

## μMP Series

### Up to 1200 Watts

**Total Power:** Up to 1200 Watts  
**Input Voltage:** 85 - 264 Vac  
120-300 Vdc  
**# of Outputs:** Up to 12

## Special Features

- Full Medical EN60601 approval
- PMBus
- High efficiency
- Current limit modification (foldback or constant current)
- High power density.
  - uMP4: 10.8 W/cu-in
  - uMP1: 15.1 W/cu-in
- Intelligent fan (speed control/fault status)
- Downloadable GUI from website
- uP controlled PFC input with active inrush protection
- Optional conformal coating
- Industrial temp range (-40 °C to 70 °C)
- No preload required
- Industrial shock/vibration (> 50G's)
- Low cost
- IEC or terminal block input
- Low profile 1U size

## Safety

- **UL** UL60950/UL60601-1
- **CSA** CSA22.2 No. 234 Level 5
- **VDE** EN60950/EN60601-1
- **BABT** Compliance to EN60950/EN60601 BS7002
- **CB** Certificate and report
- **CE** Mark to LVD
- **CCC** Approved

## MicroMP 1U Multi Output



μMP4C shown



## Electrical Specifications

Input	
Input range:	85 - 264 Vac, 120 - 350 Vdc (limited to 250 Vac/300 Vdc in medical apps)
Frequency:	47 - 440 Hz
Inrush current:	40 A peak max. (soft start)
Efficiency:	Up to 91% @ full case load
Power Factor:	0.99 typ. meets EN61000-3-2 (n/a @ 440 Hz)
Turn-on time:	AC on 2 sec for uMP1 and 1.5 sec for uMP4, inhibit/enable 250 ms typical
EMI filter:	CISPR 22/EN55022 Level "B"
Leakage current:	300 μA Max. @ 240 VAC
Radiated EMI:	CISPR 22/EN55022 Level "B"
Holdover storage:	16.7 ms minimum (independent of input Vac, 0 °C to 50 °C))
AC OK:	Signal goes low indicating loss of AC input. Hold up = Full cycle ride thru (50 Hz)
Harmonic distortion:	Meets EN61000-3-2
Isolation:	Meets EN60950 and EN60601
Global Inhibit/Enable:	TTL, Logic "1" and Logic "0"; fan off when unit is inhibited
Input fuse (internal):	uMP1: 16 A/250 V TLAG, uMP4: 10 A / 250 V. (both lines fused)
Warranty:	2 years

## Environmental Specifications

Operating temperature:	-40 ° to 70 °C ambient. Derate each output 2.5% per degree from 50 °C to 70 °C. (-20 °C start up). Meets full spec after 1/2 load. 10 min warm-up
Storage temperature:	-40 °C to 85 °C
Electromagnetic susceptibility:	Designed to meet EN61000-4; -3, -5, -6, -11 Level 3, Level 4 for -2, -4
Humidity:	Operating; non-condensing 10% to 95% RH
Vibration:	MIL-STD-810E
MTBF demonstrated:	> 350,000 hours at full load, one uMP4 case + two modules, Telcordia SR-332 calculated MTBF
Altitude:	Up to 10k feet; derate linear to 50% from 10k-30k feet

Output	
Factory set point accuracy:	± 1%
Margining:	± 3 - 7% nominal analog (single output module only)
Overall regulation:	0.4% or 30 mV whichever is greater.
Ripple:	RMS: 0.1% or 10 mV, whichever is greater Pk-Pk: 1.0% or 50 mV, whichever is greater. Bandwidth limited to 20 MHz
Dynamic response:	< ± 5% or 250 mV, with 50% step load
Recovery time:	To within 1% in < 300 μsec
Reverse voltage protection:	100% of rated output current
<b>Thermal protection:</b> (OTP)	All outputs disabled when internal temp exceeds safe operating range.
Remote sense:	Up to 0.5 V total drop (not available on triple output module)
Single wire parallel:	Current share to within 5% of total rated current
DC OK:	± 5% of nominal.
Minimum load:	Not required
Housekeeping standby:	5 Vdc @ 1.0 A max. present whenever AC input is applied
<b>Module inhibit:</b>	Logic - output on with low or open. Different logic options available
Output/Output isolation:	> 1 Megohm, 500 V

