

**Scope**

This specification applies to built-in DC stabilized power supply, mUZP-220-\*\*-\*\*E\*\*.\*.  
 In addition, all items in this specification shall be provided at nominal temperature and humidity unless otherwise specified.

**Model Name Coding**

Example: mUZ P-220-24-J B E □-C

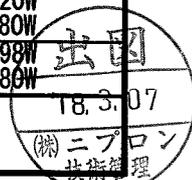
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- ① Series Name..... "mUZ" : mUZ series
- ② Peak power..... "P" : Corresponding to Peak power
- ③ Continuous output power..... "220" : 220W (12V and 18V output type:180W)
- ④ Output voltage..... "12 " : 12V, "18" : 18V, "24" : 24V, "48" : 48V
- ⑤ Input/Output connector type..... "J" : Nylon connector, "T" : Block terminal (2 terminal, without FG)
- ⑥ Backup Function..... "0" : without Backup Function, "B" : with Backup Function
- ⑦ Low standby power..... "E" : Low standby power type (at remote OFF)
- ⑧ Modification..... "Blank" : Standard, "1~9" or "A~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.	
		mUZP-220-					
		12	18	24	48		
AC Input	Rated Voltage	100-240VAC				Worldwide range	
	Voltage Range	85-264VAC				Load factor shall be 95-100% in range of 85-90VAC input	
	Current	At 100VAC	2.1A typ		2.4A typ		At rated output (Natural air cooling)
			3.0A typ		3.8A typ		At rated output (Forced air cooling)
		At 200VAC	1.1A typ		1.2A typ		At rated output (Natural air cooling)
			1.6A typ		1.5A typ		At rated output (Forced air cooling)
	Rated Frequency	50/60 Hz				Frequency range 47-63Hz	
	Inrush Current	At 100VAC	17A typ				Power thermistor system At cold start (25°C)
		At 200VAC	34A typ				
	Efficiency	At 100VAC	90.0% typ		91.5% typ		At 180W load
At 200VAC		92.0% typ		93.5% typ			
Power Factor	At 100VAC	99% typ				At rated output (Natural air cooling)	
	At 200VAC	90% typ					
Standby Power	At 100VAC	0.02W typ				Power consumption at RC signal OFF	
	At 200VAC	0.10W typ					
Input Voltage Momentary Fluctuation	70VAC/500msec		24V, 48V: at load 220W 12V, 18V: at load 180W				
	40VAC/100msec		24V, 48V: at load 190W 12V, 18V: at load 180W				

Note:



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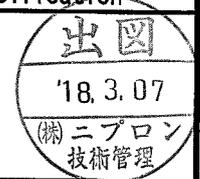
# Product Specification

Created: November 26, 2015

Items		Specification				Measurements conditions, etc.
		mUZP-220-				
		12	18	24	48	
Environment	Operating Temp.	Natural Air Cooling	-10 to 70°C (Open frame)			Refer to "Output derating specification"
			-10 to 60°C (With chassis and cover)			
		Forced Air Cooling	-10 to 70°C (Open frame)			Refer to "Output derating specification" *1
			-10 to 70°C (With chassis and cover)			
	Operating Humidity	20 to 90%RH				
	Storage Temp./Humidity	-20 to 85°C/10 to 95%RH				There shall be no condensation
	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
Mechanical Shock	Left one bottom edge of the unit 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat 3times for each of four bottom edges, and no malfunction shall be observed.				Follow JIS-C-60068-2-31 At no operation	
Insulation	Dielectric Strength	4kVAC/1minute between input and output/RC				Cut-off current 10mA
		3kVAC/1minute between input and FG				Cut-off current 10mA
		500VAC/1minute between each output/RC/FG				Cut-off current 100mA
	Insulation Resistance	50MΩmin. between each input/output/RC/FG				At 500VDC
Leakage Current	0.06mA typ (At 100VAC), 0.12mA typ (At 200VAC)					
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 100/1000ns, cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for 10 minutes)				To be measured with IIS-410. There shall be no fluctuation of DC output or malfunction.
	Impulse Voltage Immunity	IEC-61000-4-5 (Installation environment3) compliant; apply 5 times each of Common mode ±4kV and Normal mode ±2kV				There shall be no malfunction, nor failure.
	Conducted Emmission	VCCI, FCC, CISPR22, and EN55022 ClassB compliant				Rated input and rated output (Natural air 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 continuous rated output
	Safety Standard	UL60601-1, CSA C22.2 No. 601.1 (c-UL), CE marking ANSI/AAMI ES60601-1 approved. PSE (Ordinance item 2) compliant				IEC60601-1 2 <sup>nd</sup> and 3 <sup>rd</sup> (MOPP) approved
	Cooling system	Natural air cooling				
	Dimensions and Weight	75mm × 33mm × 160mm (W × H × D) / 310g typ				Without Chassis and Cover
		83.8mm × 45mm × 188mm (W × H × D) / 530g 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.				Except for errors caused by operation not specified in this specification	

