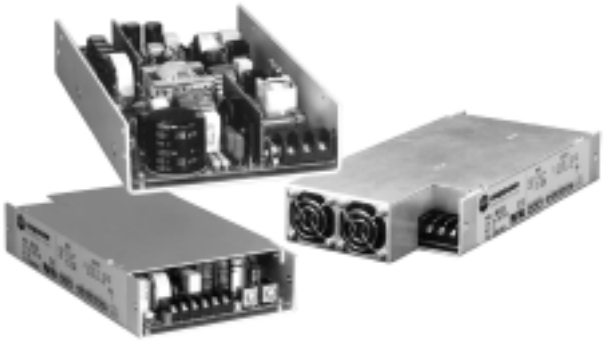
Call U.S.: +1(954) 346-2442 • sales@unipower-corp.com
Call U.K.: +44(0) 1903 768200 • info@unipower-europe.com

MD/MF SERIES: THIN-250™ AND THIN-400™

Low Profile with PFC: Single Output, 250 or 400 Watts



LVD73/23/EEC

FEATURES

- Low Profile, 1.75 Inches
- Three Package Configurations
- Active Power Factor Correction
- Meets EN61000-3-2
- Up to 5.2 Watts/Cu. Inch
- Class B Input EMI Filter
- Single-Wire Current Share
- 3.3V Output Available
- 5V, 100mA Supervisory Output
- Remote Sense
- Overvoltage Protection
- Overload & Short Circuit Protection
- Thermal Protection
- AC Power Fail & DC Power Good
- Remote Inhibit, Open or Short

TWO-YEAR WARRANTY

STANDARD MODELS

(Other Modules Available, Consult Factory)

SINGLE OUTPUT 250W

Max Watts	Output Voltage	Output Current	MODEL NUMBER
165	3.3V	50.0A	MD9000
250	5.0V	50.0A	MD2000
250	12.0V	21.0A	MD3000
250	15.0V	16.7A	MD4000
250	24.0V	10.4A	MD5000
250	28.0V	9.0A	MD6000
250	48.0V	5.2A	MD7000

SINGLE OUTPUT 400W

Max Watts	Output Voltage	Output Current	MODEL NUMBER
198	3.3V	60.0A	MF9000
300	5.0V	60.0A	MF2000
400	12.0V	33.3A	MF3000
400	15.0V	26.7A	MF4000
400	24.0V	16.7A	MF5000
400	28.0V	14.3A	MF6000
400	48.0V	8.3A	MF7000

For modified versions, call our Modification Center at 954-346-2442, Ext. 400

NOTES:
1. For option, add option code as suffix to model number.
2. Standard model no. is open frame version.

SAFETY CERTIFICATIONS

AGENCY	STANDARD
UL	UL1950
CUL	CSA22.2, No. 950
DEMKO	EN60950

OPTIONS [1]	
C	Top Mounted Cover
N	Full Cover with 2 End Mounted Fans

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Call U.K.: +44(0) 1903 768200 • info@unipower-europe.com

SPECIFICATIONS, MD/MF SERIES

Typical at Nominal 115/230VAC Line, Full Load and 25°C Unless Otherwise Noted.

OUTPUT SPECIFICATIONS

Voltage Adjustment Range..... >±5%
Total Regulation[1]..... <±2.0%
Ripple & Noise, Pk-Pk[2]..... <1% or 50mV
Hold-UpTime[3].....>20ms
Dynamic Response[4]..... 300µs
Temperature Coefficient..... ±0.02%/°C
Minimum Load.....0A
Overload Protection..... Power Shutdown
Overvoltage Protection..... Power Shutdown
Remote Sense.....Up to 0.25V Per Wire

INPUT SPECIFICATIONS

Input Voltage Range..... 85-264VAC
Power Factor..... 0.99
Input Frequency..... 47-63Hz
Inrush Limiting..... 30A peak (Cold Start)
Input Current, 250W..... 2.8A, 120VAC; 1.5A, 230VAC
400W..... 4.5A, 120VAC; 2.3A, 230VAC
Input EMI Filter, Conducted..... EN55022 Curve B
FCC20780 pt. 15J Curve B
Harmonic Distortion..... EN61000-3-2
Input Immunity, Conducted
Fast Transients, Line-Line..... ±2kV (EN61000-4-4 Level 3)
Surges, Line-Line..... ±1kV (EN61000-4-5 Level 2)
Surges, Line-Ground..... ±2kV (EN61000-4-5 Level 3)
Input Protection..... Internal Fuse, 6.3A

GENERAL SPECIFICATIONS

Efficiency..... >75% at Full Load
Switching Frequency..... 150kHz Nominal
Isolation, Class I[5]..... >3000VAC Input - Output
>1500VAC Input - Ground
>50VDC Output - Ground
Safety Standards..... EN60950, UL1950, CSA22.2-950

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature..... 0°C to 70°C Ambient
Derating..... 2.5% / °C, 50°C to 70°C
Storage Temperature..... -40°C to +85°C
Cooling
Standard & "C" Option..... 30 CFM
"N" Option..... 2 Integral Ball Bearing Fans

PHYSICAL SPECIFICATIONS

Case Material..... Aluminum
Dimensions, Inches (mm)
Standard..... 1.70 (43.2)H x 5.00 (127.0)W x 9.00 (229.0)D
"C" Option..... 1.75 (44.5)H x 5.00 (127.0)W x 9.00 (229.0)D
"N" Option..... 1.75 (44.5)H x 5.00 (127.0)W x 10.50 (267.0)D

NOTES:
1. No Load to full load, including line regulation and load regulation.
2. Whichever is greater. 20MHz bandwidth. Measured with 0.1µF ceramic and 10µF tantalum capacitors in parallel across the output.
3. Full load at nominal AC line.
4. <4% deviation recovering to within 1% for 25% load change.
5. Input - output isolation figure is for isolation components only. 100% production Hipot tested.