Vout	Full load (A)	OVP trip max (V)	OCP trip typ (I-out%)	SCP trip max (I-out%)	Overshoot (max mV)	Peak Deviation (max mV)
<b>3V3 Module</b>						
0.9	40	2.00 V	130%	160%	150	± 250
3.3	40	5.96 V	130%	160%	250	± 250
3.6	40	6.31 V	130%	160%	250	± 250
<b>5 V Module</b>						
3.2	36	5.76 V	130%	160%	250	± 250
5	36	9.00 V	130%	160%	250	± 250
6	30	10.80 V	130%	160%	300	± 300
<b>12 V Module</b>						
6	25	10.80 V	130%	160%	300	± 300
12	20	15.60 V	130%	160%	600	± 600
15	16	19.50 V	130%	160%	750	± 750
<b>24 V Module</b>						
12	13	15.60 V	130%	160%	600	± 600
24	10	31.20 V	130%	160%	1200	± 1200
30	8	39.00 V	130%	160%	1500	± 1500
<b>48 V Module</b>						
28	7	36.40 V	130%	200%	1400	± 1400
48	5	62.40 V	130%	160%	2400	± 2400
60	4	78.00 V	130%	200%	3000	± 3000

Case	Max Output	Dimensions	Connections	Max Current Amps
μMP4 - 4 Slot	400 W - 600 W	256.9±0.8 x 88.9±0.5 x 40.0±0.7 (10.11" x 3.5" x 1.57")	IEC/Terminal Block	9.91
μMP1 - 6 Slot	1000 W - 1200 W	256.9±0.8 x 127±0.5 x 40.0±0.5 (10.11" x 5" x 1.57")	IEC/Terminal Block	13.87

Output Range (Vdc)	Max Current (Amps)	Max Power (Watts)	Module Codes Standard Outputs
0.9 - 3.6	40	144	A, B, C, D - 2, 2.2, 3, 3.3
3.2 - 6.0	36	180	E, F, G, H - 5, 5, 2, 5.5, 6
6.0 - 15.0	25	240	I, J, K, L, M, N - 8, 10, 11, 12, 14, 15
12.0 - 30.0	13	240	O, P, Q, R, S - 18, 20, 24, 28, 30
28.0 - 54.0	7	240	T, U, V, W, X, Y - 28, 30, 33, 36, 42, 48, 54, 60
5.0 - 28.0	4	96	Dual Output Module. Each output is rated to 96W (192 Watts total). Wide range is adjustable.
5.0 - 28.0	4	96	

## Ordering Info

Case Size	Module/Voltage/Option Codes	Case Option Codes	Software Code	Hardware Code
<b>μMPXY</b>	<b>S2E - DER - DLL</b>	<b>00</b>	<b>A</b>	<b>###</b>
<b>Case Size</b> Single - Phase Input where X = 4 = 1.57" x 3.5" x 10"; 400 W - 600 W, 4 Slots 1 = 1.57" x 5" x 10"; 1000 W - 1200 W, 6 Slots  Input Type where Y = T = Terminal Block C = IEC Connector, C14 B = IEC Connector, C16	<b>Module Codes</b> S2 = 200 W Single O/P (1 slot) D = 96 W/96 W Dual O/P Common Ground (1 slot) I = 96 W/96 W Dual O/P Isolated Ground (1 slot)  <b>Voltage Codes:</b> See Voltage Code Table	<b>Case Option Codes</b> First digit 0 - F = Parallel Code  Second digit 0 = No Options 1 = Reverse Air 3 = Global Enable 5 = Opt 1 + Opt 3	Factory assigned for modified standards	Factory assigned for modified standards

### Parallel Codes

Code	Slots in Parallel	Code	Slots in Parallel	Code	Slots in Parallel	Code	Slots in Parallel
1	1&2	6	1,2&3	B	1,2&3; 4&5	0	no module in parallel
2	2&3	7	1,2,3&4	C	1,2,3&4; 5&6		
3	3&4	8	1,2,3,4&5	D	1&2; 3&4; 5&6		
4	4&5	9	1,2,3,4,5&6	E	1,2&3; 4,5&6		
5	5&6	A	1&2; 3&4	F	2&3; 4&5		

