 100V AC / 2.1A typical at 240V AC	
	Rated frequency	50 / 60 Hz	Frequency range:47 to 63Hz
	Inrush current	31Apeak MAX at 100V AC 75Apeak MAX at 240V AC	(Note2) with continuous rated output at cold start (25°C)
	Power factor	96% min. at 100V AC / 90% min. at 240V AC	
	Efficiency	80% typical at 100V AC / 85% typical at 240V AC	80PLUS bronze compliant
DC Input	Nominal voltage	24V DC (compatible with special battery pack)	
	Battery discharge cut-off voltage	17V typical (battery circuit cut-off)	
	Efficiency	80% typical	At nominal input and rated output power
Environment	Operating temp./Humidity	0~60°C / 10~90% RH	No condensation (Note 3)
	Storage temp./Humidity	-20~70°C / 10~95% 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 10 times	JIS-C-60068-2-6 At no operation
	Mechanical strength	Lift one bottom edge 50mm high with the opposite edge placed on a test bench, and let if fall. Repeat 3 times on other three edges as well 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	AC1.5kV for one minute between input and FG/output	Cut-off current 10mA
	Leakage current	0.5mA max. at 100V AC, 1.0mA max. at 200V AC, 1.2mA max. at 240V AC	IEC60950 compliant
EMS/EMI	Line noise immunity	±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 measure with INS-410. There shall be no fluctuation in DC-component of output or no malfunction
	Surge immunity	IEC 61000-4-5 Installation Environment Class 3 compliant Common mode : ±2kV, Normal mode : ±1kV 5times for each	There shall be no malfunction or no failure at 100V/240VAC
	Electrostatic Discharge immunity	IEC 61000-4-2 test level 3 compliant Contact discharge:10 times at ±6kV	There shall be no malfunction or no failure at 100V/240VAC
	Conducted emission	VCCI / FCC / CISPR22-B / EN55022 Class B compliant	To be measured on the single power supply
	Harmonic current	IEC61000-3-2 Class D compliant	At rated input and load

Note 1. Follow the derating condition in another page regarding the lower limit of input voltage at Continuous max and Peak rating.
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 45°C.

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Others	Safety standard	UL60950, CSA60950 (c-UL), CCC acquired, CE marking(IEC62368-1), PSE compliant Ⓑ	Class I equipment: Embedded type power supply
	Cooling system	Forced air cooling by internal fan	Fan speed changes according to operating temp. and load condition
	Dimensions	150 (W)×86(H)×140(D)	Except protrusions; Refer to the outline drawing in another page
	Weight	1.8 kg 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 AC 100V, rated load, and 25 °C of the ambient temperature
	M.T.B.F.	70,000h min.	Based on EIAJ RCR-9102
	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

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B×1 : Sep. 30th 2020 UCHIDA

Drawn by	Reviewed by	Approved by	Series name:	Drawing No.
arino	森貴	TTC 20.10.00 有野	HNSP9-520P-S20-H*V	6168－01－4－520B 2／10

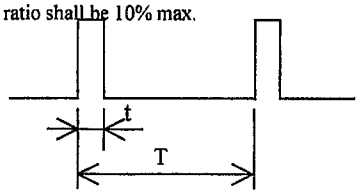
Output specification

(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	
	Rating	Rated current	10A	10A	25A	0.5A	2.0A	Standard Value at measuring of input/output characteristics
		Rated power	33W	50W	300W	6W	10W	
	Continuous max	Max. current	20A	24A	30A	0.5A	2.0A	Continuous rating. Maximum total output power is 400W (see the derating conditions in another page)
		Max. power	150W		360W	6W	10W	
			390W					
			400W					
	Peak rating	Peak current	30A	30A	35A	0.5A	2.5A	Momentary rating is within 5 seconds. Momentary total output power is 520W. (See Figure.1 and the derating conditions in another page)
		Peak power	200W		420W	6W	12.5W	
			507.5W					
			520W					
Output characteristics	Total voltage regulation		±5%	±5%	±5%	±5%	±5%	See the Cross regulation on P.
	Max. ripple voltage (mV_{p-p})		50 Max.	50 Max.	120 Max.	120 Max.	50 Max.	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.
	Max. spike voltage (mV_{p-p})		100 Max.	100 Max.	170 Max.	170 Max.	100 Max.	
Protection	OCP	OCP point(A)	27 min.	31 min.	37 min.	Short circuit protection		(Note 1)
		Method	All outputs except CH5 shut down.			Hold-down current limiting	All outputs shut down	All outputs shut down if CH5 is short (Automatic recovery)
		Recovery	Reclosing of AC input or PS_ON#			Automatic recovery		AC input re-entry time interval≧10s after previous shut off.
	OVP	OVP point (V)	3.76 to 4.30	5.74 to 7.00	13.40 to 15.60	-	-	
		Method	All outputs except CH5 shut down			-	-	
		Recovery	Reclosing of AC input or PS_ON#			-	-	AC input re-entry time interval≧10s after previous shut off.
Charging function	With a special Ni-MH battery pack connected		Charge voltage	35V max. (The voltage is automatically switched to correspond to 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°C, but to be compensated according to temperature				
			Charge current	0.5±0.2A (at 24V of battery voltage)				

