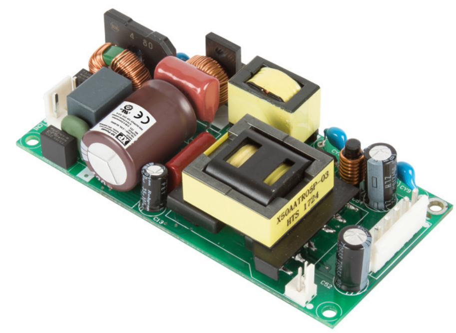
EPL150 Series

AC-DC Power Supplies

150 Watts

- 100W convection cooled
- Class I
- High efficiency, up to 94%
- Medical (BF) approvals
- High power density
- Less than 0.5W no load input power



Dimensions:

EPL150:
4.00 x 2.00 x 0.99" (101.6 x 50.8 x 25.1 mm)

The EPL150 series maximises efficiency across the load range and minimises no load power consumption minimising heat dissipation, reducing running costs and enabling compliance with the latest environmental goals and legislation. Fully approved as Class I & Class II for ITE, Industrial and Medical applications the EPL150 provides up to 100 W when convection cooled and up to 150 W when force cooled at just 10 CFM. A 12 V 0.5 A fan supply is included to support force cooled applications. The small footprint, low profile, low noise and comprehensive safety agency approvals enable this versatile product to be suitable for a wide range of Medical, ITE and industrial applications.

Models & Ratings

Output Power	Output Voltage	Output Current		Fan Output	Efficiency[2]	Model Number
		Convection-cooled	Forced-cooled[1]			
150 W	12.0 V	8.33 A[3]	12.50 A	12 V/0.5 A	93%	EPL150PS12
150 W	15.0 V	6.67 A	10.00 A	12 V/0.5 A	93%	EPL150PS15
150 W	18.0 V	5.56 A	8.33 A	12 V/0.5 A	93%	EPL150PS18
150 W	24.0 V	4.17 A	6.25 A	12 V/0.5 A	93%	EPL150PS24
150 W	28.0 V	3.50 A	5.40 A	12 V/0.5 A	93%	EPL150PS28
150 W	36.0 V	2.78 A	4.17 A	12 V/0.5 A	93%	EPL150PS36
150 W	48.0 V	2.08 A	3.10 A	12 V/0.5 A	93%	EPL150PS48

Notes

1. Requires 10 CFM.
2. Minimum average efficiencies measured at 25%, 50%, 75% & 100% of 150 W load and 230 VAC input.
3 Derate to 7.5 A below 100 VAC input.

Summary

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Range	80	115/230	264	VAC	Derate load from 100% at 90 VAC to 90% at 85 VAC and 85% at 80 VAC. See note 3 above for 12 V model.
No Load Input Power			0.5	W	
Efficiency		93		%	230 VAC (see fig.1 & 2)
Operating Temperature	-20		+70	°C	See derating curve (fig.3)
EMC	Conducted: EN55011/32, Class B, Radiated: EN55011/32, Class A (Class B with external ferrite core, see EMC Emissions for details)				

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage - Operating	80	115/230	264	VAC	Derate output from 100% at 90 VAC to 90% at 85 VAC and 85% at 80 VAC. 12 V models derate to 90% below 100 VAC.
Input Frequency	47	50/60	63	Hz	
Power Factor		>0.9			230 VAC, 100% load EN61000-3-2 class A
Input Current - Full Load		2.2/1.1		A	115/230 VAC
Inrush Current		120		A	230 VAC cold start, 25 °C
Earth Leakage Current		80/150	230	µA	115/230 VAC/50 Hz (Typ), 264 VAC/60 Hz (Max)
No load Input Power			0.5	W	
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 and Ratings table
Initial Set Accuracy			±1	%	50% load, 115/230 VAC
Output Voltage Adjustment-V1				%	None
Minimum Load	0			A	No minimum load required
Start Up Delay			2	s	115/230 VAC full load.
Hold Up Time	10	20/13		ms	Min at full load, 115 VAC. Typical at 100W/150W
Drift			±0.02	%	After 20 min warm up
Line Regulation			±0.5	%	90-264 VAC
Load Regulation			±0.5	%	0-100% load.
Transient Response			4	%	Recovery within 1% in less than 500 µs for a 50-75% and 75-50% load step
Over/Undershoot			7	%	Full load
Ripple & Noise			1	% pk-pk	20 MHz bandwidth and 10 µF electrolytic capacitor in parallel with 0.1 µF ceramic capacitor.
Overvoltage Protection	110		140	%	Vnom, recycle input to reset
Overload Protection	110		170	% I nom	
Short Circuit Protection					Trip & Restart
Temperature Coefficient			0.02	%/°C	

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		93		%	230 VAC (see fig. 1 & 2)
Isolation: Input to Output	4000			VAC	2 MOPP
Input to Ground	1500			VAC	1 MOPP
Output to Ground	1500			VAC	1 MOPP
Patient Leakage Current		50	80	µA	At 264 VAC, 60 Hz
Switching Frequency	40		130	kHz	PFC
	50		95	kHz	Main converter
Power Density			18.9/12.6	W/in³	Forced/convection-cooled
Mean Time Between Failure		600		kHrs	MIL-HDBK-217F, Notice 2 +25 °C GB
Weight		0.26 (120)		lb(g)	