CONTROL & SUPERVISORY SIGNALS

PIN	FUNCTION	PIN	FUNCTION
1	+ Sense	6	DC Power Good
2	- Sense	7	Inhibit (N.O.)
3	N.C.	8	Inhibit (N.C.)
4	N.C.	9	AC Power Fail
5	Current Share	10	Control Common

J2: 12VDC FAN SUPPLY

PIN	FUNCTION
1	12V Return
2	+12VDC

J3: 5V, 100mA AUX. SUPPLY

PIN	FUNCTION
1	+5VDC
2	5V Return

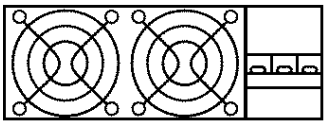
CONNECTORS		
J1:	AMP 173981-0	10-PIN
J2:	AMP 171825-2	2-PIN
J3:	AMP 171825-2	2-PIN

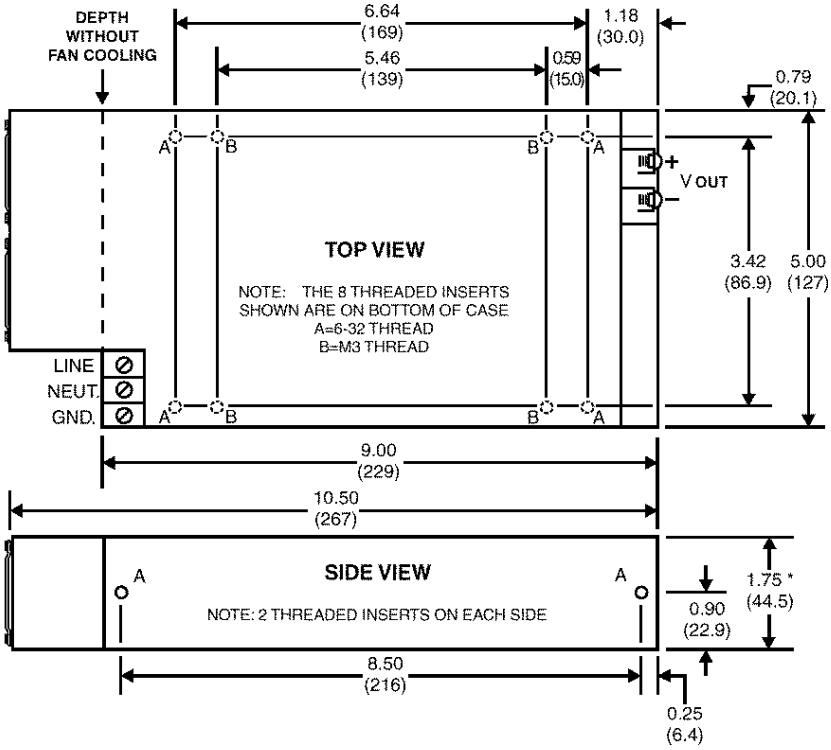
MATING CONNECTOR KIT

Kit provides mating connectors for M Series models
Order Kit No. 775-1417-0000 $8.00

***NOTE**: This composite drawing illustrates all three versions of the M Series. The open frame version has no fan or cover and is 1.70" high. Option C has a cover without fans. Both of these versions are 9.00 Inches (229mm) deep as shown by the dotted line. Option N has a cover and two end fans and is 10.50 Inches (267mm) deep. Air flow is from the fans into the power supply.

The power supply top view shows eight thredded inserts which are on the bottom of the supply. The "A" inserts accept 6-32 screws and are also on both sides of the supply; the "B" inserts accept M3 screws and are on the bottom only.





ALL DIMENSIONS IN INCHES (mm).
All specifications subject to change without notice.

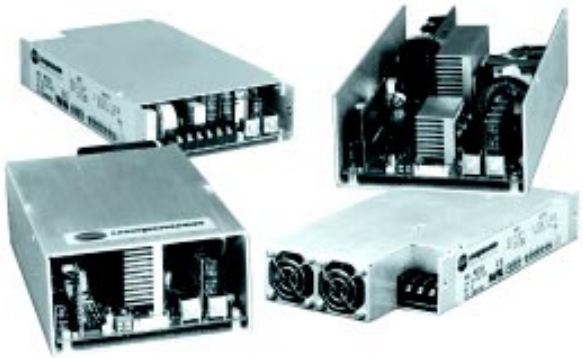
08/07/02MD-MF-ds.p65

UNIPOWER CORPORATION

North America Tel: 954-346-2442 • Fax: 954-340-7901
Europe Tel: +44(0)1903 768200 • Fax: +44(0)1903 764540

MG/MH SERIES: LOW PROFILE 500-600W

Single Output & Front End with PFC: 12V to 48VDC



LVD73/23/EEC

MODULE FEATURES

- Low Profile, 2.0 or 2.5 Inches
- Three Case Configurations
- Active Power Factor Correction
- Meets EN61000-3-2
- Up to 5.5 Watts/Cu. Inch
- Class B Input EMI Filter
- Single-Wire Current Share
- 5V, 100mA Supervisory Output
- No Minimum Load
- 85% Efficiency
- Remote Inhibit
- Overvoltage Protection
- Overload & Short Circuit Protection
- Thermal Protection
- AC Power Fail & DC Power Good
- 12V, 500mA Auxiliary Fan Supply

TWO-YEAR WARRANTY

STANDARD MODELS

(Other Outputs Available, Consult Factory)

Max Watts	Output Voltage	Output Current	PFC	Minimum Load	Total Regulation	Case Height	MODEL NUMBER
500	12.0V	42.0A	✔	0A	1%	2.0"	MG3000
500	24.0V	20.8A	✔	0A	1%	2.0"	MG5000
500	28.0V	17.9A	✔	0A	1%	2.0"	MG6000
500	48.0V	10.4A	✔	0A	1%	2.0"	MG7000
600	24.0V	25.0A	✔	0A	1%	2.5"	MH5000
600	28.0V	21.4A	✔	0A	1%	2.5"	MH6000
600	48.0V	12.5A	✔	0A	1%	2.5"	MH7000

For modified versions, call our Modification Center at 954-346-2442, Ext. 400

SAFETY CERTIFICATIONS

AGENCY	STANDARD
UL	UL1950
CUL	CSA22.2, No. 950
DEMKO	EN60-950

OPTIONS [1]	
C	Top Cover
N	Cover with End Fan

NOTES:

1. For option, add option code as suffix to model number.
2. Standard model no. is open frame version.

North America Tel: 954-346-2442 • Fax: 954-340-7901
Europe Tel: +44(0)1903 768200 • Fax: +44(0)1903 764540

SPECIFICATIONS

Typical at Nominal 115/230VAC Line, Full Load and 25°C Unless Otherwise Noted.