**Note**

\*1. Derating is required for operating at 0°C or lower.  
Derating rates are 85VAC:80%, 90VAC:86.7%, 100VAC-:100%



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

Output Specification							
Items		Specification				Measurement conditions, etc	
		mUZP-220-					
		12	18	24	48		
Output Rating	Rated Voltage		12V	18V	24V	48V	At rated input. Refer to "Output derating specification"
	Continuous Rated Output1 (Natural air cooling)	Current	15A	10A	9.2A	4.6A	
		Power	180W	180W	220.8W	220.8W	
	Continuous Rated Output2 (Forced air cooling)	Current	21A	14A	13.8A	6.9A	
		Power	252W	252W	331.2W	331.2W	
	Peak Rated Output (10s Max.)	Current	33.4A	22.3A	16.7A	8.35A	
Power		400.8W	401.4W	400.8W	400.8W		
Output Characteristics	Factory Setting		12V±2%	18V±2%	24V±2%	48V±2%	At continuous rated output1
	Adjustable Voltage Range		12V -5%, +10%	18V -5%, +10%	24V -5%, +20%	48V -5%, +10%	
	Static Input Regulation		48mV Max.	72mV Max.	94mV Max.	192mV Max.	
	Static Load Regulation		100mV Max.	125mV Max.	150mV Max.	300mV Max.	
	Temperature Regulation		0.02%/°C Max.				
	Ripple Voltage	0 to +70°C	120mVp-p Max.			150mV Max.	
		-10 to 0°C	160mVp-p Max.			200mV Max.	
	Spike Voltage	0 to +70°C	150mVp-p Max.			250mV Max.	
-10 to 0°C		180mVp-p Max.			400mV Max.		
Protection Circuit	Over Current Protection	OCP point	101%min. of peak rated current				
		Method	blocking oscillation				
		Recovery	Automatic recovery				
	Over Voltage Protection	OVP point	13.8 ~16.2V	22.0 ~ 26.0V	30.0 ~35.0V	56.2 ~63.0V	
		Method	Output shutdown (latch lock)				
		Recovery	Reclosing of AC input				
Note:							
							
