

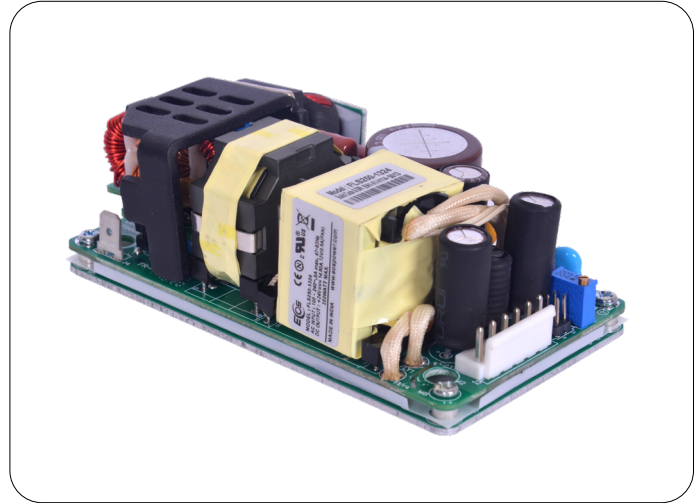
# Silent 250 Watt

Medical Grade  
AC-DC Power Supplies



## 250 Watt

- 4.5 x 2.5 X 1.5
- Mounting as per 4 X 2 footprint / 3 X 5 footprint
- 250 Watt Convection Cooled & 350 Watt Forced Cooled
- Efficiency up to 94%
- -40 to 70 °C operating temperature
- High power density: 20.74 W/inch<sup>3</sup>
- EMC IEC 60601-1-2:2014 (Ed 4.0)
- 12 V Fan O/P / Thermal Shut-Down feature / Dual fusing
- Current Sharing (optional with ADD-ON card)
- 5 V STBY/ PGPF Signal / Remote ON-OFF Feature (optional)
- 800K Hours, Telcordia -SR332-issue 3 MTBF
- No Load Power < 1W
- Suitable for BF applications
- Available with metal enclosures / accessories



### Dimension

**FLS :** 4.5 x 2.5 x 1.5 Inches  
Form factor

The New MFLS250 series is true fanless power up to 250W. this is a highly efficient power supply that can deliver up to 350W with air. The power supply is packed in 4.5" x 2.5" size having the option of industry-standard 2" x 4" or 3" x 5" like a mounting option. Also available in various type of casing option.

### 250 Watts

Model Number	Description	Voltage	Max. Load (Convection)	Max. Load (375 LFM)	Min. Load	Ripple <sup>1</sup>
MFLS250-1X12	with Screw Terminal	12V	16.60A	25.00A	0.0A	2%
MFLS250-1X12	with JST Connector	12V	16.60A	18.00A	0.0A	2%
MFLS250-1X15	with Screw Terminal	15V	13.30A	20.00A	0.0A	2%
MFLS250-1X15	with JST Connector	15V	13.30A	18.00A	0.0A	2%
MFLS250-1X24	with Screw Terminal	24V	10.41A	14.50A	0.0A	1%
MFLS250-1X24	with JST Connector	24V	10.41A	14.50A	0.0A	1%
MFLS250-1X30	with Screw Terminal	30V	8.30A	11.60A	0.0A	1%
MFLS250-1X30	with JST Connector	30V	8.30A	11.60A	0.0A	1%
MFLS250-1X48	with Screw Terminal	48V	5.20A	7.20A	0.0A	1%
MFLS250-1X48	with JST Connector	48V	5.20A	7.20A	0.0A	1%
MFLS250-1X58	with Screw Terminal	58V	4.30A	6.0A	0.0A	1%
MFLS250-1X58	with JST Connector	58V	4.30A	6.0A	0.0A	1%

### Notes:

- For Screw Terminal version replace "X" above with "0", example MFLS250-1024.
- For Header version replace "X" above with "3", example MFLS250-1324
- Add Suffix "B" for 3 X 5 Mounting option, example MFLS250-1024-B
- For Power supply unit with L bracket (metal accessory option) add "-L" suffix at the end of model number
- For Power supply unit with U channel (metal accessory option) add "-U" suffix at the end of model number
- For Power supply unit with CK Cover kit (metal accessory option) add "-CK" suffix at the end of model number

[www.eospower.com](http://www.eospower.com)

# Silent 250 Watt

## Medical Grade AC-DC Power Supplies



- For Current Sharing (ADD-ON CARD) Option, (pls contact EOS RSM for further details and ordering)
- For 5V STBY / Remote ON-OFF / PGPF use model number MFLS250-2XXX, (pls contact EOS RSM for further details and ordering).
- MFLS250 -L Bracket, -U channel, - CK Metal Cover Kit Accessory Available. (pls contact EOS RSM for further details and ordering)

### Pin Connection

J1 (Input)	PIN 1	AC LINE
	PIN 2	NOT FITTED
	PIN 3	AC NEUTRAL
J2 Option 1 & 2 (Output)	PIN 1,2,3	V1 +VE
	PIN 4,5,6	V1 -VE
J4 (Earth)		Quick Disconnect
(J9) Signal Connector	PIN 1	+VS
	PIN 2	-VS
	PIN 3	FAN -
	PIN 4	FAN +
J(310) (Multifunction Connector)***	PIN 1	+5V
	PIN 2	GND
	PIN 3	GND
	PIN 4	REMOTE ON/OFF
	PIN5	PGPF

### Notes:

1. "\*\*\*\*" mark content available only in MFLS250-2XXX series
2. Ripple is peak to peak with 20 MHz bandwidth and 10  $\mu$ F (Electrolytic capacitor) in parallel with a 0.1  $\mu$ F capacitor at rated line voltage and load ranges.
3. Specifications are for nominal input voltage, 25°C unless otherwise stated.
4. 250W with natural convection cooling at 100 to 264VAC.
5. 350W with Forced cooling at 100 to 264VAC.
6. Combine Output Power of Main Output, Fan supply and Standby shall not exceed max power rating.
7. Output ripple can be more than 1 % of the output voltage.
8. When used in Cover Kit, de-rate output power to 70% under all operating conditions.
9. "\*\*\*\*" Standby output voltage 5 V/ 0.5A(convection) with tolerance including set point accuracy, line and load regulation is +/-10 %.Ripple and noise is less than 5 %.

### Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage	85		264	VAC	De-rate linearly from 100% at 100VAC to 80% at 85VAC
	120		370	VDC	
Input Frequency	47		63	Hz	
Input Current			6.3	A	
Inrush Current	115 VAC - 25A	230VAC - 45A	264 VAC - 75A	A	
No Load Input Power			1	W	
Power Factor	exceeds 0.95 at Full Load				

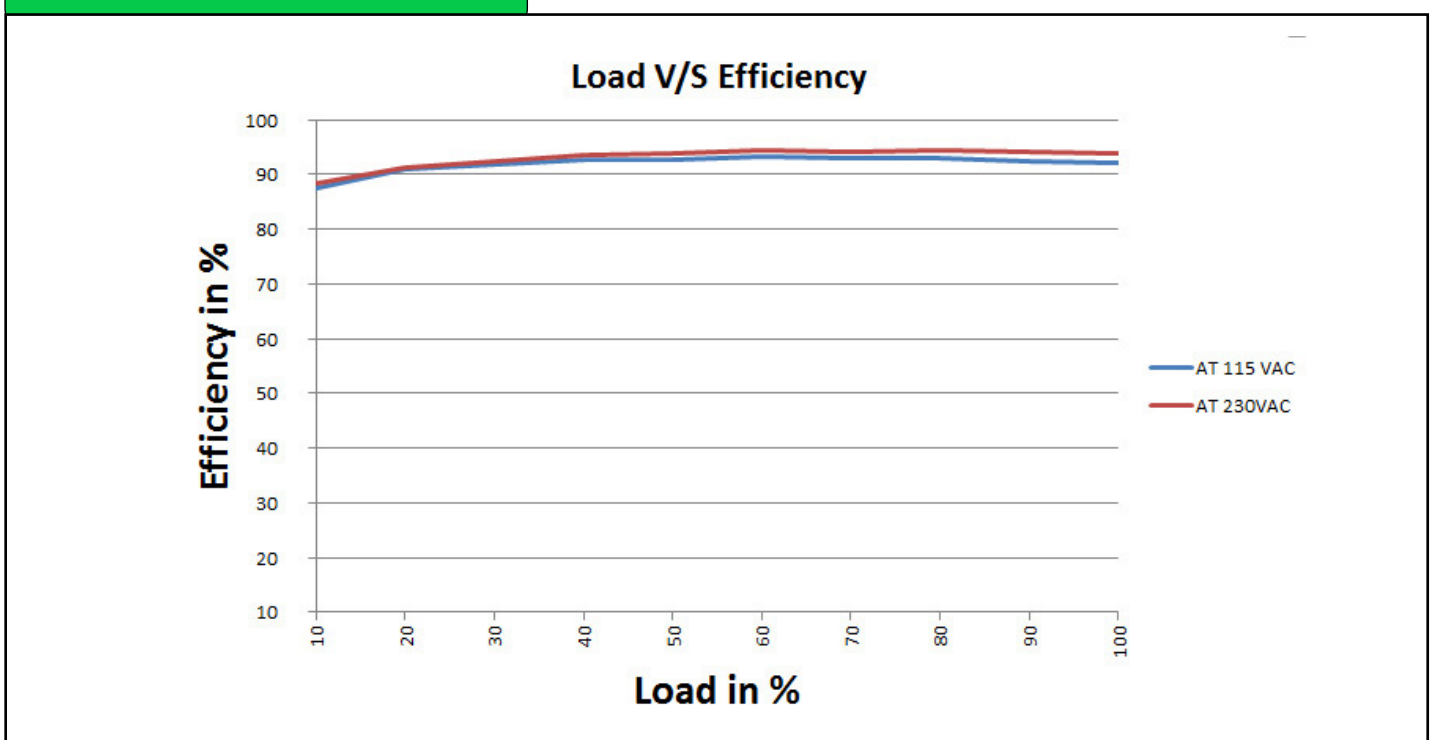
### Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Power		250	350	W	
Hold-up Time		8mS			At 230 VAC
Line Regulation			+/-0.5%		
Load Regulation			+/-0.5%		
Output Voltage Adjustability			+/-3%		
Rise Time		55		ms	
Set Point Tolerance		+/-1%			
Over Current Protection		> 110%			
Over Voltage Protection		110 to 140%			
Transient Response		25% step load change, at 0.1A/uS slew rate, 50% duty cycle, 50Hz=4% , recovery time < 5 ms			