OUTPUT SPECIFICATIONS

Voltage Adjustment Range ..... >±5%
Total Regulation[1] ..... <±1.0%
Ripple & Noise (Pk-Pk)[2] ..... <1%
Hold-Up ..... >25mS
Dynamic Response[3] 300µS
Temperature Coefficient ..... ±0.02%/°C
Minimum Load 0A
Overload Protection ..... Constant Current Limiting
Overvoltage Protection ..... Power Shutdown
Remote Sense ..... Up to 0.25V Per Wire

INPUT SPECIFICATIONS

Input Voltage Range ..... 85-264VAC, Single Phase
Power Factor 0.99
Input Frequency 47-63Hz
Inrush Limiting ..... 30A Peak
Input Current, Full Load
500W 5.0A, 120VAC; 2.6A, 230VAC
600W 5.9A, 120VAC; 3.1A, 230VAC
Input EMI Filter, Conducted ..... EN55022 Curve B
..... FCC20780 pt. 15J Curve B
Harmonic Distortion EN61000-3-2
Input Immunity, Conducted
Fast Transients, Line-Line ..... ±2kV (EN61000-4-4 Level 3)
Surges, Line-Line ..... ±1kV (EN61000-4-5 Level 2)
Surges, Line-Ground ..... ±2kV (EN61000-4-5 Level 3)
Input Protection ..... Internal Fuse

GENERAL SPECIFICATIONS

Efficiency[4] ..... >85% at Full Load
Switching Frequency ..... 150kHz Nominal
Isolation, class I [5] ..... >3000VAC Input - Output
..... >1500VAC Input - Ground
..... >50VDC Output - Ground
Safety Standards EN60-950, UL1950, CSA22.2-950

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature ..... 0°C to 70°C Ambient
Derating ..... 2.5% / °C, 50°C to 70°C
Storage Temperature ..... -40°C to +85°C
Cooling
Standard & 'C' Option ..... External 25 CFM
'N' Option ..... Integral Ball Bearing Fan

PHYSICAL SPECIFICATIONS

Case Material ..... Aluminum
Dimensions, Inches (mm); Standard & 'C' Option
500W ..... 2.0 (50.8)H x 5.0 (127)W x 9.0 (229)D
600W ..... 2.5 (63.5)H x 5.0 (127)W x 9.0 (229)D
Dimensions, Inches (mm); 'N' Option
500W ..... 2.0 (50.8)H x 5.0 (127)W x 10.5 (267)D
600W ..... 2.5 (63.5)H x 5.0 (127)W x 10.5 (267)D

NOTES:
1. No Load to full load, including line regulation and load regulation.
2. Whichever is greater. 20MHz bandwidth. Measured with 0.1µF ceramic and 10µF tantalum capacitors in parallel across the output.
3. <4% deviation recovering to within 1% for 25% load change.
4. 80% for 12V MG3000.
5. Input - output isolation figure is for isolation components only. 100% production Hipot tested.

J1 CONTROL & SUPERVISORY SIGNALS

PIN	FUNCTION	PIN	FUNCTION
1	+Sense	6	DC Power Good
2	-Sense	7	Inhibit (N.O.)
3	Not Used	8	Not Used
4	Not Used	9	AC Power Fail
5	Current Share	10	Control Common

J2: 12V, 500mA FAN SUPPLY

PIN	FUNCTION
1	12V Return
2	+12VDC

J3: 5V, 100mA AUX. SUPPLY

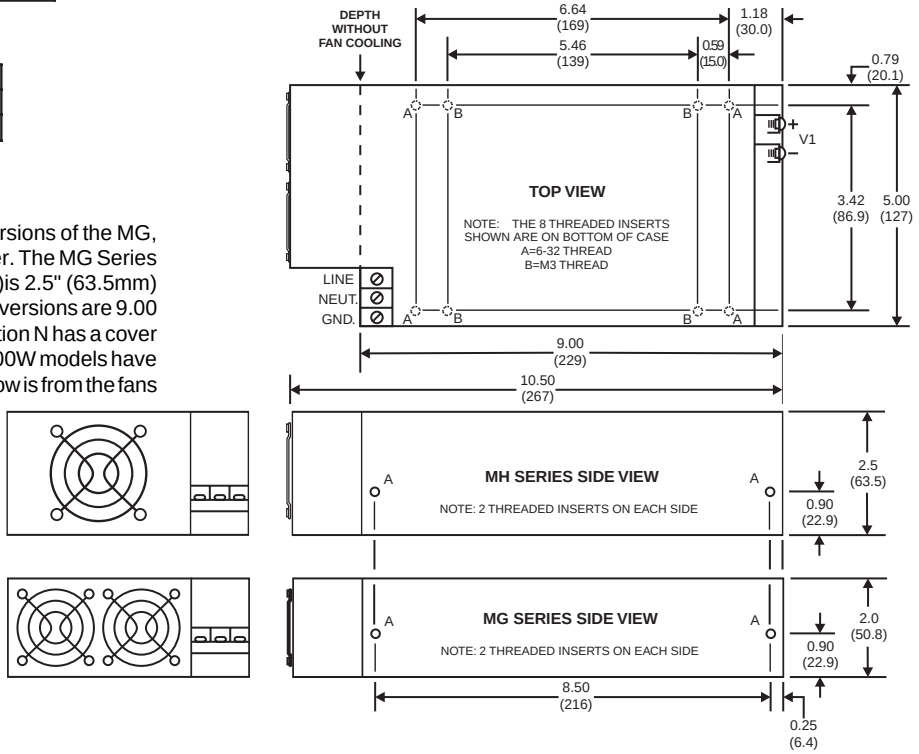
PIN	FUNCTION
1	+5VDC
2	5V Return

CONNECTORS	
J1: AMP 173981-0	10-PIN
J2: LMI 9105.102.02	2-TERM
J3: AMP 171825-2	2-PIN

MATING CONNECTOR KIT
Kit provides mating connectors for all MG and MH Series models. Order Kit No. 775-1417-000

NOTE: This composite drawing illustrates all three versions of the MG, MH Series. The open frame version has no fan or cover. The MG Series (500W) is 2.0" (50.8mm) high. The MH Series (600W)is 2.5" (63.5mm) high. Option C has a cover without fans. Both of these versions are 9.00 Inches (229mm) deep as shown by the dotted line. Option N has a cover and end fan and is 10.50 Inches (267mm) deep. The 500W models have two fans while the 600W models have a single fan. Airflow is from the fans into the power supply.

