# 1000W Power Supply with Single Output

# RSP-1000 series

Dimension

| L | * | W | * | H | | |
|---|---|---|---|---|---|---|
| 295 | * | 127 | * | 41 | (1U) | mm |
| 11.6 | * | 5 | * | 1.61 | (1U) | inch |

## Features

- Universal AC input / Full range
- Built-in active PFC function
- High efficiency up to 90%
- Forced air cooling by built-in DC fan
- Output voltage programmable
- Active current sharing up to 4000W (3+1)
- Built-in remote ON-OFF control / remote sense / auxiliary power / DC OK signal
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Optional conformal coating
- 5 years warranty

## Applications

- Factory control or automation apparatus
- Test and measurement instrument
- Laser related machine
- Burn-in facility
- RF application

## Description

RSP-1000 is a 1KW single output enclosed type AC/DC power supply with 1U low profile. This series operates for 90~264VAC input voltage and offers the models with the DC output mostly demanded from the industry. Each model is cooled by the built-in fan with fan speed control, working for the temperature up to 60℃. Moreover, RSP-1000 provides vast design flexibility by equipping various built-in functions such as the output programming, active current sharing, remote ON-OFF control, auxiliary power, etc.

## Model Encoding / Order Information

**RSP - 1000 - 24**

- 24 — Output voltage (12V/15V/24V/27V/48V)
- 1000 — Output wattage
- RSP — Series name

