



### FEATURES

- IEC60601 Ed 3 medical (2 X MOPP Pri-Sec)  
EN60950 ITE safety approved
- 400W compact high density
- 3" x 5" standard footprint
- High efficiency up to 94%
- Remote sense
- Remote On/Off, Power OK
- Universal AC input with active PFC
- Less than 1U high – 1.4"
- Convection cooled operation up to 250W
- Isolated 12V@1A fan output
- Isolated 5V@2A standby output
- RoHS compliant
- Active inrush protection
- Current sharing option

### DESCRIPTION

The MVAC400 series switching power supplies utilize advanced component and circuit technologies to deliver high efficiency. Designed for medical, computing, communications, telecom and other OEM applications to satisfy 1U height design considerations, the MVAC400 Series measures only 3.0" x 5.0" x 1.40". All models offer universal AC input with active power factor correction (PFC) and compliance to worldwide safety and EMC standards.



Available now at  
[www.murata-ps.com/en/3d/acdc.html](http://www.murata-ps.com/en/3d/acdc.html)



### ORDERING GUIDE

Model Number	Natural Convection Cooling	Forced Air Cooling	Main Output (V1)	Fan Output (V2)	Aux Output (V3)
MVAC400-12AF	250W	400W @ 250LFM	12V	12V	5V
MVAC400-24AF			24V		
MVAC400-48AF			50V		
MVAC400-12AFD			12V		
MVAC400-24AFD			24V		
MVAC400-48AFD			50V		
MVAC400-24AFT*			24V		
MVAC400-12AFR*			12V		
MVAC400-24AFT*			12V		
MVAC-COVER			Optional cover kit assembly; see MVAC-COVER datasheet for details.		

Refer to page 2 for current sharing details for MVAC400-xxAFD and MVAC400-xxAFR models.  
 \* CCC Certification is not available for these models.

### INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Operating Range	Single phase	90	115/230	264	Vac
	DC	127		300	Vdc
Input Frequency		47	50/60	63	Hz
Turn-on Input Voltage	Input rising	80		90	Vac
Turn-off Input Voltage	Input falling	70		80	
Input Current	90Vac input, full load all outputs			5.5	A
No Load Input Power <sup>7</sup>	(PS_ON = OFF, 5V_Aux = 0A)	1.5		2.0	W
Inrush Current	At 264Vac, at 25°C cold start		15		Apk
Power Factor	At 230Vac, full load		0.98		

### OUTPUT CHARACTERISTICS

Model Number	Main Output Voltage (V1)	Load Current	Maximum Load Capacitance	Line, Load, Cross Regulation <sup>6</sup>	Typical Efficiency @230Vac
MVAC400-12AFx	12V	0 to 33.3A	0 to 2200µF	± 1%	93%
MVAC400-24AFx	24V	0 to 16.7A	0 to 470µF	± 1%	93%
MVAC400-48AFx	50V	0 to 8.0A	0 to 150µF	± 1%	94%

### MAIN OUTPUT CHARACTERISTICS (ALL MODELS)

Parameter	Conditions	Typ.	Max.	Units
Transient Response <sup>9</sup>	50% load step, 1A/µsec slew rate		± 5	%
Settling Time to 1% of Nominal			500	µsec
Turn On Delay	After application of input power		3	sec
Output Voltage Rise	Monotonic <sup>5</sup>		50	msec
Output Holdup	120Vac/60Hz, full load	20		
Temperature Coefficient			0.02	%/°C
Ripple Voltage & Noise <sup>1</sup>			1	%
Remote Sense	Compensates for up to 0.5V of lead drop with remote sense connected. Protected against short circuit and reverse connection.		500	mV
Hot Swap Transients <sup>10</sup>	All outputs remain in regulation		± 10	%

### AUXILIARY OUTPUT CHARACTERISTICS (ALL MODELS)

Auxiliary Output	Aux Output Voltage <sup>9</sup>	Load Current	Load Capacitance	Line, Load, Cross Regulation <sup>3</sup>	Ripple Voltage & Noise <sup>1</sup>
Fan (V2)	12V	0 to 1A	0 to 220µF	± 10%	2%
Aux (V3)	5V	0 to 2A	0 to 220µF	± 5%	1%

### ENVIRONMENTAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Storage Temperature Range		-40		85	°C
Operating Temperature Range	See power rating curves	-10		70	
	Start up	-20			
Operating Humidity	Non-condensing	10		95	%
Operating Altitude		-200		5000	m
MTBF	Telcordia SR-332 M1C3 @25°C	474K			Hours
Shock	Operating, MIL-HBK-810E	Complies			
	Non-operating, MIL-HBK-810E	Complies			
Operational Vibration	IEC-68-2-27 standard	Complies to levels of IEC721-3-2			
Safety – Medical Standards 2 x MOPP (Primary-Secondary)	IEC60601-1 (Ed. 3) – CB Cert and Report ANSI/AAMI ES60601-1 (2005+C1:09+A2:10) CAN/CSA 22.2 No. 60601-1 (2008) 3rd Edition EN60601-1:2006+CORR:2010				
Safety – ITE Standards	UL60950-1, 2nd Edition, 2011-12-19 CSA22.2 No.60950-1-07, 2nd Edition, 2001-12. EN60950-1:2006+A11:2009/A1/2010/A12:2011 IEC 60950 (ed.2), IEC60950 (ed.2); am1 CE Marking per LVD				
Warranty	2 years				
Outside Dimensions	3.0" x 5.0" x 1.4" (76.2mm x 127mm x 35.6mm)				
Weight (typ.)	0.8lbs (362.87g)				

### RESIDUAL RISK (PER ISO 14971 & IEC60601-1) FOR USER CONSIDERATION

Fault Condition	Residual Risk
Complies	Contact your Murata salesperson for details

### PROTECTION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Over Voltage Protection <sup>4</sup>	V1 (main output) latching	110		125	%
	V3 (aux output) latching	5.5		7.5	V
Over Current Protection <sup>4</sup>	V1, hiccup mode	110		130	%Amax
	V3, auto-recovery	110		150	
Over Temperature Protection	Auto-recovery		Complies		
Remote Sense Short Circuit Protection			Complies		
Remote Sense Reverse Connection Protection			Complies		

### ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation	Primary to Chassis	1500			Vac
	Primary to Secondary (2xMOPP)	4000			
	Secondary to Chassis	500			
	Output to Output	500			
Earth Leakage Current (under single fault condition)	264Vac, 60Hz, 25°C		300		µA
Earth Leakage Current (under normal conditions)	264Vac, 60Hz, 25°C		150		µA

### CURRENT SHARING OPTION – MVAC400-xxAFD AND MVAC400-xxAFR

Model Number	Description
MVAC400-12AFD MVAC400-24AFD MVAC400-48AFD MVAC400-12AFR	<p>Main Output: Current share is achieved using the droop method. Nominal output voltage is achieved at 50% load and output voltage increases/drops at a rate of:</p> <ul style="list-style-type: none"> <li>• 30mV per amp for the 12V output</li> <li>• 120mV per amp for the 24V output</li> <li>• 500mV per amp for the 50V output.</li> </ul> <p>Startup of parallel power supplies is not internally synchronized. If more than 400W combined power is needed, start-up synchronization must be provided by using a common PS_ON signal. To account for ±10% full load current sharing accuracy and the reduction in full load output voltage due to droop, available output power must be derated by 15% when units are operated in parallel. Current sharing can be achieved with or without remote sense connected to the common load.</p> <p>If ORing protection is desired, use the AFR model or if the AFD model is selected please contact Murata sales for external ORing FET board or external ORing FET reference circuit design (also see Applications Note ACAN-42).</p> <p>Aux (V3) output can be tied together for redundancy but total combined output power must not exceed 10W, external ORing devices must be used.</p> <p>Fan (V2) can be tied together for redundancy but total com load must not exceed 12W, external ORing devices must be used.</p>