



# **MP450 / 650 / 1K0**

## **使用手冊**

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# MP450,650,1K0系列使用說明書

## 0.簡介

Modular系列產品是一採用模組化設計之交換式電源供應器，其可分為前端(Front-End)與輸出模組兩大部份。前端的部份，是利用具有零電壓切換(Zero Voltage Switching)的主動式功因修正技術，將交流電源轉換成高直流電壓(約390VDC)，並可有效抑制諧波干擾。輸出模組的部份則是將前端部份的高直流電壓，利用交換式電源供應器的技術，轉換成各種不同的直流輸出電壓，目前計有75W(MS-75)、150W(MS-150)、210W(MS-210)、300W(MS-300)、360W(MS-360)單組輸出及100W(MD-100)雙組輸出等六類共57種不同輸出模組，可供客戶選擇。

## 1.訂購方式

### 1.1 編碼說明

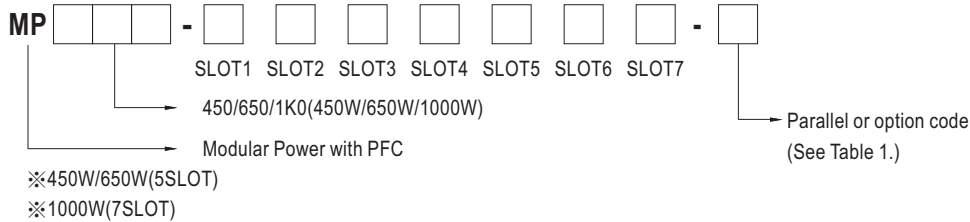
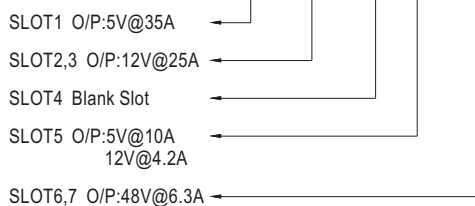


Table 1. Parallel code(For MS-210、MS-300、MS-360 only)

| Model      | Code | SLOT1 | SLOT2 | SLOT3 | SLOT4 | SLOT5 | SLOT6 | SLOT7 |
|------------|------|-------|-------|-------|-------|-------|-------|-------|
| MS-300/360 | X    |       |       |       |       |       | ----  | ----  |
|            | 1    | ○     | ○     | ○     | ○     | ○     | ----  | ----  |
|            | 2    |       | ○     | ○     | ○     | ○     | ----  | ----  |
|            | 3    |       |       | ○     | ○     | ○     | ○     |       |
|            | 4    |       |       |       | ○     | ○     | ○     |       |
|            | 5    | ○     | ○     | ○     | ○     | ○     |       |       |
| MS-210     | 6    |       | ○     | ○     | ○     | ○     | ○     |       |
|            | 7    | ○     | ○     |       |       |       |       |       |
|            | 8    | ○     | ○     | ○     | ○     |       |       |       |
|            | 9    | ○     | ○     | ○     | ○     | ○     |       |       |

※Code X,1,2,7,8,9 for MP450, MP650  
※Code X,1,2,3,4,5,6,7,8,9 for MP1K0  
※Maximum number of units for parallel function : 5 for MS-210, 3 for MS-300/360

Example: MP1K0-1C 2 E # S 2 K



### 1.2 編碼注意事項

- ◎需串、並聯的輸出模組請規劃於相鄰的位置。
- ◎各輸出模組的實際總使用瓦數須小於前端PFC的額定輸出瓦數。

### 1.3 標示

- ◎使用時請參考機器正面安規貼紙上的標示，如圖1-1。

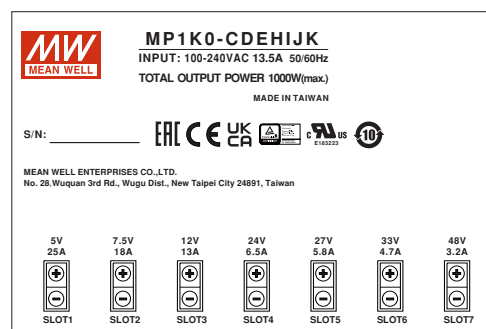
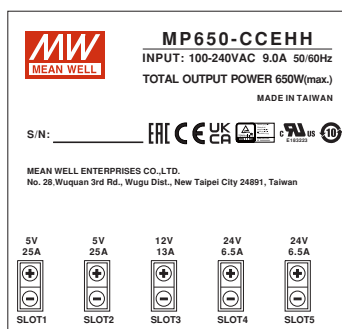
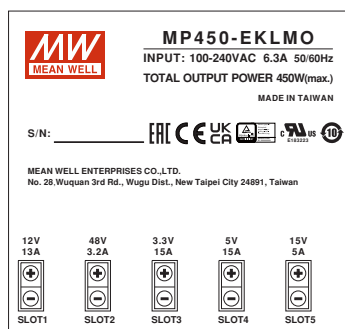
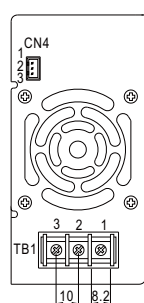


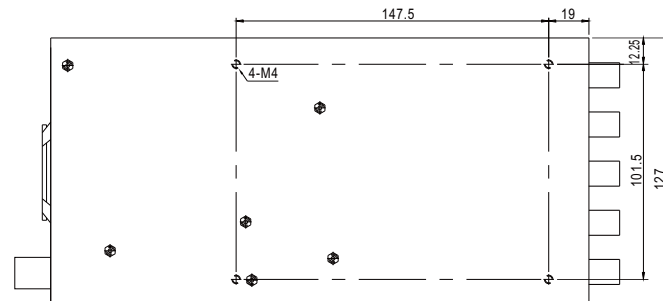
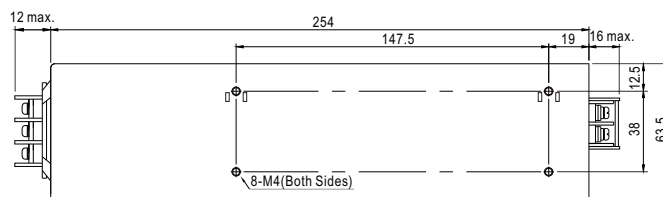
圖1-1 標示貼紙

◎MP450

Unit:mm



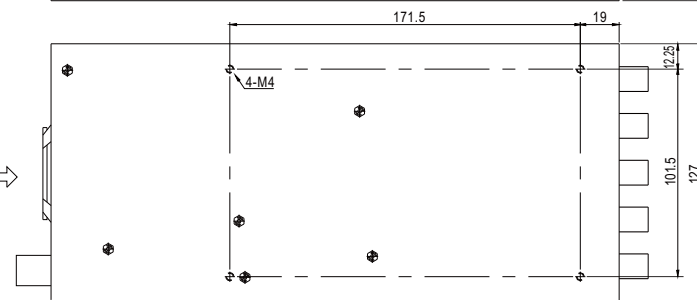
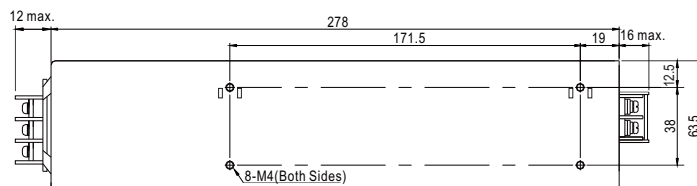
Air flow direction 



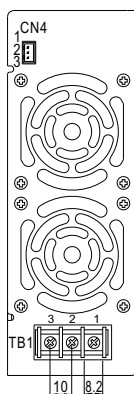
©MP650



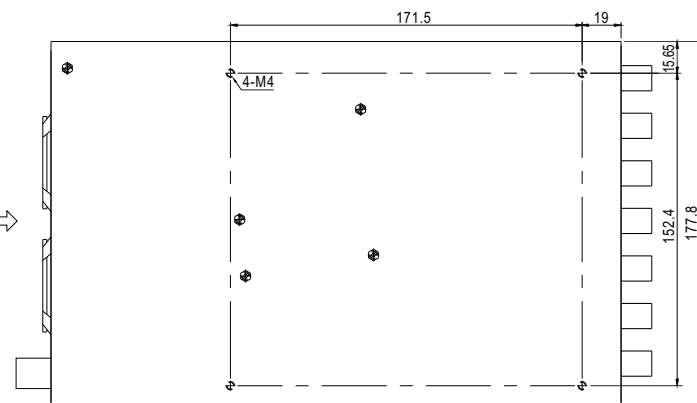
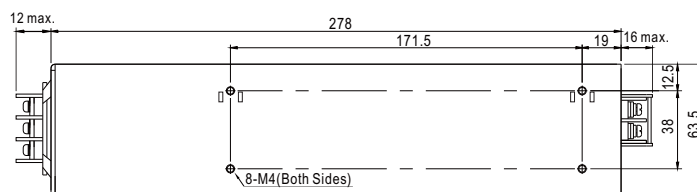
Air flow direction 