Figure 1. Duty ratio of Peak current/Power

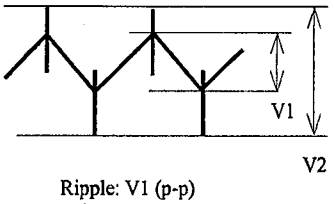
Peak current/Power shall be 5 seconds max. and its duty ratio shall be 10% max.



t ≦5 sec.

t /T ≦0.1

Figure2. The definition of ripple and spike



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

Note 1.
CH1: CH2 continuous max., others without loads,
CH2: CH1 continuous max., others without loads,
Others: all CH is measured with rated loads

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

		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)
	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 at normal output (Detection delay time: 100 to 500ms)
	AC failure detection signal for TTL (AC FAIL_T)	'H' is delivered at low input voltage or power failure (Detection voltage: 75V AC typical, Detection delay time: 16 to 40ms after AC input shuts off) (At rated input/output)
	(*1) AC failure detection signal for RS232C (AC FAIL_R)	'–9V typical' is delivered at low AC input or power failure detection (Detection voltage: 75V AC typical, Detection delay time: 16 to 40ms after AC input shuts off) (At rated input/output)
	(*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: 75V AC typical, Detection delay time: 16 to 40ms after AC input shuts off) (At rated input/output)
	Low battery voltage signal for TTL (BATT LOW_T)	'H' is delivered when battery terminal voltage falls down to 19V typical ('L' is delivered when battery pack is not connected)
	(*1) Low battery voltage signal for RS232C (BATT LOW_R)	'–9V typical' is delivered when battery voltage falls down to 19V typical ('+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 19V 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 go 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

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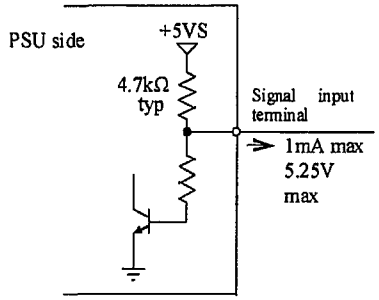
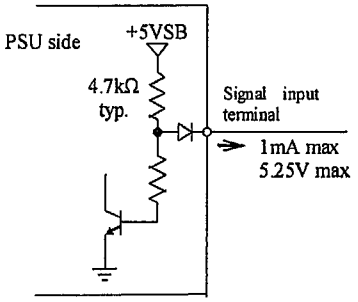
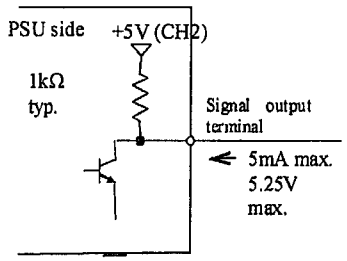
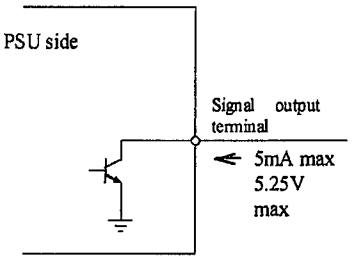
Input signal circuit	PS_ON#	SHUT DOWN_T	AC FAIL_R, BATT LOW_R	
	 ('L'≦0.8V, 2.0V≦'H')	 ('L'≦0.4V, 2.4V≦'H')	ADM232AARN (Analog Devices, Inc.) or equivalent	
Output signal circuit	PWR_OK	AC FAIL_T, FAN_M, BATT LOW_T	AC FAIL_R BATT LOW_R	AC FAIL_U BATT LOW_U
	 ('L'<0.4V)	 ('L'<0.4V)	ADM232AARN (Analog Devices, Inc.) or equivalent	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)

