CMP250 Series

XP Power

AC-DC POWER SUPPLIES

250/500W CONVECTION COOLED



The universal AC input CMP250 provides up to 500W peak power and 250W convection-cooled in a 7.5" x 4" package, over the temperature range -40°C to +50°C with derating to +70°C. Approved for IT and Medical (BF) applications and with a feature set including constant current overload characteristics, a 5V/1.5A standby output, 12V/0.6A auxiliary, AC OK signal, inhibit, current share the CMP250 is ideal for motors and other electromechanical loads, without the need for fan cooling, in both industrial and medical applications.

Features

- 250W Convection-cooled Rating
- 500W Peak Power
- IT & Medical Safety (BF) Approvals
- U Channel 4"x 7.5" Package
- 80VAC to 300VAC Input
- 5V/1.5A Standby & 12 V/0.6A Auxiliary
- AC OK Signal, Inhibit
- Current Share
- 3 Year Warranty

Applications

Household Appliances

Industrial Electronics

Instrumentation

IoT

Security

Technology

Dimensions

CMP250:
7.50 x 4.00 x 1.57" (190.5 x 101.6 x 39.9 mm)

CMP250-C:
7.89 x 4.12 x 1.92" (200.5 x 104.6 x 48.8 mm)

Models & Ratings

Model Number[1]	Output Voltage V1	Output Current V1		Standby Supply V2	Aux. Supply V3	Optional Power	
		Convection	Peak			Convection	Peak[2]
CMP250PS24	24V	10.4A	20.8A	5.0V/1.5A	12.0V/0.6A	250W	500W
CMP250PS36	36V	6.9A	13.8A	5.0V/1.5A	12.0V/0.6A	250W	500W
CMP250PS48	48V	5.2A	10.4A	5.0V/1.5A	12.0V/0.6A	250W	500W

Notes:

1. Add suffix '-C' for covered version, e.g. CMP250PS24-C (20% derating applies)
2. Peak current/power available for up to 1 minute. Average power must not exceed 225W, other peak and average load conditions can be accommodated limited by the thermal considerations and average power rating. Peak power and average power derate below 90VAC

Summary

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Range	80	115/230	264	VAC	Derate output power <90 VAC, see fig.1
			300		0.5 seconds max
No Load Input Power		1.3		W	All models, when optional inhibit activated
Input Frequency	47	50/60	63	Hz	
Power Factor		>0.95			EN61000-3-2 class A compliant
					EN61000-3-2 class C for loads ≥50%
Input Current - Full Load		5.2/2.6		A	115/230VAC, 500W
Inrush Current		30	40	A	Cold start 25°C, 230VAC
Earth Leakage Current		100/200	250	µA	Typ. 115/230VAC 50Hz, Max 264VAC 60Hz
Patient Leakage Current		55	80	µA	
Efficiency		89		%	230VAC, 250W
Operating Temperature	-40		+70	°C	See derating curve, fig.8 and Thermal Considerations on page 8
EMC	EN55032/11 Class B Conducted & Radiated, EN61000-3-2, EN61000-3-3				
Safety Approvals	EN62368-1, UL62368-1, CSA C22.2 No. 62368-1, IEC62368-1, IEC60950-1 Ed 2, IEC60601-1 Ed 3 Including Risk Management, ANSI/AAMI ES60601-1:2005 & CSA C22.2, No.60601-1:14				

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage - Operating	80	115/230	264	VAC	Derate output power <90VAC. See fig. 1
Input Voltage - Fault Condition			300		0.5 seconds max
Input Frequency	47	50/60	63	Hz	
Power Factor		>0.95			EN61000-3-2 class A compliant
					EN61000-3-2 class C for loads ≥50%
Input Current - Full Load		5.2/2.6		A	115/230VAC, 500W
No Load Input Power		1.3		W	All models, when optional inhibit activated
		7.8			CMP250PS24 - 115VAC
		6.4			CMP250PS24 - 230VAC
		6.5			CMP250PS36 - 115VAC
		4.2			CMP250PS36 - 230VAC
		7.0			CMP250PS48 - 115VAC
		6.0			CMP250PS48 - 230VAC
Inrush Current		30	40	A	230VAC
Earth Leakage Current		100/200	250	µA	Typ. 115/230 VAC 50Hz, Max 264VAC 60Hz
Input Protection	F10 A/250 V internal fuse in both AC lines				

