Product Specification

Model HPCFX-350P-X2B	Created: January 31, 2019

Scope
This specification applies to built-in DC stabilized power supply, HPCFX-350P-X2B.
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 240V AC	Worldwide range
	Permitted range	85 to 264V AC	(Note 1)
	Input current	2.9A typ. at 100V AC input 1.2A typ. at 240V AC input	
	Rated frequency	50 /60 Hz	Permitted range: 47Hz to 63Hz
	Inrush current (Note2)	50A peak or less at 100V AC input 100A peak or less at 240V AC input	At rated input/output Cold start at 25℃
	Power factor Efficiency	96%min. at 100V AC input 90%min. at 240V AC input 82%typ. at 100V AC input 87%typ. at 240V AC input	At rated output
	Standby power	0.5 W max.	(Note 3)
Environment	Operating temp. / humidity	0 to 60℃ / 10 to 90% RH	There shall be no condensation. (Note 4)
	Storage temp. / humidity	-20 to 70℃ / 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 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 500V DC
	Dielectric strength	1.5kV AC for one minute between Input and FG/Output	Cut-off current is 10mA
	Leakage current	1.0mA or less at 100V AC input, 2.0mA or less at 200V AC input, 2.4mA or less at 240V AC input	IEC62368 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).	There shall be no fluctuation in DC-component of output or no malfunction.
	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 100 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 100 and 240V AC input.
	Conducted emission	VCCI/FCC/CISPR32-B ／ EN55032 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	UL62368,CSA62368(c-UL),CE marking EN62368,PSE compliant.	Class I equipment and built-in type power supply.
	Cooling system	Forced-air cooling.	Rotation of fan will change depending on ambient temperature and loads conditions.
	Dimensions	81.5(W)x41(H)x150(D) (mm)	Except for projection. Refer to the outline drawing.
	Weight	0.7kg typ	
	Reliability grade	FA	To follow our standard.
	Lifetime expectancy	8 years min. (parts with short lifetime expectancy are electrolytic capacitors: 10 years min. and fan motor: 8 years min.)	Life expectancy when used at 100V AC input and rated output with 25℃ ambient temperature.
	M.T.B.F.	80,000 hours min.	Based on EIAJ RCR-9102
	Warranty	3 years after delivery. However, if any faults belong to us, defective unit shall be repaired or replaced at our cost.	Expect for errors caused by operation not specified in this specification.

Note1. For the lower limit of input voltage at continuous rated load and peak rated load, follow the 'derating conditions' on page 5.
Note2. Inrush current, 100μs or less, into X-capacitors of input noise filter is not specified here.
Note3. At rated input, PS_ON ='H' and 5VSB is no load.
Note4. If the ambient temperature exceeds 50℃, follow the 'derating conditions' on page 5.

承認 '19. 9. 19 (株)ニプロン 技術管理

Drawn by	Checked by	Approved by	Drawing No.	Sheet No.
Yodo	富山	有野	6200-11-4-520	1/ 8