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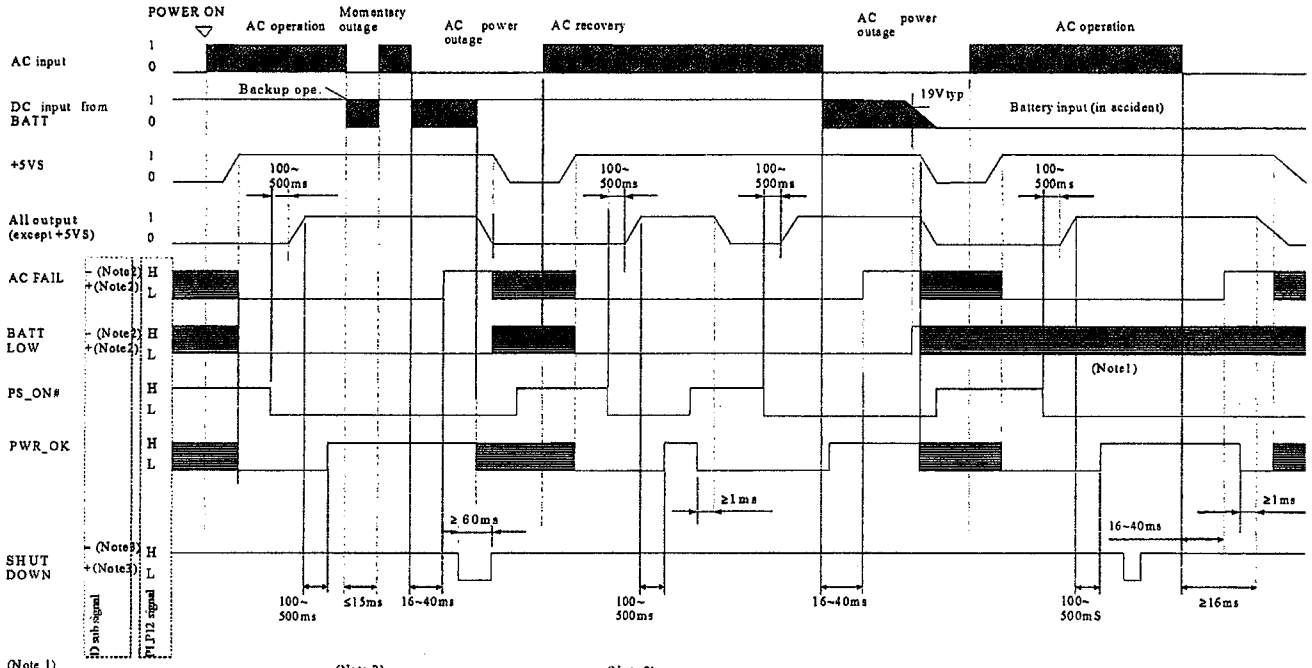
Signal input/output timing diagram (With RS232 signal unit 'SU-RS', and a specified battery pack)



(Note 1)
BATT LOW signal may not be outputted depending on the battery voltage because of battery charger output.

(Note 2)
Negative (–) signal output: –9V typ.
Positive (+) signal output: +9V typ.

(Note 3)
Negative (–) signal output: +0.4V to –20V
Positive (+) signal output: +2.8V to +20V

Indefinable area

Note: When auto shutdown is performed in Windows 2000/XP environment, do not use the shutdown signal. Use the Remote OFF control signal supported by APM or ACPI function after OS ends.

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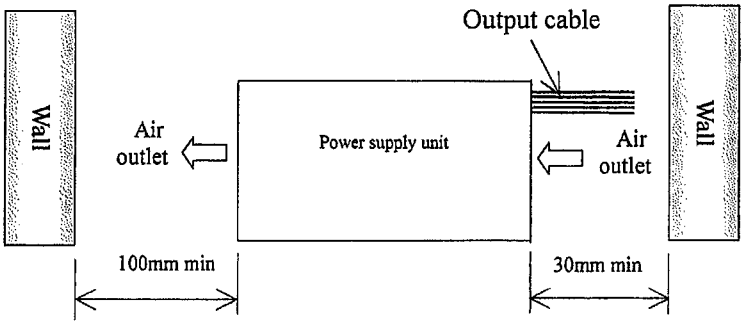
Installation condition

1. This power supply unit should be installed with the clearance as shown below from the wall to its air inlet and outlet.
2. Temperature around the air inlet area of the power supply unit should not exceed the maximum operating temperature.



