



MP450 / 650 / 1K0 Instruction Manual



MP450,650,1K0 Instruction Manual

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MP450,650,1K0 Instruction Manual

0. Introduction

Modular Series are switching power supplies with modular design that consist of two stages: front-end PFC and output modules. Using ZVS (Zero Voltage Switching) technology to realize the power factor correction, the line input is rectified into high DC voltage (around 390VDC) by the front-end PFC stage, and then the DC output modules will transfer the operating voltage into all kinds of DC output voltages. Right now we offer six-categories totally 57 different kinds of models - 75W(MS-75), 150W(MS-150), 210W(MS-210) 300W(MS-300), 360W(MS-360) single output modules and 100W(MD-100) dual output modules - to fulfill all kinds of applications.

1. Order Information

1.1 Explanation for Encoding

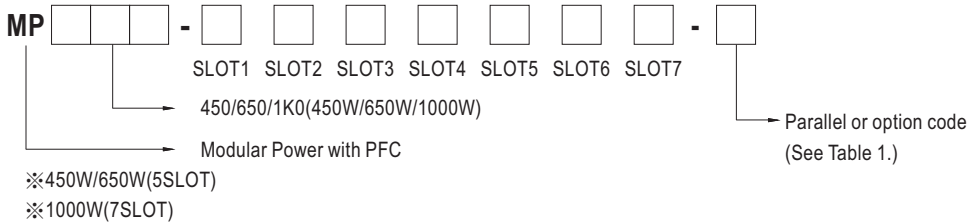
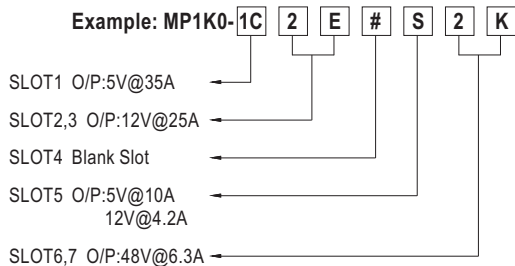


Table 1. Parallel code(For MS-210、MS-300、MS-360 only)

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



1.2 Notes on Encoding

- Please map out output modules that need to be connected in series or parallel at adjoining slots.
- Total wattage usage of all output modules should be less than the rated power of front-end PFC stage.

1.3 Marking

- Please refer to the marking on the safety label in front of the machine before using it.

