

# ***JWS70P · 120P Series***

## ***Instruction Manual***

**BEFORE USING THE POWER SUPPLY UNIT**

Pay attention to all warnings and cautions before using the unit. Incorrect usage could lead to an electrical shock, damage to the unit or a fire hazard.

**WARNING and CAUTION**

- Do not modify nor remove cover.
- Do not touch the internal components, they may have high voltage or high temperature.  
You may get electrical shock or burned.
- When the unit is operating, keep your hands and face away from it, you may get injured by an accident.
- This power supply is primarily designed and manufactured to be used and enclosed in other equipment. Stick the WARNING label for users on the system equipment and describe the notice in the instruction manual.
- Never operate the unit under over current or shorted conditions for long time, which could result in damage or insulation failure. There is no possibility for fire or burning.
- Confirm connections to input/output terminals are correct as indicated in the instruction manual.
- This power supply has a possibility that hazardous voltage may occur in output terminal depending on failure mode.  
The outputs of these products must be earthed in the end use equipment to maintain SELV.  
If the outputs are not earthed, they must be considered hazardous and must not be made user accessible.

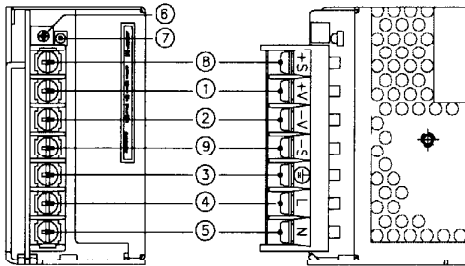
**Note: CE MARKING**

CE Marking, when applied to a product covered by this handbook indicates compliance with the low voltage directive (73/23/EEC) as modified by the CE Marking Directive (93/68/EEC) in that it is complies with EN60950.

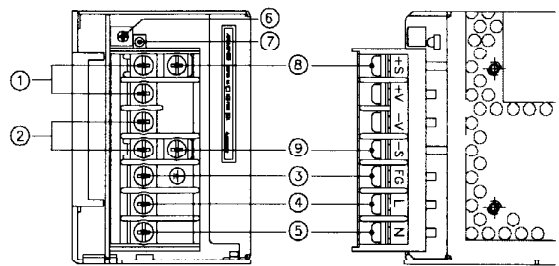
<b>DWG NO. : A180-04-01B</b>		
<b>APPD</b>	<b>CHK</b>	<b>DWG</b>
<i>M. TANE MURA 17 Jun. '05</i>	<i>AMOLEA 16. Jun. '05</i>	<i>A. Haga 16. Jun. '05</i>

## 1. Terminal Explanation

### JWS70P



### JWS120P

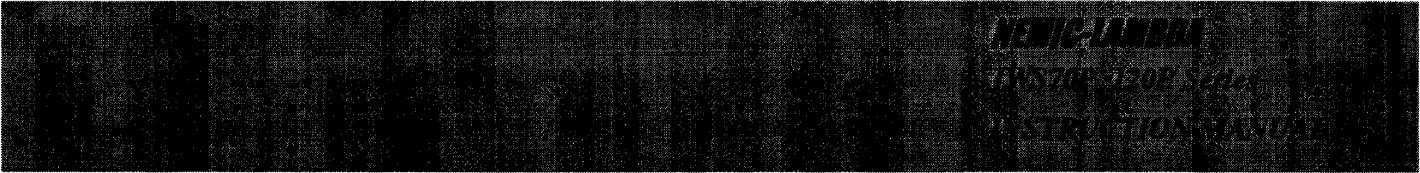


- (1) +V : + Output terminal
- (2) -V : - Output terminal
- (3) FG  $\oplus$  : Frame Ground ( Safety Earth )
- (4) L : Input terminal Live line ( Fuse in line )
- (5) N : Input terminal Neutral line

- (6) Output voltage adjustment trimmer
- (7) Output monitoring indicator ( Green LED )
- (8) +S : + Remote sensing terminal
- (9) -S : - Remote sensing terminal

## 2. Terminal Connecting Method

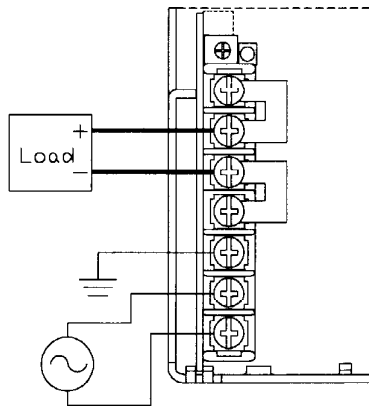
- Input must be off when making connection.
- Connect  $\oplus$  terminal to ground terminal of the equipment.
- The output load line and input line shall be separated and twisted to improve noise sensitivity.
- Remote sensing lines shall be twisted or use shielded wire.



