



MEDISTAX RANGE

AC-DC Plug & Play Power Supply Series 400W-1200W

Outline Product Specification

The MEDISTAX® family of power supplies provides an incredible 1200W of modular and configurable power in an extremely compact 1U high (40mm) package with up to 12 isolated outputs.

Employing an innovative plug & play architecture the MEDISTAX® units combine feature-laden front-end Power Units combined with slide-in output converter modules, that allows configuration of a custom power solution in less than 5 minutes.

Medically Approved, all configurations carry full safety agency approvals including UL2601-1, EN60601-1 and are CE marked. Ultra high efficiencies of over 90% significantly reduces system thermal load and an industry leading 15W/in3 power density provides a compact and versatile power solution. Less than 300µA leakage current and 4000VAC isolation plus the MM1U is available in 4 and 6 slot versions.

The non-medical MS1U range - including a family designed specifically for extended temperature applications fully specified from -20°C to +70°C with no derating and a range designed specifically for acoustically sensitive applications also available - contact Powerstax for further details

Power Units

Family	Model	Slots	Power	Width
MM1U	6A	6	400W	127mm
	6B	6	700W	127mm
	6C	6	1000W	127mm
	6D	6	1200W	127mm
MM1U	4A	4	200W	89mm
	4B	4	400W	89mm
	4C	4	600W	89mm

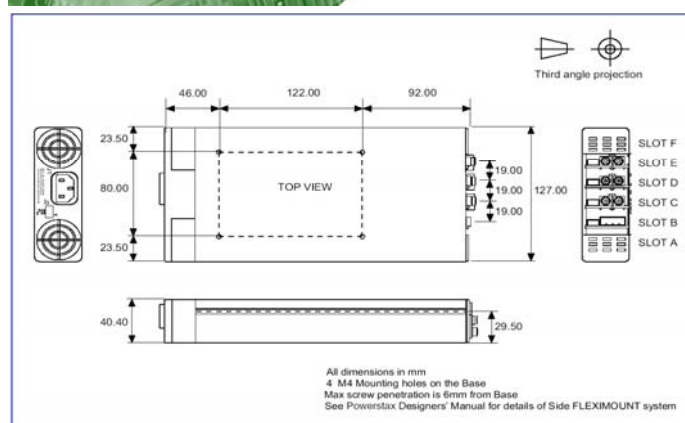
Power Modules

MODEL	Vmin	Vnom	Vmax	I _{max}	Watts*
Mx1	1.5	2.5	3.6	50A	125W
Mx2	3.2	5	6	40A	200W
Mx3	6	12	15	20A	240W
Mx4	12	24	30	10A	240W
Mx5	28	48	58	6A	288W
Mx7	5	24	28	5A	120W
Mx8 V1	5	24	28	3A	72W
V2	5	24	28	3A	72W

FEATURES

- UL2601-1 and EN60601-1 approved
- Less than 300µA leakage current
- 4000VAC isolation
- Extra low profile: 1U height (40mm)
- Ultra high efficiency up to 90%
- Plug & Play Power
 - allows fast custom configuration
 - allow easy logistics
- Reduced system heat dissipation
- Few electrolytic capacitors (all long life)
- Visual LED indicators
- Series / Parallel of multiple outputs
- 5V bias standby voltage provided
- Individual output control signals

Mechanical Specification



Input SPECIFICATION applies to configured units consisting of Power Modules plugged into the appropriate PowerUnit

Parameter	Conditions/Description	Min	Nom	Max	Units
Input Voltage Range	Universal Input	85 120		264 380	VAC VDC
Input Frequency Range		47		63	Hz
Power Rating MM1U - 6A				400	W
MM1U - 6B				700	W
MM1U - 6C	Derate linearly from 1000W at 100VAC to 850W at 85VAC			1000	W
MM1U - 6D	Derate linearly from 1200W at 120VAC to 850W at 85VAC			1200	W
Input Current MM1U - 6A	85VAC in 400W out		7.5		A
MM1U - 6B	85VAC in 700W out		9.5		A
MM1U - 6C, 6D	85VAC in 850W out		11.5		A
Inrush Current	230VAC @ 25°C			20	A
Undervoltage Lockout	Shutdown	70		78	VAC
Fusing MM1U - 6A	250V		F8A HRC		
MM1U - 6B	250V		F10A HRC		
MM1U - 6C, 6D	250V		F12A HRC		