©MP1K0



Air flow direction 



TB1(PFC-450/650/1K0)

| Pin No. | Assignment | Screw Size | Maximum mounting torque |
|---------|------------|------------|-------------------------|
| 1       | AC/L       | M3.5       | 18Kgf-cm                |
| 2       | AC/N       |            |                         |
| 3       | EG $\perp$ |            |                         |

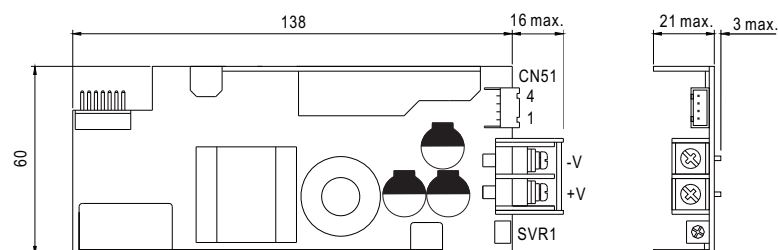
CN4(PFC-450/650/1K0) : JST B3B-XH or equivalent

| Pin No. | Assignment                     | Mating Housing           | Terminal                           |
|---------|--------------------------------|--------------------------|------------------------------------|
| 1       | +RC: +Remote ON/OFF            | JST XHP<br>or equivalent | JST SXH-001T-P0.6<br>or equivalent |
| 2       | -RC: -Remote ON/OFF            |                          |                                    |
| 3       | VCC: 12V/0.1A auxiliary output |                          |                                    |

## 2.2 輸出模組機構

### ◎MS-75

Unit:mm

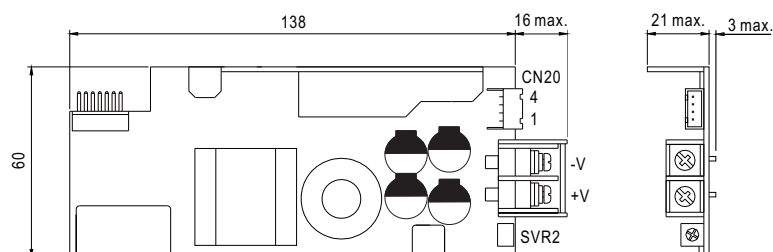


Output Connector(CN51) : JST B4B-XH or equivalent

| Pin No. | Assignment          | Mating Housing           | Terminal                           |
|---------|---------------------|--------------------------|------------------------------------|
| 1       | +S: +Remote sense   | JST XHP<br>or equivalent | JST SXH-001T-P0.6<br>or equivalent |
| 2       | -S: -Remote sense   |                          |                                    |
| 3       | +RC: +Remote ON/OFF |                          |                                    |
| 4       | -RC: -Remote ON/OFF |                          |                                    |

| Assignment | Screw Size | Maximum mounting torque |
|------------|------------|-------------------------|
| +V, -V     | M4         | 18Kgf-cm                |

### ◎MS-150

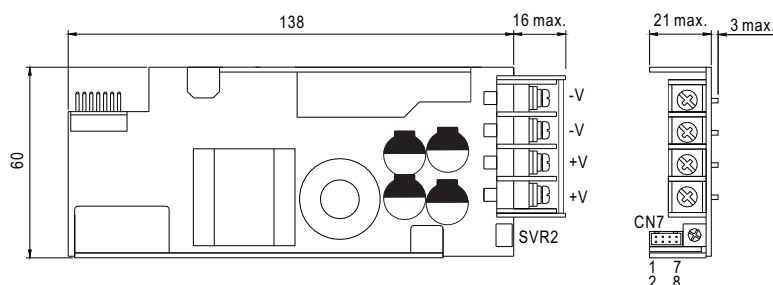


Output Connector(CN20) : JST B4B-XH or equivalent

| Pin No. | Assignment          | Mating Housing           | Terminal                           |
|---------|---------------------|--------------------------|------------------------------------|
| 1       | +S: +Remote sense   | JST XHP<br>or equivalent | JST SXH-001T-P0.6<br>or equivalent |
| 2       | -S: -Remote sense   |                          |                                    |
| 3       | +RC: +Remote ON/OFF |                          |                                    |
| 4       | -RC: -Remote ON/OFF |                          |                                    |

| Assignment | Screw Size | Maximum mounting torque |
|------------|------------|-------------------------|
| +V, -V     | M4         | 18Kgf-cm                |

### ◎MS-210



Output Connector(CN7) : HRS DF11-8DP-2DS or equivalent

| Pin No. | Assignment          | Pin No. | Assignment                    | Mating Housing                | Terminal                       |
|---------|---------------------|---------|-------------------------------|-------------------------------|--------------------------------|
| 1       | +S: +Remote sense   | 5       | CS: Current sharing           | HRS DF11-8DS<br>or equivalent | DRS DF11-**SC<br>or equivalent |
| 2       | -S: -Remote sense   | 6       | G: GND                        |                               |                                |
| 3       | +RC: +Remote ON/OFF | 7       | ML: Remote margin low control |                               |                                |
| 4       | -RC: -Remote ON/OFF | 8       | M: Remote margin control      |                               |                                |

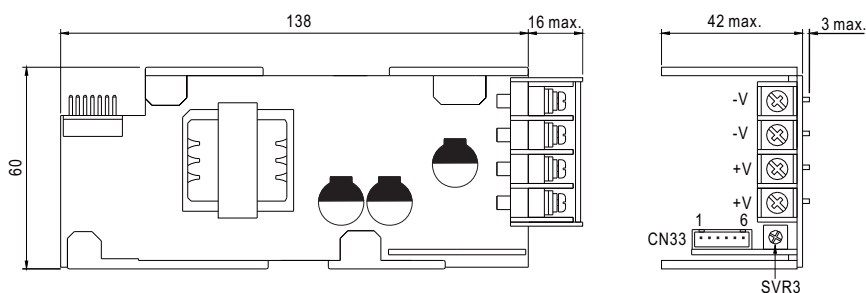
| Assignment | Screw Size | Maximum mounting torque |
|------------|------------|-------------------------|
| +V, -V     | M3.5       | 12Kgf-cm                |

NOTE: 1. The voltage difference among each output should be minimized that less than 2% is required.

2. The total output current must not exceed the value determined by the following equation.

$$(\text{Output current at parallel operation}) = (\text{The rated current per unit}) \times (\text{Number of unit}) \times 0.9$$

◎MS-300



Output Connector(CN33) : JST B6B-XH or equivalent

| Pin No. | Assignment          | Mating Housing           | Terminal                           |
|---------|---------------------|--------------------------|------------------------------------|
| 1       | +S: +Remote sense   | JST XHP<br>or equivalent | JST SXH-001T-P0.6<br>or equivalent |
| 2       | -S: -Remote sense   |                          |                                    |
| 3       | +RC: +Remote ON/OFF |                          |                                    |
| 4       | -RC: -Remote ON/OFF |                          |                                    |
| 5       | CS: Current sharing |                          |                                    |
| 6       | G: GND              |                          |                                    |

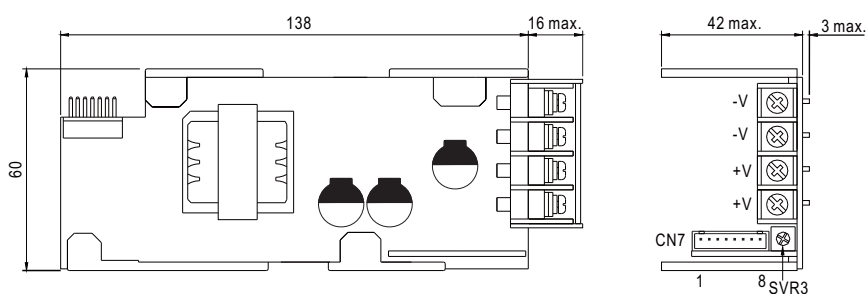
| Assignment | Screw Size | Maximum mounting torque |
|------------|------------|-------------------------|
| +V,-V      | M4         | 18Kgf-cm                |

NOTE: 1. The voltage difference among each output should be minimized that less than 2% is required.

