

# AHM180 Series



- Medical & IT Safety Approvals
- Energy Star Level V
- CEC 2008 & EISA 2007 Compliant
- IP22 Environmental Rating
- Compact Format 7.90" x 3.15" x 1.61"
- <0.5 W Standby Power
- 180 W – Convection Cooled Ratings
- Class I & Class II Models
- 0 °C to +60 °C Operation
- Very Low Earth Leakage Current
- 3 Year Warranty

The AHM180 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 IP22 and a smooth surface finish making it easier to wipe down in a clinical setting. With both medical & IT approvals the product is suitable for hospital, home healthcare, portable medical device applications and a wide range of IT applications.

## Models and Ratings - Convection-cooled

Output Power	Output Voltage V1	Max Output Current	Model Number <sup>1)</sup>
165 W	12.0 VDC	13.75 A	AHM180PS12
180 W	15.0 VDC	12.00 A	AHM180PS15
180 W	19.0 VDC	9.47 A	AHM180PS19
180 W	24.0 VDC	7.50 A	AHM180PS24
180 W	48.0 VDC	3.75 A	AHM180PS48
165 W	12.0 VDC	13.50 A	AHM180PS12C2
180 W	15.0 VDC	12.00 A	AHM180PS15C2
180 W	19.0 VDC	9.47 A	AHM180PS19C2
180 W	24.0 VDC	7.50 A	AHM180PS24C2
180 W	48.0 VDC	3.75 A	AHM180PS48C2

- Notes:**  
 1. For optional input connector retention clip, add suffix 'A' to the model number e.g. AHM180PS24-A. Models with suffix C2' have a class II equipment protection classification. For IEC320-C8 input connector with class II models, add suffix '8' to the model number, e.g. AHM180PS24C2-8.

## Input Characteristics

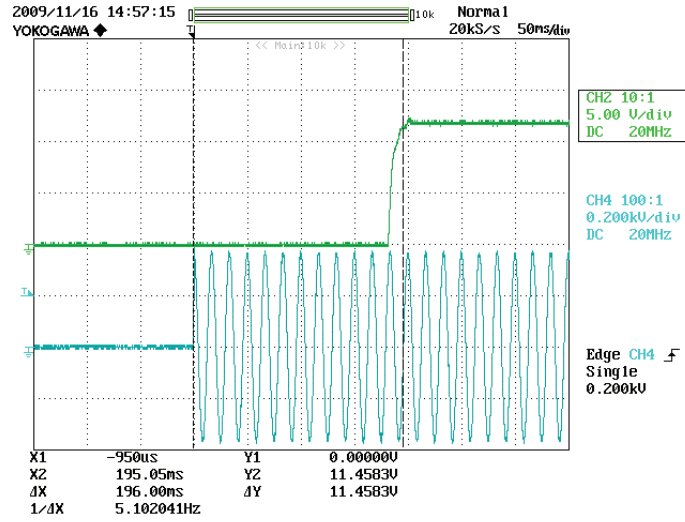
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage - Operating	80	115/230	264	VAC	Full power 90 VAC to 264 VAC. Derate output power linearly by 20% from 90 VAC to 80 VAC.
Input Frequency	47	50/60	63	Hz	
Power Factor		>0.9			EN61000-3-2 class A & D compliant & Energy Star Compliant
Input Current - No Load		0.08/0.05		A	115/230 VAC
Input Current - Full Load		1.7/0.9		A	115/230 VAC
Inrush Current		60-80	120	A	230 VAC cold start, 25 °C
No Load Input Power		0.3/0.4	0.5	W	115/230 VAC
Earth Leakage Current		50/100	200	µA	115 V 60 Hz/230 V 50 Hz (Typ.), 264 VAC/60 Hz (Max.)
		0.3/0.6		mA	115/230 VAC/400 Hz
Input Protection	T4.0A/250 V internal fuse in both lines				