### General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	92%		94%		At 230 VAC
Mean Time Between Failure	800K Hours				Telcordia -SR332-issue 3
Isolation: Input to Output		4380		VAC	Input to Output: 4380VAC (2x MOPP), Input to Ground: 1690VAC (1x MOPP), Output to Ground: 1500VAC (1x MOPP)
Input to Ground		1690			
Output to Ground		1500			
Leakage Current		300 uA Typical; Touch current <100uA			

### Efficiency Vs Load



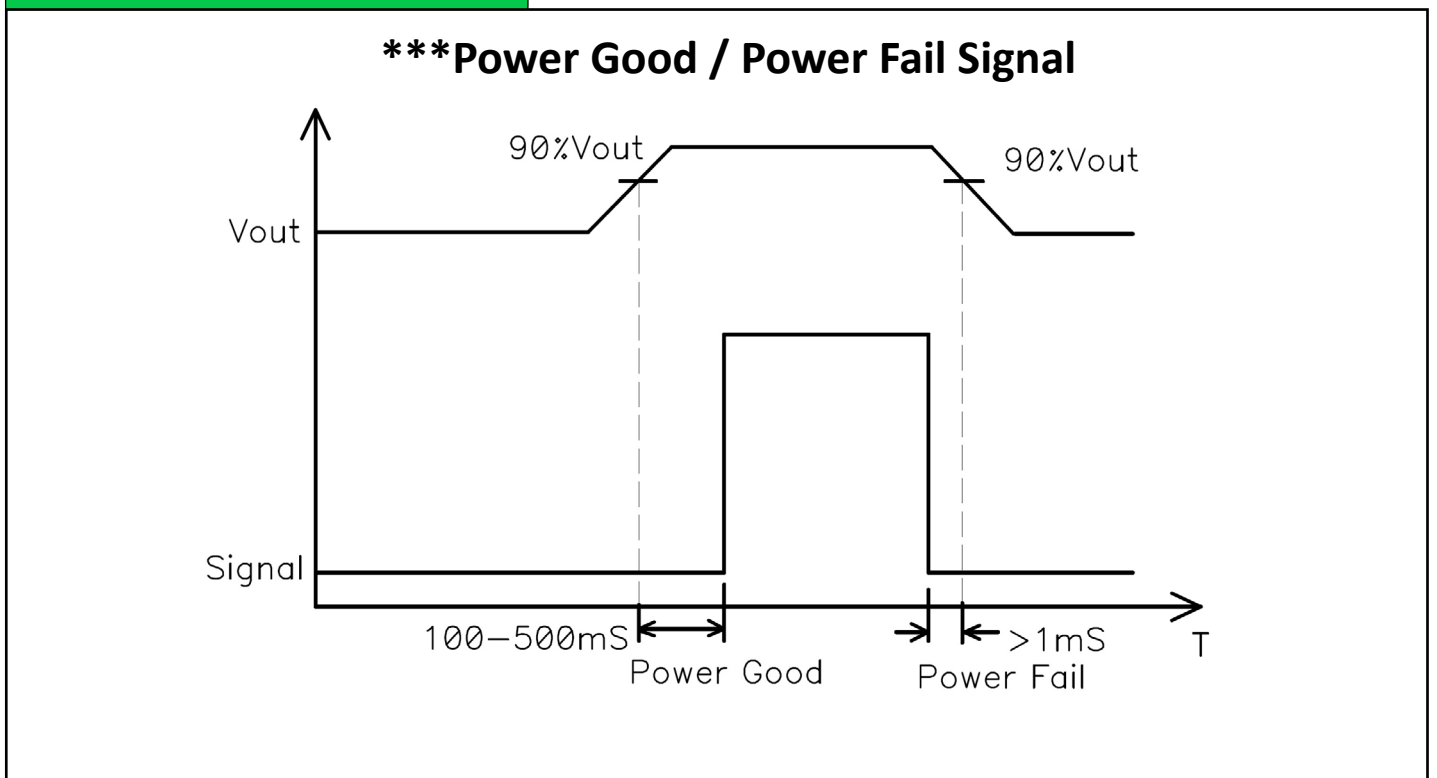
### Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		70	°C	-40 to 0 startup is guaranteed with spec deviation. 70°C (Derated)
Storage Temperature	-40		85	°C	
Relative Humidity	5		95	%	
Operating Altitude			16,000	ft	RH, non-condensing
Short Circuit Protection		Hiccup mode			
Switching Frequency		PFC – 70 to 130 KHz ,PWM – 50-80 KHz			
Cooling					350W with 375 LFM forced air cooling at 100 to 264VAC 250W with natural convection cooling at 100 to 264VAC

### Signals & Controls

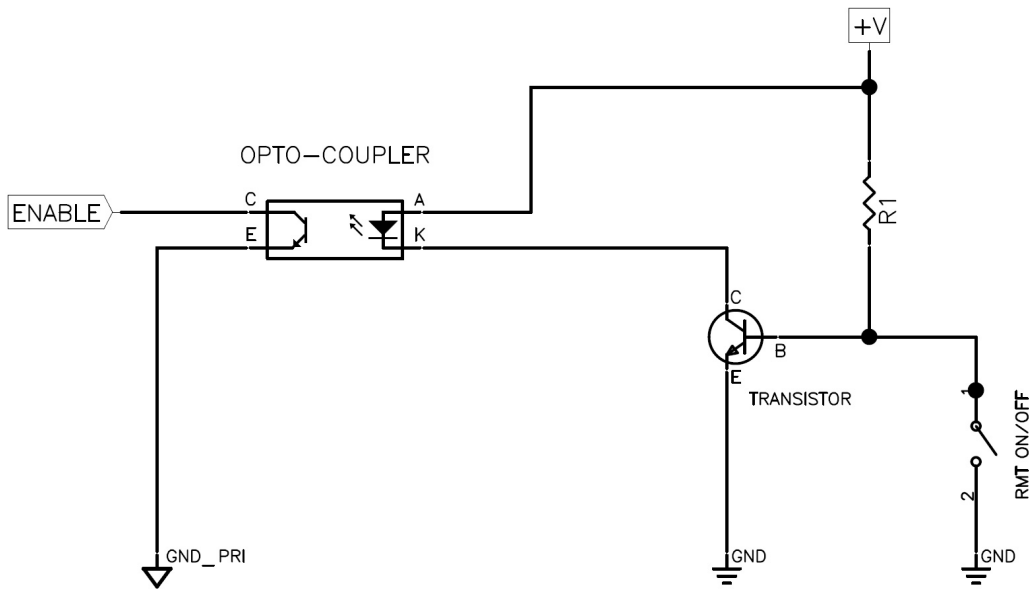
Characteristic	Notes & Conditions
***Power Good	Is a TTL signal which goes high after main output reaches 90% of its set value. The delay is 0.1 s to 0.5 s
***Power Fail	The same signal goes low at least 1ms before main output falls to 90% of set value at AC Power off
***Remote on/off	Shorting Pin 3 to Pin 4 enables main output while keeping the Pins open disables main output.

### Signals & Controls Drawing



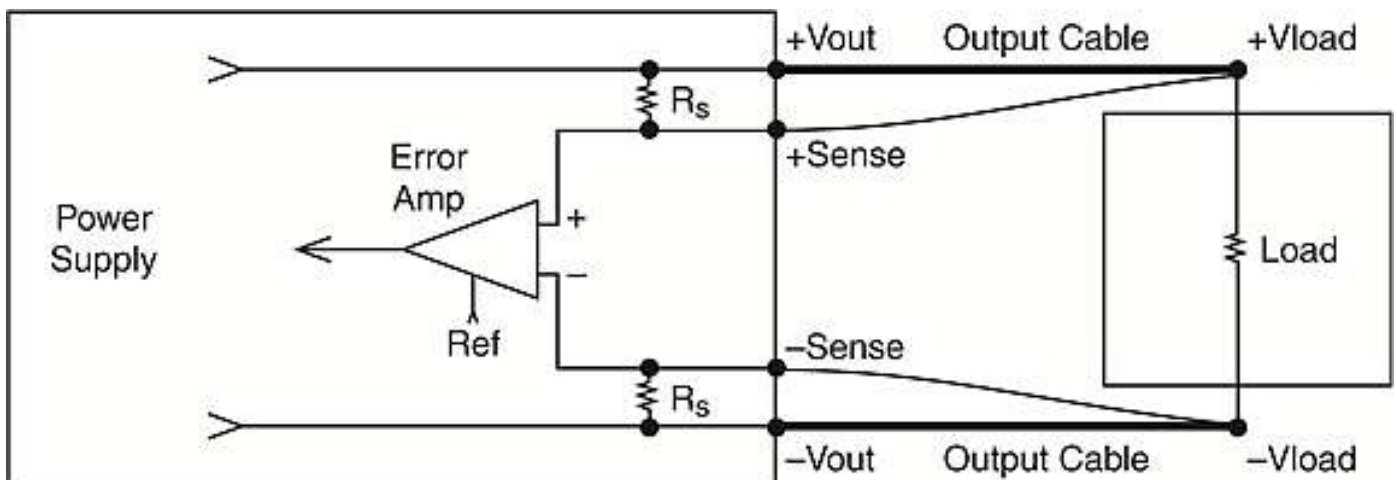
## Signals & Controls Drawing

### \*\*\* Remote ON OFF



## Signals & Controls Drawing

### Voltage Sense



### Mechanical Specifications

AC Input Connector (J1)	Molex: 26-60-4030 Mating: 09-50-3031; Pins: 08-50-0106
DC Output Connector (J2) Option 1 (Screw Terminal)	Molex: 39357 Series or equivalent
DC Output Connector (J2) Option 2 (JST Connector)	JST p/n: B6P-VH(LF)(SN) Mating: JST p/n: VHR-6M; Pins: SVH-41T-P1.1
Signal Connector (J9)	Molex Part No: 10-89-7041 or equivalent Mating part no: 1053082204 ; Pins: 1053001100
J(310) (Multifunction Connector)***	HEADER 5POS 2.54MM) P/N : P9102-40-12-1 Mating part no : CONN RCPT HSN5 POS CST-100 II P/N :1375820-5 Pins : CONN SOCKET 22-26AWG CRIMP TIN P/N : 1375819-1
Dimensions	4.5 x 2.5 x 1.58 inches (114.30 x 63.5 x 40 mm)
Weight	400 gm approx

### EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN 55011	Level B	CISPR22-B, FCC PART15-B
Radiated	EN 55011	Level A	Level B with external core (King core K5B RC 25x12x15-M or Equivalent in input cable)

### EMC: Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Input Current Harmonics	EN 61000-3-2		Class A	
Voltage Fluctuation and Flicker	EN 61000-3-3			compliance
ESD Immunity	EN 61000-4-2	Level 4	A	
Radiated Field Immunity	EN 61000-4-3	Level 3	A	
Electrical Fast Transient Immunity	EN61000-4-4	Level 3	A	
Surge Immunity	EN 61000-4-5	Level 3	A	
Conducted Immunity	EN61000-4-6	Level 3	A	
Magnetic Field Immunity	EN61000-4-8	Level 4	A	
Voltage dips, interruptions	EN61000-4-11		A & B	

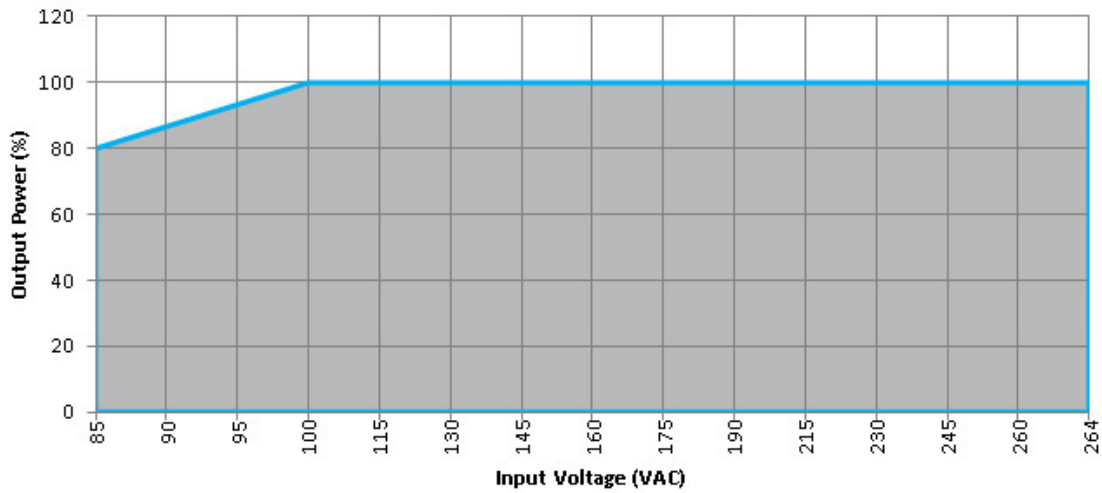
Standard IEC60601-1-2:2014 (4th Edition)

### Safety Approvals

Safety Agency	Safety Standard	Notes & Conditions
CB	IEC 60601-1:2005, IEC 60601-1:2005/AMD1:2012	Input to Output: 4380VAC (2x MOPP), Input to Ground: 1690VAC (1x MOPP), Output to Ground: 1500VAC (1x MOPP)
Nemko	EN60601-1	
UL	ANSI /AAMI 60601-1	
CSA	CSA C22.2 No.60601-1	
CE Mark	Complies with LVD Directive	

## Derating Curve

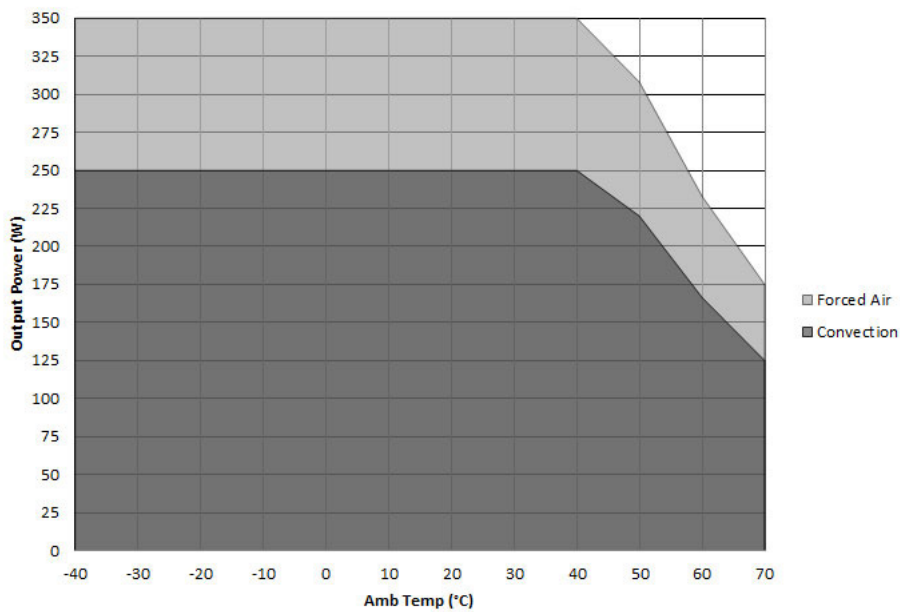
### Output Derating v/s Input Voltage



De-rate linearly from 100% at 100VAC to 80% at 85VAC

## Derating Curve

### Power de-rating : 24V,30V,48V,58V

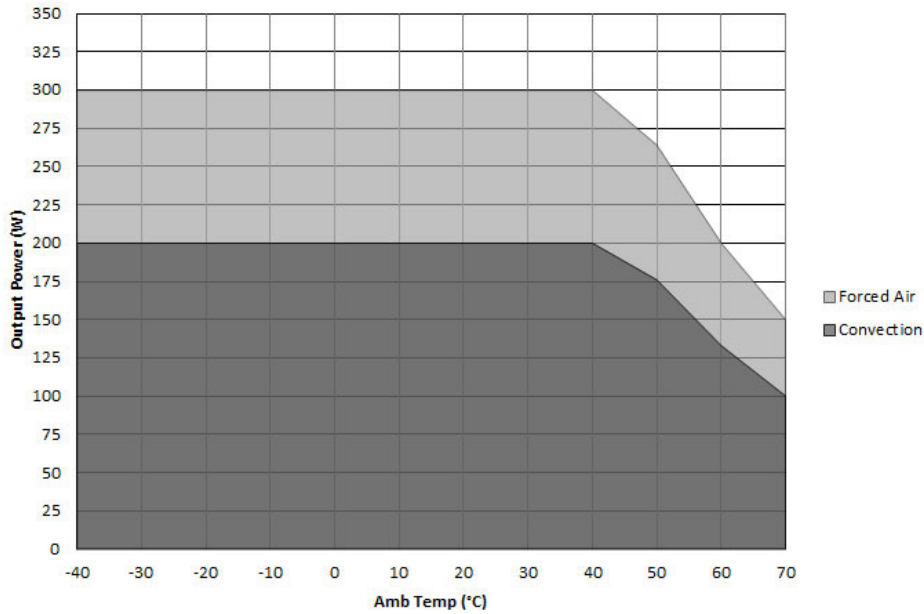


Convection load: 250W up to 40 °C. De-rate Between 40°C -50°C @ 1.2 % per °C above 50 °C @ 1.67 % per °C

Forced air cooled load: 350W up to 40 °C. De-rate Between 40°C -50°C @ 1.2 % per °C above 50 °C @ 1.67 % per °C

## Derating Curve

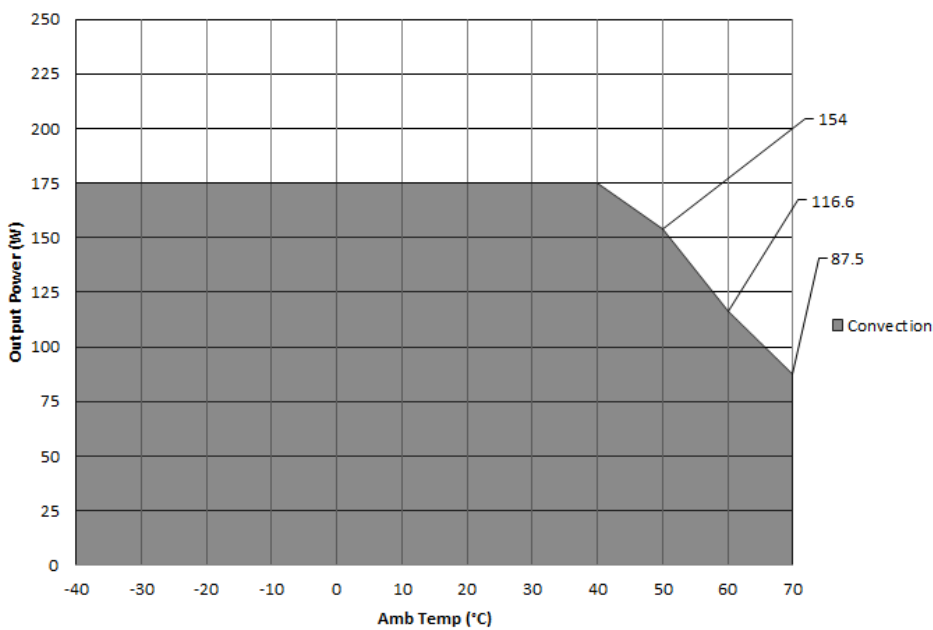
Power de-rating : 12V,15V



Convection load: 200W up to 40 °C. De-rate Between 40°C -50°C @ 1.2 % per °C above 50 °C @ 1.67 % per °C  
 Forced air cooled load: 300W up to 40 °C. De-rate Between 40°C -50°C @ 1.2 % per °C above 50 °C @ 1.67 % per °C

## Derating Curve

De-rating for CK Bracket



Convection load: 175W up to 40 °C. De-rate Between 40°C -50°C @ 1.2 % per °C above 50 °C @ 1.67 % per °C

