

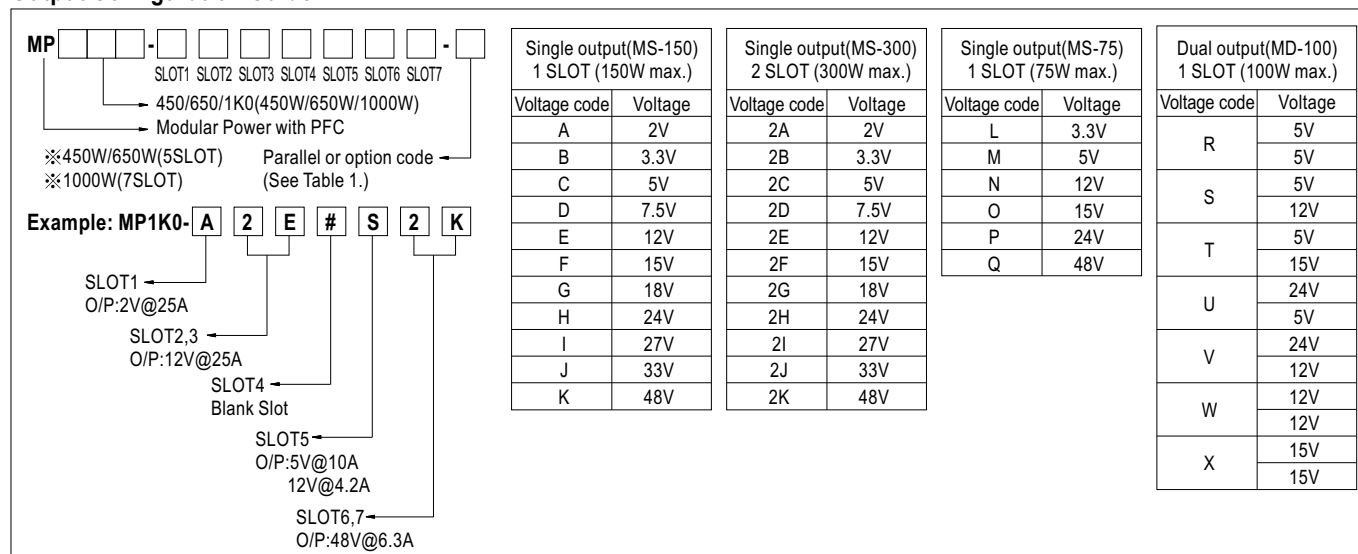


■ Features :

- ZVT technology to reduce power dissipation and improve efficiency
- Various output configuration is selectable
- Built in active PFC, PF>0.95
- Universal AC input/ full range
- Remote Control on every individual output module
- Remote Sense on every individual output module(MS-75,150,300)
- Built in parallel function(MS-300)
- Protections: Short circuit / Overload / Over voltage for all output modules
- Additional 12V/0.1A auxiliary output for remote control
- Cooling by built-in DC fan with fan alarm function
- 3 years warranty



Output Configuration Guide



SPECIFICATION

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 Note.1	83% 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	Thermal switch detect on the heatsink of power MOSFET Protection type : 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℃ (Refer to output load derating curve)					
	WORKING HUMIDITY	20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY	-40 ~ +85℃, 10 ~ 95% RH					
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 50℃)					
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes					
SAFETY & EMC (Note 5)	SAFETY STANDARDS	UL60950-1, TUV EN60950-1 approved					
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC					
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃ / 70% RH					
	EMI CONDUCTION & RADIATION	Compliance to EN55022 (CISPR22) Class B					
	HARMONIC CURRENT	Compliance to EN61000-3-2,-3					
	EMS IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN55024, EN61000-6-1, EN61204-3, light industry level, criteria A					
OTHERS	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	



SPECIFICATION

■ 1 SLOT Single output (150W) MS-150

OUTPUT (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	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	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%	±1.0%	±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	
FUNCTION		Protection type : Shut down o/p voltage, re-power on to recover											
	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%	±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
FUNCTION		Protection type : Shut down o/p voltage, re-power on to recover										
	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 Note.4	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.) Note.2	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 Note.3	±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%
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	4.1 ~ 5V	6.1 ~ 7.5V	13.3 ~ 18V	16.9 ~ 22V	26.5 ~ 35V	53.1 ~ 60V
FUNCTION		Protection type : Shut down o/p voltage, re-power on to recover					
	REMOTE INHIBIT CONTROL	RC+/RC-: 0 ~ 0.8V or OPEN, POWER ON RC+/RC-: 4 ~ 12V POWER OFF					



SPECIFICATION

■ 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	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	90W		100.4W		101W		100W		100.8W		100.8W		100.5W	
	RIPPLE & NOISE (max.)	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	±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													
		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													
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. 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.) 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. 35% Duty cycle maximum within every 10 seconds. Average output power should not exceed the rated power. 5. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. 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).														

