# RSP-2400 series

2400W Power Supply with Single Output

| Dimension | | | | |
|---|---|---|---|---|
| L | * W | * H | | |
| 278 | * 177.8 | * 63.5(2U) | mm | |
| 10.9 | * 7 | * 2.5 (2U) | inch | |



User's Manual

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## Features

- AC input 180~264VAC
- Built-in active PFC function
- High efficiency up to 91.5%
- Forced air cooling by built-in DC fan
- Output voltage programmable
- Active current sharing up to 7200W (2+1)
- Built-in remote ON-OFF control / remote sense / auxiliary power / power 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
- Digital broadcasting
- RF application

## GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

## Description

RSP-2400 is a 2.4KW single output enclosed type AC/DC power supply. This series operates for 180~264VAC 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 70℃. Moreover, RSP-2400 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

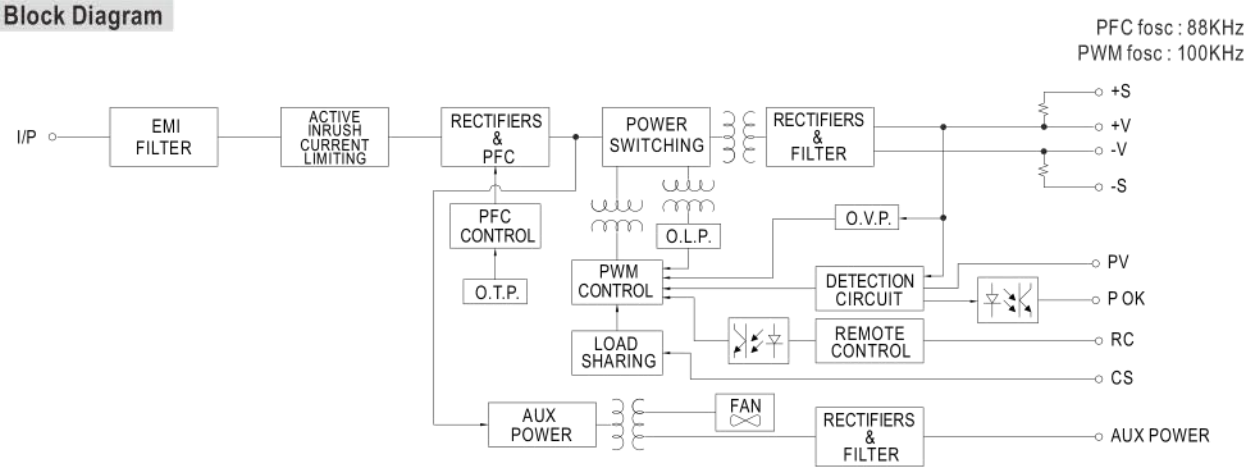
**RSP - 2400 - 24**

- 24 — Output voltage (12V/24V/48V)
- 2400 — Output wattage
- RSP — Series name

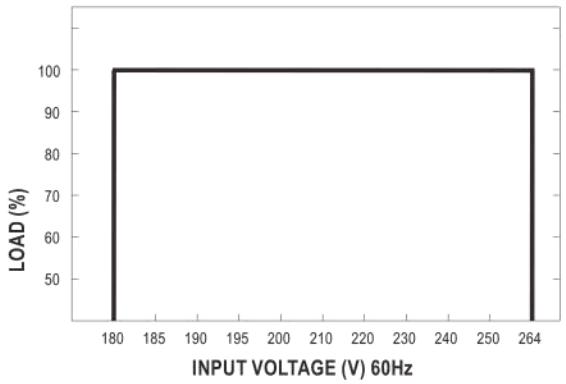
## SPECIFICATION

| MODEL | | RSP-2400-12 | RSP-2400-24 | RSP-2400-48 |
|---|---|---|---|---|
| OUTPUT | DC VOLTAGE | 12V | 24V | 48V |
| | RATED CURRENT | 166.7A | 100A | 50A |
| | CURRENT RANGE | 0 ~ 166.7A | 0 ~ 100A | 0 ~ 50A |
| | RATED POWER | 2000.4W | 2400W | 2400W |
| | RIPPLE & NOISE (max.) Note.2 | 150mVp-p | 150mVp-p | 200mVp-p |
| | VOLTAGE ADJ. RANGE | 10.8 ~ 13.2V | 22 ~ 28V | 43 ~ 56V |
| | VOLTAGE TOLERANCE Note.3 | ±1.0% | ±1.0% | ±1.0% |
| | LINE REGULATION | ±0.5% | ±0.5% | ±0.5% |
| | LOAD REGULATION | ±0.5% | ±0.5% | ±0.5% |
| | SETUP, RISE TIME | 1000ms, 80ms at full load | | |
| | HOLD UP TIME (Typ.) | 12ms at full load | | |
| INPUT | VOLTAGE RANGE | 180 ~ 264VAC 254 ~ 370VDC | | |
| | FREQUENCY RANGE | 47 ~ 63Hz | | |
| | POWER FACTOR (Typ.) | 0.95/230VAC at full load | | |
| | EFFICIENCY (Typ.) | 88% | 90.5% | 91.5% |
| | AC CURRENT (Typ.) | 15.5A/180VAC 12A/230VAC | | |
| | INRUSH CURRENT (Typ.) | 60A/230VAC | | |
| | LEAKAGE CURRENT | <2.0mA / 240VAC | | |
| PROTECTION | OVERLOAD (OLP) | 100 ~ 112% rated output power | | |
| | | User adjustable continuous constant current limiting or constant current limiting with delay shutdown after 5 seconds, re-power on to recover | | |
