

225W CONVECTION COOLED

AC-DC POWER SUPPLIES

The UCP225 series is designed to minimize the no load power consumption and maximize efficiency to facilitate equipment design to meet the latest environmental legislation. Approved for medical and ITE applications, this range of single output AC/DC power supplies are packaged in an ultra-low profile 1.18" height with a foot print of just 3.12" by 5.0". The UCP225 provides up to 225W force-cooled or 150W convection-cooled leading to very high power densities of 12.2W/in³ or 8.1W/in³ respectively. A 12V, 500mA fan supply is included in the design which can also be delivered with an optional 5V/2A standby output. The power supply contains two fuses and low leakage currents as required by medical applications and is safety approved to operate in a 70°C ambient. The low profile and safety approvals covering ITE and medical standards along with conducted emissions to EN55011/32 level B allow the versatile UCP225 series to be used in a vast range of applications.



Features

- Low 1.18" Profile U Channel Construction
- -40°C to +70°C Operation
- 3.12" by 5.0" Footprint
- 150W Convection/225W Forced Cooled Ratings
- Optional 5V Standby and Remote On/Off
- 12V Fan Output
- Medical and ITE Approvals
- High Efficiency, up to 95%
- Less than 0.5W No Load Input Power

Models & Ratings

Model Number ^(3,4,5,6)	Output Voltage	Output Current		Optional Standby Output		Fan Output ^(7,8)	Efficiency ⁽²⁾
		Convection-cooled	Forced-cooled ⁽¹⁾	Convection-cooled	Forced-cooled ⁽¹⁾		
UCP225PS12	12V	12.50A	18.75A	5V/1.0A	5V/2.0A	12V/0.5A	92%
UCP225PS15	15V	10.00A	15.00A	5V/1.0A	5V/2.0A	12V/0.5A	92%
UCP225PS18	18V	8.33A	12.50A	5V/1.0A	5V/2.0A	12V/0.5A	92%
UCP225PS24	24V	6.25A	9.38A	5V/1.0A	5V/2.0A	12V/0.5A	92%
UCP225PS28	28V	5.36A	8.04A	5V/1.0A	5V/2.0A	12V/0.5A	92%
UCP225PS36	36V	4.16A	6.25A	5V/1.0A	5V/2.0A	12V/0.5A	92%
UCP225PS48	48V	3.10A	4.69A	5V/1.0A	5V/2.0A	12V/0.5A	92%

Notes:

1. Requires 10CFM or optional top fan cover, -TF
2. Minimum average efficiencies measured at 25%, 50%, 75% & 100% of 225 W load and 230 VAC input
3. Add suffix -T for input and output screw terminals e.g. UCP225PS24-T
4. Add suffix -TF for fan cover version e.g. UCP225PS24-TF
5. Add suffix -C for vented cover version e.g. UCP225PS24-C
6. Add suffix -A for optional 5V, 2A standby and remote on/off e.g. UCP225PS24-A
7. Typical voltage, actual regulated voltage will be in range of 10.5V to 11.1V
8. Regulation of the fan output requires a minimum load of 10W on the main output.

Applications



Healthcare



Home Healthcare



Industrial Electronics



Instrumentation



Security



Technology

Dimensions

UCP225:

5.00 x 3.12 x 1.18" (127.0 x 79.2 x 29.2 mm)

Summary

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	85	115/230	264	VAC	Derate from 100% at 90VAC to 90% at 85VAC
No Load Input Power			0.5	W	
Efficiency		94		%	Model dependent
Operating Temperature	-40		+70	°C	-40°C for 150 W load, -25°C for 225W load, see derating curve
EMC	EN55011/32 Level B Conducted & Level A Radiated, EN61000-3-2, EN61000-3-3				
Safety Approvals	IEC62368-1, IEC60601-1, UL62368-1, EN60601-1				