Table 1. Parellel code(For MS-300 only)

Code	SLOT1	SLOT2	SLOT3	SLOT4	SLOT5	SLOT6	SLOT7
X						----	----
1	⊙		⊙			----	----
2		⊙		⊙		----	----
3			⊙		⊙		
4				⊙		⊙	
5	⊙		⊙		⊙		
6		⊙		⊙		⊙	

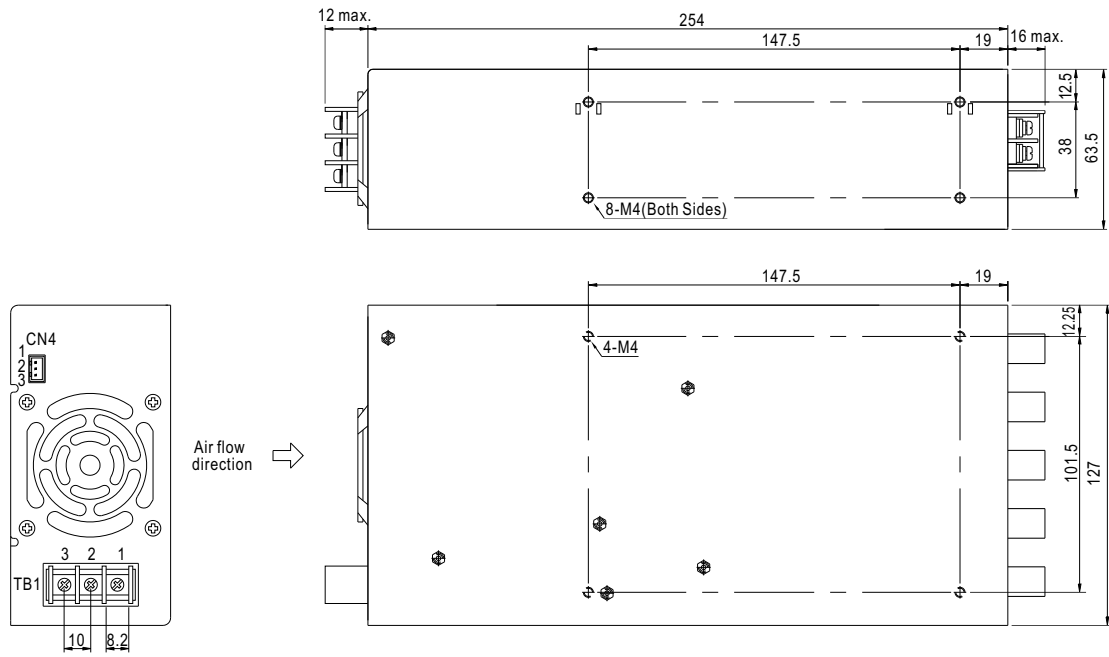
※Code X,1,2 for MP450,MP650

※Code X,1,2,3,4,5,6 for MP1K0