### Application Notes

- (Only for Output Voltages 14.0V-24.0V)
- Units should not be operated in parallel
  - In a single unit, parallel modules should not be individually inhibited
  - Total load capacitance should not exceed 2000uF

## Voltage Codes

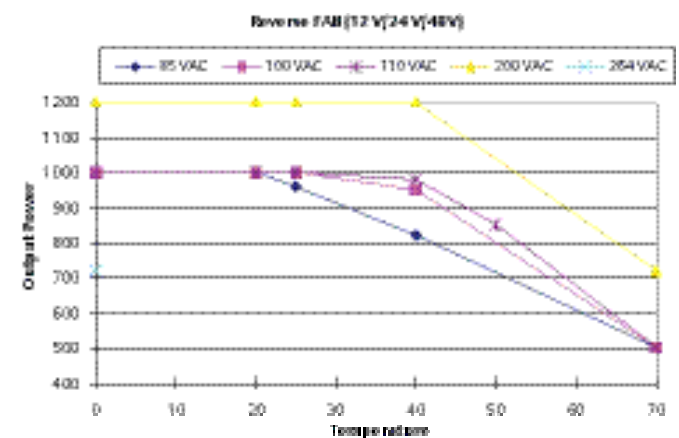
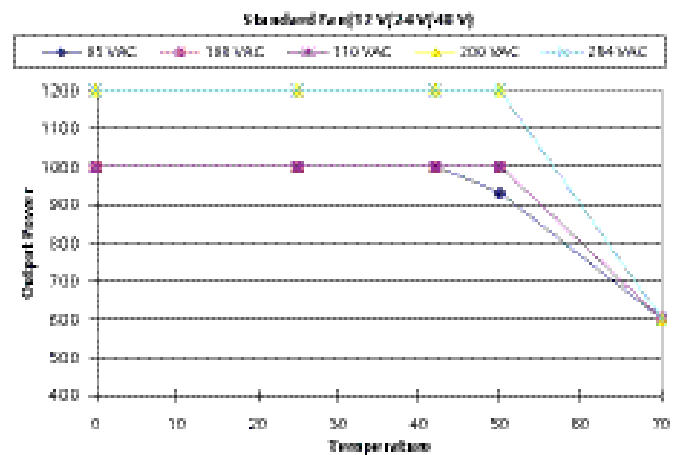
Standard Output Ratings		
Module Output Voltage Code	Single Output ONE SLOT 240 Watts Max	Dual Output ONE SLOT 192 Watts Max
Module Identification	S2	D = Dual Common Ground I = Dual Isolated Ground

### Output Module Line-Up

Code	Volts	Output Current V1	Output Current	
			V1	V2
A	2.0 V	40.0	N/A	N/A
B	2.2 V	40.0	N/A	N/A
C	3.0 V	40.0	N/A	N/A
D	3.3 V	40.0	4.0*	4.0*
E	5.0 V	36.0	4.0	4.0
F	5.2 V	34.0	4.0	4.0
G	5.5 V	32.0	4.0	4.0
H	6.0 V	30.0	4.0	4.0
I	8.0 V	25.0	4.0	4.0
J	10.0 V	24.0	4.0	4.0
K	11.0 V	22.0	4.0	4.0
L	12.0 V	20.0	4.0	4.0
M	14.0 V	17.0	4.0	4.0
N	15.0 V	16.0	4.0	4.0
O	18.0 V	13.0	4.0	4.0
P	20.0 V	12.0	4.0	4.0
Q	24.0 V	10.0	4.0	4.0
R	28.0 V	8.6	3.4	3.4
S	30.0 V	8.0	N/A	N/A
T	33.0 V	7	N/A	N/A
U	36.0 V	6.7	N/A	N/A
V	42.0 V	5.7	N/A	N/A
W	48.0 V	5.0	N/A	N/A
X	54.0 V	4.4	N/A	N/A
Y	60.0 V	4.0	N/A	N/A