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage - Operating	85	115/230	264	VAC	Derate output from 100% at 90VAC to 90% at 85VAC
Input Frequency	47	50/60	63	Hz	
Power Factor		>0.9			230VAC, 100% load. EN61000-3-2 class A, class C >145W
Input Current - Full Load		2.2/1.1		A	115/230VAC
Inrush Current		120		A	230VAC, cold start 25°C
Earth Leakage Current		80/140	230	µA	
No Load Input Power			0.5	W	When main input is inhibited
Input Protection	F3.15 A/250 V Internal fuse fitted in line and neutral				

Output - Main Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage - V1	12		48	VDC	See Models & Ratings table
Initial Set Accuracy			±1	%	50% load, 115/230VAC
Minimum Load	0			A	No minimum load required
Start Up Delay			2	s	115/230VAC, full load
Hold Up Time	10	20/13		ms	Minimum at full load, 115VAC. Typical at 150W/225W
Drift			±0.02	%	After 20 min warm up
Line Regulation			±0.5	%	90-264VAC
Load Regulation			±0.5	%	0-100% load
Transient Response			4	%	Recovery within 1% in less than 500µs for a 50-75% and 75-50% load step
Over/Undershoot		5	9	%	Full load
Ripple & Noise			1	% pk-pk	20MHz bandwidth and 10µF electrolytic capacitor in parallel with 0.1µF ceramic capacitor
Overvoltage Protection	110		140	%	Vnom, recycle input to reset
Overload Protection	110		175	% I nom	
Short Circuit Protection					Trip & restart
Temperature Coefficient			0.02	%/°C	
Overtemperature Protection					Measured internally, auto resetting

Output - Optional 5 V Standby Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage		5.0		VDC	
Initial Set Accuracy			±1	%	50% load, 115/230VAC
Minimum Load	0			A	No minimum load required
Start Up Delay			0.5	s	115/230VAC, full load
Hold Up Time	300			ms	Minimum at full load, 115VAC. Typical at 150W/225W
Drift			±0.02	%	After 20 min warm up
Line Regulation			±0.5	%	90-264VAC
Load Regulation			±0.5	%	0-100% load
Transient Response			4	%	Recovery within 1% in less than 500µs for a 50-75% and 75-50% load step
Over/Undershoot			5	%	Full load
Ripple & Noise			1.2	% pk-pk	20MHz bandwidth and 10µF electrolytic capacitor in parallel with 0.1µF ceramic capacitor
Overload Protection		2.4	4.0	A	
Short Circuit Protection					Trip & restart
Temperature Coefficient			0.02	%/°C	
Remote On/Off	Connect pin 3 of CN2 to pin 1 to turn main output off. Connect to pin 2 or leave open to turn main output on				

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		94		%	Model dependent
Isolation: Input to Output	4000			VAC	2 x MOPP
Input to Ground	1500			VAC	1 x MOPP
Output to Ground	1500			VAC	1 x MOPP
Switching Frequency	40		130	kHz	PFC
	50		80	kHz	Main converter
		65		kHz	For optional standby output
Power Density			12.2/8.1	W/in ³	Forced/convection-cooled
Mean Time Between Failure		300		khrs	MIL-HDBK-217F, Notice 2 +25°C GB
Weight		0.71 (320)		lb (g)	For U channel version

