

Product Specification

Model	PCFL-180P-X2S2	Date	June 28, 2007
		Department	Nanba Technical Center

Scope:

This specification applies to the Embedded-type DC stabilized Power Supply, model PCFL-180P-X2S2.
All items in this specification are provided at normal temperature (20 ± °C) and Humidity unless otherwise specified.

General Specification

Items		Specification and Standard	Measurement Conditions, etc.	Test
Input Specification	Rated Voltage and Current	AC 100V/240V 2.1A/0.82A (Displayed on the Label)	Current is at 150W output with forced air cooling.	—
	Voltage Range	AC 85V (Note 1) to 264V		
	Rated Frequency	50/60 Hz	Range: 47 Hz to 63 Hz	
	Inrush Current	Refer to Note 2 below.		
	Input VA at Standby	30VA typical at 100V AC / 60VA typical at 240V AC 10VA typical at 100V AC / 40VA typical at 240V AC	PS_ON 'H' or 'OPEN', and 5VSB with rated load PS_ON 'H' or 'OPEN', and 5VSB with No load	Type
	Efficiency	75% or higher (77% typical)		
	Power Factor	90% or higher	at Rated Input/Output	
Environment	Operating Temp./Humidity	0 to 60°C (Note 1) / 10 to 90% RH No condensation		
	Storage Temp./Humidity	-20 to 70°C / 10 to 95% RH No condensation		
	Vibration	To endure the vibration acceleration of 2G with vibration frequency of 10 to 55 Hz for 10 sweep cycles in each X-Y-Z direction.	JIS C 60068-2-6 Compliant at No operation	Type
	Mechanical Shock (Surface Dropping)	Lifting one bottom edge up to 50 mm 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 Compliant at No operation	
Others	Insulation Resistance	50M Ω min. between Input and Chassis/Outputs, and between Outputs and Chassis	With DC 500V Megger at normal temp./Humidity	100%
	Dielectric Strength	AC 1.5KV for one minute between Input and Chassis/Outputs	For ONE second at production line Cut-off current: 20mA max. at normal temp./Humidity	
	Leakage Current	0.5mA max. at 100V AC / 1mA max. at 200V AC	at Normal temperature and Humidity	
	Line Noise Test	±2000V (pulse width of 100/1000nS, cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for one minute for each)	To be measured by INS-410. No voltage fluctuation in DC-factor nor malfunction.	
	Surge Immunity Test	IEC61000-4-5 Installation Class 3 compliant (5 times for each of Positive/Negative polarity)	No malfunction nor breakdown at AC 240V input	
	Electrostatic Discharge Immunity Test	IEC61000-4-2 Test Level 3 compliant (10 times of Chassis contact discharge)	No malfunction nor breakdown at AC 100/240V input	Type
	Conducted Emission	VCCI/FCC part15 / CISPR 22 / EN55022 Class A compliant	To be measured on Power Supply single body	
	Safety Standard	UL60950-1, CSA60950-1(c-UL), and EN60950-1(NEMKO) Certified.	Class I equipments, Embedded type power supply	
	Harmonic Current	IEC61000-3-2 (Ver. 2.1) Class D compliant	at AC100/240V input	
	Cooling System	Natural air cooling or Forced air cooling by external fan(s) (Note 3)		
	Dimension	93 (W) by 55 (H) by 160 (D)	Except protrusions – Refer to Outline and Dimension drawing.	Sampling
	Weight	0.85Kg typical		Type
	Life Expectancy	Five Years or longer at Rated load with natural air cooling. Seven years or longer at 150W load with forced air cooling (Note 4)	Life expectancy in hours at AC100V in continuous operation at ambient temp. of 25°C and normal humidity.	
	M.T.B.F.	100,000 or longer	Calculated based on EIAJ RCR-9102	
Warranty	One year after delivery. However, if any faults belong to us, the defective unit shall be repaired or replaced at our cost.	Except causes generated by operations out of this specification.	—	
Restriction on Hazardous substances	RoHS Directive compliant			

Note 1: Follow the derating conditions shown in another page when the unit is operated at low input voltage and under high temperature environment.

Note 2: In general, inrush current is defined as the peak charging current into electrolytic capacitors used for input smoothing. This type of the inrush current does not exist in this unit as no electrolytic capacitors are used for input smoothing. Also, the charging current into X-capacitors used for input filter circuit is not defined as inrush current for its width is 100uS or shorter.

Note 3: Follow the installation conditions shown in another sheet when an external fan is used for forced air cooling.