The power supply top view shows eight threaded inserts which are on the bottom of the supply. The "A" inserts accept 6-32 screws and are also on both sides of the supply; the "B" inserts accept M3 screws and are on the bottom only.



ALL DIMENSIONS IN INCHES (mm).
All specifications subject to change without notice.

UNIPOWER CORPORATION

OPERATING INSTRUCTIONS FOR
SWITCHING POWER SUPPLIES

These operating instructions should be read through carefully before installing and operating this UNIPOWER switching power supply. For complete information on this unit, including specifications, see the inside pages of this operating sheet.

1.0 SAFETY WARNING

1.1 This switching power supply has hazardous external and internal voltages. It should be handled, tested and installed only by qualified technical personnel who are trained in the use of power supplies and are well aware of the hazards involved. Be especially careful if the power supply is an open frame type. If an enclosed unit, the cover or covers should not be removed.

1.2 The AC input terminals are at hazardous voltage potentials. **DO NOT TOUCH** this area when AC power is applied. When operating this power supply, the AC input ground terminal must be connected to safety ground to minimize electrical shock hazard and to ensure low EMI (electromagnetic interference). The internal voltages are at hazardous potentials. If covered, the power supply cover **SHOULD NOT BE REMOVED**. There are no user-serviceable components in this unit. Removing the cover will void the warranty.

2.0 UNPACKING AND INSPECTION

2.1 This switching power supply was carefully tested, inspected and packaged for shipment from our factory. Upon receipt of the unit, it should be carefully unpacked and inspected for any damage in shipment.

2.2 If there is evidence of damage, **DO NOT** attempt to test the unit. The freight carrier should be notified immediately, and a claim for the cost of the power supply should be filed with the carrier for direct reimbursement. Be sure to include the model and serial number of the damaged unit in all correspondence with the freight carrier. Also save the shipping carton and packing material as evidence of damage for the freight carrier's inspection.

2.3 UNIPOWER Corporation will cooperate fully in case of any shipping damage investigation. Always save the packing materials for later use in shipping the unit. Never ship the power system without proper packing.

3.0 SAFETY CERTIFICATIONS

3.1 UNIPOWER Corporation has a rigorous policy for the safe design and safety testing of its switching power supplies. All products are certified to the safety standards of UL1950, CSA22.2 No.950-95 and EN60-950. All products are CE marked to indicate compliance with the EEC Low Voltage Directive (LVD73/23/EEC).

3.2 For further operational safety, UNIPOWER switching power supplies have output current limiting and short circuit protection in addition to thermal protection by means of power shutdown.

4.0 CONNECTING TO AC POWER LINE

4.1 Before connecting to AC power, in the case of an uncovered power supply (open board, open frame or L-bracket type), a protective safety cover should be placed over the unit to prevent accidental contact with it. In addition, in the case of power supplies without a self-contained cooling fan, specified air flow must be provided for proper cooling.

4.2 Check that the correct, specified AC voltage is to be applied to the power supply input. A three-wire line and plug must be used with proper connection made to line, neutral and safety ground terminals. Also make sure that the proper line cord wire size is used for the input current to the power supply.

4.3 Connect a load to each power supply output. This load should not exceed the rating of the output, and the total load on all outputs must not exceed the rating for the power supply. Note that some power supplies specify a minimum load for proper regulation. Also in some cases the speed of the cooling fan may be affected by very light loads.

4.4 The + and - sense leads for all applicable outputs should be connected to their proper load points with proper polarity. This assures specified regulation at the load points.

UNIpower CORPORATION

M SERIES SINGLE OUTPUT SWITCHERS

MD, MF, MG, MH, ML, MN & MP: 250 TO 1,200 WATTS

MD SERIES

MAX WATTS	V1 OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NUMBER
165	3.3V	50.0A	MD9000
250	5.0V	50.0A	MD2000
250	12.0V	21.0A	MD3000
250	15.0V	16.7A	MD4000
250	24.0V	10.4A	MD5000
250	28.0V	9.0A	MD6000
250	48.0V	5.2A	MD7000

MF SERIES

MAX WATTS	V1 OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NUMBER
198	3.3V	60.0A	MF9000
300	5.0V	60.0A	MF2000
400	12.0V	33.3A	MF3000
400	15.0V	26.7A	MF4000
400	24.0V	16.7A	MF5000
400	28.0V	14.3A	MF6000
400	48.0V	8.3A	MF7000

MG & MH SERIES

MAX WATTS	OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NUMBER
500	12.0V	42.0A	MG3000
500	24.0V	20.8A	MG5000
500	28.0V	17.9A	MG6000
500	48.0V	10.4A	MG7000
600	24.0V	25.0A	MH5000
600	28.0V	21.4A	MH6000
600	48.0V	12.5A	MH7000

ML, MN & MP SERIES

MAX WATTS	OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NUMBER
800	24V	33A	ML5000
800	28V	29A	ML6000
800	48V	17A	ML7000
1000	24V	42A	MN5000
1000	28V	36A	MN6000
1000	48V	21A	MN7000
1200	24V	50A	MP5000
1200	28V	43A	MP6000
1200	48V	25A	MP7000

CONNECTIONS

J1 CONTROL & SUPERVISORY SIGNALS

PIN	FUNCTION	PIN	FUNCTION
1	+Sense	6	DC Power Good
2	-Sense	7	Inhibit (N.O.)
3	Remote Adjust*	8	Not Used
4	Not Used	9	AC Power Fail
5	Current Share	10	Control Common

J2: 12V, 500mA STANDBY SUPPLY

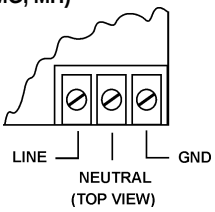
PIN	FUNCTION
1	12V Return
2	+12VDC

J3: 5V, 100mA STANDBY SUPPLY

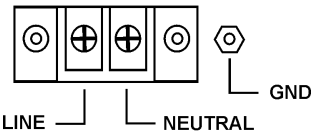
PIN	FUNCTION
1	+5VDC
2	5V Return

***NOTE:**
There is no remote adjust input on the MD version. On all other versions a 0V to +5V input on this pin produces a minimum of -10% to +10% change from nominal voltage on the output.