Efficiency Graphs

Efficiency vs Load

Figure 1
UCP225PS12

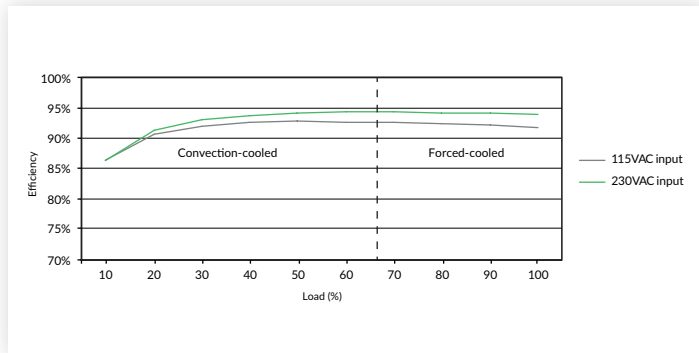


Figure 2
UCP225PS12-A

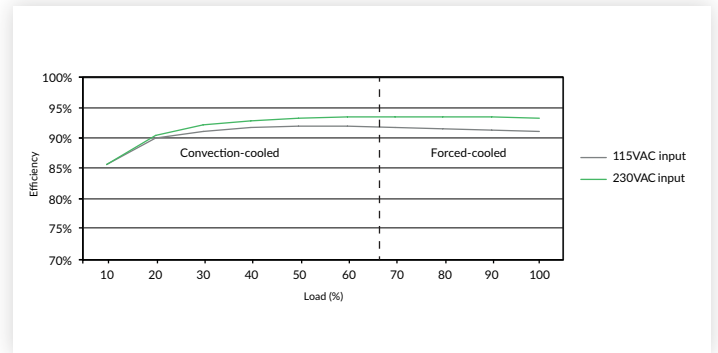


Figure 3
UCP225PS24

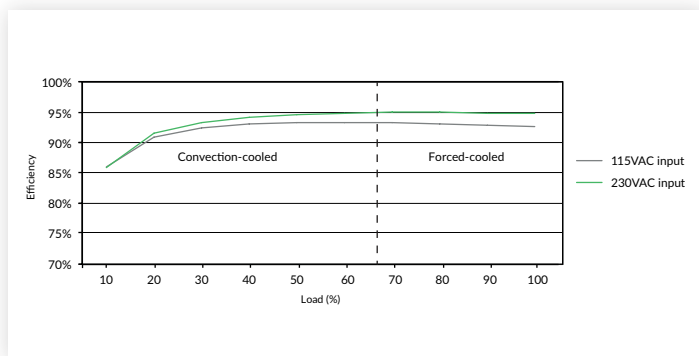
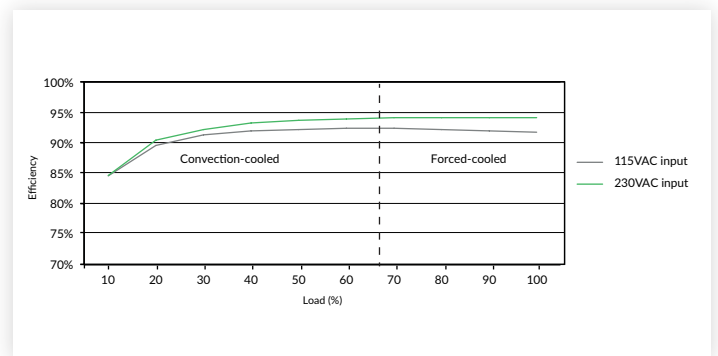


Figure 4
UCP225PS24-A



Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		+70	°C	-40°C for 150W load, -25°C for 225W load. See derating curves, figures 5 and 6
Storage Temperature	-40		+85	°C	
Cooling	10			CFM	Forced-cooled >150W
Humidity	5		95	%RH	Non-condensing
Operating Altitude			5000/4000	m	ITE/Medical
Shock	3 x 30g shocks in each plane, total 18 shocks. 30g = 11ms (+/- 0.5msecs), half sine. Conforms to EN60068-2-27				
Vibration	Single axis 10-500 Hz at 2g sweep and endurance at resonance in all 3 planes. Conforms to EN60068-2-6				