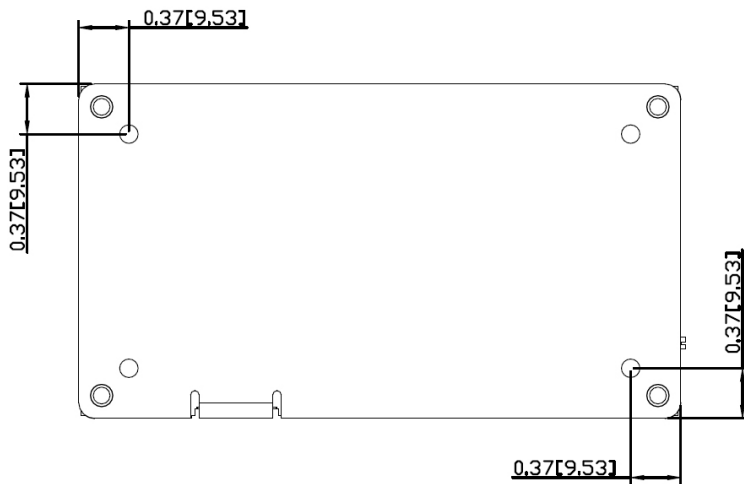
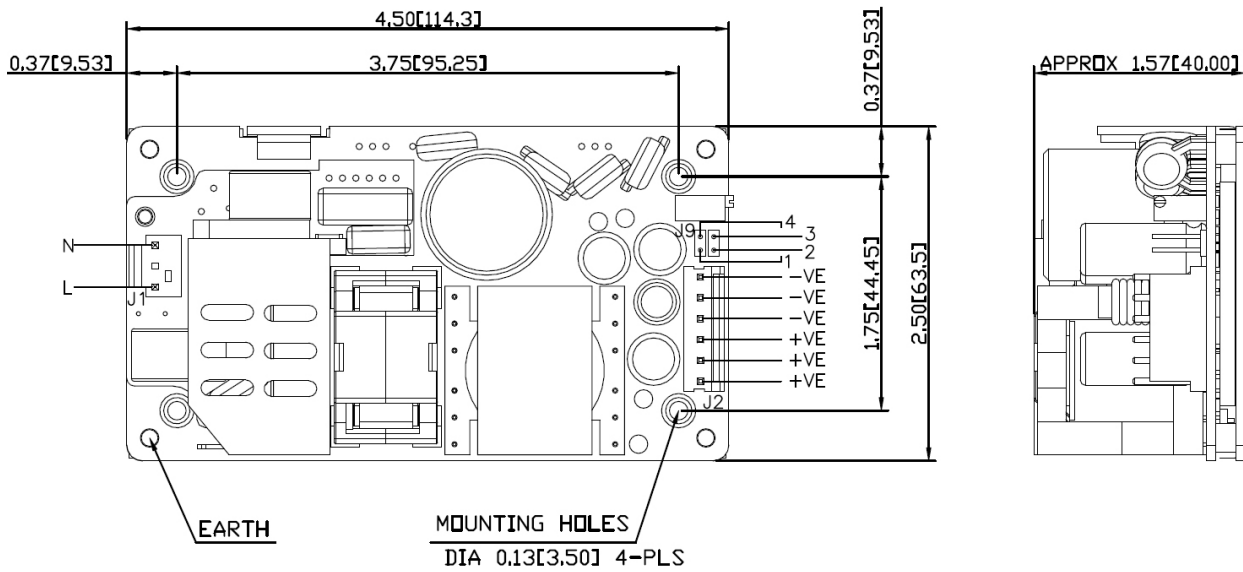


## Mechanical Drawing

### Header terminal (1XXX/ 2XXX)

NOTE:-

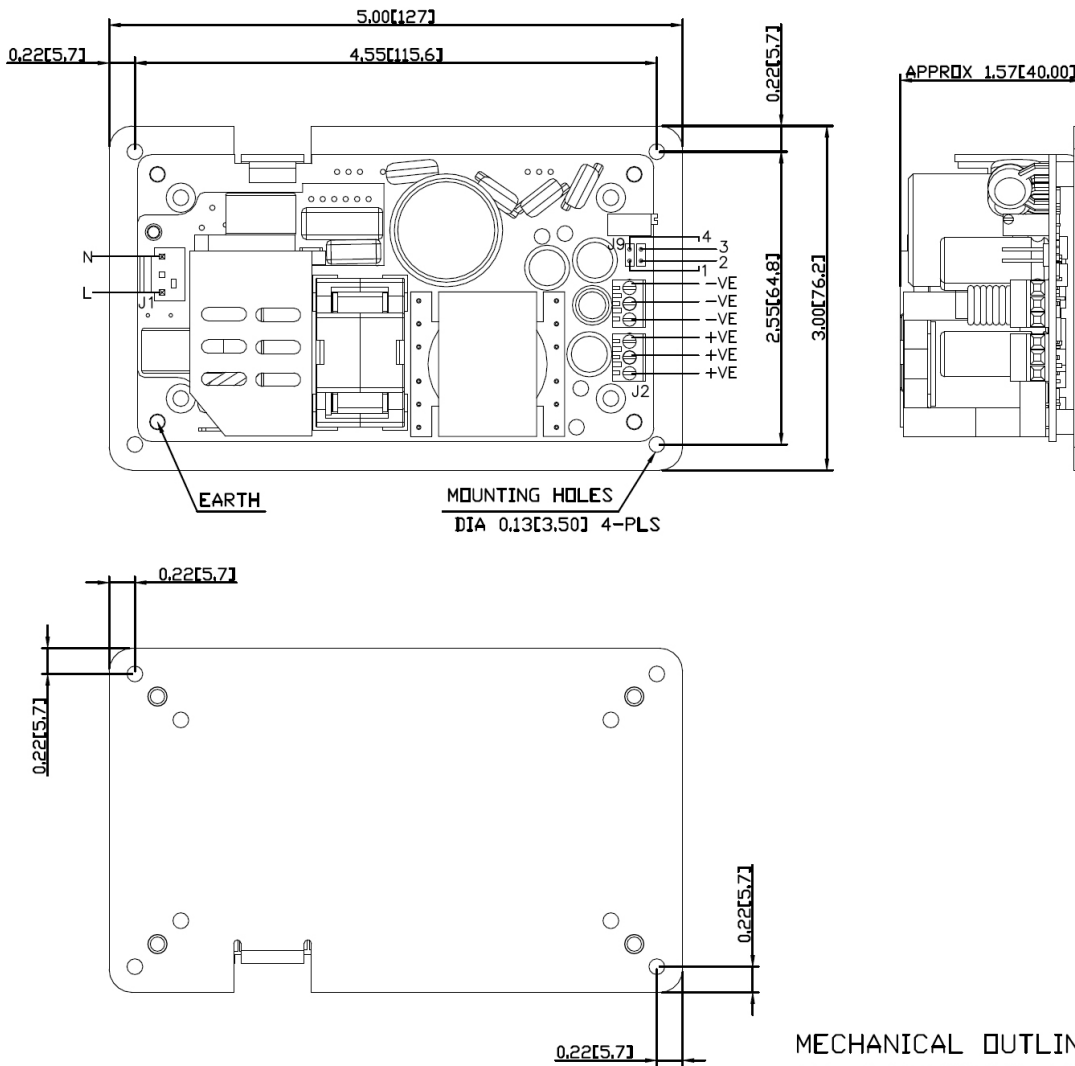
PLEASE REFER "FLS250 2.5X4.5 WITH 'L' CHANNEL" SPEC FOR CONNECTOR DETAILS ON PAGE NO.13.



MECHANICAL OUTLINE DIMENSIONS  
ALL DIMENSIONS ARE IN INCHES[MM]  
GEN TOLERANCE  $\pm 0.04$  [ $\pm 1.0$ MM]

## Mechanical Drawing

### Screw terminal (1XXX-B/ 2XXX-B)



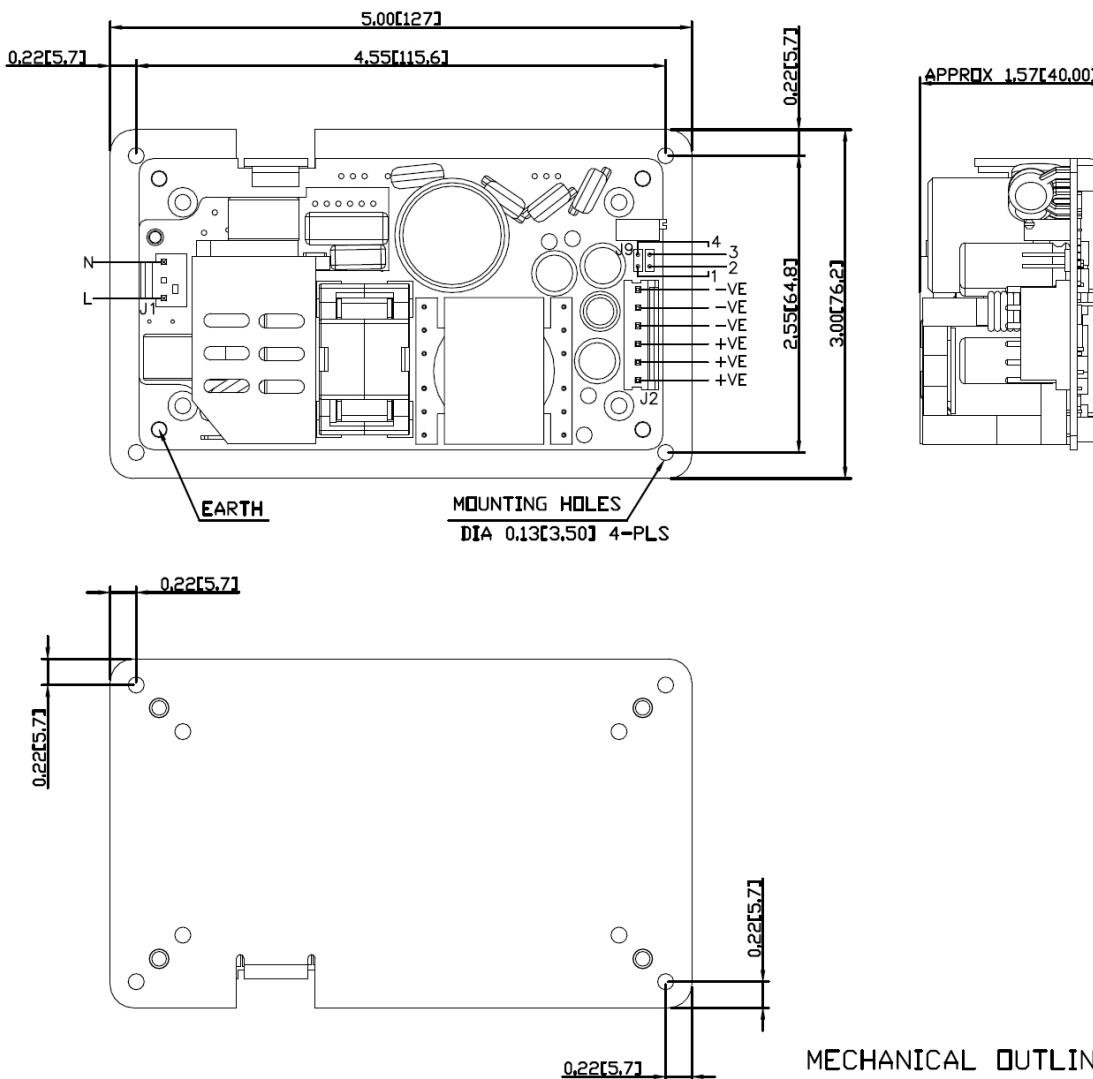
MECHANICAL OUTLINE DIMENSIONS  
ALL DIMENSIONS ARE IN INCHES[MM]  
GEN TOLERANCE  $\pm 0.04$  [ $\pm 1.0$ MM]