Derating Conditions

Follow the item 1 and 2 below to derate output current and power in operation at high temperature and low input voltage. For Continuous and Peak rating, max. output current of each CH specified in output specification shall be regarded as 100% of load factor. Also, when total power between channels is provided, total of those powers shall be regarded as 100% of load factor.

1. When the ambient temperature adjacent to the air inlet exceeds 45°C, follow the load factor shown in Fig.1 for continuous and peak rating.

2. When input voltage is 90V or less at operation of continuous rating and peak rating (5 sec max.), follow the load factor shown in Fig.2. In addition, when the ambient temperature exceeds 45°C, the load factor shall be the load factor shown in Fig 2 multiplied by the load factor shown in Fig.1.

Cross regulation

The total voltage regulation of CH2 (5V) and CH3 (12V) is defined by the combinatorial range shown in Fig.3 Cross regulation. It should be used within the combinatorial power between each CH.

Figure1. Derating curve for temperature

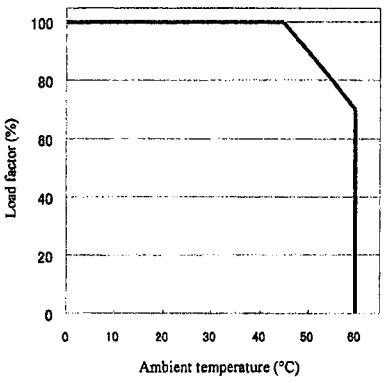


Figure2. Derating curve for low input voltage

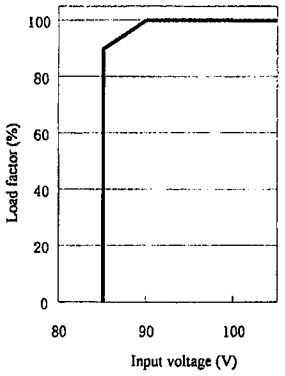
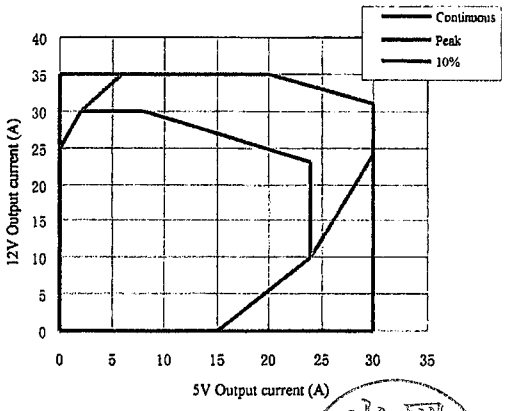


Figure3. Cross regulation



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Current ratings of output connector pins

The maximum allowable continuous current for each of output connector pins is shown in Table below.

The sum of the shared currents for the same output must be less than the maximum current specified for each output.

Connector	Pin	Output	Max. current	Note
MAIN1 (Output 1)	1	+3.3V	6.0A	
	2	+3.3V SE	-	+3.3V Sensing input
	3	+12V	6.0A	
	4	+5V	6.0A	
	5	+5V	6.0A	
	6	COM	6.0A	
	7	COM	6.0A	
	8	COM	6.0A	
	9	COM	6.0A	
	10	-12V	0.5A	
	11	+5VSB	4.0A	
	12	+3.3V	6.0A	
	13	+3.3V	6.0A	
	14	+12V	6.0A	
	15	+5V	6.0A	
	16	+5V	6.0A	
	17	COM	6.0A	
	18	COM	6.0A	
	19	COM	6.0A	
	20	COM	6.0A	
	21	PWR_OK	5 mA	Signal output
	22	PS_ON	1 mA	Signal input
MAIN2 (Output 2)	1	+5V	6.0A	
	2	+3.3V	6.0A	
12V1-2 (Output 3-4)	1	COM	6.0A	
	2	COM	6.0A	
	3	COM	6.0A	
	4	COM	6.0A	
	5	+12V	6.0A	
	6	+12V	6.0A	
	7	+12V	6.0A	
	8	+12V	6.0A	
HD (Output 5)	1	+3.3V	6.0A	
	2	+5V	6.0A	
	3	COM	6.0A	
	4	COM	6.0A	
	5	+12V	6.0A	
	6	+3.3V	6.0A	
	7	+5V	6.0A	
	8	COM	6.0A	
	9	COM	6.0A	
	10	+12V	6.0A	

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Current ratings of output connector pins

Connector	Pin	Output	Max. current	Note
SIG (Output 6)	1	AC_FAIL	5mA	Signal output
	2	NC	1mA	Signal input
	3	NC	5mA	Signal output
	4	FAN_C	-	Signal input
	5	FAN_M	5mA	Signal output
	6	PS_ON	1mA	Signal input
	7	COM	2.0A	
	8	+3.3V SE	-	+3.3V Sensing input
	9	NC	-	
	10	+5VSB	2.0A	

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Warnings and Cautions on operation

1. WARNING: ⚠ Grounding
   This power supply is designed as 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 for integrating. 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: ⚠ Output shortage
   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.

