

# Product Specification

**Model HPCSA-1000P-E2S**

Date Aug 17th, 2010

## Scope

This specification applies to Embedded type DC stabilized power supply HPCSA-1000P-E2S

All items in this specification shall be provided at normal temperature and humidity unless otherwise specified.

## General Specification

Item		Specification and Standard	Measurement condition, etc
AC Input	Nominal Voltage	100 - 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)	15 sec. min. of reclosing interval at rated load, Cold start at 25°C
	Power factor	96% min at 100V input / 90% min at 240V input	
	Efficiency	84%typ at 100V input / 88% typ at 240V input	At rated load, 80PLUS Silver
Environment	Operation temperature/humidity	0 to 60°C (Note 3)/ 10 to 90%RH	No condensation
	Storage temperature/humidity	-20 to 70°C / 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 for other 3 edges, and no malfunction shall be observed.	JIS-C-60068-2-6 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 20mA
	Leakage current	0.2mA max. at 100V input, 0.4mA max. at 200V input, and 0.5mA max. at 240V input	YEW. TYPE3226 (1kΩ range) or equivalent
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 PSE, EN60950 compliant	Class I equipment: Embedded type power supply
	Cooling system	Forced cooling system (with a fan inside)	(Note 4)
	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°C 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: for lower limit at peak rated load, etc., follow the derating condition in another page.

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°C.

Note 4: Fan motor Comes to start to avoid degradation of reliability caused by the temperature rise of Components inside the power supply at stand-by mode at which PS\_ON signal is 'H' or 'OPEN.'



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

# Product Specification

## Output Specification

(Voltage shall be measured at output connector terminal. Voltage drop of the load side connector due to contact resistance is not included)

Items		CH1 (3.3V)	CH2 (5V)	CH3 (12V1)	CH4 (12V2)	CH5 (12V3)	CH6 (12V4)	CH7 (-12 V)	CH8 (5VSB)	Measurement condition, etc	
Output Rating	Rated Voltage (V)	+3.3	+5	+12	+12	+12	+12	-12	+5		
	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
		Rated power (W)	33	50	180	180	180	180	3.6	15	
	Continuous max. rating	Max. Current (A)	25	25	18	18	18	18	0.4	3	Continuous rating. Maximum total output power is 822W (see the derating conditions on another page.)
			82.5	125	216	216	216	216	4.8	15	
		Max. Output Power (W)	207.5		792						
	Momentary max. rating	Max. Current (A)	30	30	25	25	25	25	0.6	4	Momentary rating is within 5s. Momentary total output power is 1000W. See Figure 1 below and derating conditions on another page
			99	150	264	264	264	264	7.2	20	
		Momentary output Power (W)	249		1000						
Output Characteristics	Total Voltage accuracy (%)	±4	±4	±4	±4	±4	±4	±4	±4	Accuracy against output Voltage Value including temperature and time-lapse drifts 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.	
	Ripple + 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	CH1 to CH7 outputs shut down						Fold back	All outputs shut down	
		Recovery	Re-entry of AC input or re-start of PS_ON# signal						Automatic recovery		
	Over voltage Protection	OVP point (V)	3.8 to 4.3	5.7 to 7.0	13.4 to 15.6	13.4 to 15.6	13.4 to 15.6	13.4 to 15.6	-	(5.7 to 7.5)	
		Method	CH1 to CH7 outputs shut down						-	All outputs shut down	
		Recovery	Re-entry of AC input or re-start of PS_ON# signal						-	Re-entry	AC input re-entry time interval ≥ 1 min after previous shut off. (Note1)
	Low Voltage lock-out	When AC input is less than 80V, CH1 to CH7 outputs shut down								-	
Insulation between GND terminal of each output	Connection is Common for all outputs.										

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.