## Output Characteristics

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage - V1	12		48	VDC	See Models and Ratings table
Output Voltage Adjustment				%	No user adjustment
Minimum Load	0			A	
Start Up Delay		200/100		ms	115/230 VAC full load (see fig.1)
Hold Up Time		15		ms	115/230 VAC full load (see fig.2)
Drift			±0.2	%	After 20 min warm up
Line Regulation			±0.5	%	90-264 VAC (50% load)
Load Regulation			±4	%	0←50→100% load.
Transient Response - V1			5	%	Recovery within 1% in less than 500 µs for a 50-75% and 75-50% load step
Over/Undershoot - V1		3		%	
Ripple & Noise		<1	1.5	% pk-pk	20 MHz bandwidth with external circuit (see fig.3-6)
Overvoltage Protection		125		%	Vnom, Recycle AC to reset
		13.2	18	VDC	AHM180PS12 & C2
		16.5	22		AHM180PS15 & C2
		20.9	28		AHM180PS19 & C2
		26.4	33		AHM180PS24 & C2
	52.8	59	AHM180PS48 & C2		
Overload Protection		115.0	175	%	I nom, Auto reset
		16.5	23.4	A	AHM180PS12 & C2
		14.4	20.4		AHM180PS15 & C2
		10.4	16.1		AHM180PS19 & C2
		8.3	12.8		AHM180PS24 & C2
	4.5	6.4	AHM180PS48 & C2		
Short Circuit Protection					Continuous, trip & restart (hiccup mode)
Temperature Coefficient			0.05	%/°C	
Overtemperature Protection				°C	Connected to transformer. Auto reset.

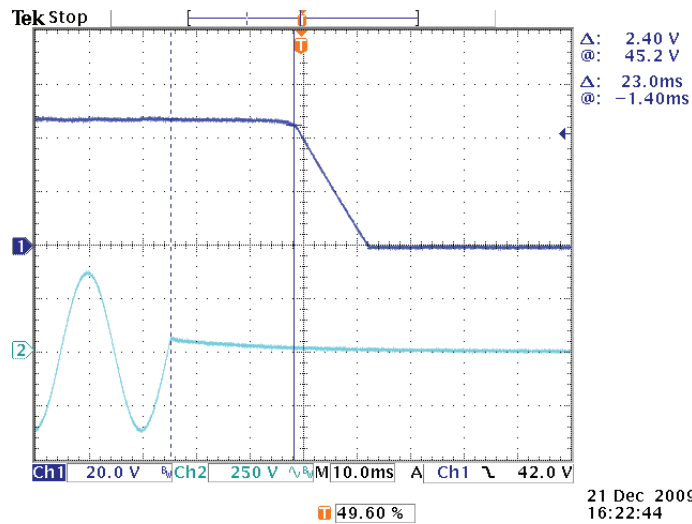
## Start Up Delay From AC Turn On

Figure 1  
Start up example from AC turn on  
(230 VAC, 196 ms)



## Hold Up Time From Loss of AC

Figure 2  
Hold up example at 180 W load  
with 230 VAC input (23 ms)



## Ripple & Noise

Figure 3  
AHM180PS12  
Ripple & noise example at 165 W load  
with 230 VAC input (50 mV)

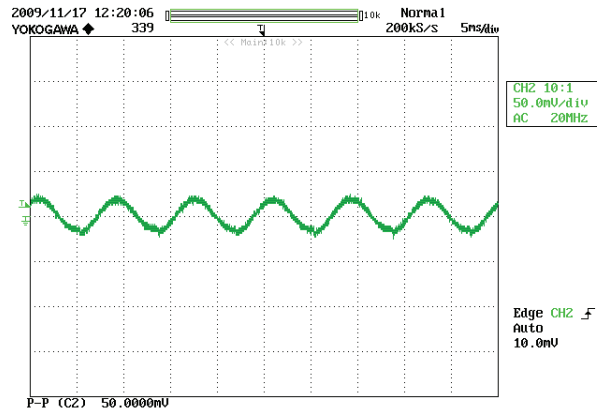


Figure 4  
AHM180PS24  
Ripple & noise example at 180 W load  
with 230 VAC input (228 mV)

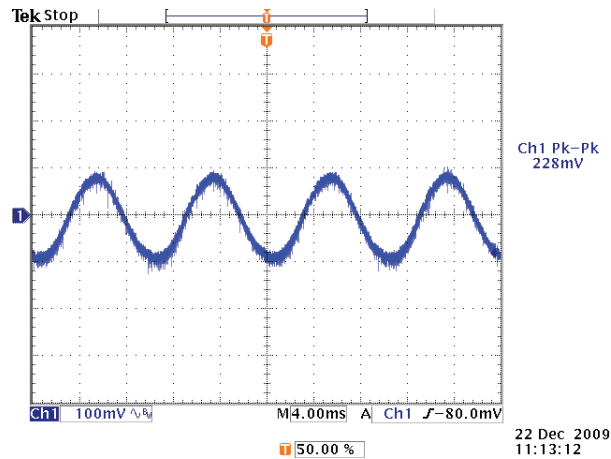


Figure 5  
AHM180PS48  
Ripple & noise example at 180 W load  
with 230 VAC input (360 mV)