Applications Notes

Temperature Derating Curves

Figure 5
150W Convection Cooled

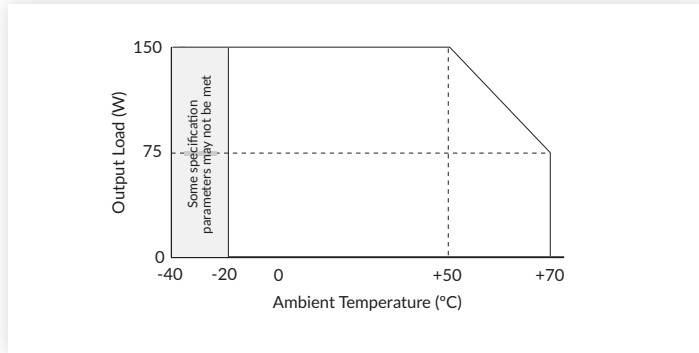
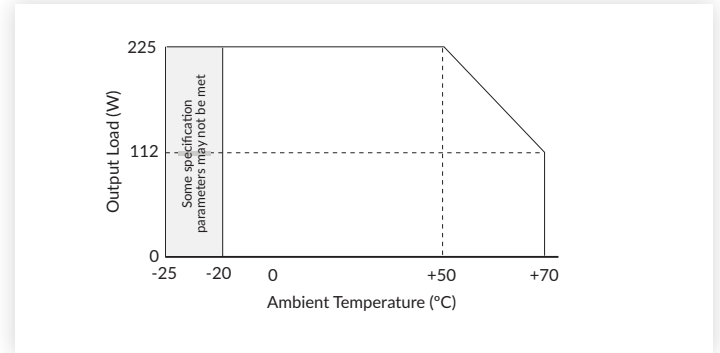


Figure 6
225W Forced Cooled



EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55011/32	Class B	
Radiated	EN55011/32	Class A	Class B with King Core ferrites: Output cable: KCF-130-B, Input cable for 150W load: K5B RC 14x28.5x7-M for all models with additional KCF-130-B on 48V version. Input cable for 225W load: K5B RC 14x28.5x7-M plus KCF-130-B.
Harmonic Current	EN61000-3-2	Class A	Meets Class C for loads above 145W
Voltage Functions	EN61000-3-3		

EMC: Immunity

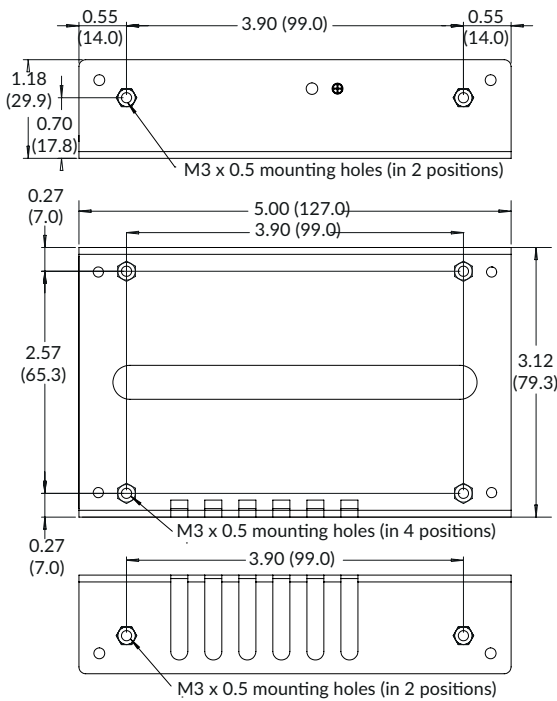
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Medical Device EMC	IEC60601-1-2	Ed.4.0	as below	
Low Voltage PSU EMC	EN61204-3	High severity level	as below	
ESD	EN61000-4-2	4	A	±8kV contact, ±15kV air
Radiated	EN61000-4-3	3	A	
EFT	EN61000-4-4	3	A	
Surges	EN61000-4-5	Installation class 3	A	
Conducted	EN61000-4-6	3	A	
Magnetic Fields	EN61000-4-8	4	A	
Dips and Interruptions	EN55035 (100VAC)	Dip >95% (0VAC), 8.3ms	A	
		Dip 30% (70VAC), 416ms	A	
		Dip >95% (0VAC), 4160ms	B	
	EN55035 (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	Performance criteria A <60W for 15V & 18V versions, <100W for others
		Dip 60% (40VAC), 100ms	A	Derate Output Power to 40W
		Dip 30% (70VAC), 500ms	A	
	EN60601-1-2 (240VAC)	Dip 100% (0VAC), 5000ms	B	
		Dip 100% (0VAC), 10.0ms	A	
		Dip 100% (0VAC), 20ms	B	Performance criteria A <60W for 15V & 18V versions, <100W for others
		Dip 60% (96VAC), 100ms	A	
		Dip 30% (168VAC), 500ms	A	
		Dip 100% (0VAC), 5000ms	B	