| | OVER VOLTAGE | 13.8 ~ 16.8V | 28.8 ~ 33.6V | 57.6 ~ 67.2V |
| | | 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) | 2.4 ~ 13.2V | 4.8 ~ 28V | 9.6 ~ 56V |
| | | Please refer to the Function Manual. | | |
| | CURRENT SHARING | Up to 7200W or (2+1) units. Please refer to the Function Manual. | | |
| | AUXILIARY POWER | 12V@0.1A(Only for Remote ON-OFF control) | | |
| | REMOTE ON-OFF CONTROL | Please refer to the Function Manual | | |
| | REMOTE SENSE | Compensate voltage drop on the load wiring up to 0.25V. Please refer to the Function Manual. | | |
| | ALARM SIGNAL OUTPUT | Power OK signal. Please refer to the Function Manual | | |
| ENVIRONMENT | WORKING TEMP. | -20 ~ +70℃ (Refer to "Derating Curve") | | |
| | WORKING HUMIDITY | 20 ~ 90% RH non-condensing | | |
| | STORAGE TEMP., HUMIDITY | -40 ~ +85℃, 10 ~ 95% RH non-condensing | | |
| | TEMP. COEFFICIENT | ±0.05%/℃ (0 ~ 50℃) | | |
| | VIBRATION | 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes | | |
| SAFETY & EMC (Note 4) | SAFETY STANDARDS | UL62368-1, CSA C22.2 No. 62368-1, TUV BS EN/EN62368-1, BSMI CNS15598-1, 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), CNS15936 | Class B |
| | | Radiated | BS EN/EN55032 (CISPR32), CNS15936 | Class A |
| | | Harmonic Current | BS EN/EN61000-3-2 | ----- |
| | | Voltage Flicker | BS EN/EN61000-3-3 | ----- |
| | EMC IMMUNITY | BS EN/EN55035, BS EN/EN61000-6-2, 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 3, 2KV/Line-Earth ; Level 2, 1KV/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 | 692.3K hrs min. Telcordia SR-332 (Bellcore) ; 83.9K hrs min. MIL-HDBK-217F (25℃) | | |
| | DIMENSION | 278*177.8*63.5mm (L*W*H) | | |
| | PACKING | 3.3Kg; 4pcs/14.2Kg/2.04CUFT | | |
| NOTE | 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.<br>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.<br>3. Tolerance : includes set up tolerance, line regulation and load regulation.<br>4. 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 720mm*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 https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)<br>5. 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).<br>※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx | | | |

## ■ Block Diagram

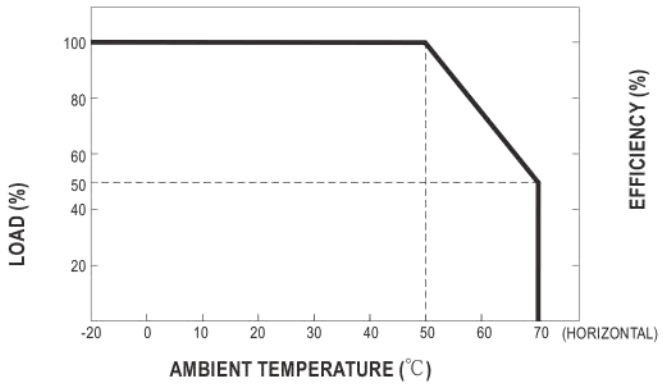



## ■ Static Characteristics



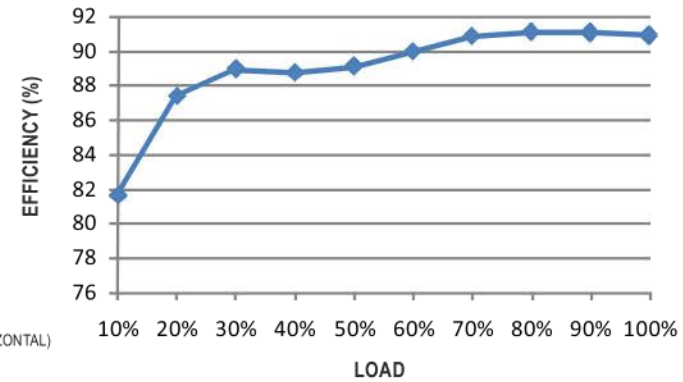

| MODEL / INPUT | 12V | 24V | 48V |
|---|---|---|---|
| 180~264VAC | 2000.4W<br>166.7A | 2400W<br>100A | 2400W<br>50A |

## ■ Derating Curve




◎ Load (%) typically represents the output power.
However, when the PV function is involved, Load (%) changes to indicate the percentage of the output current.
For example, with the PV function used for the RSP-2400-24, 80A corresponds to 80% of the load.

## ■ Efficiency vs Load (48V Model)

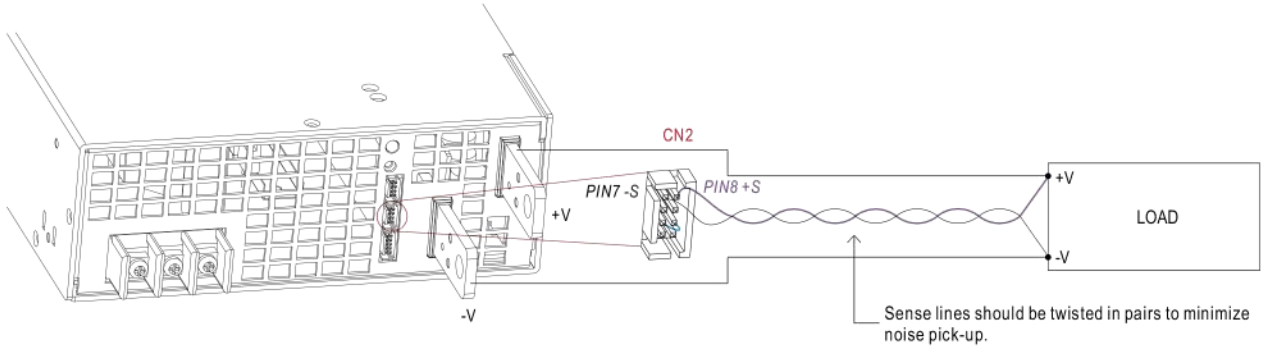



※ The curve above is measured at 230VAC.

## ■ Function Manual

### 1. Remote Sense

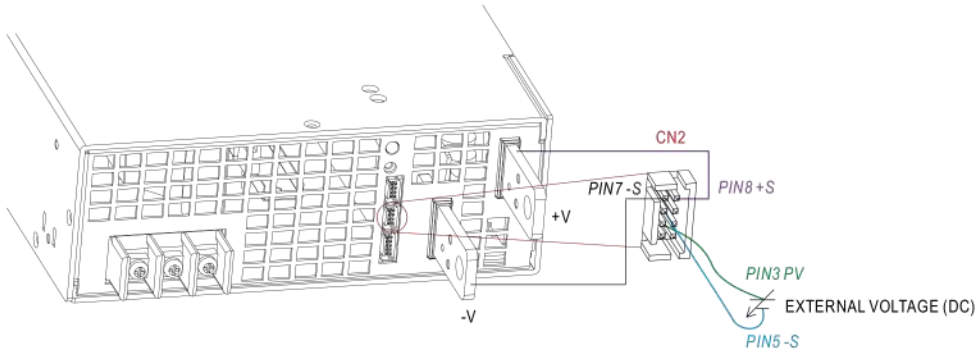
※ The Remote Sense compensates voltage drop on the load wiring up to 0.25V