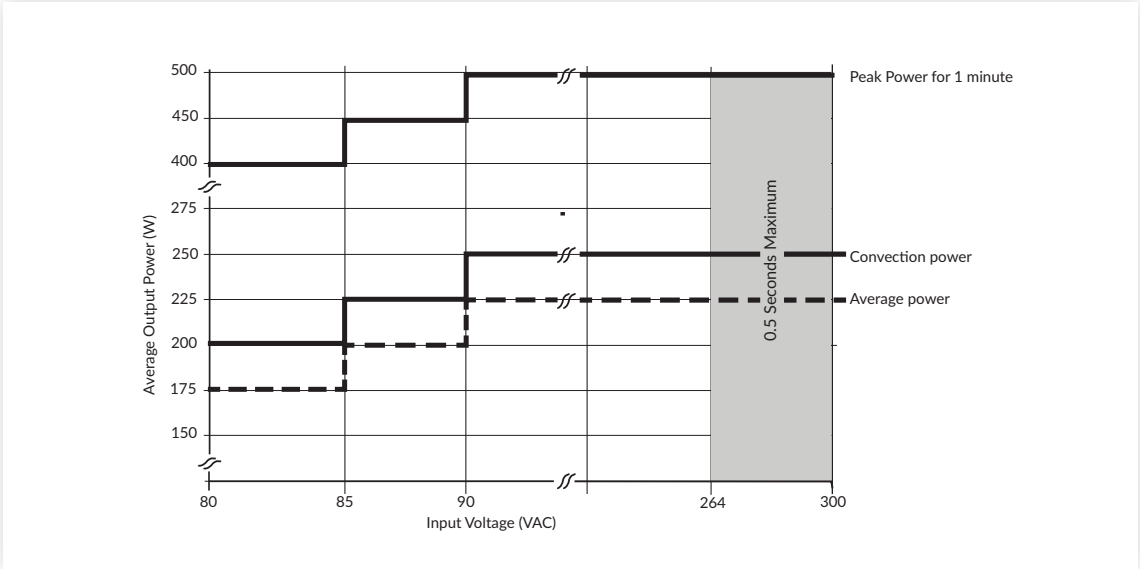
Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	24		48	VDC	See Models & Ratings table
Initial Set Accuracy			±1	%	50% load, 115/230VAC
Output Voltage Adjustment			±10	%	
Minimum Load	0			A	
Start Up Delay		1.0	2.0	s	115/230VAC, full load
Hold Up Time	20			ms	90VAC, 250W
Drift			±0.2	%	After 20 min warm up
Line Regulation			0.5	%	
Load Regulation			1.0	%	0-100% load
Transient Response			<4	%	Recovery within 1% in less than 500µs for a 50-75%-50% load change
Ripple & Noise			1	% pk-pk	20 MHz bandwidth
Overvoltage Protection	115		140	%	Vnom DC. Output 1, recycle input to reset
Overload Protection	205		255	%	Of average power, approx. constant current
Short Circuit Protection	Continuous, no damage				
Temperature Coefficient			0.05	%/°C	
Overtemperature Protection	Shut down and auto recovery				
Patient Leakage Current		55	80	µA	

Applications Notes

Input Voltage Derating

Figure 1



General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		89		%	230VAC, 250W
Isolation: Input to Output	4000			VAC	2 X MOPP
Input to Ground	1500				1 X MOPP
Output to Ground	1500				
Switching Frequency		62-560		kHz	PFC
		59			Main converter
		50-130			Standby
Power Density			5.3	W/in³	At Average Power Rating
Mean Time Between Failure		200		khrs	MIL-HDBK-217F, Notice 2 +25°C GB
Weight		2.02 (919)		lb (g)	CMP250PSxx
		2.36 (1072)			CMP250PSxx-C

