

Scope

This specification applies to built-in DC stabilized power supply, OZP-350-12-**E*-, OZP-350-24-**E*-, OZP-350-30-**E*-, OZP-350-36-**E*-, and OZP-350-48-**E*-.
 This power supply provides DC output at AC input instantaneous power failure by connecting the dedicated capacitor package (380 VDC).
 In addition, all items in this specification shall be provided at nominal temperature and humidity unless otherwise specified.

Model Name Coding

Example: **OZ P - 350 - 24 - J S E - C**
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- ① Series Name....."OZ": OZ series
- ② Peak power....."P": Corresponding to Peak power
- ③ Continuous output power....."350": 350W (300W for 12V output type)
- ④ Output voltage....."12": 12V, "24": 24V, "30": 30V, "36": 36V, "48": 48V
- ⑤ Input / output connector type....."J": Nylon connector, "T": Block terminal
- ⑥ Current balance function....."0": Without current balance function, "S": With current balance function
- ⑦ Low standby power....."E": Low standby power type (at RC signal OFF)
- ⑧ Modification....."Blank": Standard, "1 to 9" or "A to Z": Modification symbol
- ⑨ Chassis....."C": With Chassis, "K": With Chassis and Cover, "Blank": Without Chassis and Cover.

General Specification

Items		Specification					Measurements conditions, etc.	
		OZP-350-						
		12	24	30	36	48		
AC Input	Rated Voltage	100-240VAC					Worldwide range	
	Voltage Range	85-264VAC					Load factor shall be 90-100% in range of 85-95VAC input	
	Current	At 100VAC	3.3A typ.	3.8A typ.				At rated output (Natural air cooling)
			4.8A typ.	5.5A typ.				At rated output (Forced air cooling)
		At 200VAC	1.7A typ.	2.0A typ.				At rated output (Natural air cooling)
			2.5A typ.	2.9A typ.				At rated output (Forced air cooling)
	Rated Frequency	50/60Hz					Frequency range 47-63Hz	
	Inrush Current	At 100VAC	14A typ.				At rated output	
		At 200VAC	28A typ.					
	Efficiency	At 100VAC	90% typ.	92% typ.				At 300W load
		At 200VAC	92% typ.	94% typ.				
	Power Factor	At 100VAC	99% typ.				At rated output (Natural air cooling)	
		At 200VAC	96% typ.					
Standby Power	At 100VAC	60mW typ.				Power consumption at RC signal OFF		
	At 200VAC	200mW typ.						
Holding Time	22msec typ.					At 300W output		
出図								

Note:

(株)ニプロン・技管

Drawn by <i>Ishibashi</i>	Checked by <i>Yamada</i>	Approved by <i>yamamoto</i>	Model: OZP-350-**-**E*-*	Drawing No. 3178-01-4-520
------------------------------	-----------------------------	--------------------------------	-----------------------------	------------------------------

Items		Specification					Measurements conditions, etc.	
		OZP-350-						
		12	24	30	36	48		
Environment	Operating Temp.	Natural Air Cooling	-10 to 60°C (Open frame)					Refer to "Output derating specification".
		Forced Air Cooling	-10 to 55°C (With chassis and cover)					
	Operating Humidity	20 to 90%RH					There shall no condensation	
		Storage Temp. / Humidity	-20 to 75°C / 10 to 95 %RH					
	Vibration	To endure the vibration acceleration of 2G with vibration frequency of 10 to 55Hz for 10 sweep cycles in each X, Y, Z direction.					Follow JIS-C-60068-2-6 At no operation	
	Surface Dropping	Left one bottom edge of the unit 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.					Follow JIS-C-60068-2-31 At no operation	
Insulation	Dielectric Strength	3kVAC/1min between input and output /RC/AC FAIL					Cut-off current 10mA	
		2kVAC/1min between input and FG					Cut-off current 10mA	
		500VAC/1min between each input/output/RC/AC FAIL/FG						
	Insulation Resistance	50MΩ min. between each input/output/RC/AC FAIL/FG					At 500 VDC	
Leakage Current	Please refer to page 8							
Others	Electrostatic discharge	IEC61000-4-2 test level 3 compliant (Contact discharge: ±6kV, 10 times)					Apply to FG and case. There shall be no malfunction, nor failure.	
	Line noise immunity	±2000V (pulse width of 100/1000nsec, 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 output voltage fluctuation in DC component nor malfunction.	
	Impulse voltage immunity	IEC-61000-4-5 (Installation environment 3, 4) compliant; apply 5 times each of Common mode ±4kV and Normal mode ±2kV					There shall be no malfunction, nor failure.	
	Conducted emission	VCCI, FCC, CISPR22, and EN55022 Class B compliant					At rated Input and output (Natural cooling), with chassis*	
	Harmonic current regulations	IEC61000-3-2 (edition 2.1) class D, EN61000-3-2 (A14) class D compliant.					At rated input and output	
	Safety Standard	UL60950-1, CSA60950-1(c-UL), CE marking, PSE (Ordinance item 2) approved						
	Cooling system	Natural air cooling						
	Dimensions and Weight	95×44×222 (W×H×D) / 650g typ.					Without Chassis and Cover	
		107×57×252 (W×H×D) / 1050g typ.					With Chassis and Cover	
Warranty	Three years after delivery: if any defects belong to us, the defective unit shall be repaired or replaced at our cost.					The unit shall be operated at normal temperature and humidity. Except for lifetime of electrolytic capacitors due to operating environment.		