Safety Approvals

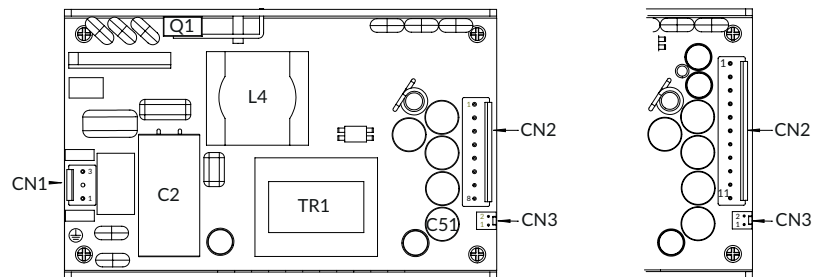
Certification	Standard	Notes & Conditions
CB	IEC62368-1	Information Technology
	IEC60601-1 Ed 3.1 Including Risk Management	Medical
UL	CSA 22.2 No.62368-1-11, UL62368-1	Information Technology
	ES60601-1	Medical
TUV	EN62368-1	Information Technology
	EN60601-1	Medical
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	
Isolation	Level	Notes & Conditions
Primary to Secondary	2 x MOPP (Means of Patient Protection)	IEC60601-1
Primary to Earth	1 x MOPP (Means of Patient Protection)	IEC60601-1
Secondary to Earth	1 x MOPP (Means of Patient Protection) @ 48VDC	IEC60601-1

Mechanical Details

Standard U-Channel Version



Optional Standby Output & Remote On/Off Version, -A



CN1 - Input Connector	
Pin	Single
1	Neutral
2	No Fitted
3	Line

Mates with JST housing VHR-3N and JST Series SVH-21T-P1.1 crimp terminals

CN3 - Fan Connector	
Pin	Single
1	Fan -
2	Fan +

Mates with Molex housing 22-01-1022 and 2759 crimp terminals

CN2 - Output Connector for standard models	
Pin	Single
1	+Vout
2	+Vout
3	+Vout
4	+Vout
5	-Vout
6	-Vout
7	-Vout
8	-Vout

Mates with JST housing VHR-8N and JST Series SVH-21T-P1.1 crimp terminals

CN2 - Output Connector optional -A version	
Pin	Single
1	+5V standby
2	RTN
3	Remote On/Off
4	+Vout
5	+Vout
6	+Vout
7	+Vout
8	-Vout
9	-Vout
10	-Vout
11	-Vout

