Product Specification

Model: mHPCSF-400P-X2S	Created: December 22nd, 2015

Scope

This specification applies to built-in DC stabilized power supply, mHPCSF-400P-X2S*.
All items in this specification shall be provided at normal temperature and humidity unless otherwise specified.

General Specification

	Items	Specification and Standard	Measurement conditions, etc.
Input Specification	Rated voltage	100 to 240Vac	Worldwide range
	Permitted range	85 to 264Vac	(*Note 1*)
	Input current	3.8A typical at 100Vac input and 1.6A typical at 240Vac input.	
	Rated frequency	50/60 Hz	Permitted range: 47Hz to 63Hz
	Inrush current (*Note 2*)	31A peak or less at 100Vac input. 75A peak or less at 240Vac input.	Input reclosing interval shall be 10 seconds minimum at rated load. Cold start (25 °C)
	Power factor Efficiency	96% minimum at 100V input and 90% minimum at 240Vac input. 82% typical at 100V input and 85% typical at 240Vac input.	At rated output.
	Standby power	0.1 W maximum	(*Note 3*)
Environment	Operating temp. /humidity	0 to 60°C /10 to 90%RH	There shall be no condensation. (*Note 4*)
	Storage temp. /humidity	-20 to 70°C/10 to 95%RH	There shall be no condensation.
	Vibration	It is to endure an acceleration of 2G with a vibration frequency of 10 to 55Hz for 10 sweep cycles 10 times in the X-,Y-, and Z-directions.	JIS-C-60068-2-6 At no operation.
	Impact (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.	JIS-C-60068-2-31 At no operation.
Insulation	Insulation resistance	50MΩ or more between Input and FG/Output.	At 500Vdc
	Dielectric strength	1.5kVac for one minute between Input and FG/Output.	Cut-off current is 10mA.
	Leakage current	0.2mA or less at 100Vac input, 0.4mA or less at 200Vac input, and 0.5mA or less at 240Vac input.	IEC60601 compliant
EMS / EMI	Line noise immunity	Impulse of ±2,000V (10 minutes each for pulse width of 100ns and 1000ns, cycle period of 30 to 100Hz, and normal/common mode with positive/negative polarity).	Measured with INS-410. There shall be no fluctuation or malfunction of output.
	Surge immunity	IEC 61000-4-5 Installation Environment Class 3 compliant. Apply 5 times each of ±2kV common mode and ±1kV normal mode.	There shall be no malfunction or breakdown at 100V and 240V ac input.
	Electrostatic discharge immunity	IEC 61000-4-2 Test Level 3 compliant. Contact discharge: with ±6kV for 10 times.	There shall be no malfunction or breakdown at 100Vac and 240Vac input.
	Conducted emission	VCCI/FCC/CISPR22-B/EN55022 Class B compliant.	Measured with power supply single body.
	Harmonic current regulation	IEC 61000-3-2 Class D compliant.	At rated input and output
Others	Safety standard	UL60601-1(ANSI/AAMI 60601-1),CSA60950 (c-UL) acquire, EN60601-1 compliant and CE marking	Class I equipment and built-in type power supply. UL FILE No. E358786
	Cooling system	Forced-air cooling.	Rotation of fan will change depending on ambient temperature and loads conditions.
	Dimensions	125 (W)×63.5 (H)×125 (D)	Except for projection. Refer to the outline drawing.
	Weight	1.0kg typical	
	Reliability grade	FA	It is to follow our standard.
	Lifetime expectancy	10 years minimum (parts with short lifetime expectancy are electrolytic capacitors: 10 years minimum and fan motor: 10 years minimum)	Life expectancy when used at AC100V input/rated output with 25°C ambient temperature.
	M.T.B.F.	80,000 hours minimum.	Based on EIAJ RCR-9102.
	Warranty	3 years after delivery. However, if any faults belong to us, the defective unit shall be repaired or replaced at our cost.	Except for errors caused by operation not specified in this specification..

