PRODUCT SPECIFICATION

Created: June 14, 2007

Scope:

This application applies to embedded DC power supply OZ-060 series.
All items in this specification shall be provided at 20±5 ℃ and normal humidity environment unless otherwise specified.

Model name coding

Ex.: OZ－060－5－J 0 0 －□
① ② ③ ④⑤⑥ ⑦

① Series name ② Output power ･･･060 ⇒ 60W ③ Output voltage･･･3R3 ⇒ 3.3V, 5 ⇒ 5V, 12 ⇒ 12V, 15 ⇒ 15V, 24 ⇒ 24V
④ Input/Output terminal ･･･ J ⇒ Nylon connector, E ⇒ European terminal block
⑤ Backup function ･･･ 0 ⇒ No backup function equipped
⑥ Option ･･･ 0 ⇒ No option equipped ⑦ Chassis ･･･ Blank ⇒ Open frame, -C ⇒ W/T Chassis, -K ⇒ W/T Chassis and Cover

Model name (basic code)	OZ-060-3R3	OZ-060-5	OZ-060-12	OZ-060-15	OZ-060-24
Max. Power 〔W〕	39.6	60	60	60	60
Output voltage/Current	3.3V/12A	5V/12A	12V/5A	15V/4A	24V/2.5A

General specification

Items		Specification and Standard					Measurement conditions, etc.
		OZ-060-3R3	OZ-060-5	OZ-060-12	OZ-060-15	OZ-060-24	
Input	Nominal voltage	100 - 240Vac					Voltage range: 85 to 264V
	Rated frequency	50 - 60 Hz					Frequency range: 47 to 63Hz
	Current (typical) 〔A〕	0.85/0.48	1.23/0.67	1.18/0.64	1.15/0.64	1.14/0.63	at 100V/240V input with rated load
	Inrush current	25A typical at 100 Vac/50A typical at 200 Vac					at cold start with power thermistor and rated load *(Note 1)*
	Efficiency (typical) 〔%〕	74/75	77/79	80/82	82/82	82/83	at 100V/240V input with rated load
Environment	Operating Temp./Humidity	-10 to 60℃ (convection cooling), 70℃ (forced air cooling) *(Note 2)*／20 to 90% RH					There shall be no condensation
	Storage Temp./Humidity	-20 to 75℃/10 to 95% RH					There shall be 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
	Impact (surface dropping)	Lifting one bottom edge of the unit 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	50MΩ or more between input and FG; between input and outputs connected all together, and between outputs and FG					at DC 500V and normal temp./humidity
	Dielectric strength	AC 1.5 kV for one minute between input and FG; and between input and outputs connected all together					For one second at production line Cut-off current 20mA or less at normal temp./ humidity
	Leakage current	0.5mA max. at 100Vac and 1mA max. at 200Vac					at normal temperature and humidity
	Line noise immunity	±1000V min. (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 with INS-410 There shall be no DC-component output voltage fluctuation nor malfunction.
	Surge immunity	IEC61000-4-5 Installation environment Class 3 compliant (Normal mode 1kV, Common mode 2kV with Positive/Negative polarity 5 times for each)					There shall be no malfunction or failure that prevents automatic recovery. (at 100/240Vac)
	Conducted emission	VCCI, FCC part15, CISPR 22, and EN55022 Class B compliant					To be measured with single power supply under the condition (Note 3) below
	Safety standard	UL/CSA60950-1 (UL/c-UL), EN60950-1/EN50178 (TUV/CE: LVD)					Embedded power supply, Class I
	Cooling system	Convection cooling, or Forced air cooling by external fan					
	Dimensions	55 (W)×32 (H: including lead length on the solder side) ×195 (D)					Open frame standard dimensions (see drawing on another page)
	Weight	300g typical					Open frame standard weight
	Lifetime expectancy	50,000 hours or longer (Limited lifetime components: Electrolytic capacitors)					Estimated lifetime of continuous operation under the following condition: 100Vac input, Rated load, ambient temperature 25℃, no cover, convection cooling in the standard installation direction
	M.T.B.F.	200,000 hours					Calculated based on EIAJ RCR-9102
	Warranty	3 yeas after delivery; if any faults belong to us, the defective unit shall be repaired or replaced at our cost.					Except wrong operation out of specification
	Hazardous Substances	RoHS Directive compliant					

Note 1: The inrush current shall be the primary inrush current. Any inrush current in microampere order of 100uS or less across X capacitor in input filter shall not be specified.
Note 2: Follow the temperature-derating curve against installation condition on another page.
Note 3: Measurement condition: Place an 8mm metal spacer in height between FG part of solder side mounting hole of power supply and metal plate before measurement. The metal plate shall be the same dimensions of power supply PCB in size, and thickness 1mm.