AC CONNECTIONS (MD, MF, MG, MH)

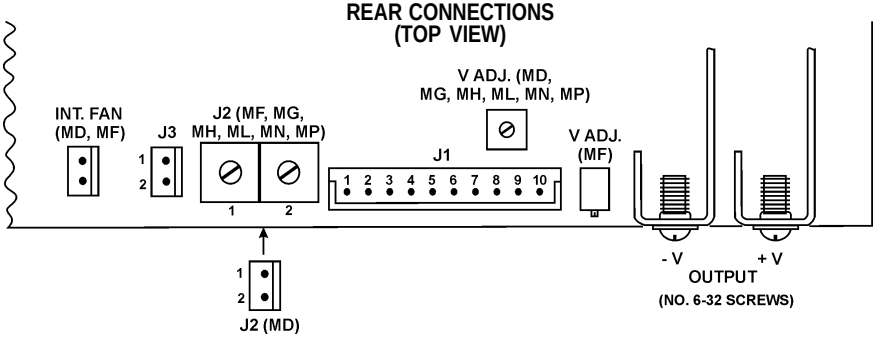


(ML, MN, MP)



(END VIEW)

REAR CONNECTIONS (TOP VIEW)



UNIPOWER CORPORATION

SPECIFICATIONS - M SERIES SINGLE OUTPUT

OUTPUT SPECIFICATIONS

Voltage Adjustment Range ..... ±5%
Total Regulation[1] 1.0%
Ripple & Noise, Pk-Pk[2] ..... 1% or 50mV
Dynamic Response[3] 300µS
Temperature Coefficient ..... ±0.02%/°C
Minimum Load 0A
Overload Protection ..... Constant Current Limiting
Overvoltage Protection ..... Power Shutdown
Remote Sense ..... Up to 0.25V Per Wire

INPUT SPECIFICATIONS

Input Voltage Range ..... 85-264VAC, Single Phase
Power Factor 0.99
Input Frequency 47-63Hz
Inrush Limiting ..... 30A Peak (Cold Start)
Input Current, Full Load
250W 2.8A, 120VAC; 1.5A, 230VAC
400W 4.5A, 120VAC; 2.3A, 230VAC
500W 5.0A, 120VAC; 2.6A, 230VAC
600W 5.9A, 120VAC; 3.1A, 230VAC
800W 7.8A, 120VAC; 3.9A, 230VAC
1000W 9.8A, 120VAC; 4.9A, 230VAC
1200W 9.8A, 120VAC; 6.2A, 230VAC
Input EMI Filter, Conducted ..... EN55022 Curve B
FCC20780 pt. 15J Curve B

SAFETY CERTIFICATIONS

AGENCY	STANDARD
UL	UL1950
CUL	CSA22-2, No. 950
DEMKO	EN60-950

M SERIES SET-UP AND TESTING

STEP 1. Connect a 50% load at the output.

STEP 2. Connect the sense leads with propoer polarity to their respective loads. Make sure that the inhibit input is at TTL HI or open.

STEP 3. Connect a three-wire AC power cord to the correct input terminals for line, neutral and ground.

STEP 4. Plug the AC power cord into the outlet. Check the output voltage, at its load, against its specification with a digital voltmeter.

STEP 5. Connect output to actual load, plug in power cord and recheck output voltages.

Harmonic Distortion EN61000-3-2
Input Immunity, Conducted
Fast Transients, Line-Line .... ±2kV (EN610000-4-4 Level 3)
Surges, Line-Line ..... ±2kV (EN610000-4-5 Level 2)
Surges, Line-Ground ..... ±2kV (EN610000-4-5 Level 3)
Input Protection ..... Internal Fuse

GENERAL SPECIFICATIONS

Efficiency ..... 75-85% at Full Load
Switching Frequency ..... 150kHz Nominal
Isolation, class 1[4] ..... 3000VAC Input - Output
>1500VAC Input - Ground
>50VDC Output - Ground
Safety Standards EN60-950, UL1950, CSA22.2-950

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature ..... 0°C to 70°C Ambient
Derating ..... 2.5% / °C, 50°C to 70°C
Storage Temperature ..... -40°C to +85°C
Cooling ..... Integral Ball Bearing Fans

PHYSICAL SPECIFICATIONS

Case Material ..... Aluminum

NOTES:

1. No load to full load, including line regulation and load regulation.
2. Whichever is greater, 20MHz bandwidth. Measured with 0.1µF ceramic and 10µF tantalum capacitors in parallel across the output.
3. <4% deviation recovering to within 1% for 25% load change.
4. Input - output isolation figure is for isolation components only. 100% production Hipot tested.

CONNECTORS	
J1: AMP 173981-0	10-PIN
J2: LMI 9105.102.02*	2-PIN
J3: AMP 171825-2	2-PIN

MATING CONNECTORS	
J1: AMP 1-1757780	10-PIN
J2: NONE	
J3: AMP 172142-2	2-PIN

MATING CONNECTOR KIT

Kit provides mating connectors for all M Series models.
Order Kit No.: 775-1417-000 $8.00

NOTES: J1 for the MD is same as J1.

IN CASE OF TROUBLE...

1. Check AC Input connections.
2. Check for shorted output.
3. Check if OVP is engaged.
4. Check if output is held off by inhibit control.
5. Check if overtemperature protection is activated.
6. Check if remote sense leads are connected.
7. If a problem can't be solved, call UNIPOWER factory for assistance: 954-346-2442 ext: 400

5.0 TESTING

5.1 Line and load regulation should be checked with the connections shown in Figure 1. Loads should be applied to all outputs and the applicable sense leads should be connected with proper polarity to the load points. Voltages should be measured at the sense leads at the load points.

