MicroPAC
Conduction Cooled

AC-DC Power Supply

Features

- High efficiency up to 91%
- Small Size
- High power density (25W/In^3)
- Up to 1300 W (Configuration dependent)
- Low power standby mode (Green mode)
- Universal Input (85 – 264 Vac) (47 – 63 Hz) (400Hz)
- DC Input (120 – 300 Vdc)
- Up to 4 isolated outputs
- Standard 12 V, 14 V, 24 V 28 V, 36 V & 48 V output
- 5 V @ 250 mA Isolated Aux Supply
- Output parallel capability
- Output series capability
- Output current sharing
- MicroPAC to MicroPAC Current sharing
- Power shed capability
- Vibration MIL-STD 810G-Figure 514.5C-17
- Over temperature warning
- Over temperature shut down
- Individual output
- Enable / disable
- All output enables / Disable capability
- TTL control signals
- Visual LED display panel
- Shock MIL-STD 810F
- Method 516.5 procedure 1
- Wave, 40G 11 mS

Product Description

The Conduction cooled MicroPAC power supply provides up to 4 isolated semi regulated output voltages of 12, 14, 24, 28, 36 and 48 Vdc and up to 1300 W of continuous power in a very small highly efficient package. The isolated outputs may be placed in parallel/series configurations and for applications requiring higher power levels MicroPAC power supplies can be configured in arrays up to several KW. Safety agency approvals limit the configured output votages to 60Vdc. Configurations and applications where output voltages are greater than 60Vdc are non-SELV. This factory configurable rugged power supply supports a wide range of customer power requirements and is especially suited for distributed power architectures. The design offers a small flexible cost effective solution for applications requiring Power Factor Correction, high efficiency and power density even in environmentally challenging conditions.

Part Numbering

UP **a** – **b** **b** **b** **b** **c** **d** **e**

MicroPAC
Constant

Number of outputs,
1 to 4

Output Configuration

Fill in character from chart below for each output

b	=	Vout	Watts	b	=	Vout	Watts
A		12	300	T		28	600
B		12	600	U		28	1200
C		12	900	G		48	325
D		12	1200	H		48	650
P		14	300	I		48	975
Q		14	600	J		48	1300
R		14	900	K		36	900
S		14	1200	M		[1]	[1]
E		24	600	Z		[2]	[2]
F		24	1200				

[1] M defines a slot with an air block filler, no BCM board

[2] Z indicates the slot is populated with a BCM board that is connected in series or parallel with the previous slot

