Created: June. 6<sup>th</sup>, 2012

## Scope

This specification applies to built-in DC stabilized power supply, OZP-200-3R3-\*\*E\*-\* and OZP-200-5-\*\*E\*-\*.

This power supply provides DC output at AC input instantaneous power failure by connecting dedicated capacitor package (DC output 380V)

In addition, all items in this specification shall be provided at normal temperature and humidity unless otherwise specified.

# Model name coding

Example: OZ P - 200 - 5 - 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 ..... "200": 200W
- 4 Output voltage ..... "3R3": 3.3V, "5": 5V
- ⑤ Input/Output connector type ····· "J": Nylon connector, "T": Harmonica Terminal block
- 6 Current balance function ..... "0": W/O current balance function, "S": With current balance function
- ① Low standby power consumption "E": Low standby power consumption type
- ® Modification · · · · "(Blank)": Standard, "1 to 9" or "A to Z": Modification symbol

G	eneral specif	ication				
	Item	ne		ecification	Measurement conditions, etc.	
	Reins		OZP-200-3R3 OZP-200-5		Weasurement conditions, etc.	
	Rated volta	1ge	100 – 240 VAC		Worldwide range	
	Voltage ran	ıge	85 - 264 VAC		Load factor shall be 90 to 100% at 85 – 95 VAC range.	
		At 100VAC	1.7A typ.	2.4A typ.	At rated output (Natural air cooling)	
	Current	At 100 VAC	1.9A typ.	2.8A typ.	At rated output (Forced air cooling)	
	Carron	At 200VAC	0.9A typ.	1.2A typ.	At rated output (Natural air cooling)	
			1.0A typ.	1.4A typ.	At rated output (Forced air cooling)	
	Rated freque	ncy	50/60 Hz		Frequency range: 47 to 63Hz	
A	Inrush	At 100VAC	17A typ.		Power thermistor system  Continuous rated output power	
AC Input	current	At 200VAC	34A typ.		with cold start at 25°C	
Ħ	Efficiency	At 100VAC	82% typ.	85% typ.	At rated output (Natural air cooling)	
	Efficiency	At 200VAC	85% typ.	88% typ.		
	Power	At 100VAC	99% typ.		At rated output	
	factor	At 200VAC	92% typ.	94% typ.		
	No-load	At 100VAC	1.3W typ.			
	power	At 200VAC	1.3W typ.		Power consumption at No-load	
	Standby	At 100VAC	60mW typ.		Power consumption at RC	
	power	At 200VAC	200mW typ.		signal OFF	

Note

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	Item	s	Specifi OZP-200-3R3	OZP-200-5	Measurement conditions, etc.
$\vdash$		Natural air	-10 to 60°C (Open frame sin		Refer to
Ì	Operating	cooling	-10 to 55°C (With Chassis a	"Output derating specification."	