## SPECIFICATION

| MODEL | | RSP-1000-12 | RSP-1000-15 | RSP-1000-24 | RSP-1000-27 | RSP-1000-48 |
|---|---|---|---|---|---|---|
| OUTPUT | DC VOLTAGE | 12V | 15V | 24V | 27V | 48V |
| | RATED CURRENT | 60A | 50A | 40A | 37A | 21A |
| | CURRENT RANGE | 0 ~ 60A | 0 ~ 50A | 0 ~ 40A | 0 ~ 37A | 0 ~ 21A |
| | RATED POWER | 720W | 750W | 960W | 999W | 1008W |
| | RIPPLE & NOISE (max.) Note.2 | 150mVp-p | 150mVp-p | 150mVp-p | 150mVp-p | 150mVp-p |
| | VOLTAGE ADJ. RANGE | 10 ~ 13.5V | 13.5 ~ 16.5V | 20 ~ 26.4V | 24 ~ 30V | 43 ~ 55V |
| | VOLTAGE TOLERANCE Note.3 | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% |
| | LINE REGULATION | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% |
| | LOAD REGULATION | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% |
| | SETUP, RISE TIME | 300ms, 50ms at full load | | | | |
| | HOLD UP TIME (Typ.) | 16ms/230VAC 16ms/115VAC at full load | | | | |
| INPUT | VOLTAGE RANGE Note.4 | 90 ~ 264VAC 127 ~ 370VDC | | | | |
| | FREQUENCY RANGE | 47 ~ 63Hz | | | | |
| | POWER FACTOR (Typ.) | 0.95/230VAC 0.98/115VAC at full load | | | | |
| | EFFICIENCY (Typ.) | 83% | 85% | 88% | 88% | 90% |
| | AC CURRENT (Typ.) | 12A/115VAC 6A/230VAC | | | | |
| | INRUSH CURRENT (Typ.) | 25A/115VAC 40A/230VAC | | | | |
| | LEAKAGE CURRENT | <2.0mA / 240VAC | | | | |
| PROTECTION | OVERLOAD | 105 ~ 125% rated output power | | | | |
| | | Protection type : Constant current limiting, recovers automatically after fault condition is removed | | | | |
| | OVER VOLTAGE | 13.8 ~ 16.8V | 17 ~ 20.5V | 27.6 ~ 32.4V | 31 ~ 36.5V | 56.6 ~ 66.2V |
| | | Protection type : Shut down o/p voltage, re-power on to recover | | | | |
| | OVER TEMPERATURE | Shut down o/p voltage, recovers automatically after temperature goes down | | | | |
| FUNCTION | OUTPUT VOLTAGE PROGRAMMABLE(PV) | Adjustment of output voltage is allowable to 40 ~ 110% of nominal output voltage. Please refer to the Function Manual. | | | | |
| | CURRENT SHARING | Up to 4000W or (3+1) units. Please refer to the Function Manual. | | | | |
| | AUXILIARY POWER | 5V @ 0.5A (+5%, -8%) | | | | |
| | REMOTE ON-OFF CONTROL | Power ON : short Power OFF : open. Please refer to the Function Manual. | | | | |
| | REMOTE SENSE | Compensate voltage drop on the load wiring up to 0.5V. Please refer to the Function Manual. | | | | |
| | DC OK SIGNAL | The TTL signal out, PSU turn on = 0 ~ 1V ; PSU turn off = 3.3 ~ 5.6V. Please refer to the Function Manual. | | | | |
| ENVIRONMENT | WORKING TEMP. | -20 ~ +60℃ (Refer to "Derating Curve") | | | | |
| | WORKING HUMIDITY | 20 ~ 90% RH non-condensing | | | | |
| | STORAGE TEMP., HUMIDITY | -40 ~ +85℃, 10 ~ 95% RH non-condensing | | | | |
| | TEMP. COEFFICIENT | ±0.02%/℃ (0 ~ 50℃) | | | | |
| | VIBRATION | 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes | | | | |
| SAFETY & EMC (Note 5) | SAFETY STANDARDS | UL62368-1, CSA C22.2 No. 62368-1, TUV BS EN/EN62368-1, CCC GB4943.1, BSMI CNS14336-1, AS/NZS62368.1, IS13252(Part1)/IEC60950-1, EAC TP TC 004 approved | | | | |
| | WITHSTAND VOLTAGE | I/P-O/P:3KVAC I/P-FG:2KVAC O/P-FG:0.5KVAC | | | | |
| | ISOLATION RESISTANCE | I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH | | | | |
| | EMC EMISSION | **Parameter** | **Standard** | **Test Level / Note** | | |
| | | Conducted | BS EN/EN55032 (CISPR32) | Class B | | |
| | | Radiated | BS EN/EN55032 (CISPR32) | Class A | | |
| | | Harmonic Current | BS EN/EN61000-3-2 | ----- | | |
| | | Voltage Flicker | BS EN/EN61000-3-3 | ----- | | |
| | EMC IMMUNITY | BS EN/EN55024, BS EN/EN61000-6-2, CCC GB17625.1, GB/T9254, BSMI CNS13438 | | | | |
| | | **Parameter** | **Standard** | **Test Level / Note** | | |
| | | ESD | BS EN/EN61000-4-2 | Level 3, 8KV air ; Level 2, 4KV contact | | |
| | | Radiated | BS EN/EN61000-4-3 | Level 3 | | |
| | | EFT / Burst | BS EN/EN61000-4-4 | Level 3 | | |
| | | Surge | BS EN/EN61000-4-5 | Level 4, 4KV/Line-Earth ; Level 3, 2KV/Line-Line | | |
| | | Conducted | BS EN/EN61000-4-6 | Level 3 | | |
| | | Magnetic Field | BS EN/EN61000-4-8 | Level 4 | | |
| | | Voltage Dips and Interruptions | BS EN/EN61000-4-11 | >95% dip 0.5 periods, 30% dip 25 periods, >95% interruptions 250 periods | | |
| OTHERS | MTBF | 313.1K hrs min. Telcordia SR-332 (Bellcore) ; 116.75K hrs min. MIL-HDBK-217F (25℃) | | | | |
| | DIMENSION | 295*127*41mm (L*W*H) | | | | |
| | PACKING | 1.95Kg; 6pcs/12.7Kg/1.15CUFT | | | | |