Cooling

F = Fan Cooled
L = -40C Fan Cooled
C = Conduction Cooled

Interface Customer Option
Non-Safety Related

S = Standard (TTL levels) Signaling and Control

RoHS Customer Option
Non-Safety Related

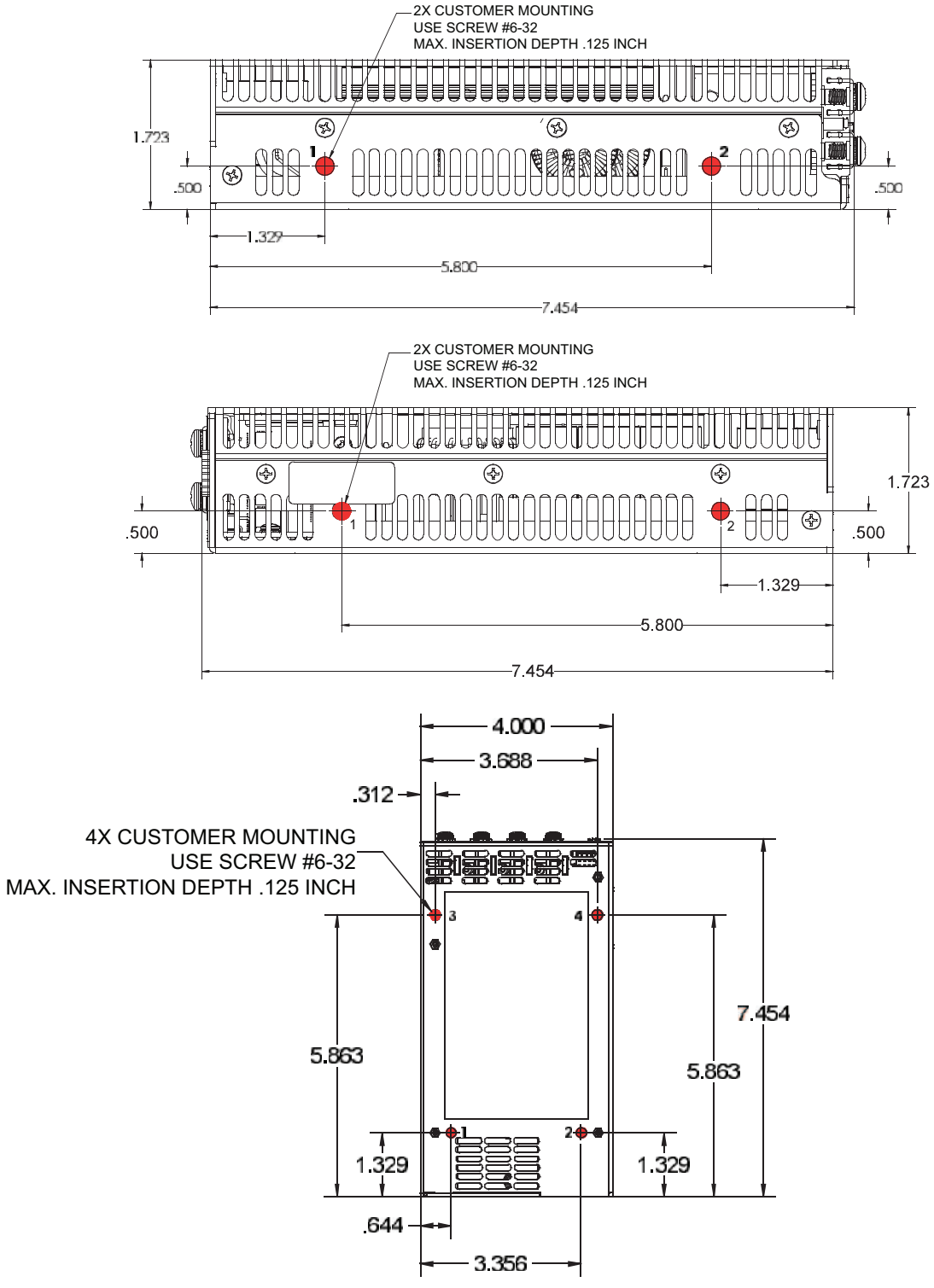
G = RoHS
N = Non-RoHS
O = RoHS Eco array
L = Non-RoHS eco array

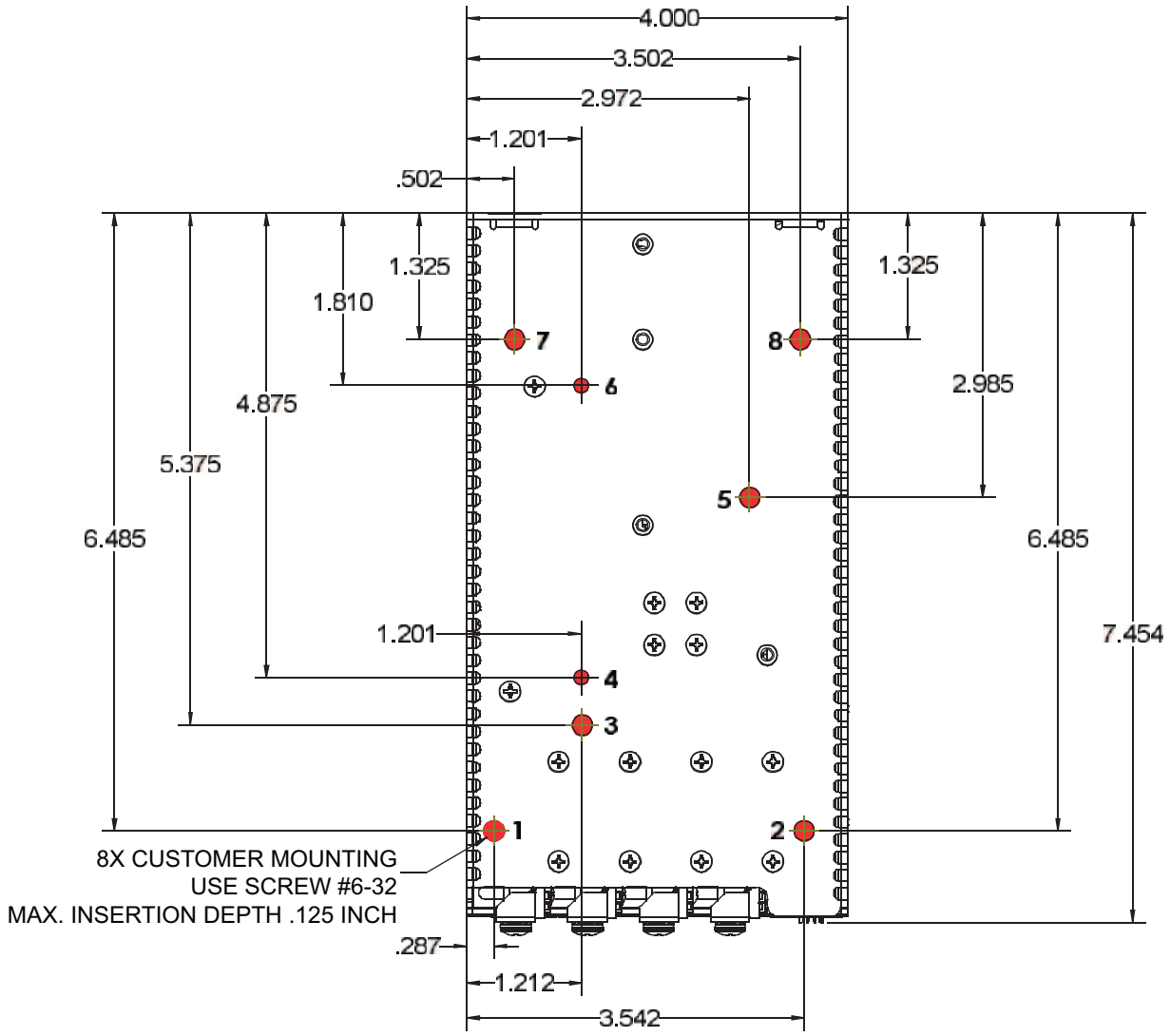
Examples:

UP1-FZZZ-CSG Denotes a single output of 24 V 1200 W standard TTL signaling and control, RoHS compliant

UP4-AAAA-CSN Denotes 4 output unit, each output is 12 V 300 W standard TTL signaling and control, non-RoHS

Mechanical


2X CUSTOMER MOUNTING
USE SCREW #6-32
MAX. INSERTION DEPTH .125 INCH
1.723
.500
1
2
.500
1.329
5.800
7.454
2X CUSTOMER MOUNTING
USE SCREW #6-32
MAX. INSERTION DEPTH .125 INCH
1.723
.500
1
2
.500
1.329
5.800
7.454
4.000
3.688
.312
4X CUSTOMER MOUNTING
USE SCREW #6-32
MAX. INSERTION DEPTH .125 INCH
3
4
7.454
5.863
5.863
1
2
1.329
1.329
.644
3.356

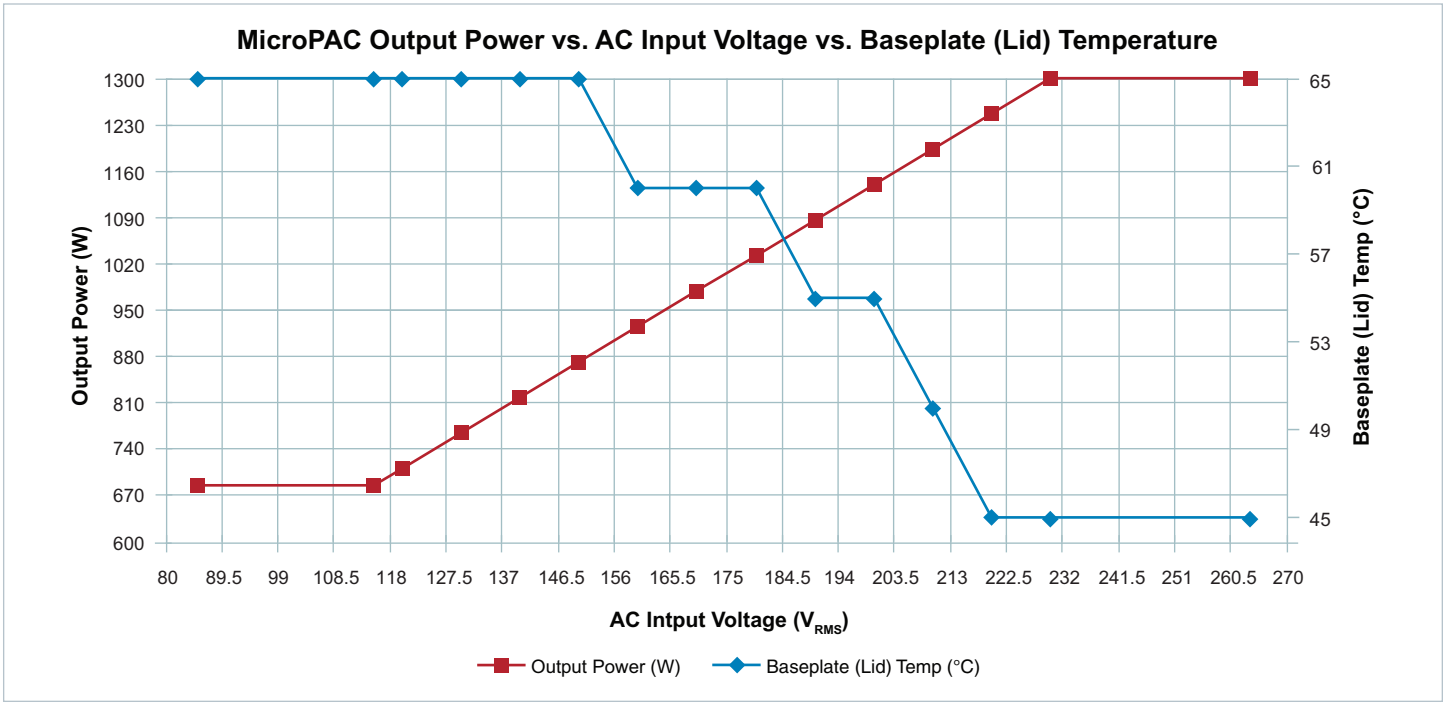


Physical Weight

2.15 lbs

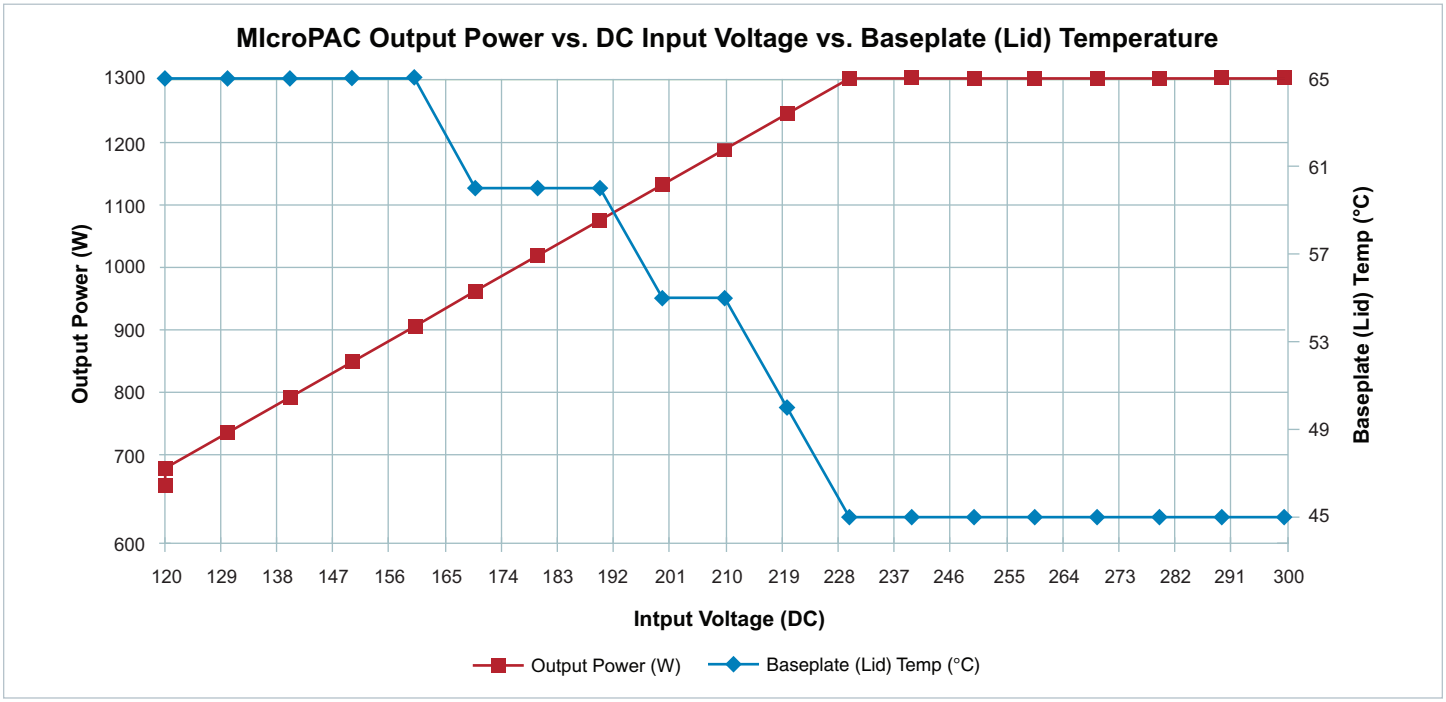
Power Out versus AC Input Voltage versus Base Plate (Lid) Temperature

The maximum output power plotted against AC input voltage and Base Plate (Lid) temperature must be maintained at or below the maximum limits. The graph below shows the rated power at different input voltages and base plate (Lid) temperatures.

