

Medical Grade Adapter



MA60

Medical Grade Adapter



2MOPP



5000M Altitude OP



LEVEL VI EFFICIENCY



RoHS

Highlights:

- For IT and Medical Application
- 6.5W/in³ High Power Density
- <150mW low standby
- DOE Efficiency Level VI
- Universal 85VAC~264VAC input
- Option for Class I & Class II
- Option for tuning fork type, barrel type or din type output connector
- IP22
- >500kHour MTBF
- 2MOPP Isolation
- Designed for BF type application
- 5000 meters operation
- LED Indicator
- Optimized 19V, 24V and 28V for CPAP application available

Key Specification

Model	MA60xx12	MA60xx15	MA60xx19	MA60xx24	MA60xx28	MA60xx48
Output Voltage	12V	15V	19V	24V	28V	48V
Rated Output Current	5.0A	4.0A	3.2A	2.5A	2.1A	1.3A
Peak Output Current	6.3A	5.0A	4.0A	3.1A	2.6A	1.6A
Rated Output Power	60W					
Warranty	3 Years					
Dimension	104mm x 47.5mm x 30.6mm					
EMC	IEC60601-1-2 4 th Edition					
Safety Compliance	IEC60601-1 3 rd +A1 Edition CB Report, TUV62368-1, CSA/UL62368-1					

Model Name

MA	60	□	□	28	□ □
Series Name	Rated Power	Inlet Type A: C14, CLASS I B: C8, CLASS II C: C6, CLASS I D: C18, CLASS II	Connector Code See Page 6 for Detail	Output Voltage: 05: 5V 28: 28V	Control Code for Internal Use AA for standard version

SPECIFICATIONS

All specifications are for rated input/output and 25°C unless otherwise specified

INPUT CHARACTERISTICS

Function	Minimum	Typical	Maximum	Condition
Rated Input Voltage	100 VAC		240 VAC	
Input Voltage Range	85 VAC		264 VAC	Output Power Derating from 100% load at 90VAC to 85% load at 85VAC. See Fig.1
Input Frequency	47 Hz	50/60Hz	63 Hz	
Input Current			1.5 A @ 100VAC 0.8A @ 230VAC	
Efficiency		91%		24V Model, Rated Input and Output
Inrush Current			40 A	240VAC Input, Cold Start

OUTPUT CHARACTERISTICS

Function	Minimum	Typical	Maximum	Condition
Output Voltage Total Regulation			±3%	Including initial tolerance, line regulation and load regulation
Output Ripple & Noise			1%	Peak to peak value
Turn on delay			2s	
Rise Time			100ms	
Holdup Time	12ms			115VAC 60Hz Input
Peak Power	120% Rated Load			

PROTECTION CHARACTERISTICS

Function	Minimum	Typical	Maximum	Condition
Over Current Protection (OCP)	120% Rated Current		150% Rated Current	Auto-restart after fault condition is removed
Short Circuit Protection (SCP)				Auto-restart after fault condition is removed
Over Voltage Protection (OVP)			130% Rated Output Voltage	Latch off
Over Temperature Protection (OTP)				Latch off

ENVIRONMENTAL

Function	Minimum	Typical	Maximum	Condition
No Load Power Consumption			0.15 W	115VAC/60Hz and 230VAC/50Hz Input
Operation Ambient Temperature	0 °C		60 °C	Output Power Derating from 100% load at 40°C to 50% load at 60°C. See Fig.2
Cooling				Convection Cooled
Operation Humidity	5% RH		95% RH	Non-condensing
Storage Ambient Temperature	-40 °C		85 °C	
Storage Humidity	5% RH		95% RH	Non-condensing
Operating Altitude			5000 m	Or 16,400 feet
Shock (Non-Operation)			50 g	11ms, 3 shocks for each direction
Vibration (Operation)			2 g _{RMS}	5-500Hz, 15 Minutes for each three axis
Weight			300 gram	

RELIABILITY

Function	Minimum	Typical	Maximum	Condition
MTBF	1M Hours			According to Telecordia SR-332. 25°C
Life	3 Years			Rated input and output condition

EMC

Item	Description
Conducted Emissions	EN55011/EN55022, FCC TITLE 47: Class B
Radiated Emissions	EN55011/EN55022, FCC TITLE 47: Class B
Harmonic Current Emissions	IEC61000-3-2, Class D
Voltage Flicker	IEC61000-3-3
Electrostatic Discharge	IEC61000-4-2, Level 4, Criteria A. Air Discharge 15kV, Contact Discharge 8kV
Surge	IEC61000-4-5, Level 3 Criteria A. Common mode 2kV, Differential Mode 1kV
Conducted Immunity	IEC61000-4-6, Level 2 Criteria A. 150kHz-80MHz, 3Vrms, 6Vrms at ISM Band and Amateur radio bands
Power Frequency Magnetic Fields	IEC61000-4-8, Criteria A. 30A/m
Voltage Dips	IEC61000-4-11 Criteria A & B: 30% 10ms, Criteria B: 60% 100ms, 100% 5000ms
	IEC60601-1-2 Criteria A: 100% 10ms at step 45° (load derating required for 100VAC) Criteria B: 30% 500ms, 100% 20ms, 100% 5000ms