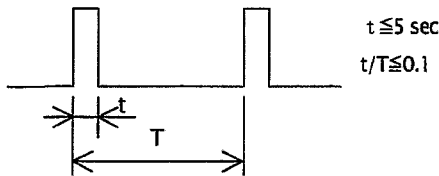
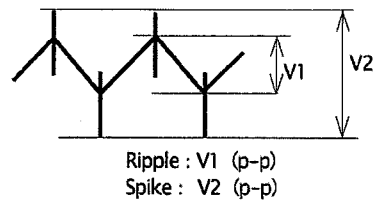


Figure 2. Definition of ripple and spike



Note1. When OVP operation of CH8, AC input re-entry time interval ≥ 10 min after previous shut off.



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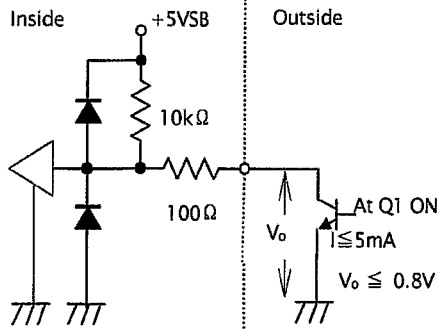
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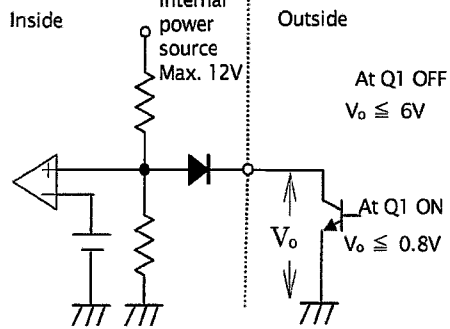
## Signal Input/Output Specification

Item	Specification
Input	PS_ON CH1 to 7 are output upon receipt of 'L'. CH1 to 7 shut down upon receipt of 'H' or 'OPEN'.
	+3.3 A SENSE Input terminal for Voltage detection of CH1 (+3.3 A) output to Compensate the Voltage drop of +side cable by connecting to the +side load end. (Refer to "current rating table for load connection pins" on the other page)
	FAN_C Control terminal of a fan motor. Fan motor operates at a maximum speed upon receipt of 'L'.
Output	PWR_OK 'H' is delivered when output is normal.
	AC_FAIL 'OPEN' is delivered when AC input lowers or power failure is detected. Detection Voltage: 80V AC or less. Detection delay time: 20 to 40ms after AC failure
	FAN_M Two pulse waves are delivered per 1 rotation of a fan motor. Duty ratio for the pulse shall be 0.5 (typical). The signal remains 'L' or 'OPEN' when the fan stops operating due to malfunction.