Note 4: For life expectancy at natural air cooling, calculate it according to installation condition Item 2-drawing ① shown in another sheet, and for life expectancy at forced air cooling, calculate to follow the installation condition Item 2-drawing ① and Fan installation condition shown in Item 3-drawing ②

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Product Specification

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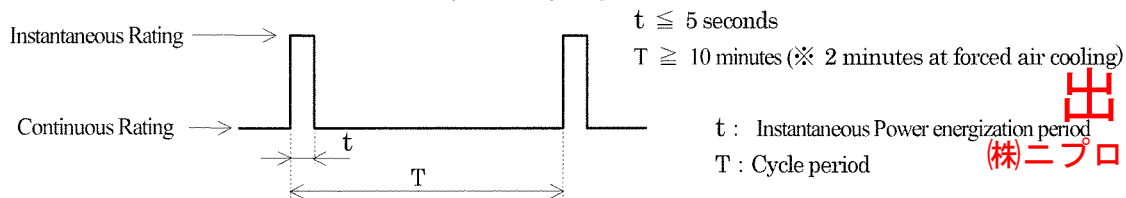
Output Specification (Voltage measurement point is at the output connector terminals and voltage drop caused by contact resistance of receptacle side connectors is not included).

Items		CH1	CH2	CH3	CH4	CH5	Measurement Conditions, etc.	Test	
Output Rating	Rated Voltage [V]	+3.3	+5	+12	-12	+5VSB	Continuous Rating (Criteria when Input/Output characteristics are measured). Total rated output power: 89.8W	-	
	Rated Current [A]	4	4	4	0.3	1			
	Rated Power [W]	13.2	20	48	3.6	5			
	Max. Current 1 [A]	10	10	7.5	0.3	1.5			
	Max. Power 1 [W]	Total 60W max.		90	3.6	7.5			Continuous Rating at natural air cooling
	Follow Output Power restriction diagram 1 in another page.								
	Max. Current 2 [A]	10	10	8.5	0.3	1.5			Continuous Rating at natural air cooling (with optional special AL-heat sink attached)
	Max. Power 2 [W]	Total 70W max.		102	3.6	7.5			
	Follow Output Power restriction diagram 2 in another page.								Continuous Rating at forced air cooling (with an external Fan)
	Max. Current 3 [A]	10	10	10	0.3	1.5			
	Max. Power 3 [W]	33	50	120	3.6	7.5			Instantaneous Rating (within 5 seconds)
	Follow Output Power restriction diagram 3 in another page.								
Max. Peak Current [A]	10	10	15	0.3	2	Instantaneous Rating (within 5 seconds)			
Max. Peak Power [W]	33	50	180	3.6	10				
Follow Chart 1 and Output Power restriction diagram 4 in another page.						Minimum load to achieve output characteristics and timing characteristics			
Min. Current [A]	0	0	0	0	0				
Output characteristics	Regulation Accuracy [%]	±5 Max.	±5 Max.	±5 Max.	±10 Max.	±5 Max.	Accuracy against rated output voltage value when Input voltage changes from Min. to Max., and each load changes statically within Output Power restriction diagram 1, 2 and 3.	100%	
	Regulation Accuracy 2 (at Instantaneous Rating) [%]	±5 Max.	±5 Max.	±5 Max.	±10 Max.	±5 Max.	Accuracy against rated output voltage value when Input voltage changes from Min. to Max., and each load changes statically within Output Power restriction diagram 4.	Type	
	Ripple Voltage [mVp-p]	50 Max.	50 Max.	120 Max.	120 Max.	50 Max.	Connect wires of 150mm max. in length between output terminals and the measurement board with capacitors (47µF) placed on it and conduct the measurement at the board. The board shall be away from load lines.	100%	
	Noise [mVp-p]	100 Max.	100 Max.	170 Max.	170 Max.	100 Max.			
	Rising Time [mS]	1 Min./20 Max.					Time to reach 90% from 10% of rated output voltage: The load shall be a resistor.	Type	
Protection Circuit and Others	OCP and Short	Method	Hold-down: Outputs of CH1 to CH4 are to be latch locked.			Fold-back	Hold-down	All outputs shut down when CH5 is shorted. (Refer to Note 1).	100%
		PCP Point [A]	10.5 min.	10.5 min.	—	0.32 min.	2.1 min.	All outputs are rated except the measured output.	
		Recovery	※ Manual			Automatic		※ PS_ON [#] signal shall be delivered or Input voltage shall be turned on after 10 seconds. Min.	
	OVP	Method	All outputs latch locked					External over voltage shall not be applied to CH1, 2, and 3 due to circuit characteristics. CH4 is not equipped with OVP.	Type
		OVP Point [V]	3.7 ~4.3	5.7 ~7.0	13.8 ~15.6	—	5.7 ~7.0		
		Recovery	Manual; Input voltage shall be turned on after 10 seconds or more.						
	Insulation between GNDs of each Output	All GNDs of each output are connected.					All GNDs are isolated from Power Supply Chassis.	Type	
Back-up function operated for output at blackout	Possible by connecting with the battery, BS17A-H24/2.0L, to CN13					See more details at battery specification	Type		

Note 1: Other outputs shut down when CH5 is completely shorted, that is, Output voltage is less than one volt. All outputs automatically recover when the short of CH5 is removed. However, if the short of CH5 is incomplete, that is, output voltage is one to 3 volts remained due to Hold-back, all other outputs go to latch lock. All outputs except CH5 remain latch locked event the short of CH5 is removed. In this case, PS_ON[#] signal shall be delivered or Input shall be rebooted after 10 seconds for manual recovery.