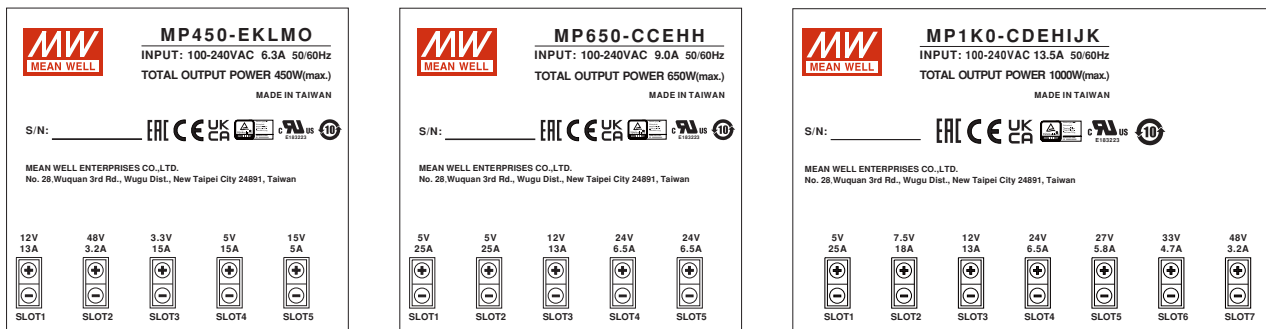


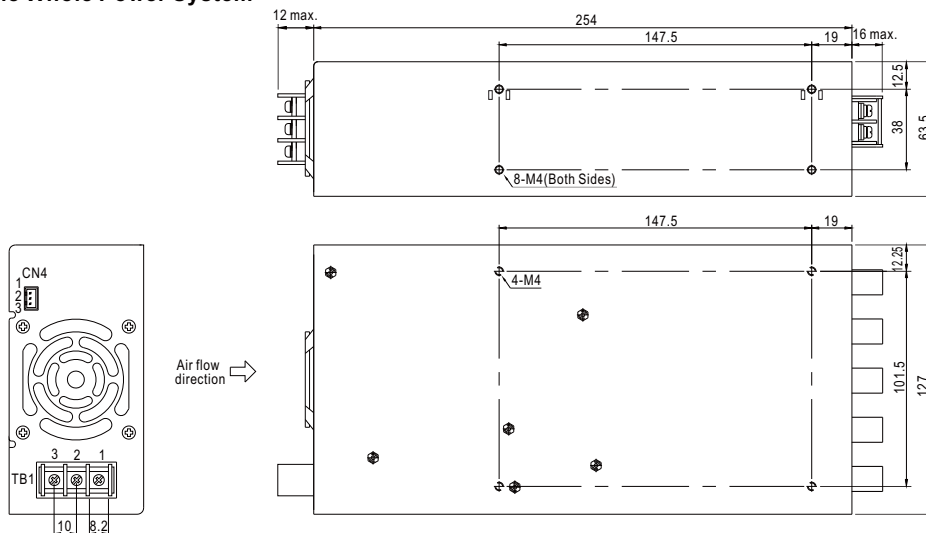
Figure 1-1 Safety labels

2. Mechanical Specification and Output Terminals

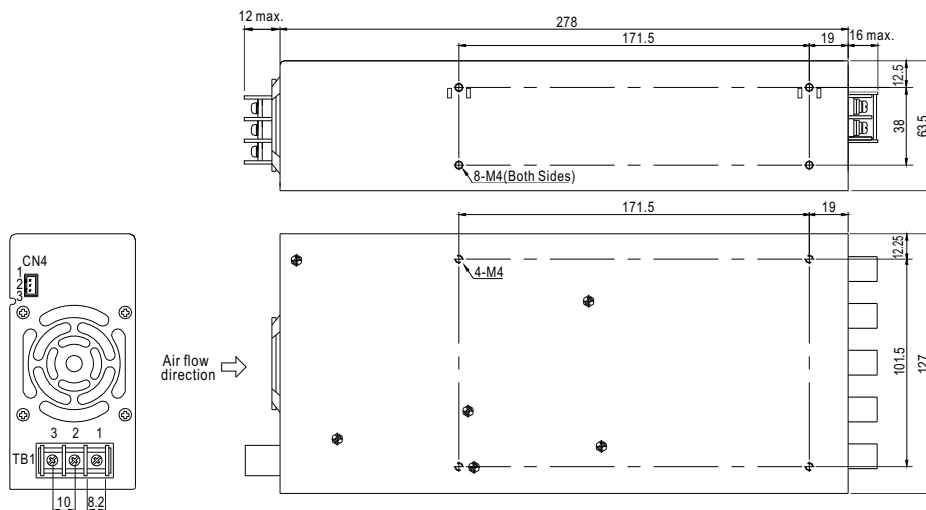
2.1 Mechanism of the Whole Power System

◎MP450

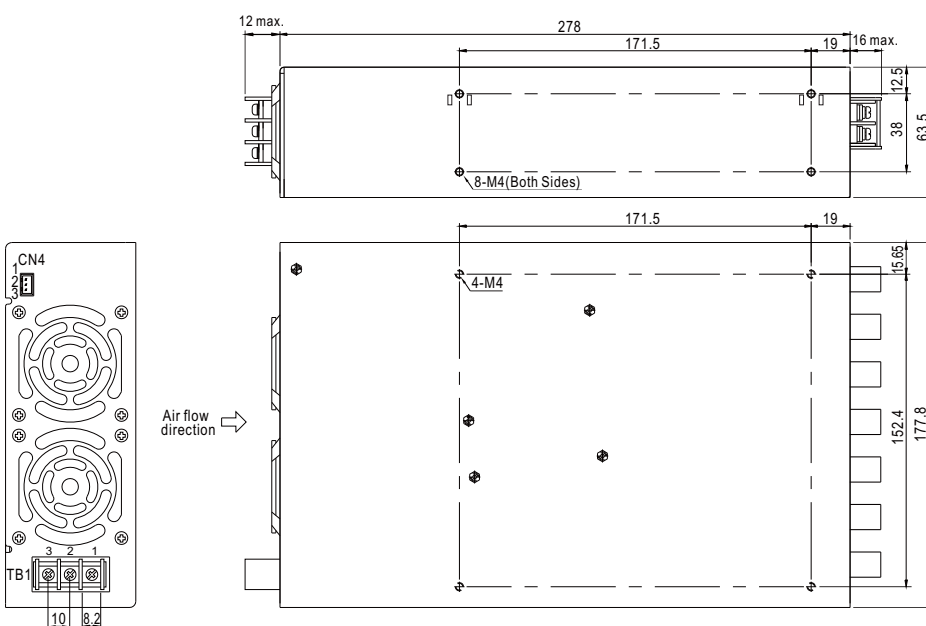
Unit:mm



◎MP650



◎MP1K0



TB1(PFC-450/650/1K0)

| Pin No. | Assignment | Screw Size | Maximum mounting torque |
|---------|------------|------------|-------------------------|
| 1 | AC/L | M3.5 | 18Kgf-cm |
| 2 | AC/N | | |
| 3 | FG ⅓ | | |