Product Specification

Model HPCFX-350P-X2B	Created: January 31, 2019

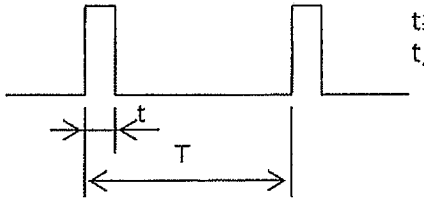
Output Specification

(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	
	Rating	Rated current (A)	8	8	14	0.5	1.0	Reference value at measurement of Input/Output characteristics.
		Rated output power (W)	26.4	40	168	6	5	
	Continuous max. rating	Max. current (A)	12	12	20	0.5	1.0	Continuous rating Maximum total output power is 245W (See 'derating conditions' on page 5) ※When used in backup applications, please decide the maximum output power considering the capacity of the battery pack.
		Max. output power (W)	66.4		240	6	5.0	
			240					
			245					
	Peak rating	Peak current (A)	16	16	28	0.5	2.0	Peak rating is less than 5 seconds. Peak total output power is 346W. (see Figure 1 below and 'derating conditions' on page 5)
		Peak power (W)	83		336	6	10	
			336					
			346					
Output characteristics	Total rated voltage accuracy (%)		±5	±5	±5	±10	±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 (47uF) 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.
	Spike voltage (mV p-p)		100 max.	100 max.	200 max.	200 max.	100 max.	
Protection circuit / Others	OCP	OCP point (A)	17 min.	17 min.	29 min.	Short circuit protection		At without loads except measured CH.
		Method	All output except CH5 shut down			Hold-down current limiting	All outputs shut down	When CH5 is shorted, all outputs will shut down (automatic recovery)
		Recovery method	Re-entry of AC input or PS_ON			Automatic recovery		Wait at least 270 seconds before reclosing.
	OVP	OVP point (V)	3.7 to 4.3	5.7 to 7.0	13.4 to 15.6	-	-	
		Method	All output except CH5 shut down			-	-	
		Recovery method	Re-entry of AC input or PS_ON			-	-	Wait at least 270 seconds before reclosing.
	Low voltage lock-out		-					
	Insulation between GNDs of each output		Connection is common for all outputs					Common with the power supply chassis

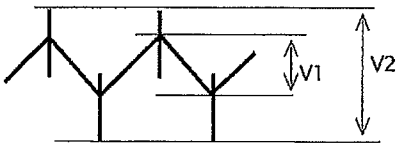
Figure 1. Duty ratio of Peak Output Current/Power

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)
Spike :V2 (p-p)

出図
'19. 9. 19
(株)ニプロン
技術管理

Drawn by	Checked by	Approved by	Drawing No.	Sheet No.
Yodo	畠山	有野	6200-11-4-520	2/ 8

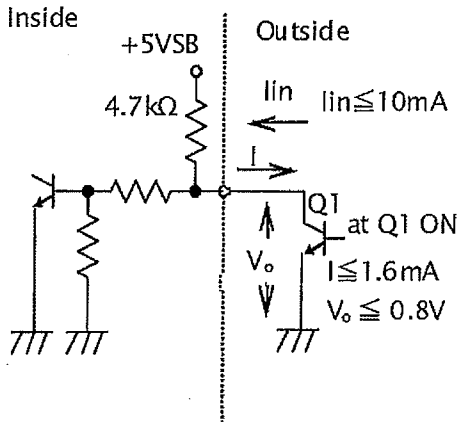
Model HPCFX-350P-X2B	Created: January 31, 2019

Signal Input/Output Specification

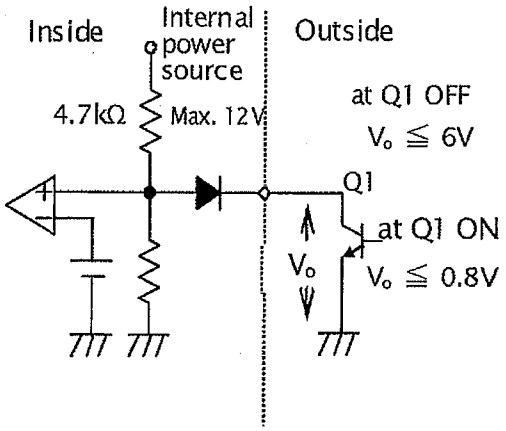
	Items	Specification
Input	PS_ON	CH1 to 4 outputs will turn on at ' L ' signal input. CH1 to 4 will shut down with ' H ' or ' OPEN ' signal input.
	+3.3V SENSE	Voltage-detecting input terminal for CH1(+3.3V) output. It compensates the voltage drop of + side cable by connecting to the + side of load end.
	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 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). The signal stops ' L ' or ' OPEN ' when the fan stops operating due to malfunction.