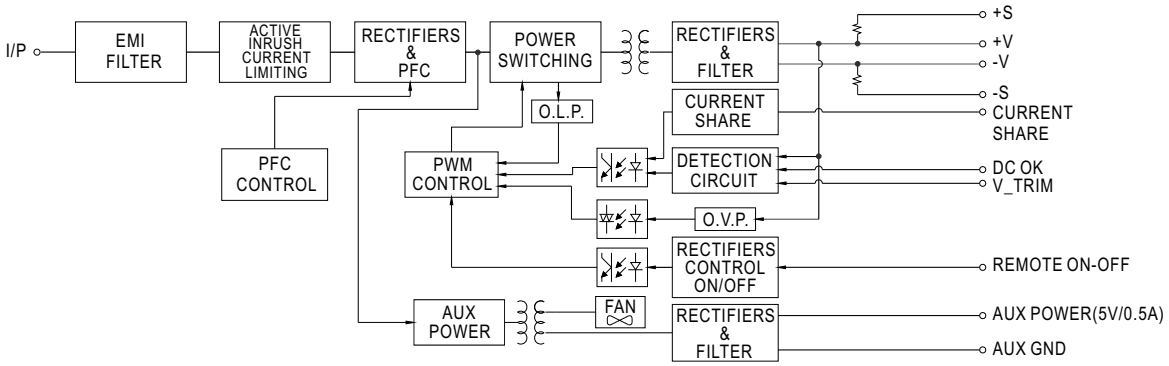
**NOTE**

1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. Derating may be needed under low input voltages. Please check the derating curve for more details.
5. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.” (as available on http://www.meanwell.com)
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

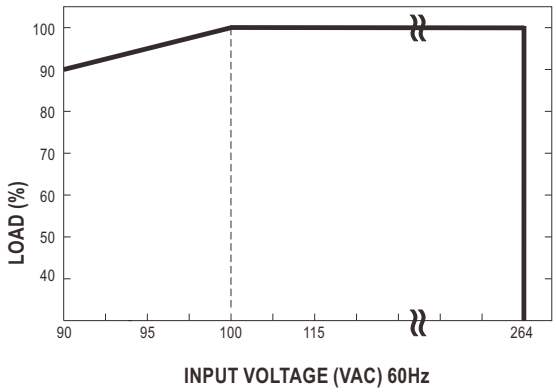
※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

## ■ Block Diagram

PFC fosc : 110KHz
PWM fosc : 90KHz

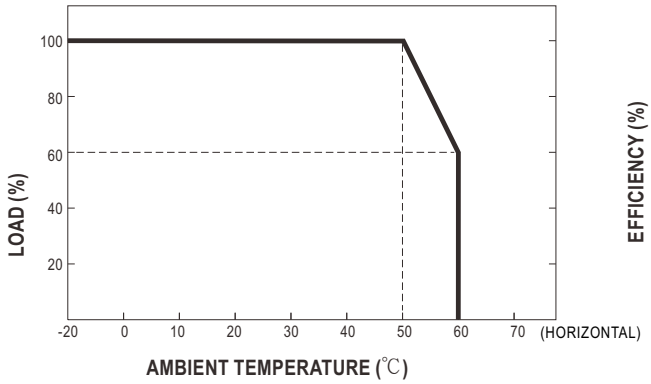



## ■ Static Characteristics

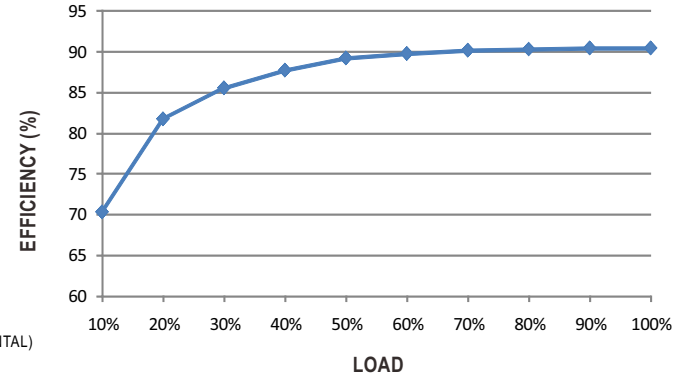



| INPUT \ MODEL | 12V | 15V | 24V | 27V | 48V |
|---|---|---|---|---|---|
| 100~264VAC | 720W 60A | 750W 50A | 960W 40A | 999W 37A | 1008W 21A |
| 90VAC | 648W 54A | 675W 45A | 864W 36A | 899.1W 33.3A | 907.2W 18.9A |