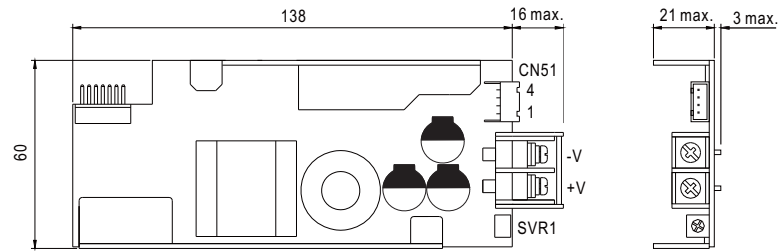
CN4(PFC-450/650/1K0) : JST B3B-XH or equivalent

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

2.2 Mechanism of Output Modules

◎MS-75

Unit:mm

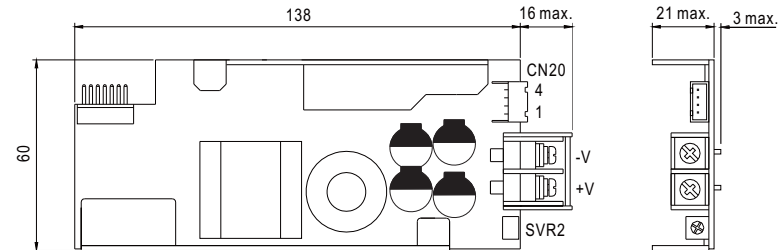


Output Connector(CN51) : JST B4B-XH or equivalent

| Pin No. | Assignment | Mating Housing | Terminal |
|---------|---------------------|--------------------------|------------------------------------|
| 1 | +S: +Remote sense | JST XHP or equivalent | JST SXH-001T-P0.6 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

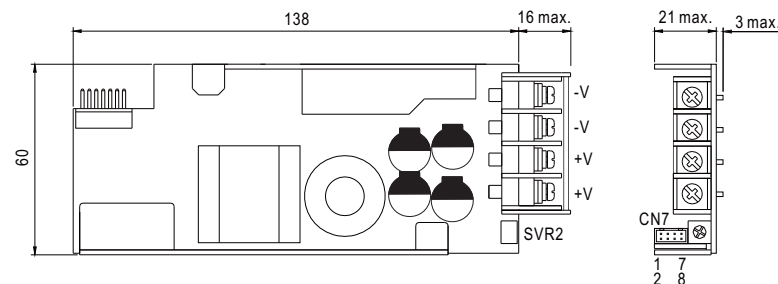


Output Connector(CN20) : JST B4B-XH or equivalent

| Pin No. | Assignment | Mating Housing | Terminal |
|---------|---------------------|--------------------------|------------------------------------|
| 1 | +S: +Remote sense | JST XHP or equivalent | JST SXH-001T-P0.6 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 or equivalent | DRS DF11-**SC 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 | | |

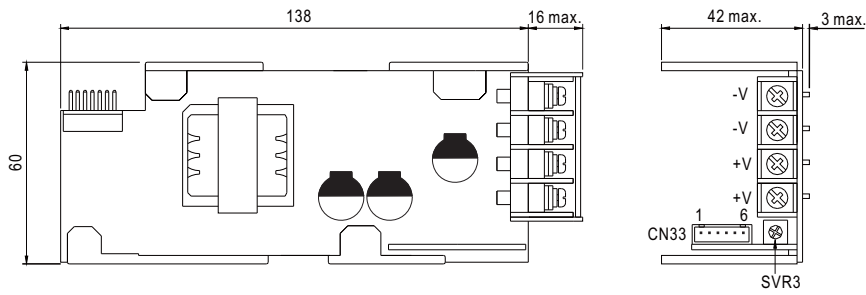
| Assignment | Screw Size | Maximum mounting torque |
|------------|------------|-------------------------|
| +V,-V | M3.5 | 12Kgf-cm |

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



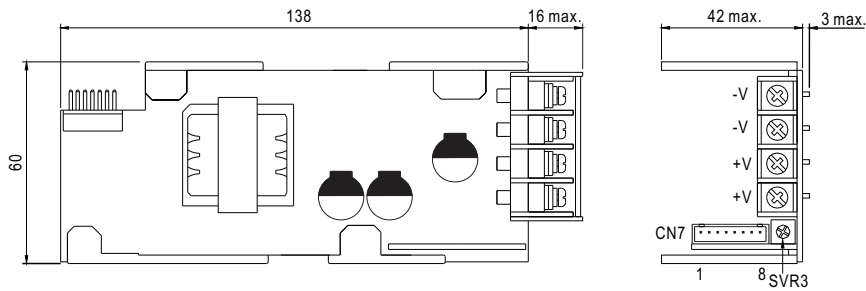
Output Connector(CN33) : JST B6B-XH or equivalent

| Pin No. | Assignment | Mating Housing | Terminal |
|---------|---------------------|--------------------------|------------------------------------|
| 1 | +S: +Remote sense | JST XHP or equivalent | JST SXH-001T-P0.6 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.
 (Output current at parallel operation) = (The rated current per unit) × (Number of unit) × 0.9