※ Make sure to connect the +3.3V SENSE to load end of CH1(+3.3V).
CH1(+3.3V) output may not enough for the spec.

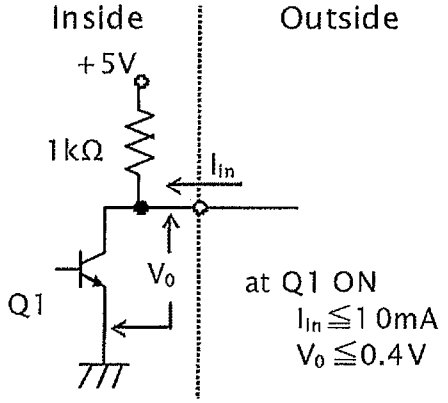
PS_ON signal input circuit



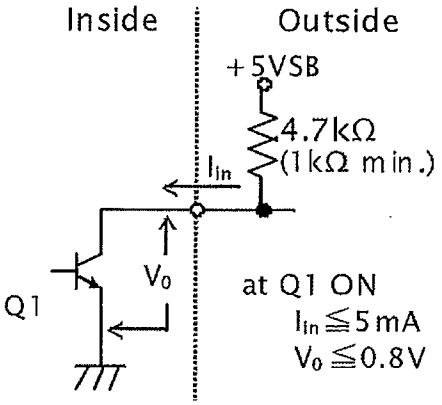
FAN_C signal input circuit



PWR_OK signal output circuit



FAN_M signal output circuit

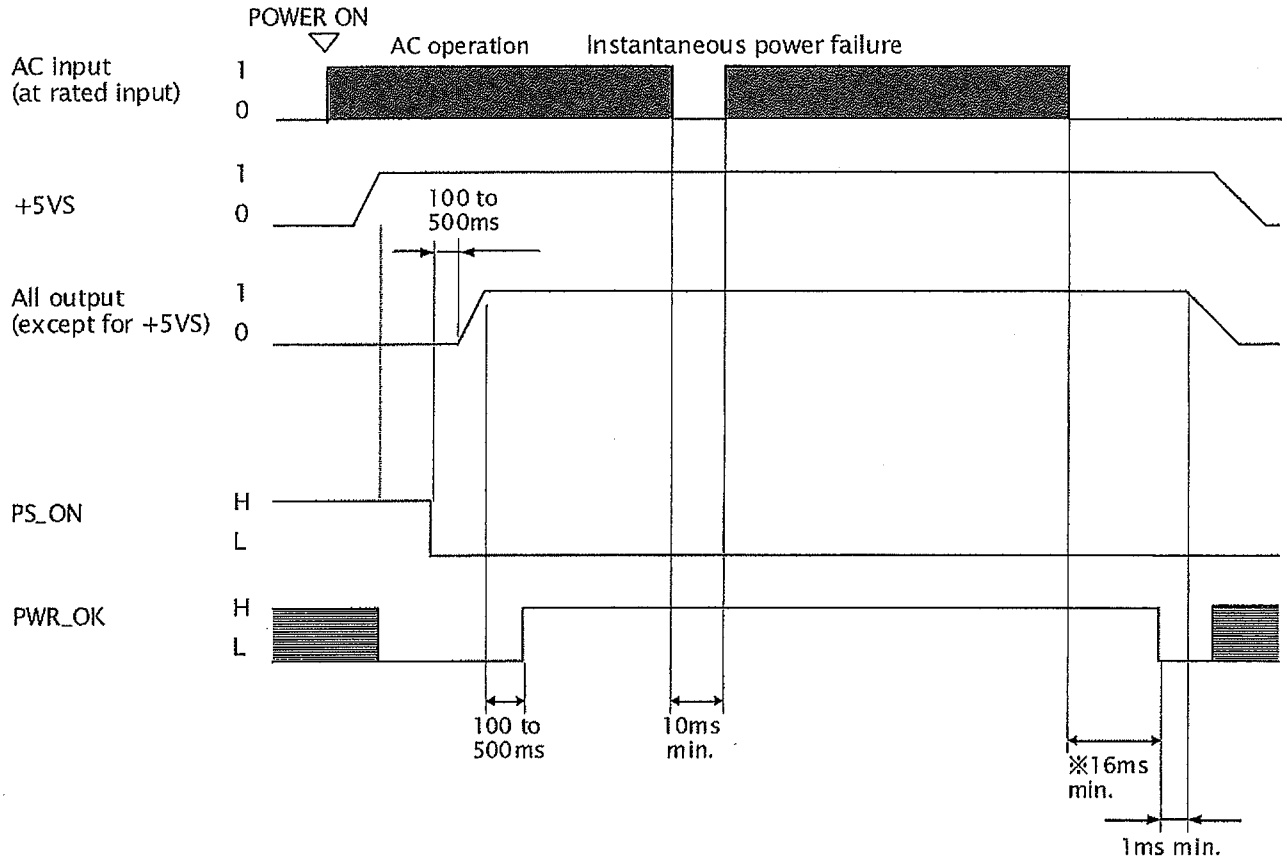


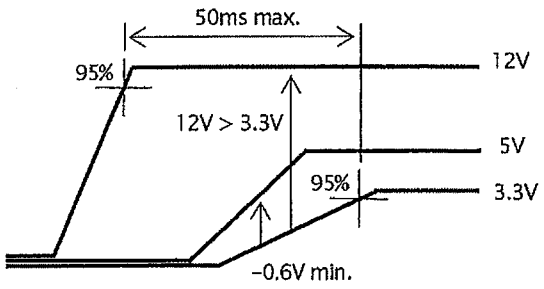
出図
'19.9.19
㈱ニプロン
技術管理

Drawn by	Checked by	Approved by	Drawing No.	Sheet No.
Yodo	畠山	有野	6200-11-4-520	3/ 8

Model HPCFX-350P-X2B	Created: January 31, 2019

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





Undefined

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.
However, orders and differences in level of output voltage for each output voltage at falling shall not be specified.

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

※Follow the 'derating conditions' on page 5.

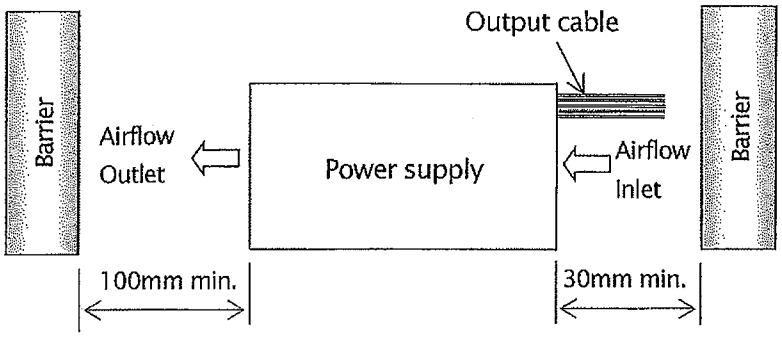
出図
'19.9.19
(株)ニプロン
技術管理

Drawn by	Checked by	Approved by	Drawing No.	Sheet No.
Yodo	畠山	有野	6200-11-4-520	4/ 8

Model HPCFX-350P-X2B	Created: January 31, 2019

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 under high temperature or at low input voltage, or when the holding time is required more than a certain amount, follow the item 1,2, and 3 below the 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 air flow inlet exceeds 50℃, both the continuous rating and peak rating should follow the derating curve shown in Figure 1 below.
2. When using at below 100V AC input voltage, follow the derating curve in Figure 2.
   In addition, when the ambient temperature exceeds 50℃,
   follow the load factor to multiply the load factor in Figure 2 by that in Figure 1.
3. As the holding time changes according to the load factor, when holding time is required,
   it should be used according to the load factor shown in Figure 3 below.
   For the load factor in Figure 3 below, the rated output power shall be 100%