Efficiency Graphs

Efficiency vs Load

Figure 2
24V models

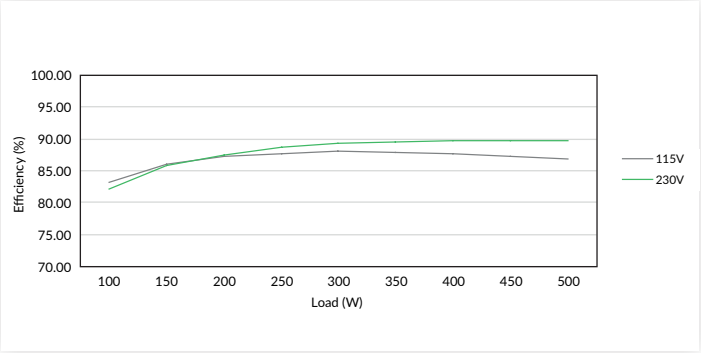


Figure 3
36V models

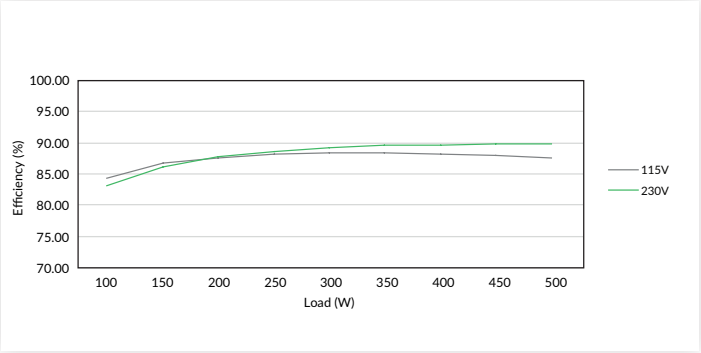
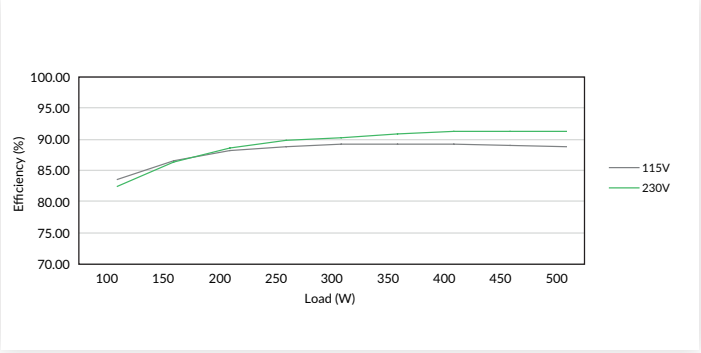


Figure 4
48V models



Signal & Controls - Optional

Characteristic	Notes & Conditions
Remote Sense	Compensates for 0.5 V total voltage drop
5V Standby Supply (V2)	5V/1.5A supply, always present when AC supplied, isolated supply
12V Aux. (V3)	12V/0.6A supply, present when AC supplied, inhibit turns supply off. Referenced to V1 return
AC OK/Power Fail	AC OK is an open collector transistor, referenced to V1 return, providing a minimum of 3 ms warning of loss of output regulation. The transistor is normally on when AC is healthy. See fig. 5
Inhibit	The inhibit high pin should be pulled below 0.4V to switch V1 & V Aux (V3) off. Open circuit or 2-8V maximum to switch the output on. See fig. 6
Current Share	Connecting pin 9 like voltage units (3 maximum) will force the current to share between the outputs. Units share current within 10% of each other at full load. See fig. 7.

Applications Notes

Temperature Derating Curves

Figure 5
Power Fail

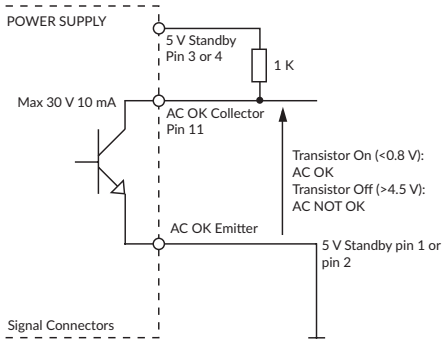


Figure 6
Inhibit (High)

