## **ALM65 Series**

## **AC-DC Power Supplies**



## 65 Watts

- Medical & IT Safety Approvals
- Energy Efficiency Level VI
- 4th Edition Medical EMC
- IP32 Environmental Rating
- Class I and Class II Versions
- <0.21 W Standby Power</li>
- 0 °C to 60 °C Operation
- Low Earth Leakage Current
- 3 Year Warranty



#### Dimensions:

ALM65:

4.94 x 2.19 x 1.32" (125.5 x 55.5 x 33.5 mm)

The ALM65 series of medical external power supplies is fully approved to international medical safety standards. It has been designed with very high efficiency and low standby power, enabling it to meet the latest environmental legislation. The unit has a fully sealed enclosure complying with IP32 and a smooth surface finish making it easier to wipe down in a clinical setting.

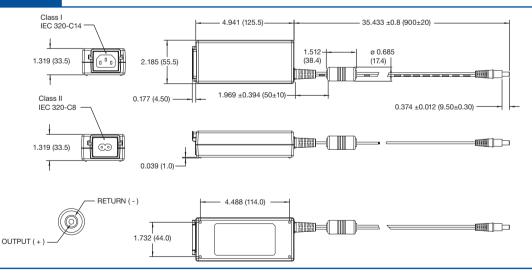
#### **Models & Ratings**

Output Power	Output Voltage Output Current Total Regulation		Total Regulation	Efficiency <sup>(1)</sup>	Model Number(2,3,4)
	12.0 V	5.40 A		88%	ALM65US12
65 W	15.0 V	4.30 A		88%	ALM65US15
	19.0 V	3.40 A	±5%	88%	ALM65US19
	24.0 V	2.70 A		88%	ALM65US24
1	48.0 V	1.35 A		88%	ALM65US48

#### Notes

- 1. Typical average of efficiencies measured at 25%, 50%, 75% and 100% load and 115VAC input.
- 2. For class II versions, add suffix 'C2-8' to the end of the part number e.g. ALM65US24C2-8.
- 3. For optional input connector retention clip add suffix '-A' to the model number, e.g. ALM65US24-A (not available for C2 versions)
- 4. 5.5 x 2.1 mm output connector add suffix B1 to the part number, e.g. ALM65US24-B1, ALM65US24C2-8B1, ALM65US24-AB1.

#### **Mechanical Details**



#### **Notes**

- 1. All dimensions shown in inches (mm). Tolerance is 0.02 (0.5) maximum, except output cable length.
- 3. Weight: 0.68 lbs (308 g) approx.
- 4. For European mains lead order part EU-MAINS-IEC for C14 versions, or EU-MAINS-8 for C8 versions.
- 5. For UK mains lead order part UK-MAINS-IEC for C14 versions, or UK-MAINS-8 for C8 versions.
- 2. Output connector: 5.5 outer diameter, 2.5 mm inner diameter with centre positive. 6. For US mains lead order part US-MAINS-IEC for C14 versions, or US-MAINS-8 for C8 versions.

# **ALM65 Series**



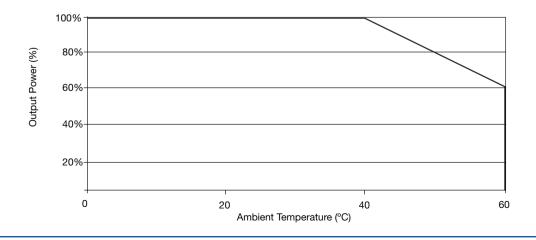


Input					
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage	80		264	VAC	Derate linearly from 100% load at 90 VAC to 80% load at 80 VAC
Input Frequency	47		63	Hz	
Input Current		1.2/0.6		A	Measured at 115/230 VAC
Inrush Current			60/120	A	115/230 VAC, cold start at 25 °C
Power Factor					EN61000-3-2 Class A
Earth Leakage Current			250	μΑ	264 VAC, 60 Hz
No Load Input Power			0.21	W	
Input Protection	T3.15A/250 VAC internal fuse in both line				

Output					
Characteristic	Min.	Тур.	Max.	Units	Notes & Conditions
Output Voltage	12		48	VDC	See Models and Ratings table
Initial Set Accuracy			±2	%	At 50% load
Minimum Load					No minimum load required
Start Up Delay			2	S	
Start Up Rise Time			40	ms	
Hold Up Time	20			ms	Full load and 230 VAC
Line Regulation			±0.5	%	
Total Regulation			±5	%	
Transient Response			4	%	Maximum deviation, recovering to less than 1% within 500 µs for 25% step load
Ripple and Noise			1.5	% pk-pk	20 MHz bandwidth, measured with 20 MHz Bandwidth and 10 μF electrolytic in parallel with 0.1 μF ceramic capacitor.
Overshoot			10	%	At turn on / turn off
Overload Protection	115		175	%	
Overvoltage Protection	145		170	%	Recycle mains to reset
Short Circuit Protection	Trip and restart (	hiccup), auto rese	tting	•	
Thermal Protection	Measured intern	ally, auto resetting			
Temperature Coefficient		0.05		%/°C	
Patient Leakage Current			100	μА	264 VAC, 60 Hz