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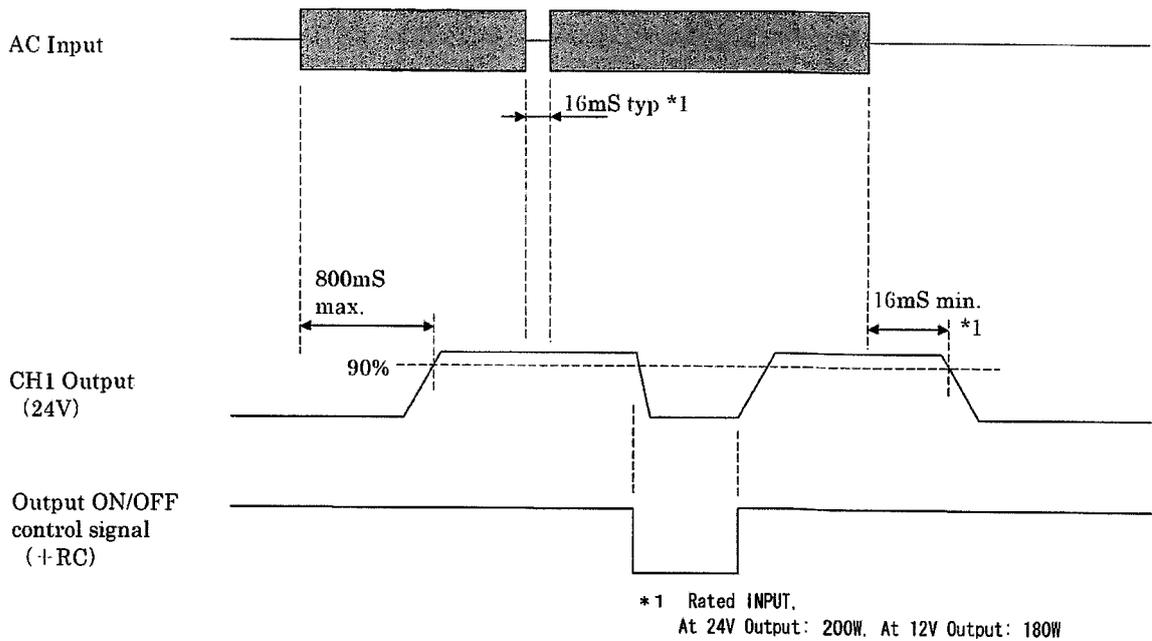
Signal Input/Output Specification																			
Items	Specification				Signal circuit														
	mUZP-220-																		
	12	18	24	48															
Input Signal	<p><b>Output ON/OFF control signal (RC signal)</b></p> <p><u>Operating mode</u></p> <table border="1"> <tr> <td>Between +RC and -RC</td> <td>CH1</td> </tr> <tr> <td>SW ON (4.5V min.)</td> <td>ON</td> </tr> <tr> <td>SW OFF (0.8V max.)</td> <td>OFF</td> </tr> </table> <p><u>External power supply and Load-limiting resistor</u></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> <p><u>Shorting Plug</u>                      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>Note: Shorting plug (CN2) is primary circuit components. Make sure to operate the plug after the AC input is turned off.</p>				Between +RC and -RC	CH1	SW ON (4.5V min.)	ON	SW OFF (0.8V max.)	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><u>Connecting example in the case of using external power supply</u></p>
	Between +RC and -RC	CH1																	
	SW ON (4.5V min.)	ON																	
	SW OFF (0.8V max.)	OFF																	
External power supply : E	Load-limiting resistor : R																		
4.5~12.5Vdc	Not required																		
12.5~30Vdc	1.5kΩ																		
30~48Vdc	8.2kΩ																		

Note



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●Sequence Timing Diagram



●Peak Output Specification

Peak output current shall meet the conditions below.

- Duty ratio of peak current shall be 30% 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

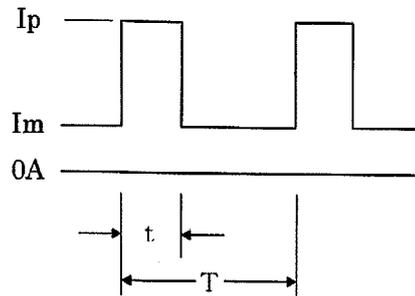
$I_m$ =Min. current value

$D$ =Duty ratio,  $t/T$

$t$ =Pulse width of peak current

$T$ =Cycle

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



(Note)