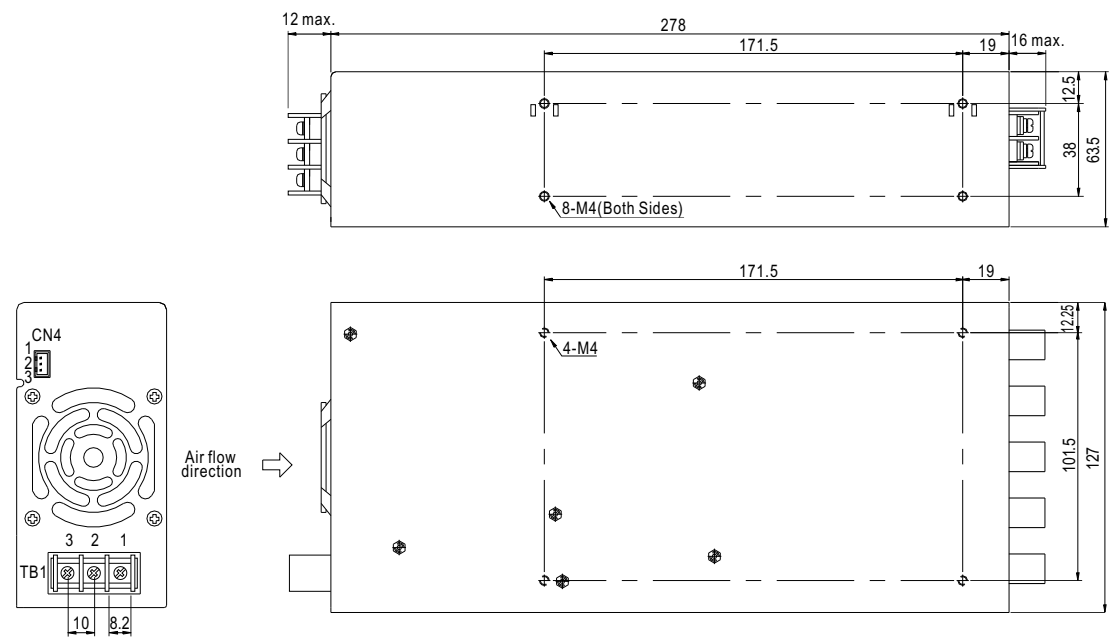
■ Mechanical Specification

Unit:mm

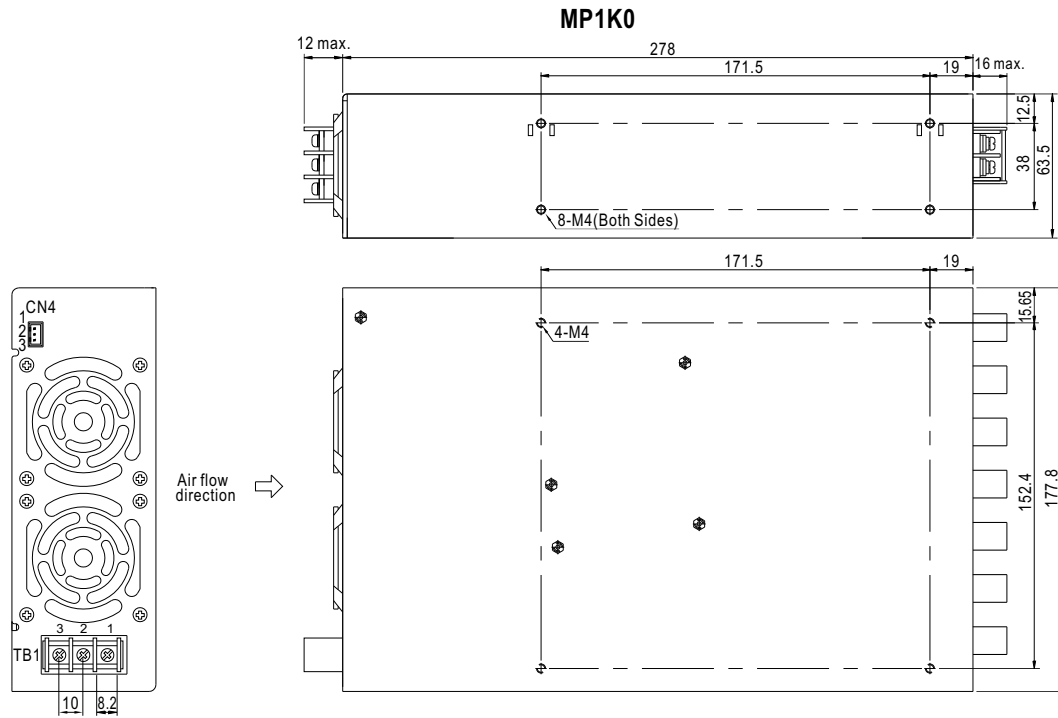
MP450



MP650



Mechanical Specification



TB1(PFC-450/650/1K0)

Pin No.	Assignment
1	AC/L
2	AC/N
3	FG $\perp$

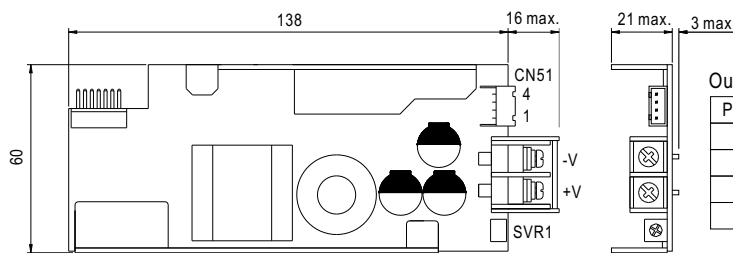
CN4(PFC-450/650/1K0) : JST B3B-XH or equivalent