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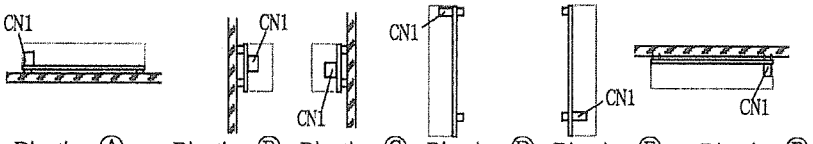
Output specification

(Measurement points shall be at the output terminals).

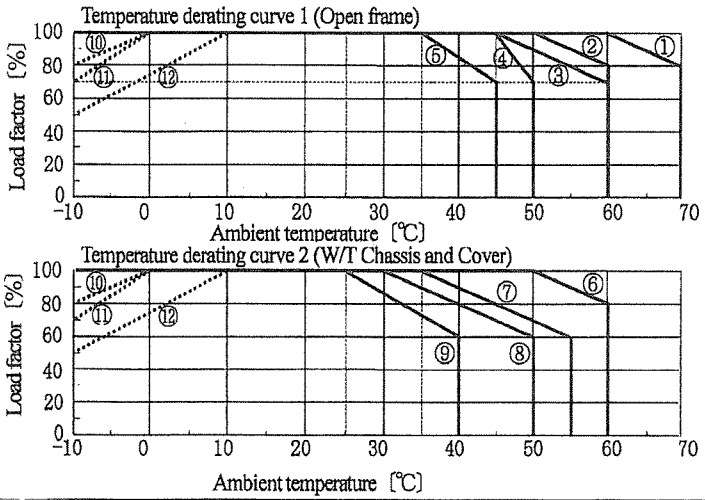
	Items		OZ-060-3R3	OZ-060-5	OZ-060-12	OZ-060-15	OZ-060-24	Measurement conditions, etc.
Output rating	Voltage [V]		3.3	5	12	15	24	
	Load [A]		12	12	5	4	2.5	Continuous rated load
	Power [W]		39.6	60	60	60	60	
	Min. load required [A]		0	0	0	0	0	Min. load to meet output voltage accuracy
Output characteristics	Adjustable voltage range [%]		±10					at rated input with 50% load
	Voltage Factory setting [V]		3.2~3.4	4.9~5.1	11.7~12.3	14.7~15.3	23.5~24.5	at rated input with 50% load
	Total regulation (1) [mV]		±148 max	±225 max	±540 max	±675 max	±1000 max	Sum of input regulation, load regulation and setting variation against rated output voltage value
	Total regulation (2) [mV]		±165 max	±250 max	±600 max	±750 max	±1200 max	Total voltage regulation including drift caused by temperature and time-lapse in addition to total regulation (1)
	Ripple [mV p-p]	0 to 50℃	80 max	80 max	120 max	120 max	120 max	Connect wires of 150mm max. in length between output terminals and the measurement board with capacitors (47uF) placed on it and conduct the measurement at the board with 20MHz oscilloscope. The board shall be away from load lines.
		-10 to 0℃	140 max	140 max	160 max	160 max	160 max	
	Ripple Noise [mV p-p]	0 to 50℃	120 max	120 max	150 max	150 max	150 max	
		-10 to 0℃	160 max	160 max	180 max	180 max	180 max	
	Startup time [mS]		1000 max					Time to reach 90% of rated output voltage with rated load (resistor) after rated input 100Vac is applied
	Rise time [mS]		50 max					Time to reach 90% from 10% of rated output voltage with rated load (resistor) after rated input 100Vac is applied
	Hold-up time [mS]		20 min. at 100Vac/100 min. at 200Vac					Time to reach 90% of rated output voltage with rated load (resistor) after input voltage is turned off.
Protection, and others	OCP	Method	Hold-down current limiting					Rapid shortage, long-time over current or shortage shall be avoided as it may shorten lifetime.
		OCP point [A]	12.6 min.	12.6 min.	5.25 min.	4.2 min.	2.65 min.	Current value when output voltage goes down by 10%.
		Recovery	Automatic recovery					
	OVP	Method	Output latch lock					
		OVP point [V]	4 to 6	To operate at the level of 115% to 140% of rated output voltage				
		Recovery	Input reclosing					Input reclosing cycle shall be 60 seconds or longer.
	Operation display		N/A					
	Remote sensing		N/A					
	Remote control		N/A					

Temperature-derating curve against installation condition

Follow the temperature-derating curve below to decrease load factor according to installation condition such as installation direction, cooling system, with or without cover and input voltage. However, load factor shall be 100% at rated load and rated power specified in the output specification.