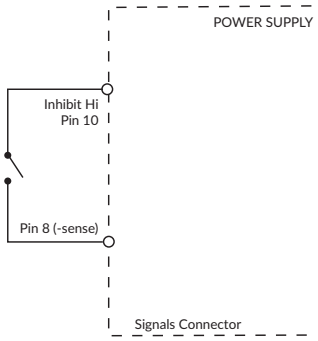
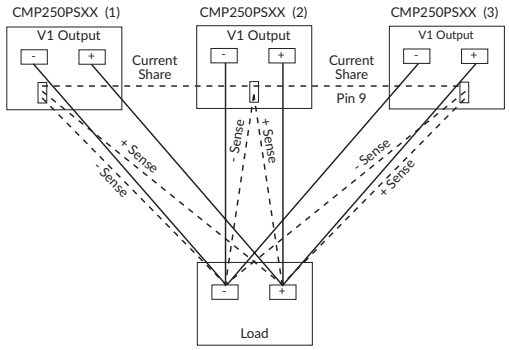


Figure 7
Parallel & Current Share



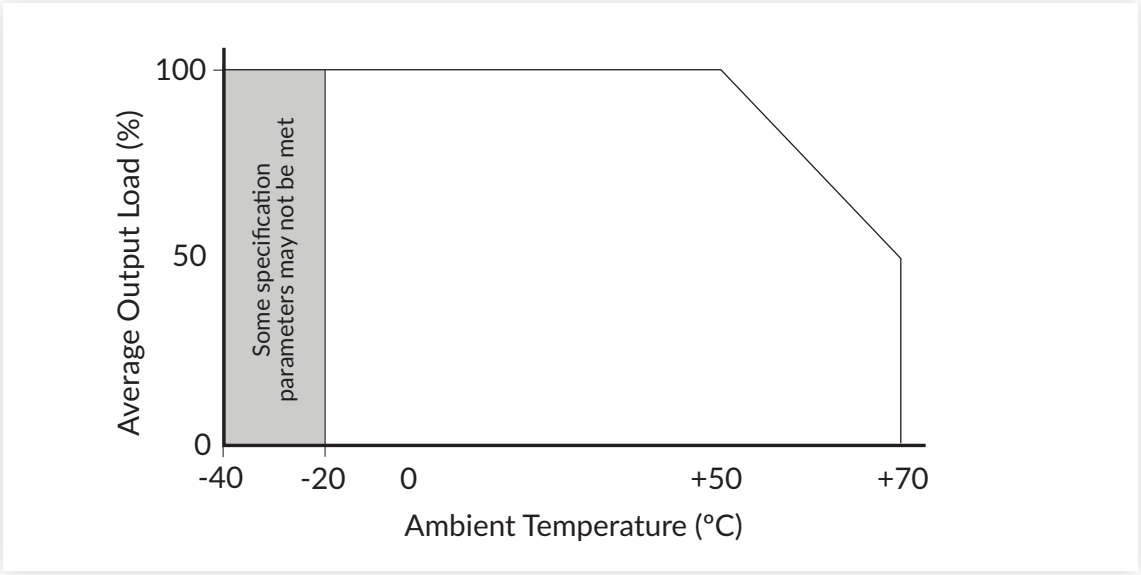
Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		+70	°C	See derating curve, fig.8. and Thermal Considerations on page 8
Storage Temperature	-40		+85	°C	
Cooling	Convection-cooled				
Humidity			95	%RH	Non-condensing
Operating Altitude			5000	m	ITE
			4000		Medical
Shock	3 x 30g shocks in each plane, total 18 shocks. 30g = 11ms (+/- 0.5msecs), half sine. Conforms to EN60068-2-27 & EN60068-2-47				
Vibration	Single axis 10-500 Hz at 2g sweep and endurance at resonance in all 3 planes. Conforms to EN60068-2-6				

Efficiency Graphs

Temperature Derating Curve

Figure 8



EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55011/32	Class B	
Radiated	EN55011/32	Class A	
		Class B	With 2 turns Wurth 742 712 22 core or similar on AC input cable
Harmonic Current	EN61000-3-2	Class A	All models
		Class C	≥50% load
Voltage Functions	EN61000-3-3		