Note 2: OCP point of CH3 is provided at 25°C of AI-Chassis. (※ OCP point of CH3 varies according to rise of ambient temperature and component temperature due to Over current vs. Thermal protection circuit characteristics built in CH3.)

Chart 1. Instantaneous power frequency condition



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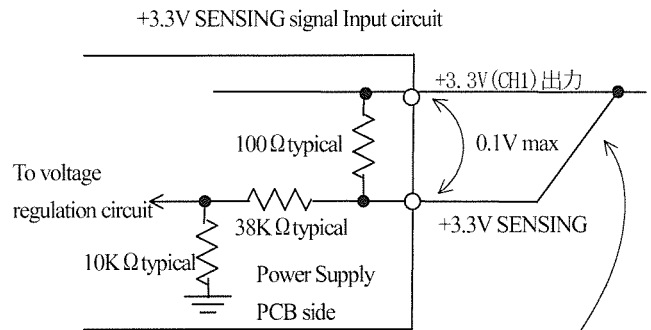
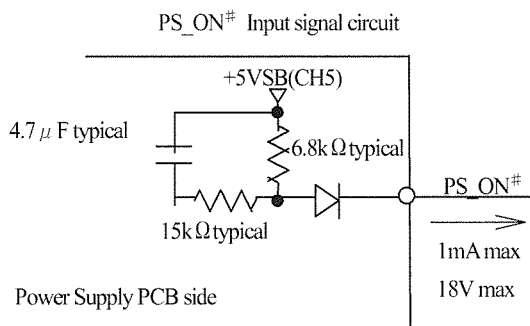
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Signal Input/Output Specification

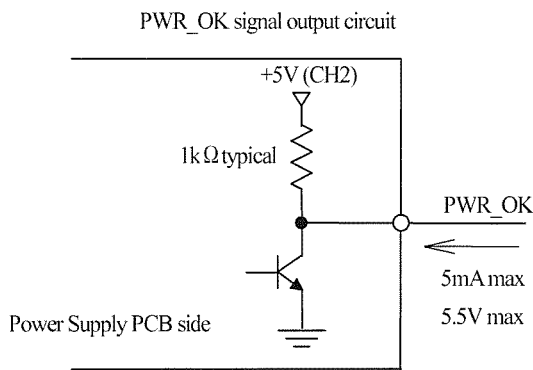
	Items	Specification	Test
Input	PS_ON#	Upon receipt of 'L', CH1 to CH4 are delivered. Upon receipt of 'H' or 'OPEN', CH1 to CH4 shut down, and Latch lock is reset when outputs shut down due to OCP and OVP activation. (Refer to Note 1 below). In addition, re-delivery period when 'H' or 'OPEN' of PS_ON# (Output OFF) goes to 'L' (Output ON) shall be 5 seconds or longer.	100%
	+3.3V SENSING	Input terminal for detecting CH1 (+3.3V) output voltage. By connecting to + side of Load end, the voltage drop on + side output cable is compensated. (Compensated voltage is 0.1V max.) (Refer to Note 2 below).	
Output	PWR_OK	'H' is delivered when CH2 (+5V) output is ON.	

Note 1: Voltage range for 'L' of PS_ON# signal is 0.8V max. (0V to 0.8V), 2.4V min. (2.4V to 18V) for H. Threshold level as power supply is 1.9V typical, and the level is used to judge Low or High having some undefined area.



! Note 2

Connect +3.3V SENSING to + side of +3.3V (CH1) load.
The voltage drop of the cable between connector on power supply and + side load end shall be 0.1V max.
Do not apply over voltage as the resistor (100Ω) inside the power supply may get damaged.