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		

Mechanism of Output Modules

◎MS-75

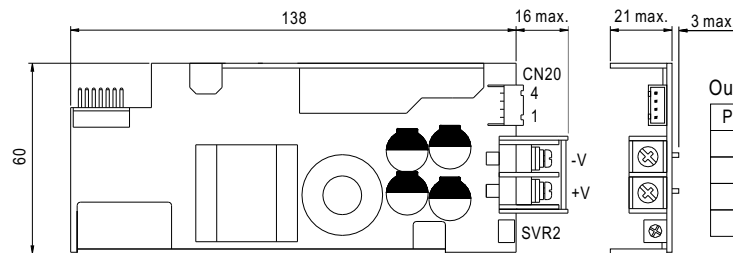
Unit:mm



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

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

◎MS-150

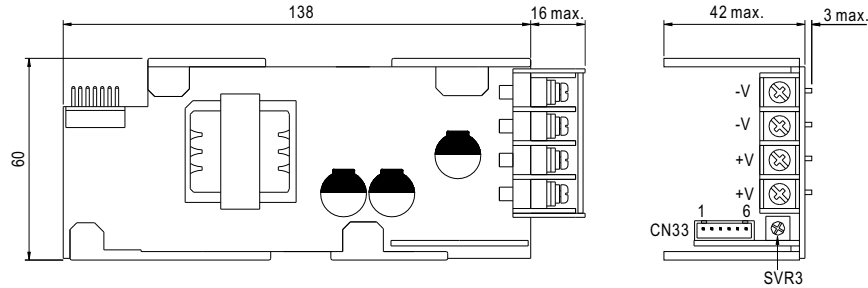


Output Connector(CN20) : JST B4B-XH or equivalent

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

Mechanism of Output Modules

©MS-300



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

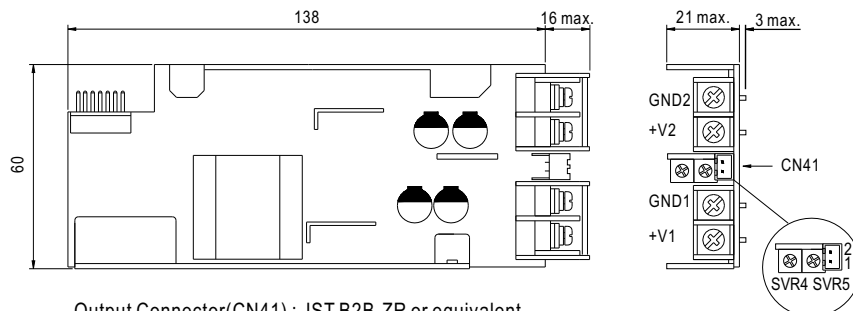
Pin No.	Assignment	Mating Housing	Terminal
1	+S: +Remote sensing	JST XHP or equivalent	JST SXH-001T-P0.6 or equivalent
2	-S: -Remote sensing		
3	+RC: +Remote ON/OFF		
4	-RC: -Remote ON/OFF		
5	P: Current sharing		
6	G: GND		

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

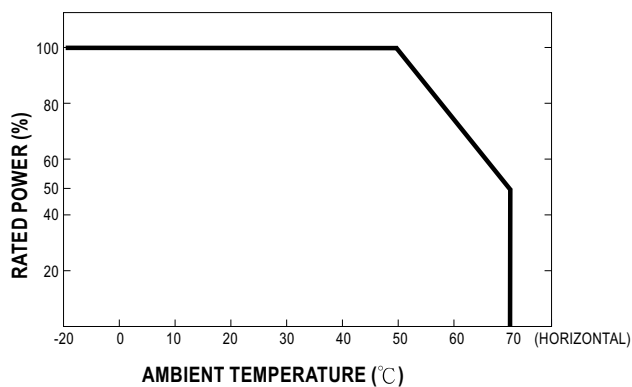
Pin No.	Assignment	Mating Housing	Terminal
1	+RC	JST ZHR-2 or equivalent	JST SZH-002T-P0.5 or equivalent
2	-RC		

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)

Derating Curve



Static Characteristics