Figure 1. Temperature Derating chart

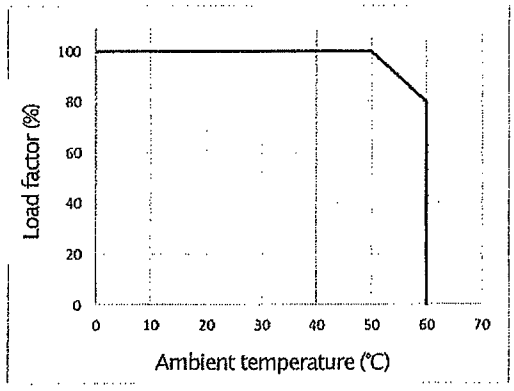


Figure 2. Low input voltage Derating chart

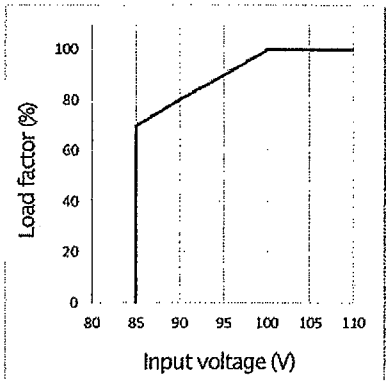
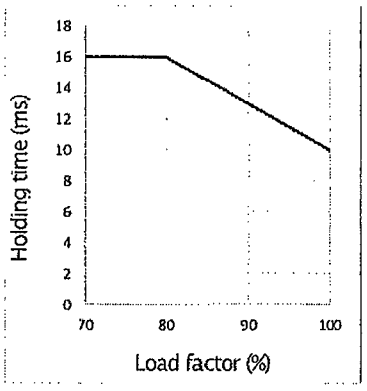


Figure 3. Holding time Derating chart



出図
'19.9.19
(株)ニプロン
技術管理

Drawn by	Checked by	Approved by	Drawing No.	Sheet No.
Yodo	畠山	有野	6200-11-4-520	5/ 8

Model HPCFX-350P-X2B	Created: January 31, 2019

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 No.	Output signal name	Max. pin current (Peak)	Note
MAIN (Output 1)	1	+3.3 V	5.0 A (7.0A)	
	2	+3.3 V	5.0 A (7.0A)	+3.3V sensing input
	3	COM	6.0 A (8.4A)	
	4	+5V	5.0 A (7.0A)	
	5	COM	6.0 A (8.4A)	
	6	+5V	5.0 A (7.0A)	
	7	COM	6.0 A (8.4A)	
	8	PWR_OK	10 mA	
	9	+5VSB	1.0 A (2.0A)	
	10	+12V	6.0 A (8.4A)	
	11	+12V	6.0 A (8.4A)	
	12	+3.3 V	5.0 A (7.0A)	
	13	+3.3 V	5.0 A (7.0A)	
		+3.3 V SENSE	—	+3.3V sensing input
	14	-12V	0.5 A	
	15	COM	6.0 A (8.4A)	
	16	PS_ON	10 mA	
	17	COM	6.0 A (8.4A)	
	18	COM	6.0 A (8.4A)	
	19	COM	6.0 A (8.4A)	
	20	—	—	NC
	21	+5V	5.0 A (7.0A)	
	22	+5V	5.0 A (7.0A)	
	23	+5V	5.0 A (7.0A)	
	24	COM	6.0 A (8.4A)	

※ If current concentrates on a specific pin, it will cause heat generation etc.
Please evaluate sufficiently in the actual machine so that the effective value and the peak value of the current flowing to each pin do not exceed the specified value.