	temp.	Forced air	-10 to 70°C (Open frame sin		Refer to
	tempi	cooling			"Output derating specification."
	0 1		-10 to 70°C (With Chassis a	nd Cover)	Output defating specification.
띮	Operating h Storage	umidity	20 – 90% RH		
viro	temp. / Hun	nidity	-20 to 75°C / 10 to 95% RI	<del> </del>	There shall be no condensation.
nment	Storage temp. / Humidity  Vibration  Surface dropping		To endure the vibration accel frequency of 10 to 55Hz fo X-Y-Z direction.		To follow JIS-C-60068-2-6 at no operation  However, 1G for mounting only with heat releasing fin.
			Lift one bottom edge of the opposite edge placed on the Repeat 3 times for each of malfunction shall be observed	test bench, and let it fall. four bottom edges, and no	To follow JIS-C-60068-2-31 at no operation
			3kVAC for 1min.between Inp	ut and Output/RC/AC_FAIL	Cut-off current: 10mA
H	Dielectric st	rength	2kVAC for 1 min. between 1	Input and FG	Cut-off current: 10mA
ısule			500VAC for 1 min. between 0		
Insulation	Insulation re	sistance	50M Ω min. between Input/Output/RC/AC_FAIL/F	With 500 VDC	
L	Leakage cur	rent	Refer to page.8		
	Electrostatic	discharge	IEC61000-4-2 test level 3 cor (Contact discharge: ±6kV, 10	Apply to FG, Chassis or Cover. There shall be no malfunction	
	Line noise ir	nmunity	±2000V (Pulse width of 100/1 100Hz, Normal/Common m polarity for 10 minutes)	To be measured with INS-410.  There shall be no output voltage fluctuation in DC component nor malfunction	
	Impulse volt immunity	age	IEC-61000-4-5 (Installation compliant; apply five times eand Normal mode ±2kV	There shall be no malfunction.	
	Conducted e	mission	VCCI, FCC, CISPR22, and compliant	At rated input and output, with chassis (natural air cooling)	
	Harmonic cu regulations	ırrent	IEC61000-3-2 (Ed. 2.1) Class EN61000-3-2 (A14) Class D		At rated input and output
Others	Safety Stand	ard	UL60950-1, CSA60950-1 (c-U CE marking, PSE (Ordinance it		
	Cooling syst	em	Natural air cooling		
	Dimensions and Weight  Warranty		73×40×222(W×H×D)/530g	g typ.	Except Chassis and Cover
			83.8×51×252(W×H×D)/83	0g typ.	With Chassis and Cover
			Three years after delivery us, the defective unit shall our cost.		The unit shall be operated at normal temperature and humidity.  Except for lifetime of elementic capacitors (林 To operating) · 技管 environment.