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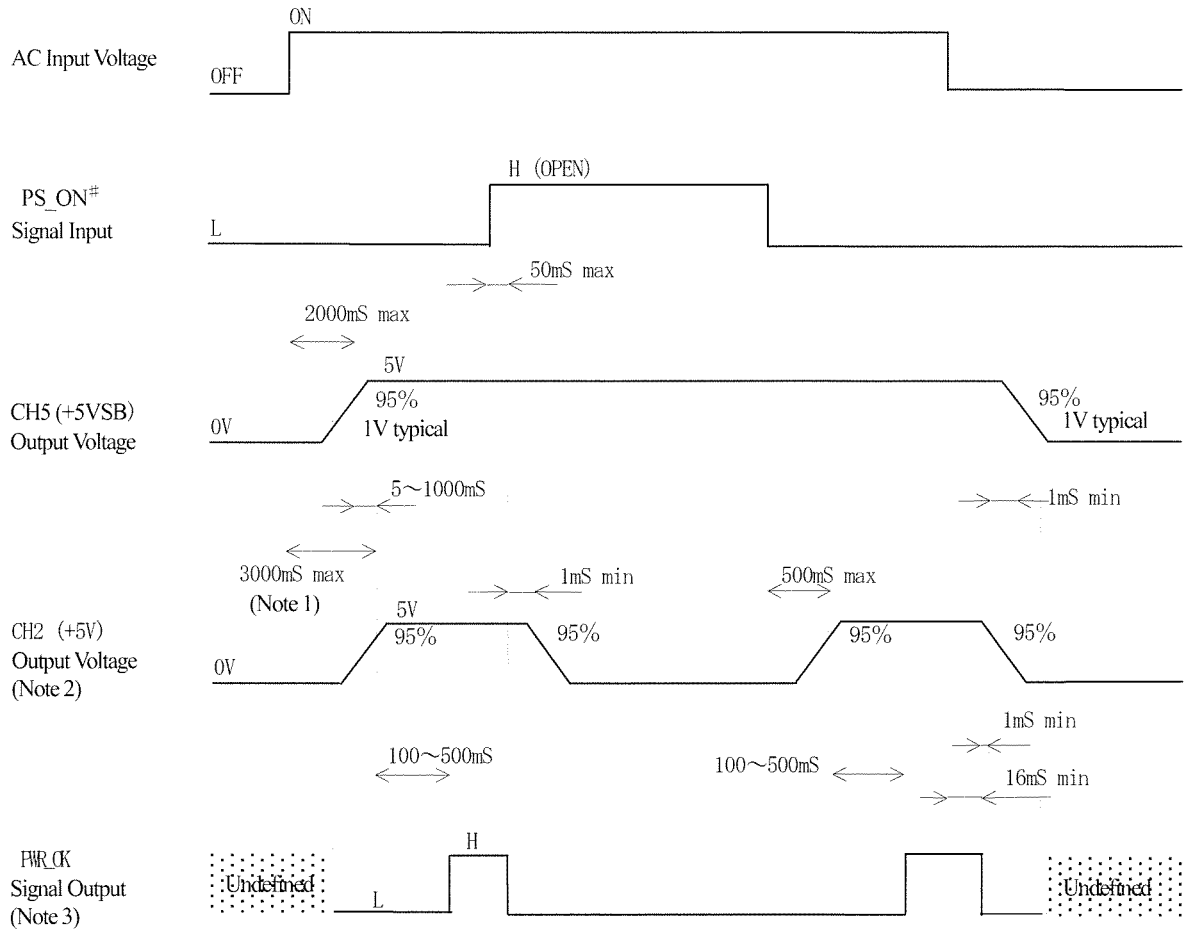
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Sequence Timing Chart (To be provided at Rated Input/Output condition, Test: Type test)



Note 1: Provided that Reclosing period after Input is turned off is 10 seconds or longer.

Note 2: CH1 (+3.3V) starts up 5 ms (typical) after CH2 (+5V) and CH3 (+12V) start up at the same time. In addition, Output voltage levels of CH2 (+5V) and CH3 (+12V) are higher than or equal to the level of CH1 (+3.3) during startup. Also, the order and output voltage level difference for each output at falling is not defined.

Note 3: The rise time and fall time of PWR_OK signal shall be 1mS or less. (Provided that the load of PWR_OK signal is NOT capacitive).

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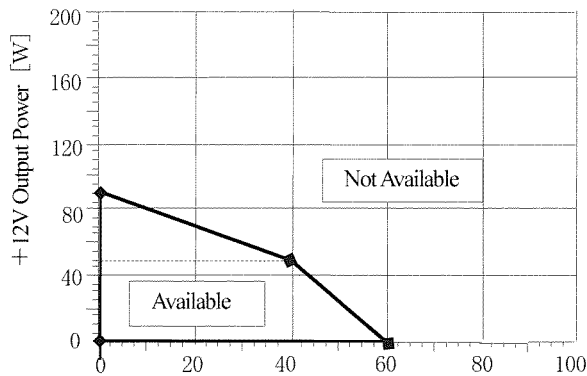
Output Power Restriction Chart

Total power of this unit is restricted by limiting current of each output. Total power of each output power (voltage times current) shall follow the condition from 1 to 4 below.

1. Max. output current/Power 1 specified by Output specification shall be within "Available" area (bold line area) of Fig. 1 below.
2. Max. output current/Power 2 specified by Output specification shall be within "Available" area (bold line area) of Fig. 2 below.
3. Max. output current/Power 3 specified by Output specification shall be within "Available" area (bold line area) of Fig. 3 below.
4. Instantaneous output current/Power specified by Output specification shall be within "Available" area (bold line area) of Fig. 4 below.

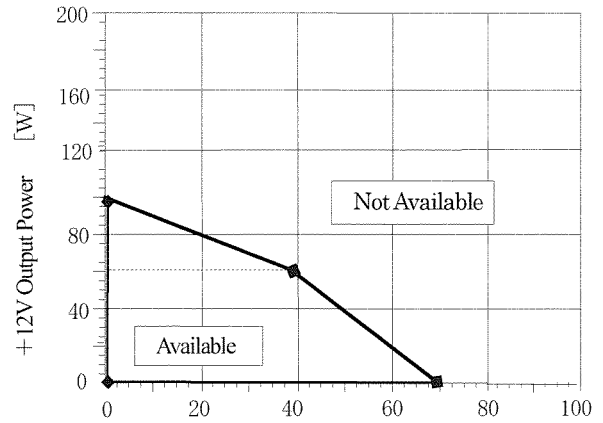
However, for operation under high temperature and low input voltage condition, follow the Derating Conditions on page 6.