Note: *For the reduction of radiated noise, the input harness "WH-C05VH-800-02" (with ferrite core type) is recommended.



出図

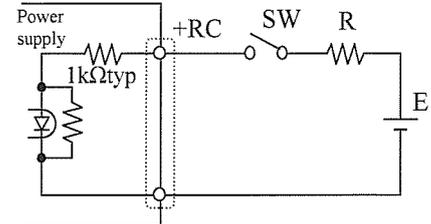
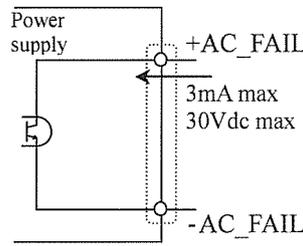
(株)ニプロン・技管

Drawn by <i>Ishibashi</i>	Checked by <i>Yamada</i>	Approved by <i>yamamoto</i>	Model: OZP-350-**-**E*-*	Drawing No. 3178-01-4-520
------------------------------	-----------------------------	--------------------------------	-----------------------------	------------------------------

Output Specification								
Items		Specification					Measurement conditions, etc.	
		OZP-350-						
		12	24	30	36	48		
Output Rating	Rated Voltage		12V	24V	30V	36V	48V	At rated input Refer to "Output derating specification"
	Continuous rating (natural air cooling)	Current	25A	14.6A	11.7A	9.8A	7.3A	
		Power	300W	350.4W	351W	352.8W	350.4W	
	Continuous rating (forced air cooling)	Current	36A	21.0A	16.8A	14A	10.5A	
		Power	432W	504W	504W	504W	504W	
	Peak rating (10 seconds or less)	Current	42A	25A	20A	16.7A	12.5A	
Power		504W	600W	600W	601W	600W		
Output Characteristics	Factory setting		12V±2%	24V±2%	30V±2%	36V±2%	48V±2%	At rated output
	Adjustable voltage range		12V±10%	24V±10%	30V±10%	36V±10%	48V±10%	At more than rated voltage setting, Use it within rated output power.
	Static input regulation		48mV max.	94mV max.	120mV max.	144mV max.	192mV max.	
	Static load regulation		100mV max.	150mV max.	180mV max.	220mV max.	300mV max.	
	Temperature regulation		0.02%/°C max.					
	Ripple voltage	0 to 70°C	120mV max.				150mV max.	Connect 150mm max. lead wire to output connectors, and then connect a 10µF electrolytic capacitor with a 0.1µF ceramic capacitor in parallel to the other ends of the wires to measure by an oscilloscope with 100MHz frequency band. At rated output*
		-10 to 0°C	160mV max.				200mV max.	
	Spike voltage	0 to 70°C	150mV max.				250mV max.	
		-10 to 0°C	180mV max.				400mV max.	
Protection Circuit	Overcurrent protection	OCP point	101% min. of peak rated current					
		Method	Hold-down current limiting → Blocking oscillation					
		Recovery	Automatic recovery					
	Overvoltage protection	OVP point	13.8-16.2 V	30.0-35.0 V	34.5-40.5 V	43.2-49.4 V	56.2-63.0 V	
Method		Output shutdown						
Recovery		Reclosing of AC input or RC signal OFF → ON						
Backup specification	By connecting the dedicated capacitor package (sold separately) with the dedicated connection harness (sold separately) to CN3, the output power will be backup during the following time at AC input failure.		Capacitor package model name	Output power at backup operation				(note) The backup time shown left is indication value, not guaranteed value. 出図 (株)ニプロン・技管
			BS13A-EC400/422F (Charge time: 1 minute typ.)	50W	100W	200W	350W	
				2.1 sec.	1.1 sec.	0.55 sec.	0.26 sec.	