## Mechanical Drawing

### Header terminal (1XXX-B/ 2XXX-B)

NOTE:-

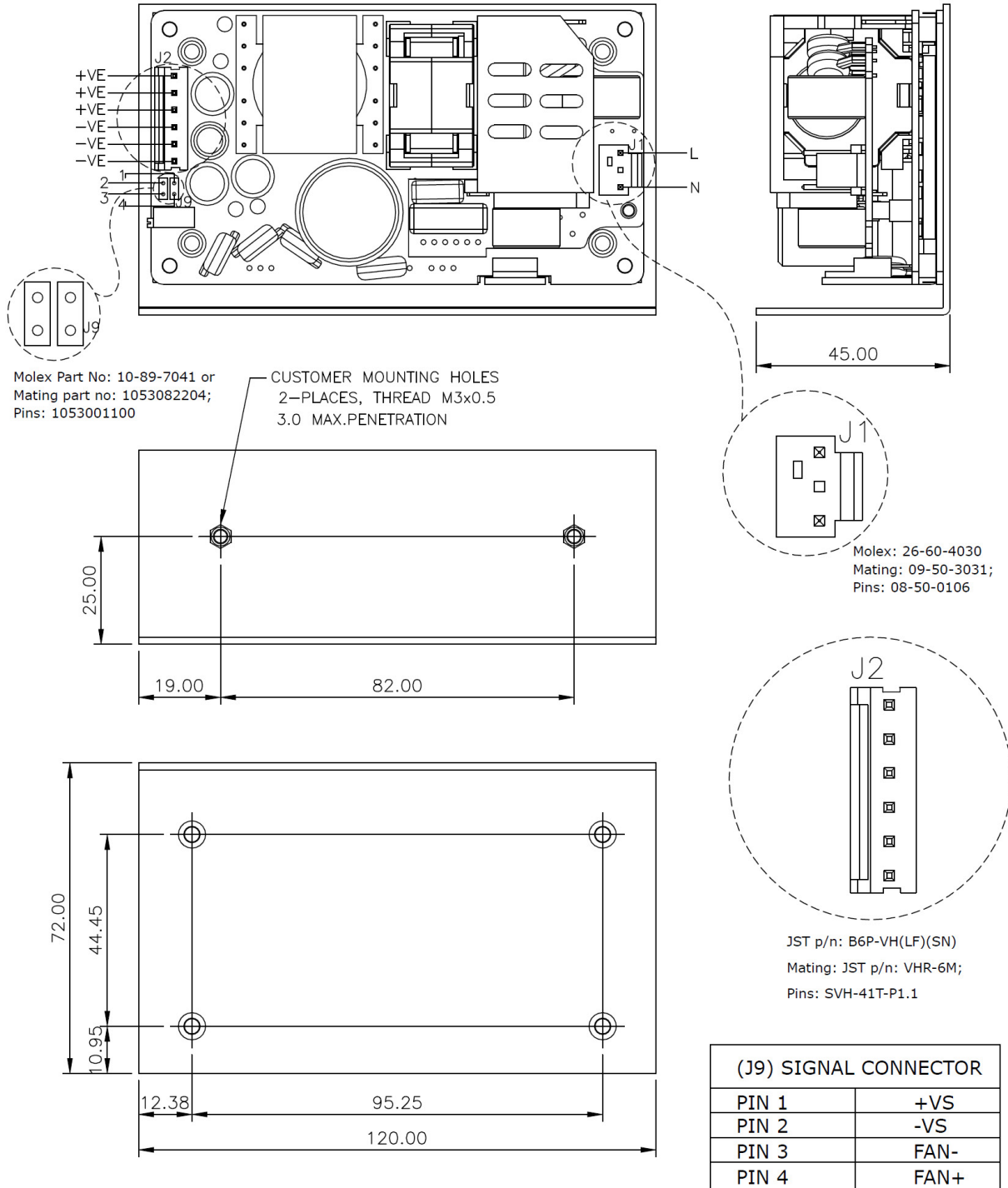
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MECHANICAL OUTLINE DIMENSIONS  
ALL DIMENSIONS ARE IN INCHES[MM]  
GEN TOLERANCE +/-0.04 [+/-1.0MM]

### Mechanical Drawing

### MFLS250 2.5 X 4.5 with L-Bracket



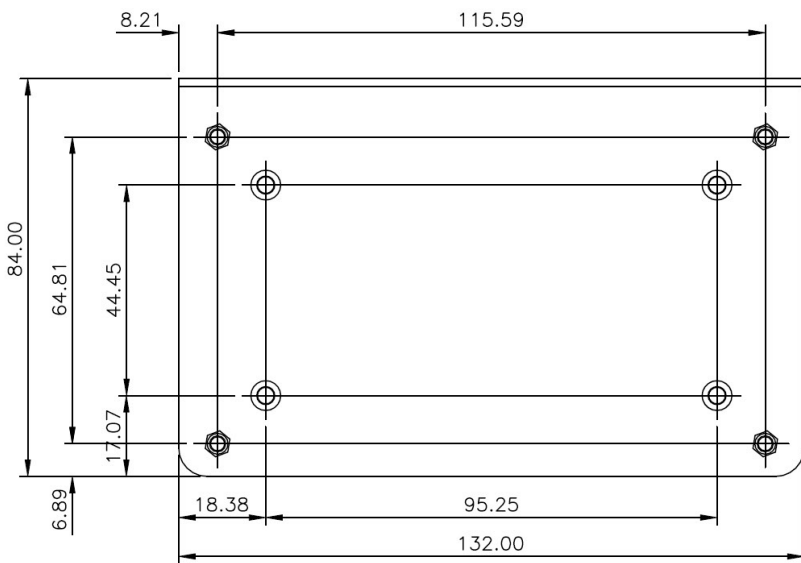
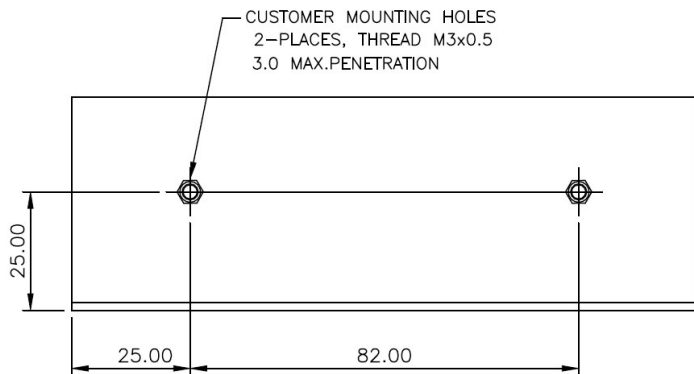
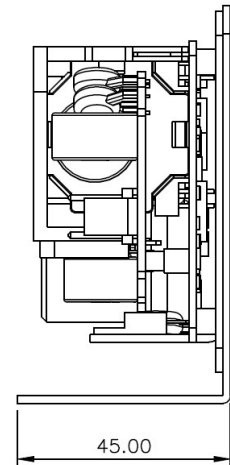
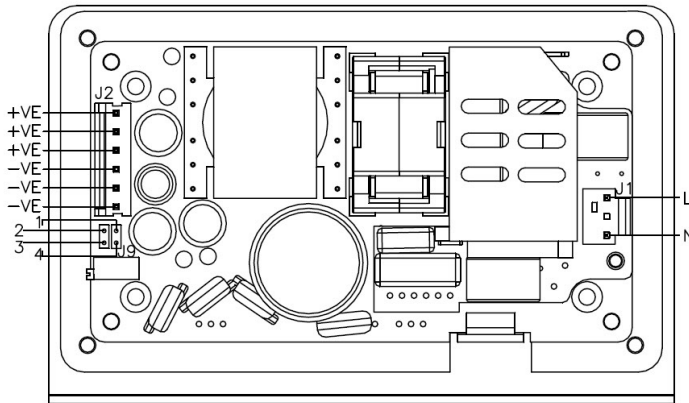
MECHANICAL OUTLINE DIMENSIONS  
ALL DIMENSIONS ARE IN MM  
GEN.TOLERANCE: +/-0.5 MM