4. CAUTION: ⚠ Inrush current limiting circuit
   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.

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. This will not affect performance or lifetime at all.

6. 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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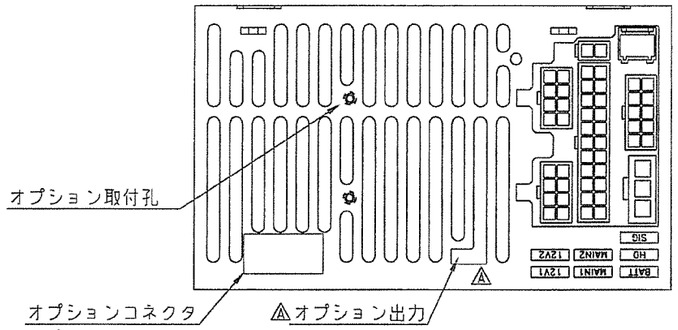
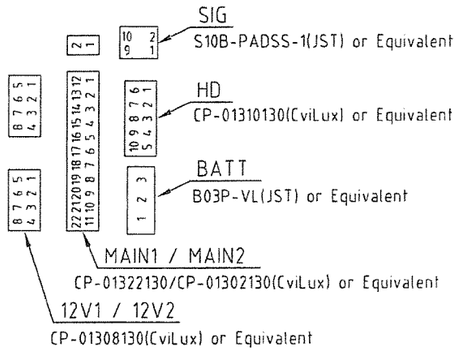
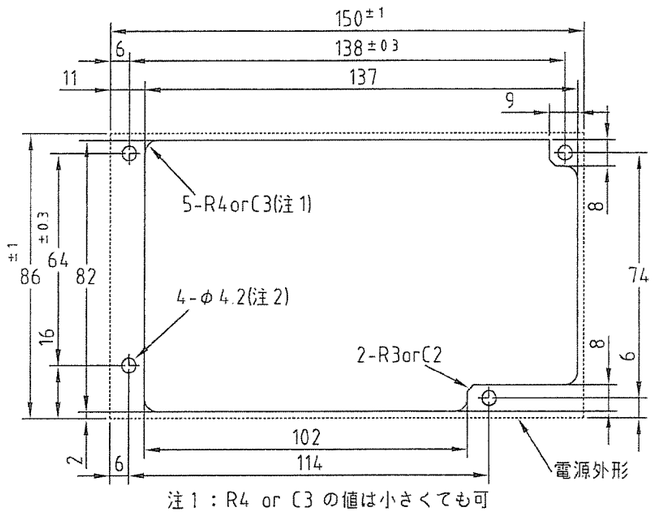
Nipron