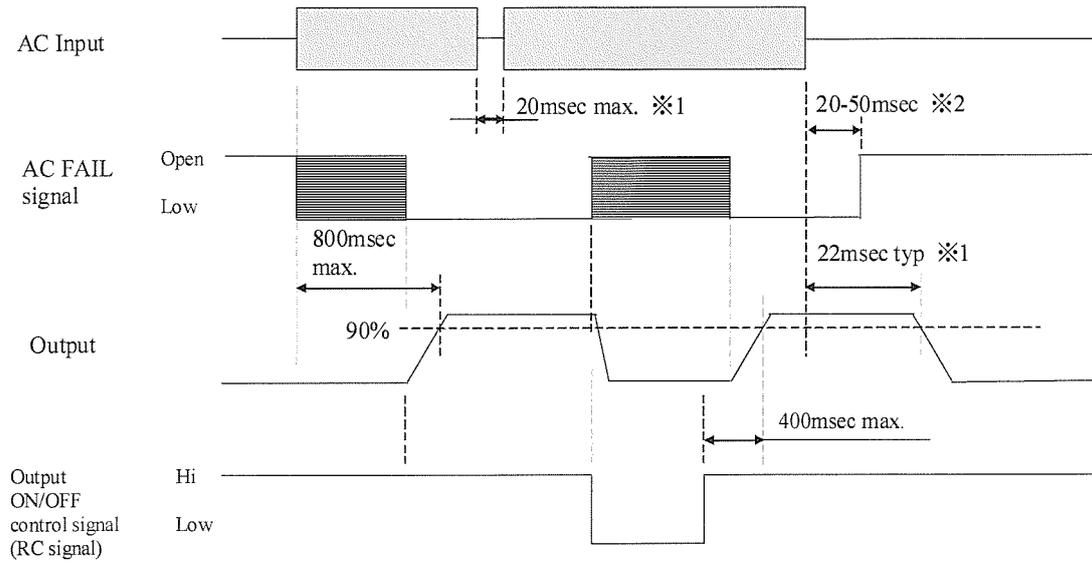
Note. * The ripple and spike voltage at 70W output shall be 200mV/400mV max.

Drawn by	Isibashi	Checked by	Yamada	Approved by	yamamoto	Model:	OZP-350-**-**E*-*	Drawing No.	3178-01-4-520
3 / 11									

Signal Input/Output specification																				
Items	Specification					Signal Input/Output circuit diagram /Other														
	OZP-350-																			
	12	24	30	36	48															
Input signal	<p>Output ON/OFF control signal (RC signal)</p> <p>Shorting Plug With shorting plug (CN2) connected, output starts up when AC input is applied regardless of RC signal. To control Start/Stop of output by RC signal, uncap shorting plug of CN2.</p>	<p>Operating mode</p> <table border="1"> <tr> <td>Between +RC and -RC</td> <td>Output</td> </tr> <tr> <td>SW ON (4.5Vmin.)</td> <td>ON</td> </tr> <tr> <td>SW OFF (0.8Vmax.)</td> <td>OFF</td> </tr> </table> <p>External power supply and Load-limiting resistor</p> <table border="1"> <tr> <td>External power supply: E</td> <td>Load-limiting resistor: R</td> </tr> <tr> <td>4.5-12.5Vdc</td> <td>Not required</td> </tr> <tr> <td>12.5-30Vdc</td> <td>1.5kΩ</td> </tr> <tr> <td>30-48Vdc</td> <td>8.2kΩ</td> </tr> </table>				Between +RC and -RC	Output	SW ON (4.5Vmin.)	ON	SW OFF (0.8Vmax.)	OFF	External power supply: E	Load-limiting resistor: R	4.5-12.5Vdc	Not required	12.5-30Vdc	1.5kΩ	30-48Vdc	8.2kΩ	<p>Circuit diagram</p>  <p>Note: Shorting plug (CN2) and radiating fin next to it are primary circuit components. Make sure to operate the plug after the AC input is turned off.</p>
	Between +RC and -RC	Output																		
	SW ON (4.5Vmin.)	ON																		
	SW OFF (0.8Vmax.)	OFF																		
External power supply: E	Load-limiting resistor: R																			
4.5-12.5Vdc	Not required																			
12.5-30Vdc	1.5kΩ																			
30-48Vdc	8.2kΩ																			
Remote Sensing signal (RS signal)	Input terminal for detection of output voltage. Connecting RS signal to positive side of devices, it shall compensate line-drop at positive side such as output cable.																			
Current balance signal (CB signal) *Only for "OZP-350-**-*SE*-*"	Input terminal on current balance circuit. During parallel operation, connect CB signal terminals of each power supply.				Total output current at connecting N units in parallel shall be within "rated output current x N x 0.9" A. (N ≤ 5)															
Voltage balance signal (VB signal) *Only for "OZP-350-**-*SE*-*"	Input terminal on voltage balance circuit. For parallel operation, connect VB signal terminals of each power supply.				Higher VR setting value of output voltage shall be preferential															
Output signal	Blackout detection signal (AC_FAIL)	<p>The signal goes "OPEN" at low AC input voltage and power failure detection. Undefined at RC signal OFF.</p> <p>Detection voltage: 80 VAC typ. Detection delay time: 20-50ms after AC input failure.</p>				<p>Circuit</p> 														
	LED drive output	<p>Delivers "Hi" when main inverter circuit is operating and an external LED on PCB will light. The LED light turn off during main inverter circuit is shut down, such as circuit failure, AC fail, or OFF operation by "output ON/OFF control signal". (In parallel operation, with connecting O Ring diode to the output end, the operating condition of each power supply can be confirmed.)</p>				<p>Open voltage: 12V typ. Max current: 7mA max. (Built in 1.7 kΩ or equivalent)</p>														
<p>Note</p> <p style="text-align: right;">出図 (株)ニプロン・技管</p>																				