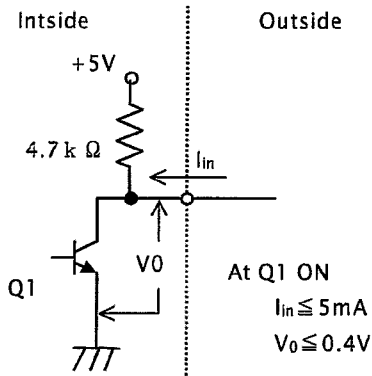
PS\_ON signal input circuit



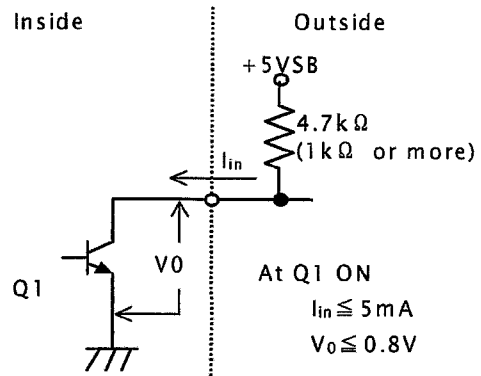
FAN\_C signal input circuit



PWR\_OK signal output circuit



FAN\_M signal output circuit



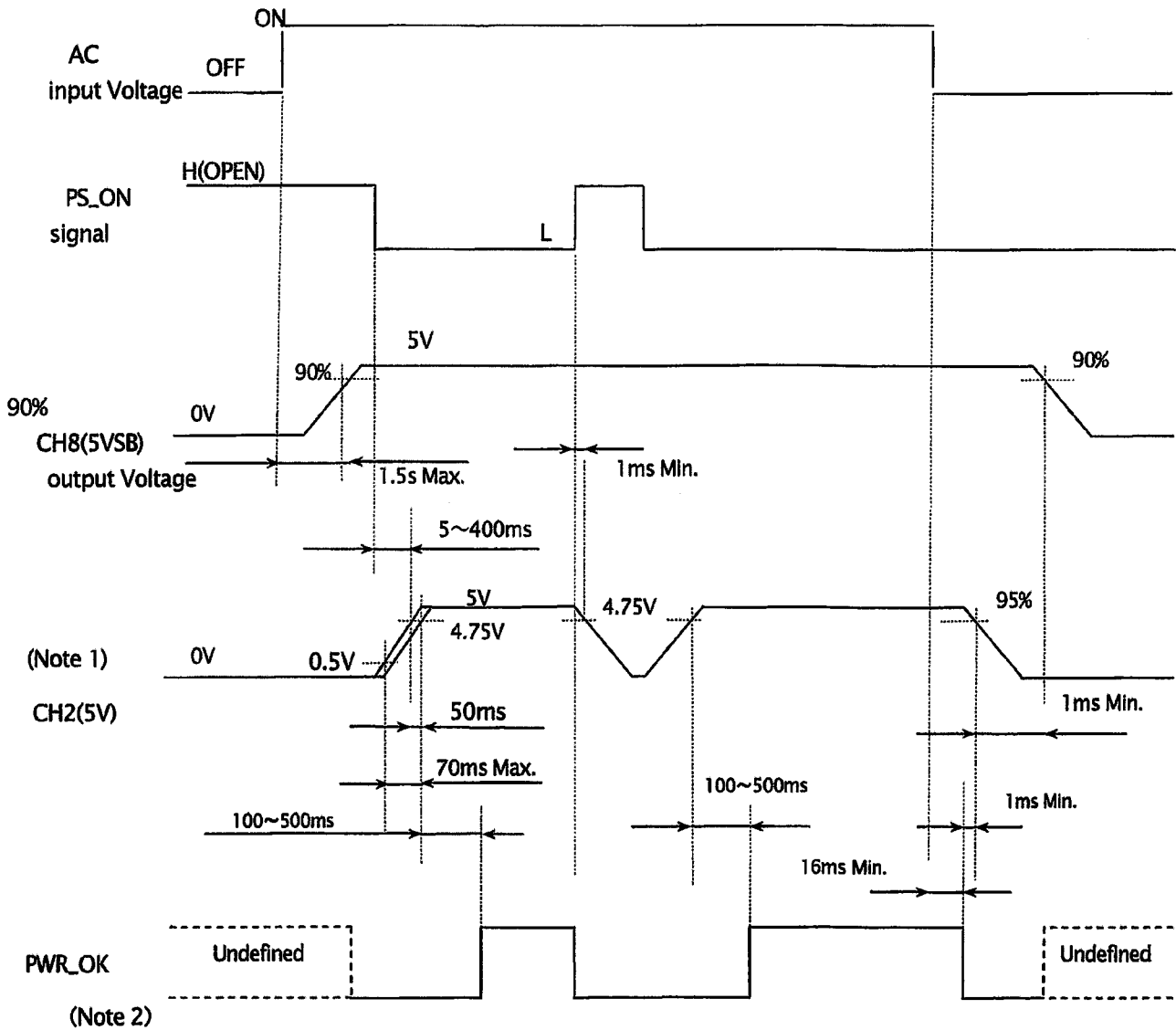
Drawn by <b>Arino</b>	Reviewed by <i>nishi</i>	Approved by <i>Tatsumi</i>	Drawing No. <b>6162-01-4-520</b>	<b>3 / 7</b>
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## Power Supply Timing (At rated input and output)



Note 1: Outputs other than CH2(+5 V) shall follow this except for the Voltage Value, and difference in rise time from CH2(+5 V) shall be 50ms or less. In addition, output Voltage level of CH2 (+5 V) and CH3 (+12 V1)–CH6 (+12 V4) shall be at or above that of CH1 (+3.3 V).