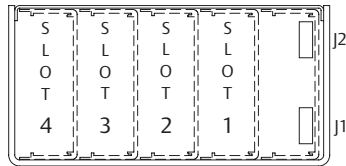
\* For "I" codes only

## Derating Curves - μMP1



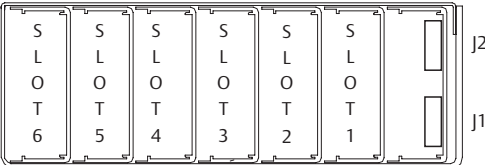
## S2 Module

μMP4 (AC input on opposite side)

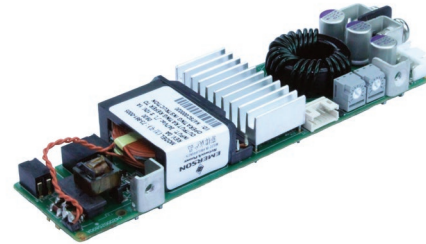


Input  
 μMP4 = 4 available slots      85-264 Vac      200-264 Vac  
    400 W max.      600 W max.

μMP1 (AC input on opposite side)



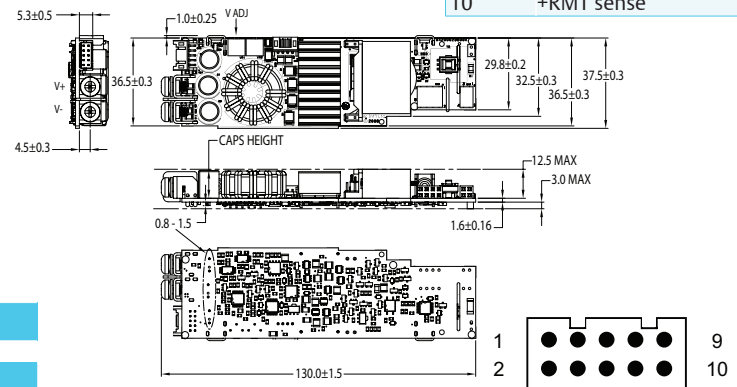
Input  
 μMP1 = 6 available slots      85-264 Vac      200-264 Vac  
    1000 W max.      1200 W max.



240 W

### DC Output Control & Signals (Single output)

Pin	Function
1	No connection
2	No connection
3	Current share
4	Module inhibit return
5	Module ISO inhibit
6	SCOM
7	-RMT sense
8	Margin
9	Remote margin / V prog.
10	+RMT sense



## Pin Connectors

Figure 1. AC Input



IEC Connector



Terminal Block

PEN L

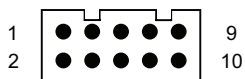
### AC Input

Pin	Function
1	AC neutral
2	AC line (hot)
3	Chassis (earth) ground

### J1 PFC Input Connector (control & signals)

Pin	Function
1	Input AC OK - "emitter"
2	Input AC OK - "collector"
3	Global DC OK - "emitter"
4	Global DC OK - "collector"
5	Spare
6	Global inhibit/optional enable logic "1"
7	Global inhibit/optional enable logic "0"
8	Global inhibit/optional enable return
9	+5 VSB housekeeping
10	+5 VSB housekeeping return

Figure 2. Connector J1 & J2



Mates with  
 Landwin 2050S1000 Housing  
 2053T011V Pin

OR

JST PHDR-10VS Housing  
 JST SPHD-002T-P0.5 (28-24)  
 JST SPHD-001T-P0.5 (26-22)