Output

Parameter	Conditions/Description	Min	Nom	Max	Units
Power Module Power	As per Power Module table				
Output Adjustment Range	Manual: Multi-turn potentiometer. As per power module table Electronic: See Designers' Manual				
Minimum Load			0		A
Line Regulation	For $\pm 10\%$ change from nominal line			± 0.1	%
Load & Cross Regulation	For 25% to 75% load change			± 0.2	%
Transient Response	For 25% to 75% load change Voltage Deviation			10	%
	Settling Time			250	μ s
Ripple and Noise	20MHz Bandwidth			1.0	% pk-pk
Overvoltage Protection	1st level: Vset Tracking. 2nd level: Vmax (Latching)	110		125	%
Overcurrent Protection	Straight line with hiccup activation at $<30\%$ of Vnom See Power Module datasheet and Designer's Manual for full details	110		120	%.
Remote Sense	Max. line drop compensation. (except Mx7, Mx8)			0.5	VDC
Overshoot				2	%
Turn-on Delay	From AC In / Enable signal			300 / 30	ms
Rise Time	Monotonic			5	ms
Hold-up Time	For nominal output voltages at full load. MM1U - 6A, 6B, 6C / 6D	20 / 15			ms
Output Isolation	Output to Output / Output to Chassis	500 / 500			VDC

General

Parameter	Conditions/Description	Min	Nom	Max	Units
Isolation Voltage	Input to Output Input to Chassis	4500 1500			VAC VAC
Efficiency	230VAC, 1200W @ 24V		90		%
Safety Agency Approvals	EN60601-1, UL2601-1, CSA601-1 UL File No. E230761				
Earth Leakage Current	250VAC, 60Hz, 25°C			300	μ A
Signals	See MM1U Series datasheet				
Bias Supply	Always ON. Current 250mA	4.9	5	5.1	VDC
Reliability	Failures per million hours at 25°C and full load - power modules See Designers' Manual. Power unit excludes fans - power unit			1 0.6	fpmh fpmh

EMC

Parameter	Standard		Level		Units
Emissions					
Conducted	EN55011, EN55022, FCC		Level B		
Radiated	EN55011, EN55022, FCC		Level B		
Harmonic Distortion	EN61000-3-2		Compliant		
Flicker and Fluctuation	EN61000-3-3		Compliant		
Immunity					
Electrostatic Discharge	EN61000-4-2		Level 4		
Radiated RFI	EN61000-4-3		Level 3		
Fast Transients - burst	EN61000-4-4		Level 4		
Input Line Surges	EN61000-4-5		Class 4		
Conducted RFI	EN61000-4-6		10		V/m
Voltage Dips	EN61000-4-11 (EN55024)		10		ms

Environmental

Parameter	Conditions/Description	Min	Nom	Max	Units
Operating Temperature	Full Load up to 50°C. See derating below.	-20		+70	°C
Storage Temperature		-40		+85	°C
Derating	2.5% per °C above 50°C				
Relative Humidity	Non-condensing	5		95	%RH
Shock	3000 Bumps, 10G (16ms) half sine				
Vibration	1.5G	10		200	Hz

- NOTES**
1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
 2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
 3. All specifications at nominal input, full load, 25°C unless otherwise stated.



MEDISTAX SLIMLINE RANGE

1U High AC-DC Medical Power Supply 200, 400 & 600W

Outline Product Specification

The MEDISTAX® slimline family of power supplies provides 200, 400 or 600W of modular and configurable power in an extremely compact 1U high (40mm) package with up to 4 isolated outputs.

Medically Approved, all configurations carry full safety agency approvals including UL2601-1, EN60601-1 and are CE marked. Ultra high efficiencies of over 90% significantly reduces system thermal load and an industry leading 15W/in³ power density provides a compact and versatile power solution. Less than 300μA leakage current and 4000VAC isolation plus the MM1U is available in 4 and 6 slot versions.

Employing an innovative plug & play architecture the MEDISTAX® units combine feature-laden front-end Power Units combined with slide-in output converter modules, that allows configuration of a custom power solution in less than 5 minutes.