EMC: Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Medical Device EMC	IEC60601-1-2	Ed.4.0:2014	as below	
Low Voltage PSU EMC	EN61204-3	High severity level	as below	
ESD	EN61000-4-2	4	A	±8kV contact, ±15kV air
Radiated	EN61000-4-3	3	A	
EFT	EN61000-4-4	3	A	
Surges	EN61000-4-5	Installation class 3	A	
Conducted	EN61000-4-6	3	A	
Magnetic Fields	EN61000-4-8	4	A	
Dips and Interruptions based on 250W output load	EN55024 (100VAC)	Dip >95% (0VAC), 8.3ms	A	
		Dip 30% (70VAC), 416ms	A	
		Dip >95% (0VAC), 4160ms	B	
	EN55024 (240VAC)	Dip >95% (0VAC), 10.0ms	A	
		Dip 30% (168VAC), 500ms	A	
		Dip >95% (0VAC), 5000ms	B	
	EN60601-1-2 (100VAC)	Dip 100% (0VAC), 10.0ms	A	
		Dip 100% (0VAC), 20ms	B	
		Dip 60% (40VAC), 100ms	A	Derate Output Power to 40W
		Dip 30% (70VAC), 500ms	A	
		Dip 100% (0VAC), 5000ms	B	
	EN60601-1-2 (240VAC)	Dip 100% (0VAC), 10.0ms	A	
		Dip 100% (0VAC), 20ms	B	
		Dip 60% (96VAC), 100ms	A	
		Dip 30% (168VAC), 500ms	A	
		Dip 100% (0VAC), 5000ms	B	