Direction Ⓐ Direction Ⓑ Direction Ⓒ Direction Ⓓ Direction Ⓔ Direction Ⓕ



① Open frame with forced air cooling (Air flow: 0.5m³/min. minimum to the component side)
② Open frame with convection cooling and Direction Ⓑ
③ Open frame with convection cooling and Direction Ⓐ、Ⓒ、and Ⓓ
④ Open frame with convection cooling and Direction Ⓔ
⑤ Open frame with convection cooling and Direction Ⓕ
⑥ W/T Chassis and Cover with forced air cooling (Air flow: 0.5m³/min. minimum to the component side)
⑦ W/T Chassis and Cover with convection cooling and Direction Ⓑ
⑧ W/T Chassis and Cover with convection cooling and Direction Ⓐ、Ⓒ、Ⓓ、and Ⓔ
⑨ W/T Chassis and Cover with convection cooling and Direction Ⓕ
⑩ at input voltage of 95V to less than 100V
⑪ at input voltage of 90V to less than 95V (Note)
⑫ at input voltage of 85V to less than 90V

Note: When the unit is left not energized or operated with light load at low input voltage or low temp. environment, the power thermistor to prevent inrush current becomes high resistance (= too low input voltage). If input is turned on at this condition, or if the load changes rapidly from light load to heavy load, blocking operation or high ripple voltage may be caused due to short of input voltage. In order to prevent this, set the load factor within the broken lines.

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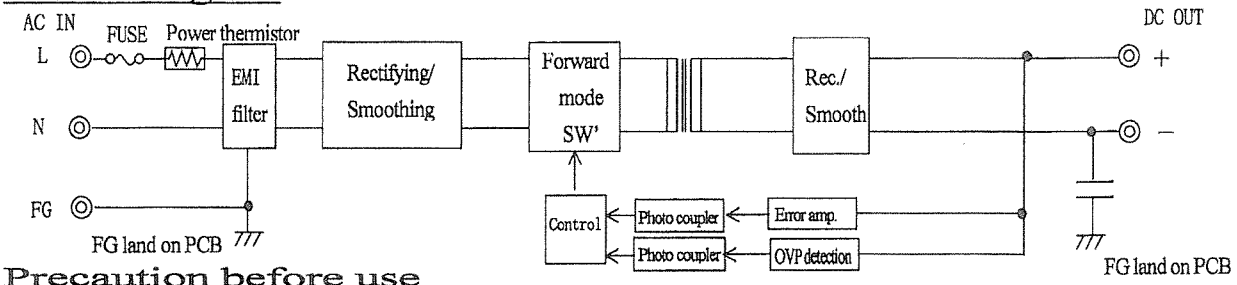
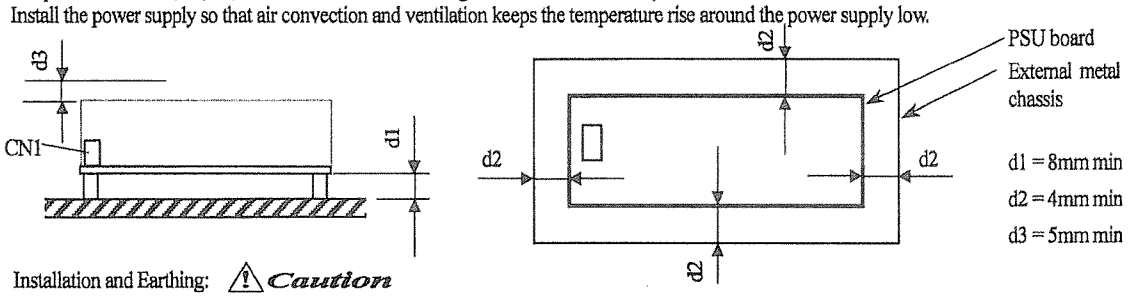
Block Diagram