⚠ However, order and difference in level of output Voltage for each output Voltage at falling shall not be specified.

Note 2: Rise time of PWR\_OK signal shall be 100μs or less. (provided that capacitive load is not connected to PWR\_OK signal output)



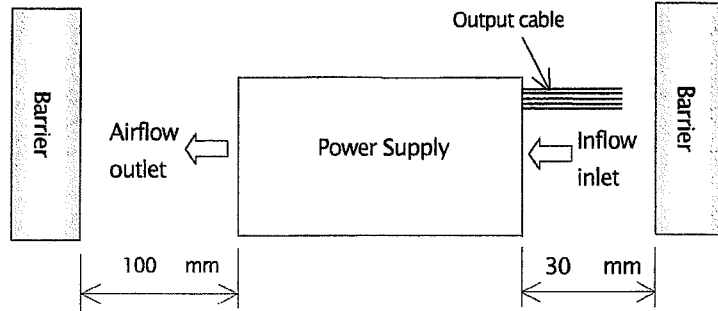
Drawn by <b>Arino</b>	Reviewed by 	Approved by 	Drawing No. <b>6162-01-4-520 A</b>	<b>4 / 7</b>
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# Product Specification

## Installation

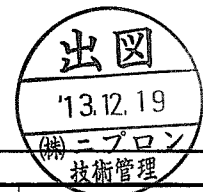
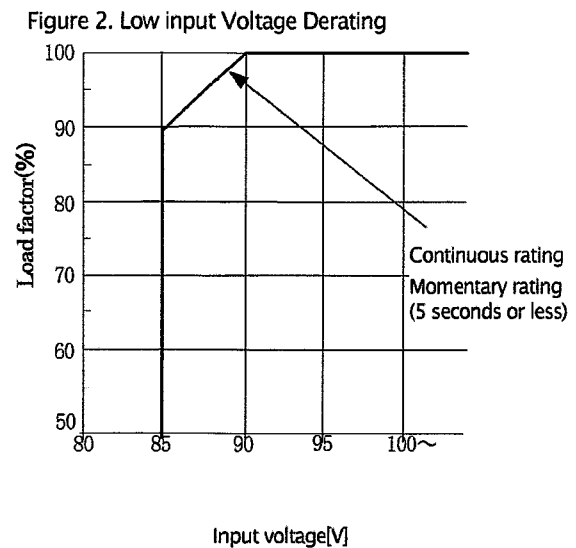
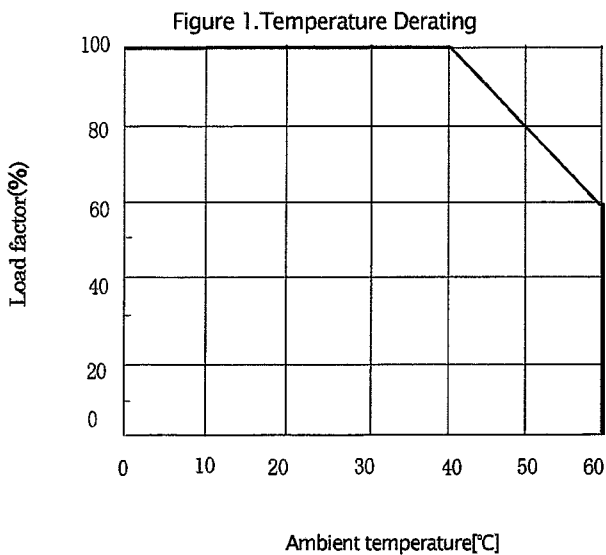
1. When installing the power supply, make sure that the distance between airflow-inlet/outlet of this unit and the adjacent barriers keeps the dimensions below at minimum.
2. Make sure to install the power supply in a position where temperature near the airflow inlet does not exceed the maximum operating 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. For continuous rating, however, max. output current for each CH specified in the "output specification" including +5 VSB shall be 100% of load factor. Also, total of max. output current of CH1 and 2, and CH3 to 7, and total of max. output power of CH1 to 7 shall be 100% of load factor. In the same way, momentary output current Value for each channel shall be 100% of load factor. Also, total of momentary output current of CH1 and 2, and CH3 to 6, and total momentary output power of CH 1 to 7 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 1.
2. When using with continuous and instantaneous rating (within 5 seconds or less) at or below 90V, follow the solid-line of derating curve below. Also, if the ambient temperature exceeds 40°C, follow the load factor that is gained by multiplying the load factor in Fig. 1 and the one in Figure 2.