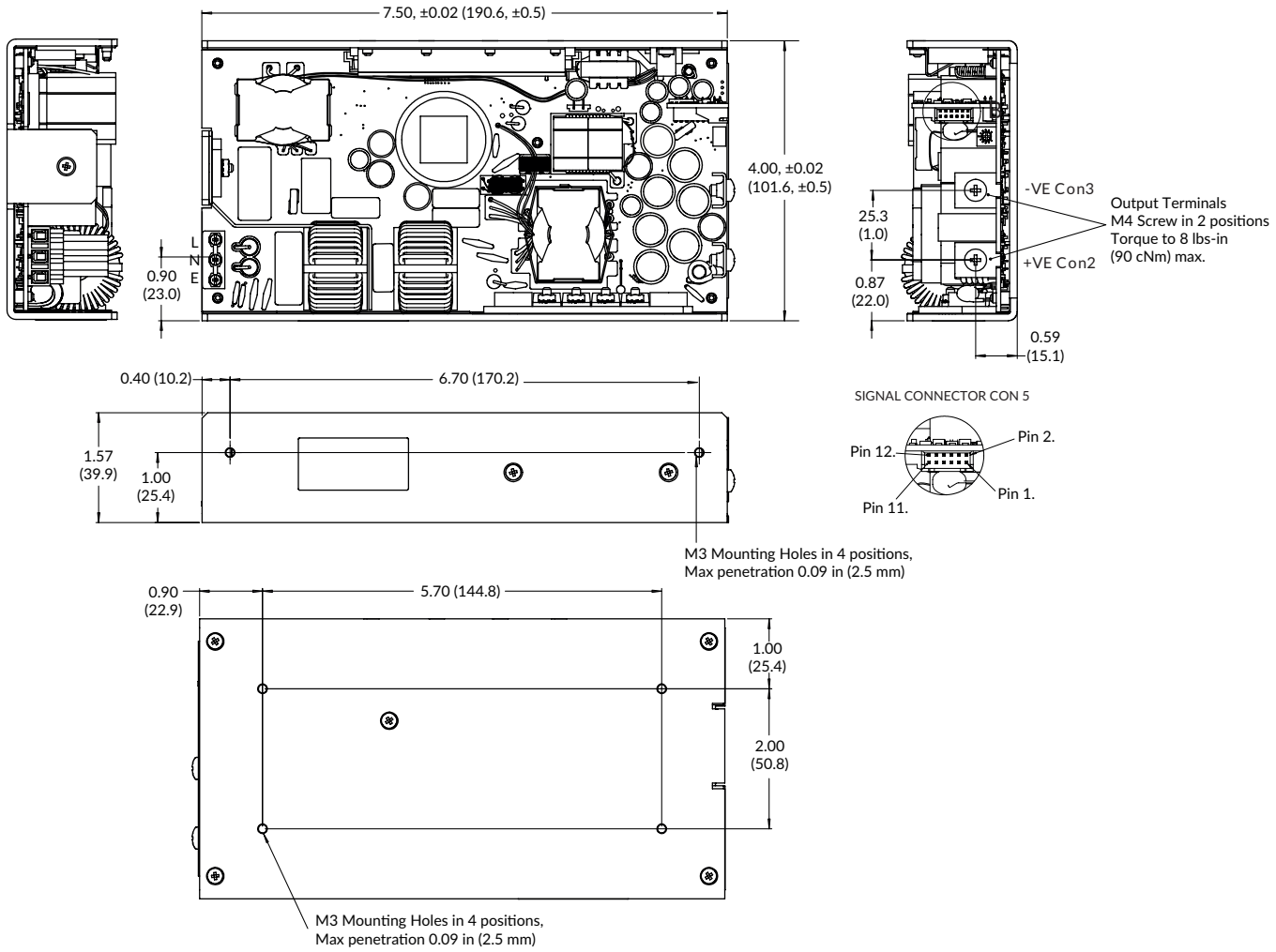
Safety Approvals

Certification	Standard	Notes & Conditions
CB	IEC60950-1 Ed 2	Information Technology
	IEC62368-1 Ed 2	Information Technology
	IEC60601-1 Ed 3.1 Including Risk Management	Medical
UL	UL62368-1, CSA 22.2 No.62368-1-11	Information Technology
	ANSI/AAMI ES60601-1:2005 & CSA C22.2, No.60601-1:14	Medical
TUV	EN62368-1	Information Technology
	EN60601-1	Medical
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

Means of Protection		Notes & Conditions
Primary to Secondary	2 x MOPP (Means of Patient Protection)	IEC60601-1 Ed 3.1
Primary to Earth	1 x MOPP (Means of Patient Protection)	
Secondary to Earth	1 x MOPP (Means of Patient Protection)	