## ■ Derating Curve




## ■ Efficiency vs Load (48V Model)

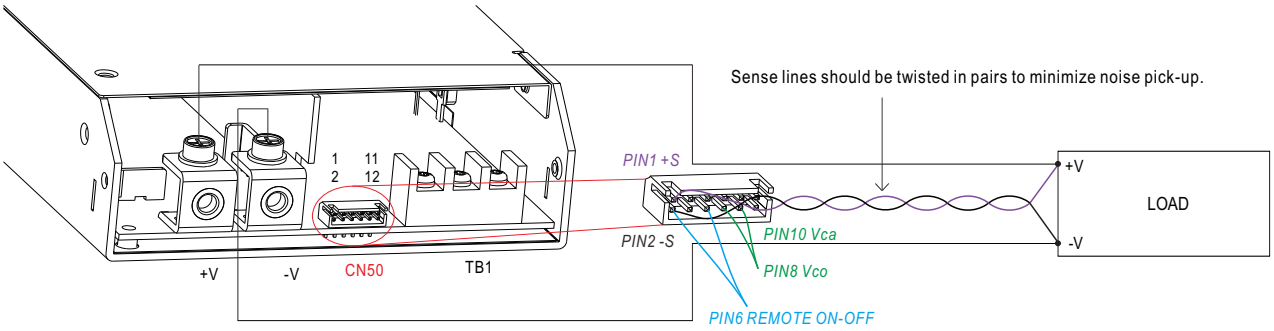



※ The curve above is measured at 230VAC.

## ■ Function Manual

### 1.Remote Sense

※ The Remote Sense compensates voltage drop on the load wiring up to 0.5V




◎ The +*S* signal should be connected to the positive terminal of the load whereas -*S* signal to the negative terminal.

◎ This configuration is based on the assumption the Output Voltage Programming is not activated and power supply is ON.

Fig 1.1

### 2.Remote ON-OFF Control

※ The power supply can be turned ON-OFF indivicluaaly or along with other units by using the “Remote ON-OFF” function.

| Between *Remote ON-OFF (pin6)* and *-S(pin2)* | Power Supply Status |
|---|---|
| Switch Short | ON |
| Switch Open | OFF |

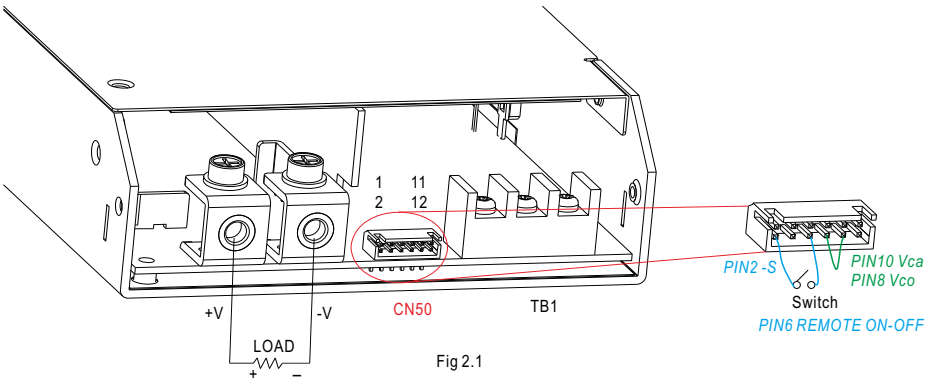



Fig 2.1

◎ The power supply is shipped, by factory default, with *Remote ON-OFF(pin6)* and *-S(pin2)* shorted by connector.

◎ When multiple power supplies need to turn ON/OFF simultaneously by Remote ON-OFF control, -S & -V, as well as +S & +V, on each power supply should be connected.

### 3.DC_OK signal

※ "DC_OK" is an open collector signal. It indicates the output status of the power supply. It can operate in two ways : One is sinking current from external TTL signal ; the other is sending out a TTL voltage signal.

◎ **Sinking current from external TTL signal:** The maximum sink current is 10mA and the maximum external voltage is 5.6V.