Drawn by <i>Ishibashi</i>	Checked by <i>Yamada</i>	Approved by <i>yamamoto</i>	Model: OZP-350-**-*E*-*	Drawing No. 3178-01-4-520
				4/11

● **Sequence Timing diagram (Without Capacitor Package)**



:Undefined area

※1 : Rated input, 300W output.

※2 : If the output power is less than 10%, the input voltage is the maximum 150msec in the range of AC150V or more.

● **Peak output specification**

Peak output current shall meet the conditions below.

- Duty ratio of peak current shall be 45% or less.
- Energized period of peak current shall be 10 seconds or less.
- In the case that the ambient temperature is 50°C or higher with natural air cooling, the energized period of peak current shall be 5 seconds or less.
- The value resulting from the formula below shall not exceed the continuous rated current, I_o , after derating specified in "Output derating" item.

$$\sqrt{((I_p^2 \times D) + (I_m^2 \times (1-D)))} \leq I_o$$

I_p = Peak current value

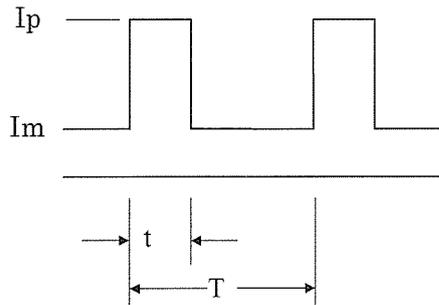
I_m = Min. current value

D = Duty ratio, t/T

t = Pulse width of peak current

T = Cycle

I_o = Continuous rated current specified in "Output derating" item



Note

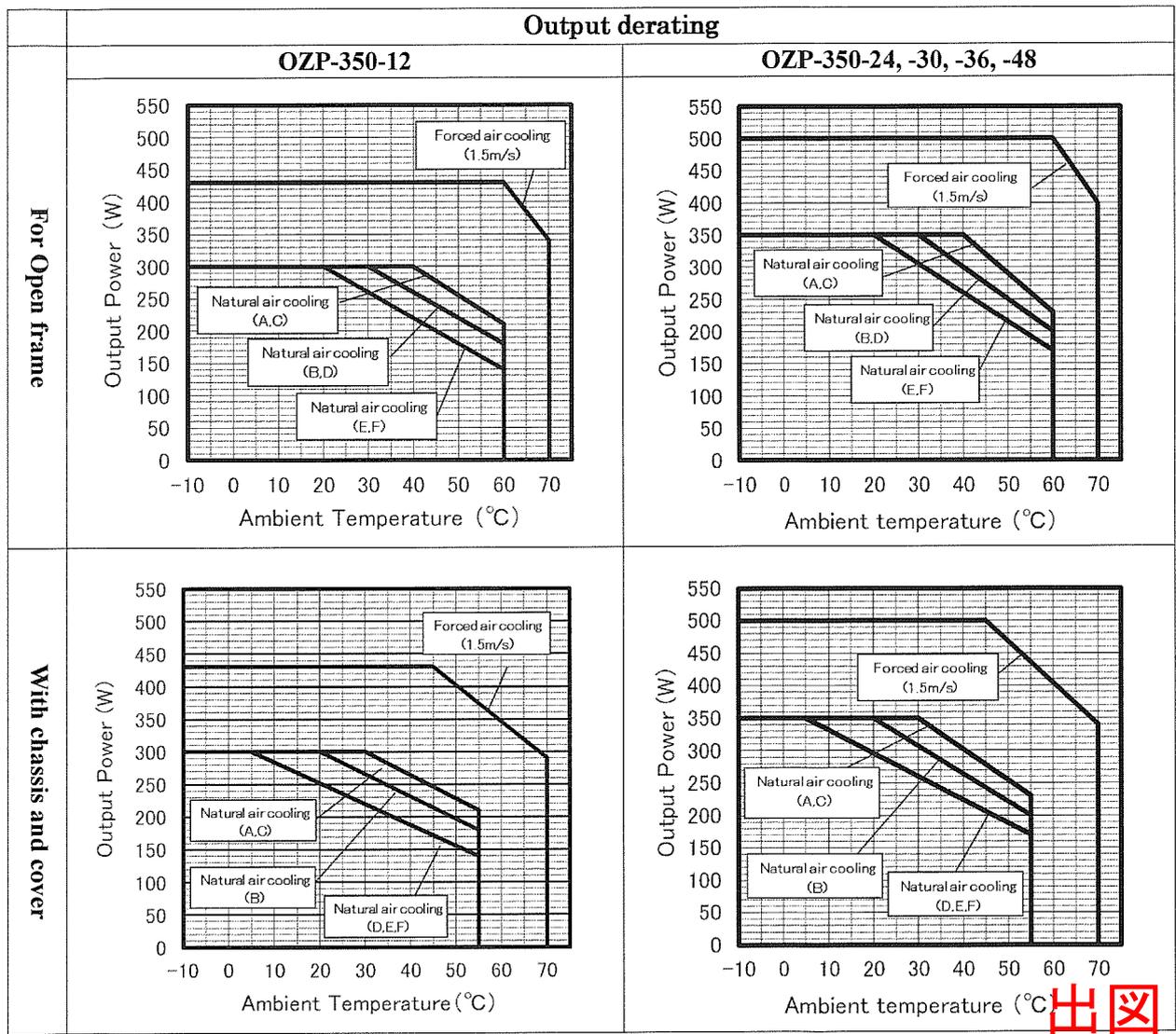
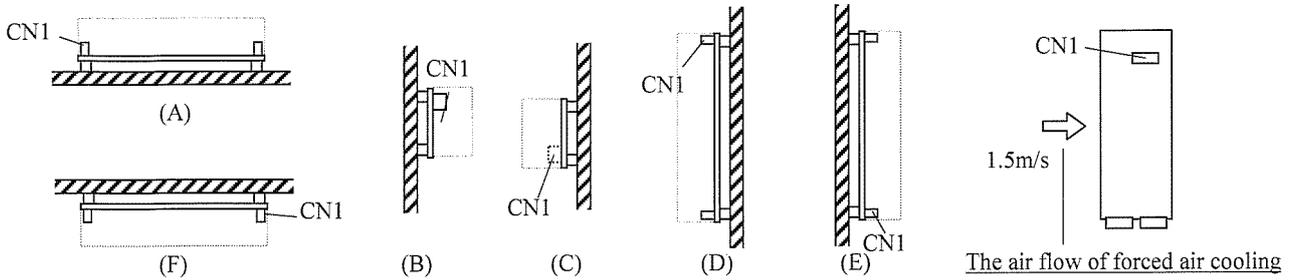