2. The total output current must not exceed the value determined by the following equation.

$$(\text{Output current at parallel operation}) = (\text{The rated current per unit}) \times (\text{Number of unit}) \times 0.9$$

◎MS-360



Output Connector(CN7) : JST B8B-XH or equivalent

| Pin No. | Assignment          | Pin No. | Assignment                    | Mating Housing           | Terminal                           |
|---------|---------------------|---------|-------------------------------|--------------------------|------------------------------------|
| 1       | +S: +Remote sense   | 5       | CS: Current sharing           | JST XHP<br>or equivalent | JST SXH-001T-P0.6<br>or equivalent |
| 2       | -S: -Remote sense   | 6       | G: GND                        |                          |                                    |
| 3       | +RC: +Remote ON/OFF | 7       | ML: Remote margin low control |                          |                                    |
| 4       | -RC: -Remote ON/OFF | 8       | M: Remote margin control      |                          |                                    |

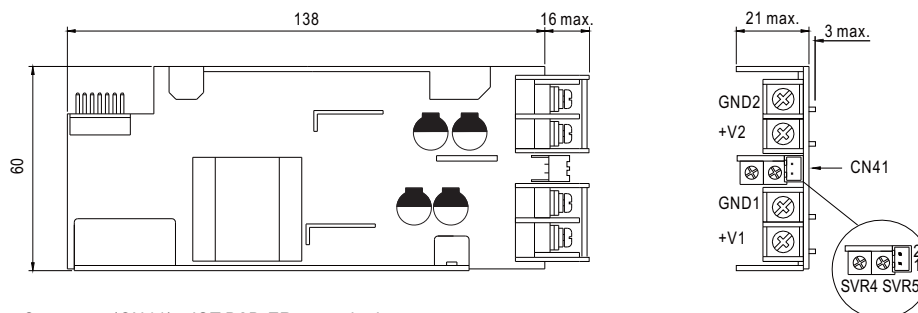
| Assignment | Screw Size | Maximum mounting torque |
|------------|------------|-------------------------|
| +V,-V      | M3.5       | 12Kgf-cm                |

NOTE: 1. The voltage difference among each output should be minimized that less than 2% is required.

2. The total output current must not exceed the value determined by the following equation.

$$(\text{Output current at parallel operation}) = (\text{The rated current per unit}) \times (\text{Number of unit}) \times 0.9$$

◎MD-100



Output Connector(CN41) : JST B2B-ZR or equivalent

| Pin No. | Assignment | Mating Housing             | Terminal                           |
|---------|------------|----------------------------|------------------------------------|
| 1       | +RC        | JST ZHR-2<br>or equivalent | JST SZH-002T-P0.5<br>or equivalent |
| 2       | -RC        |                            |                                    |

| Assignment | Screw Size | Maximum mounting torque |
|------------|------------|-------------------------|
| +V,-V      | M4         | 18Kgf-cm                |

NOTE: 1. Remote ON/OFF of CN4 turn ON/OFF the entire power system

2. Remote ON/OFF of CN20, CN33, CN41, CN51 turn ON/OFF the individual output module

3. SVR1~5: DC output voltage adjustment(SVR4 for CH2 of MD-100, SVR5 for CH1 of MD-100)



### 3.11 遙控-輸出模組

- ◎每一輸出模組均內建遙控電路，故每一模組均可獨立遙控ON/OFF。
- ◎遙控線路+RC、-RC與輸入、輸出回路有電性隔離。
- ◎當+RC、-RC施加4~12V時，該模組無電壓輸出；施加低於0.8V或開路時則有輸出。
- ◎可配合輔助電源作ON/OFF控制，接線方式如圖3-3所示。

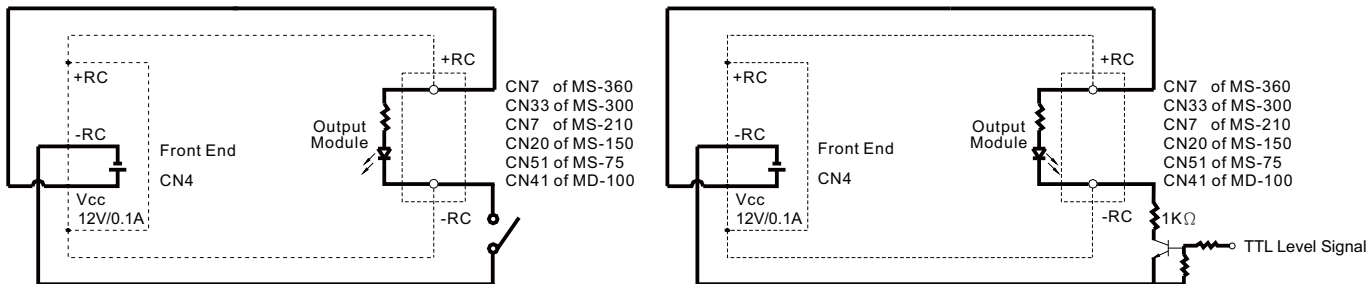


圖3-3 模組遙控功能接線圖

### 3.12 輸出電壓遙控

- ◎假設無法透過內置的電位器調整輸出電壓，可依下列設置微調MS-210和MS-360之輸出電壓。

- (1)連接CN7-6 PIN腳及CN7-8 PIN腳可以提升輸出電壓(約為5%額定電壓)。

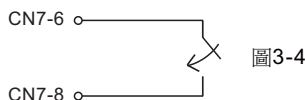


圖3-4

- (2)連接CN7-7 PIN腳及CN7-8 PIN腳可以降低輸出電壓(約為5%額定電壓)。

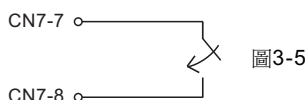


圖3-5

- (3)使用一額外100KΩ之電位器連接至CN7-6~CN7-8之間，可以調整輸出電壓至+/- 5%範圍(例：-3%、+2.5%等)。

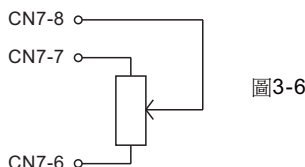


圖3-6

註：當模組間採並聯連接時，無法使用輸出電壓遙控功能。

### 3.13 並聯操作

- ◎MS-210,MS-300及MS-360系列可以並聯操作。
- ◎並聯操作時，必須是相同的輸出電壓模組且在同一台電源供應器內的相鄰位置。
- ◎並聯工作時其總和輸出電流以90%計算

例如:MP650-2C2CO-1

並聯碼1，代表SLOT1,2與SLOT3,4為並聯操作，且因SLOT1,2與SLOT3,4

選擇MS-300-2C(5V/50A)，則最大輸出電流為(50A+50A)x0.9=90A

- ◎並聯前請先將輸出電壓調至所要的電壓值，並儘可能的減少兩模組間的電壓差;建議每一台輸出電壓誤差不超過2%。

- ◎並聯工作前，需先完成並聯連接再開機，不適合熱插式開機。

- ◎並聯工作時，應先在每一模組的輸出端並聯後再連接到負載，不要個別連接到負載，建議配線如圖3-4所示。

- ◎並聯時需將控制訊號之+S、-S、CS、G一併並聯，如圖3-7所示。

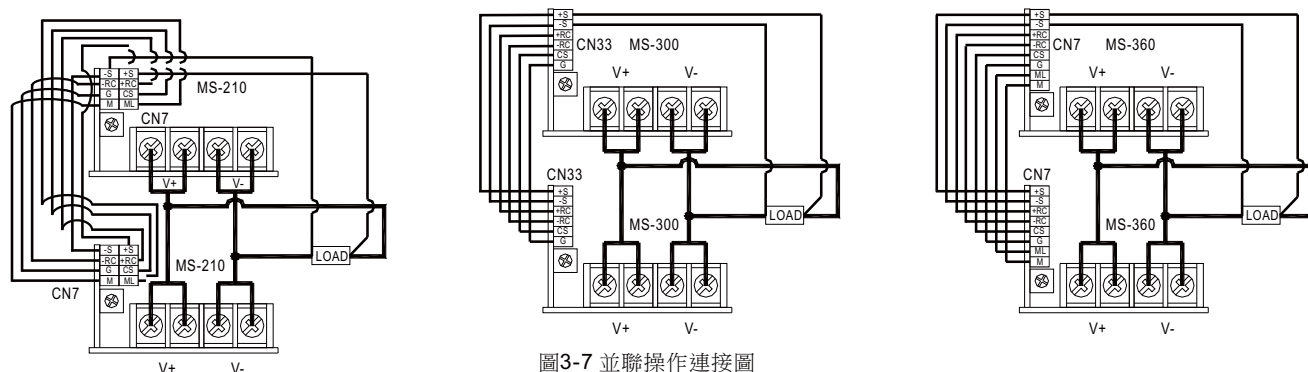


圖3-7 並聯操作連接圖



### 3.14 串聯操作

- ◎MS-75,MS-150,MS-210,MS-300,MS-360等模組，可串聯使用以獲取較高的輸出電壓。
- ◎串聯使用請以相同瓦數的模組為原則，並應置於相鄰的位置。
- ◎串聯操作時的輸出電流，不可超出所串聯模組中最小的額定輸出電流。
- ◎串聯工作時，其輸出電壓於開機時可能有階梯上升之現象。
- ◎串聯後的輸出電壓應小於60V[安規IEC60950-1 SELV(Safety Extra Low Voltage)之要求]。