## Mechanical Drawing

### MFLS250 3 X 5 with L -Bracket

NOTE:-

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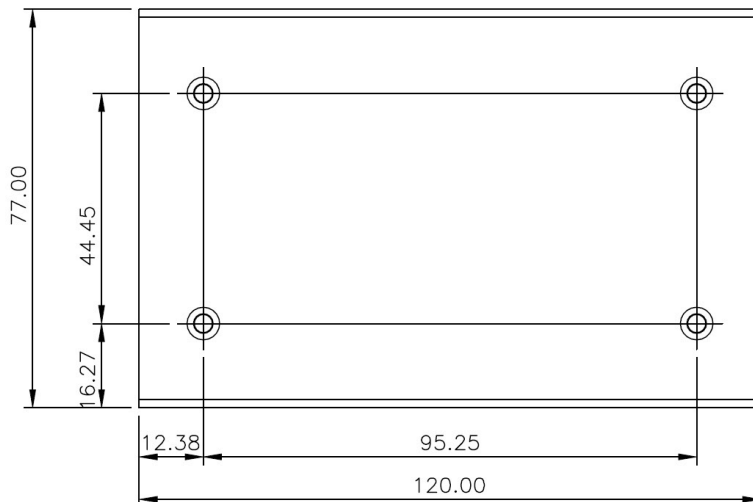
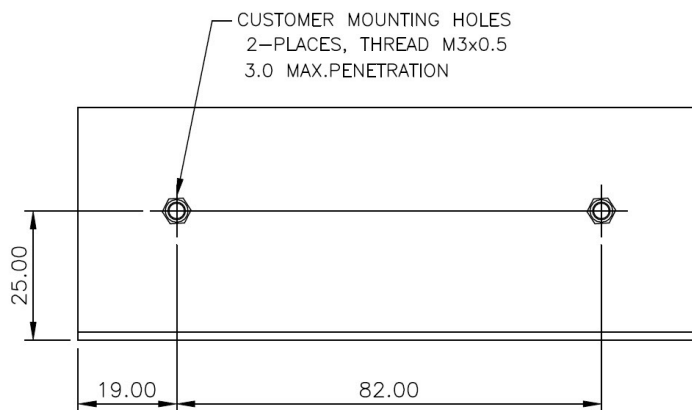
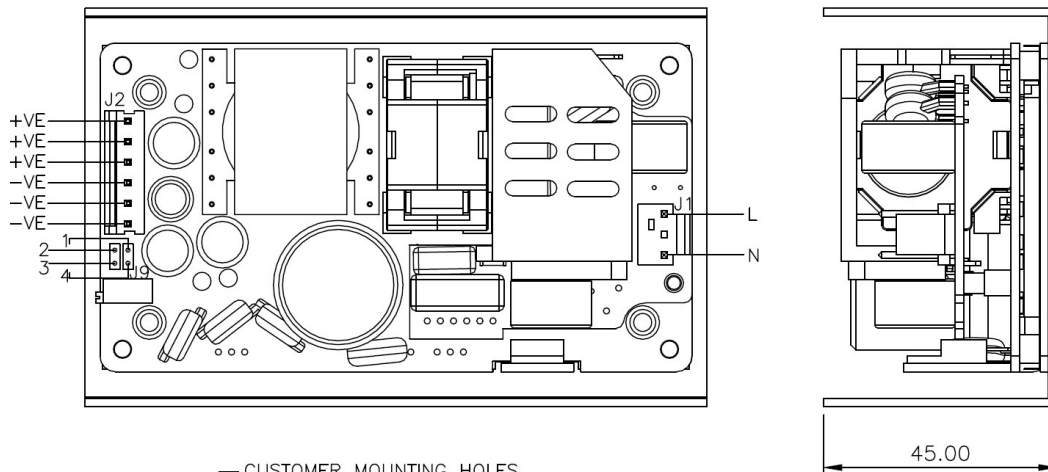


MECHANICAL OUTLINE DIMENSIONS  
ALL DIMENSIONS ARE IN MM  
GEN.TOLERANCE: +/-0.5 MM

## Mechanical Drawing

### MFLS250 2.5 X 4.5 with U Channel

NOTE:-  
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FOR CONNECTOR DETAILS ON PAGE NO.13.



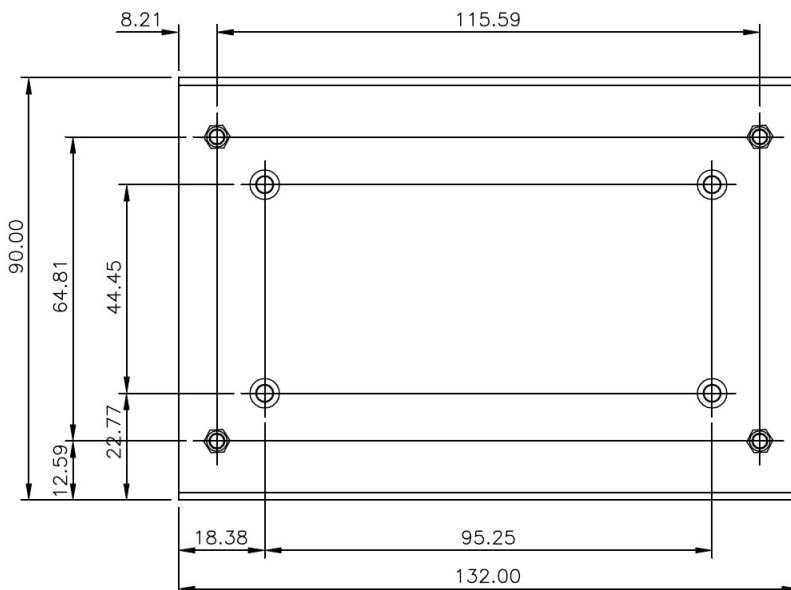
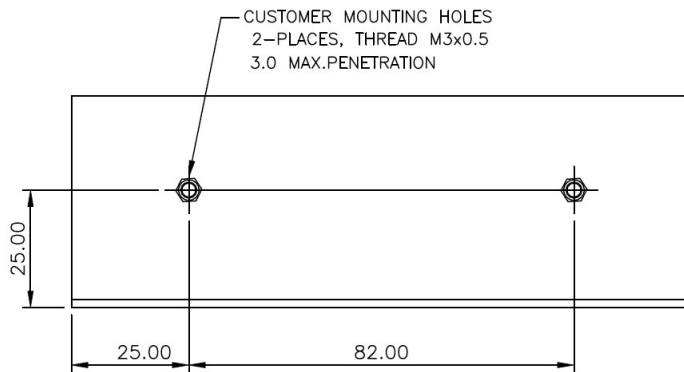
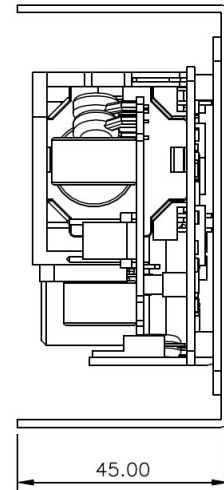
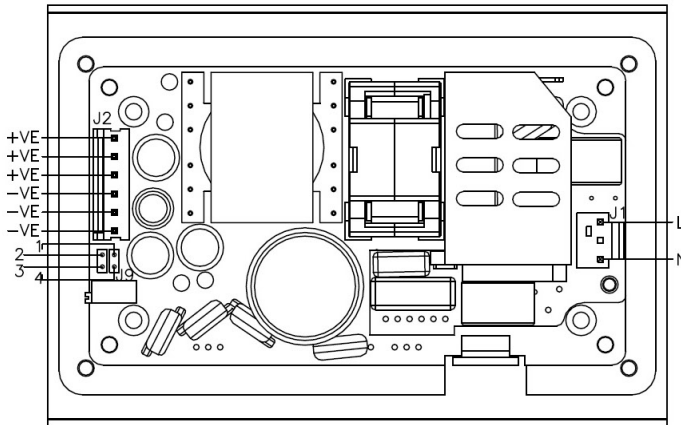
MECHANICAL OUTLINE DIMENSIONS  
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GEN.TOLERANCE: +/-0.5 MM

## Mechanical Drawing

### MFLS250 3 X 5 with U Channel

NOTE:-

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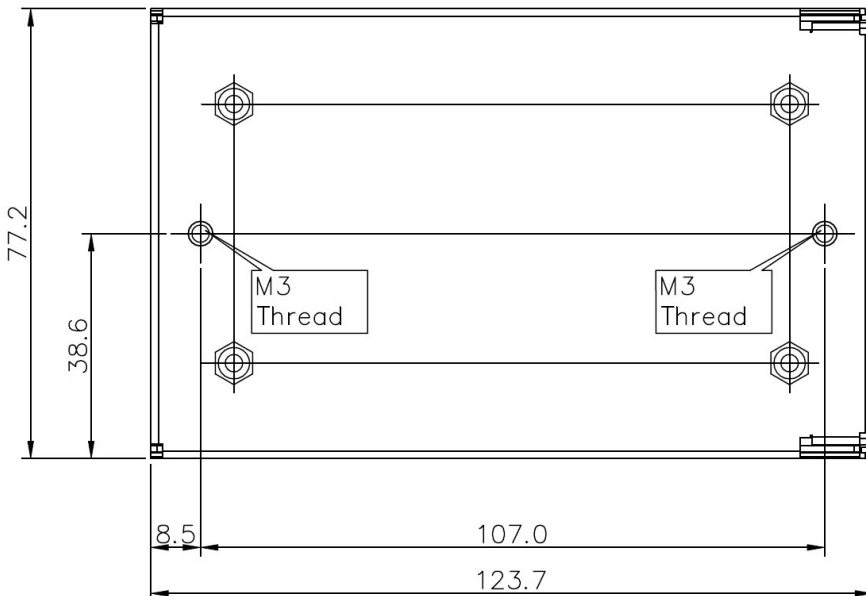
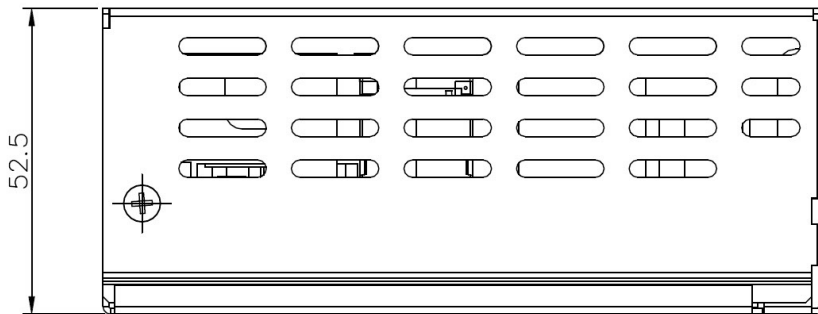
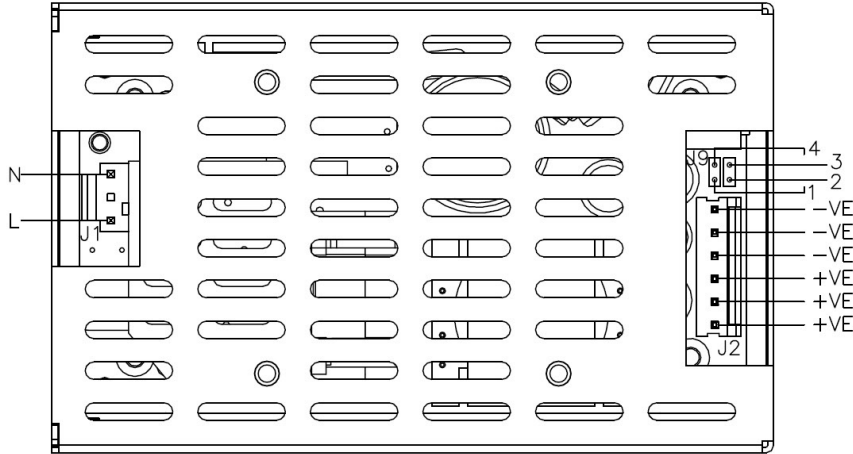


MECHANICAL OUTLINE DIMENSIONS  
ALL DIMENSIONS ARE IN MM  
GEN.TOLERANCE: +/-0.5 MM

### Mechanical Drawing

#### MFLS250 2.5 X 4.5 with Cover kit

NOTE:-  
PLEASE REFER "FLS250 2.5X4.5 WITH 'L' CHANNEL" SPEC  
FOR CONNECTOR DETAILS ON PAGE NO.13.