◎MS-360



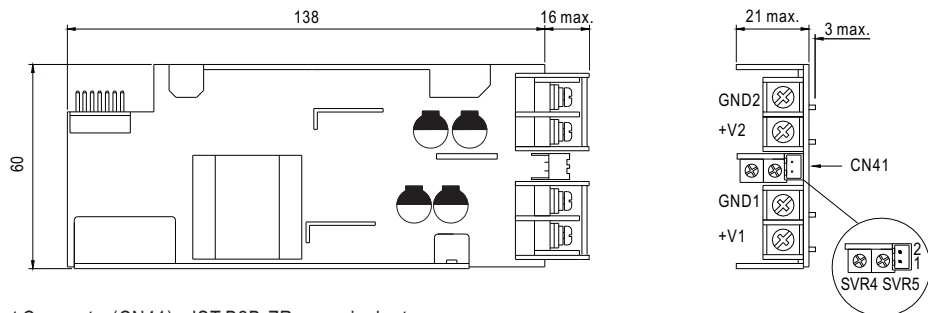
Output Connector(CN7) : JST B8B-XH or equivalent

| Pin No. | Assignment | Pin No. | Assignment | Mating Housing | Terminal |
|---------|---------------------|---------|-------------------------------|--------------------------|------------------------------------|
| 1 | +S: +Remote sense | 5 | CS: Current sharing | JST XHP or equivalent | JST SXH-001T-P0.6 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.
 (Output current at parallel operation) = (The rated current per unit) × (Number of unit) × 0.9

◎MD-100



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

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

3.1 Input Voltage Range

- ⊙ Nominal input voltage range is AC 85~264V or DC 120~370V.
- ⊙ To insure proper operation, AC input should be within the pre-specified range. The wrong input will cause the power supply to operate improperly, lose the PFC function or even be damaged.
- ⊙ Since the Modular Series have built-in active PFC circuit, there will be lower efficiency and output derating is required when operating at lower input voltage (<100VAC).

3.2 Inrush Current Limiting

- ⊙ Built-in inrush current limiting circuit.
- ⊙ The external switch, if needed, should have a current rating exceeding the maximum inrush current.
- ⊙ Since the inrush current limiting circuit mainly consists of thermistor and relay, after turning off the power supply, a 10 second cool down period is recommended before turning it back on. Inrush current will be much higher than the specified value if input thermistor is not allowed sufficient time to cool down.

3.3 Output Voltage Adjustment Range

- ⊙ Minor adjustments can be made to the output voltage of all channels by using a potentiometer. Turning clockwise will increase output voltage and counterclockwise will decrease output voltage.
- ⊙ When the output is tuned to a higher voltage, please notice that the load current should be decreased accordingly. The output wattage of each module should not exceed its rated value under any circumstances.

3.4 Short Circuit Protection & Over Current Protection (O.C.P.)

- ⊙ Built-in short circuit and over current protection function in each output module. O.C.P. comes into effect at >116% of output rated current and the output module will automatically recover once the over current condition is removed. (MS-75/150/210/300/360 are constant current type while MD-100 is shut-off type)

3.5 Over Voltage Protection (O.V.P.)

- ⊙ Built-in over voltage protection circuit for each output channel.
- ⊙ The O.V.P. triggering points are different for different output modules. Please refer to the specification sheet for details.
- ⊙ The output module shuts down when O.V.P. is triggered. To restart power supply, please switch off V_{AC} first and then wait for 10 seconds before switching it back on.

3.6 Over Temperature Protection (O.T.P.)

- ⊙ Built-in 2 sets of over temperature protection circuit. When the internal temperature exceeds the threshold value, the power supply will shut down automatically. You should switch off V_{AC} and remove all possible causes of overheating, and then let the power supply cool down to normal working temperature (needs about 10 minutes~1hour) before turning it back on.

3.7 Fan Alarm

- ⊙ Built-in fan malfunction protection circuit. When the DC fan stop operating (fan lock, wire broken, or connector loosed), all output modules will be shut down. Please switch off V_{AC} and send back to our local distributor or MEAN WELL for repair.

3.8 Remote Sense - Output Modules

- ⊙ Built-in remote sense circuit in MS-75, MS-150, MS-210, MS-300 and MS-360.
- ⊙ When using this function, the sensing wires should either be twisted or shielded to prevent external noise interference. (refer to figure 3-1)
- ⊙ When Remote Sense is not in use, +S should be shorted to +V and -S to -V. Or +S and -S can be left unconnected.
- ⊙ The voltage drop across the output wires must be limited to less than 0.5V. Also heavy wires with adequate current rating should be used between +V/-V and the load. Please firmly connect the output wires to prevent them from loosing, or the power supply may be out of order.
- ⊙ If long sensing wires are necessary, then Noise Filtering Capacitors C1, C2 and C3 need to be added as figure 3-1.
- ⊙ The power supply unit may become unstable due to the difference in wire impedance and load current. The addition of C1, C2, C3 and R1 shown in figure 3-1 may help improve output voltage stability. Please contact MEAN WELL for more detail specification of these components.