Fig. 1 at Natural air cooling (basic structure)



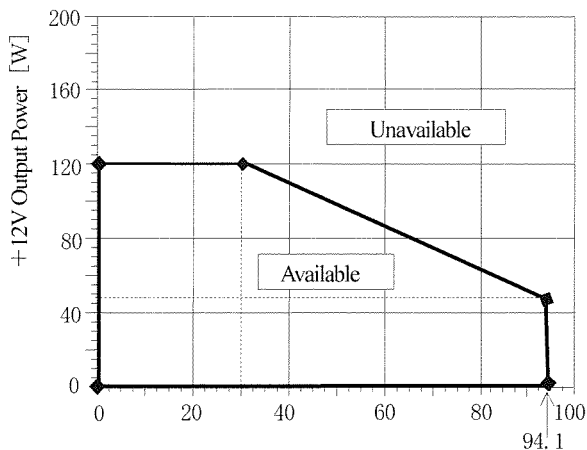
Total power of +5V, +3.3V, -12V, and +5VSB [W]

Fig. 2 at Natural air cooling with special AL-heat sink



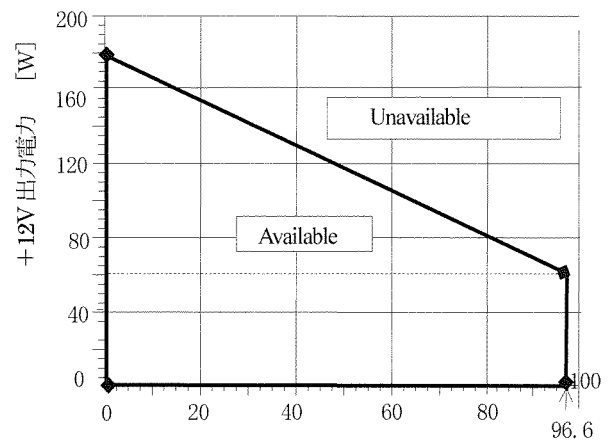
Total power of +5V, +3.3V, -12V, and +5VSB [W]

Fig. 3 at Forced air cooling with external Fan



Total power of +5V, +3.3V, -12V, and +5VSB [W]

Fig. 4 at Instantaneous Rating within 5 seconds



Total power of +5V, +3.3V, -12V, and +5VSB [W]

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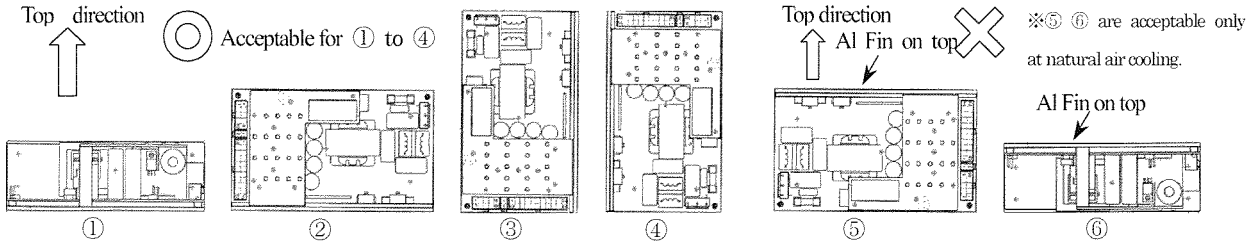
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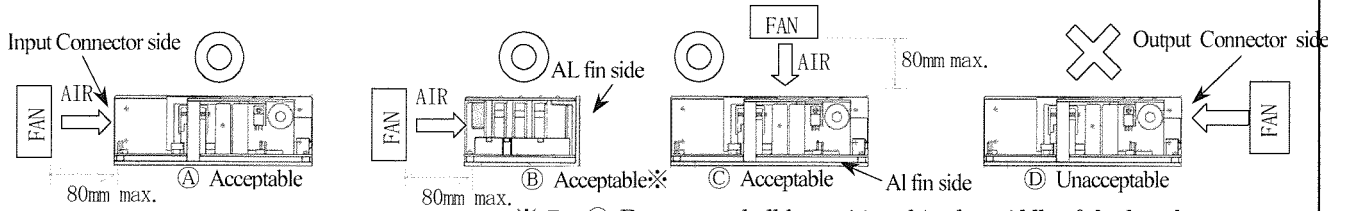
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Installation

- In mounting into the system, keep 5 mm away from the PCB edge and component surface of the unit to meet insulation and dielectric voltage requirements.
- Keep sufficient space on top area to secure natural air flow under natural air cooling operation. The installation direction marked "X" below is unacceptable.