Power Units

Family	Model	Slots	Power	Width
MM1U	4A	4	200W	89mm
	4B	4	400W	89mm
	4C	4	600W	89mm

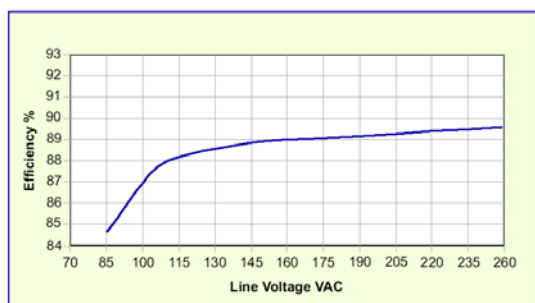
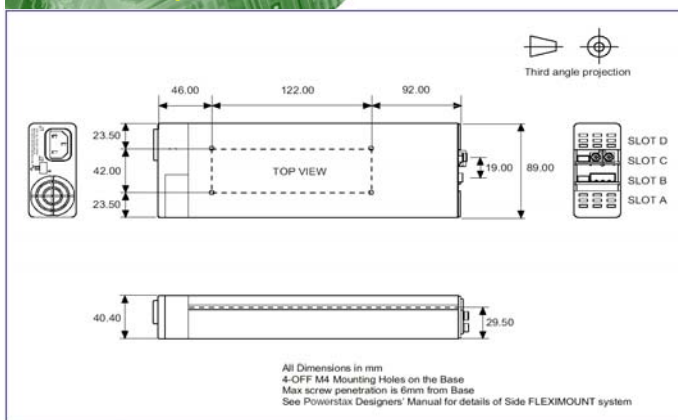
Power Modules

MODEL	Vmin	Vnom	Vmax	I _{max}	Watts*
Mx1	1.5	2.5	3.6	50A	125W
Mx2	3.2	5	6	40A	200W
Mx3	6	12	15	20A	240W
Mx4	12	24	30	10A	240W
Mx5	28	48	58	6A	288W
Mx7	5	24	28	5A	120W
Mx8 V1	5	24	28	3A	72W
V2	5	24	28	3A	72W

FEATURES

- UL2601-1 and EN60601-1 approved
- Less than 300μA leakage current
- 4000VAC isolation
- Extra low profile: 1U height (40mm)
- Ultra high efficiency up to 90%
- Plug & Play Power
 - allows fast custom configuration
 - allow easy logistics
- Reduced system heat dissipation
- Few electrolytic capacitors (all long life)
- Visual LED indicators
- Series / Parallel of multiple outputs
- 5V bias standby voltage provided
- Individual output control signals

Mechanical Specification



Input

SPECIFICATION applies to configured units consisting of power modules plugged into the appropriate power unit

Parameter	Conditions/Description	Min	Nom	Max	Units
Input Voltage Range	Universal Input	85		264	VAC
		120		380	VDC
Input Frequency Range		47		63	Hz
Power Rating MM1U - 4A				200	W
MM1U - 4B				400	W
MM1U - 4C	Derate linearly from 600W at 180VAC to 400W at 85VAC			600	W
Input Current MM1U - 4A	85VAC in 200W out		4.0		
MM1U - 4B	85VAC in 400W out		7.5		A
MM1U - 4C	85VAC in 400W out		7.5		A
Inrush Current	230VAC @ 25°C			20	A
Undervoltage Lockout	Shutdown	70		78	A
Fusing MM1U - 4A	250V 5 x 20mm		F5A HRC		VAC
MM1U - 4B	250V 5 x 20mm		F8A HRC		
MM1U - 4C	250V 5 x 20mm		F8A HRC		

Output

Parameter	Conditions/Description	Min	Nom	Max	Units
Power Unit Power	As per <i>Power Unit</i> table				
Output Adjustment Range	Manual: Multi-turn potentiometer. As per power module table Electronic: See Designers' Manual				
Minimum Load			0		A
Line Regulation	For $\pm 10\%$ change from nominal line			± 0.1	%
Load & Cross Regulation	For 25% to 75% load change			± 0.2	%
Transient Response	For 25% to 75% load change Voltage Deviation Settling Time			10 250	% μ s
Ripple and Noise	20MHz Bandwidth			1	% pk-pk
Overvoltage Protection	Two Level 1st level: Vset Tracking. 2nd level: Vmax (Latching)	110		125	%
Overcurrent Protection	Straight line with hiccup activation at <30% of Vnom See power module datasheet and Designer's Manual for full details	110		120	%.
Remote Sense	Max. line drop compensation. (except Mx7, Mx8)			0.5	VDC
Overshoot				2	%
Turn-on Delay	From AC In / Enable signal			300 / 30	ms
Rise Time	Monotonic			5	ms
Hold-up Time	For nominal output voltages at full load.	20 / 15			ms
Output Isolation	Output to Output / Output to Chassis	500 / 500			VDC