◎ **Sending out TTL voltage signal :**

| Between *DC- OK(pin5)* and *GND(pin11&12)* | Output Status |
|---|---|
| 0 ~ 1V | ON |
| 3.3 ~ 5.6V | OFF |

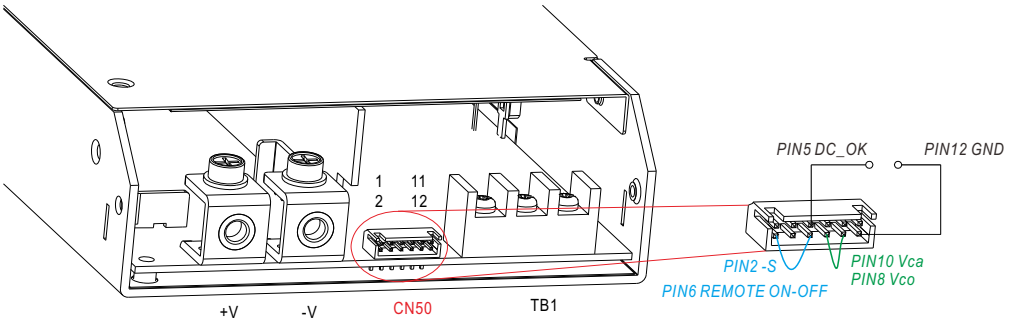
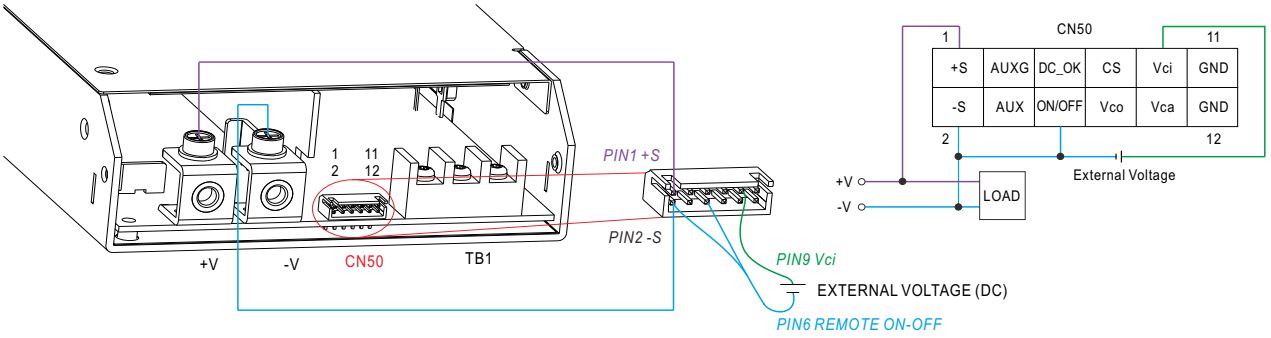



Fig 3.1

**4. Output Voltage Programming (or, PV / remote voltage programming / remote adjust / margin programming / dynamic voltage trim)**

※ In addition to the adjustment via the built-in potentiometer, the output voltage can be trimmed to 40~110% of the nominal voltage by applying either an EXTERNAL VOLTAGE or an EXTERNAL RESISTANCE.

(1)Applying EXTERNAL VOLTAGE between "*Vci*"*(pin9)* and "*-S*"*(pin2)* as shown in Fig4.1