### JWS70P

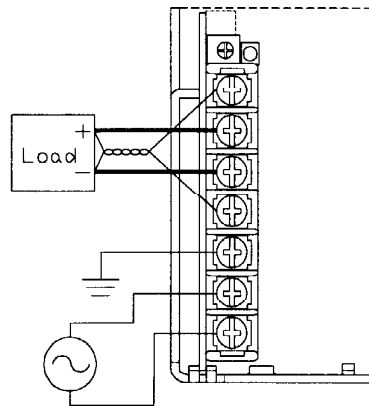
#### Basic connection ( Local sensing )

Connect "+S" terminal to "+V" terminal and "-S" terminal to "-V" terminal with the attached short pieces.



#### Remote sensing required

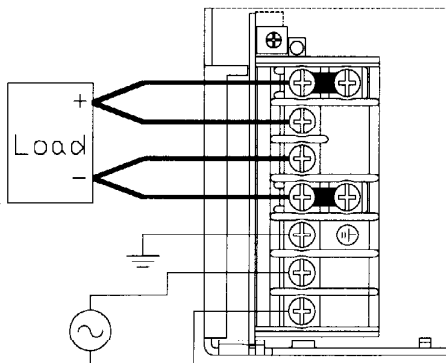
Connect "+S" terminal to "+" terminal of load and "-S" terminal to "-" terminal of load with wires. When remote sensing terminals are open, output is shut down.



### JWS120P

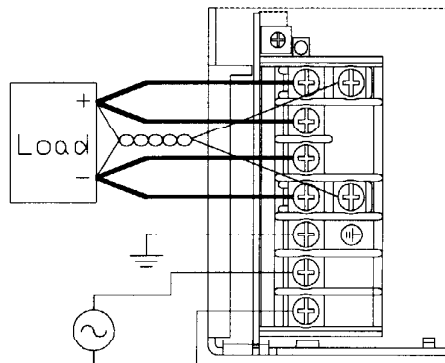
#### Basic connection ( Local sensing )

Connect "+S" terminal to "+V" terminal, and "-S" terminal to "-V" terminal with the attached short pieces.



#### Remote sensing required

Connect "+S" terminal to "+" terminal of load and "-S" terminal to "-" terminal of load with wires. When remote sensing terminals are open, output is shut down.



**3. Explanation of Functions and Precautions**

**3-1. Input Voltage Range**

Input voltage range is single phase 85 ~ 265VAC ( 47 ~ 63Hz ). Input voltage which is out of specification may cause unit damage.

**3-2. Output Voltage Range**

V.ADJ trimmer on the front panel side can adjust the output voltage within the range. Output voltage range is within +/- 10% of nominal output voltage. To turn the trimmer clockwise, the output voltage will be increased. Note over voltage protection ( OVP ) function may trigger if the output voltage is increased excessively.

**3-3. Inrush Current**

This series has used Power Thermistor to protect the circuit from Inrush Current. Please carefully select input switch and fuse in cases of the high temperature and re-input the power.

**3-4. Over Voltage Protection ( OVP )**

The OVP function ( Inverter shut down method, manual reset type ) is provided. When OVP triggers, the output will be shut down. The input shall be removed for a few minutes, and then re-input for recovery of the output. OVP setting shall be fixed and not to be adjusted externally.

**3-5. Over Current Protection ( OCP )**

Constant current limiting, automatic recovery. OCP function operates when the output current exceeds 204% of average output current on specification. The output will be automatically recov-

ered when the overload condition is canceled.

Never operate the unit under over current or shorted conditions for a long time, which could result in damage or insulation failure.

**3-6 Over Temperature Protection ( OTP )**

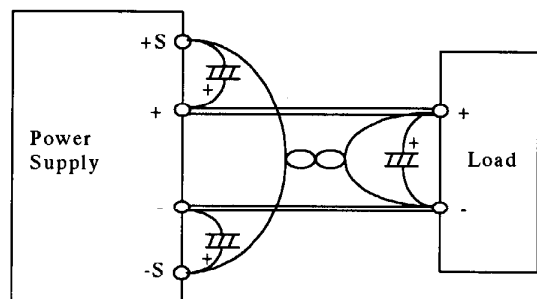
Over temperature protection function ( automatic recovery ) is provided. When ambient or internal temperature rises abnormally, OTP will shut down the output. The output will automatically recover if the over temperature condition is canceled.