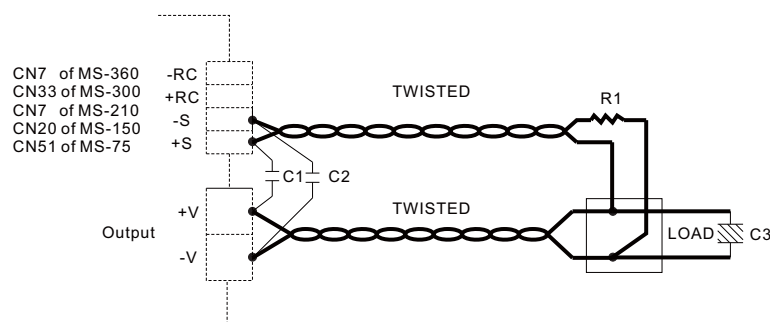


Figure 3-1 Connection for using the remote sense function

3.9 Auxiliary Output

⊙ Built-in 12V/0.1A auxiliary output that can be used as the voltage source of remote ON/OFF control application for individual output modules or the whole modular system. Please refer to figure 3-2 and 3-3 for wiring methods.

3.10 Remote ON/OFF Control - Whole Power System

- ⊙ Built-in remote ON/OFF control circuit for the whole power system.
- ⊙ The remote control circuit (+RC and -RC) has electric isolation from V_{in} and V_{out} .
- ⊙ When there's a 4~12V voltage difference or open circuit between +RC & -RC, the whole power system will be turned off. The power supply will be turned on if the voltage difference between +RC & -RC is less than 0.8V or short circuit. (The whole power system will have no output if the shorting connector is not assembled between +RC & -RC on CN4.)
- ⊙ The auxiliary output on the power supply can be used as the external control source of the remote ON/OFF control function. Please refer to figure 3.2 for connecting methods.

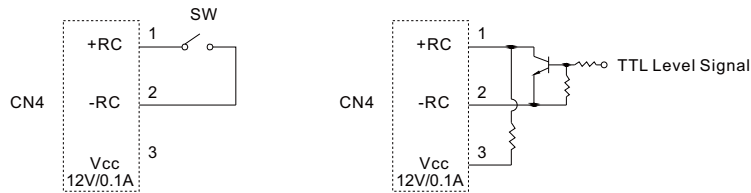


Figure 3-2 Connection for the remote ON/OFF control function of the whole power system

3.11 Remote ON/OFF Control - Output Modules

- ⊙ Built-in remote ON/OFF control circuit for each output module. All output modules can be turned ON/OFF independently by using the remote ON/OFF control function.
- ⊙ The remote control circuit (+RC and -RC) has electric isolation from V_{in} and V_{out} .
- ⊙ When there's a 4~12V voltage difference between +RC & -RC, the output module will be turned off. The power supply will be turned on if the voltage difference between +RC & -RC is less than 0.8V or open circuit.
- ⊙ The auxiliary output on the power supply can be used as the external control source of the remote ON/OFF control function on each output module. Please refer to figure 3.3 for connecting methods.

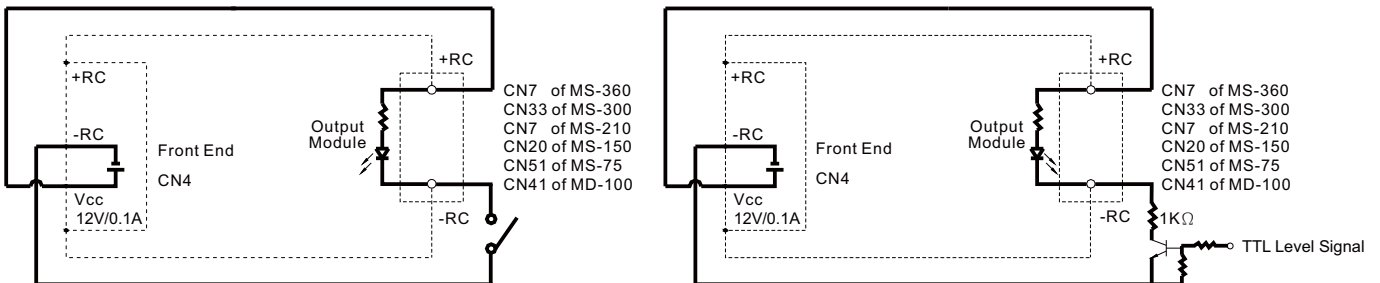
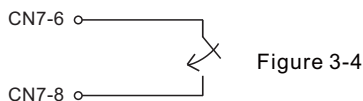


Figure 3-3 Connection for the remote ON/OFF control function of output modules

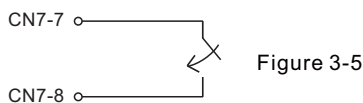
3.12 Remote Margin / V-Program

⊙ Remote Margin / V- Program is available for MS-210 and MS-360 to fine tune the output voltage. Hereunder is the instruction, assuming no voltage adjustment is applied via the built-in potentiometer.