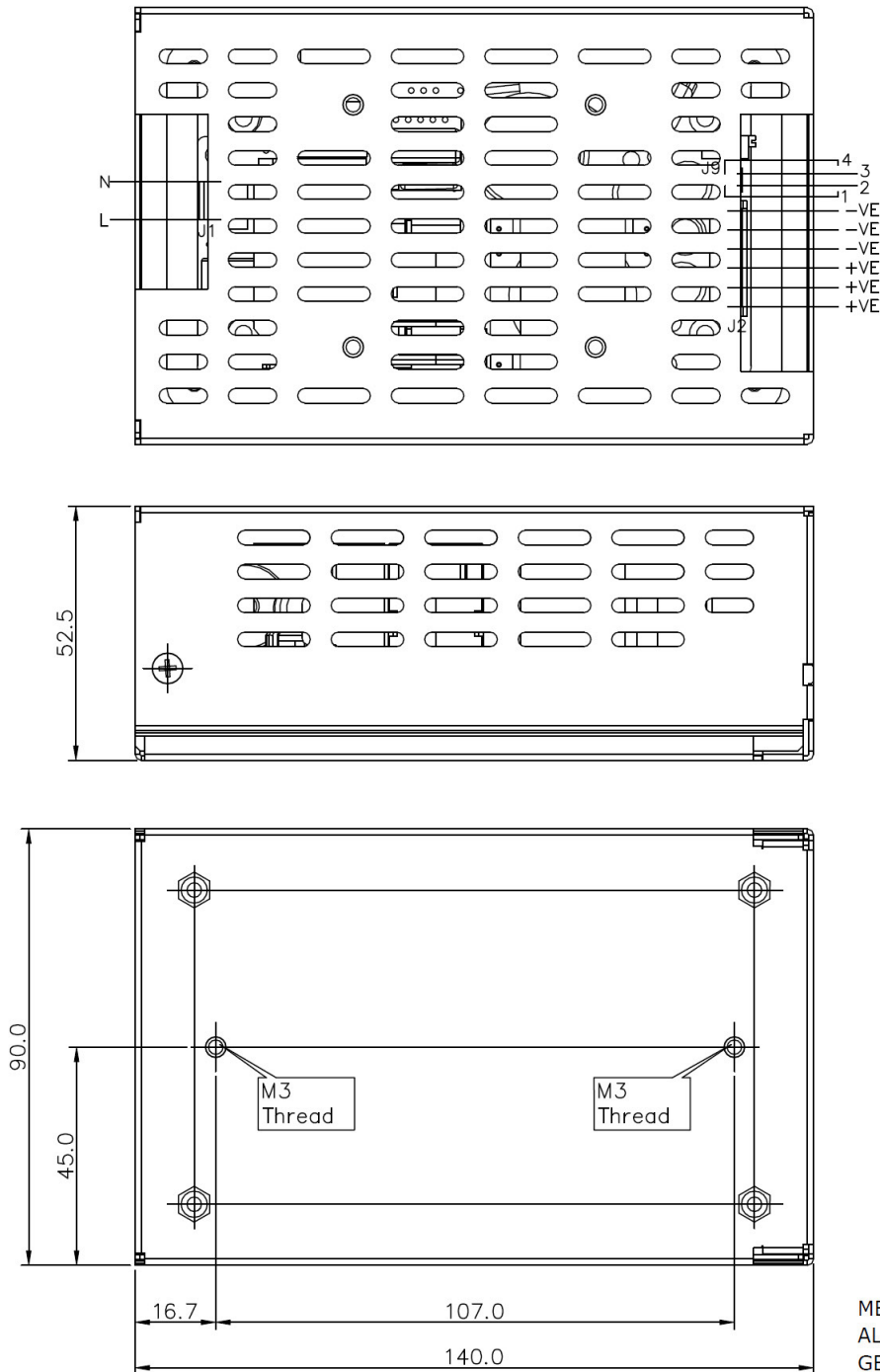
MECHANICAL OUTLINE DIMENSIONS  
ALL DIMENSIONS ARE IN MM  
GEN.TOLERANCE: +/-0.5 MM

## Mechanical Drawing

### MFLS250 3 X 5 with Cover Kit

NOTE:-

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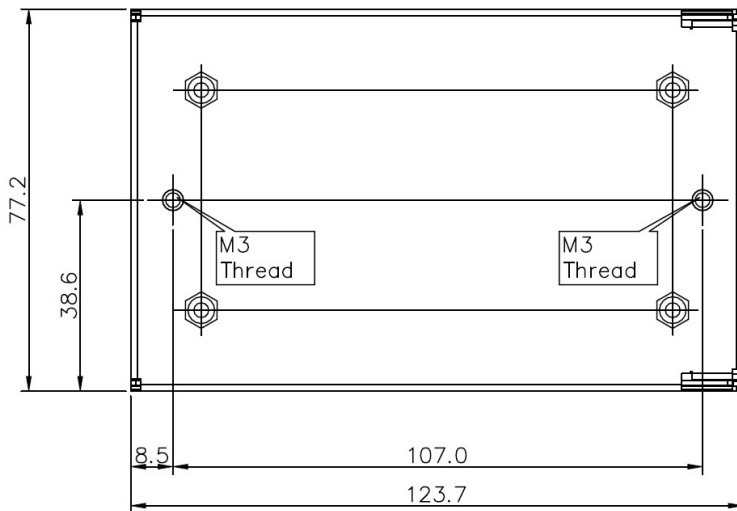
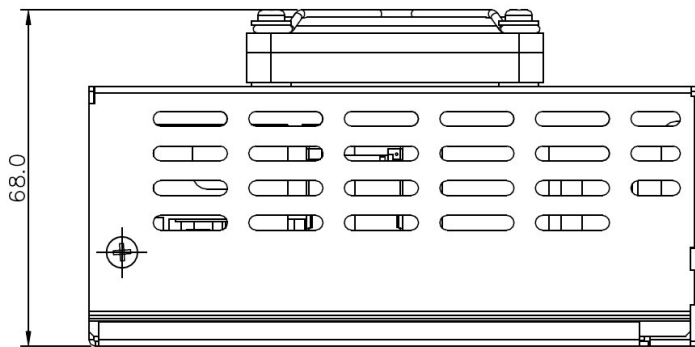
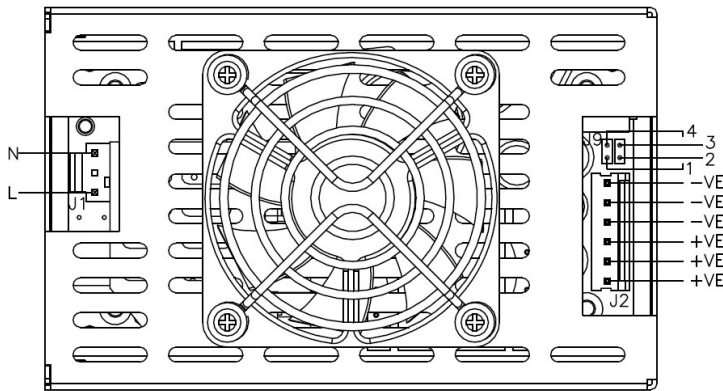


## Mechanical Drawing

### MFLS250 2.5 X 4.5 with Cover kit - Fan

NOTE:-

PLEASE REFER "FLS250 2.5X4.5 WITH 'L' CHANNEL" SPEC FOR CONNECTOR DETAILS ON PAGE NO.13.