**3-7 Remote Sensing ( +S, -S terminal )**

This function compensates voltage drop of wiring from output terminals to load terminals. Connect "+S" terminal to "+" terminal of load and "-S" terminal to "-" terminal of load with sensing wires. The total line voltage drop ( + side line and - side line ) shall be less than 0.3V. In case that sensing line is too long, it is necessary to put an electrolytic capacitor in following 3 placed;

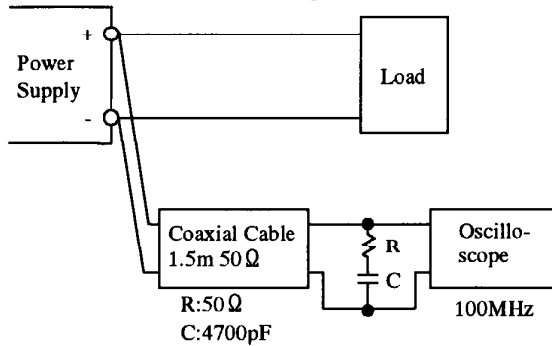
- 1) Across the load terminal,
- 2) Between "+S" terminal and "+" terminal,
- 3) Between "-S" terminal and "-" terminal.

If remote sensing terminals are opened, the output will rise and OVP may be triggered.



### 3-8. Output Ripple & Noise

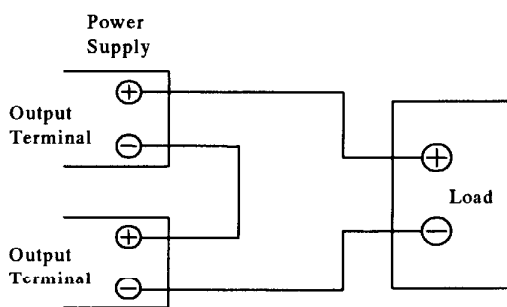
The standard specification for maximum ripple value is measured according to measurement circuit specified by EIAJ-RC9131. When load lines are longer, ripple becomes larger. In this case, electrolytic capacitor, film capacitor, etc., might be necessary to use across the load terminal. The output ripple cannot be measured accurately if the probe ground lead of oscilloscope is too long.



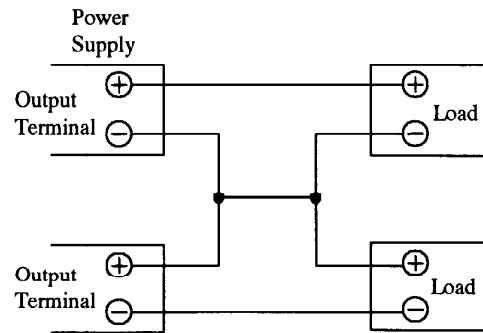
### 3-9. Series Operation

For series operation, either method (A) or (B) is possible.

#### Method (A)



#### Method (B)



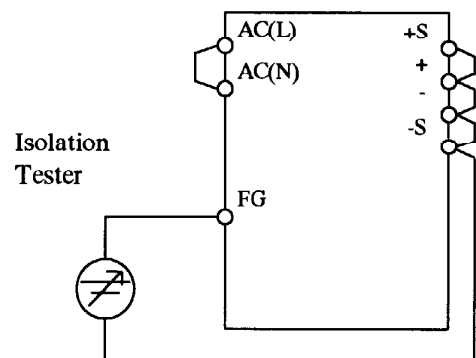
## 4. Isolation/Withstand Voltage

### 4-1. Isolation Test

Isolation resistance between output and FG (chassis) shall be more than 100MΩ at 500VDC. For safety operation, voltage setting of DC isolation tester must be done before the test. Ensure that it is fully discharged after the test.