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

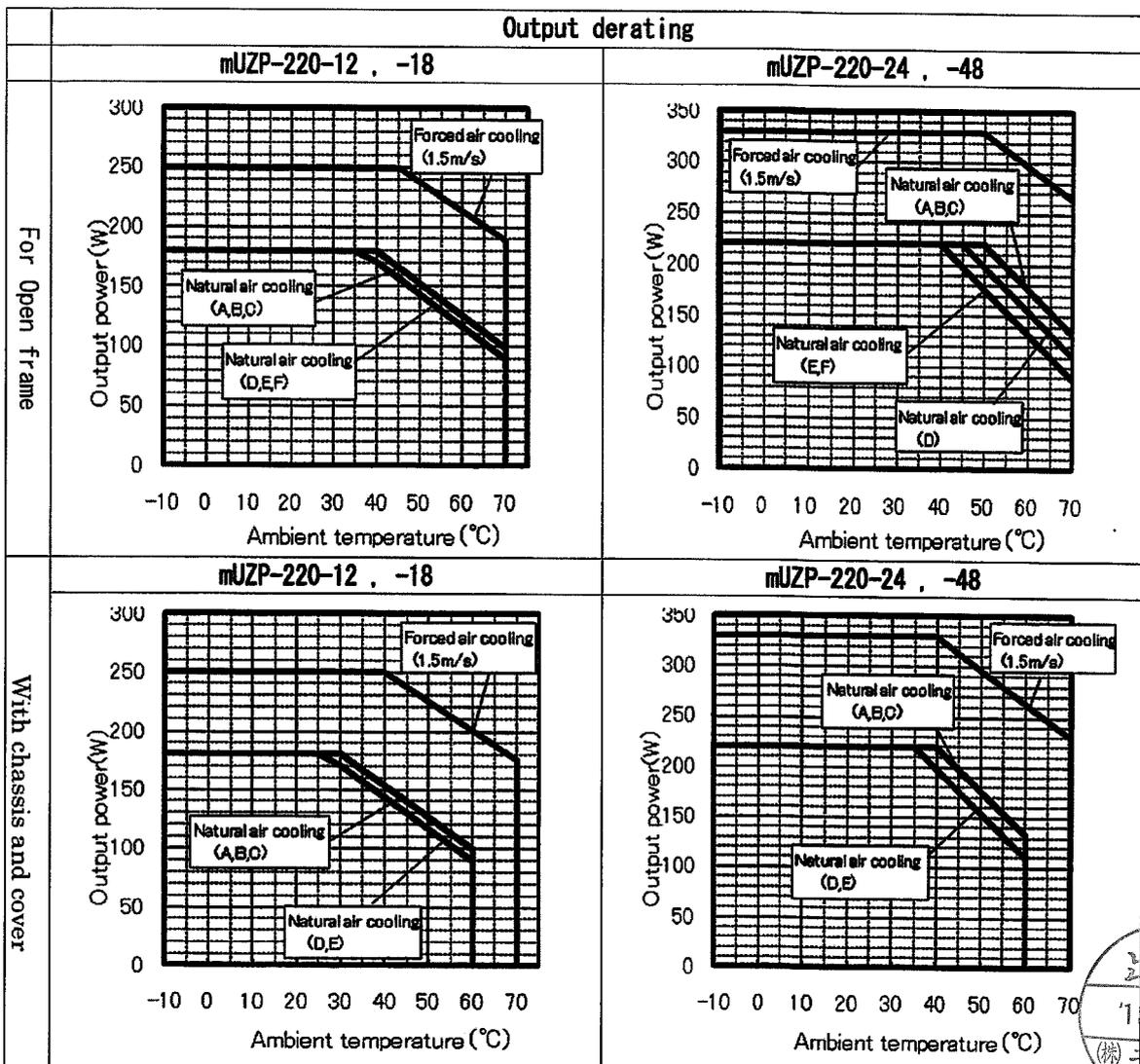
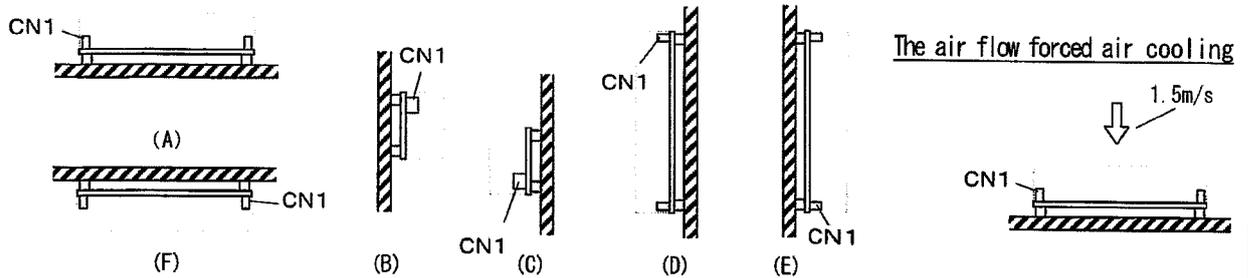