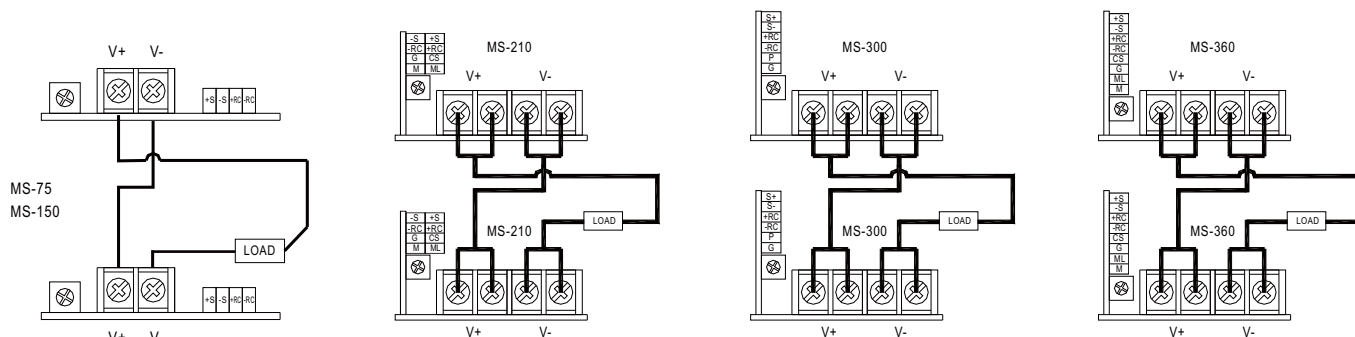


圖3-8 串聯操作連接圖

## 4.使用注意事項

### 4.1 組裝要求

- ◎基於安全考量，組裝工作需在具備安規機構認證的工廠中進行，並需經過明緯的授權許可才得進行組裝。

### 4.2 裝置方式

- ◎輸出模組與前端PFC板的組裝方式如圖4-1所示。

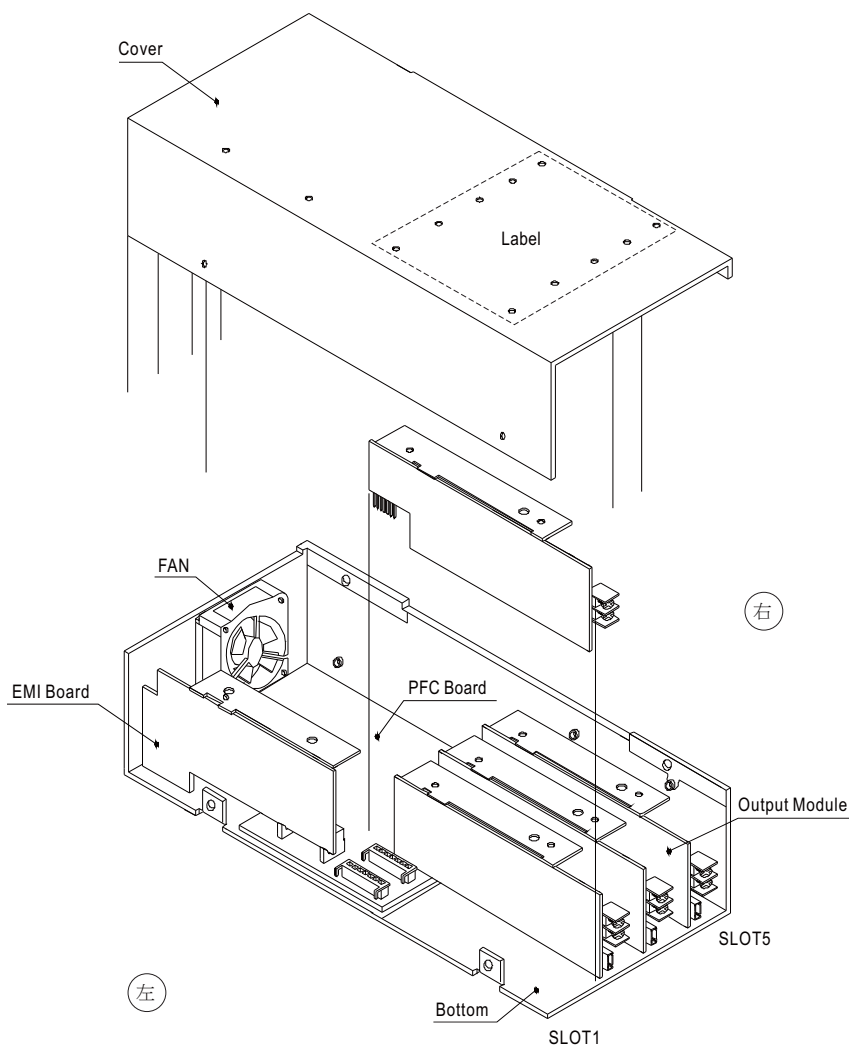


圖4-1 系統組裝圖

- ◎此為內建風扇強制散熱機型，不可妨害其出入通風孔，影響熱散量，建議出入風口10公分內不應有妨害通風的障礙物。
- ◎固定電源供應器時需考量其重量，建議裝置方式如圖4-2所示。

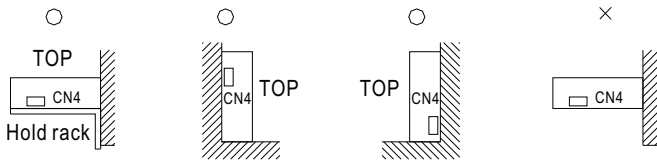


圖4-2 電源供應器固定方式

- ◎固定螺絲的長度L由電源供應器外殼之外側量起，必須小於6mm，如圖4-3所示

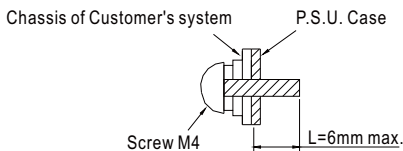


圖4-3 固定螺絲

4.3 減額

- ◎Modular系列是由輸出模組所組成，工作時必須確認每一輸出模組都能符合其電氣規格，並注意總輸出功率必須小於最大額定輸出功率。
- ◎工作環溫高與輸入AC電源電壓低時，均需減額。圖4-4分別為MP450,MP650,和MP1K0的減額曲線圖。

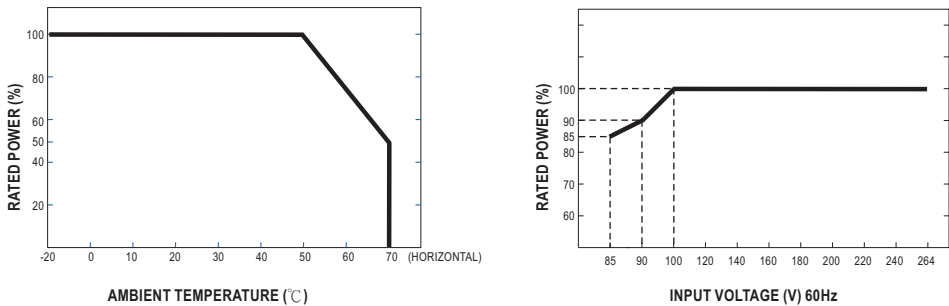


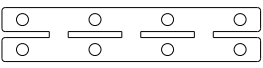
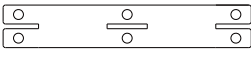
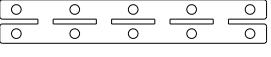
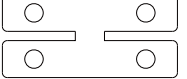
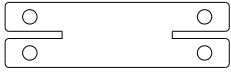
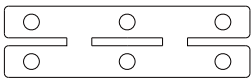
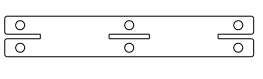
圖4-4 Modular系列減額曲線