Mechanical Details

CMP250PSxx



Input Connector CON1	
Pin	Single
1	Line
2	Neutral
3	Earth

Output Connector	
Pin	Single
CON2	+V1
CON3	-V1

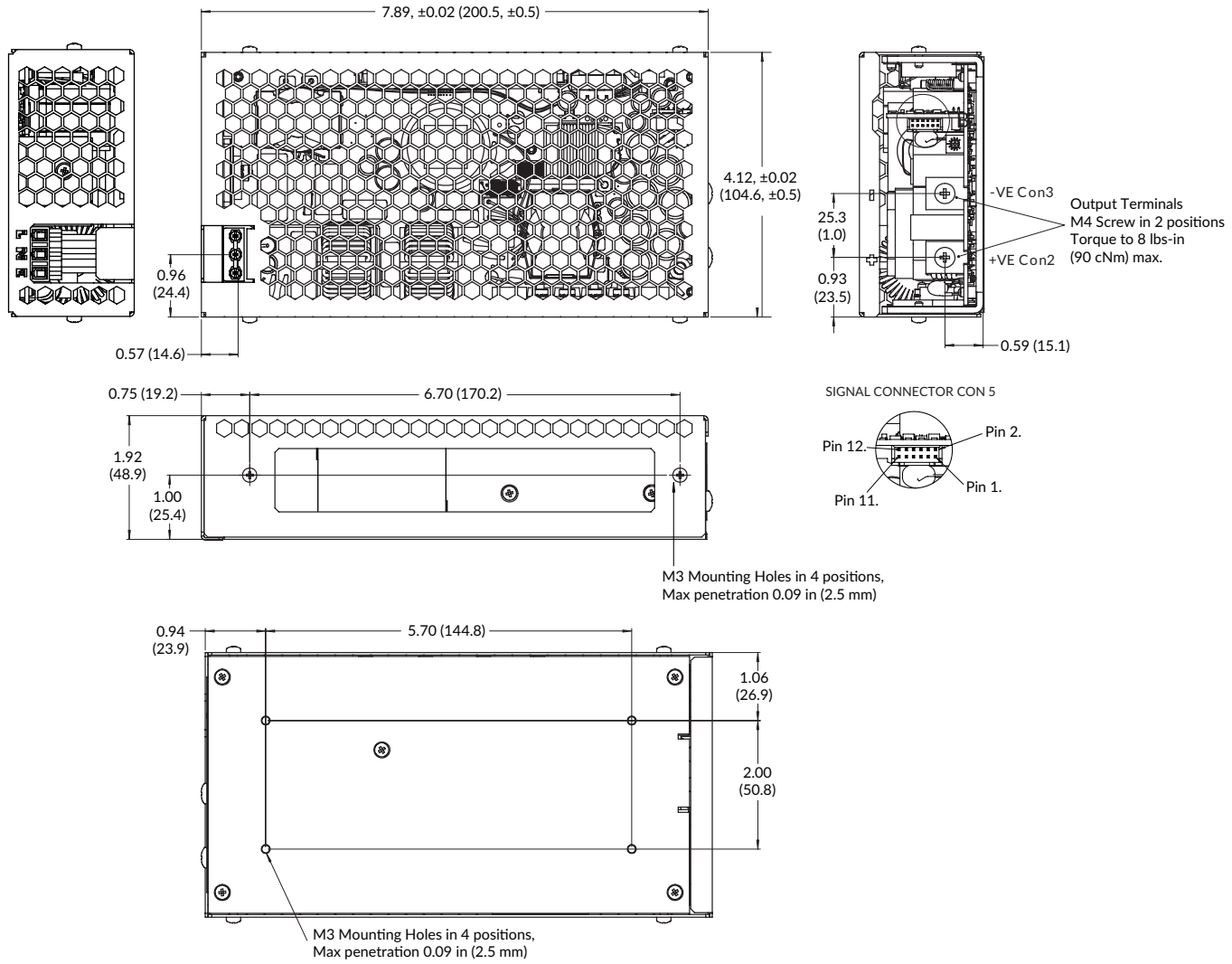
Signals Connector CON5			
Pin	Single	Pin	Single
1	-VE Standby V2	7	+VE Sense, V1
2	-VE Standby V2	8	-VE Sense, V1
3	+VE Standby V2	9	Current Share
4	+VE Standby V2	10	Inhibit
5	+VE Aux. V3	11	Power Fail
6	-VE Aux. V3	12	N/C

Notes:

1. All dimensions shown in inches (mm).

Mechanical Details

CMP250PSxx-C (Covered)



Input Connector CON1	
Pin	Single
1	Line
2	Neutral
3	Earth

Output Connector	
Pin	Single
CON2	+V1
CON3	-V1

Signals Connector CON5			
Pin	Single	Pin	Single
1	-VE Standby V2	7	+VE Sense, V1
2	-VE Standby V2	8	-VE Sense, V1
3	+VE Standby V2	9	Current Share
4	+VE Standby V2	10	Inhibit
5	+VE Aux. V3	11	Power Fail
6	-VE Aux. V3	12	N/C

Notes:

1. All dimensions shown in inches (mm).

Thermal Considerations

In order to ensure safe operation of the PSU in the end-use equipment, the temperature of the components listed in the table below must not be exceeded. Temperature should be monitored using K type thermocouples placed on the hottest part of the component (out of direct air flow). See below for component locations.

Temperature Measurements (at Ambient 50°C)	
Component	**Max. Temperature °C**
PFC1 Coil	120°C
T1 Coil	120°C
C5	105°C
C3	105°C
BR1	130°C
L12	130°C
L13	130°C

Service Life

The estimated service life of the CMP250 Series is determined by the cooling arrangements and load conditions experienced in the end application. Due to the uncertain nature of the end application this estimated service life is based on the actual measured temperature of a key capacitors within the product when installed in the end application. The worst case of the two figures below should be taken as the indicative service life in 24/7 operation.

The graphs below expresses the estimated lifetime of a given component temperature and assumes continuous operation at this temperature.

Estimated Service Life vs Component Temperature