5.2 Noise and ripple at the outputs should be measured as shown in Figure 2. This is done with a 20 MHz bandwidth oscilloscope with a probe isolated from ground. A 10µF tantalum capacitor and 0.1µF ceramic capacitor are connected directly across the output terminals. The ground connection to the probe should be as short as possible to prevent noise pickup.

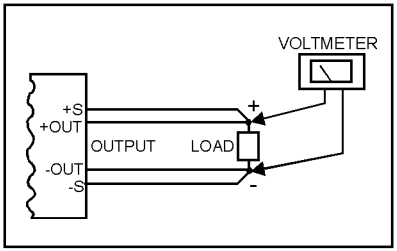


Figure 1. Measuring Regulation

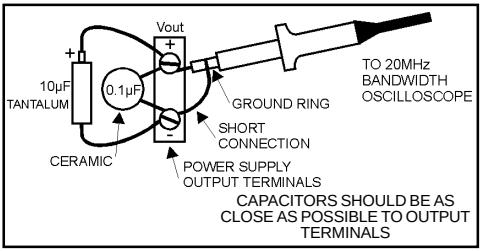


Figure 2. Measuring Output Ripple Voltage

6.0 INSTALLATION

6.1 Secure the power supply by means of bolts into the threaded inserts in the case.

6.2 Connect a three-wire line cord to the power supply AC terminals with proper connection to line, neutral and safety ground terminals.

6.3 Check that the AC outlet provides the correct AC line voltage.

6.4 Connect the remote sense leads to their respective load points with proper polarity. Each pair of remote sense leads should be twisted to present noise pickup.

6.5 Use proper wire size for both AC inputs and outputs to loads.

6.6 Long runs of the AC input line should be either shielded or routed away from possible noise sources.

6.7 The conductors connecting the power supply outputs to the loads should be low inductance. Either co-planar bus bars or twisted pair leads will provide low inductance.

6.8 Specified forced air cooling must be provided to power supplies without self-contained fans. For power supplies with fans, sufficient clearance without obstruction must be provided at both the fan intake and the air outlets. A properly cooled power supply will give a long operating life.

7.0 DISCONNECTION WARNING

Before disconnecting outputs after the AC input has been turned off, a sufficient time must be allowed for all internal capacitors to discharge. Internal capacitors can maintain a high-voltage charge for some time and can therefore remain hazardous.

CE This product complies with the general requirements of the Low Voltage Directive (LVD73/23/EEC) when correctly installed within the final equipment.

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UNIPOWER
Powering Technology

ML/MN SERIES: BULK FRONT ENDS
800 & 1000 Watts: 24, 28 & 48 VDC with PFC

DESCRIPTION

UNIPOWER's ML & MN Series are 800 watt and 1000 watt single output switchers for bulk power applications in a fully enclosed format with integral cooling fan.

ML and MN Series are available with outputs of 24V, 28V or 48V and have a universal 85 to 264VAC input. Features include active Power Factor Correction meeting EN61000-3-2, a Class B input EMI filter, single-wire current share, no minimum load, 85% efficiency and remote inhibit and output voltage adjust.

The units incorporate protection against output overvoltage, overload and short circuit as well as thermal protection. AC Power Fail & DC Power Good signals are included along with both 12V, 500mA and 5V, 100mA standby outputs.

TWO-YEAR WARRANTY

SAFETY CERTIFICATIONS

UL60950-1
CSA22.2, No. 60950-1
EN60950-1

E130645 2006/95/EC RoHS

STANDARD MODELS

OUTPUT POWER	OUTPUT VOLTAGE	OUTPUT CURRENT	AC INPUT RANGE	MODEL NUMBER
800W	24VDC 28VDC 48VDC	33A 29A 17A	85-264VAC	ML5000 ML6000 ML7000
1000W	24VDC 28VDC 48VDC	42A 36A 21A	85-264VAC	MN5000 MN6000 MN7000

FEATURES

- Cost Effective
- Active Power Factor Correction
- Meets EN61000-3-2
- Up to 6 Watts / Cu. Inch
- Class B Input EMI Filter
- Single-Wire Current Share
- No Minimum Load
- 85% Efficiency
- Remote Inhibit
- Remote Output Voltage Adjust
- Overvoltage Protection
- Overload & Short Circuit Protection
- Thermal Protection
- AC Power Fail & DC Power Good
- 12V, 500mA Standby Output
- 5V, 100mA Standby Output

SPECIFICATIONS

Typical at 115/230VAC Line, Full Load and 25°C Unless Otherwise Noted (115/230).

INPUT

Input Voltage Range ..... 85-264VAC, Single Phase
Power Factor 0.99
Input Frequency 47-63Hz
Inrush Limiting ..... 30A Peak
Input Current, Full Load
800W 7.9A, 120VAC; 4.1A, 230VAC
1000W 9.9A, 120VAC; 5.2A, 230VAC
Input EMI Filter, Conducted ..... EN55022 Curve B
FCC20780 pt. 15J Curve B
Harmonic Distortion EN61000-3-2
Input Immunity, Conducted
Fast Transients, Line-Line ..... ±2kV (EN610000-4-4 Level 3)
Surges, Line-Line ..... ±2kV (EN610000-4-5 Level 2)
Surges, Line-Ground ..... ±2kV (EN610000-4-5 Level 3)
Input Protection ..... Internal Fuse

OUTPUT

Voltage Adjustment Range ..... ±5%
Total Regulation [1] 1.0%
Ripple & Noise, Pk-Pk [2] 1%
Holdup 15mS
Dynamic Response [3] 300µS
Temperature Coefficient ..... ±0.02%/°C
Minimum Load 0A
Overload Protection ..... Constant Current Limiting
Overvoltage Protection ..... Power Shutdown
Remote Sense ..... Up to 0.25V Per Wire
Efficiency ..... 85% at Full Load