Note 1. For the lower limit of Input voltage at continuous rated load and Peak rated load, follow the 'derating conditions' on page 5.
Note 2. Inrush current, 100μs or less, into X-capacitors of input noise filter is not specified here.
Note 3. At rated input, PS_ON = 'H' and 5VSB is no load
Note 4. If the ambient temperature exceeds 40°C, follow the 'derating conditions' on page 5.

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Nipron Co., Ltd.

Product Specification

Model:	mHPCSF-400P-X2S	Created:	December 22nd, 2015

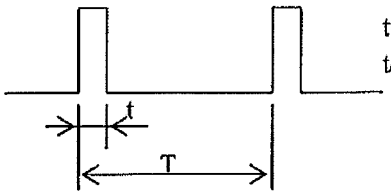
Output Specification (Voltage is measured at output connector terminal. Voltage drop of the load side due to contact resistance is not included.)

		Items	CH1	CH2	CH3	CH4	CH5 (5VSB)	Measurement conditions, etc.
Output Rating		Rated voltage [V]	+3.3	+5	+12	-12	+5	
		Minimum current [A]	0	0	0	0	0	See 'minimum loads conditions' on page5
	Rating	Rated current [A]	8	8	19	0.5	2.0	Reference value at measurement of Input/Output characteristics.
	Rating	Rated output power [W]	26.4	40	228	6	10	
	Continuous max rating	Max. current [A]	16	16	25	0.5	2.0	
	Continuous max rating	Max. output power [W]	90		300	6	10	Continuous rating. Maximum total output power is 310W (See 'derating conditions' on page 5)
	Continuous max rating	Max. output power [W]	300					
	Continuous max rating	Max. output power [W]	310					
	Peak rating	Peak current [A]	20	20	30	0.5	3.0	
	Peak rating	Peak power [W]	120		360	6	15	Peak rating is less than 5 seconds. Peak total output power is 400W. (see Figure 1 below and 'derating condition' on page 5).
	Peak rating	Peak power [W]	385					
	Peak rating	Peak power [W]	400					
Output Characteristics		Total rated voltage accuracy [%]	±5	±5	±5	±5	±5	Accuracy against output voltage value including temperature and time-lapse drifts as well as Input / load regulation.
		Ripple voltage [mVp-p]	50 max.	50 max.	120 max.	120 max.	50 max.	Connect an electrolytic capacitor (47μF) and a ceramic capacitor (0.1uF) on the test board and measure with a 100MHz oscilloscope. The test board shall be separated from the load wire and placed within 150mm from the output terminal.
		Ripple and Spike voltage [mVp-p]	100 max.	100 max.	170 max.	170 max.	100 max.	
Protection Circuit/ Others	OCP	OCP point [A]	21 min.	21 min.	31 min.	Short circuit protection		At no loads except for measured CH
	OCP	Method	CH1 to CH4 outputs shut down			Hold-down current limiting	All outputs shutdown	When CH5 is shorted, all outputs will shut down (automatic recovery)
	OCP	Recovery method	Re-entry of AC input or PS_ON#			Automatic recovery		Wait at least 10 seconds before reclosing
	OVP	OVP point [V]	3.76 to 4.3	5.74 to 7.0	13.4 to 15.6	-	(7.0)	
	OVP	Method	CH1 to CH4 outputs shut down			-	Zener diode clamp	
	OVP	Recovery method	Re-entry of AC input or PS_ON#			-	-	Wait at least 10 seconds before reclosing
		Low voltage lock-out	-					
		Insulation among GND terminals	Connection is common for all outputs					Common with the power supply chassis

Figure 1. Duty Ratio of Peak Output Current/Power

Peak output current/power shall be 5 seconds maximum.