Output ~ FG (chassis)

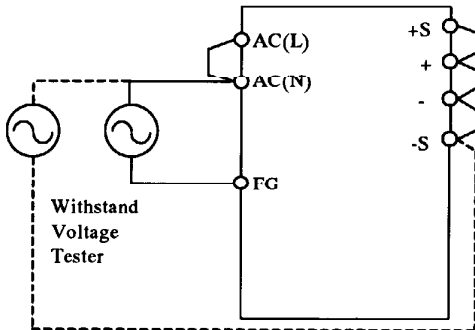
500VDC 100MΩ or more



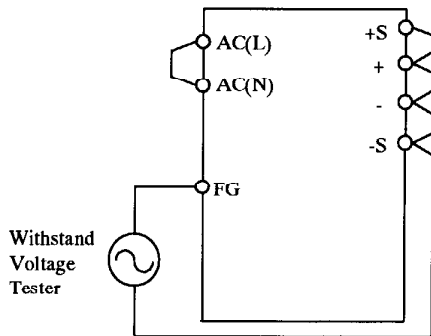
**4-2. Withstand Voltage**

This series is designed to withstand 3.0kVAC between input and output, 2.0kVAC between input and FG ( chassis ), and 500VAC between output and FG ( chassis ), each for 1 minute. When testing withstand voltage, set current limit of withstand voltage test equipment at 20mA ( Output-FG ( chassis ) : 100mA ). The applied voltage must be gradually increased from zero to testing value and then gradually decreased for shut down. When timer is used, the power supply may be damaged by high impulse voltage at timer switch on and off. Connect input and output as follows.

- Input ~ Output( dotted line )  
3kVAC 1min. ( 20mA )
- Input ~ FG( chassis )( solid line )  
2kVAC 1min. ( 20mA )

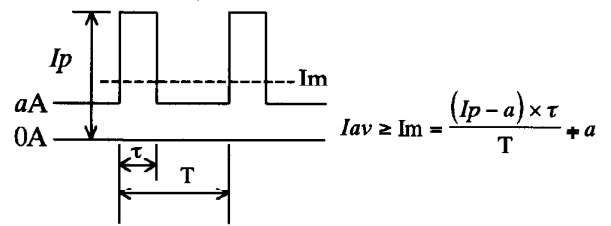
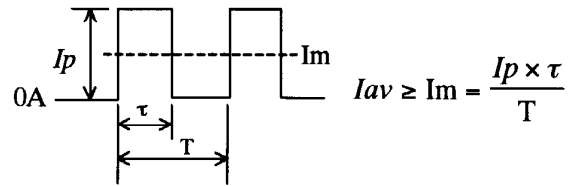


- Output ~ FG( chassis )  
500VAC 1min. ( 100mA )



**5. Peak Output Current**

For JWS-P series, relation with average output current and peak output current must satisfy formulas below. Also operating time at peak output is less than 10sec.  
 ( Duty  $\leq 0.5$  )



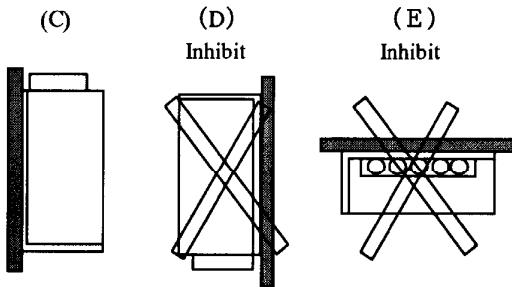
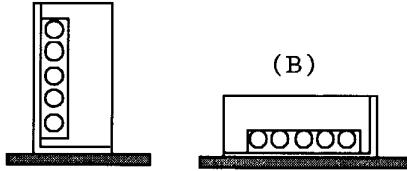
- $I_p$  : Peak output current ( A )
- $I_{av}$  : Average output current of Specification ( A )
- $I_m$  : Average output current ( A )
- $\tau$  : Pulse width of peak output current ( sec )  
( Operating time at peak output )
- $T$  : Period ( sec )

**6. Mounting Directions**

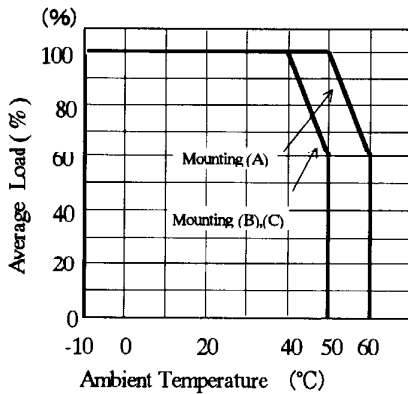
**6-1. Output Derating according to the Mounting Directions**

Recommended standard mounting method is ( A ). Method ( B ) and ( C ) are also possible. Refer to the derating below. Please do not use installation method ( D ) and ( E ), where the PCB will be on the topside and heat will be trapped inside the unit. In the following derating curve, the average output current is considered to be 100%.