- Any directions from ① to ⑥ above are acceptable at forced air cooling operation. However, position relation with external fan shall meet (A) to (C) below. (D) is unacceptable. In addition, Fan air flow shall be 0.5m^3 per minute or larger in the "Arrow" direction below.



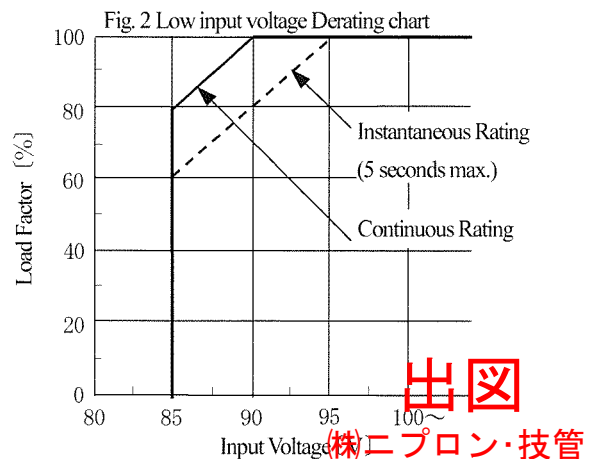
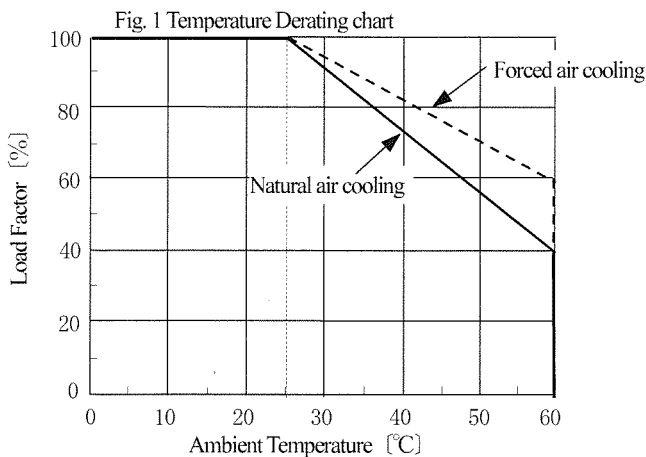
Derating

In operation under high temperature and at low input voltage, derate Output current/Power following the items from 1 to 4 below. For continuous rating operation, Max. output current of each CH provided in Output specification is regarded as 100% load factor. Also, Total of max. output power of CH1 to CH5 (Note) is regarded as 100% load factor.

For instantaneous rating, as with the above, total of instantaneous output current of each CH is regarded as 100% load factor. Also, Total of instantaneous output power of CH1 to CH5 (Note) is regarded as 100% load factor.

Note: Refer to Output Power restriction chart on page 5 for total of max. output power and total of instantaneous output power of CH1 to CH5.

- In operation exceeding 25°C of ambient temperature under natural air cooling, follow the load factor indicated by the solid line in fig. 1 below for both of continuous and instantaneous rating.
- In operation exceeding 25°C of ambient temperature under forced air cooling, follow the load factor indicated by the dashed line in fig. 1 below for both of continuous and instantaneous rating.
- In operation with continuous rating at 90V input voltage or lower, follow the load factor indicated by the solid line in Fig. 2 below. In addition, when the ambient temperature exceeds 25°C , follow the load factor gained by multiplying the load factor in Fig. 2 and Fig. 1.
- For operation of instantaneous rating at 95V input voltage or lower, follow the load factor indicated by the dashed line in Fig. 2 below. In addition, when the ambient temperature exceeds 25°C , follow the load factor gained by multiplying the load factor in Fig. 2 by the load factor in Fig. 1.



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Current rating table for load connection pins

Max. continuous current rating of each pin for load connection shall follow the table below. However, total current per each output shall not exceed max. output current defined in the output specification.

Connector name	Pin No.	Output (signal) name	Max. Current	Note
CN10	1	+3.3V	5.0A	
	2	+3.3V SENSING	※	※ Refer to Signal Input/Output specification.
	3	+12V	5.0A	
	4	+5V	5.0A	
	5	+5V	5.0A	
	6	COM. GND	5.0A	
	7	COM. GND	5.0A	
	8	COM. GND	5.0A	
	9	COM. GND	5.0A	
	10	-12V	5.0A	
	11	+5VSB	5.0A	
	12	+3.3V	5.0A	
	13	+3.3V	5.0A	
	14	+12V	5.0A	
	15	+5V	5.0A	
	16	+5V	5.0A	
	17	COM. GND	5.0A	
	18	COM. GND	5.0A	
	19	COM. GND	5.0A	
	20	COM. GND	5.0A	
	21	PWR_OK	※	※ Refer to Signal Input/Output specification.
	22	PS-ON#	※	※ Refer to Signal Input/Output specification.
CN11	1	+3.3V	5.0A	
	2	+5V	5.0A	
	3	COM. GND	5.0A	
	4	COM. GND	5.0A	
	5	+12V	5.0A	
	6	+3.3V	5.0A	
	7	+5V	5.0A	
	8	COM. GND	5.0A	
	9	COM. GND	5.0A	
	10	+12V	5.0A	
CN12	1	+5V	5.0A	
	2	+3.3V	5.0A	
CN13	1	BATT+	10.0A	Connecting the specific battery Note: Please refer to the battery spec. for more details
	2	BATT-(COM. GND)	10.0A	

Packaging Specification

Packaging structure: One unit is wrapped in a plastic bag and packed in individual box. 12 individual boxes are packed in a collective box in order of 6 individual boxes by two layers. Individual box and collective box material shall be cardboard.