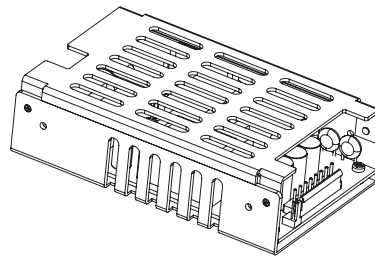
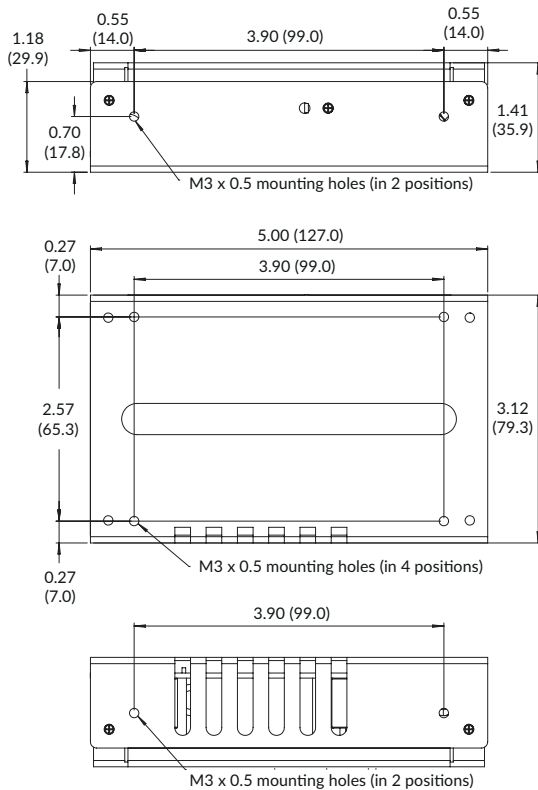
Mates with JST housing VHR-11N and JST Series SVH-21T-P1.1 crimp terminals

Notes:

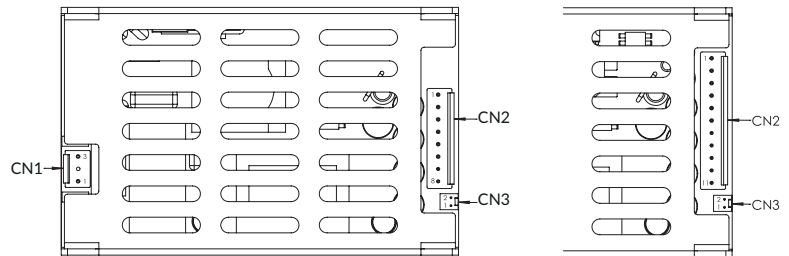
- All dimensions shown in inches (mm). Tolerance: ± 0.02 (0.5)
- Weight: 0.71lbs (320g) approx.
- A kit is available containing the housings and crimps for CN1, CN2 and CN3 for the -A version with optional standby, order part ECP_UCP-A CON KIT

Mechanical Details

Covered Version (-C suffix)



Optional Standby Output & Remote On/Off Version, -A



CN1 - Input Connector	
Pin	Single
1	Neutral
2	No Fitted
3	Line

Mates with JST housing VHR-3N and JST Series SVH-21T-P1.1 crimp terminals

CN3 - Fan Connector	
Pin	Single
1	Fan -
2	Fan +

Mates with Molex housing 22-01-1022 and 2759 crimp terminals

CN2 - Output Connector for standard models	
Pin	Single
1	+Vout
2	+Vout
3	+Vout
4	+Vout
5	-Vout
6	-Vout
7	-Vout
8	-Vout

Mates with JST housing VHR-8N and JST Series SVH-21T-P1.1 crimp terminals

CN2 - Output Connector optional -A version	
Pin	Single
1	+5V standby
2	RTN
3	Remote On/Off
4	+Vout
5	+Vout
6	+Vout
7	+Vout
8	-Vout
9	-Vout
10	-Vout
11	-Vout

Mates with JST housing VHR-11N and JST Series SVH-21T-P1.1 crimp terminals

Notes:

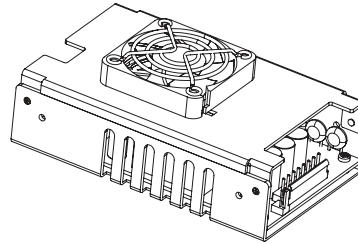
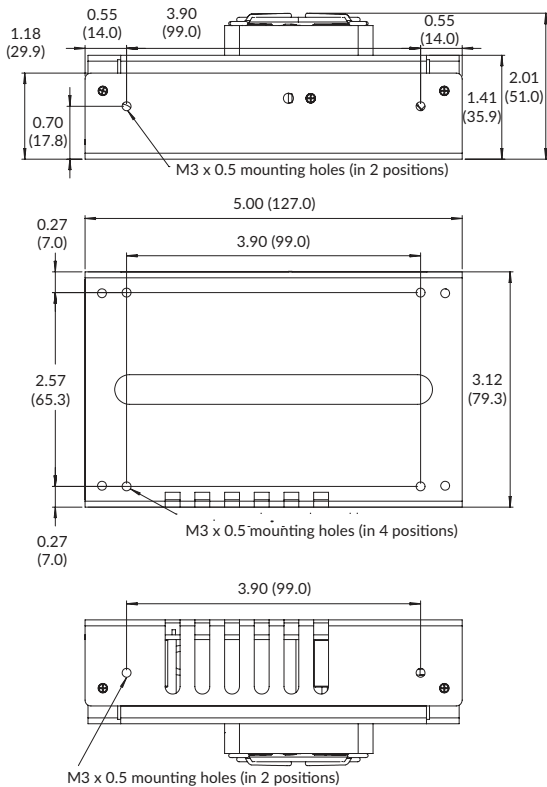
1. All dimensions shown in inches (mm). Tolerance: ± 0.02 (0.5)
2. Weight: 0.78lbs (355g) approx.
3. A kit is available containing the housings and crimps for CN1, CN2 and CN3 for the -A version with optional standby, order part ECP225_UCP225-A CON KIT.

UCP225 Series

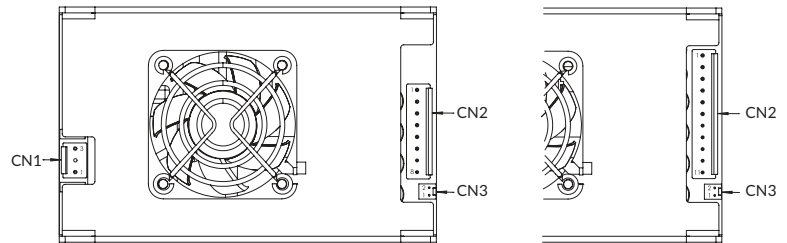
AC-DC POWER SUPPLIES

Mechanical Details

Top Fan Version (-TF suffix)



Optional Standby Output & Remote On/Off Version, -A



CN1 - Input Connector	
Pin	Single
1	Neutral
2	No Fitted
3	Line

Mates with JST housing VHR-3N and JST Series SVH-21T-P1.1 crimp terminals

CN3 - Fan Connector	
Pin	Single
1	Fan -
2	Fan +

Mates with Molex housing 22-01-1022 and 2759 crimp terminals

CN2 - Output Connector for standard models	
Pin	Single
1	+Vout
2	+Vout
3	+Vout
4	+Vout
5	-Vout
6	-Vout
7	-Vout
8	-Vout

Mates with JST housing VHR-8N and JST Series SVH-21T-P1.1 crimp terminals

CN2 - Output Connector optional -A version	
Pin	Single
1	+5V standby
2	RTN
3	Remote On/Off
4	+Vout
5	+Vout
6	+Vout
7	+Vout
8	-Vout
9	-Vout
10	-Vout
11	-Vout

Mates with JST housing VHR-11N and JST Series SVH-21T-P1.1 crimp terminals

Notes:

- All dimensions shown in inches (mm). Tolerance: ± 0.02 (0.5)
- Weight: 0.86lbs (390g) approx.
- A kit is available containing the housings and crimps for CN1, CN2 and CN3 for the -A version with optional standby, order part ECP225_UCP225-A CON KIT.

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 Mechanical Details for component locations.

Temperature Measurements (at Maximum Ambient)	
Component	Max. Temperature °C
TR1 Coil	110°C
L4 Coil	120°C
Q1 Body	120°C
C2	105°C
C51	105°C

Service Life

The estimated service life of the UCP225 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 capacitor with in the product when installed by the end application.

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

Estimated Service Life vs Component Temperature