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# Product Specification

## 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	+3.3 V SE	-	+3.3 v Sensing input
	3	+12 V4	6.0 A	
	4	+5 V	6.0 A	
	5	+5 V	6.0 A	
	6	COM	6.0 A	
	7	COM	6.0 A	
	8	COM	6.0 A	
	9	COM	6.0 A	
	10	-12 V	0.6A	
	11	+5 VSB	4.0A	
	12	+3.3 V	6.0 A	
	13	+3.3 V	6.0 A	
	14	+12 V4	6.0 A	
	15	+5 V	6.0 A	
	16	+5 V	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	-	Signal output
	22	PS_ON	-	Signal input
MAIN2 (Output2)	1	+5 V	6.0 A	
	2	+3.3 V	6.0 A	
12V1-3 (Output 3-5)	1	COM	6.0 A	
	2	COM	6.0 A	
	3	COM	6.0 A	
	4	COM	6.0 A	
	5	+12 V#	6.0 A	#: Same as connector number
	6	+12 V#	6.0 A	#: Same as connector number
	7	+12 V#	6.0 A	#: Same as connector number
	8	+12 V#	6.0 A	#: Same as connector number
HD1-2 (Output 6-7)	1	+3.3 V	6.0 A	
	2	+5 V	6.0 A	
	3	COM	6.0 A	
	4	COM	6.0 A	
	5	+12 V4	6.0 A	
	6	+3.3 V	6.0 A	
	7	+5 V	6.0 A	
	8	COM	6.0 A	
	9	COM	6.0 A	
	10	+12 V4	6.0 A	
SIG (Output 8)	1	AC_FAIL	5mA	
	2	NC	-	
	3	NC	-	
	4	FAN_C	-	
	5	FAN_M	5mA	
	6	PS_ON	5mA	
	7	COM	2.0A	
	8	+3.3 VSE	-	
	9	NC	-	
	10	+5 VSB	2.0A	



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# Product Specification

## Precaution before use

### 1. 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. Electric shock

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. 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. 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. Regarding the sound from the power supply

It might arise high-frequency sound during applying current that is the switching show up on the transformer.

This switching generates the function when it makes the power consumption of supplemental power supply for stand-by reduced. 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.