出図

(株)ニプロン・技管

Drawn by <i>Ishibashi</i>	Checked by <i>Yamada</i>	Approved by <i>yamamoto</i>	Model: OZP-350-**-**E*-*	Drawing No. 3178-01-4-520
------------------------------	-----------------------------	--------------------------------	-----------------------------	------------------------------

●Output derating based on ambient temperature, installation direction and cooling condition

Follow the derating diagram below for output according to the ambient temperature and installation direction. In addition, for the unit with chassis and cover, input voltage shall be 90V or higher. Also, forced air cooling condition in the diagram shall be provided that the air flow of 1.5 m/s is applied from the direction shown below.



出図

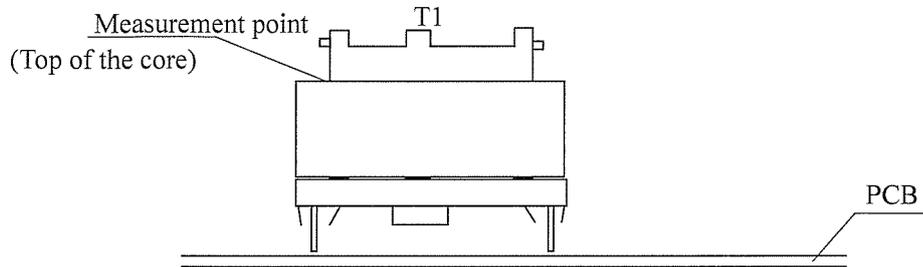
株式会社ニプロン・技管

Note

Drawn by <i>Ishibashi</i>	Checked by <i>Yamada</i>	Approved by <i>yamamoto</i>	Model: OZP-350-**-**E*.*	Drawing No. 3178-01-4-520
------------------------------	-----------------------------	--------------------------------	-----------------------------	------------------------------

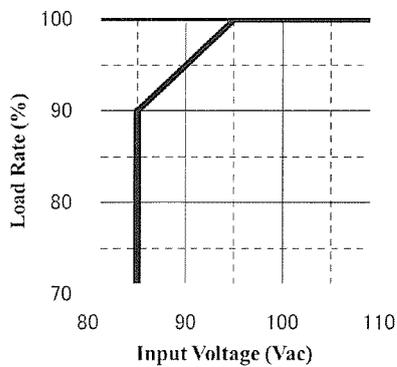
Guideline for forced air cooling

Set the core surface temperature of the transformer (T1) to 80°C or lower.