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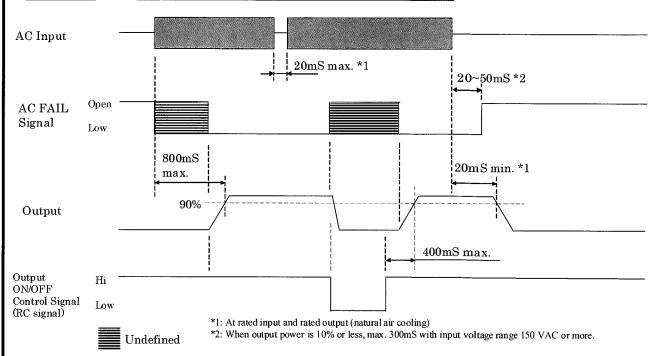
О	utput Specific	cation								
	Itama			Specif	ication					
	Items	,	OZP-200-3R3	3		OZP-	200-5		Measurement conditions, etc.	
	Rated Voltage		3.3V		5V					
	Continuous	Current	40A		40A				At rated input	
Out <sub>l</sub>	rating (natural air cooling)	Power	132W 200W						Refer to "Output derating specification."	
put	Continuous	Current	46A		46A				1	
Output Rating	rating (forced air cooling)	Power	151.8W		230V	V				
	Peak rating	Current	60A		60A				Refer to	
	(10 seconds or less)	Power	198W		300V	V			"Peak output specification"  Natural cooling and forced cooling.	
	Factory setting		$3.3V \pm 2\%$		5.0V	±2%			At rated output	
	Adjustable vol	tage range	3.3V + 20%, -10%		5.0V	+ 20%	, -20%		At 5V or more, use it within rated output power.	
Ou	Static input reg	gulation	20mV max.		20m\	V max.				
Output Characteristics	Static load regulation		40mV max. 40mV max.						Measured on the output terminal of the PCB.	
Ήaı	Temperature re	gulation	0.02% / °C max.							
ract	Ripple	0 to 65°C	80mVp-p max.						Connect 150mm max. lead wire to	
eris	voltage	-10 to 0°C	140mVp-p max.						output connectors, and then connect a 10uF electrolytic capacitor with a	
stic		0 to 65°C	120mVp-p max.							
s	Spike noise voltage	-10 to 0°C	160mVp-p max.						0.1uF ceramic capacitor in parallel to the other ends of the wires to measure by an oscilloscope with 100MHz frequency band.	
_		OCP point	101% min. of peak rated current							
rot	Overcurrent protection	Method	Hold-down current lir	niting	→ Blo	1				
ect	protection	Recovery	Automatic recovery							
Protection circuit	Overvoltage	OVP point	4.5 to 5.5V		6.5 to	7.5V			No applying external voltage to output terminal.	
rcu	protection	Method	Output shutdown							
ıŧ	•	Recovery	Reclosing of AC inpu	t						
	Output power ba	-	Capacitor package mo	odel	Output	power at b	ack-up op	eration		
н	functionality is a connecting dedic		name		50W	100W	150W	200W		
lack	package (sold se	•	BS13A-EC400/422F	3.3V	3.1	1.4	0.8	0.5	(Note) The back-up time	
{-uţ	CN3, connector		(Charging time: 1 min.		sec.	sec.	sec.	sec.	shown left is indication value, not guaranteed value.	
Back-up time	supply board, us		typ.)	5V	2.7	1.2	0.7	0.4		
ne	harness (sold sep			<u> </u>	sec.	sec.	sec.	sec.	1	
	Please refer to riginformation of ba	-								
N	ote		<u> </u>			<u>.                                    </u>	<u> </u>	<u> </u>	ЩМ	
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S	ignal Input/Output specific	cation	
	Items	Specification	Signal Input/Output circuit diagram/Other
<u></u>	Tionio	OZP-200-3R3 OZP-200-5	
Ir	Output ON/OFF control signal (RC signal)  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.	Departion mode	Power supply +RC SW R supply -RC -RC  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.
Input signal	Remote Sensing signal (RS signal)	Input terminal for detection of output voltage. Line-drop at positive side of output cable shall be covered by connecting RS signal to positive side of devices.	
	Current balance signal (CB signal) *Only for "OZP-200-*-*SE*-*"	Input terminal on current balance circuit.  During parallel operation, connect CB signal terminals of each power supply	Total output current at parallel operation shall be within "rated output current x N x 0.9". $(N \le 5)$
	Voltage balance signal (VB signal) *Only for "OZP-200-*-*SE*-*"	Input terminal on voltage balance circuit.  During 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)	To go "OPEN" when AC input goes down and power failure is detected.  Detection voltage: 80 VAC typ. Detection delay time: 20 - 50ms after blackout.	PSU +AC_FAIL  3mA max 30Vdc max  -AC_FAIL
signal	LED drive output	Delivers "Hi" when main inverter circuit is operating and an external LED on PWB will light. The LED turn off during main inverter circuit is shut down, such as circuit failure, AC fail, or OFF operation by "output ON/OFF control signal".	Open voltage: 10V max.  Max. current: 14mA max. (680Ω: built-in)  (Note) LED light might flicker or darken at light load (10% max.) or at pulse load, even the main inverter circuit is operating.
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# • Sequence Timing diagram (W/O capacitor package connected)