**( A ) Standard Mounting**



**Output Derating**

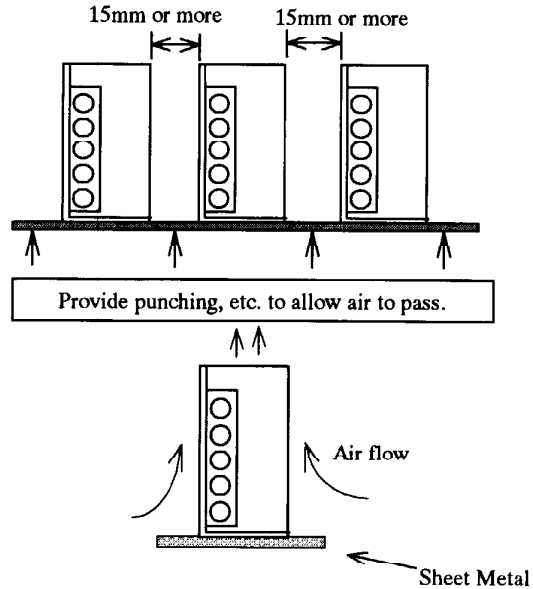


**JWS70P, JWS120P Output Derating**

Ta( °C )	AVERAGE LOAD( % )		
	A	B	C
-10 ~ +40	100	100	100
45	100	80	80
50	100	60	60
55	80	-	-
60	60	-	-

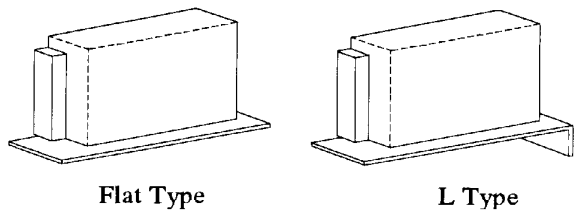
**6-2. Mounting Method**

- 1) This is convection cooling type power supply. In the consideration for the heat radiation and safety. Please take a distance more than 15mm between the power supply and the peripheral parts. When lining up multiple units, please make sure to place them 15mm or more apart from each other.
- 2) The maximum allowable penetration of mounting screws is 6mm.
- 3) Recommended torque for mounting screw JWS70P , 120P( M4 screw ) : 1.27 N·m ( 13.0kgf·cm )



**6-3. Optional sheet metal parts for mounting**

Optional sheet metal mounting parts are available to meet following mounting methods. Contact to NL sales representatives.



## 7. Wiring Method

- The output load line and input line shall be separated and twisted to improve noise sensitivity.
- The sensing lines shall be twisted and separated from the output lines.
- Use all lines as thick and short as possible to make lower impedance.
- Noise can be eliminated by attaching a capacitor to the load terminals.
- For safety and EMI considerations, connect FG to the mounting set ground terminal.
- Recommended torque for the terminal piece:  
JWS70P , 120P( M4 screw ) : 1.27 N·m  
( 13.0kgf·cm )
- Recommended wire type  
(JWS70P/508, JWS120P/508) : AWG12-22  
(3.5-0.3mm<sup>2</sup>)
- Check if the rated input voltage is connected.
- Check if the wiring of input and output is correct.
- Check if the wire material is not too thin.
- Check if the output voltage control (V.ADJ) is properly adjusted.
- Check if the output current and output wattage dose not over specification.
- Audible noise can be heard during Dynamic-Load operation.
- Audible noise can be heard when input voltage waveform is not sinusoidal wave.

## 8. External Fuse Rating

Refer to the following fuse rating when selecting the external fuses that are to be used on input line. Surge current flows when line turns on. Use slow-blow fuse or time-lag fuse. Do not use fast-blow fuse. Fuse rating is specified by in-rush current value at line turn-on. Do not select the fuse according to input current (rms.) values under the actual load condition.

JWS70P : 5A  
JWS120P : 6.3A

## 9. Before concluding that the unit is at fault...

Before concluding that the unit is at fault, make the following checks.

## 10. Notes

1. Overvoltage Category II
2. Radio Interference Suppression Test is not performed.

## 11. JWS70P/508, JWS120P/508

### UL508 Listed Condition

1. Surrounding Air Temperature  
JWS70P/508 : 40°C  
JWS120P/508 : 50°C
2. Wire Requirement
  - Use min. 60°C or 60/75°C wire.
  - Use copper conductor only.
3. For use in a Pollution degree 2 environment only.
4. Indoor use only.