5.串並聯配件

5.1 串聯配件

| Series Connection Accessory                           |  |
|-------------------------------------------------------|--|
| FAS-001<br>(For 1-slot modules:<br>MS-75/150, MD-100) |  |
| FAS-002<br>(For 2-slot modules:<br>MS-300)            |  |
| FAS-003<br>(For 1-slot modules:<br>MS-210)            |  |
| FAS-004<br>(For 2-slot modules:<br>MS-360)            |  |

## 5.2 並聯配件

| Parallel Connection Accessory    |                                                                                   |                                  |                                                                                     |
|----------------------------------|-----------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------|
| FAP-001<br>(For MS-300, 2 units) |  | FAP-005<br>(For MS-210, 4 units) |  |
| FAP-002<br>(For MS-300, 3 units) |  | FAP-006<br>(For MS-210, 5 units) |  |
| FAP-003<br>(For MS-210, 2 units) |  | FAP-007<br>(For MS-360, 2 units) |  |
| FAP-004<br>(For MS-210, 3 units) |  | FAP-008<br>(For MS-360, 3 units) |  |

## 6.Specification

### 6.1 Front End

| MODEL                    |                                  | PFC-450                                                                                                                                                                                                                                                                             | PFC-650                              | PFC-1000                          |
|--------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------|
| INPUT                    | VOLTAGE RANGE                    | 85 ~ 264VAC 120 ~ 370VDC                                                                                                                                                                                                                                                            |                                      |                                   |
|                          | FREQUENCY RANGE                  | 47 ~ 63Hz                                                                                                                                                                                                                                                                           |                                      |                                   |
|                          | POWER FACTOR                     | PF>0.95/230VAC PF>0.98/115VAC at full load                                                                                                                                                                                                                                          |                                      |                                   |
|                          | EFFICIENCY <small>Note.1</small> | 82.5% typ.                                                                                                                                                                                                                                                                          | 84% typ.                             | 84% typ.                          |
|                          | AC CURRENT                       | 6.3A/115VAC 3.2A/230VAC                                                                                                                                                                                                                                                             | 9A/115VAC 4.5A/230VAC                | 13.5A/115VAC 6.7A/230VAC          |
|                          | INRUSH CURRENT                   | 25A/115VAC 40A/230VAC                                                                                                                                                                                                                                                               | 30A/115VAC 50A/230VAC                | 20A/115VAC 40A/230VAC             |
|                          | LEAKAGE CURRENT                  | <1.5mA/240VAC                                                                                                                                                                                                                                                                       |                                      |                                   |
| OUTPUT                   | TOTAL OUTPUT POWER               | 450W max.                                                                                                                                                                                                                                                                           | 650W max.                            | 1000W max.                        |
| PROTECTION               | OVER TEMPERATURE                 | Shut down o/p voltage, recovers automatically after temperature goes down                                                                                                                                                                                                           |                                      |                                   |
|                          | FAN ALARM                        | Output shutdown when FAN is malfunction                                                                                                                                                                                                                                             |                                      |                                   |
| FUNCTION                 | REMOTE CONTROL                   | RC+/RC-: 0 ~ 0.8V or Short, Power ON RC+/RC-: 4 ~ 12V or Open, Power OFF                                                                                                                                                                                                            |                                      |                                   |
|                          | AUXILIARY POWER(AUX)             | 12V@0.1A(only for Remote ON/OFF Control)                                                                                                                                                                                                                                            |                                      |                                   |
| ENVIRONMENT              | WORKING TEMP.                    | -20 ~ +70°C (Refer to "Derating Curve")                                                                                                                                                                                                                                             |                                      |                                   |
|                          | WORKING HUMIDITY                 | 20 ~ 90% RH non-condensing                                                                                                                                                                                                                                                          |                                      |                                   |
|                          | STORAGE TEMP., HUMIDITY          | -40 ~ +85°C, 10 ~ 95% RH non-condensing                                                                                                                                                                                                                                             |                                      |                                   |
|                          | TEMP. COEFFICIENT                | ±0.03%/°C (0 ~ 50°C)                                                                                                                                                                                                                                                                |                                      |                                   |
|                          | VIBRATION                        | 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes                                                                                                                                                                                                                        |                                      |                                   |
| SAFETY & EMC<br>(Note 5) | SAFETY STANDARDS                 | UL62368-1, TUV BS EN/EN62368-1, 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°C / 70% RH                                                                                                                                                                                                                          |                                      |                                   |
|                          | EMC EMISSION                     | Compliance to BS EN/EN55032 (CISPR32) Class B, BS EN/EN61000-3-2,-3, EAC TP TC 020                                                                                                                                                                                                  |                                      |                                   |
|                          | EMC IMMUNITY                     | Compliance to BS EN/EN61000-4-2,3,4,5,6,8,11, BS EN/EN55035, BS EN/EN61000-6-1, light industry level, criteria A, EAC TP TC 020                                                                                                                                                     |                                      |                                   |
| OTHERS                   | MTBF                             | 2257.3K hrs min. Telcordia SR-332 (Bellcore) ; 225.9K hrs min. MIL-HDBK-217F (25°C) (450W)<br>2135.5K hrs min. Telcordia SR-332 (Bellcore) ; 292K hrs min. MIL-HDBK-217F (25°C) (650W)<br>1793K hrs min. Telcordia SR-332 (Bellcore) ; 239.8K hrs min. MIL-HDBK-217F (25°C) (1000W) |                                      |                                   |
|                          | DIMENSION                        | 254*127*63.5mm (L*W*H)                                                                                                                                                                                                                                                              | 278*127*63.5mm (L*W*H)               | 278*177.8*63.5mm (L*W*H)          |
|                          | PACKING                          | 1.8Kg(typ.); 6pcs / 11.8Kg / 1.25CUFT                                                                                                                                                                                                                                               | 2.16Kg(typ.); 6pcs / 14Kg / 1.34CUFT | 3Kg(typ.); 6pcs / 19Kg / 1.74CUFT |

## 6.2 Output Module

### ■ 1 SLOT Single output (150W) MS-150

|                           |                                 |                                                                                                      |          |            |             |                               |                            |            |            |            |            |            |
|---------------------------|---------------------------------|------------------------------------------------------------------------------------------------------|----------|------------|-------------|-------------------------------|----------------------------|------------|------------|------------|------------|------------|
| OUTPUT<br>(MS-150)        | OUTPUT VOLTAGE CODE             | MS-150A                                                                                              | MS-150B  | MS-150C    | MS-150D     | MS-150E                       | MS-150F                    | MS-150G    | MS-150H    | MS-150I    | MS-150J    | MS-150K    |
|                           | DC VOLTAGE                      | 2V                                                                                                   | 3.3V     | 5V         | 7.5V        | 12V                           | 15V                        | 18V        | 24V        | 27V        | 33V        | 48V        |
|                           | RATED CURRENT                   | 25A                                                                                                  | 25A      | 25A        | 18A         | 13A                           | 10A                        | 8.5A       | 6.5A       | 5.8A       | 4.7A       | 3.2A       |
|                           | CURRENT RANGE                   | 0 ~ 25A                                                                                              | 0 ~ 25A  | 0 ~ 25A    | 0 ~ 18A     | 0 ~ 13A                       | 0 ~ 10A                    | 0 ~ 8.5A   | 0 ~ 6.5A   | 0 ~ 5.8A   | 0 ~ 4.7A   | 0 ~ 3.2A   |
|                           | PEAK LOAD                       | Note.4<br>30A                                                                                        | 30A      | 30A        | 20.7A       | 15A                           | 11.5A                      | 9.8A       | 7.5A       | 6.7A       | 5.4A       | 3.68A      |
|                           | RATED POWER                     | 50W                                                                                                  | 82.5W    | 125W       | 135W        | 156W                          | 150W                       | 153W       | 156W       | 156.6W     | 155.1W     | 153.6W     |
|                           | RIPPLE & NOISE (max.)           | Note.2<br>50mVp-p                                                                                    | 80mVp-p  | 80mVp-p    | 100mVp-p    | 150mVp-p                      | 150mVp-p                   | 150mVp-p   | 150mVp-p   | 150mVp-p   | 250mVp-p   | 250mVp-p   |
|                           | VOLTAGE ADJ. RANGE              | 1.6 ~ 2.6V                                                                                           | 2.6 ~ 4V | 4 ~ 6V     | 6 ~ 9V      | 9 ~ 13.2V                     | 13.2 ~ 16.8V               | 16.8 ~ 20V | 20 ~ 26.4V | 25 ~ 31V   | 30 ~ 40V   | 40 ~ 53V   |
|                           | VOLTAGE TOLERANCE               | Note.3<br>±3.0%                                                                                      | ±2.0%    | ±2.0%      | ±2.0%       | ±1.0%                         | ±1.0%                      | ±1.0%      | ±1.0%      | ±1.0%      | ±1.0%      | ±1.0%      |
|                           | LINE REGULATION                 | ±0.5%                                                                                                | ±0.5%    | ±0.5%      | ±0.5%       | ±0.3%                         | ±0.3%                      | ±0.3%      | ±0.2%      | ±0.2%      | ±0.2%      | ±0.2%      |
|                           | LOAD REGULATION                 | ±2.0%                                                                                                | ±1.0%    | ±1.0%      | ±1.0%       | ±0.5%                         | ±0.5%                      | ±0.5%      | ±0.5%      | ±0.5%      | ±0.5%      | ±0.5%      |
| SETUP, RISE, HOLD UP TIME | 1500ms, 50ms, 20ms at full load |                                                                                                      |          |            |             |                               |                            |            |            |            |            |            |
| PROTECTION                | OVERLOAD                        | 121 ~ 150% rated output power                                                                        |          |            |             | 116 ~ 150% rated output power |                            |            |            |            |            |            |
|                           |                                 | Protection type : Constant current limiting, recovers automatically after fault condition is removed |          |            |             |                               |                            |            |            |            |            |            |
|                           | OVER VOLTAGE                    | 2.7 ~ 4V                                                                                             | 4.1 ~ 5V | 6.1 ~ 7.5V | 9.1 ~ 11.2V | 13.3 ~ 18V                    | 16.9 ~ 22V                 | 20.1 ~ 26V | 26.5 ~ 35V | 31.1 ~ 39V | 40.1 ~ 48V | 53.1 ~ 60V |
|                           |                                 | Protection type : Shut down o/p voltage, re-power on to recover                                      |          |            |             |                               |                            |            |            |            |            |            |
| FUNCTION                  | REMOTE INHIBIT CONTROL          | RC+/RC-: 0 ~ 0.8V or OPEN, POWER ON                                                                  |          |            |             |                               | RC+/RC-: 4 ~ 12V POWER OFF |            |            |            |            |            |