SAFETY STANDARDS UL60950-1, CSA22.2 No.60950-1, EN60950-1

GENERAL SPECIFICATIONS

Switching Frequency ..... 150kHz Nominal
Isolation, class 1 [4] ..... 3000VAC Input - Output
>1500VAC Input - Ground
>50VDC Output - Ground

ENVIRONMENTAL

Operating Temperature ..... 0°C to 70°C Ambient
Derating ..... 2.5%/°C, 50°C to 70°C
Storage Temperature ..... -40°C to 85°C
Cooling ..... Integral Ball Bearing Fans

PHYSICAL SPECIFICATIONS

Case Material ..... Aluminum
Dimensions, Inches(mm) ..... 3.25 H x 5 W x 10.5 D
(82.6 x 127 x 267)

NOTES:

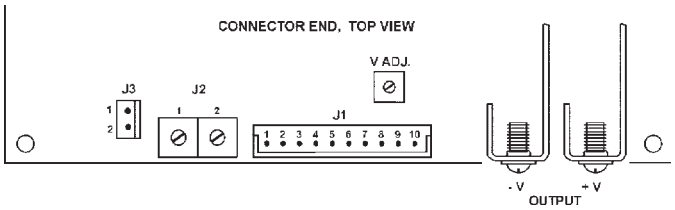
1. No load to full load, including line regulation and load regulation.
2. Whichever is greater, 20MHz bandwidth. Measured with 0.1µF ceramic and 10µF tantalum capacitors in parallel across the output.
3. <4% deviation recovering to within 1% for 25% load change.
4. Input - output isolation figure is for isolation components only. 100% production Hipot tested.

CONNECTORS	
J1: AMP 173981-0	10-PIN
J2: LMI 9105.102.02	2-PIN
J3: AMP 171825-2	2-PIN

MATING CONNECTOR KIT
Kit provides mating connectors for all ML and MN Series models. Order Kit No.: 775-1417-000

J1 CONTROL & SUPERVISORY SIGNALS

PIN	FUNCTION	PIN	FUNCTION
1	+Sense	6	DC Power Good
2	-Sense	7	Inhibin (N.O.)
3	Remote Adjust	8	Not Used
4	Not Used	9	AC Power Fail
5	Current Share	10	Control Common

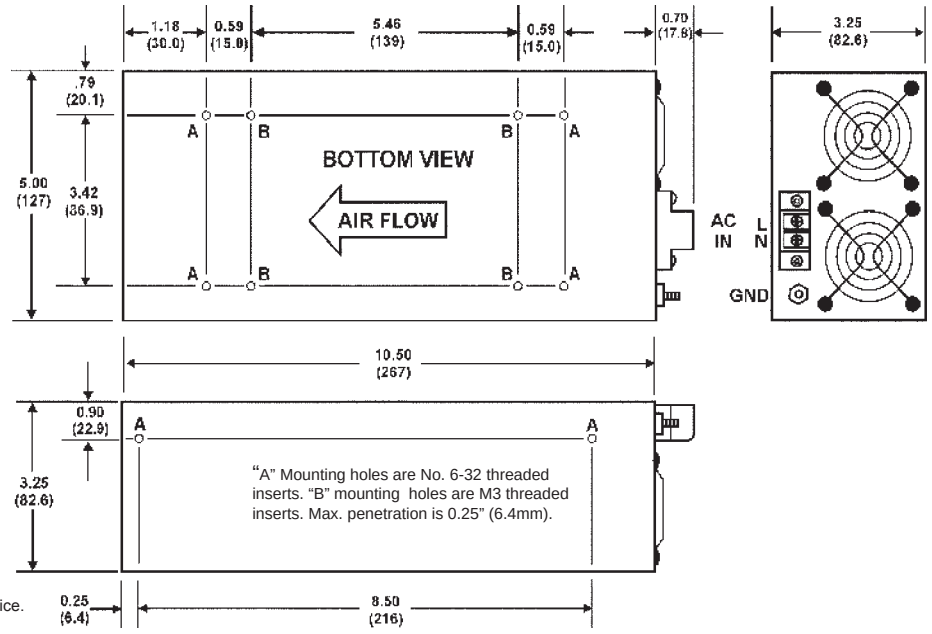


J2: 12V, 500mA STANDBY SUPPLY

PIN	FUNCTION
1	12V Return
2	+12VDC

J5: 5V, 500mA STANDBY SUPPLY

PIN	FUNCTION
1	+5VDC
2	5V Return



ALL DIMENSIONS IN INCHES (mm).
All specifications subject to change without notice.

ML/MN SERIES: BULK FRONT ENDS
INSTALLTION & OPERATING INSTRUCTIONS

These operating instructions should be read through carefully before installing and operating this UNIPOWER switching power supply. For complete information on this unit, including specifications, see the inside pages of this operating sheet.

1.0 SAFETY WARNING

1.1 This switching power supply has hazardous external and internal voltages. It should be handled, tested and installed only by qualified technical personnel who are trained in the use of power supplies and are well aware of the hazards involved. Be especially careful if the power supply is an open frame type. If an enclosed unit, the cover or covers should not be removed.

1.2 The AC input terminals are at hazardous voltage potentials. DO NOT TOUCH this area when AC power is applied. When operating this power supply, the AC input ground terminal must be connected to safety ground to minimize electrical shock hazard and to ensure low EMI (electromagnetic interference). The internal voltages are at hazardous potentials. If covered, the power supply cover SHOULD NOT BE REMOVED. There are no user-serviceable components in this unit. Removing the cover will void the warranty.

2.0 UNPACKING AND INSPECTION

2.1 This switching power supply was carefully tested, inspected and packaged for shipment from our factory. Upon receipt of the unit, it should be carefully unpacked and inspected for any damage in shipment.

2.2 If there is evidence of damage, DO NOT attempt to test the unit. The freight carrier should be notified immediately, and a claim for the cost of the power supply should be filed with the carrier for direct reimbursement. Be sure to include the model and serial number of the damaged unit in all correspondence with the freight carrier. Also save the shipping carton and packing material as evidence of damage for the freight carrier's inspection.

2.3 UNIPOWER will cooperate fully in case of any shipping damage investigation. Always save the packing materials for later use in shipping the unit. Never ship the power system without proper packing.