(1) Connecting PIN CN7-6 with PIN CN7-8 will increase the output voltage by approximately 5% of the rated voltage.



(2) Connecting PIN CN7-6 with PIN CN 7-8 will reduce the output voltage by approximately 5% of the rated voltage.



(3) Connecting an additional 100KΩ potentiometer to PIN CN7-6, PIN CN7-7 and PIN CN7-8 will provide an adjustment for the output voltage in a range of -5% to +5% of the rated voltage (ex: -3%, +2.5% and etc.)

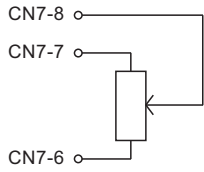


Figure 3-6

Note : The remote margin / V- program function cannot be used when units are connected in parallel.

3.13 Parallel Operation

- ⊙ MS-210, MS-300 and MS-360 are allowed to work in parallel.
- ⊙ Only same output modules adjoining one another inside the same power supply are recommended to connect in parallel.
- ⊙ The total output current should not exceed 90% of the sum of rated currents.

For example: MP650-2C2CO-1

Parallel code "1" means that the two MS-300-2C(5V/50A) located at SLOT 1,2 & SLOT 3,4 should be connected in parallel and the maximum output current is 90A [(50A+50A)*0.9].

- ⊙ Please adjust the output voltages to the required value before wiring the output modules. The voltage difference among output modules should be minimized that less than ±2% is required.
- ⊙ All wirings should be properly connected before turning on. The power supply can not be hot swapped.
- ⊙ Please connect the output terminal of each output module in parallel first and then connect to the load as shown in Figure 3-7. Don't connect to the load separately.
- ⊙ Please connect the +S,-S,CS and G of each output module in parallel as well.

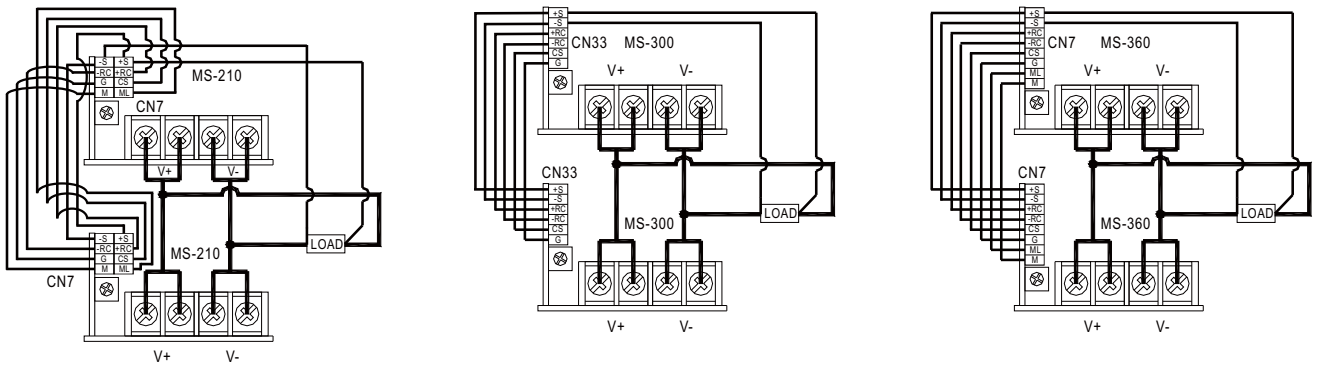


Figure 3-7 Operating in parallel connection

3.14 Series Operation

- ⊙ Higher output voltage can be acquired by using MS-75, MS-150, MS-210, MS-300 or MS-360 in series connection.
- ⊙ Only output modules with the same output wattage and adjoining one another are recommended to connect in series.
- ⊙ Output current for series connection should not exceed the smallest rated current of all series connecting modules.
- ⊙ The difference in rise times of individual output module will lead to steps/stairs like turn on.
- ⊙ The output voltage after series connection should be less than 60Vdc [the requirement of SELV(Safety Extra Low Voltage) of IEC60950-1].