● **Output derating vs. Input voltage**

When input voltage is 95VAC or lower, follow the derating diagram below to reduce the continuous rated current and power.



Note

出図
(株)ニプロン・技管

Drawn by <i>Isibashi</i>	Checked by <i>Yamada</i>	Approved by <i>yamamoto</i>	Model: OZP-350-**-**E*-*	Drawing No. 3178-01-4-520
-----------------------------	-----------------------------	--------------------------------	-----------------------------	------------------------------

● Parallel operation precautions

By connecting the outputs of “N” power supplies in parallel, output capacity “rated output x N units x 0.9” will be obtained. (N ≤ 5) In this case, please note the points written below.

(Connection)

- Please connect the dedicated cable (Model name: WH-02PH02PH-200) between the connectors “CN13” or “CN14” on the PCB of both power supplies connected in parallel. By connecting between these connectors, output current balances for each power supply are controlled to be equal.
- Load wires from each power supply should be wired to make both impedance equal as much as possible.

(Output voltage adjustment)

- When adjusting the output voltage, set either one of the output voltage adjusting knob to the minimum (to the leftmost), and adjust the output voltage using the output voltage adjusting knob of the other power supply.

(Temperature increase)

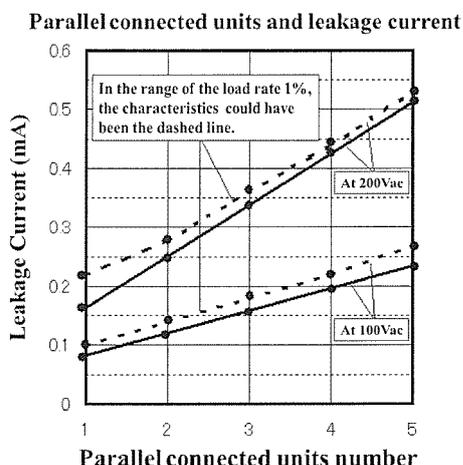
- There might be heat increasing caused by installation interval, direction, and any shielding materials around power supply units when you connect in parallel. To avoid the heat increasing, please check temperature increasing with equipping actual device and operating. In case of the temperature of transformer (T1) exceeds 80°C (indication value), please change the installation interval, direction, or cut down the output power to reduce the heat.

(LED indication)

- LED on the PCB light green when the main inverter circuit is operating. It blacks out at circuit failure, at AC input failure, or when the main inverter circuit stops by turning off the “Output ON/OFF control signal”.

(Leakage Current)

- Please refer to the below for the leakage current value at parallel connecting.



(Others)

- Because it does not include O Ring diode in the output terminal, output power does not remain when one of the power supplies is damaged due to short mode etc. In addition, output power does not remain normally when power supply in operation is connected to the one in shutdown condition in parallel.