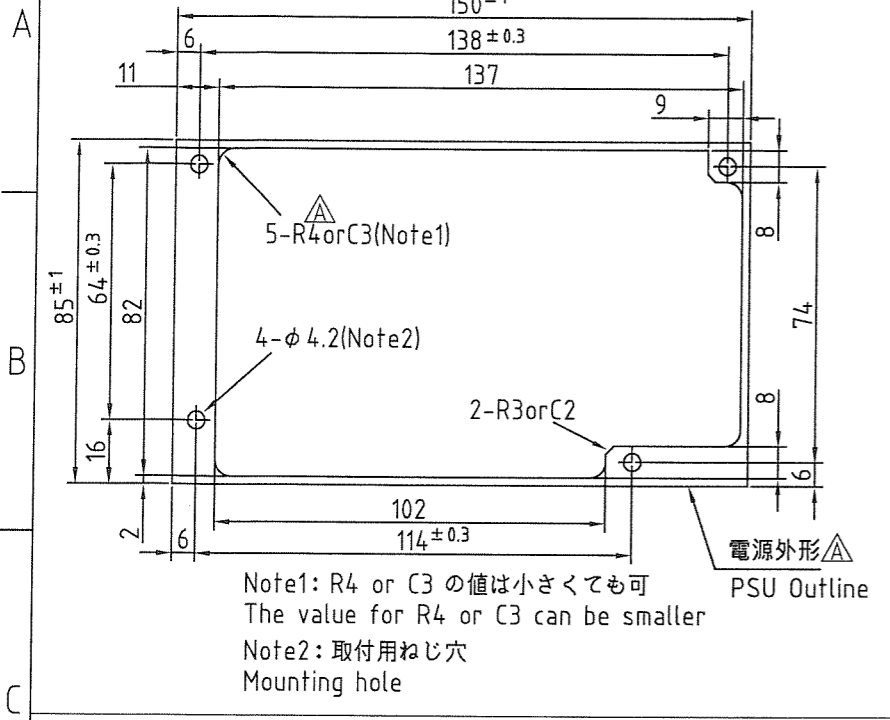


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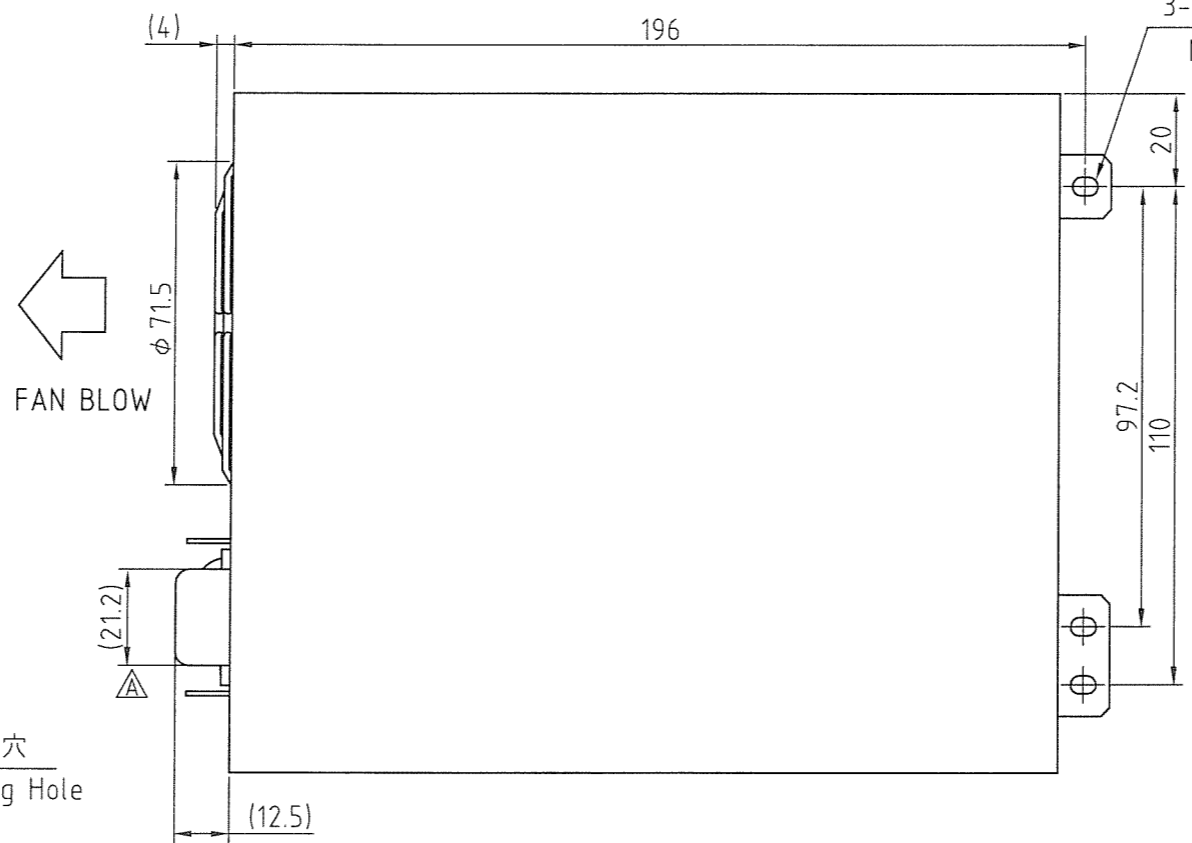
推奨電源取り付け穴加工図

How to process the mounting holes(Recommended)