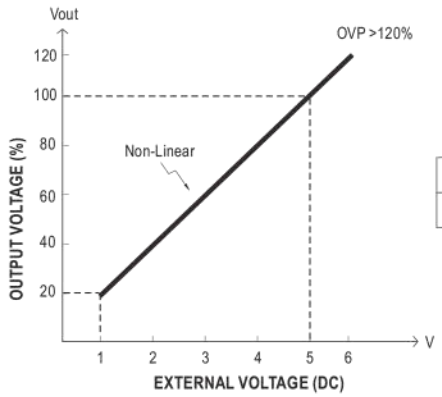

※ Caution: The power supply, by factory default(also the assumption for other sections), is shipped with, -S & -V on CN2, as well as +S & +V, shorted by connector. When activating the Remote Sense, the +S signal should be connected to the positive terminal of the load whereas -S signal to the negative terminal of the load.

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

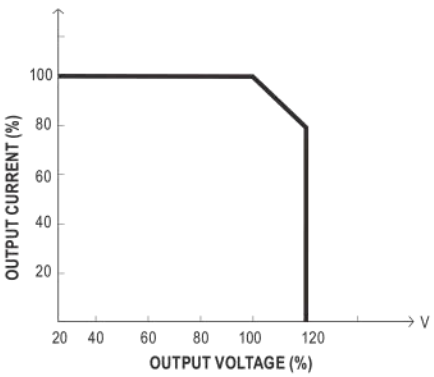
※ In addition to the adjustment via the built-in potentiometer, the output voltage can be trimmed to 20~110%(Typ.) of the nominal voltage by applying EXTERNAL VOLTAGE.




◎ Connecting an external DC source between *PV & -S* on CN2, and *+S & +V, -S & -V* also need to be connected as exhibited above.




| MODEL | 12V | 24V | 48V |
|---|---|---|---|
| PV Range | 2.4 ~ 13.2V | 4.8 ~ 28V | 9.6 ~ 56V |




◎ Please do not adopt PWM signal as the EXTERNAL VOLTAGE.

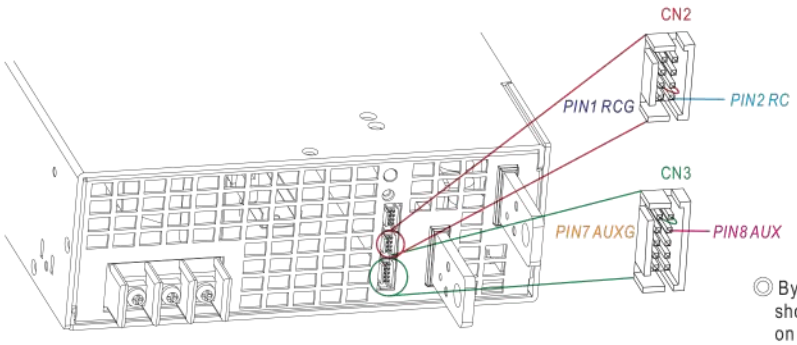
◎ The rated current should change with the Output Voltage Programming accordingly.

※ Caution: (1)By factory default, the Output Voltage Programming is not activated, and *PV(PIN3)* and *PS(PIN4)* of CN2 are shorted by connector. Whenever this function is not needed to activate, as assumed in other sections' diagrams, please keep *PV(PIN3)* and *PS(PIN4)* of CN2 shorted ; otherwise, the power supply will have no output.

(2)*PV(PIN3)* and *PS(PIN4)* of CN1 or CN2 must be disconnected if "Output Voltage Programming" function is used; otherwise, the internal electrical components may be damaged, and the power supply unit may thus be out of order.

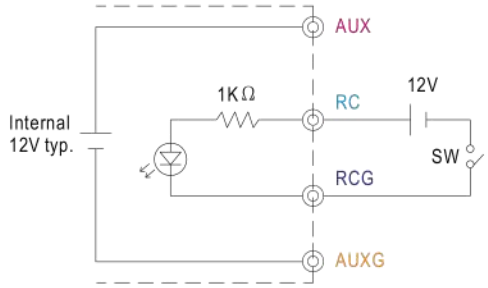
**3.Remote ON-OFF**

※ Remote ON-OFF is activated by the configuration with respect to CN1,CN2 and CN3 as shown in the following diagram.