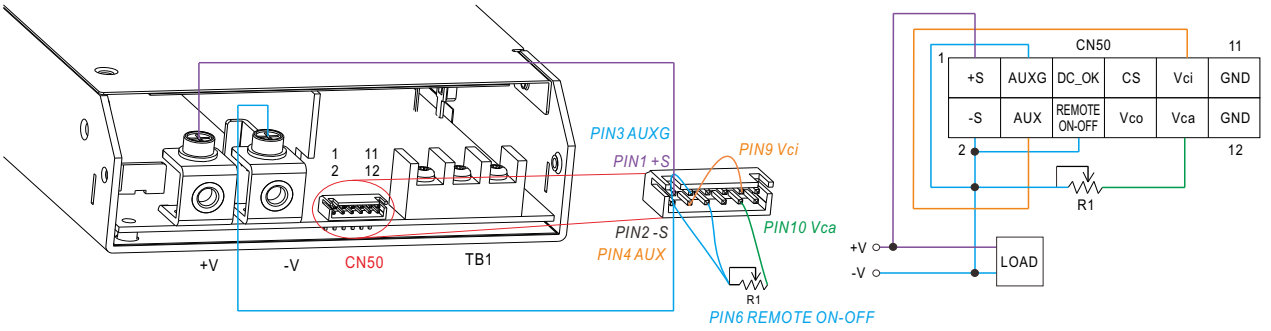



◎+*S* & +*V* and -*S* & -*V* also need to be connected on CN50

Fig 4.1

(2)Applying EXTERANL RESISTANCE as shown in Fig4.2 & Fig 4.3

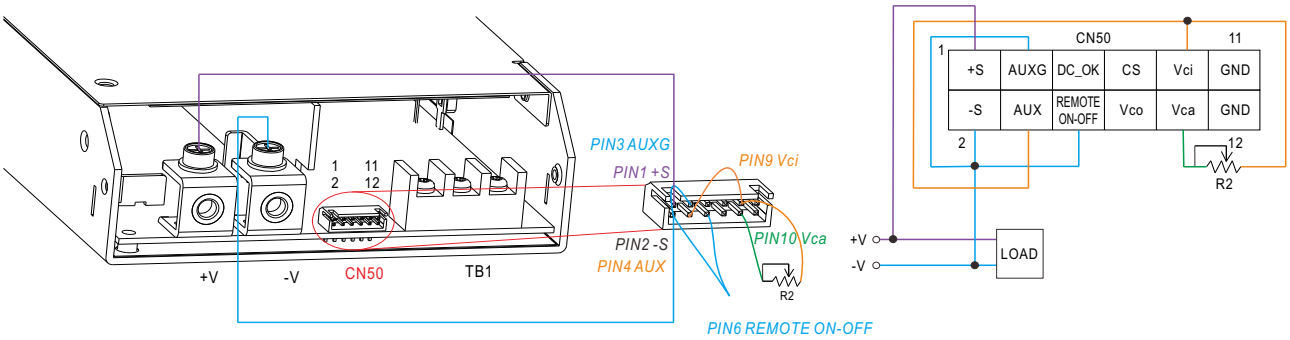
(A) Output voltage goes down




◎+*S* & +*V* and -*S* & -*V* also need to be connected on CN50.

Fig 4.2

(B)Output voltage goes up




◎+*S* & +*V* and -*S* & -*V* also need to be connected on CN50.

Fig 4.3

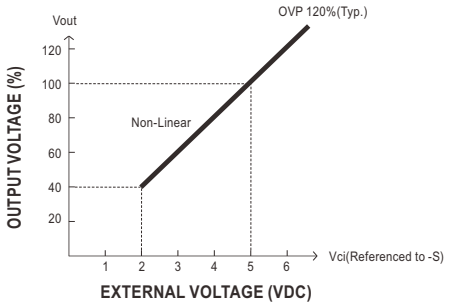



Fig 4.1.1

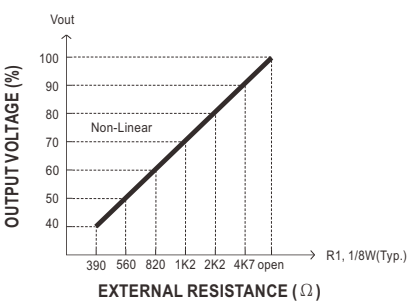



Fig 4.2.1

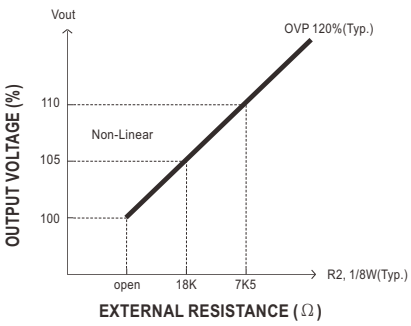



Fig 4.3.1

※ Caution: By factory default, the Output Voltage Programming is not activated, and *Vco (pin8)* and *Vca(pin10)* are shorted by connector. Whenever this function is not needed to activate, as assumed in other sections' diagrams, please keep *Vco(pin8)* and *Vca(pin10)* shorted ; other wise, the power supply will have no output.

**5.Current Sharing with Remote Sense**

RSP-1000 has the built-in active current sharing function and can be connected in parallel, up to 4 units, to provide higher output power as exhibited below :

※The power supplies should be paralleled using short and large diameter wiring and then connected to the load.

※ Difference of output voltages among parallel units should be less than 0.2V.

※ The total output current must not exceed the value determined by the following equation:

Maximum output current at parallel operation=(Rated current per unit)×(Number of unit)×0.9

※ When the total output current is less than 5% of the total rated current, or say (5% of Rated current per unit)×(Number of unit) the current shared among units may not be fully balanced.