### ■ 1 SLOT Single output (210W) MS-210

|                           |                                 |                                                                                                      |           |            |             |                               |                            |            |            |            |            |            |
|---------------------------|---------------------------------|------------------------------------------------------------------------------------------------------|-----------|------------|-------------|-------------------------------|----------------------------|------------|------------|------------|------------|------------|
| OUTPUT<br>(MS-210)        | OUTPUT VOLTAGE CODE             | MS-210-1A                                                                                            | MS-210-1B | MS-210-1C  | MS-210-1D   | MS-210-1E                     | MS-210-1F                  | MS-210-1G  | MS-210-1H  | MS-210-1I  | MS-210-1J  | MS-210-1K  |
|                           | DC VOLTAGE                      | 2V                                                                                                   | 3.3V      | 5V         | 7.5V        | 12V                           | 15V                        | 18V        | 24V        | 27V        | 33V        | 48V        |
|                           | RATED CURRENT                   | 35A                                                                                                  | 35A       | 35A        | 28A         | 17.5A                         | 14A                        | 11.6A      | 8.75A      | 7.8A       | 6.4A       | 4.4A       |
|                           | CURRENT RANGE                   | 0 ~ 35A                                                                                              | 0 ~ 35A   | 0 ~ 35A    | 0 ~ 28A     | 0 ~ 17.5A                     | 0 ~ 14A                    | 0 ~ 11.6A  | 0 ~ 8.75A  | 0 ~ 7.8A   | 0 ~ 6.4A   | 0 ~ 4.4A   |
|                           | PEAK LOAD                       | Note.4 38.5A                                                                                         | 38.5A     | 38.5A      | 32.2A       | 20.1A                         | 16.1A                      | 13.4A      | 10.1A      | 9A         | 7.4A       | 5.1A       |
|                           | RATED POWER                     | 70W                                                                                                  | 115.5W    | 175W       | 210W        | 210W                          | 210W                       | 208.8W     | 210W       | 210.6W     | 211.2W     | 211.2W     |
|                           | RIPPLE & NOISE (max.)           | Note.2 50mVp-p                                                                                       | 80mVp-p   | 80mVp-p    | 100mVp-p    | 150mVp-p                      | 150mVp-p                   | 150mVp-p   | 150mVp-p   | 150mVp-p   | 250mVp-p   | 250mVp-p   |
|                           | VOLTAGE ADJ. RANGE              | 1.6 ~ 2.6V                                                                                           | 2.6 ~ 4V  | 4 ~ 6V     | 6 ~ 9V      | 9 ~ 13.2V                     | 13.2 ~ 16.8V               | 16.8 ~ 20V | 20 ~ 26.4V | 25 ~ 31V   | 30 ~ 40V   | 40 ~ 53V   |
|                           | VOLTAGE TOLERANCE               | Note.3 ±3.0%                                                                                         | ±2.0%     | ±2.0%      | ±2.0%       | ±1.0%                         | ±1.0%                      | ±1.0%      | ±1.0%      | ±1.0%      | ±1.0%      | ±1.0%      |
|                           | LINE REGULATION                 | ±0.5%                                                                                                | ±0.5%     | ±0.5%      | ±0.5%       | ±0.3%                         | ±0.3%                      | ±0.3%      | ±0.2%      | ±0.2%      | ±0.2%      | ±0.2%      |
|                           | LOAD REGULATION                 | ±2.0%                                                                                                | ±1.5%     | ±1.0%      | ±1.0%       | ±0.5%                         | ±0.5%                      | ±0.5%      | ±0.5%      | ±0.5%      | ±0.5%      | ±0.5%      |
| SETUP, RISE, HOLD UP TIME | 1500ms, 50ms, 20ms at full load |                                                                                                      |           |            |             |                               |                            |            |            |            |            |            |
| PROTECTION                | OVERLOAD                        | 110 ~ 135% rated output power                                                                        |           |            |             | 116 ~ 150% rated output power |                            |            |            |            |            |            |
|                           |                                 | Protection type : Constant current limiting, recovers automatically after fault condition is removed |           |            |             |                               |                            |            |            |            |            |            |
|                           | OVER VOLTAGE                    | 2.7 ~ 4V                                                                                             | 4.1 ~ 5V  | 6.1 ~ 7.5V | 9.1 ~ 11.2V | 13.3 ~ 18V                    | 16.9 ~ 22V                 | 20.1 ~ 26V | 26.5 ~ 35V | 31.1 ~ 39V | 40.1 ~ 48V | 53.1 ~ 60V |
|                           |                                 | Protection type : Shut down o/p voltage, re-power on to recover                                      |           |            |             |                               |                            |            |            |            |            |            |
| FUNCTION                  | REMOTE INHIBIT CONTROL          | RC+/RC-: 0 ~ 0.8V or OPEN, POWER ON                                                                  |           |            |             |                               | RC+/RC-: 4 ~ 12V POWER OFF |            |            |            |            |            |