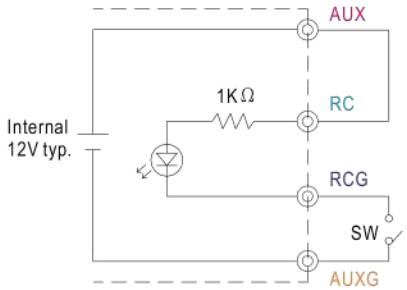



◎ By factory default, *PV(PIN3)* and *PS(PIN4)* on CN2 are shorted by connector; likewise, *OLP(PIN9)* and *OL-SD(PIN10)* on CN3 are shorted when shipped.

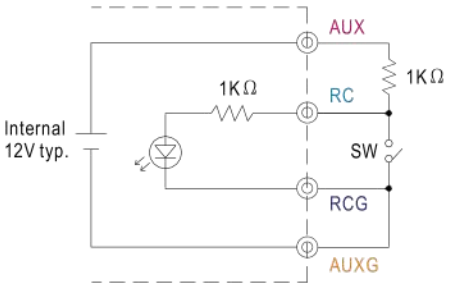
Example 3.2(A): Using external voltage source




Example 3.2(B): Using internal 12V auxiliary output




Example 3.2(C): Using internal 12V auxiliary output

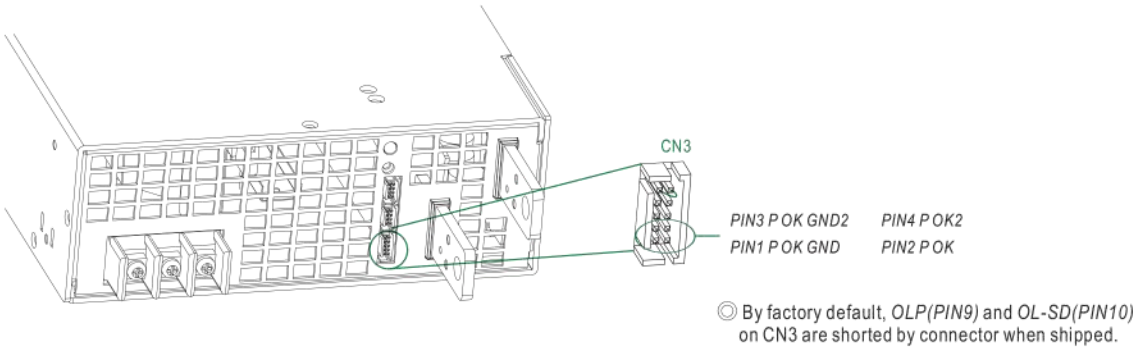



◎ Connection Method

| | | Example 3.2(A) | Example 3.2(B) | Example 3.2(C) |
|---|---|---|---|---|
| SW Logic | Power supply output ON | SW Open | SW Open | SW Close |
| | Power supply output OFF | SW Close | SW Close | SW Open |

**4.Alarm Signal Output**

※ Alarm signal is sent out through "*P OK*" & "*P OK GND*" and *P OK2 & P OK GND2* pins on CN3. Please acknowledge an external voltage source is required for this function.




◎ By factory default, *OLP(PIN9)* and *OL-SD(PIN10)* on CN3 are shorted by connector when shipped.

| Function | Description | Output of alarm(P OK, Relay Contact) | Output of alarm(P OK2, TTL Signal) |
|---|---|---|---|
| P OK | The signal is "Low" when the power supply is above 80% of the rated output voltage, or, say, Power OK | Low<br>(0.5V max at 500mA) | Low<br>(0.5V max at 10mA) |
| | The signal turns to be "High" when the power supply is under 80% of the rated output voltage, or, say, Power Fail | High or open<br>(External applied voltage, 500mA max.) | High or open<br>(External applied voltage, 10mA max.) |

Table 4.1 Explanation of alarm

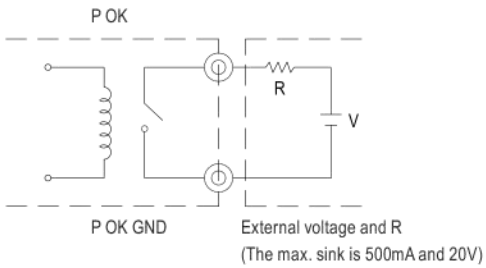



Fig. 4.1 Internal circuit of P OK (Relay, total is 10W)

