



P-DUKE POWER

MAD40 Single Series

2 X 3 Inch AC-DC POWER SUPPLIES
Up to 40 Watts

5
YEARS
WARRANTY

ROHS
COMPLIANT

REACH
COMPLIANT

+85°C
-40°C
AMBIENT TEMP.



Medical



Automation



Datacom



IPC



Industry



Measurement



Telecom



Automobile



Boat



Charger



PV



Railway



2
X
MOPP

4000
VAC
Reinforced
Insulation

ADJ.
Output
Voltage

Internal
EN55032
Class
Filter **B**

LOW
Leakage
Current

LOW
Standby
Power

Operating
Altitude
5000
meter

Protection
Class I
Class II

OCP

OVP

SCP

PART NUMBER STRUCTURE

M	A	D	40	U	S	12	B	-	□
Application	Package Code	Dimension Code	Output Power (W)	Input Voltage (VAC)	Output Quantity	Output Voltage (VDC)	Protection Type		Connector Option
Medical Application	A:Open type U:U chassis type E:Enclosed type D:Din rail type			U:Universal 85 ~ 264	S:Single	05:5 7P5:7.5 09:9 12:12 121:12 15:15 151:15 18:18 24:24 28:28 36:36 48:48 53:53	B:CLASS II Blank:CLASS I		Blank: JST M: Molex T: Terminal Block

TECHNICAL SPECIFICATION All specifications are typical at 230VAC input, full load and 25°C unless otherwise noted

Model Number	Input Range VAC	Output Voltage VDC	Output Current Natural convection A	Max. Output Power W	Input Power @ No Load W	Efficiency %
MAD40US05B MUD40US05B MED40US05B MDD40US05B	85 ~ 264	5	8	40	0.11	90
MAD40US7P5B MUD40US7P5B MED40US7P5B MDD40US7P5B	85 ~ 264	7.5	5.34	40	0.11	90
MAD40US09B MUD40US09B MED40US09B MDD40US09B	85 ~ 264	9	4.45	40	0.11	91
MAD40US12B MUD40US12B MED40US12B MDD40US12B	85 ~ 264	12	3.34	40	0.11	92
MAD40US121B MUD40US121B MED40US121B MDD40US121B	85 ~ 264	12	3.34	40	0.11	90
MAD40US15B MUD40US15B MED40US15B MDD40US15B	85 ~ 264	15	2.67	40	0.11	92
MAD40US151B MUD40US151B MED40US151B MDD40US151B	85 ~ 264	15	2.67	40	0.11	90
MAD40US18B MUD40US18B MED40US18B MDD40US18B	85 ~ 264	18	2.23	40	0.11	91
MAD40US24B MUD40US24B MED40US24B MDD40US24B	85 ~ 264	24	1.67	40	0.11	92
MAD40US28B MUD40US28B MED40US28B MDD40US28B	85 ~ 264	28	1.43	40	0.11	91
MAD40US36B MUD40US36B MED40US36B MDD40US36B	85 ~ 264	36	1.12	40	0.11	92
MAD40US48B MUD40US48B MED40US48B MDD40US48B	85 ~ 264	48	0.84	40	0.11	93
MAD40US53B MUD40US53B MED40US53B MDD40US53B	85 ~ 264	53	0.77	40	0.11	92.5

INPUT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range	AC input	85		264	VAC
	DC input	120		370	VDC
Input frequency	AC input	47		63	Hz
Input current	100VAC and Full Load			1.0	A
	240VAC and Full Load			0.5	A
No load input power	230VAC		0.11		Watts
Leakage current	264VAC			75	μA
Start up time				1000	ms
Rise time			20		ms
Hold up time	115VAC and Full Load		25		ms
Input inrush current	230VAC			60	A
Input protection	Internal fuse in line and neutral			T3.15A/250VAC	

OUTPUT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Output power				40	Watts
Initial set voltage accuracy	230VAC and Full Load	-1.0		+1.0	%
Line regulation	Low Line to High Line at Full Load	-0.2		+0.2	%
Load regulation	No Load to Full Load	5Vout		+0.7	%
		Others	-0.5	+0.5	
	10% Load to 90% Load	5Vout	-0.6	+0.6	%
		Others	-0.4	+0.4	
Voltage adjustability	Single output	53Vout		+10	%
		Others	-20	+10	
Minimum load			0		%
Ripple and noise	Measured by 20MHz bandwidth With a 10μF/25V 1206 X7R MLCC	5Vout, 7.5Vout, 9Vout	75		mVp-p
		12Vout, 15Vout, 18Vout	75		
	With a 1μF/50V 1206 X7R MLCC	24Vout, 28Vout, 36Vout	75		
	With a 0.1μF/100V 1206 X7R MLCC	48Vout, 53Vout	150		
Temperature coefficient		-0.02		+0.02	%/°C
Transient response	Load step from 50 ~ 75% change at 2.5A/μs	Peak deviation		3	%Vout
		Recovery time	600		μs
Over voltage protection	% of Vout(nom); Latch mode	125		140	%
Over load protection	% of Iout rated; Hiccup mode		145		%
Short circuit protection					Continuous, automatic recovery