### ■ 2 SLOT Single output (300W) MS-300

|                    |                                             |                                                                                                      |           |            |             |            |              |            |            |            |            |            |
|--------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------|-----------|------------|-------------|------------|--------------|------------|------------|------------|------------|------------|
| OUTPUT<br>(MS-300) | OUTPUT VOLTAGE CODE                         | MS-300-2A                                                                                            | MS-300-2B | MS-300-2C  | MS-300-2D   | MS-300-2E  | MS-300-2F    | MS-300-2G  | MS-300-2H  | MS-300-2I  | MS-300-2J  | MS-300-2K  |
|                    | DC VOLTAGE                                  | 2V                                                                                                   | 3.3V      | 5V         | 7.5V        | 12V        | 15V          | 18V        | 24V        | 27V        | 33V        | 48V        |
|                    | RATED CURRENT                               | 50A                                                                                                  | 50A       | 50A        | 40A         | 25A        | 20A          | 16.7A      | 12.5A      | 11.2A      | 9.1A       | 6.3A       |
|                    | CURRENT RANGE                               | 0 ~ 50A                                                                                              | 0 ~ 50A   | 0 ~ 50A    | 0 ~ 40A     | 0 ~ 25A    | 0 ~ 20A      | 0 ~ 16.7A  | 0 ~ 12.5A  | 0 ~ 11.2A  | 0 ~ 9.1A   | 0 ~ 6.3A   |
|                    | PEAK LOAD <small>Note.4</small>             | 57.5A                                                                                                | 57.5A     | 57.5A      | 46A         | 29A        | 23A          | 19.2A      | 14.4A      | 12.9A      | 10.5A      | 7.2A       |
|                    | RATED POWER                                 | 100W                                                                                                 | 165W      | 250W       | 300W        | 300W       | 300W         | 300.6W     | 300W       | 302.4W     | 300.3W     | 302.4W     |
|                    | RIPPLE & NOISE (max.) <small>Note.2</small> | 80mVp-p                                                                                              | 80mVp-p   | 80mVp-p    | 100mVp-p    | 150mVp-p   | 150mVp-p     | 150mVp-p   | 150mVp-p   | 200mVp-p   | 250mVp-p   | 300mVp-p   |
|                    | VOLTAGE ADJ. RANGE                          | 1.6 ~ 2.6V                                                                                           | 2.6 ~ 4V  | 4 ~ 6V     | 6 ~ 9V      | 9 ~ 13.2V  | 13.2 ~ 16.8V | 16.8 ~ 20V | 20 ~ 26.4V | 25 ~ 31V   | 30 ~ 40V   | 40 ~ 53V   |
|                    | VOLTAGE TOLERANCE <small>Note.3</small>     | ±3.0%                                                                                                | ±2.0%     | ±2.0%      | ±2.0%       | ±1.0%      | ±1.0%        | ±1.0%      | ±1.0%      | ±1.0%      | ±1.0%      | ±1.0%      |
|                    | LINE REGULATION                             | ±0.5%                                                                                                | ±0.5%     | ±0.5%      | ±0.5%       | ±0.3%      | ±0.3%        | ±0.3%      | ±0.2%      | ±0.2%      | ±0.2%      | ±0.2%      |
|                    | LOAD REGULATION                             | ±2.0%                                                                                                | ±1.0%     | ±1.0%      | ±1.0%       | ±0.5%      | ±0.5%        | ±0.5%      | ±1.0%      | ±1.0%      | ±1.0%      | ±1.0%      |
| PROTECTION         | SETUP, RISE, HOLD UP TIME                   | 1500ms, 50ms, 20ms at full load                                                                      |           |            |             |            |              |            |            |            |            |            |
|                    | OVERLOAD                                    | 116 ~ 150% rated output power                                                                        |           |            |             |            |              |            |            |            |            |            |
|                    |                                             | Protection type : Constant current limiting, recovers automatically after fault condition is removed |           |            |             |            |              |            |            |            |            |            |
| OVER VOLTAGE       |                                             | 3 ~ 4V                                                                                               | 4.1 ~ 5V  | 6.1 ~ 7.5V | 9.1 ~ 11.2V | 13.3 ~ 18V | 16.9 ~ 22V   | 20.1 ~ 26V | 26.5 ~ 35V | 31.1 ~ 39V | 40.1 ~ 48V | 53.1 ~ 60V |
|                    |                                             | Protection type : Shut down o/p voltage, re-power on to recover                                      |           |            |             |            |              |            |            |            |            |            |
| FUNCTION           | REMOTE INHIBIT CONTROL                      | RC+/RC-: 0 ~ 0.8V or OPEN, POWER ON      RC+/RC-: 4 ~ 12V POWER OFF                                  |           |            |             |            |              |            |            |            |            |            |

## ■ 2 SLOT Single output (360W) MS-360

| OUTPUT<br>(MS-360) | OUTPUT VOLTAGE CODE                         | MS-360-3A                                                                                            | MS-360-3B | MS-360-3C  | MS-360-3D   | MS-360-3E  | MS-360-3F    | MS-360-3G  | MS-360-3H  | MS-360-3I  | MS-360-3J  | MS-360-3K  |
|--------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------|-----------|------------|-------------|------------|--------------|------------|------------|------------|------------|------------|
|                    | DC VOLTAGE                                  | 2V                                                                                                   | 3.3V      | 5V         | 7.5V        | 12V        | 15V          | 18V        | 24V        | 27V        | 33V        | 48V        |
|                    | RATED CURRENT                               | 60A                                                                                                  | 60A       | 60A        | 48A         | 30A        | 24A          | 20A        | 15A        | 13.4A      | 11A        | 7.5A       |
|                    | CURRENT RANGE                               | 0 ~ 60A                                                                                              | 0 ~ 60A   | 0 ~ 60A    | 0 ~ 48A     | 0 ~ 30A    | 0 ~ 24A      | 0 ~ 20A    | 0 ~ 15A    | 0 ~ 13.4A  | 0 ~ 11A    | 0 ~ 7.5A   |
|                    | PEAK LOAD <small>Note.4</small>             | 69A                                                                                                  | 69A       | 69A        | 55.2A       | 34.5A      | 27.6A        | 23A        | 17.3A      | 15.5A      | 12.7A      | 8.7A       |
|                    | RATED POWER                                 | 120W                                                                                                 | 198W      | 300W       | 360W        | 360W       | 360W         | 360W       | 360W       | 361.8W     | 363W       | 360W       |
|                    | RIPPLE & NOISE (max.) <small>Note.2</small> | 80mVp-p                                                                                              | 100mVp-p  | 100mVp-p   | 100mVp-p    | 150mVp-p   | 150mVp-p     | 150mVp-p   | 150mVp-p   | 200mVp-p   | 250mVp-p   | 300mVp-p   |
|                    | VOLTAGE ADJ. RANGE                          | 1.6 ~ 2.6V                                                                                           | 2.6 ~ 4V  | 4 ~ 6V     | 6 ~ 9V      | 9 ~ 13.2V  | 13.2 ~ 16.8V | 16.8 ~ 20V | 20 ~ 26.4V | 25 ~ 31V   | 30 ~ 40V   | 40 ~ 53V   |
|                    | VOLTAGE TOLERANCE <small>Note.3</small>     | ±3.0%                                                                                                | ±2.0%     | ±2.0%      | ±2.0%       | ±1.0%      | ±1.0%        | ±1.0%      | ±1.0%      | ±1.0%      | ±1.0%      | ±1.0%      |
|                    | LINE REGULATION                             | ±0.5%                                                                                                | ±0.5%     | ±0.5%      | ±0.5%       | ±0.3%      | ±0.3%        | ±0.3%      | ±0.2%      | ±0.2%      | ±0.2%      | ±0.2%      |
|                    | LOAD REGULATION                             | ±2.0%                                                                                                | ±1.5%     | ±1.0%      | ±1.0%       | ±0.5%      | ±0.5%        | ±0.5%      | ±1.0%      | ±1.0%      | ±1.0%      | ±1.0%      |
|                    | SETUP, RISE, HOLD UP TIME                   | 1500ms, 50ms, 20ms at full load                                                                      |           |            |             |            |              |            |            |            |            |            |
| PROTECTION         | OVERLOAD                                    | 116 ~ 150% rated output power                                                                        |           |            |             |            |              |            |            |            |            |            |
|                    |                                             | Protection type : Constant current limiting, recovers automatically after fault condition is removed |           |            |             |            |              |            |            |            |            |            |
|                    | OVER VOLTAGE                                | 3 ~ 4V                                                                                               | 4.1 ~ 5V  | 6.1 ~ 7.5V | 9.1 ~ 11.2V | 13.3 ~ 18V | 16.9 ~ 22V   | 20.1 ~ 26V | 26.5 ~ 35V | 31.1 ~ 39V | 40.1 ~ 48V | 53.1 ~ 60V |
| FUNCTION           | REMOTE INHIBIT CONTROL                      | Protection type : Shut down o/p voltage, re-power on to recover                                      |           |            |             |            |              |            |            |            |            |            |
|                    |                                             | RC+/RC-: 0 ~ 0.8V or OPEN, POWER ON      RC+/RC-: 4 ~ 12V POWER OFF                                  |           |            |             |            |              |            |            |            |            |            |