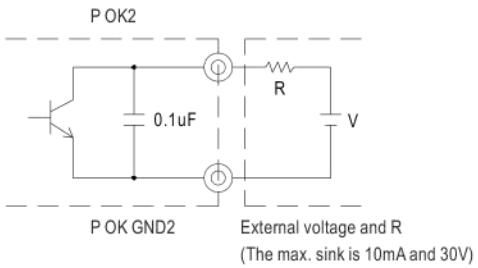



Fig. 4.2 Internal circuit of P OK2 (Open collector method)

**5.Select Overload Protection Type**

(1)Insert the shorting connector on CN3 that is shown in Fig 5.1, the Overload Protection Type will be "constant current limiting with delay shutdown after 5 seconds, re-power on to recover". This is the factory default.

(2)Remove the shorting connector on CN3 that is shown in Fig 5.2, the Overload Protection Type will be "continuous constant current limiting".

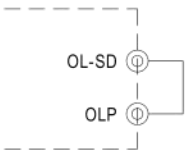



Fig. 5.1 Insert the CN3
Overload Protection Type : constant current limiting with delay shutdown after 5 seconds




Fig. 5.2 Remove the CN3
Overload Protection Type : constant current limiting

**6.Current Sharing with Remote Sense**

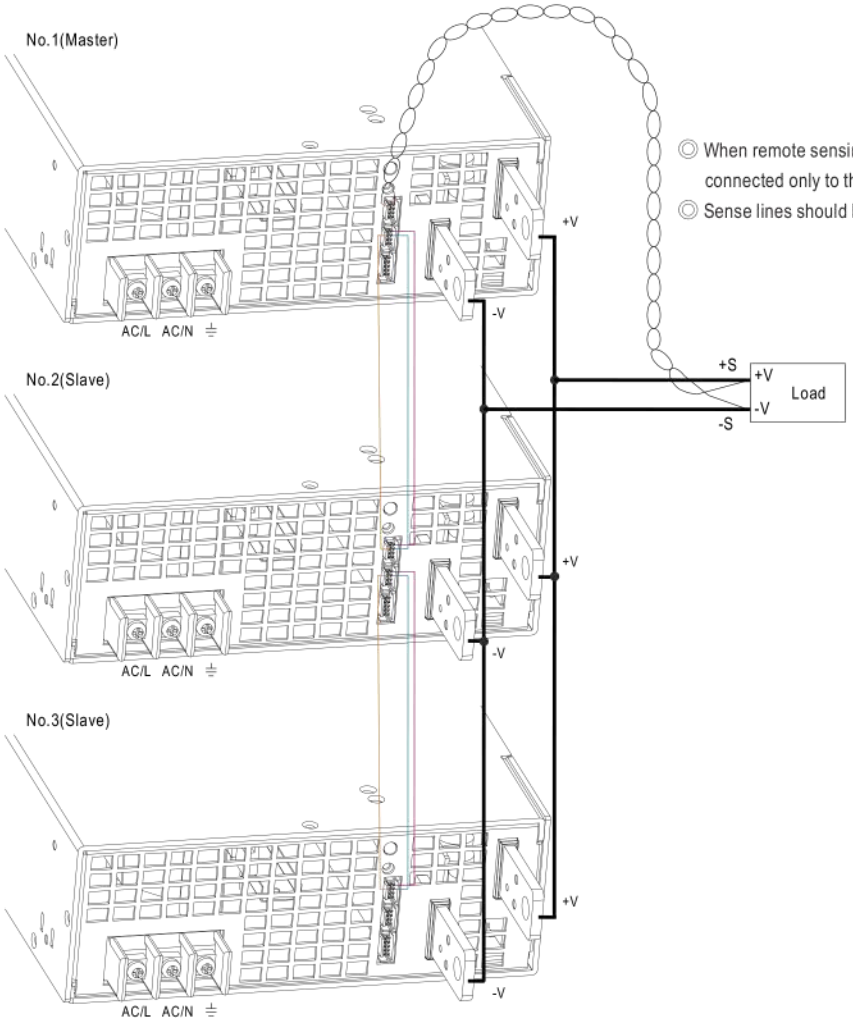
RSP-2400 has the built-in active current sharing function and can be connected in parallel, up to 3 units, to provide higher output power as exhibited below :

※ 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 3% of the total rated current, or say (3% of Rated current per unit)×(Number of unit) the current shared among units may not be fully balanced.




◎ When remote sensing is used in parallel operation, the sensing wire must be connected only to the master unit

◎ Sense lines should be twisted in pairs to minimize noise pick-up.