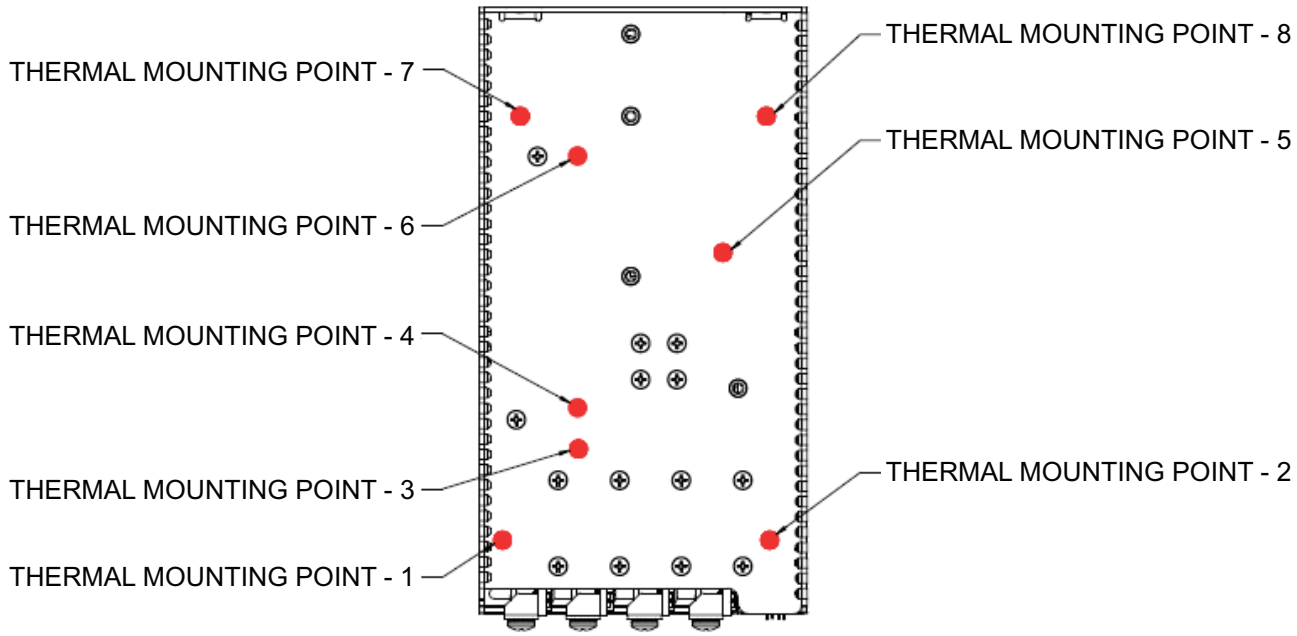


Power Out versus DC Input Voltage versus Base Plate (Lid) Temperature

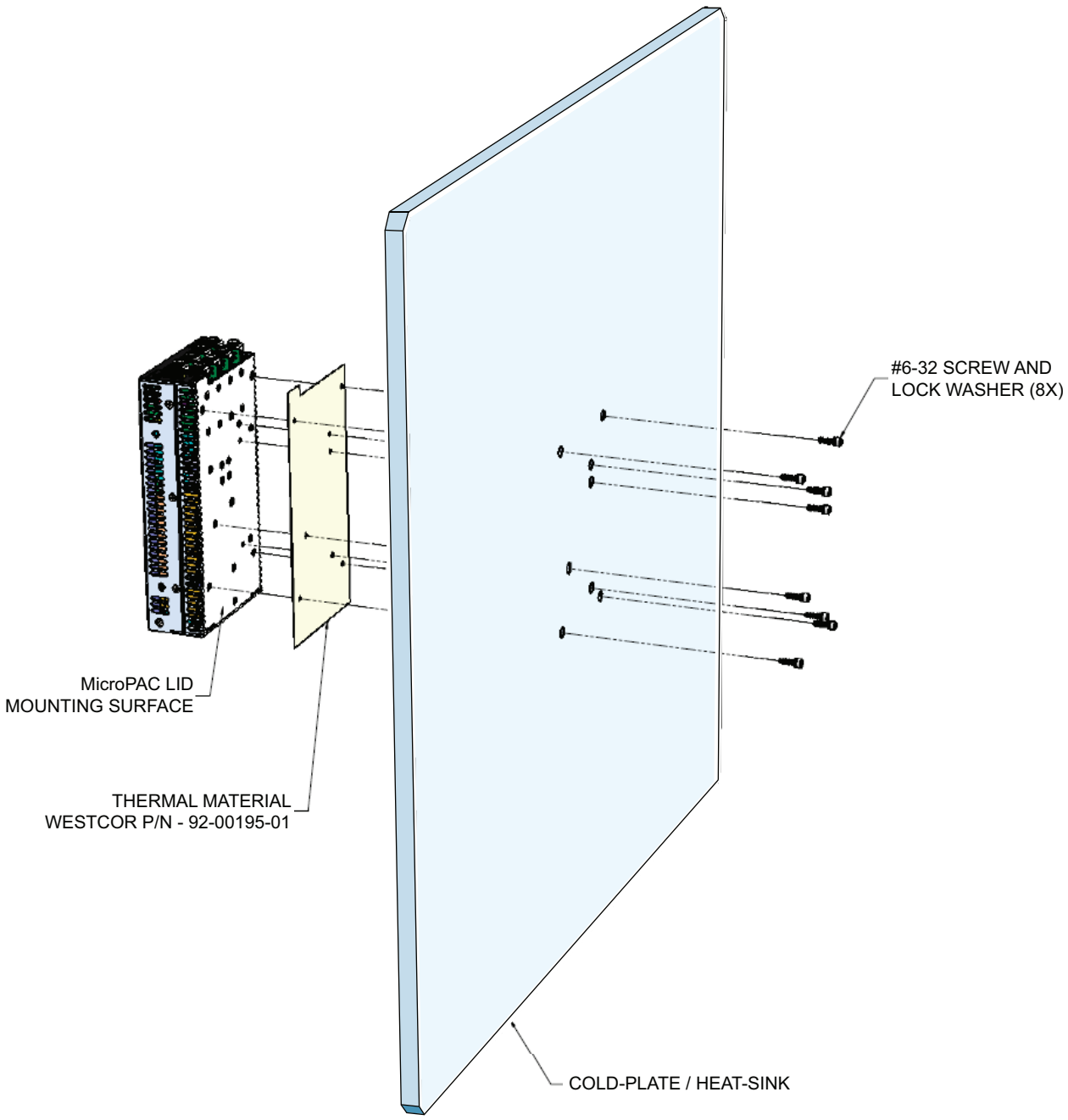
The maximum output power plotted against DC input voltage and Base Plate (Lid) temperature must be maintained at or below the maximum limits. The graph below shows the rated power at different input voltages and base plate (Lid) temperatures.