出図
'19.9.19
㈱ニプロン
技術管理

Drawn by	Checked by	Approved by	Drawing No.	Sheet No.
Yodo	畠山	有野	6200-11-4-520	6/ 8

Model HPCFX-350P-X2B	Created: January 31, 2019

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 No.	Output signal name	Max. pin current (Peak)	Note
12V (Output 2)	1	COM	6.0 A (8.4A)	
	2	COM	6.0 A (8.4A)	
	3	+12V	6.0 A (8.4A)	
	4	+12V	6.0 A (8.4A)	
HD (Output 3)	1	+3.3V	6.0 A (8.4A)	
	2	+5V	6.0 A (8.4A)	
	3	COM	6.0 A (8.4A)	
	4	COM	6.0 A (8.4A)	
	5	+12V	6.0 A (8.4A)	
	6	+3.3V	6.0 A (8.4A)	
	7	+5V	6.0 A (8.4A)	
	8	COM	6.0 A (8.4A)	
	9	COM	6.0 A (8.4A)	
	10	+12V	6.0 A (8.4A)	
SIG (Output 4)	1	FAN_C	5 mA	
	2	FAN_M	5 mA	
	3	+5VSB	10 mA	
	4	COM	10 mA	

※ If current concentrates on a specific pin, it will cause heat generation etc.
Please evaluate sufficiently in the actual machine so that the effective value and the peak value of the current flowing to each pin do not exceed the specified value.

出図
'19.9.19
㈱ニプロン
技術管理

Drawn by	Checked by	Approved by	Drawing No.	Sheet No.
Yodo	畠山	有野	6200-11-4-520	7/ 8

Product Specification

Model HPCFX-350P-X2B	Created: January 31, 2019

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 build-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 speaks, 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. Hanging 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 carry.

7. The hold-up time of internal power supply
   After the input turned off, the internal power supply keeps outputting CH5(5VSB).
   The insertion and extraction of output connectors shall be done after the confirmation of all outputs stop with the following indication time.

   At 100V AC : 45 sec. At 200V AC: 150 sec. At 240V AC: 180 sec.

8. Low input voltage outside specification range
   Starting and stopping may be repeated depending on load conditions,
   at low input voltage outside the specification rage.

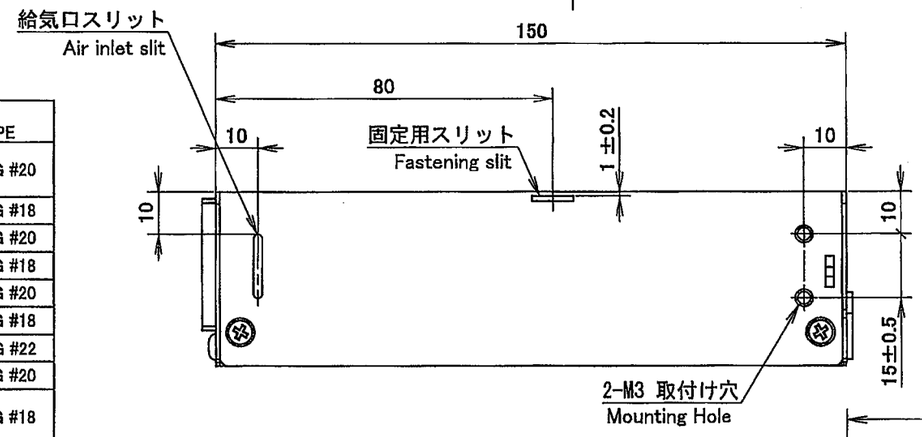
9. Connection with battery pack
   When insertion and extraction of the connector connected to the battery pack,
   be sure to confirm that the AC is shut down and confirm that it is not in the backup state.
   There is a danger that this power supply unit will fail due to excessive current caused by hot swapping.