## ■ 1 SLOT Single output (75W) MS-75

| OUTPUT<br>(MS-75) | OUTPUT VOLTAGE CODE                         | MS-75L                                                                                               | MS-75M     | MS-75N     | MS-75O       | MS-75P     | MS-75Q     |
|-------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------|------------|------------|--------------|------------|------------|
|                   | DC VOLTAGE                                  | 3.3V                                                                                                 | 5V         | 12V        | 15V          | 24V        | 48V        |
|                   | RATED CURRENT                               | 15A                                                                                                  | 15A        | 6.3A       | 5A           | 3.2A       | 1.6A       |
|                   | CURRENT RANGE                               | 0 ~ 15A                                                                                              | 0 ~ 15A    | 0 ~ 6.3A   | 0 ~ 5A       | 0 ~ 3.2A   | 0 ~ 1.6A   |
|                   | PEAK LOAD <small>Note.4</small>             | 17.3A                                                                                                | 17.3A      | 7.3A       | 5.8A         | 3.7A       | 1.8A       |
|                   | RATED POWER                                 | 49.5W                                                                                                | 75W        | 75.6W      | 75W          | 76.8W      | 76.8W      |
|                   | RIPPLE & NOISE (max.) <small>Note.2</small> | 80mVp-p                                                                                              | 80mVp-p    | 150mVp-p   | 150mVp-p     | 150mVp-p   | 250mVp-p   |
|                   | VOLTAGE ADJ. RANGE                          | 2.6 ~ 4V                                                                                             | 4 ~ 6V     | 9 ~ 13.2V  | 13.2 ~ 16.8V | 20 ~ 26.4V | 40 ~ 53V   |
|                   | VOLTAGE TOLERANCE <small>Note.3</small>     | ±2.0%                                                                                                | ±2.0%      | ±1.0%      | ±1.0%        | ±1.0%      | ±1.0%      |
|                   | LINE REGULATION                             | ±0.5%                                                                                                | ±0.5%      | ±0.3%      | ±0.3%        | ±0.2%      | ±0.2%      |
|                   | LOAD REGULATION                             | ±1.0%                                                                                                | ±1.0%      | ±0.5%      | ±0.5%        | ±0.5%      | ±0.5%      |
|                   | SETUP, RISE, HOLD UP TIME                   | 1500ms, 50ms, 20ms at full load                                                                      |            |            |              |            |            |
| PROTECTION        | OVERLOAD                                    | 116 ~ 150% rated output power                                                                        |            |            |              |            |            |
|                   |                                             | Protection type : Constant current limiting, recovers automatically after fault condition is removed |            |            |              |            |            |
|                   | OVER VOLTAGE                                | 4.1 ~ 5V                                                                                             | 6.1 ~ 7.5V | 13.3 ~ 18V | 16.9 ~ 22V   | 26.5 ~ 35V | 53.1 ~ 60V |
| FUNCTION          | REMOTE INHIBIT CONTROL                      | Protection type : Shut down o/p voltage, re-power on to recover                                      |            |            |              |            |            |
|                   |                                             | RC+/RC-: 0 ~ 0.8V or OPEN, POWER ON      RC+/RC-: 4 ~ 12V POWER OFF                                  |            |            |              |            |            |

## ■ 1 SLOT Isolated Dual output (100W) MD-100

| OUTPUT<br>(MD-100) | OUTPUT VOLTAGE CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MD-100R                                                                                                                                                                                                                      |                                                                     | MD-100S     |              | MD-100T     |              | MD-100U      |             | MD-100V      |              | MD-100W      |              | MD-100X      |              |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------|--------------|-------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                    | DC VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 5V                                                                                                                                                                                                                           | 5V                                                                  | 5V          | 12V          | 5V          | 15V          | 24V          | 5V          | 24V          | 12V          | 12V          | 12V          | 15V          | 15V          |
|                    | RATED CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 10A                                                                                                                                                                                                                          | 8A                                                                  | 10A         | 4.2A         | 10A         | 3.4A         | 2.5A         | 8A          | 2.5A         | 3.4A         | 5A           | 3.4A         | 4A           | 2.7A         |
|                    | CURRENT RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2 ~ 10A                                                                                                                                                                                                                      | 0 ~ 8A                                                              | 2 ~ 10A     | 0 ~ 5.8A     | 2 ~ 10A     | 0 ~ 4.7A     | 0.5 ~ 3A     | 0 ~ 10A     | 0.6 ~ 3A     | 0 ~ 4.7A     | 1 ~ 5A       | 0 ~ 5.8A     | 1 ~ 4.7A     | 0 ~ 4.7A     |
|                    | RATED POWER <span>Note.6</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 90W                                                                                                                                                                                                                          |                                                                     | 100.4W      |              | 101W        |              | 100W         |             | 100.8W       |              | 100.8W       |              | 100.5W       |              |
|                    | RIPPLE & NOISE (max.) <span>Note.2</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 100mVp-p                                                                                                                                                                                                                     | 100mVp-p                                                            | 100mVp-p    | 150mVp-p     | 100mVp-p    | 150mVp-p     | 200mVp-p     | 100mVp-p    | 240mVp-p     | 120mVp-p     | 120mVp-p     | 120mVp-p     | 150mVp-p     | 150mVp-p     |
|                    | VOLTAGE ADJ. RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4.75 ~ 5.5V                                                                                                                                                                                                                  | 4.75 ~ 5.5V                                                         | 4.75 ~ 5.5V | 11.4 ~ 13.2V | 4.75 ~ 5.5V | 14.2 ~ 16.5V | 22.8 ~ 26.4V | 4.75 ~ 5.5V | 22.8 ~ 26.4V | 11.4 ~ 13.2V | 11.4 ~ 13.2V | 11.4 ~ 13.2V | 14.2 ~ 16.5V | 14.2 ~ 16.5V |
|                    | VOLTAGE TOLERANCE <span>Note.3</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ±3.0%                                                                                                                                                                                                                        | ±3.0%                                                               | ±3.0%       | ±3.0%        | ±3.0%       | ±3.0%        | ±3.0%        | ±3.0%       | ±2.0%        | ±3.0%        | ±2.0%        | ±3.0%        | ±2.0%        | ±3.0%        |
|                    | LINE REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ±1.0%                                                                                                                                                                                                                        | ±1.0%                                                               | ±1.0%       | ±1.0%        | ±1.0%       | ±1.0%        | ±1.0%        | ±1.0%       | ±0.5%        | ±1.0%        | ±0.5%        | ±1.0%        | ±0.5%        | ±1.0%        |
|                    | LOAD REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ±2.0%                                                                                                                                                                                                                        | ±2.0%                                                               | ±2.0%       | ±2.0%        | ±2.0%       | ±2.0%        | ±2.0%        | ±2.0%       | ±1.0%        | ±2.0%        | ±1.0%        | ±2.0%        | ±1.0%        | ±2.0%        |
|                    | SETUP, RISE, HOLD UP TIME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1500ms, 50ms, 20ms at full load                                                                                                                                                                                              |                                                                     |             |              |             |              |              |             |              |              |              |              |              |              |
| PROTECTION         | OVERLOAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 105 ~ 150% rated output power<br>Protection type : Shut down o/p voltage, re-power on to recover                                                                                                                             |                                                                     |             |              |             |              |              |             |              |              |              |              |              |              |
|                    | OVER VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5.6 ~ 7.2V 5.6 ~ 7.2V 5.6 ~ 7.2V 13.3 ~ 17V 5.6 ~ 7.2V 16.6 ~ 22V 26.5 ~ 34V 5.6 ~ 7.2V 26.5 ~ 34V 13.3 ~ 17V 13.3 ~ 17V 13.3 ~ 17V 16.6 ~ 22V 16.6 ~ 22V<br>Protection type : Shut down o/p voltage, re-power on to recover |                                                                     |             |              |             |              |              |             |              |              |              |              |              |              |
|                    | FUNCTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | REMOTE INHIBIT CONTROL                                                                                                                                                                                                       | RC+/RC-: 0 ~ 0.8V or OPEN, POWER ON      RC+/RC-: 4 ~ 12V POWER OFF |             |              |             |              |              |             |              |              |              |              |              |              |
| NOTE               | 1. MP450:The value changed by installing different output modules. The efficiency in specification means output modules are composed by following modules.<br>5V(Voltage code C)*1, 12V(Voltage code E)*1, 24V(Voltage code H)*1, 5V(Voltage code M)*1.<br>MP650:The value changed by installing different output modules. The efficiency in specification means output modules are composed by following modules.<br>5V(Voltage code C)*2, 12V(Voltage code E)*1, 24V(Voltage code H)*2.<br>MP1K0:The value changed by installing different output modules. The efficiency in specification means output modules are composed by following modules.<br>5V(Voltage code C)*2, 12V(Voltage code E)*2, 24V(Voltage code H)*3.<br>The hold-up time of above combination is 20ms(typ.)<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. 35% Duty cycle maximum within every 10 seconds. Average output power should not exceed the rated power.<br>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 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 <a href="http://www.meanwell.com">http://www.meanwell.com</a> )<br>6. If the output voltage adjust to higher level, the rated current should be derated to meet the total rated power for both outputs(For MD-100 only).<br>7.The ambient temperature derating of 3.5°C/1000m with fanless models and of 5°C/1000m with fan models for operating altitude higher than 2000m(6500ft).<br>※ Product Liability Disclaimer : For detailed information, please refer to <a href="https://www.meanwell.com/serviceDisclaimer.aspx">https://www.meanwell.com/serviceDisclaimer.aspx</a> |                                                                                                                                                                                                                              |                                                                     |             |              |             |              |              |             |              |              |              |              |              |              |