SAFETY & DIRECTIVES

Item	Description
Safety Standards (Compliance Only)	IEC62368-1 CB Report, TUV62368-1, CSA/UL62368-1 GB4943.1-2011, GB9254-2008, GB17625.1-2003 UL60601-1 3 rd edition+A1 CB Report TUV EN60601-1:2006, UL60601-1+CAN/CSA C22.2 NO.60601-1
Energy Saving	DOE Level VI CoC Tier II (12V and below models)
Directives	MDD Directive 93/42/EEC RoHS Directive 2011/65/EU Compliant
Dielectric Voltage	Primary to Secondary (2xMOPP): 4kVAC Primary to Earth (1xMOPP): 1.5kVAC (Class I only) Secondary to Earth (1xMOPP): 1.5kVAC (Class I only, for limited output cable options)
Touch Current @264VAC, 60Hz	<100uA @ Normal Condition <300uA @ Single Fault Condition

DERATING CURVE

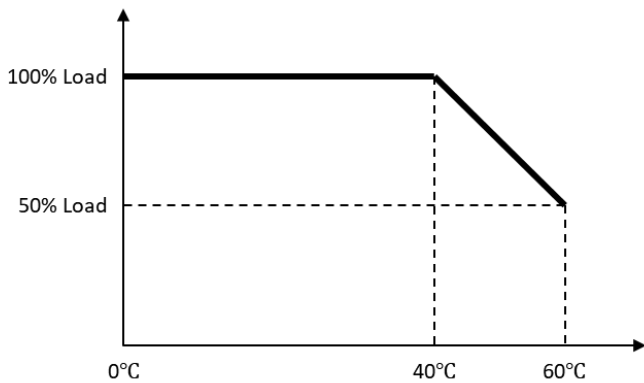
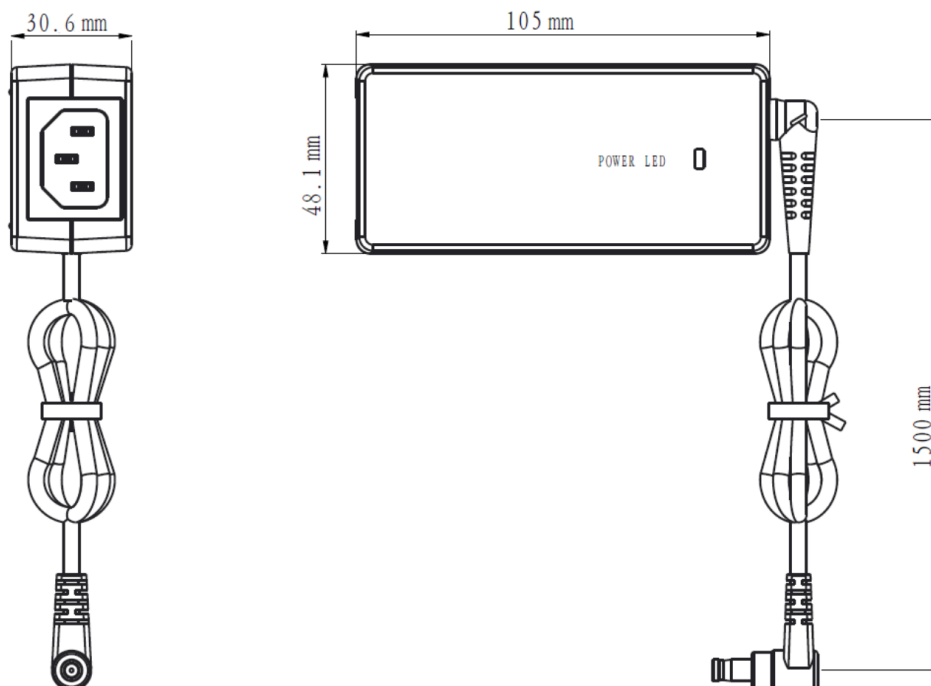


Figure 1

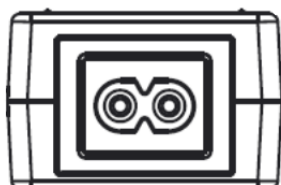
MECHANICAL DRAWING



Input Options



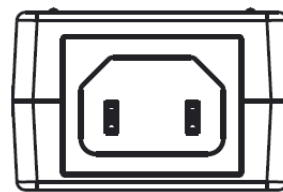
IEC C14
MA60A



IEC C8
MA60B



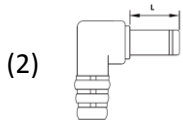
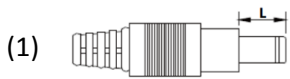
IEC C6
MA60C



IEC C18
MA60D

CONNECTOR OPTIONS

Connector Code	Type	Overmold Direction	Pin Assignment	OD (mm)	ID (mm)	L (mm)	
A	Tuning Fork Type		Straight ⁽¹⁾ Right Angled ⁽²⁾ Straight Right Angled		5.5	2.5	
B							
C							
D							
E	Barrel Type		Straight Right Angled Straight Right Angled		5.5	2.5	
F							
G							
H							
J	Mini DIN 3P with lock	 Kycon KPPX-3P or equivalent	Straight		9.6	-	6.5
K							
L	Mini DIN 4P with lock	 Kycon KPPX-4P or equivalent	Straight		9.6	-	6.5
M							



(3) FG: Functional Ground. Available for CLASS I models only

For other connector options, contact sales representative

CONTACTS & OTHER INFORMATION

For more information, please visit www.appliedpsu.com

For sales inquiries, please send an email to sales@appliedpsu.com

User manual and other document available at www.appliedpsu.com/support