GENERAL SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	1 minute (2MOPP insulation)	Input to Output	4000		VAC
		Input (Output) to F.G.	2500		
Isolation resistance	500VDC	0.1			GΩ
Switching frequency	230VAC	5Vout		70	kHz
		Others		120	
Safety approvals	IEC/ EN/ ANSI/AAMI ES 60601-1 IEC/ EN/ UL 60950-1				UL:E360199 CB:UL(Demko)
Weight		MAD			114g (4.02oz)
		MUD			154g (5.43oz)
		MED			169g (5.96oz)
		MDD			190g (6.70oz)
MTBF	MIL-HDBK-217F, Full load				3.010 x 10 ⁶ hrs

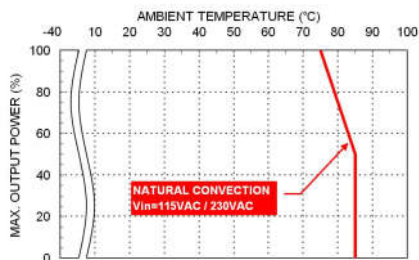
ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Natural convection	-40		+85	°C
Storage temperature range	With derating	-40		+85	°C
Operating altitude				5000	m
Shock					IEC60068-2-27
Vibration					IEC60068-2-6
Relative humidity	Non-condensing				5% to 95% RH

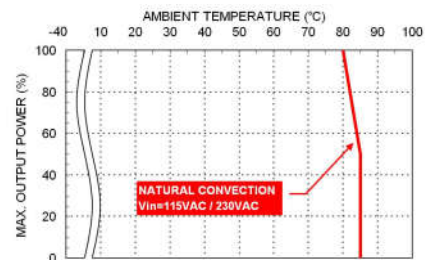
EMC SPECIFICATIONS

Parameter	Conditions	Level
EMI	EN55011, EN55032, EN60601-1-2 and FCC Part 18 / 15 External components may be required for class I application.	Conducted Radiated Class B Class B
Harmonic currents	EN61000-3-2 Full Load	Class A
Voltage flicker	EN61000-3-3	
EMS	EN55024, EN60601-1-2 and Complies with EN 61850-3	
ESD	EN61000-4-2 Air ± 15 kV and Contact ± 8 kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 20 V/m	Perf. Criteria A
Fast transient	EN61000-4-4 ± 2 kV	Perf. Criteria A
Surge	EN61000-4-5 DM ± 1 kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 20 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8 30 A/m	Perf. Criteria A
Dip and interruptions	EN61000-4-11	

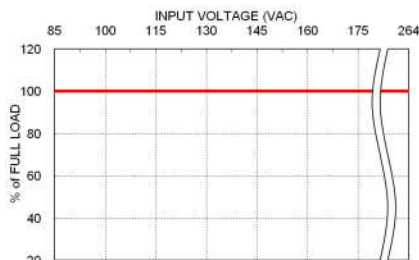
CHARACTERISTIC CURVE



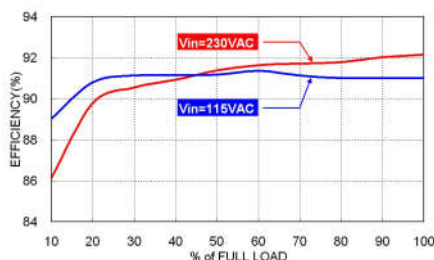
Derating Curve vs. Ambient Temperature
M□D40USxxB xx=5/7P5/9/12/1/15/1/28