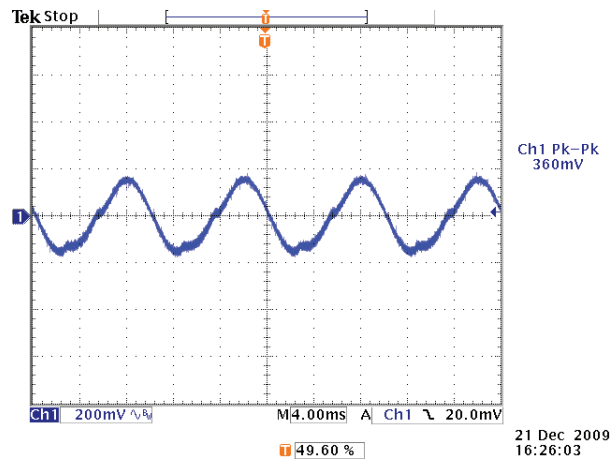
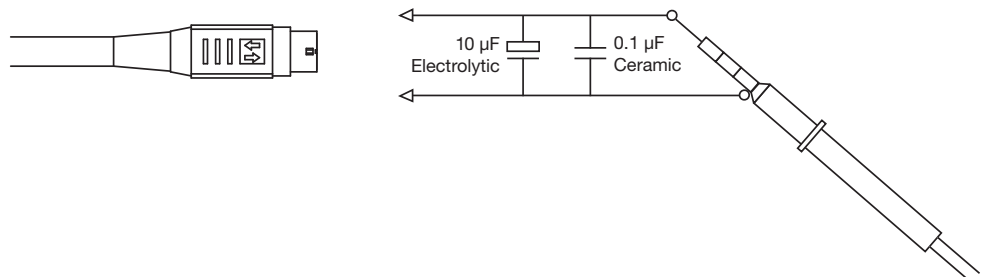


Figure 6  
Ripple & noise measurement circuit



## General Specifications

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		92		%	Full load (see fig.7-9)
Isolation: Input to Output Input to Ground Output to Ground	4000			VAC	
	1500			VAC	
	500			VAC	
Switching Frequency	30		200	kHz	PFC stage
	90		110		DC-DC stage
Power Density			4.4	W/in <sup>3</sup>	
Mean Time Between Failure		156		kHrs	MIL-HDBK-217F, Notice 2 +25 °C GB
Weight		1.4 (620)		lb (g)	

## Average Active Efficiency



Characteristic	Average Active Efficiency		Units	Notes & Conditions
	115 V / 60 Hz	230 VAC / 50 Hz		
AHM180PS12	90.19	91.25	%	As per Energy Star Level V test procedure
AHM180PS15	91.13	92.26		
AHM180PS19	91.28	92.44		
AHM180PS24	91.67	92.83		
AHM180PS48	92.11	93.12		