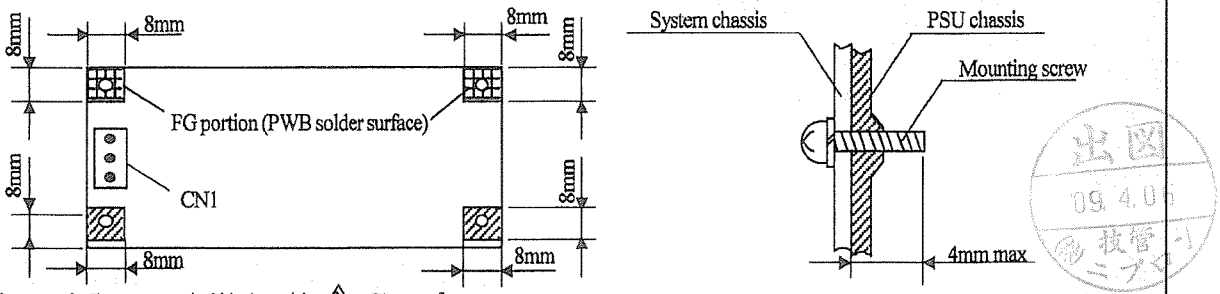


Precaution before use

1. Earthing: ⚠ *Warning*
   This power supply is designed and produced as Class I equipment. Make sure to securely connect earthing terminal (FG) to the ground in a proper way before use.
2. Electric shock: ⚠ *Warning*
   This power supply is designed and produced as built-in equipment and has high-voltage part inside. Make sure to securely install in the equipment in a way to prevent electric shock before use.
3. Output shortage: ⚠ *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.
4. Inrush current limit circuit: ⚠ *Caution*
   Power thermistor is used to limit the inrush current into smoothing capacitors at turn-on of input voltage. If input voltage is applied again in a short period of time after power-off, excessive surge current may occur to melt contacts of power switch causing damage of the power supply. Make sure to turn on the power with cold staring of the power thermistor.
5. PWB board handling: ⚠ *Caution*
   Use the edge of the board so as not to touch the component side surface in handling. Lift the board with spacers from the equipment in installation. Besides, handle it with care to prevent twisting or bending of the board as it has SMT components on it
6. Power supply installation: ⚠ *Caution*
   Keep the dimensions, d1, d2, and d3 shown in the drawing below to meet the safety standard for insulation and dielectric withstand
   Install the power supply so that air convection and ventilation keeps the temperature rise around the power supply low.



7. Installation and Earthing: ⚠ *Caution*
   When a single open frame unit is used, fix all four holes firmly with the screws whose diameter shall be 3mm.
   Metal parts to fix the power supply shall not exceed the hatched area shown below.
   In case of chassis or cover attached, the screws to fix the power supply shall not exceed the dimension shown below.
   Make sure to connect FG terminal of CN1 or FG portion of PWB solder surface with metal spacers to the Safety Earthing of the equipment. Make sure to connect FG terminal of CN1 to Safety Earthing of the system in making application to safety standard.



8. Wire gauge for European terminal block model: ⚠ *Caution*
   Applicable wire gauge for input terminal (CN1) and output terminal (CN2) of European terminal block model is AWG#16 to 26 for both solid and twisted wires. Take into account the rating of acceptable current of the wires. Also, standard stripped length of sheath shall be 6mm for input terminal (CN1), and 5mm for output terminal (CN2).