Environmental						
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions	
Operating Temperature	0		+60	°C	Derate from 100% load at 40 °C to 50% load at 60 °C	
Cooling	Natural convection					
Operating Humidity	10		90	%RH	Non-condensing	
Storage Temperature	-40		+85	°C		
Operating Altitude			5000	m		
Shock	IEC68-2-27, 30 g, 11 ms half sine, 3 times in each of 6 axes					
Vibration	IEC68-2-6, 10-500 Hz, 2 g 10 mins/sweep, 60 mins for each of 3 axes					

#### **Derating Curve**

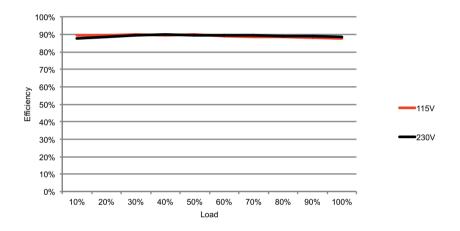




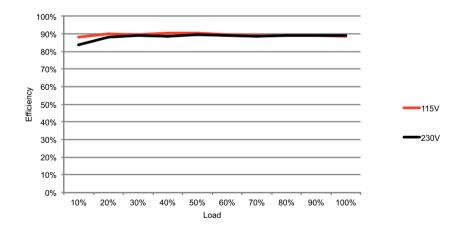
General					
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	88			%	See Models and Ratings table and curves.
Isolation: Input to Output			4000	VAC	2 x MOPP
Input to Ground			1500	VAC	1 x MOPP (Class I versions only)
Output to Ground			500	VAC	Class I versions only
Switching Frequency		65 KHz		kHz	PWM
Power Density		4.55		W/in³	
Mean Time Between Failure		>300		kHrs	MIL-HDBK-217F at 25 °C GB
Weight		0.68 (308)		lb (g)	

#### **Efficiency Curves**

#### **ALM65US12**



#### ALM65US24



### **EMC: Emissions**

Phenomenon	Standard	Test Level	Notes & Conditions
Emissions	EN55022	Level B	Conducted & Radiated
Harmonic Current	EN61000-3-2	Class A	
Voltage Flicker	EN61000-3-3		



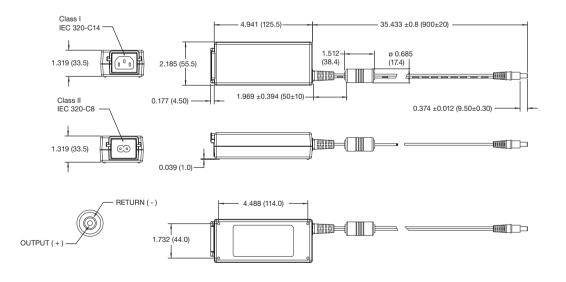
#### **EMC: Immunity**

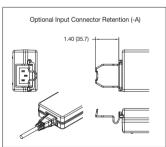
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD	EN61000-4-2	3	A	±15 kV air/±8 kV contact
Radiated	EN61000-4-3	10 V/m	Α	80-2700 MHz. IEC60601-1-2 Ed.4 at other frequencies
EFT/Burst	EN61000-4-4	3	Α	
Surge	EN61000-4-5	Installation Class 3	Α	
Conducted	EN61000-4-6	10 V	A	
Magnetic Fields	EN61000-4-8	4	A	
	EN61000-4-11	Dip: 30% 500 ms	A/B	High Line/Low Line
		Dip: 60% 200 ms	A/B	High Line/Low Line
		Dip: 80% 5000 ms	В	
Dia		Dip: 100% 5000 ms	В	
Dips and Interruptions	EN60601-1-2	Dip: 30% 25 AC Cycles	Α	230 VAC 100% load, 100 VAC 75%
		Dip: 60% 5 AC Cycles	A	230 VAC 100% load, 100 VAC 20%
		Dip: 100% 0.5 AC Cycles	А	At 8 angles
		Int.: >95% 5000 ms	В	

#### **Safety Approvals**

Safety Agency	Safety Standard	Notes & Conditions		
UL	UL60950-1 2nd Edition			
TUV	EN60950-1	Information Tochnology		
СВ	IEC60950-1	Information Technology		
CE	LVD	1		
UL	ANSI/AAMI ES 60601-1			
CSA	CSA C22.2 No. 60601	- Medical		
TUV	EN60601-1	Iviedical		
СВ	IEC60601-1			

#### **Mechanical Details**





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