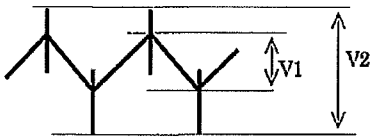
For repetitive peak loads, duty ration shall be 10% or less.



t≦5 seconds

t/T≦0.1

Figure 2 Definition of ripple and spike



Ripple : V1 (p-p)

Noise : V2-p)

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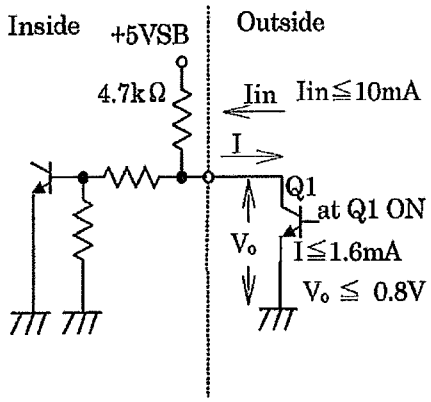
Product Specification

Model: mHPCSF-400P-X2S	Created: December 22nd, 2015

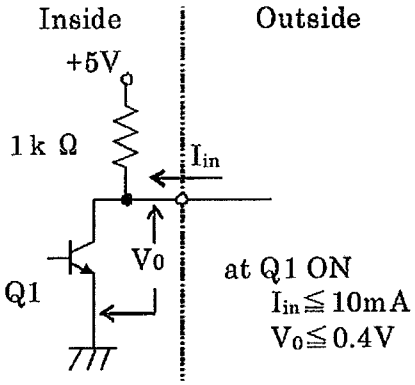
Signal Input/Output Specification

	Items	Specification
Input	PS_ON#	CH1 to 4 outputs will turn on at 'L' signal input. CH1 to 4 will shut down with 'H' or 'OPEN' signal input.
	+3.3V SENSE	Voltage-detecting input terminal for CH1 (+3.3V) output. It compensates the voltage drop of + side cable by connecting to the + side of load end.
	FAN_C	Fan motor control terminal. Fan motor will be forced to rotate at maximum speed at 'L' signal input.
Output	PWR_OK	'H' signal is delivered when CH2 (+5V) output is ON.
	FAN_M	Two cycles of square wave are delivered per one rotation of the fan motor. Duty ratio of square wave shall be 0.5 (typical) - OPEN COLLECTOR output. The signal stops 'L' or 'OPEN' when the fan stops operating due to malfunction.