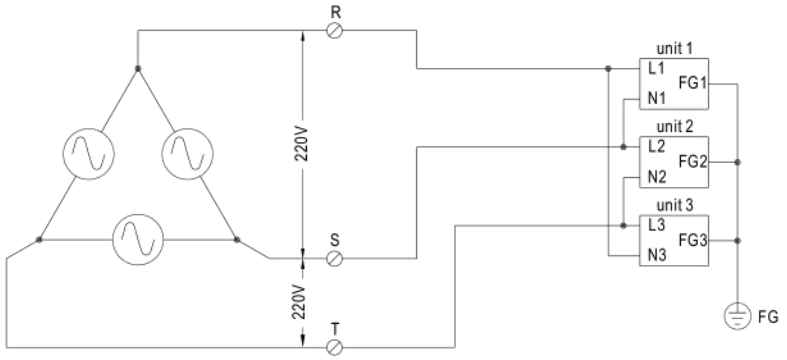
◎ *+S*,*-S* and *CS* on CN1 or CN2are connected mutually in parallel.

◎ Under parallel operation, the "output voltage programming" function is not available.

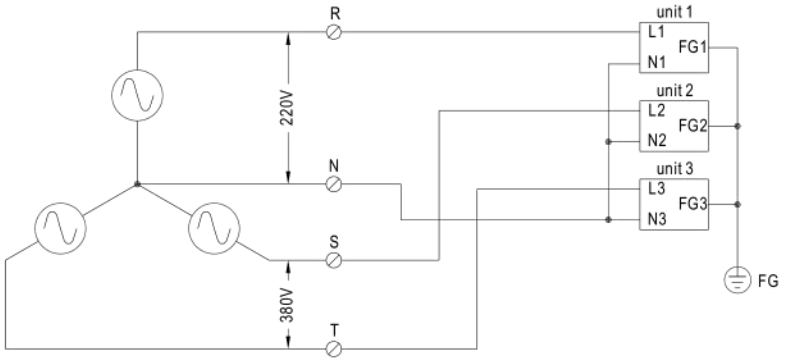
**7.Three Phase Connect**

Users can exploit three units of RSP-2400(unit 1 ,unit 2,unit 3) to work with 3 $\psi$ power system. Please refer to following diagrams for configuration.

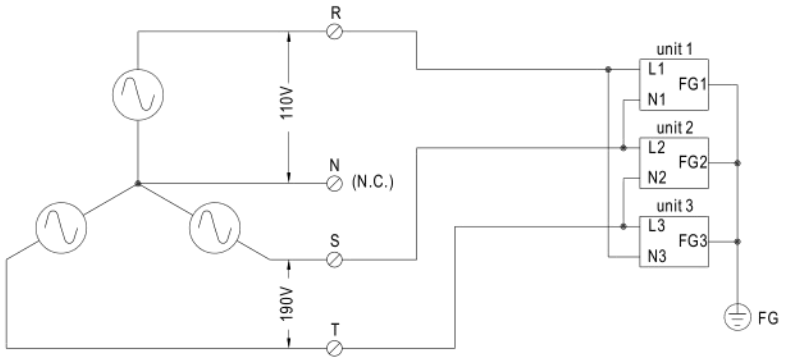
**※FIG. A: 3 $\psi$ 3 wire 220VAC SYSTEM**