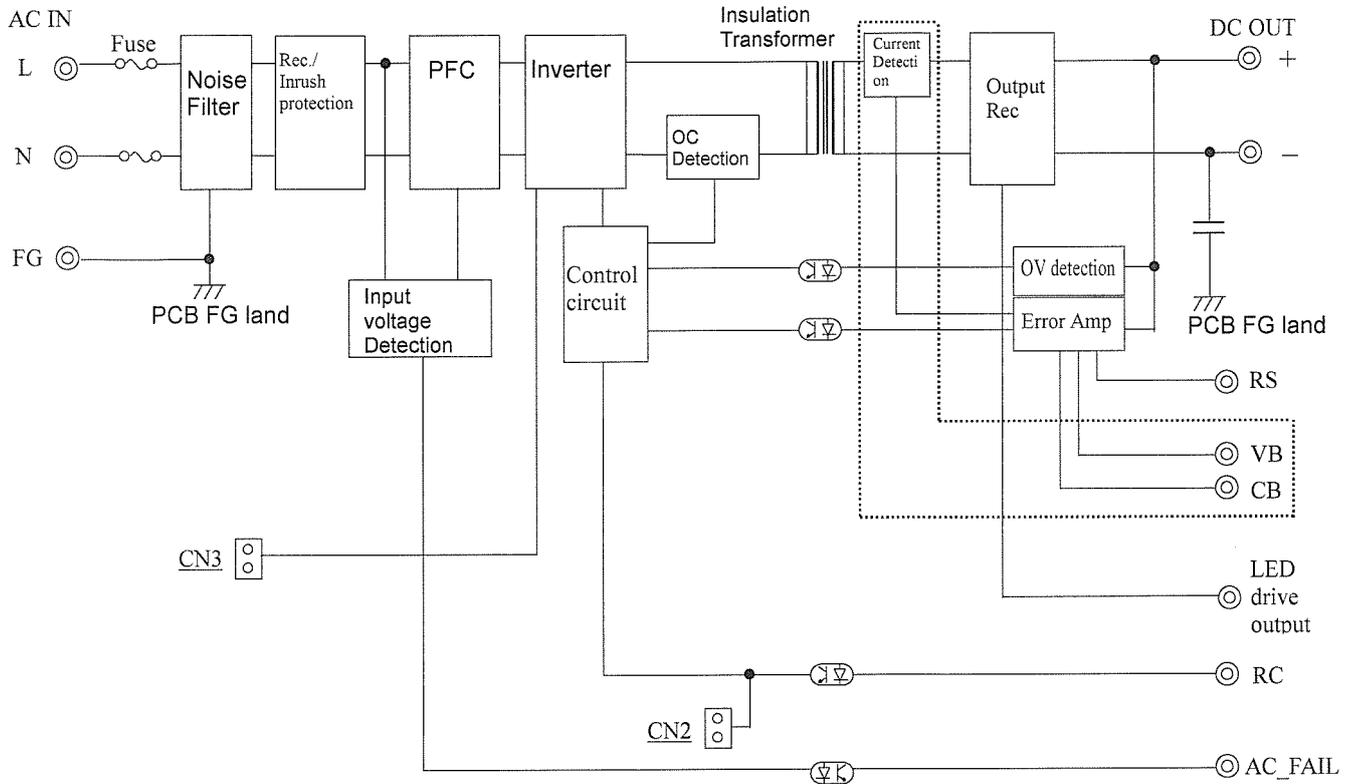
出図
(株)ニプロン・技管

Note

Drawn by	Ishibashi	Checked by	Yamada	Approved by	yamamoto	Model: OZP-350-**-**E*-*	Drawing No. 3178-01-4-520
----------	-----------	------------	--------	-------------	----------	-----------------------------	------------------------------

Circuit block diagram

( is applied to OZP-350-**-**SE**-** type only)



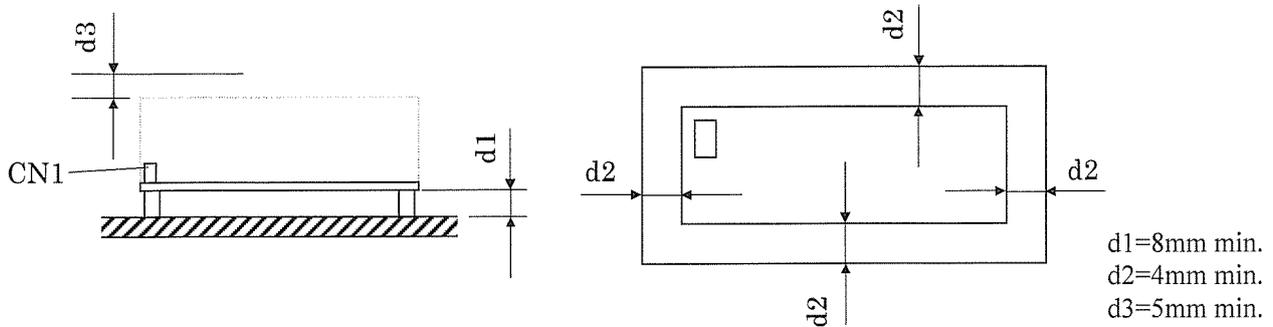
Note

出図
(株)ニプロン・技管

Drawn by <i>Ishibashi</i>	Checked by <i>Yamada</i>	Approved by <i>yamamoto</i>	Model: OZP-350-**-**E**-**	Drawing No. 3178-01-4-520
------------------------------	-----------------------------	--------------------------------	-------------------------------	------------------------------