Items	Specification	Note
Dimension/Weight	400mm (W) × 400mm (D) × 260mm (H)/13Kg	Standard weight per each collective box containing 12 individual boxes.
Number of piles	Max. three piles from the bottom to the top	One collective box shall be regarded as one layer.
Vibration	To endure the vibration acceleration of 0.75g _r with vibration frequency of 5 to 50Hz (Logarithm sweeping) and in upward and downward vibration for 40 minutes.	JIS Z 0200 compliant (Less than 2,000Km distance in a motor truck)
Fall Impact	To endure the free fall from the height of 35 cm.	JIS Z 0200 compliant (Distribution condition: Level III)





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Product Specification

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Precaution before use

- Grounding**  **Warning**
 The unit is designed and manufactured as Class I equipment. For safety, make sure to connect the Chassis (L-shaped Al chassis) to ground in a proper way. The FG terminal, Pin No. 1, of input connector is not for grounding for safety.
- Electrical Shock**  **Warning**
 The unit is designed and manufactured as embedded type equipment. Make sure to install into the system to prevent electrical shock as it has high voltage portion inside.
- Instantaneous output current and Short**  **Caution**
 Make sure to use the instantaneous output current within provided current, time and frequency as specified. Operation beyond the provision may cause the damage in the unit.
 Do not short the output terminals as capacitors inside rapidly discharge and may cause spark to lead fire and adverse impact on life-time.
- Temperature rise of the chassis (L-shaped Al chassis)**  **Warning**
 The chassis (L-shaped Al chassis) also serves as heat sink. Make sure to handle with care as it gets very high and may cause burn injury, and pay much attention to thermal influence and safety in operation.
- Acoustic noise at Power ON and OFF**
 Acoustic noise at Power On/Off by PS_ON signal may be generated. This is due to low frequency vibration by transient current in chokes or coils used for harmonic countermeasures. Also, very small and low frequency noise may be generated during operation. This is due to low frequency of input voltage vibrating chokes and coils used for harmonic countermeasures. Both of them will not affect the characteristics, such as performance or life-time.
- Mother Board on load side**
 Some motherboards may need higher peak current than rated current at startup and activate the protection circuit in the unit resulting in output power shutdown. In the case like this, make sure before use that the peak current at startup is within the specification.

Inspection

Product inspection is conducted according to our standard and inspection classification, such as Type, Sampling, 100%, categorized by each product specification. Details on inspection classification are as follows,
 Each inspection data is not attached to the specification in general, but kept by us. However, it may be attached at your cost, if necessary, via additional meeting.

Type: This is Evaluation and Authorization Test (called Type Approval Test) conducted before 1st lot of mass production or due to Design Change that is considered necessary to apply the Test. The Evaluation Test Class A is conducted to all specification items marked with Type • Sampling • 100% (or All) in the Test column according to our standard.