General

Parameter	Conditions/Description	Min	Nom	Max	Units
Isolation Voltage	Input to Output Input to Chassis	4000 1500			VAC VAC
Efficiency	230VAC, 400W @ 24V		89		%
Safety Agency Approvals	EN60601-1, UL2601-1, CSA601-1 UL				
Leakage Current	250VAC, 60Hz, 25°C			300	μ A
Signals	See MS1U Series datasheet				
Bias Supply	Always ON. Current 250mA	4.9	5	5.1	VDC
Reliability	Failures per million hours at 25°C and full load - <i>power modules</i> See Designers' Manual. Power unit excludes fans - <i>power unit</i>			1.0 0.6	fpmh fpmh

EMC

Parameter	Standard		Level		Units
Emissions					
Conducted	EN55011, EN55022, FCC		Level B		
Radiated	EN55011, EN55022, FCC		Level B		
Harmonic Distortion	EN61000-3-2		Compliant		
Flicker and Fluctuation	EN61000-3-3		Compliant		
Immunity					
Electrostatic Discharge	EN61000-4-2		Level 4		
Radiated RFI	EN61000-4-3		Level 3		
Fast Transients - burst	EN61000-4-4		Level 4		
Input Line Surges	EN61000-4-5		Class 4		
Conducted RFI	EN61000-4-6		10		V/m
Voltage Dips	EN61000-4-11 (EN55024)		10		ms

Environmental

Parameter	Conditions/Description	Min	Nom	Max	Units
Operating Temperature	Full Load up to 50°C. See derating below.	-20		+70	°C
Storage Temperature		-40		+85	°C
Derating	2.5% per °C above 50°C				
Relative Humidity	Non-condensing	5		95	%RH
Shock	3000 Bumps, 10G (16ms) half sine				
Vibration	1.5G	10		200	Hz

NOTES

1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
3. All specifications at nominal input, full load, 25°C unless otherwise stated.



MEDISTAX RANGE

1U High AC-DC Plug & Play Power Supply Series

Product Specification

The *Power Module* family of plug-in DC output modules are for use with the MM1U series of *Power Units*. Compatible with the entire range, the *Power Modules* convert the intermediate bus voltage provided by the *Power Unit* to your specific output voltage requirements. Each *Power Module* can be simply plugged into, removed and exchanged to ensure that you have the most flexible power supply at your fingertips.

The *Power Module* family comprises 8 models providing output voltages from 1.5 to 58V. The feature-rich *Power Modules* provide a suite of output signals and user configurable functions increasing design-in flexibility. User configurable functions include local and remote adjustment, adjustable current limit, alternative current limiting technique and inhibit/enable functions.

Employing high efficiency DC-DC conversion techniques, *Power Modules* have minimal power losses, while the use of planar magnetics and surface mount components minimise the size, making the MM1U series the smallest power supply in the industry.



Power Modules

MODEL	Vmin	Vnom	Vmax	I _{max}	Watts*
Mx1	1.5	2.5	3.6	50A	125W
Mx2	3.2	5	6	40A	200W
Mx3	6	12	15	20A	240W
Mx4	12	24	30	10A	240W
Mx5	28	48	58	6A	288W
Mx7	5	24	28	5A	120W
Mx8 V1	5	24	28	3A	72W
V2	5	24	28	3A	72W

Power Module Connector Details

Pin	J2(Power Unit)	J3 Power Module (Type A)	J3 Power Module (Type B)
1	Common	+ Sense	+pg (V2)
2	+5V Bias	- Sense	-pg (V2)
3		V trim	inhibit (V2)
4	ac fail	I trim	common (V2)
5	fan fail*	+inhibit/enable	+pg (V1)
6	global enable	- inhibit/enable	-pg (V1)
7	temp alarm*	+ power good	inhibit (V1)
8	global inhibit	- power good	common (V1)

*Option 01 only

** See individual Power Module datasheets





MEDISTAX RANGE

1U High AC-DC Plug & Play Power Supply Series

Product Specification

Voltage Adjustment - Local

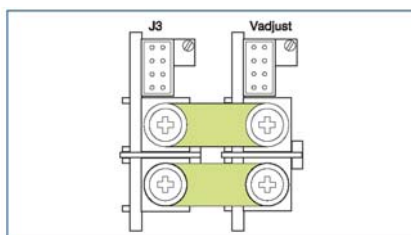
The multi-turn potentiometer that adjusts each output within the specified range may be accessed via the output panel of the power supply. Clockwise rotation increases output voltage. Resolution is approximately 5% of nominal voltage (V_{nom}) per turn.