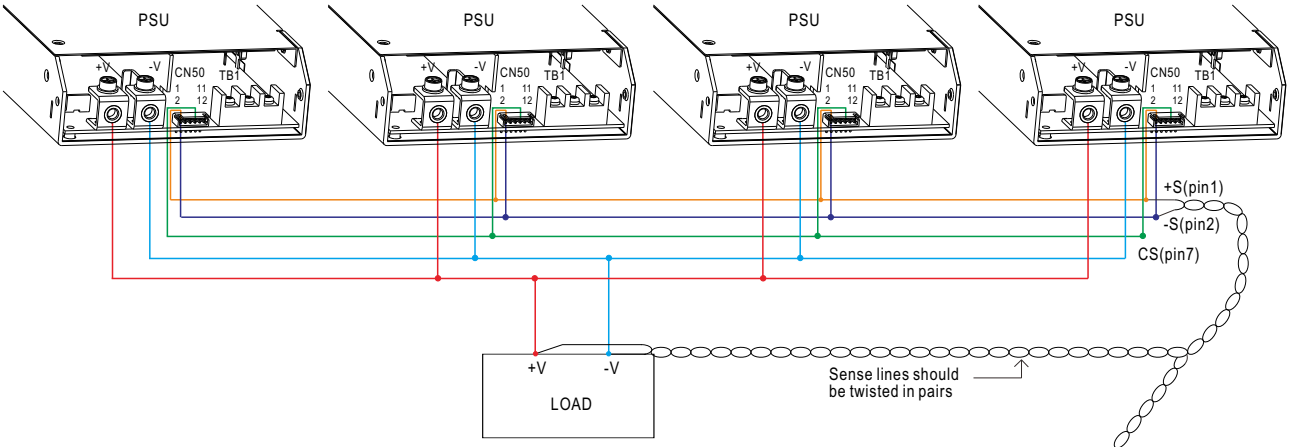
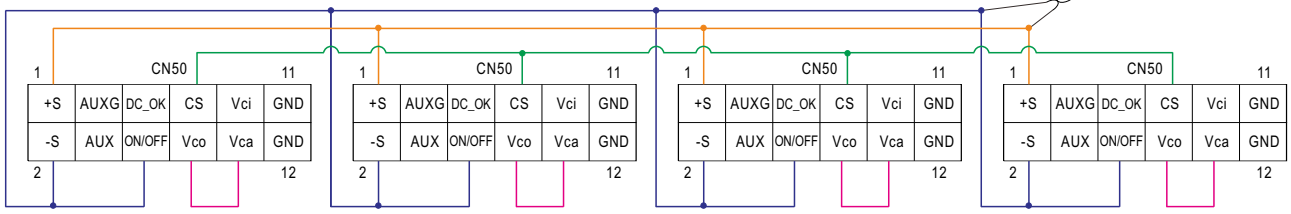