Derating Curve vs. Ambient Temperature
M□D40USxxB xx=12/15/24/36/48/53



Derating Curve vs. Input Voltage
M□D40



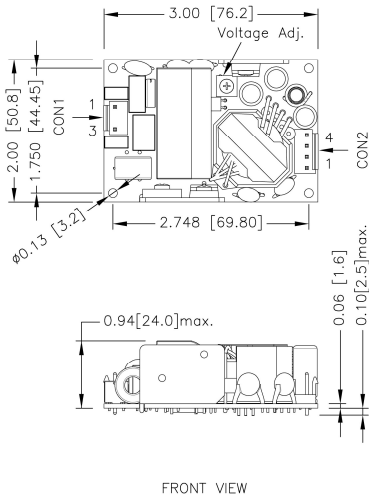
Efficiency vs. Output Load
M□D40US24B



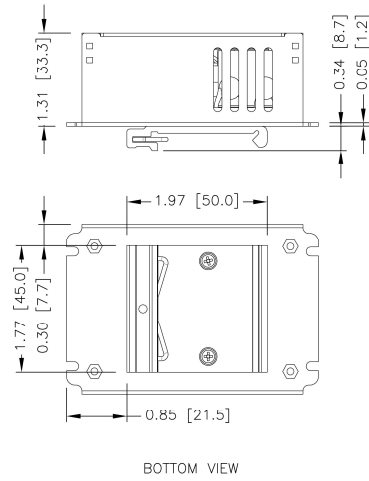
Efficiency vs. Input Voltage
M□D40US24B

MECHANICAL DRAWING

MAD Open type



MDD Din rail type



1. All dimensions in inch [mm]
2. Tolerance : $x.xx \pm 0.02$ [$x.x \pm 0.5$] $x.xxx \pm 0.01$ [$x.xx \pm 0.25$]
3. M3×0.5 screw locked torque MAX 5Kgf.cm/0.49N.m

CONNECTORS CONNECTIONS

CON1 – Input Connector

Pin 1	Line
Pin 3	Neutral

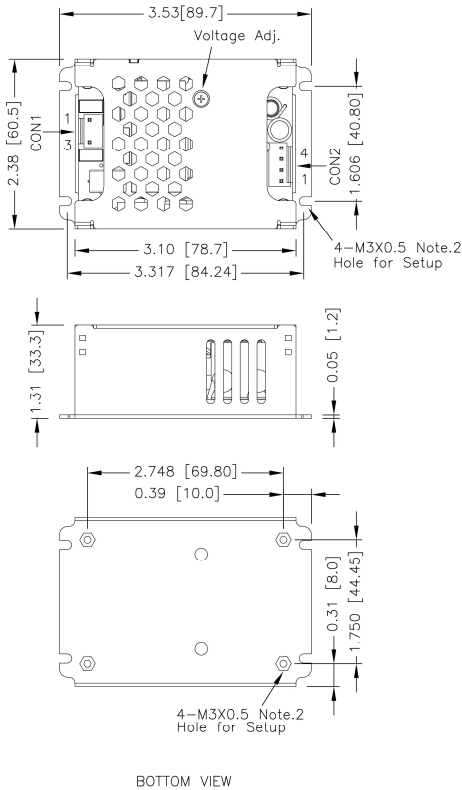
CON2 – Output Connector

Pin 1,2	-Vout
Pin 3,4	+Vout

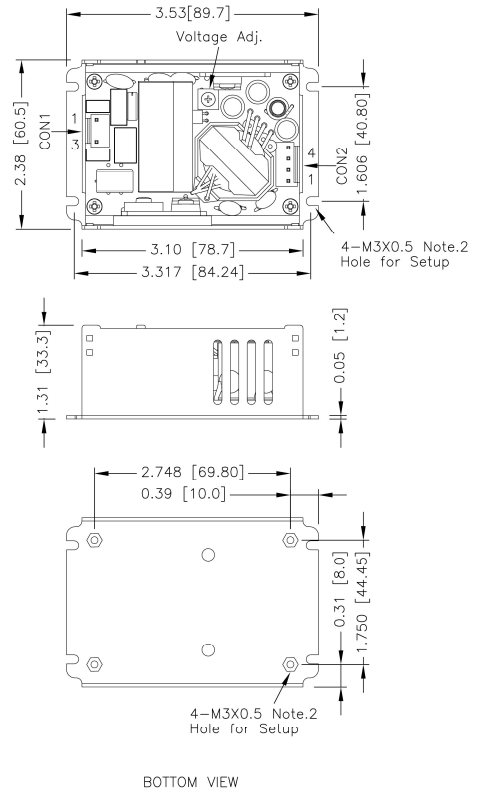
*Either one of four screws holes of Open / Chassis type can be considered as PE connection for CLASS I application.

MECHANICAL DRAWING(CONTINUED)

MED Enclosed type



MUD U chassis type



1. All dimensions in inch [mm]
2. Tolerance : x.xx±0.02 [x.x±0.5] x.xxx±0.01 [x.xx±0.25]
3. M3×0.5 screw locked torque MAX 5Kgf.cm/0.49N.m

CONNECTORS CONNECTIONS

CON1 – Input Connector




Pin 1	Line
Pin 3	Neutral

CON2 – Output Connector

Pin 1,2	-Vout
Pin 3,4	+Vout

*Either one of four screws holes of Open / Chassis type can be considered as PE connection for CLASS I application.

CONNECTOR OPTIONS

Blank:	JST Type	-M	Molex Type	-T	Terminal Block
	Mates with housing CON1: VHR-3N CON2: VHR-4N		Mates with housing CON1: 09-50-8031 CON2: 09-50-8041		Mates with Screw locked torque MAX 2Kgf.cm/0.2N.m
	Crimp terminals CON1: SVH-21T-P1.1 CON2: SVH-21T-P1.1		Crimp terminals CON1: SD-2478 CON2: SD-2478		Wire dimension range 26 ~ 16AWG