MicroPAC Conduction Cooled Thermal Mounting Ponts

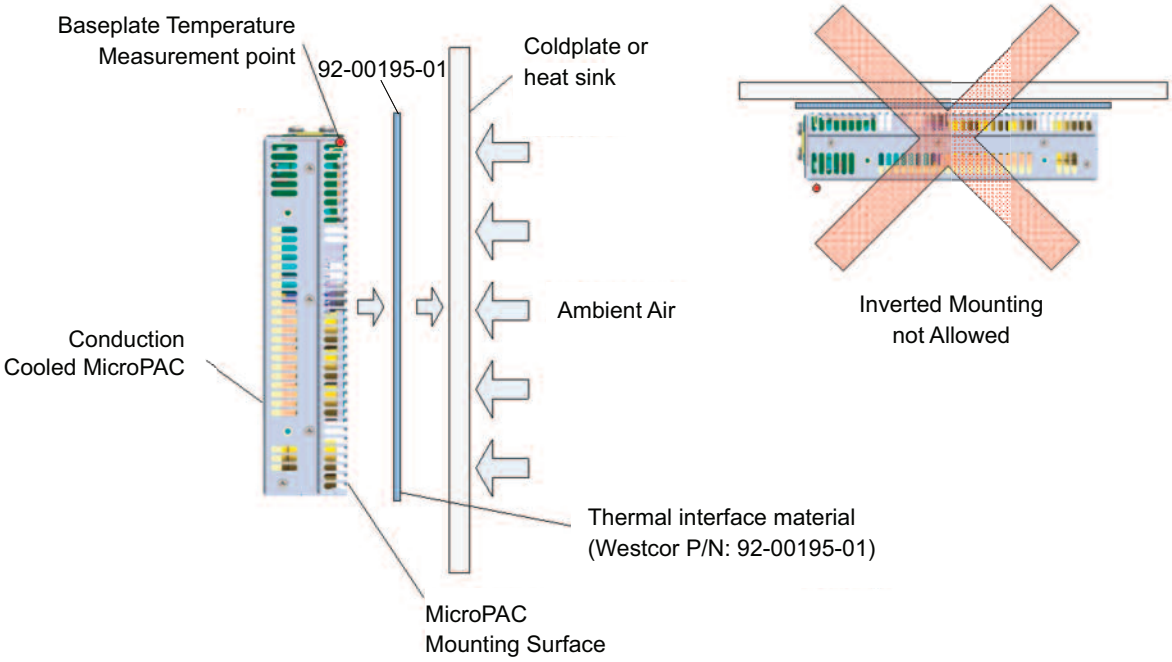


MicroPAC Conduction Cooled Mounting Example



Selecting a MicroPAC Heat-sink

P_{OUT} = MicroPAC Output Power
η = MicroPAC Efficiency (%)
T_b = MicroPAC Lid temperature (°C)
T_a = Worse case ambient air temperature
θ = Thermal Resistance degrees per watt (°C/W)
P_d = Power Dissipation through coldplate or heat sink (Watts)
θ_{sa} = Thermal resistance between the coldplate/heat sink and air
θ_{sb} = Thermal resistance between the MicroPAC Lid and the coldplate/heat sink



Examples:

P_{OUT} = 1000 W — MicroPAC Output Power
η = 91% — MicroPAC Efficiency
T_b = 40 — MicroPAC Lid temperature
T_a = 25 — Worse case ambient air temperature

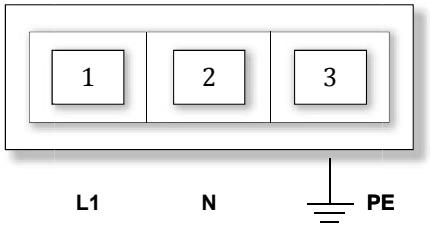
$$P_d = \frac{P_{OUT}}{\eta} - P_{OUT} = 98.901\ W$$ — Power Dissipation

$$\theta = \frac{T_b - T_a}{P_d} = 0.152\ \frac{1}{W}$$ — Thermal Resistance; degrees per watt (°C/W)

Customer Interface

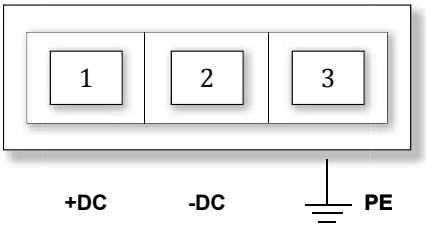
Input Power Connector Pin Designation (AC Use Only)

Pin	Designation
1	Live (L1)
2	Neutral (L2)
3	Protective Earth (PE)



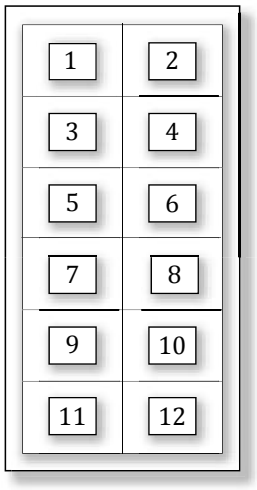
Input Power Connector Pin Designation (DC Use Only)

Pin	Designation
1	+ DC (L1)
2	- DC (L2)
3	Protective Earth (PE)



Customer Interface Pin Designation (J2)

Pin	Function
1	+5V
2	0V (+5V Return)
3	ED 1
4	Over Temperature Warning / Over Temperature Shut Down
5	ED 3
6	AC-OK
7	Standby Mode
8	General Shut Down
9	N/C
10	ED 2
11	N/C
12	ED 4



Customer Interface Connector Kit (19-130066)

Item	QTY	Description	Westcor	Vendor	# Vendor
1	1	CONN HOUSING 12 POS MINITEK	63-00168-12	FCI	90311-012LF
2	12	TERM FEM CRIMP 26-30 AWG	63-00167-01	FCI	77138-101LF
		CRIMP TOOL FOR ITEM 2		FCI	HT-151/RCY21151
3	1	CONN HOUSING 3 POS W/LATCH	63-00084-03	MOLEX	39-01-4030
4	3	TERM FEM CRIMP 16 AWG	63-00125-01	MOLEX	45750-3211
		CRIMP TOOL FOR ITEM 4		MOLEX	11-01-0199