Connector Kit Part No.:  
 70-841-023

### J2 PC Bus Output Connector

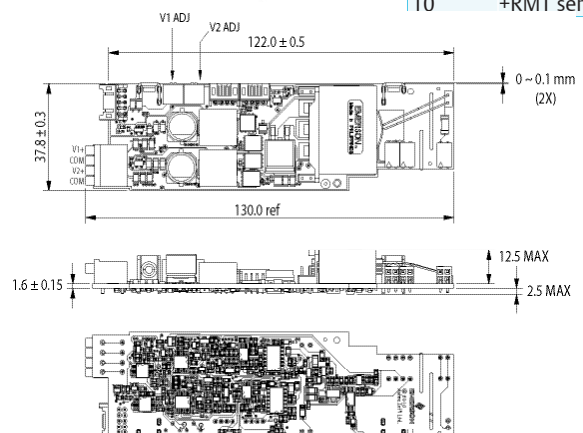
Pin	Function
1	5 Vcc bus
2	Serial data signal (SDA)
3	Secondary return (COM)
4	Serial clock signal (SCL)
5	Address bit 2 (A2)
6	No connection
7	Address bit 1 (A1)
8	No connection
9	Address bit 0 (A0)
10	No connection

## Dual Module



### DC Output Control & Signals (Dual output)

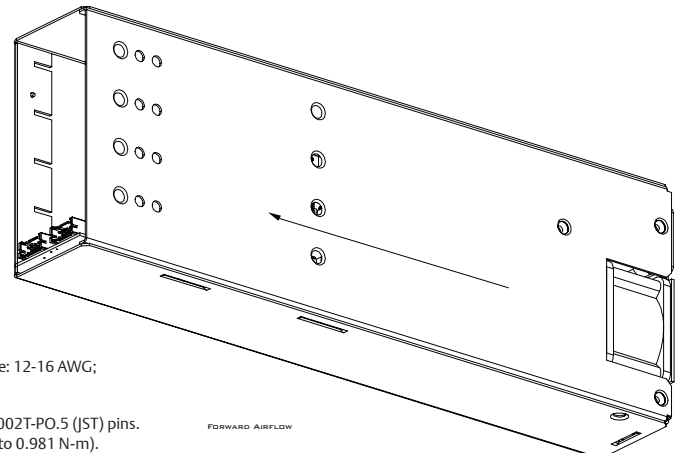
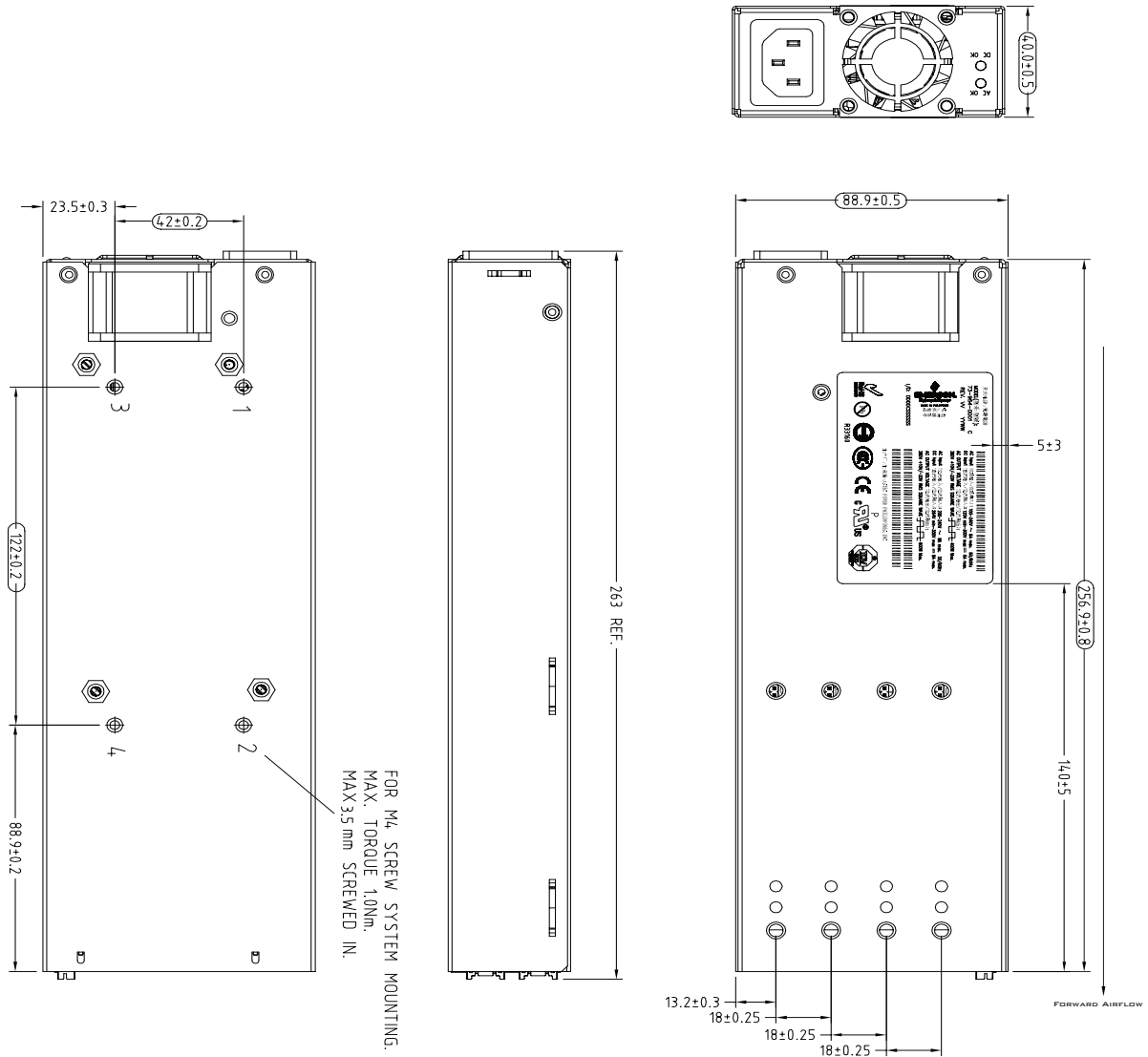
Pin	Function
1	-RMT sense V2
2	+RMT sense V2
3	No connection
4	Module inhibit rtn
5	Module ISO inhibit
6	SCOM
7	-RMT sense V1
8	No connection
9	No connection
10	+RMT sense V1