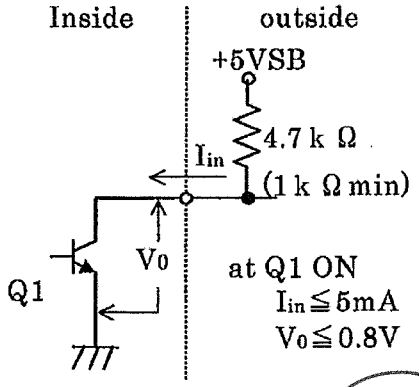
PS_ON signal input circuit



PWR_OK signal output circuit



FAN M signal output circuit



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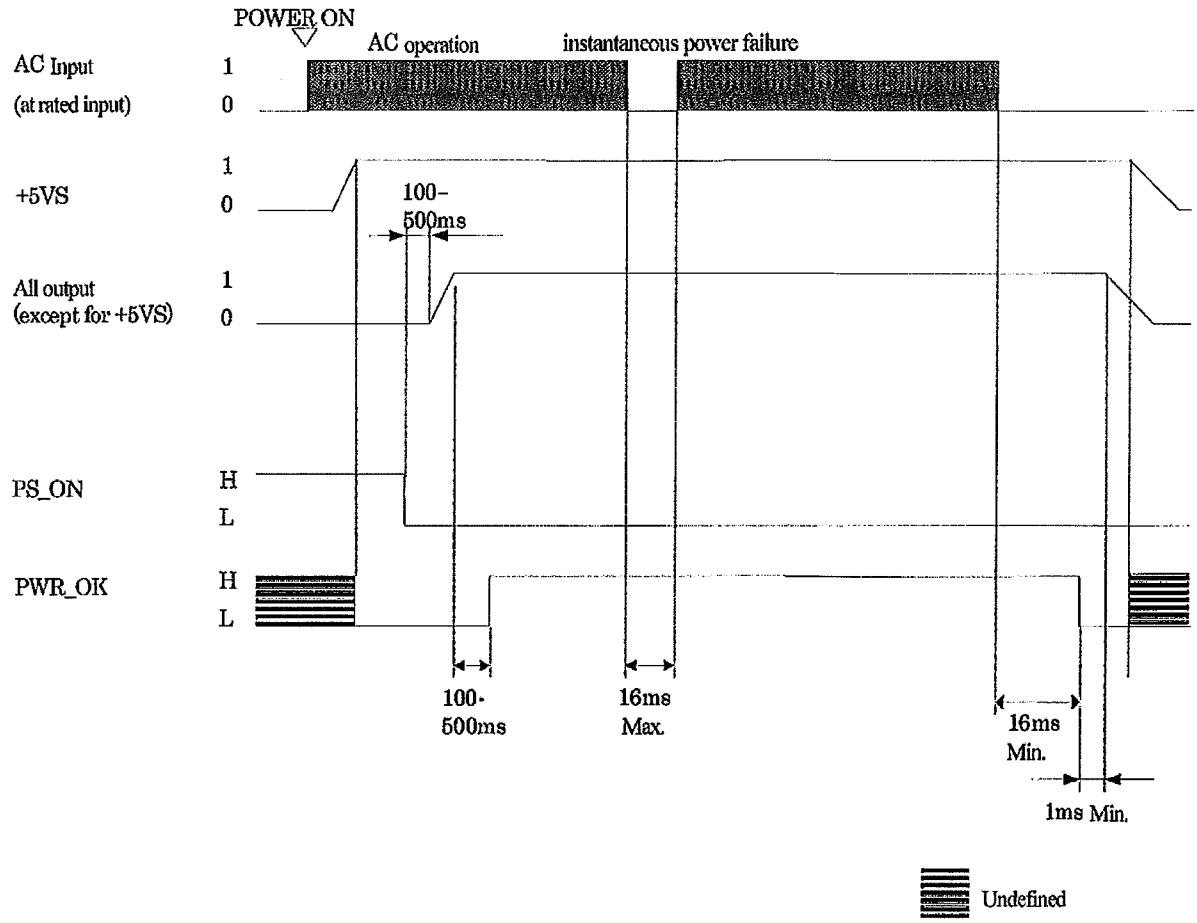
Product Specification

Model: mHPCSF-400P-X2S	Created: December 22nd, 2015

Sequence Timing Diagram (Items are provided at rated Input and Output)



Note 1. Rising time difference among outputs shall be 50ms max.
The output voltage level at raising of CH3 (+12V) shall be at or above that of CH1 (+3.3V). Also, difference in output voltage level between CH2 (+5V) and CH1 (+3.3V) shall be above -0.6V and 2.25V or less.
However, orders and differences in level of output voltage for each output voltage at falling shall not be specified.

Note 2. Rise time and of PWR_OK signal shall be 10ms or less (provided that capacitive load is not connected to PWR_OK signal output).