Specifications

Input Specification			
Input Voltage	85 - 264 Vac		DC Rating: 120 VDC – 300 VDC
Fuse	(“¼ 1-¼”)Cooper Bussman, ABC-15, rated 15 amps Littelfuse, 505 series, rated 16A/500 VAC		(5 x 20mm) Littelfuse, 216 series, rated 16 amps (“¼ 1-¼”) Littelfuse, 505 series, rated 16A/500 Vdc
Frequency	47Hz - 63Hz (400Hz)		
Inrush Current	30 A Peak		
Efficiency	≥91% @ Full load @ 25°C ambient 48 V output		≥90% @ Full load @ 25°C ambient 12 V output
Power factor (115-230vrms)	.99/.96 typ. Meets EN61000-3-2		
Turn-on time	Ac on: 1.sec typ.1.5 sec maximum.		
Conducted EMI	EN55022 Class B Information technology equipment – Radio disturbances characteristics – Limits and methods of measurement BS EN55022:1998; CISPR 22:1997, incorporating corrigendum		
Harmonic distortion	Meets IEC 61000-3-2		
Isolation	Meets IEC 60950		
Leakage current	< 3.5mA @ 264Vac @ 63 Hz		
Hold up time	20 mS typical		
Warranty	2 Years		
Output Specification			
Number of outputs	1-to 4		
Normal output voltages	12 V, 14 V, 24 V, 28 V, 36 V and 48 V (contact factory for details)		
Maximum output current	100 A @ 12 V	85.71A @ 14V	[27 A @ 48 V]
Auxiliary output	5 V @ 0.5 A 5 0mV p-p		
Voltage regulation	12 V ± 3% typ	14 V ± 3% typ	48 V± 2% typ
Ripple and noise (20MHz bandwidth) (Full load)	12 V output (150 mV - 300 mV p-p) typ 14 V output (150 mV – 300 mV p-p) typ		48V output (600mV – 900mVp-p) typ
Current sharing accuracy	5 to 10%		
Short circuit protection	“Fold-Back” Technique		
Over voltage protection	12 V output set point 12.5 V typ		48 V output set point 50 V typ
Thermal protection	All outputs disabled when internal temperature exceeds safe operating range		
Minimum load	12 V up-to 1200 W		
Maximum load	48 V up-to 1300 W		
Maximum load	5.0 V Aux up-to 1.25 W		
Maximum load capacitance	1000µF per 12 V output		100µF per 48 V output
Environmental Specifications			
Storage Temperature	-40°C - +85°C		
Operating temperature	-40°C to (Please see Temperature and Input voltage de-rating guide)		
Functional shock	MIL-STD 810F Method 516.5 procedure 1, terminal peak saw-tooth wave, 40G 11 mS		
Vibration	Mil-STD 810G figure 514.5C-17 for Minimum Integrity Vibration		
Humidity	95% non condensing		
Cooling	Conduction Cooled (See design guide for details)		
Electromagnetic Compatibility			
	EN61000-6-1n European General EMC Immunity		
IEC 61000-4-11 [50Hz]	Voltage Dips 30% for 0.5 prd, pc C Voltage Interrupts (pc C)		
IEC 61000-4-4 [TRANSIENT]	EFT/Burst ± 1kV AC leads ± 500V DC leads. 5/50nsec 5kHz rep rate (pc B)		
IEC 61000-4-5 [SURGE]	Power line Surge AC in ± 2kV CM ± 1kV DM DC in ± 500V CM & DM 1.2/µSec (pc B)		
EN 61000-4-6 [0.15 to 80MHz]	RF Common Mode Input leads, AC & DC leads, CDN 150 kHz to 80 MHz, 3V rms with 80% AM @1 kHz (pa A)		
EN 61000-4-2 [ELECTROSTATIC]	Electrostatic Discharge ± 4kV Contact ± 8kV Discharge (pc B)		
EN 61000-4-3	RF E-Field 80 MHz to 1 GHz 3 V/m with 80% AM @ 1 kHz (pc A)		
EN 61000-4-8	Power Freq H-Field 3A/M @ 50 Hz (pa A)		

Specifications cont.

Reliability	
FIT	3,449 FITS, 50% duty cycle at 25°C ambient; 45% RH ± 10%, 90% total output load; any specified input voltage; sea level operation.
Service life	5 Years
Safety & Regulatory	
UL / cUL (recognized)	UL 60950-1:2007 CAN C22.2 No. 60950-1-07
EN	EN 60950-1/A12:2011
IEC	60950-1-2005 2 Ed. +A1:2009

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