## Efficiency Versus Load

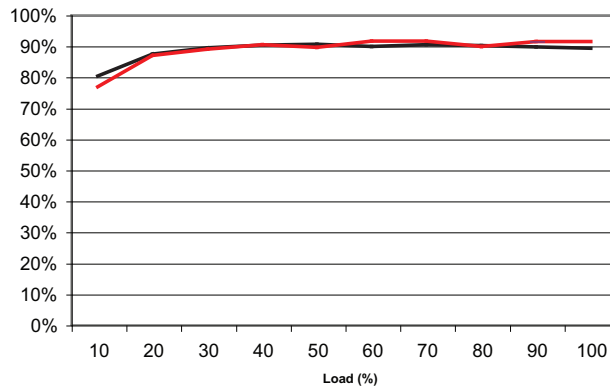


Figure 7 - AHM180PS12

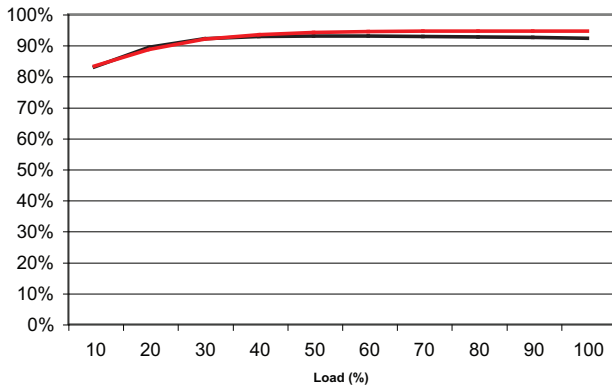


Figure 8 - AHM180PS24

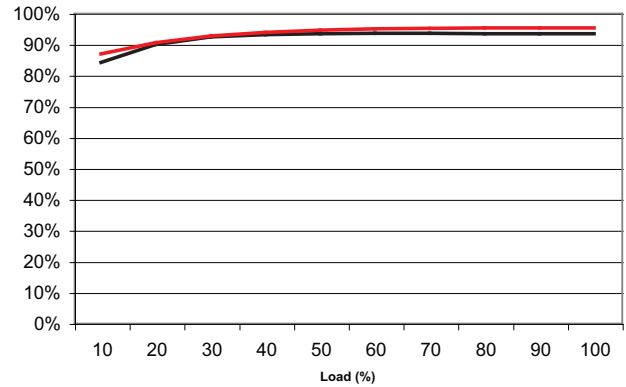
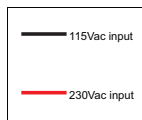


Figure 9 - AHM180PS48

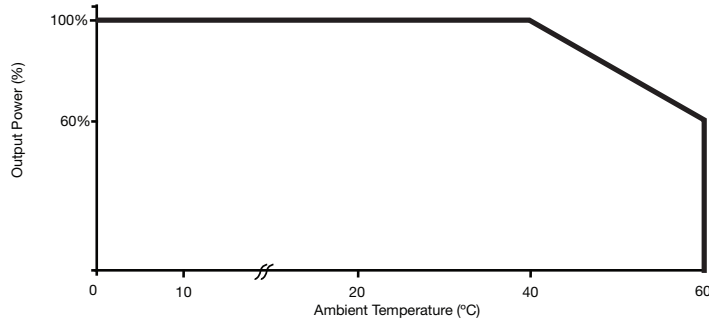


## Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	0		+60	°C	Derate linearly to 60% load at 60 °C from +40 °C. (See fig.10)
Case Temperature (IEC60601 3rd Edition)			71	°C	100% Load, with TAMB +40 °C
			60		60% Load Maximum, with TAMB +40 °C
			48		5% Load Maximum, with TAMB +40 °C
Storage Temperature	-40		+85	°C	
Cooling					Convection cooled, see fig.10
Humidity	5		95	%RH	Non-condensing
Operating Altitude			3000	m	
Ingress Protection	IP22				
Shock					3 x 30 g/11 ms shocks in both +ve & -ve directions along the 3 orthogonal axis, total 18 shocks.
Vibration					Three axis 5-500 Hz at 2 g x 10 sweeps

## Derating Curve

Figure 10



## Electromagnetic Compatibility - Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Low Voltage PSU EMC	EN61204-3	High severity level	as below	
Harmonic Current	EN61000-3-2	Class A		
ESD	EN61000-4-2	3	A	
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 Field	EN61000-4-8	3	A	
Dips and Interruptions	EN61000-4-11	Dip: 30% 500 ms	A	
		Dip: 60% 200 ms	B	
		Dip: 80% 5000 ms	A	
		Dip: 100% 5000 ms	B	
	EN60601-1-2	Dip: 30% 25 AC Cycles	A	230 VAC 100% load, 100 VAC 80% load
		Dip: 60% 5 AC Cycles	A	230 VAC 100% load, 100 VAC 80% load
		Dip: 100% 0.5 AC Cycles	A	
		Int.: >95% 5000 ms	B	

## Electromagnetic Compatibility - Emissions

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Conducted	EN55011/32	Class B		
Radiated	EN55011/32	Class B		
Voltage Fluctuations	EN61000-3-3			

## Safety Agency Approvals

Safety Agency	Safety Standard	Category
CB Report	IEC60950-1 & IEC62368-1	Information Technology
UL	UL62368-1, CSA62368-1 via cUL	Information Technology
TUV	EN62368-1	Information Technology
Denan Japan	PSE Certificate	
CE	LVD	

Safety Agency	Safety Standard	Category
CB Report	IEC60601-1 including Risk Management	Medical
UL	ANSI/AAMI ES60601-1 & CSA60601-1 via cUL	Medical
TUV	EN60601-1	Medical

Means of Protection		Category
Primary to Secondary	2 x MOPP (Means of Patient Protection)	IEC60601-1 Ed 3
Primary to Earth	1 x MOPP (Means of Patient Protection)	
Secondary to Earth	1 x MOPP (Means of Patient Protection)	