Efficiency Vs Load

Figure 1
EPL150PS24
Convection cooled, 100 W

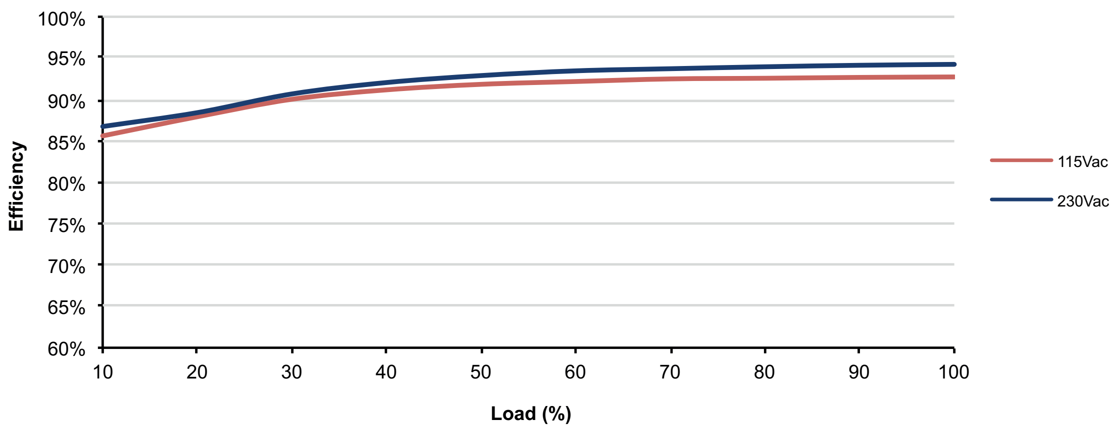
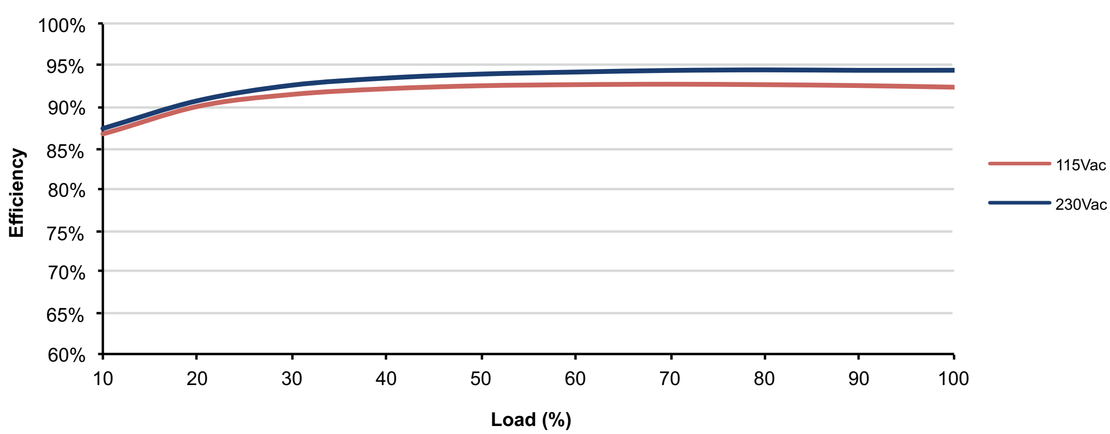


Figure 2
EPL150PS24
Force cooled, 150 W

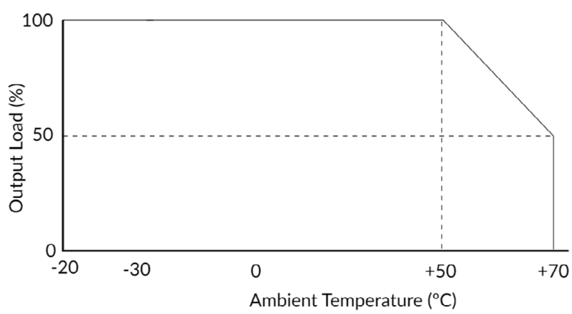


Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-20		+70	°C	See derating curve, fig.3
Storage Temperature	-40		+85	°C	
Cooling	10			CFM	Forced-cooled > 100W
Humidity	5		95	%RH	Non-condensing
Operating Altitude			5000	m	
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				

Temperature Derating Curve

Figure 3



EMC: Emissions

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Conducted	EN55011/32	Class B		
Radiated	EN55011/32	Class A		Class B with King Core KCF-100-B on input cable
Harmonic Current	EN61000-3-2	Class A		
Voltage Functions	EN61000-3-3			