# • Peak output current specification

Peak output current shall meet the specification 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, Io, after derating specified in "Output derating" item.

$$\sqrt{((\mathrm{Ip}^2 \times \mathrm{D}) + (\mathrm{Im}^2 \times (1 - \mathrm{D})))} \leq \mathrm{Io}$$

Ip=Peak current value

Im=Min. current value

D=Duty ratio, t/T

t=Pulse width of peak current

T=Cvcle

Io=Continuous rated current specified in "Output derating" item.



In case of temp. of power thermistor for prevention of inrush current will NOT go up enough, such as the amount of average load power is small, (Resistance value is high), output power at peak might drop for about 100ms.

If this might cause any problem, please check output voltage waveform equipping and operating the power supply with actual device. 株二プロン・技管

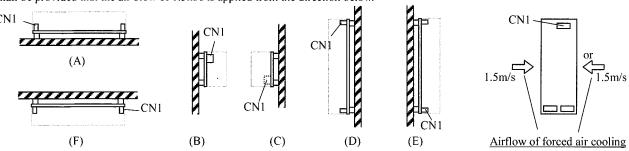
Note

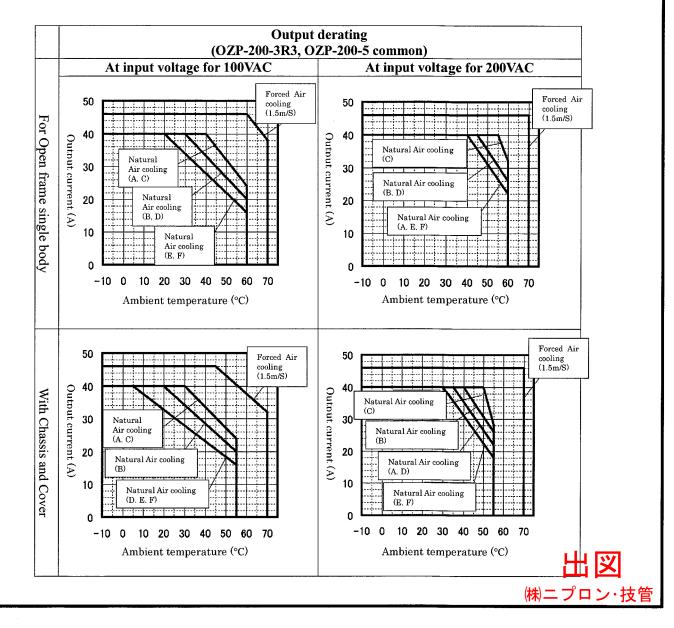
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# Output derating based on ambient temperature, installation direction and cooling condition

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 90VAC or higher. Also, forced air cooling condition in the diagram shall be provided that the air blow of 1.5m/s is applied from the direction below.

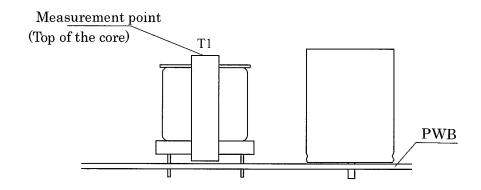




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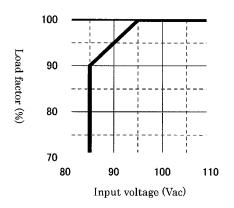
#### Guideline for forced air cooling

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



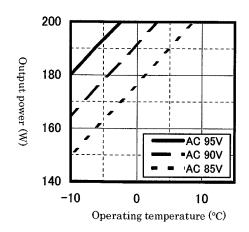
#### Output derating vs. Input voltage

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



## Output derating for startup at low temperature

When power supply is operated at lower temperature, follow the derating diagram below to reduce the output power for startup.



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#### Parallel running precautions

By connecting the outputs of N power supplies in parallel, output capacity "Rated output x N units x 0.9" will be obtained. In this case, please beware of the following. ( $N \le 5$ )

#### (Connection)

- Please connect the applicable cable (Model type: 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 balance for each power supply is controlled to be equal.
- Load wires from each power supplies should be wired to make both impedance equal as much as possible.

#### (Usage)

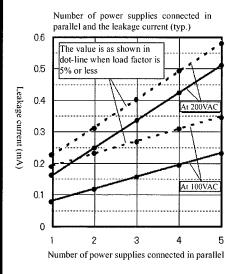
- When adjusting the output voltage, set either one of the potentiometer to the minimum (to the leftmost), and adjust the potentiometer of the other power supply.
- When starting up the power supply by AC input, operating waveform of output voltage may be tiered or dropped
  down (caused by the operation of overcurrent protection circuit) due to dispersion of startup time of the power
  supplies connected in parallel. It can be prevented by starting up each output at the same time using output ON/OFF
  control signal of both power supplies connected in parallel.

#### (LED indication)

• LED on the PCB light green when main inverter circuit is operating, and blacks out at circuit failure, AC input failure, or at main inverter circuit is stopped, by turning off "Output ON/OFF control signal" stops circuit. Also, there may be LED light darken or flickering at output power is with almost no load (about 0.2A or less), or at pulse load even main inverter circuit is operating.