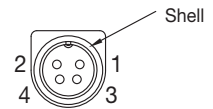
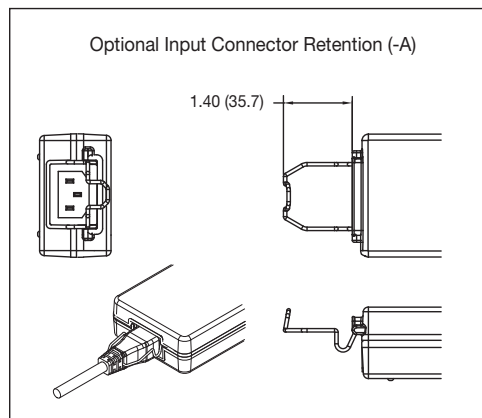
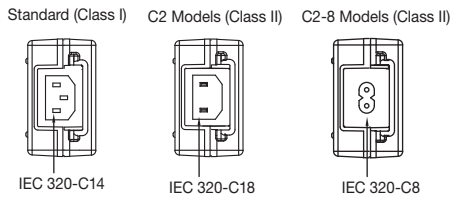
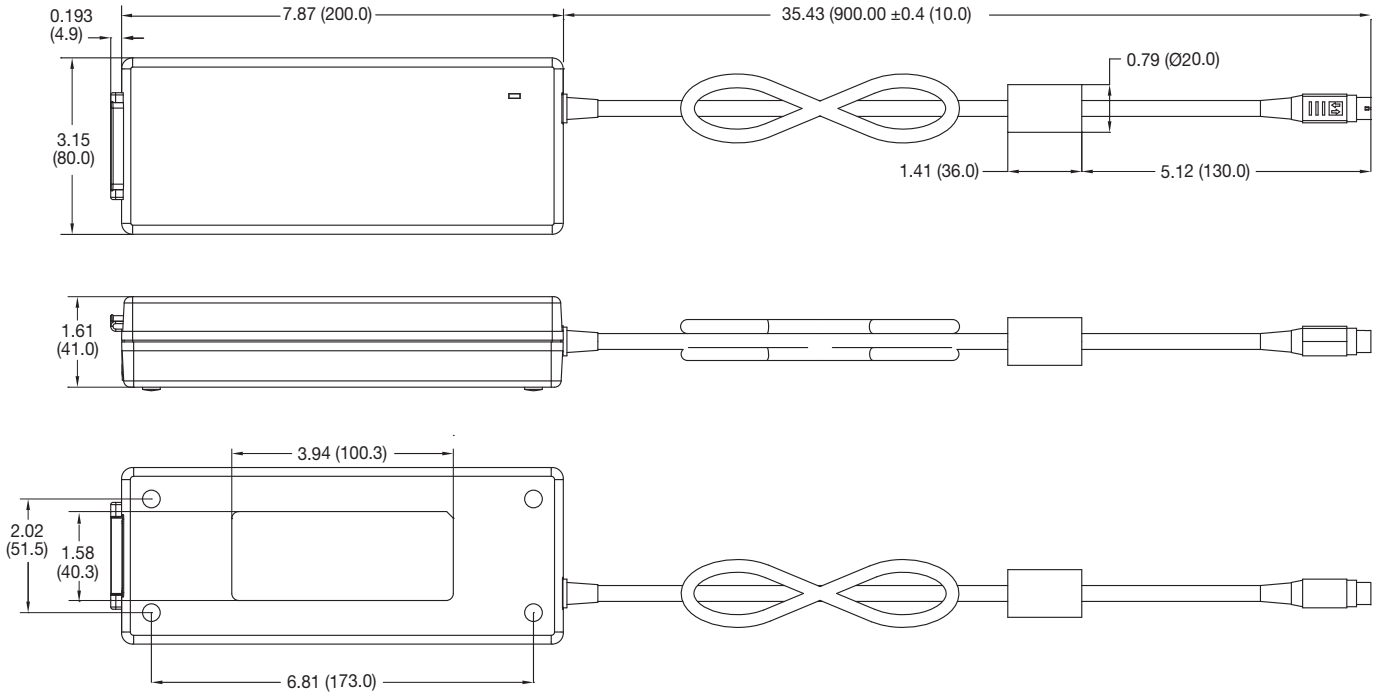
Equipment Protection Class	Safety Standard	Notes & Conditions
Class I & Class II	IEC62368-1 & IEC60601-1	See safety agency conditions of acceptibility for details

## Environmental Legislation

Authority	Location	Date	Notes & Conditions
EISA	US	2007	
CEC	California, US	2008	
Energy Star	US	2008	Level V
ErP Directive	Europe	2011	Regulation No. 278/2009

## Mechanical Details

Weight: 1.1 lbs (500 g)  
 Dimensions shown in inches (mm).



Output Connector equivalent to KPPX-4P (Non Locking)	
Pin 1	Output +
Pin 2	Output +
Pin 3	Return
Pin 4	Return
Outer Shell	GND*
Outer Shell C2 Models	Floating

\* Functional earth.