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**Output Derating Based on Ambient Temperature, Installation Direction and Cooling Condition**

Follow the derating diagram below for output according to the ambient temperature and installation direction.

In case of using the type with chassis and cover, input voltage range shall be 90VAC or higher, and shall not use in direction (f). Also, forced air cooling condition in the diagram shall be provided that the air flow of 1.5m/s is applied from the direction shown below.



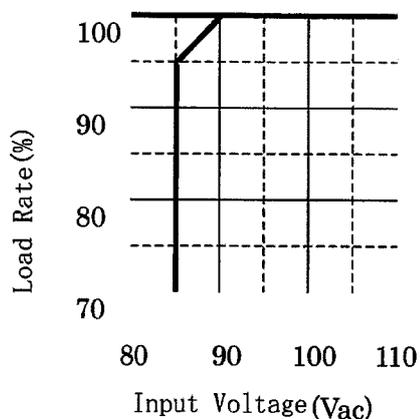
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**●Guideline for forced air cooling**

Ask us separately about the guideline for temperature rise of each component at forced air cooling.

**●Output Derating vs. Input Voltage**

When input voltage is 90VAC or lower, follow the derating diagram below to reduce the continuous rated current and power.



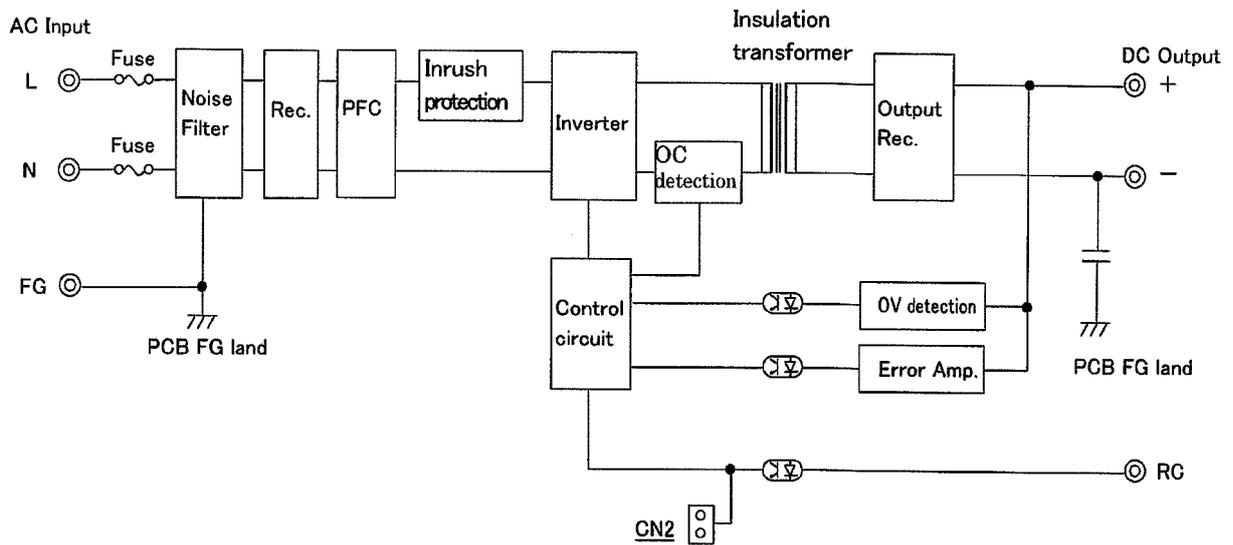
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●Circuit Block Diagram