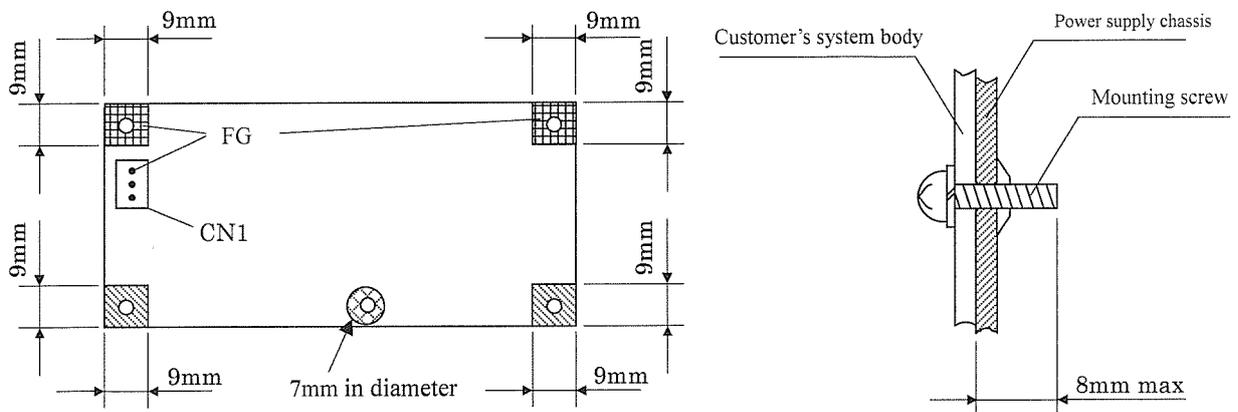
● Power supply installation

- To meet the standard of Insulation and dielectric withstanding, install the power supply to keep the dimensions, d1, d2, and d3, shown in the drawings below.
- Install the power supply so that natural air convection and air ventilation are expected to keep the temperature rise around the power supply low.



● Mounting screws and grounding of power supply

- Fix all 5 screws firmly at power supply mounting holes.
- Use 3mm diameter screws for mounting power supply.
- Do not use the metal mounting parts that exceed the hatched area shown below.
- In mounting the unit with Chassis and Cover, do not use any screws that exceed the area shown below.
- Make sure to connect FG terminal of CN1 or FG portion of PCB to customer's safety grounding. Also, make sure to connect FG terminal of CN1 to the safety ground of the customer's system in the case of safety standard application.
- Be recommended to connect the FG portion of solder face of PCB to customer's metal system body with metal parts such as metal spacers to reduce noise.



Note

出図
(株)ニプロン・技管

Drawn by <i>Ishibashi</i>	Checked by <i>Yamada</i>	Approved by <i>yamamoto</i>	Model: OZP-350-**-**E*-*	Drawing No. 3178-01-4-520	10/11
------------------------------	-----------------------------	--------------------------------	-----------------------------	------------------------------	-------

Precautions before use

1. Grounding - ⚠ Warning

This unit is designed and produced to meet Class 1 equipment. Make sure to connect the grounding terminal of the unit to grounding in a proper way for safety.

2. Electric shock - ⚠ Warning

This unit is designed and produced as built-in equipment and has high-voltage part inside. Make sure to securely install in the equipment in a proper way to prevent electric shock. Also, shorting plug (CN2) for RC signal setting and radiating fin next to it are primary circuit components. When the plug is handled, make sure to turn off AC input before the handling of the plug.

3. PCB handling - ⚠ Caution

In handling, use the edge of the PCB so as not to touch the component sides. Lift the PCB from the equipment with filter pieces in installation. Besides, handle the PCB with care to prevent twisting or bending of the PC board as it has SMT components on it.

4. Output short circuit - ⚠ Caution

Prevent shorting outputs. When output is shorted, capacitors inside the power supply rapidly discharge leading to fire and/or spark resulting in serious accident. It also shortens the lifetime of the power supply.

5. Applying external voltage to output terminal - ⚠ Caution

Applying external voltage to power supply's output terminal, parallel connection of output power without connecting voltage and current balance signal (CN13 or CN14), parallel connection of power supplies with different output (12V output and 24V output power supplies etc.) may lead to the failure of power supply.

6. Inrush current control circuit - ⚠ Caution

A register with thermal fuse is used to limit the surge current which flows into rectifying capacitor at AC input. In case of repeating AC input and the shutoff, the register would produce heat and the thermal fuse could have been fused.

7. Output energy - ⚠ Caution

The output energy of this unit is 240VA or more, and regarded as dangerous. Any operators must not touch the unit. Besides, apply necessary measures to prevent service personnel or service tools to touch accidentally the equipment with this unit installed. Make sure that the output voltage of this unit goes down to the safe level before servicing after the input voltage is turned off.

出図

(株)ニプロン・技管

Drawn by <i>Ishibashi</i>	Checked by <i>Yamada</i>	Approved by <i>yamamoto</i>	Model: OZP-350-**-**E*-*	Drawing No. 3178-01-4-520	11/11
------------------------------	-----------------------------	--------------------------------	-----------------------------	------------------------------	-------

Nipron Co., Ltd.

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