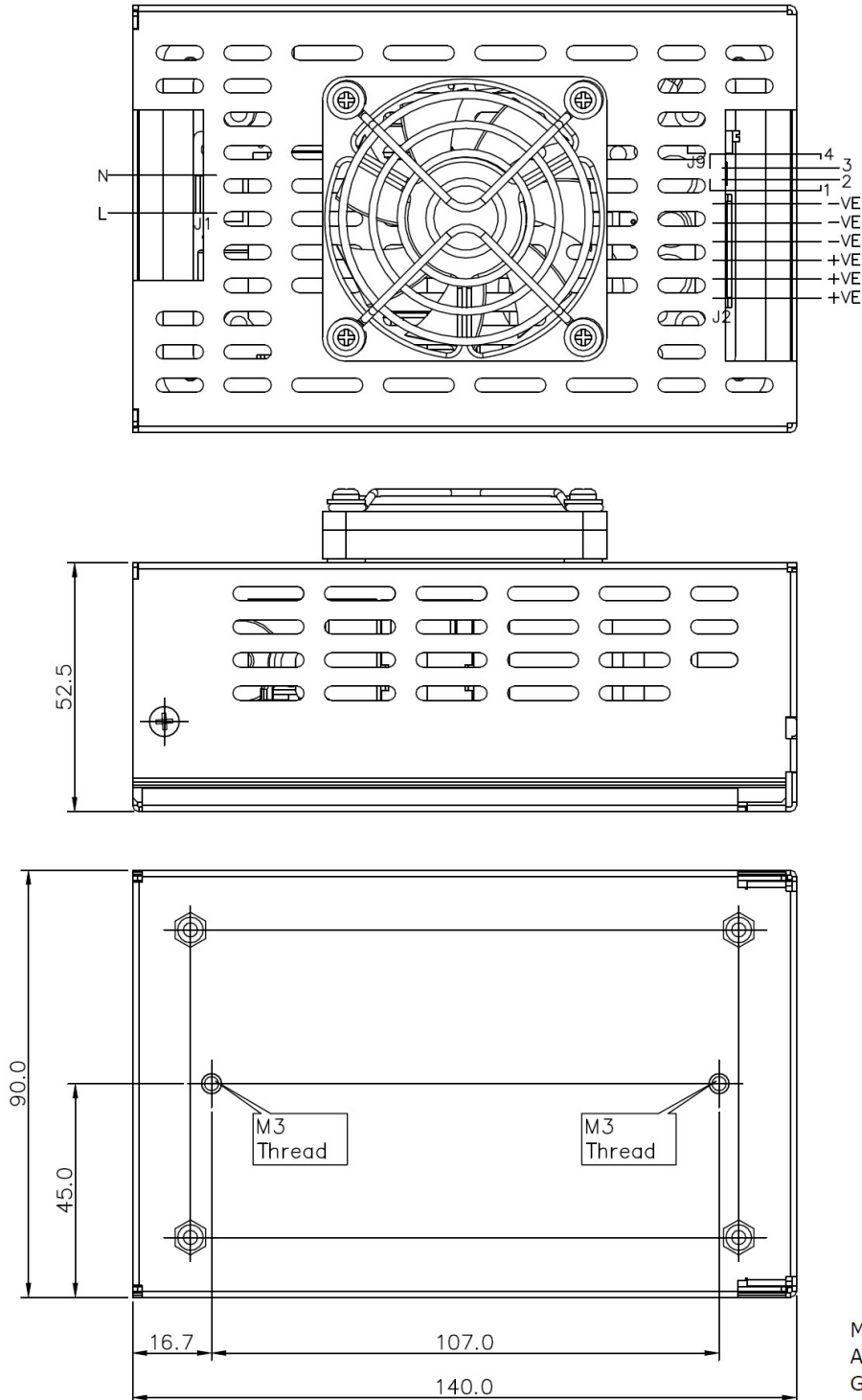
MECHANICAL OUTLINE DIMENSIONS  
ALL DIMENSIONS ARE IN MM  
GEN.TOLERANCE: +/-0.5 MM

### Mechanical Drawing

#### MFLS250 3 X 5 with Cover kit - Fan

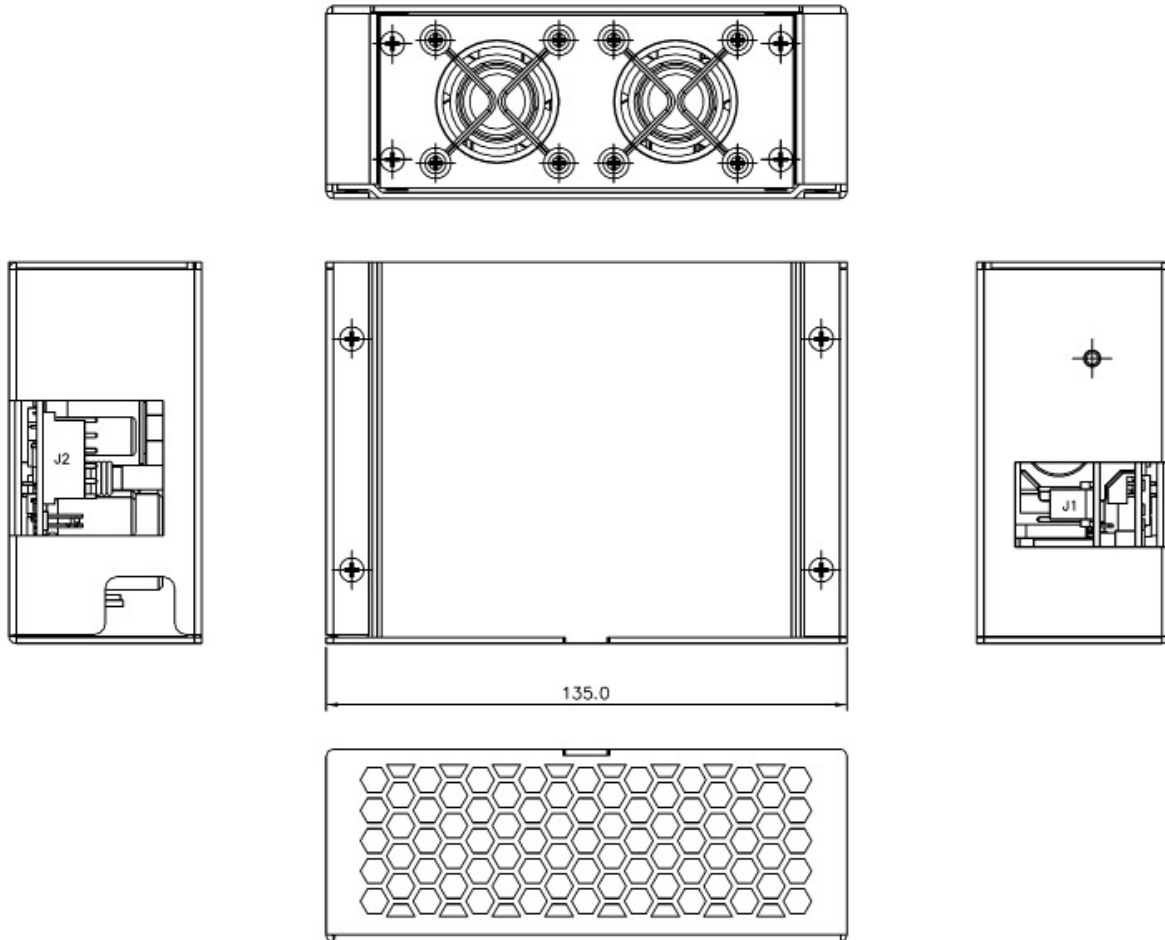
NOTE:-

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FOR CONNECTOR DETAILS ON PAGE NO.13.

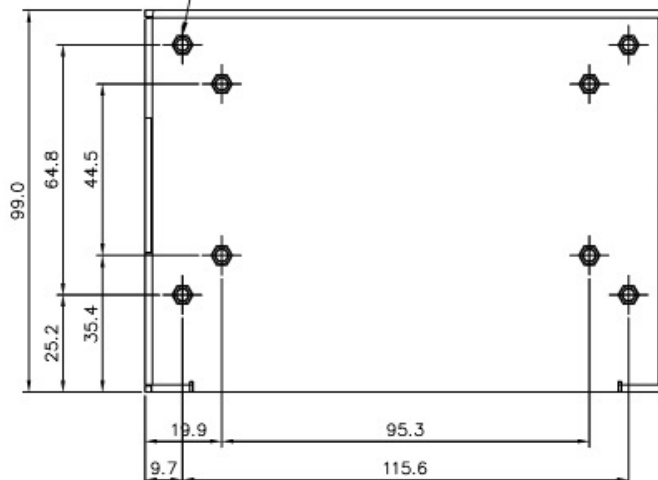


## Mechanical Drawing

### COVER KIT WITH SIDE FAN



CUSTOMER MOUNTING HOLES  
2-PLACES, THREAD M3x0.5  
3.0 MAX.PENETRATION



MECHANICAL OUTLINE DIMENSIONS  
ALL DIMENSIONS ARE IN MM  
GEN.TOLERANCE: +/-0.5 MM

### STANDARD DC CABLE / CONNECTOR, AC CORD

AC CORD	
EOS P/N	Description
CEL-22-LF00000005981	CORD, AC, US PLUG, C7, 2PIN, 2METER
CEL-22-LF00000007286	CORD, AC, US PLUG, C13, 3PIN, 2METER
CEL-22-LF00000007287	CORD, AC, EURO PLUG, C13, 3PIN, 2METER
CEL-22-LF00000007288	CORD, AC, EURO PLUG, C7, 2PIN, 2METER
CEL-22-LF00000007289	CORD, AC, UK PLUG, C7, 2PIN, 2METER
CEL-22-LF00000007290	CORD, AC, UK PLUG, C13, 3PIN, 2METER
Ordering guidelines	
<p>To order a cable and connector , substitute the appropriate Suffix below.  <i>Example</i> : The eZVC65SG15D has connector ID of 2.1mm. To receive ID of 2.54mm connector, order eZVC65SG15E.</p> <p><b>Note:</b>                      All cables are 18GA &amp; black color.                      For minimum order &amp; ship quantity consult your sales representative.</p>	
Mechanical Abbreviations	
<p>ID: Inside diameter of the DC barrel connector                      OD: Outside diameter of the DC barrel or Hirose connector                      LB: Length of the barrel connector                      L2: Length between ferrite filter and DC connector                      N/A: Not applicable</p>	

Standard DC Cable / Connector							
EOS P/N :	Suffix	Description	ID (mm)	OD (mm)	LB (mm)	L2 (mm)	CordLength (length)
CEL-22-LF00000003311	A	2.54mm Straight Barrel	2.54	5.54	9.6	N/A	24*
CEL-22-LF00000003411	AR	2.54mm Right Angle with ferrite filter	2.54	5.54	9.6	25.4	40*
CEL-22-LF00000006739	AD	2.54mm Straight Barrel	2.54	5.54	10.16	N/A	52*
CEL-22-LF00000005949	BD	2.54mm Straight Barrel with ferrite filter	2.54	5.54	10.16	25.4	40*
CEL-22-LF00000003405	D	2.1mm Straight Barrel	2.1	5.54	9.6	N/A	40*
CEL-22-LF00000003249	GN	2.1mm Right Angle	2.1	5.54	9.6	N/A	6*
CEL-22-LF00000007565	BE	2.1mm Straight Barrel with ferrite filter	2.1	5.54	10.16	25.4	40*
CEL-22-LF00000007412	Z2	2.54mm Straight Barrel with ferrite filter	2.54	5.54	10.16	40	76*
CEL-22-LF00000007424	E1	2.1mm Right Angle	2.1	5.54	12.3	N/A	40*
CEL-22-LF00000007570	Z3	2.1mm Straight Barrel	2.1	5.54	10.16	N/A	40*