Note

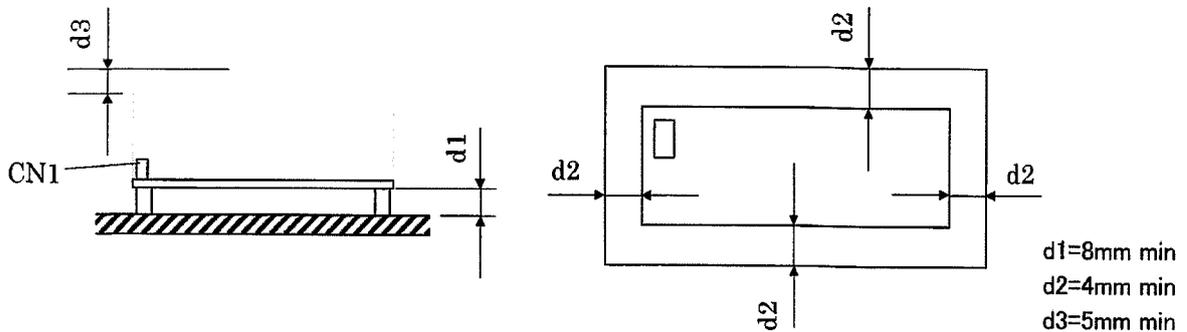


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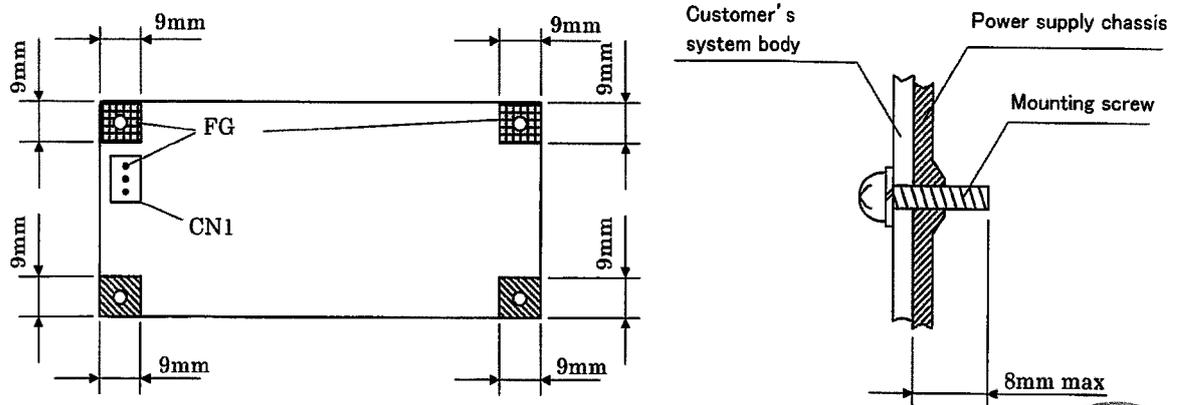
**●Power Supply Installation**

- 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.

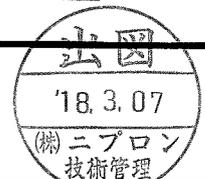


**●Mounting Screws and Grounding of Power Supply**

- Fix all 4 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 (Nylon connector) or FG on the soldered side of PCB or heatsink with mounting holes, chassis to customer's safety grounding.
- However, the connection to FG on the soldered side of PCB is not approved as protective earthing by safety standards. (\*Please refer to the outline drawing regarding a heatsink with mounting holes.)
- 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



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Precautions before use

1. Grounding  Warning  
This unit is designed and produced to meet Class1 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 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 is 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. Also, any failures or a latch stop may occur.
5. Inrush current control circuit  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.
6. 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.



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