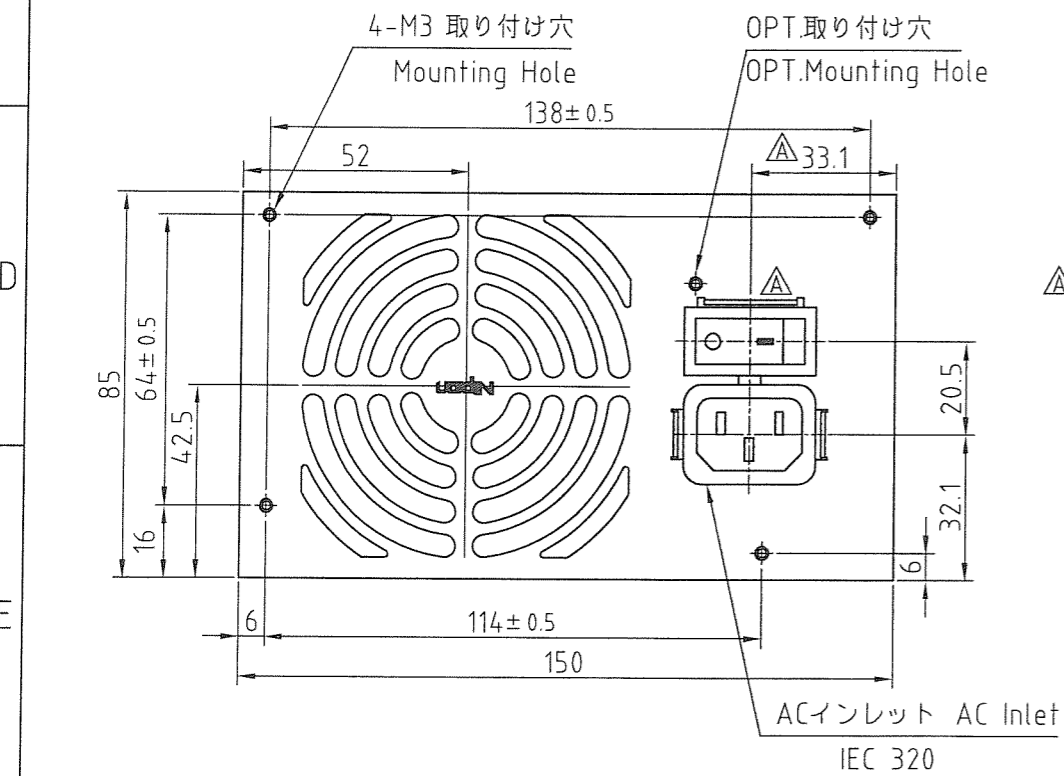
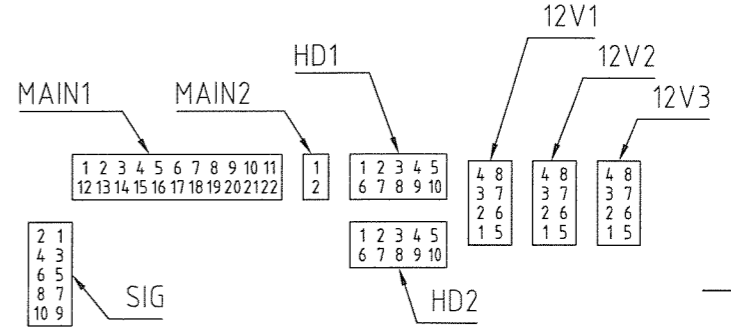


Note1: R4 or C3 の値は小さくても可  
The value for R4 or C3 can be smaller  
Note2: 取付用ねじ穴  
Mounting hole