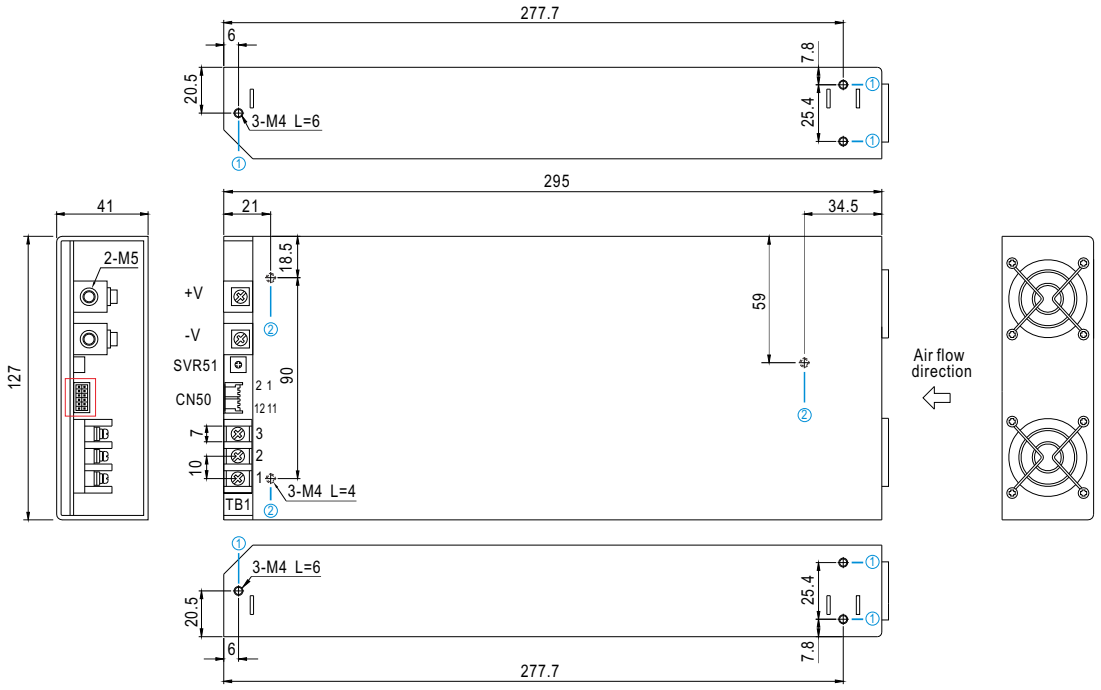

Fig 5.1




◎ +S,-S and CS are connected mutually in parallel.

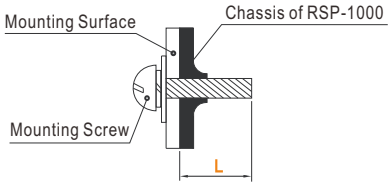
## ■ Mechanical Specification

Case No. 952B Unit:mm

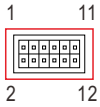



※ Mounting Instruction

| Hole No. | Recommended Screw Size | MAX. Penetration Depth L | Recommended mounting torque |
|---|---|---|---|
| ① | M4 | 6mm | 7~11Kgf-cm |
| ② | M4 | 4mm | 7~11Kgf-cm |



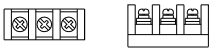

※Control Pin No. Assignment (CN50) : HRS DF11-12DP-2DS or equivalent



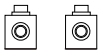

| | |
|---|---|
| Mating Housing | HRS DF11-12DS or equivalent |
| Terminal | HRS DF11-**SC or equivalent |

| Pin No. | Function | Description |
|---|---|---|
| 1 | +S | Positive sensing for remote sense. |
| 2 | -S | Negative sensing for remote sense. |
| 3 | G-AUX | Auxiliary voltage output ground.<br>The signal return is isolated from the output terminals (+V & -V). |
| 4 | 5V-AUX | Auxiliary voltage output, 4.6~5.25V, referenced to pin 3(G-AUX).<br>The maximum load current is 0.5A. This output has the built-in oring diodes and is not controlled by the "remote ON/OFF control". |
| 5 | DC_OK | Open collector signal, referenced to pin11,12(GND).<br>Low when PSU turns on. The maximum sink current is 10mA and the maximum external voltage is 5.6V. |
| 6 | Remote ON-OFF | Turns the output on and off by electrical or dry contact between pin 6 (Remote ON-OFF) and pin 2 (-S). Short: Power ON, Open: Power OFF. |
| 7 | CS | Current sharing signal. When units are connected in parallel, the CS pins of the units should be connected to allow current balance between units. |
| 8 | Vco | Short connecting between Vco (pin8) and Vca (pin10) if output voltage programming function is not activated. |
| 9 | Vci | Connect to external DC voltage source for output voltage programming, referenced to pin 2 (-S). |
| 10 | Vca | Connect to external resistor (1/8W) for output voltage programming. |
| 11,12 | GND | These pins connect to the negative terminal (-V). Return for DC_OK Signal output. |

※AC Input Terminal Pin No. Assignment

| Pin No. | Assignment | Diagram | Maximum mounting torque |
|---|---|---|---|
| 1 | AC/N |  | 18Kgf-cm |
| 2 | AC/L | | |
| 3 | FG ⏚ | | |

※DC Output Terminal Pin No. Assignment

| Assignment | Diagram | Maximum mounting torque |
|---|---|---|
| +V, -V |  | 10Kgf-cm |

## ■ Installation Manual

Please refer to : http://www.meanwell.com/manual.html