**μMP Series**  
**μMP4 (400/600 Watts Max)**

Case Size: μMP4: 10.11" x 3.5" x 1.57" (256.9mm x 88.9mm x 40.0mm)  
Weight: μMP4 Case: 1.96 lbs • Single O/P: 0.22 lb. • Dual O/P: 0.16 lb.  
• Blank: 0.06 lb.

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μMP Series  
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Notes:

- Input: IEC 60320 C13 (for IEC connector)  
Barrier Type DECA Switchlab MT300-50003 (for terminal block connector); Max Torque: 4.0 lb-in (0.4-0.5 Nm); Wire: 12-16 AWG;  
Wire Strip Length: 0.354" (9.0 mm)
- Control Connectors (J1 and J2): 10-position housing, brass, matte tin-plated contacts.  
Mates with housing 2050S1000 (Landwin) with 2053T011P (Landwin) pins or housing PHDR-IOVS (JST) and SPHD-002T-PO.5 (JST) pins.
- Output Module Connectors: All single O/P modules are M4 x 10mm screws; Max. Torque: 6.94 to 8.68 lb-in (0.785 to 0.981 N-m).  
Dual O/P module is PUSH IN conductor connector; Wire Strip Length: 0.315" (8.0 mm); Control signal connector: Refer to Item 2.
- Chassis Material: Steel with chemical film coating (conductive).
- Customer Mounting: Screw M4-type mounting holes; Max. Penetration is 0.138" (3.5 mm); Max. Torque: 8.85 lb-in (1.0 N-m)
- All dimensions are in millimeters and inches, and are typical.

μMP Series  
μMP1 (1000/1200 Watts Max)

Case Size: μMP1: 10.11" x 5" x 1.57" (256.9mm x 127mm x 40.0mm)  
 Weight: μMP1 Case: 2.78 lbs • Single O/P: 0.22 lb.  
 • Dual O/P: 0.16 lb. • Blank: 0.06 lb.