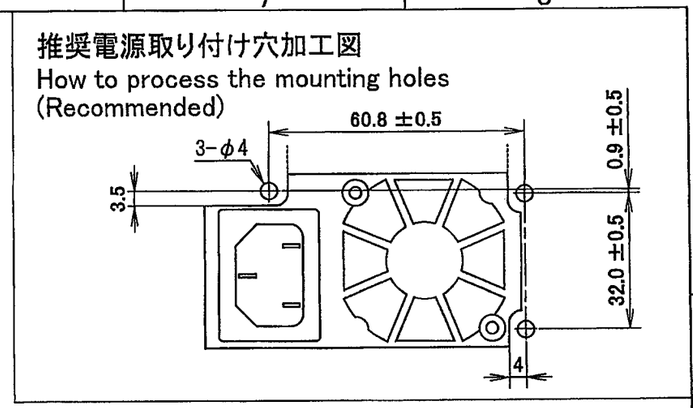
出図
'19.9.19
㈱ニプロン
技術管理

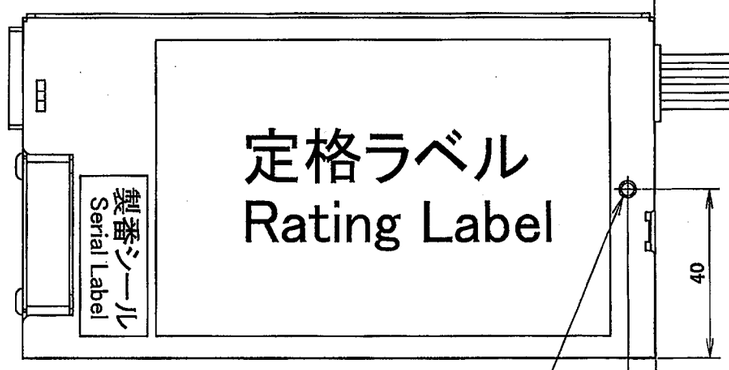
Drawn by	Checked by	Approved by	Drawing No.	Sheet No.
Yodo	畠山	有野	6200-11-4-520	8/ 8