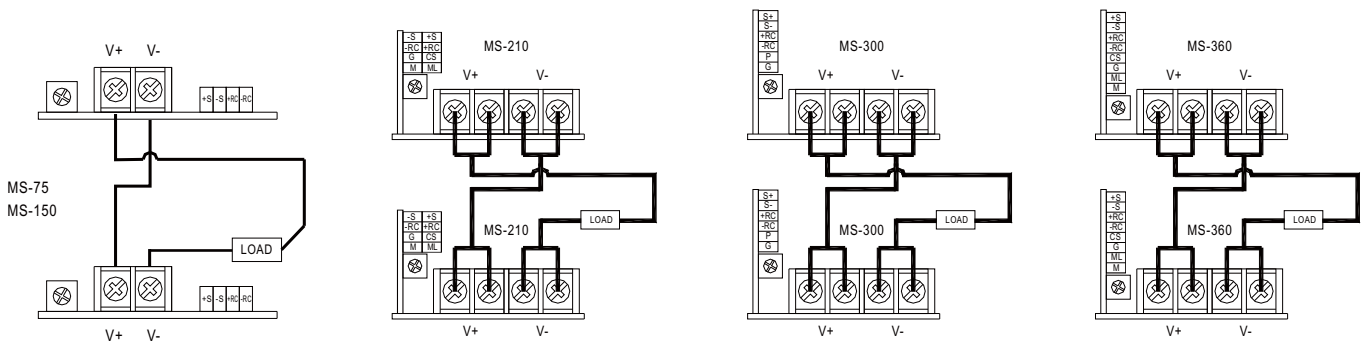


Figure 3-8 Operating in series connection

4. Notes On Operation

4.1 Requirement for Assembly

⊙ Based on safety considerations, the assembly task should be executed in factories certified by the safety organizations and should be authorized by MEAN WELL in advance as well.

4.2 Installation Method

⊙ The assembly diagram of the PFC front-end and output modules is shown in Figure 4-1.

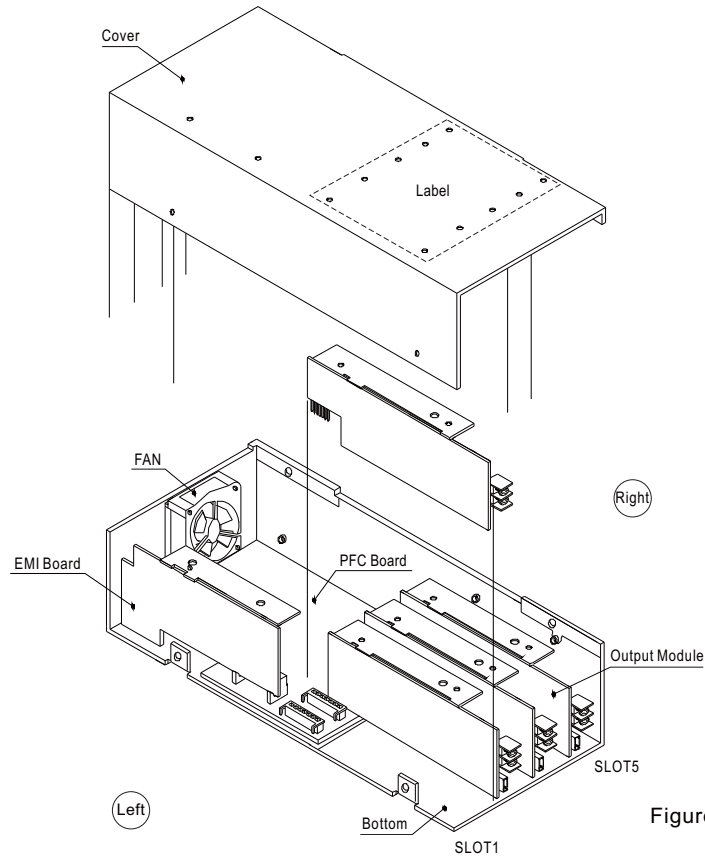


Figure 4-1 System assembly diagram

⊙ This is a power supply with built-in DC fan and please make sure that the ventilation is not blocked. It is suggested that there should be no barriers within 10cm of the ventilating holes.

⊙ The power supply unit should be mounted on a holding rack for extra support as shown in Figure 4-2.



Figure 4-2 Mounting alternatives

⊙ In order to maintain a safe isolation distance from internal components, please use screws with length less than 6mm measured from the case as shown in Figure 4-3.

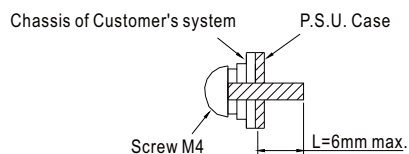


Figure 4-3 Mounting screw

4.3 Derating

- ⊙ The Modular Series consists of PFC front-end and output modules. The electrical specification of each output module should be carefully checked before operating and the total output power of all modules that is actually used should be less than the rated power of its PFC front-end.
- ⊙ Output load derating is required for proper operation in high ambient temperature or at low AC input. Please refer to the output derating curves of MP450, MP650, and MP1K0 shown in Figure 4-4.