**Americas**

5810 Van Allen Way  
 Carlsbad, CA 92008  
 USA  
 Telephone: +1 760 930 4600  
 Facsimile: +1 760 930 0698

**Europe (UK)**

Waterfront Business Park  
 Merry Hill, Dudley  
 West Midlands, DY5 1LX  
 United Kingdom  
 Telephone: +44 (0) 1384 842 211  
 Facsimile: +44 (0) 1384 843 355

**Asia (HK)**

14/F, Lu Plaza  
 2 Wing Yip Street  
 Kwun Tong, Kowloon  
 Hong Kong  
 Telephone: +852 2176 3333  
 Facsimile: +852 2176 3888

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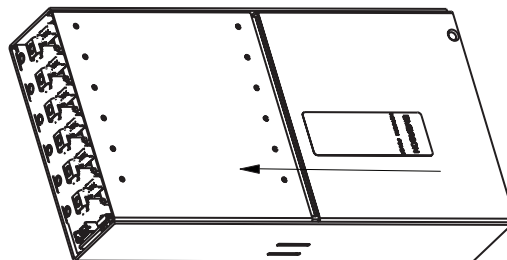
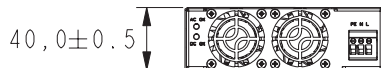
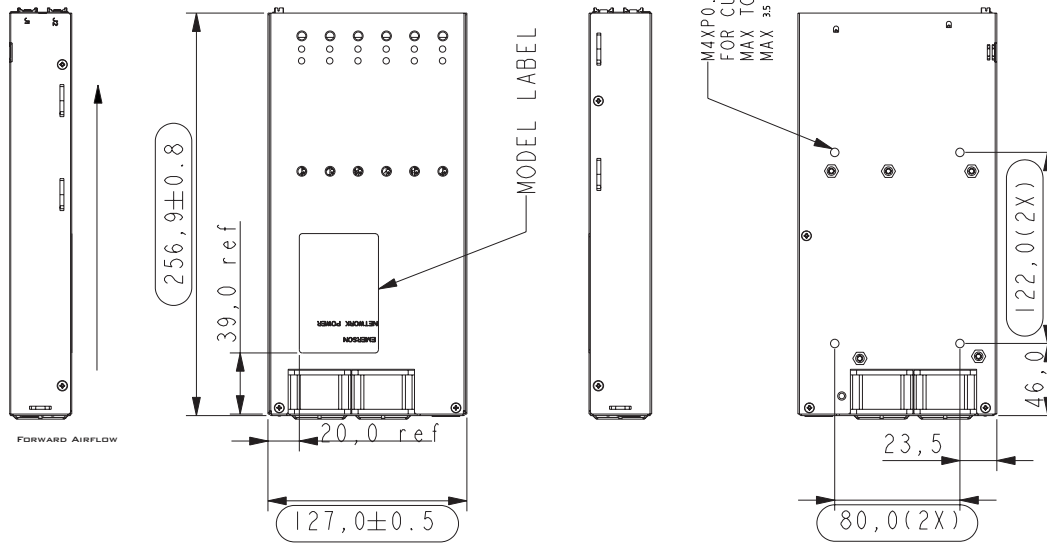
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- Notes:
- Input: IEC 60320 C13 (for IEC connector)  
 Barrier Type DECA Switchlab MT300-50003 (for terminal block connector); Max Torque: 4.0 lb-in (0.4-0.5 Nm); Wire: 12-16 AWG; Wire Strip Length: 0.354" (9.0 mm)
  - Control Connectors (J1 and J2): 10-position housing, brass, matte tin-plated contacts. Mates with housing 2050S1000 (Landwin) with 2053T011P (Landwin) pins or housing PHDR-IOVS (JST) and SPHD-002T-PO.5 (JST) pins.
  - Output Module Connectors: All single O/P modules are M4 x 10mm screws;  
 Max. Torque: 6.94 to 8.68 lb-in (0.785 to 0.981 N-m).  
 Dual O/P module is PUSH IN conductor connector; Wire Strip Length: 0.315" (8.0 mm);  
 Control signal connector: Refer to Item 2.
  - Chassis Material: Steel with chemical film coating (conductive).
  - Customer Mounting: Screw M4-type mounting holes; Max. Penetration is 0.138" (3.5 mm);  
 Max. Torque: 8.85 lb-in (1.0 N-m)
  - All dimensions are in millimeters and inches, and are typical.