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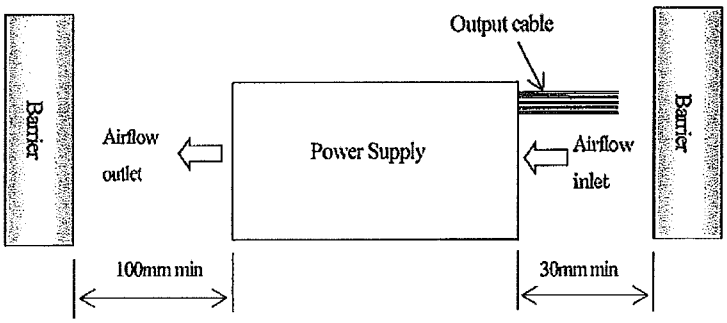
Product Specification

Model: mHPCSF-400P-X2S	Created: December 22nd, 2015

Installation

1. When installing the power supply, make sure that the distance between airflow inlet/outlet and adjacent barriers keep 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 a power supply at high temperature or at low input voltage, follow the items (items 1 to 2) below to derate output current and power.
For continuous rating, however, max. output current for each CH specified in the "output specification" including +5VSB shall be 100% of load factor.

1. When the ambient temperature around the air flow inlet exceeds 40°C, both the continuous rating and peak rating should follow the derating curve shown in Figure 1 below.
2. When using with continuous or peak rating (5 seconds max.) at or below 90V, follow the derating curve in Figure 2. In addition, when the ambient temperature exceeds 40°C, follow the load factor to multiply the load factor in Figure 2 by that in Figure 1.

Minimum loads conditions

The accuracy of output voltage CH2(-12V) is defined by the range shown in Figure 3. Minimum loads conditions

Figure 1. Temperature derating chart

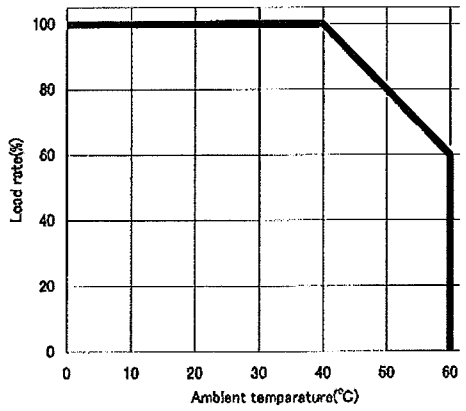


Figure 2. Low Input voltage Derating chart

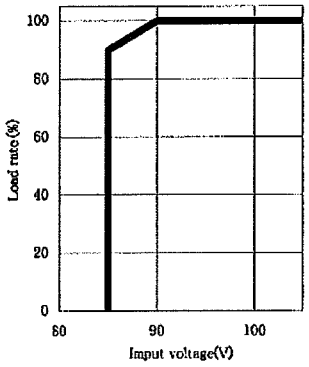
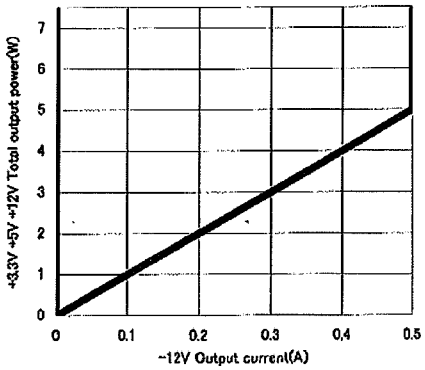


Figure 3. Minimum loads conditions



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Product Specification

Model: mHPCSF-400P-X2S	Created: December 22nd, 2015

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. pin current	Note
MAIN 1 (Output 1)	1	+3.3V	6.0A	
	2	+3.3V Sense	-	+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	2.0A	
	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	10 mA	Signal output
	22	PS_ON#	10 mA	Signal input
MAIN 2 (Output 2)	1	+5V	6.0A	
	2	+3.3V	6.0A	

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Product Specification

Model: mHPCSF-400P-X2S	Created: December 22nd, 2015

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. pin current	Note
12V (Output 3)	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 4)	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	
SIG (Output 5)	1	NC	-	
	2	NC	-	
	3	NC	-	
	4	FAN_C	-	Signal input
	5	FAN_M	5 mA	Signal output
	6	PS_ON#	10 mA	Signal input
	7	COM	2.0A	
	8	+3.3V Sense	-	+3.3V sensing input
	9	NC	-	
	10	+5VSB	2.0A	

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Product Specification

Model: mHPCSF-400P-X2S	Created: December 22nd, 2015

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 (chassis) for safety.