Voltage Adjustment - Remote (resistive / electronic)

The output voltage may be adjusted or trimmed by means of an external resistor or potentiometer network connected to the V_{trim} pin. Linear Electronic programming is also possible and may be implemented according to the formula $V_{out} = K V_{control}$. See Powerstax MS1U series Designers' Manual for full details.

Paralleling

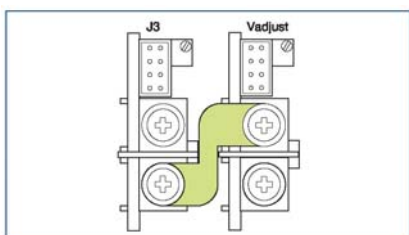
To achieve increased current capacity, simply parallel outputs using the standard parallel links. Powerstax 'wireless' sharing ensures that current hogging is not possible.



Standard parallel links can be supplied. To order, please use part number XP1.

Seriesing

To achieve increased output voltages, simply series outputs using standard series links, paying attention to the requirements to maintain SELV levels if required in your system.



Standard serial links can be supplied. To order, please use part number XS1.

Remote Sensing

When the load is remote from the power supply, the remote sense pins may be used to compensate for drops in the power leads. Where the power cabling contributes significant dynamic impedance, see MS1U series Designers' Manual.

Bias Voltage

A SELV isolated 5V (always on) bias voltage rated at 250mA is provided on J2 to facilitate miscellaneous control functions.

Current Limit Adjustment

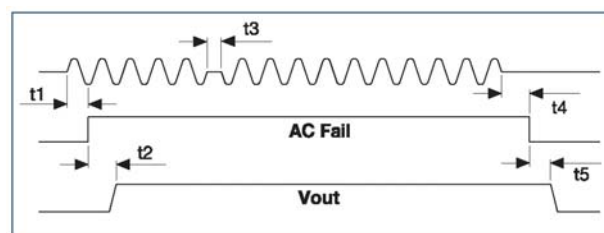
The output current limit setting may be adjusted (downwards only) by means of an external resistor connection to the I trim pin.

Inhibit/Enable

Inhibiting may be implemented either globally or on a per module basis (Power Unit or Power Module inhibiting). Reverse logic (Enabling) may also be implemented, see MS1U series Designers' Manual.

AC Fail

Open collector signal indicating that the input voltage has failed or is less than 80Vac. This signal changes state giving 5mS of warning before loss of output regulation. See MS1U series Designers' Manual for full specifications.

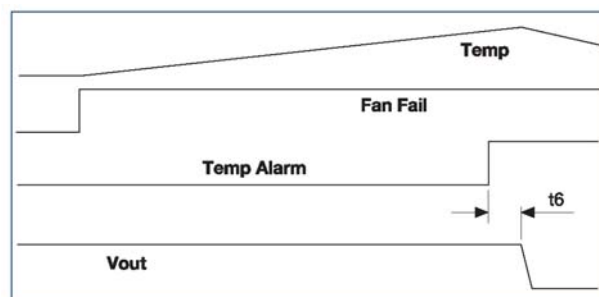


Temperature Alarm (Option 01)

Open collector signal indicating excessive Power Unit temperatures due to fan failure or operation beyond ratings. This signal is activated at least 10ms prior to system shutdown.

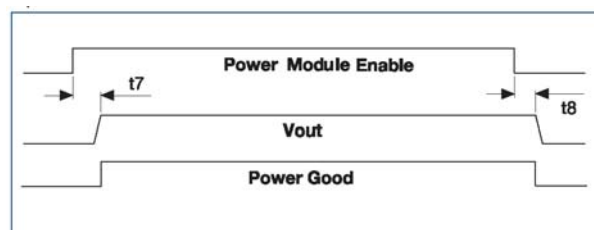
Fan Fail (Option 01)

Open collector signal indicating that at least one of the system fans have failed. This does not cause system shutdown.



Power Good

Opto-isolated output signal indicates that the Power Module is operating correctly and output voltage is within normal band. Opto transistor ON = Good.



Indication LEDs

Each Power Module has a visual indicator to identify that it is operating within normal ratings. Very useful for system diagnosis.



How to Order

Accessories may be ordered directly using the part numbers shown.

Parallel Link XP1



June 2005