EMC: Immunity

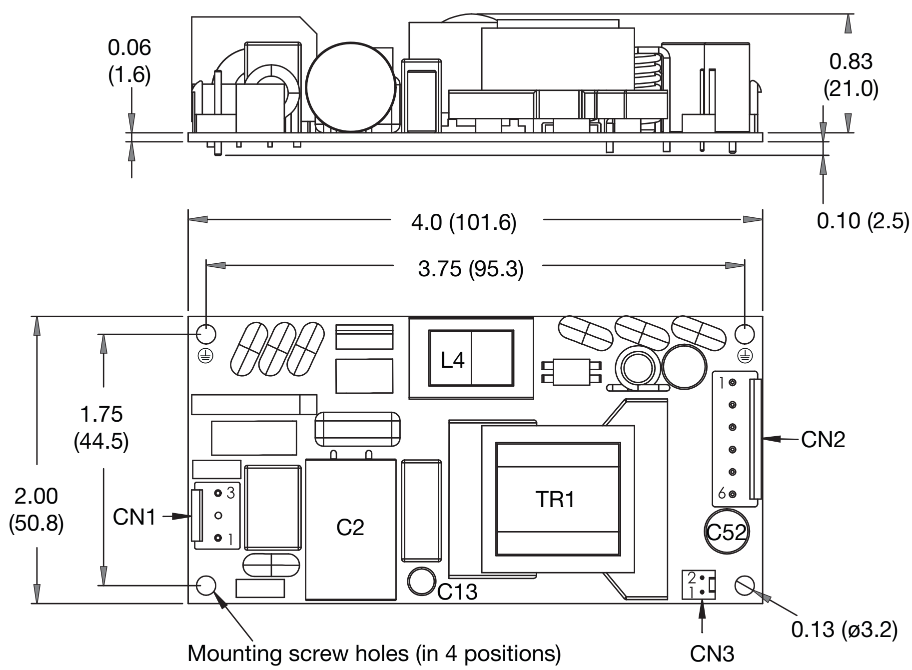
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Medical Device EMC	IEC60601-1-2	Ed.4.0 : 2014	as below	
Low Voltage PSU EMC	EN61204-3	High severity level	as below	
ESD	EN61000-4-2	4	A	±8kV contact, ±15kV air
Radiated	EN61000-4-3	3	A	
EFT	EN61000-4-4	3	A	
Surges	EN61000-4-5	Installation class 3	A	
Conducted	EN61000-4-6	3	A	
Magnetic Fields	EN61000-4-8	4	A	
Dips and Interruptions	EN55035 (100 VAC)	Dip >95% (0 VAC), 8.3 ms	A	
		Dip 30% (70 VAC), 416 ms	A	
		Dip >95% (0 VAC), 4160 ms	B	
	EN55035 (240 VAC)	Dip >95% (0 VAC), 10.0 ms	A	
		Dip 30% (168 VAC), 500 ms	A	
		Dip >95% (0 VAC), 5000 ms	B	
	EN60601-1-2 (100 VAC)	Dip 100% (0 VAC), 10.0 ms	A	
		Dip 100% (0 VAC), 20 ms	B	
		Dip 60% (40 VAC), 100 ms	B	
		Dip 30% (70 VAC), 500 ms	A	
		Dip 100% (0 VAC), 5000 ms	B	
	EN60601-1-2 (240 VAC)	Dip 100% (0 VAC), 10.0 ms	A	
		Dip 100% (0 VAC), 20 ms	B	
		Dip 60% (96 VAC), 100 ms	A	
		Dip 30% (168 VAC), 500 ms	A	
		Dip 100% (0 VAC), 5000 ms	B	

Safety Approvals

Safety Agency	Safety Standard	Notes & Conditions
CB Report	IEC60950-1-1, IEC62368-1	Information Technology
	IEC60601-1	Medical
UL	UL60950-1, UL62368-1	Information Technology
	ES60601-1	Medical
EN	EN62368-1	Information Technology
	EN60601-1	Medical
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

Isolation	Safety Standard	Notes & Conditions
Primary to Secondary	2 x MOPP (Means of Patient Protection)	
Primary to Earth	1 x MOPP (Means of Patient Protection)	
Secondary to Earth	1 x MOPP (Means of Patient Protection)	Suitable for use in BF applied part applications

Mechanical Details



CN1	
Pin 1	AC-L
Pin 2	
Pin 3	AC-N

Mates with JST VHR-3N housing and SVH-21T-P1.1 crimps

CN2	
Pin 1	+Vo
Pin 2	+Vo
Pin 3	+Vo
Pin 4	Com
Pin 5	Com
Pin 6	Com

Mates with JST VHR-6N housing and SVH-21T-P1.1 crimps

CN3	
Pin 1	Fan -
Pin 2	Fan +

Mates with Molex 22-01-1022 housing and 2759 crimps

Mounting holes marked with ⏚ must be connected to safety earth in Class I application or connected together in Class II application.

Notes

1. All dimensions shown in inches (mm).
   Tolerance: ±0.02 (0.5)
2. Weight: 0.26 lbs (120 g) approx.

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 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	120°C
L4 Coil	120°C
C13	105°C
C52	105°C
C2	105°C

Service Life

The estimated service life of the EPL150 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 key capacitors within the product when installed by the end application,

The graph below expresses the estimated lifetime based on the temperature of these key components based on the average temperature over the lifetime of the equipment.

Estimated Service Life vs Component Temperature

Figure 4