UCH600 Series

XP Power

600W CONVECTION-COOLED

AC-DC POWER SUPPLIES

Approved for medical and ITE applications, this range of convection cooled single output AC/DC power supplies are packaged in an ultra compact foot print of just 5.0” by 8.0”. The UCH600 provides up to 600W convection-cooled leading to very high power density of 9.5W/in3. A 12V/0.6A fan supply is included in the design to faciliate system cooling, if required, along with 5V/1A standby output. The power supply contains two fuses and low leakage currents as required by medical device applications.

The low profile and safety approvals covering ITE and medical standards along with conducted emissions to EN55011/32 level B allow the versatile UCH600 series to be used in a vast range of applications.

Applications

Dimensions

UCH600:

8.00 x 5.00 x 1.57 in (203.2 x 127.0 x 40.0 mm)

Features

- 600W convection cooled
- 8.0” x 5.0” x 1.57” U channel
- Suitable for BF applications
- ITE & medical (BF) approvals
- Class B conducted & radiated emissions
- Power density 9.5W/in^3
- High efficiency, up to 95%
- 5V 1.0A standby
- Remote On/Off
- -20°C to +70°C operating temperature
- 3 year warranty

Models & Ratings

Model Number	Output Power	Output Voltage	Output Current	Standby Output	Fan Output[1]	Efficiency[2]
UCH600PS12	600W	12.0V	50.0A	5V/1.0A	12V/0.6A	93%
UCH600PS24	600W	24.0V	25.0A	5V/1.0A	12V/0.6A	95%
UCH600PS36	600W	36.0V	16.6A	5V/1.0A	12V/0.6A	95%
UCH600PS48	600W	48.0V	12.5A	5V/1.0A	12V/0.6A	95%

Notes:

1. Typical voltage, actual regulated voltage will be in range of 11.4V to 12.6V.
2. Typical efficiencies measured at 100% load and 230VAC input.
3. Regulation of the fan output requires a minimum load of 10W on the main output.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage - Operating	90	115/230	264	VAC	
Input Frequency	47	50/60	63	Hz	
Power Factor		>0.9			230VAC, 100% load. EN61000-3-2 class A, class C >150W
Input Current - Full Load		6.0/3.0		A	115/230VAC
Inrush Current			60	A	230VAC cold start, 25°C
Earth Leakage Current		80/140	300	µA	115/230VAC/50Hz (Typ), 264VAC/60Hz (Max)
No load Input Power			1.5	W	When main output is Inhibited
Input Protection	F12A/250 V Internal fuse fitted in line and neutral.				

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage - V1	12		48	VDC	See Models and 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			ms	Min at full load, 115VAC
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			1.5/1	%pk-pk	20MHz bandwidth and 47µF electrolytic capacitor in parallel with 0.1µF ceramic capacitor 12V/other models.,
Overvoltage Protection	110		130	%	Vnom, recycle input to reset
Overload Protection	110		130	% Inom	
Short Circuit Protection					Trip & Restart
Temperature Coefficient			0.02	%/°C	
Overtemperature Protection					Measured internally, Auto Resetting
Output Leakage Current			50	µA	264 VAC/60Hz
Remote On/Off	Connect CN202 pin 3 to pin 2 to inhibit output				

Output - 5V Standby

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage		5		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	500			ms	Min at full load, 115VAC
Drift			±0.02	%	After 20 min warm up
Line Regulation			±0.5	%	90-264VAC
Load Regulation			1	%	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			2	%pk-pk	20MHz bandwidth and 47µF electrolytic capacitor in parallel with 0.1µF ceramic capacitor.
Overload Protection			2	A	
Short Circuit Protection					Trip & Restart
Temperature Coefficient			0.02	%/°C	

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		95		%	230VAC Full load (see fig. 1 & 2)
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	37		120	kHz	PFC, Variable
	76		106	kHz	Main converter, Variable
		100		kHz	5V standby output
Power Density			9.5	W/in^3	
MTBF		300		kHrs	MIL-HDBK-217F, Notice 2 +25°C GB
Weight		2.43 (1.1)		lb (kg)	

EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55011/EN55032	Class B	
Radiated	EN55011/EN55032	Class A	
Harmonic Currents	EN61000-3-2	Class A	Class C for Load >150W
Voltage Flicker	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 discharge
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	EN55024 (100VAC)	Dip >95% (0 VAC), 8.3ms	A	
		Dip 30% (70 VAC), 416ms	B	
		Dip >95% (0 VAC), 4160ms	B	
	EN55024 (240VAC)	Dip >95% (0 VAC), 10.0ms	A	
		Dip 30% (168 VAC), 500ms	A	
		Dip >95% (0 VAC), 5000ms	B	
	EN60601-1-2 (100VAC)	Dip 100% (0 VAC), 10.0ms	A	
		Dip 100% (0 VAC), 20.0ms	B	
		Dip 60% (40 VAC), 100ms	B	
		Dip 30% (70 VAC), 500ms	B	
		Dip 100% (0 VAC), 5000ms	B	
	EN60601-1-2 (240VAC)	Dip 100% (0 VAC), 10.0ms	A	
		Dip 100% (0 VAC), 20.0ms	B	
		Dip 60% (96 VAC), 100ms	A	
		Dip 30% (168 VAC), 500ms	A	
		Dip 100% (0 VAC), 5000ms	B	

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-20		+70	°C	See derating curve, safety approved to +50°C
Storage Temperature	-40		+80	°C	
Cooling					Convection cooled
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 (±0.5ms), half sine. Conforms to EN60068-2-27				
Vibration	Single axis 10-500Hz at 2g sweep and endurance at resonance in all 3 planes. Conforms to EN60068-2-6				