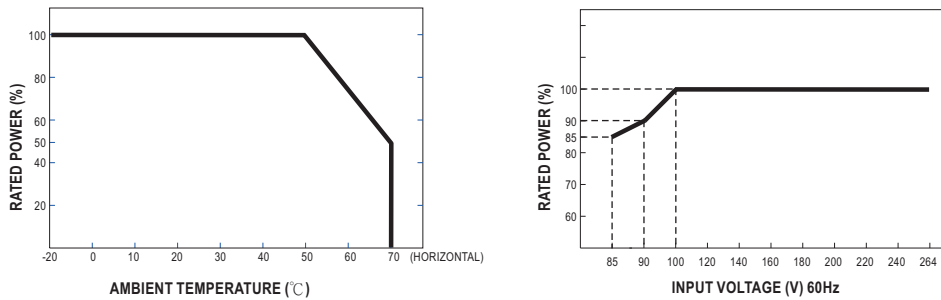


Figure 4-4 Output derating curves for Modular Series

5. Series / Parallel Connection Accessory

5.1 Series Connection Accessory

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

5.2 Parallel Connection Accessory

| Parallel Connection Accessory | | | |
|----------------------------------|--|----------------------------------|--|
| FAP-001 (For MS-300, 2 units) | | FAP-005 (For MS-210, 4 units) | |
| FAP-002 (For MS-300, 3 units) | | FAP-006 (For MS-210, 5 units) | |
| FAP-003 (For MS-210, 2 units) | | FAP-007 (For MS-360, 2 units) | |
| FAP-004 (For MS-210, 3 units) | | FAP-008 (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. |
| | 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 <small>(Note 5)</small> | 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 | | |
| OTHERS | 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 | | |
| | MTBF | 2257.3K hrs min. Telcordia SR-332 (Bellcore) ; 225.9K hrs min. MIL-HDBK-217F (25°C) (450W) 2135.5K hrs min. Telcordia SR-332 (Bellcore) ; 292K hrs min. MIL-HDBK-217F (25°C) (650W) 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 VOLTAGE CODE | MS-150A | MS-150B | MS-150C | MS-150D | MS-150E | MS-150F | MS-150G | MS-150H | MS-150I | MS-150J | MS-150K | |
|-----------------|---|---|----------|------------|-------------|------------|--------------|------------|------------|------------|------------|------------|----------|
| OUTPUT (MS-150) | 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 <small>Note.4</small> | 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.) <small>Note.2</small> | 50mVp-p | 80mVp-p | 80mVp-p | 100mVp-p | 150mVp-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 <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% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | |
| | SETUP, RISE, HOLD TIME | 1500ms, 50ms, 20ms at full load | | | | | | | | | | | |
| PROTECTION | OVER LOAD | 121 ~ 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 | |
| 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 (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 (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 Note.4 | 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.) Note.2 | 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 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% | ±1.0% | ±1.0% | ±1.0% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±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 | |
| | | 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 (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 Note.4 | 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.) Note.2 | 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 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% | ±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 | |
| | | 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 (75W) MS-75

| | | | | | | | |
|---------------------------|---|---|------------|------------|--------------|------------|------------|
| OUTPUT (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 |
| | | 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 Isolated Dual output (100W) MD-100

| | | | | | | | | | | | | | | | | |
|--------------------|--|--|-------------|-------------|--------------|-------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| OUTPUT (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 | 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 <small>Note.6</small> | 90W | | 100.4W | | 101W | | 100W | 100.8W | | 100.8W | | 100.5W | | | |
| | RIPPLE & NOISE (max.) <small>Note.2</small> | 100mVp-p | 100mVp-p | 100mVp-p | 150mVp-p | 100mVp-p | 150mVp-p | 200mVp-p | 100mVp-p | 240mVp-p | 120mVp-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 | 11.4 ~ 13.2V | 14.2 ~ 16.5V | 14.2 ~ 16.5V |
| | VOLTAGE TOLERANCE <small>Note.3</small> | ±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% | ±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% | ±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% | ±2.0% |
| | SETUP, RISE, HOLD UP TIME | 1500ms, 50ms, 20ms at full load | | | | | | | | | | | | | | |
| PROTECTION | OVERLOAD | 105 ~ 150% rated output power 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 | 13.3 ~ 17V | 16.6 ~ 22V | 16.6 ~ 22V |
| | | 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 | <p>1. MP450:The value changed by installing different output modules. The efficiency in specification means output modules are composed by following modules. 5V(Voltage code C)*1, 12V(Voltage code E)*1, 24V(Voltage code H)*1, 5V(Voltage code M)*1. MP650:The value changed by installing different output modules. The efficiency in specification means output modules are composed by following modules. 5V(Voltage code C)*2, 12V(Voltage code E)*1, 24V(Voltage code H)*2. MP1K0:The value changed by installing different output modules. The efficiency in specification means output modules are composed by following modules. 5V(Voltage code C)*2, 12V(Voltage code E)*2, 24V(Voltage code H)*3. The hold-up time of above combination is 20ms(typ.)</p> <p>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.</p> <p>3. Tolerance : includes set up tolerance, line regulation and load regulation.</p> <p>4. 35% Duty cycle maximum within every 10 seconds. Average output power should not exceed the rated power.</p> <p>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 https://www.meanwell.com/Upload/PDF/EMI_statement_en.pdf)</p> <p>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).</p> <p>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).</p> <p>※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx</p> | | | | | | | | | | | | | | | |