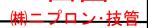
#### (Leakage current)

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



#### (Others)

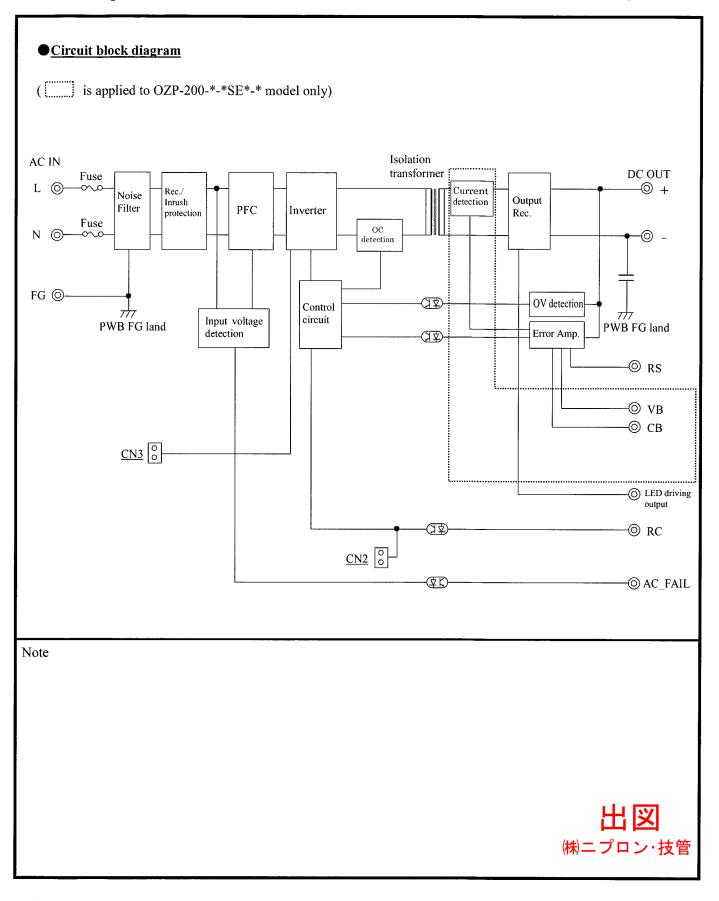
• Because it does not include ORing diode in the output terminal, output power does not remain when one of the power supplies is damaged due to short mode etc. In addition, output power does not remain normally when power supply in operation is connected to the one in shutdown condition in parallel.



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Note

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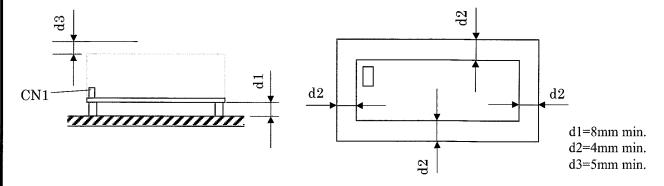


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# • Power supply installation

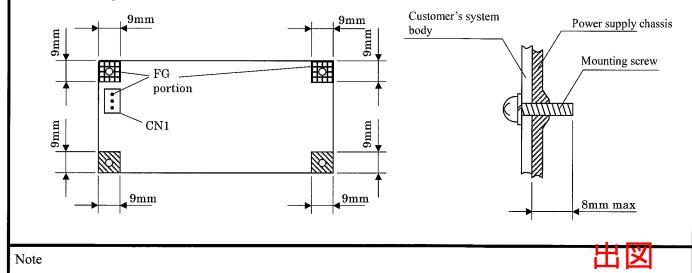
To meet the safety standard for insulation and dielectric withstand, install the power supply to keep the dimensions, d1, d2, and d3, shown in the drawings below.

Install the power supply so that natural air convection and air ventilation is expected to keep the temperature rise around the power supply low.



### Mounting screws and grounding of power supply

- Fix all four screws firmly at power supply mounting holes.
- Use 3mm diameter screws for mounting power supply.
- In mounting, do not use any metal 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 PWB 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 PWB to customer's metal system body with metal parts such as metal spacers to reduce noise.



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# Precautions before use

1. Grounding - **A** 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 - AWarning

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. PWB handling - ACaution

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

4. Output short circuit - A 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-  $\triangle$  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 (3.3V output and 5V etc.) may lead to the failure of power supply.

6. Inrush current control circuit - A Caution

To prevent inrush current into rectifying capacitors when AC input is turned on, a power thermistor is used. When AC input is turned on before the temperature of the thermistor goes low after turning off, huge inrush current may occur. Make sure to keep 60-second period at least before reclosing of AC input.

7. Output energy - A 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.

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