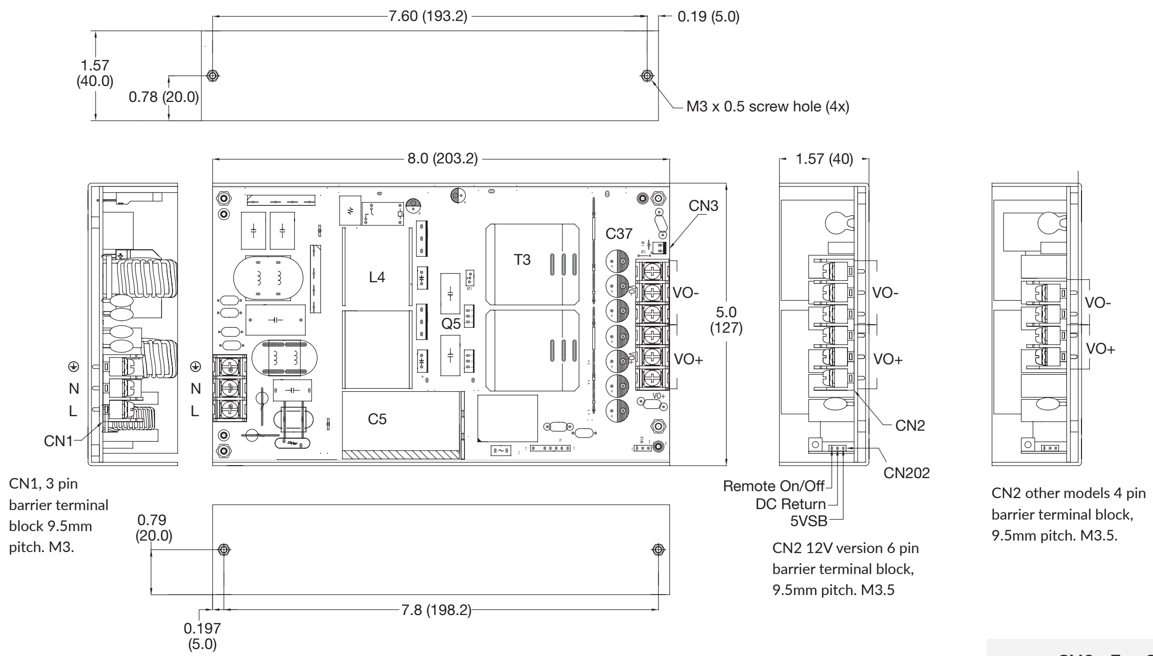
Safety Approvals

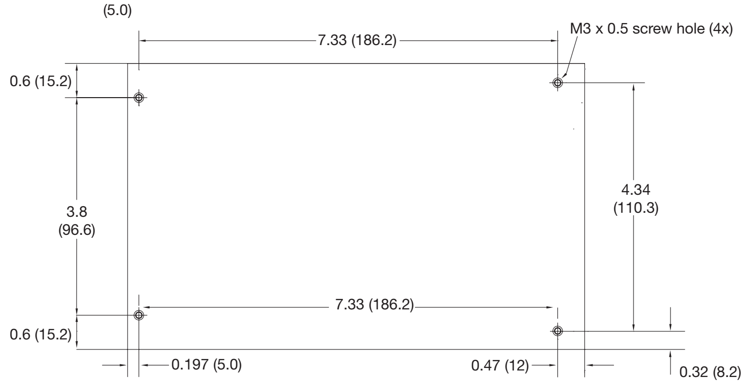
Safety Agency	Safety Standard	Notes & Conditions
CB Report	IEC62368-1	Information Technology
	IEC60601-1 Ed 3.1 Including Risk Management	Medical
UL	UL62368-1	Information Technology
	ANSI/AAMI ES60601-1 & CSA C22.2 No.60601-1:08	Medical
TUV	EN62368-1	Information Technology
	EN60601-1	Medical
CE	Meets 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)	

UCH600 Series

Mechanical Details





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

Mates with Molex 22-01-1022

CN202 - Signal Connector	
Pin 1	+5V Standby
Pin 2	DC Return
Pin 3	Remote On/Off

Mates with JST Molex XHP-3

Notes:

1. All dimensions shown in inches (mm). Tolerance: ±0.02 (0.5)
2. Weight: 2.43lbs (1100g) approx.
3. Maximum screw penetration 0.1" (2.5mm)
4. To turn output off, connect Remote On/Off, Pin 3 to Return, Pin 2.
   Output is on if Remote On/Off, Pin 3 is floating or connected to 5V standby, Pin 1.

Applications Notes

Efficiency Vs Load

Figure 1 - UCH600PS12

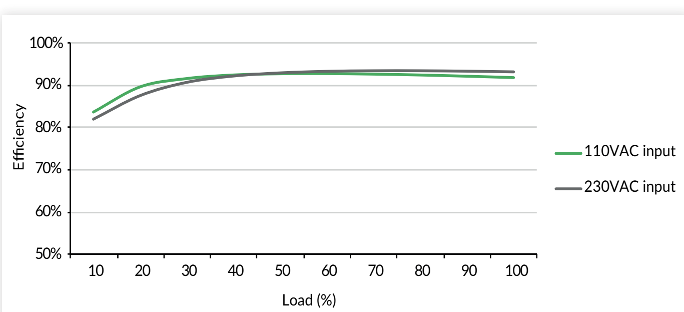
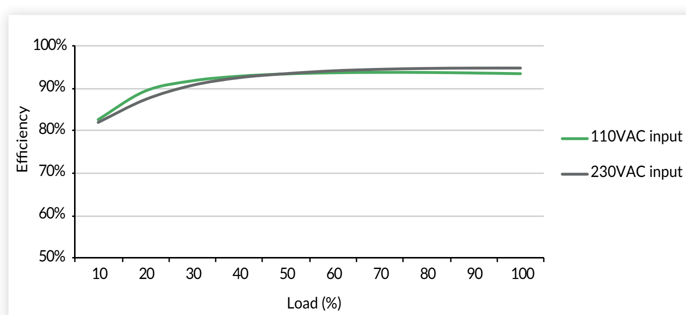


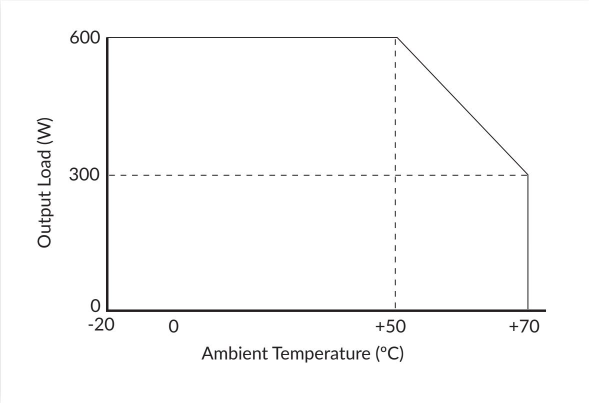
Figure 2 - UCH600PS24



Applications Notes

Temperature Derating Curves

Figure 3



Thermal Consideration

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**
T3 Coil	110°C
L4 Coil	120°C
Q5 Body	120°C
C5	105°C
C37	105°C

Service Life

The estimated service life of the UCH600 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

Figure 4