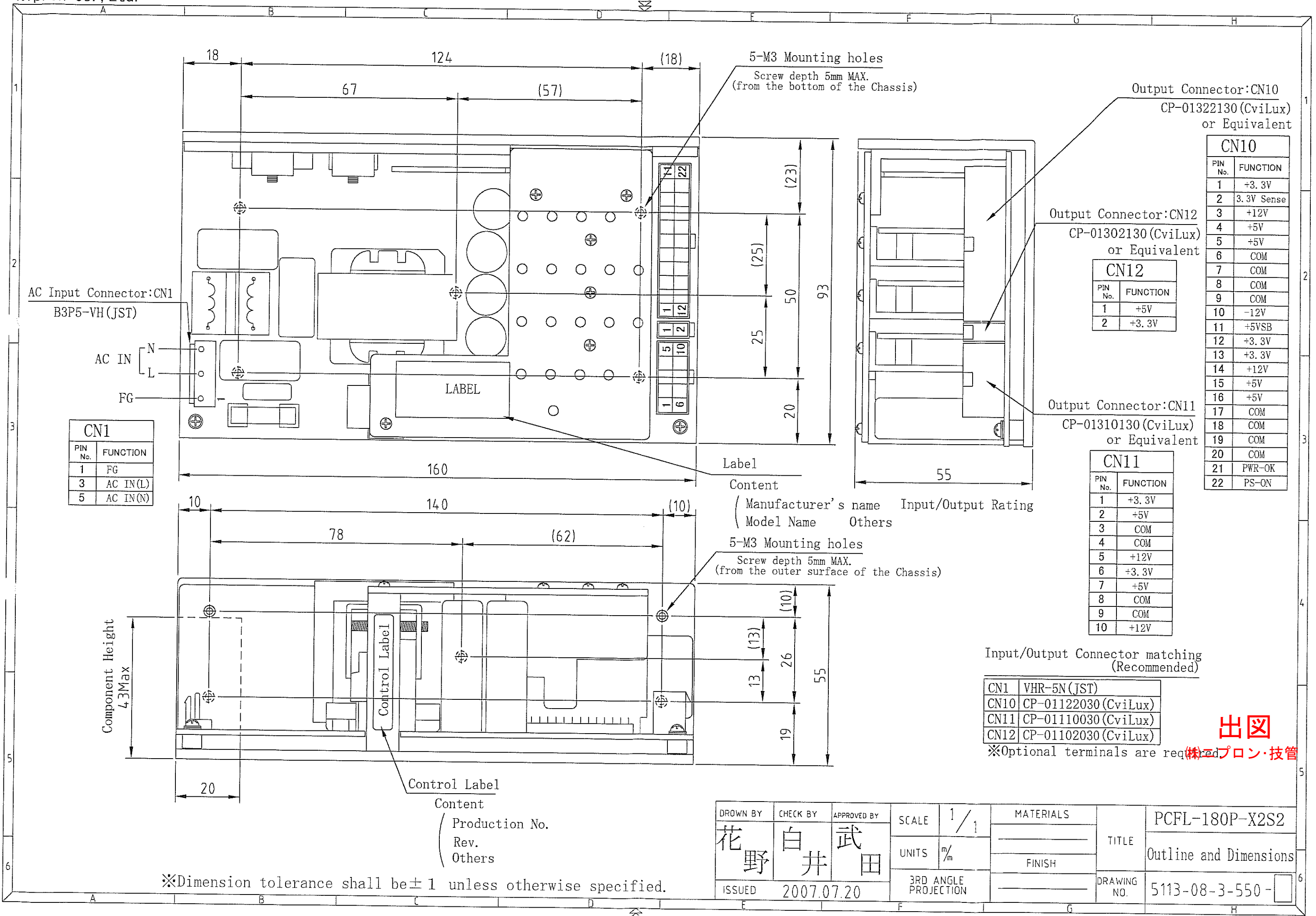
Sampling: This inspection is applied to every production lot by Sampling under normal temperature and humidity. Sampling methods is compliant with JIS Z9015 Normal Inspection Standard 1, normal inspection once. This inspection is conducted to all specification items marked with Sampling • All (or 100%) by sampling of every production lot. However, for dimension inspection, one unit from every lot is inspected.

All (or 100%): This inspection is conducted under normal temperature and humidity to all products marked with 100% (or All) marked in the Test column of the specification for every production lot.

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Nipron Co., Ltd. 120006
 Due to the technical improvement, the specifications and functions are subject to change without notice.



AC Input Connector:CN1
B3P5-VH(JST)

CN1	
PIN No.	FUNCTION
1	FG
3	AC IN(L)
5	AC IN(N)

Output Connector:CN10
CP-01322130 (CviLux)
or Equivalent

CN10	
PIN No.	FUNCTION
1	+3.3V
2	3.3V Sense
3	+12V
4	+5V
5	+5V
6	COM
7	COM
8	COM
9	COM
10	-12V
11	+5VSB
12	+3.3V
13	+3.3V
14	+12V
15	+5V
16	+5V
17	COM
18	COM
19	COM
20	COM
21	PWR-OK
22	PS-ON

Output Connector:CN12
CP-01302130 (CviLux)
or Equivalent

CN12	
PIN No.	FUNCTION
1	+5V
2	+3.3V

Output Connector:CN11
CP-01310130 (CviLux)
or Equivalent

CN11	
PIN No.	FUNCTION
1	+3.3V
2	+5V
3	COM
4	COM
5	+12V
6	+3.3V
7	+5V
8	COM
9	COM
10	+12V

5-M3 Mounting holes
Screw depth 5mm MAX.
(from the bottom of the Chassis)

5-M3 Mounting holes
Screw depth 5mm MAX.
(from the outer surface of the Chassis)

Component Height
4.3Max

Label
Content
(Manufacturer's name Input/Output Rating
Model Name Others)

Control Label
Content
(Production No.
Rev.
Others)

Input/Output Connector matching
(Recommended)

CN1	VHR-5N(JST)
CN10	CP-01122030 (CviLux)
CN11	CP-01110030 (CviLux)
CN12	CP-01102030 (CviLux)

※Optional terminals are required (株)ニプロン・技管

※Dimension tolerance shall be ±1 unless otherwise specified.

DRAWN BY 花野	CHECK BY 白井	APPROVED BY 武田	SCALE 1/1	MATERIALS	TITLE PCFL-180P-X2S2 Outline and Dimensions
ISSUED 2007.07.20	3RD ANGLE PROJECTION		UNITS mm	FINISH	
				DRAWING NO.	5113-08-3-550-