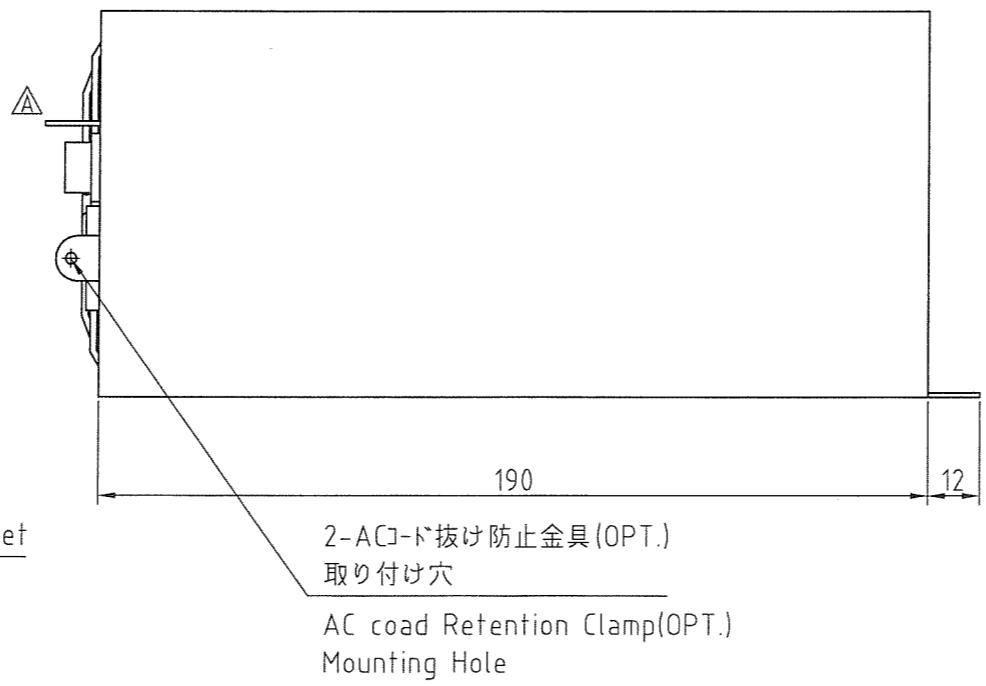
電源外形 △  
PSU Outline



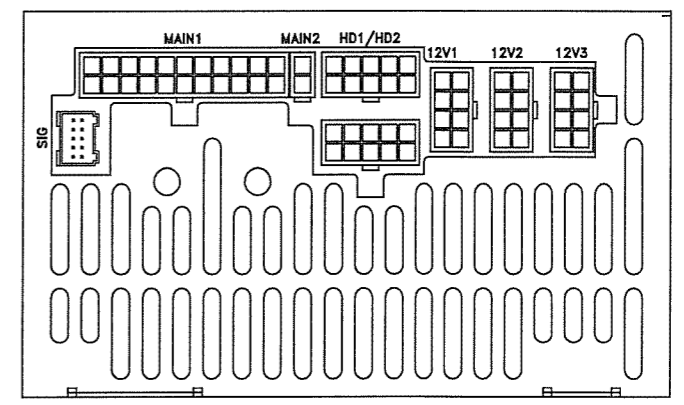
CN	Type
MAIN1	CP-01422150(CviLux) or Equivalent
MAIN2	CP-01402150(CviLux) or Equivalent
HD1-2	CP-01310130(CviLux) or Equivalent
12V1-3	CP-01308130(CviLux) or Equivalent
SIG	S10B-PADSS-1(JST) or Equivalent



ACインレット AC Inlet  
IEC 320



2-ACコード抜け防止金具 (OPT.)  
取り付け穴  
AC load Retention Clamp (OPT.)  
Mounting Hole



出図  
11.4.15  
技管  
ニプロ

B版 英文表記の追記 2011.04.12 I-220414 大前  
△×6 スリッパ保護部の追加 2010.12.21 I-221230 大前

×1: 指示なき寸法公差は ±1.0mm とする  
×2: 取り付けビスの電源内部長さは 5mm MAX.  
×1: Dasing tolerance of dimensions is ±1.0mm  
×2: The screw depth of penetration into PSU is 5mm MAX.

DRAWN BY	CHECKED BY	CHECKED BY	APPROVED BY	SCALE	MATERIALS	TITLE	DRAWING NO.
大前	西	有野	唇	UNITS m/m			
ISSUED	2010.08.19			3RD ANGLE PROJECTION	FINISH	6162-01-3-050	B