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 power 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 limit circuit ⚠Caution
   Inrush prevention circuit is used to limit surge current into the smoothing capacitors when AC input is turned on. If Input is turned on again before the specified time interval after input failure, surge current protection may not work. As a result, excessive surge current may break the power supply. Make sure to take enough input reclosing interval as specified.

5. Acoustic noise at power-on and power-off
   A low frequency sound may be observed at AC input or power-on/off by PS_ON signal; this noise is caused by low frequency vibration of chokes for preventing harmonic current. A similar low frequency noise may be observed while being energized (at operation and standby). These noises, however, do not cause any damage to the function and lifespan of the power supply.

6. Handling of the output cables
   Do not grab only the output cables connected to the output connector as you move or carry the power supply.
   Hold the body of the power supply when you move or cany.

7. Coverage of safety standard
   This power supply is designed and product as medical standard equipment.
   Electrical specification of this power supplr is equivalent to 'HPCSF-400P-X2S' for information technology equipment.

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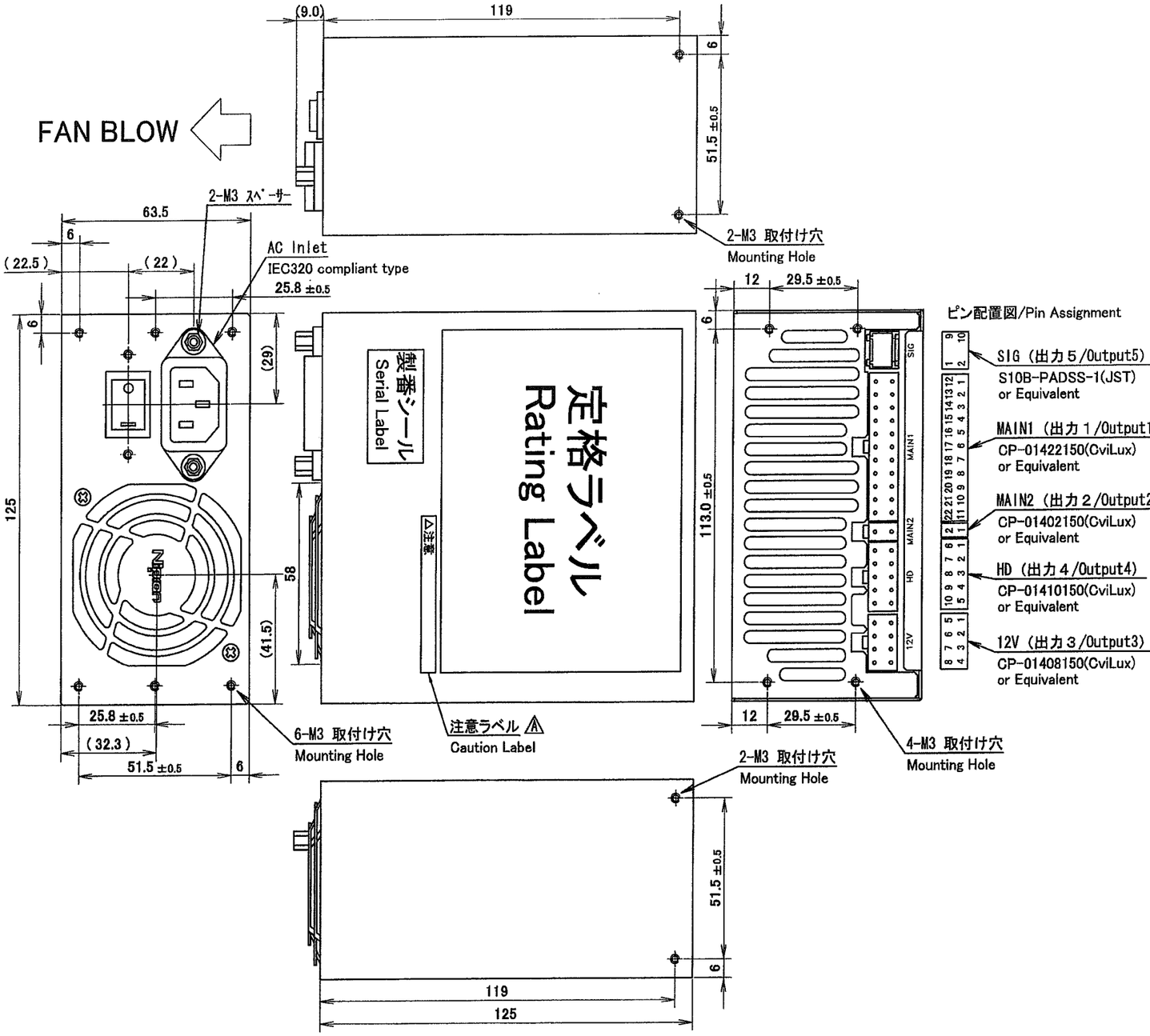
Nipron