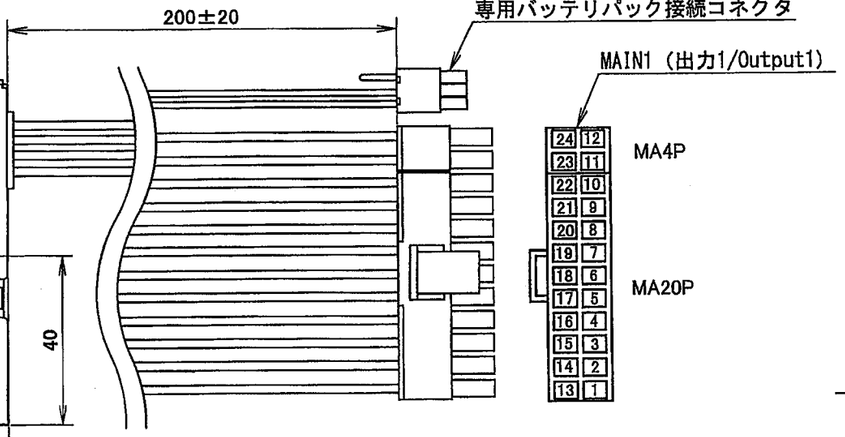
Nipron

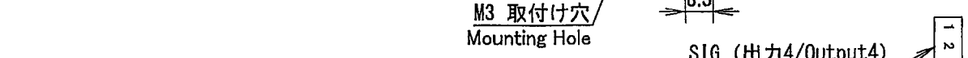
コネクタ CONECTOR TYPE	PIN No.	線色 WIRE COLOR	線種 WIRE TYPE
MA20P Housing: CP-01120030-C(CviLux) or equivalent Terminal: (13PIN) CP-01100105(CviLux) or equivalent (Other) CP-01100102(CviLux) or equivalent	1	ORANGE	UL1007 AWG #20
	2	ORANGE	
	3	BLACK	UL1007 AWG #18
	4	RED	UL1007 AWG #20
	5	BLACK	UL1007 AWG #18
	6	RED	UL1007 AWG #20
	7	BLACK	UL1007 AWG #18
	8	GRAY	UL1007 AWG #22
	9	VIOLET	UL1007 AWG #20
	10	YELLOW	UL1007 AWG #18
	11	YELLOW	
MA4P (11,12,23,24PIN) Housing: CP-01104030-C(CviLux) or equivalent Terminal: CP-01100102(CviLux) or equivalent	12	ORANGE	UL1007 AWG #20
	13	ORANGE	
		BROWN	UL1007 AWG #22
	14	BLUE	
	15	BLACK	UL1007 AWG #18
	16	GREEN	UL1007 AWG #22
	17	BLACK	UL1007 AWG #18
	18	BLACK	
	19	BLACK	
	20	N.C	-
	21	RED	UL1007 AWG #20
	22	RED	
	23	RED	
	24	BLACK	UL1007 AWG #18

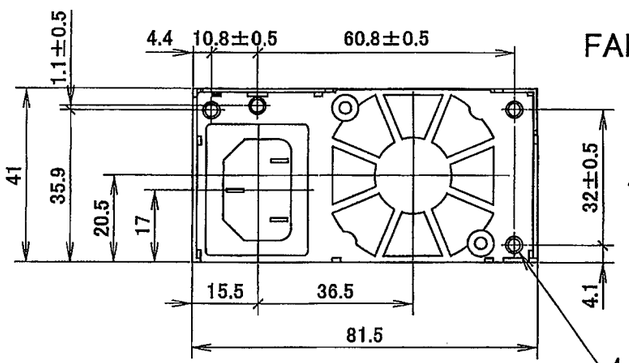




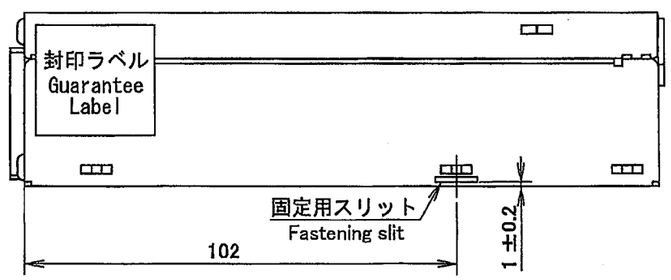


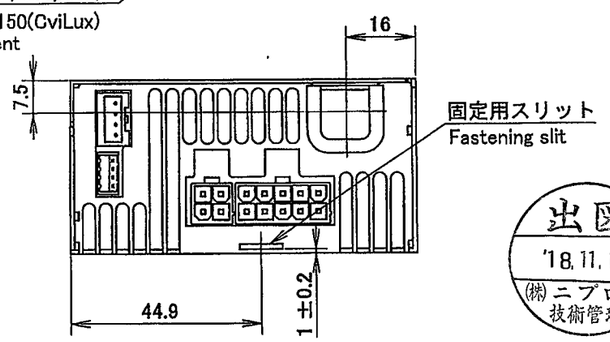






FAN BLOW





出図
'18.11.19
(株)ニプロン
技術管理

*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 5mm MAX.
The screw depth of penetration into PSU is 5mm MAX.
*3 固定用スリットへの差込みは奥行4mm 幅9mm 高さ1mm MAX.(推奨取付け形状:ACC6200)
Insertion into the fastening slit shall be 4mm in depth and 9mm in width and 1mm in thick MAX.
(The recommended shape is ACC6200)

DRAWN BY	CHECKED BY	CHECKED BY	APPROVED BY	SCALE		MATERIALS		HPCFX-350P-X2B
森	畠山	石川	有野	UNITS	m/m	FINISH	TITLE	外形図/Outline Drawing
ISSUED 2018.07.23				3RD ANGLE PROJECTION			DRAWING NO.	6200-11-3-050

株式会社 ニプロン