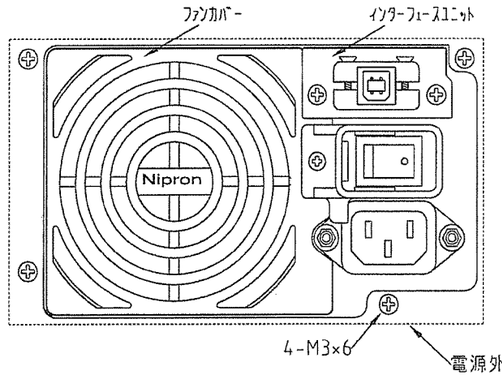




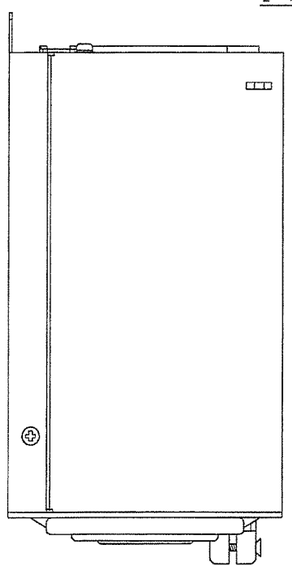
推奨電源取り付け穴加工図

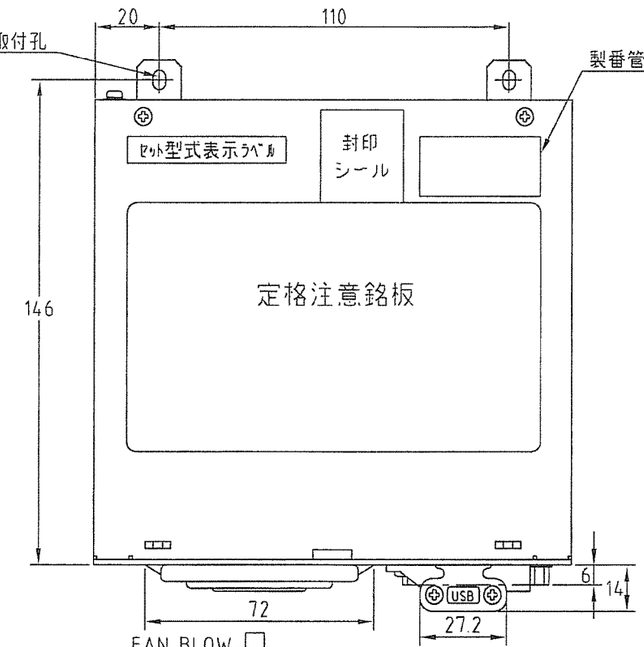


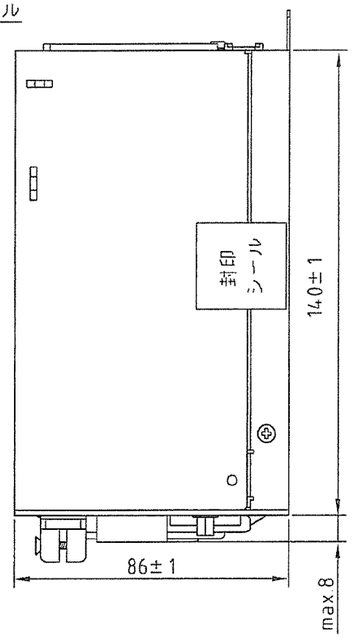
注1：R4 or C3 の値は小さくても可
注2：取付用ねじ穴

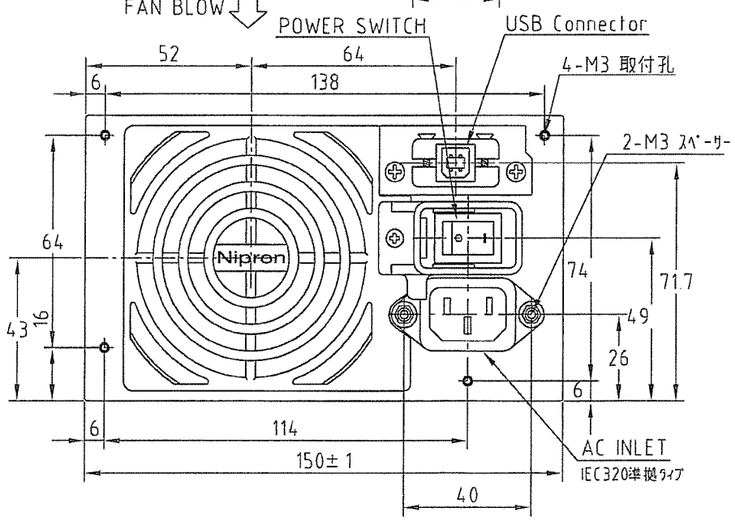


電源をパソコン等のキョウ体に取り付けた状態で
ファン交換を行う場合は指定の穴加工を施して下さい。









USB	
PIN No	FUNCTION
1	VBUS
2	D-
3	D+
4	COM

× 取付ビスの電源ケース表面よりの内部侵入深さ Max.12 mm
× 指示なき寸法公差は ±0.5 とする

出図 11.11.04 技管 ニプロ

⚠×2 2010.05.18 I-230515

DRAWN BY	CHECKED BY	CHECKED BY	APPROVED BY	SCALE	×	MATERIALS	TITLE	HNSP9-520P-S20-H6V
大前	有野	西	髙	UNITS	m/m	FINISH		外形図
ISSUED 2011.04.25				3RD ANGLE PROJECTION			DRAWING NO.	6175-01-3-050 A

株式会社 ニプロン

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