FAN BLOW



ピン配置図/Pin Assignment

SIG (出力5/Output5)
S10B-PADSS-1(JST)
or Equivalent

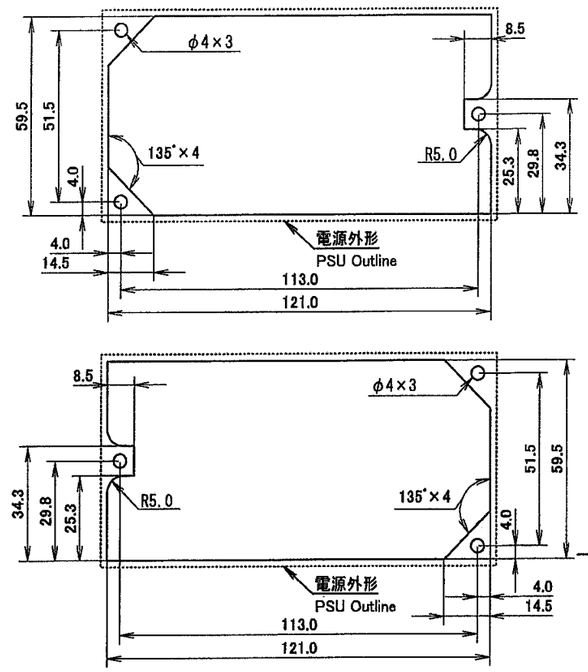
MAIN1 (出力1/Output1)
CP-01422150(CviLux)
or Equivalent

MAIN2 (出力2/Output2)
CP-01402150(CviLux)
or Equivalent

HD (出力4/Output4)
CP-01410150(CviLux)
or Equivalent

12V (出力3/Output3)
CP-01408150(CviLux)
or Equivalent

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



出図
'16.1.13
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B版 ⚠B ×1：2016.01.07 内田 I-280102
A版 ⚠A ×1：2012.09.10 梅木 I-240657A

DRAWN BY	CHECKED BY	CHECKED BY	APPROVED BY	SCALE	※	MATERIALS	⚠B	(m)HPCSF-400P-X2S1
大前	森貴	石川	有野	UNITS	m/m	FINISH	TITLE	外形図/Outline Drawing
ISSUED 2012.05.17				3RD ANGLE PROJECTION		———	DRAWING NO.	6164-03-3-050 B

*1 特に指示がない寸法公差は ±1mm とする
Desing tolerance of dimensions is ±1mm
*2 取り付けﾋﾞｽの電源内部長さは 6mm MAX.
The screw depth of penetration into PSU is 6mm MAX.

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