**※FIG. B: 3 $\psi$ 4 wire 220/380VAC SYSTEM**



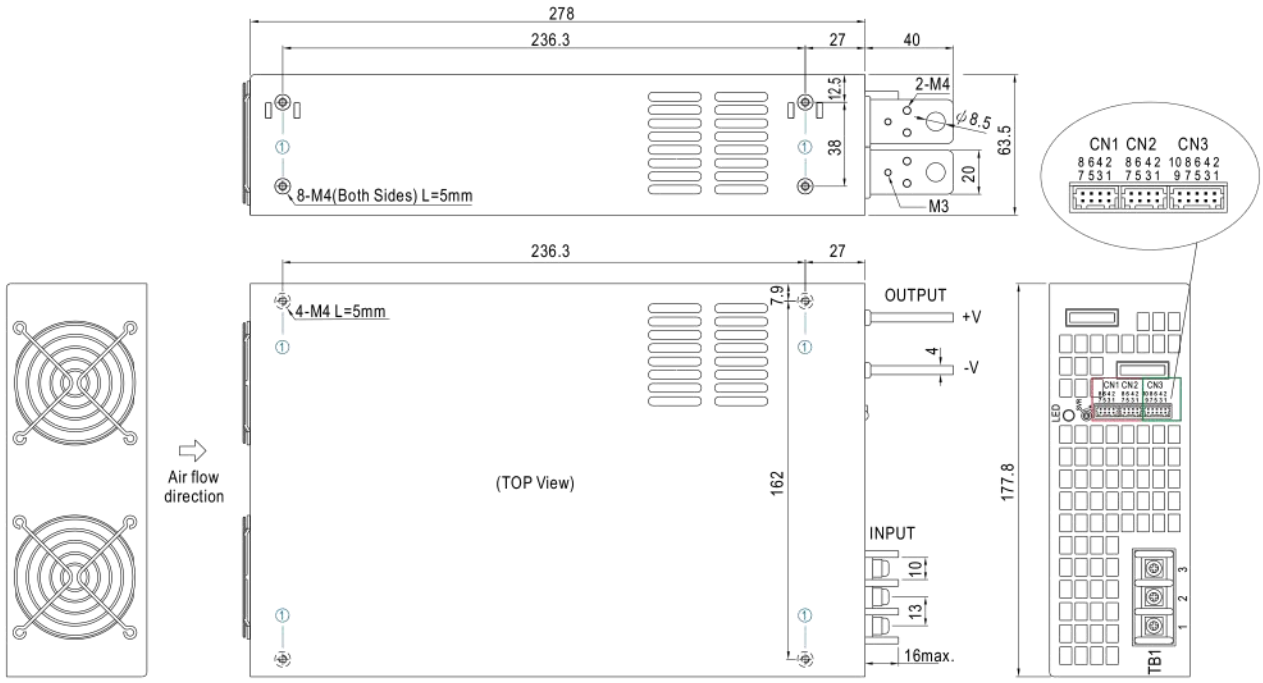

**※FIG. C: 3 $\psi$ 4 wire 190/110VAC SYSTEM**



## ■ Mechanical Specification

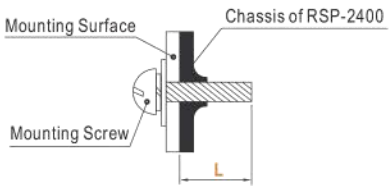
(Unit: mm , tolerance ±0.5mm)

Case No.982B

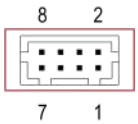



※ Mounting Instruction

| Hole No. | Recommended Screw Size | MAX. Penetration Depth L | Recommended mounting torque |
|---|---|---|---|
| ① | M4 | 5mm | 7~10Kgf-cm |




※ Control Pin No. Assignment (CN1,CN2) : HRS DF11-8DP-2DS or equivalent

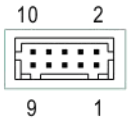



| | |
|---|---|
| Mating Housing | HRS DF11-8DS or equivalent |
| Terminal | HRS DF11-**SC or equivalent |

◎ CN1 and CN2 are connected internally.

| Pin No. | Function | Description |
|---|---|---|
| 1 | RCG | Remote ON-OFF Ground |
| 2 | RC | Remote ON-OFF |
| 3 | PV | Connection for output voltage programming |
| 4 | PS | Reference Voltage Terminal |
| 5,7 | -S | Negative sensing for remote sense |
| 6 | CS(Current Share) | Current Share |
| 8 | +S | Postive sensing for remote sense |

※Control Pin No. Assignment (CN3) : HRS DF11-10DP-2DS or equivalent




| | |
|---|---|
| Mating Housing | HRS DF11-10DS or equivalent |
| Terminal | HRS DF11-**SC or equivalent |

| Pin No. | Function | Description |
|---|---|---|
| 1 | P OK GND | Power OK Ground |
| 2 | P OK | Power OK Signal (Relay Contact) |
| 3 | P OK GND2 | Power OK Ground |
| 4 | P OK2 | Power OK Signal (TTL Signal) |
| 5 | RCG | Remote ON-OFF Ground |
| 6 | RC | Remote ON-OFF |
| 7 | AUXG | Auxiliary Ground |
| 8 | AUX | Auxiliary Output |
| 9 | OLP | Overload(OLP) type select |
| 10 | OL-SD | |

※AC Input Terminal Pin No. Assignment

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

## ■ Installation Manual

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