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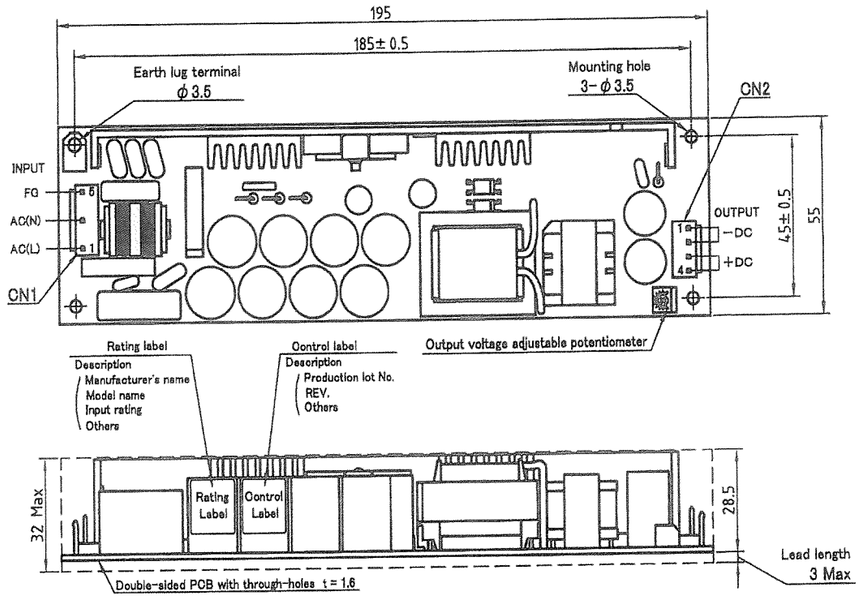
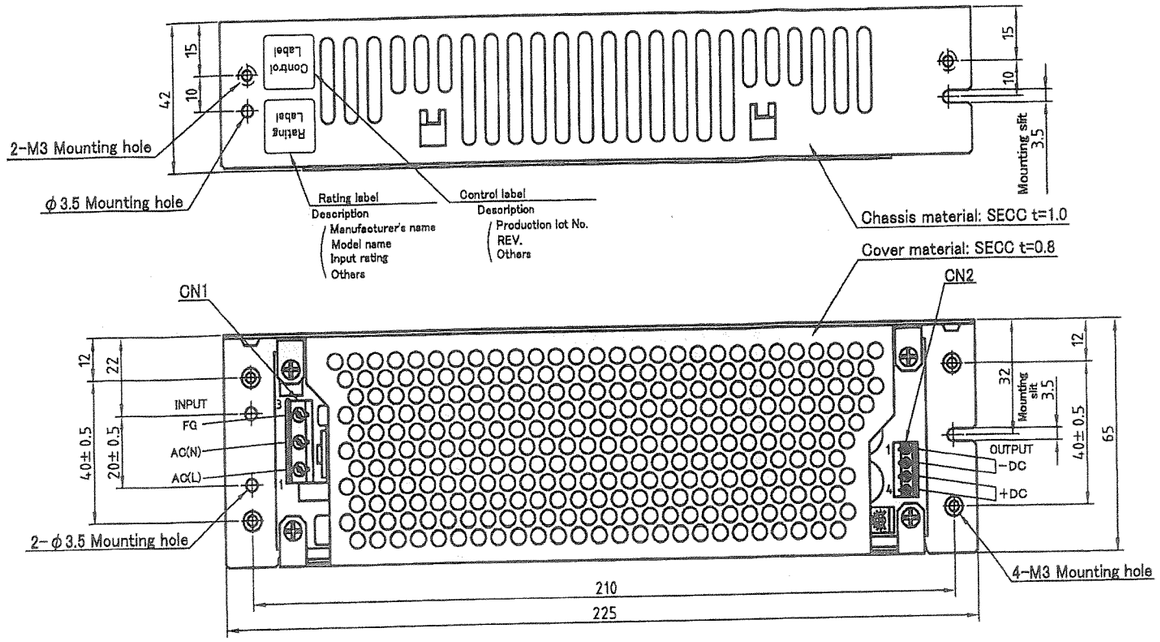


Open frame model
Model: OZ-060-***-*00



W/T Chassis and Cover
Model: OZ-060-***-*00-K

※ Connector pinout assignment

Nylon connector type
Model: OZ-060-***-J00(-*)

Note: Refer to Open frame model for connector dimensions.

CN1:INPUT

PIN No.	FUNCTION	CONNECTOR TYPE
1	AC(L)	B3P5-VH (JST)
2		
3	AC(N)	
4		
5	FG	

* Applicable housing
VHR-5N (JST)
* Applicable terminal
Reel: SVH-21T-P1.1
Bulk: BVH-21T-P1.1

CN2:OUTPUT

PIN No.	FUNCTION	CONNECTOR TYPE
1	-DC	B4P-VH (JST)
2		
3	+DC	
4		

* Applicable housing
VHR-4N (JST)
* Applicable terminal
Reel: SVH-21T-P1.1
Bulk: BVH-21T-P1.1
* Acceptable current per pin of CN2 shall be 6A max.

European terminal block type
Model; OZ-060-***-E00(-*)

Note: Refer to W/T Chassis and Cover model for connector dimensions.

CN1:INPUT

PIN No.	FUNCTION	CONNECTOR TYPE
1	AC(L)	GMKDSN 1.5/3-7.62 (PHOENIX)
2	AC(N)	
3	FG	

* Applicable wire
UL1015 AWG#26~16
* Stripped length of wire: 6mm

CN2:OUTPUT

PIN No.	FUNCTION	CONNECTOR TYPE
1	-DC	MKDS 1/4-3.81 (PHOENIX)
2		
3	+DC	
4		

* Applicable wire
UL1007 AWG#26~16
* Stripped length of wire: 6mm
* Acceptable current per pin of CN2 shall be 6A max.

Dimentional tolerance shall be±1 unless otherwise specified.
Tightning torque for power supply mounting hole(M3): 0.6N·m Max

DROWN BY	CHECK BY	APPROVED BY	SCALE		MATERIALS	TITLE	OZ-060 Series
T.HANANO	A.SHIRAI	A.TAKEDA	UNITS	m/m			Outside drawing
ISSUED 2009. 2. 9			3RD ANGLE PROJECTION		FINISH	DRAWING NO.	5124-01-3-550 -

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