3.0 SAFETY CERTIFICATIONS

3.1 UNIPOWER has a rigorous policy for the safe design and safety testing of its switching power supplies. All products are certified to the safety standards of UL60950-1, CSA22.2 No.60950-1 and EN60950-1. All products are CE marked to indicate compliance with the EEC Low Voltage Directive (LVD73/23/EEC).

3.2 For further operational safety, UNIPOWER switching power supplies have output current limiting and short circuit protection in addition to thermal protection by means of power shutdown.

4.0 CONNECTING TO AC POWER LINE

4.1 Before connecting to AC power, in the case of an uncovered power supply (open board, open frame or L-bracket type), a protective safety cover should be placed over the unit to prevent accidental contact with it. In addition, in the case of power supplies without a self-contained cooling fan, specified air flow must be provided for proper cooling.

4.2 Check that the correct, specified AC voltage is to be applied to the power supply input. A three-wire line and plug must be used with proper connection made to line, neutral and safety ground terminals. Also make sure that the proper line cord wire size is used for the input current to the power supply.

4.3 Connect a load to each power supply output. This load should not exceed the rating of the output, and the total load on all outputs must not exceed the rating for the power supply. Note that some power supplies specify a minimum load for proper regulation. Also in some cases the speed of the cooling fan may be affected by very light loads.

4.4 The + and - sense leads for all applicable outputs should be connected to their proper load points with proper polarity. This assures specified regulation at the load points.

5.0 TESTING

5.1 Line and load regulation should be checked with the connections shown in Figure 1. Loads should be applied to all outputs and the applicable sense leads should be connected with proper polarity to the load points. Voltages should be measured at the sense leads at the load points.

5.2 Noise and ripple at the outputs should be measured as shown in Figure 2. This is done with a 20MHz bandwidth oscilloscope with a probe isolated from ground. A 10µF tantalum capacitor and 0.1µF ceramic capacitor are connected directly across the output terminals. The ground connection to the probe should be as short as possible to prevent noise pickup.

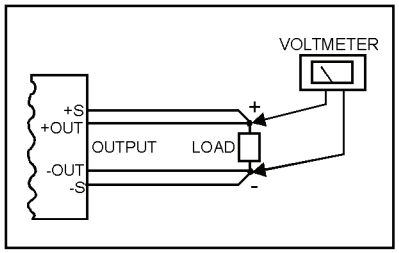


Figure 1. Measuring Regulation

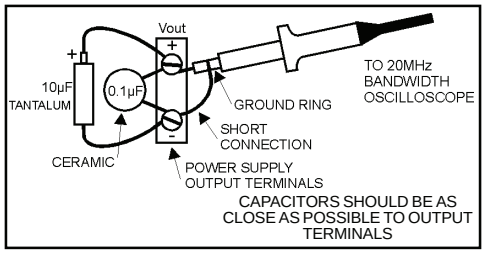


Figure 2. Measuring Output Ripple Voltage

6.0 INSTALLATION

6.1 Secure the power supply by means of bolts into the threaded inserts in the case.

6.2 Connect a three-wire line cord to the power supply AC terminals with proper connection to line, neutral and safety ground terminals.

6.3 Check that the AC outlet provides the correct AC line voltage.

6.4 Connect the remote sense leads to their respective load points with proper polarity. Each pair of remote sense leads should be twisted to present noise pickup.

6.5 Use proper wire size for both AC inputs and outputs to loads.

6.6 Long runs of the AC input line should be either shielded or routed away from possible noise sources.

6.7 The conductors connecting the power supply outputs to the loads should be low inductance. Either co-planar bus bars or twisted pair leads will provide low inductance.

6.8 Specified forced air cooling must be provided to power supplies without self-contained fans. For power supplies with fans, sufficient clearance without obstruction must be provided at both the fan intake and the air outlets. A properly cooled power supply will give a long operating life.

7.0 DISCONNECTION WARNING

Before disconnecting outputs after the AC input has been turned off, a sufficient time must be allowed for all internal capacitors to discharge. Internal capacitors can maintain a high-voltage charge for some time and can therefore remain hazardous.

STANDARD MODELS

OUTPUT POWER	OUTPUT VOLTAGE	OUTPUT CURRENT	AC INPUT RANGE	MODEL NUMBER
800W	24VDC 28VDC 48VDC	33A 29A 17A	85-264VAC	ML5000 ML6000 ML7000
1000W	24VDC 28VDC 48VDC	42A 36A 21A	85-264VAC	MN5000 MN6000 MN7000

CONNECTIONS

J1 CONTROL & SUPERVISORY SIGNALS

PIN	FUNCTION	PIN	FUNCTION
1	+Sense	6	DC Power Good
2	-Sense	7	Inhibin (N.O.)
3	Remote Adjust	8	Not Used
4	Not Used	9	AC Power Fail
5	Current Share	10	Control Common

* A 0V to +5V input on this pin produces a minimum of -10% to +10% change from nominal voltage on the output.

J5: 5V, 500mA STANDBY SUPPLY

PIN	FUNCTION
1	+5VDC
2	5V Return

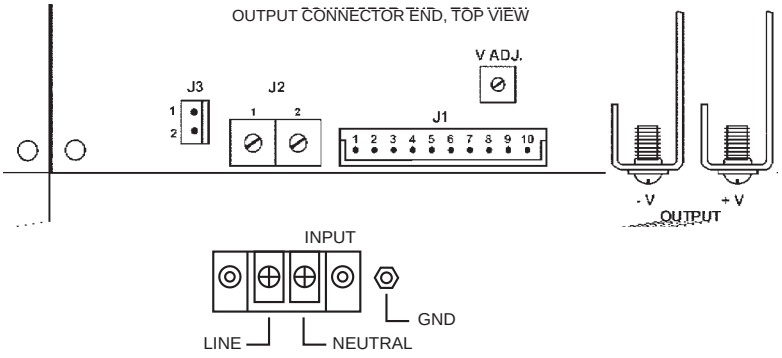
J2: 12V, 500mA STANDBY SUPPLY

PIN	FUNCTION
1	12V Return
2	+12VDC

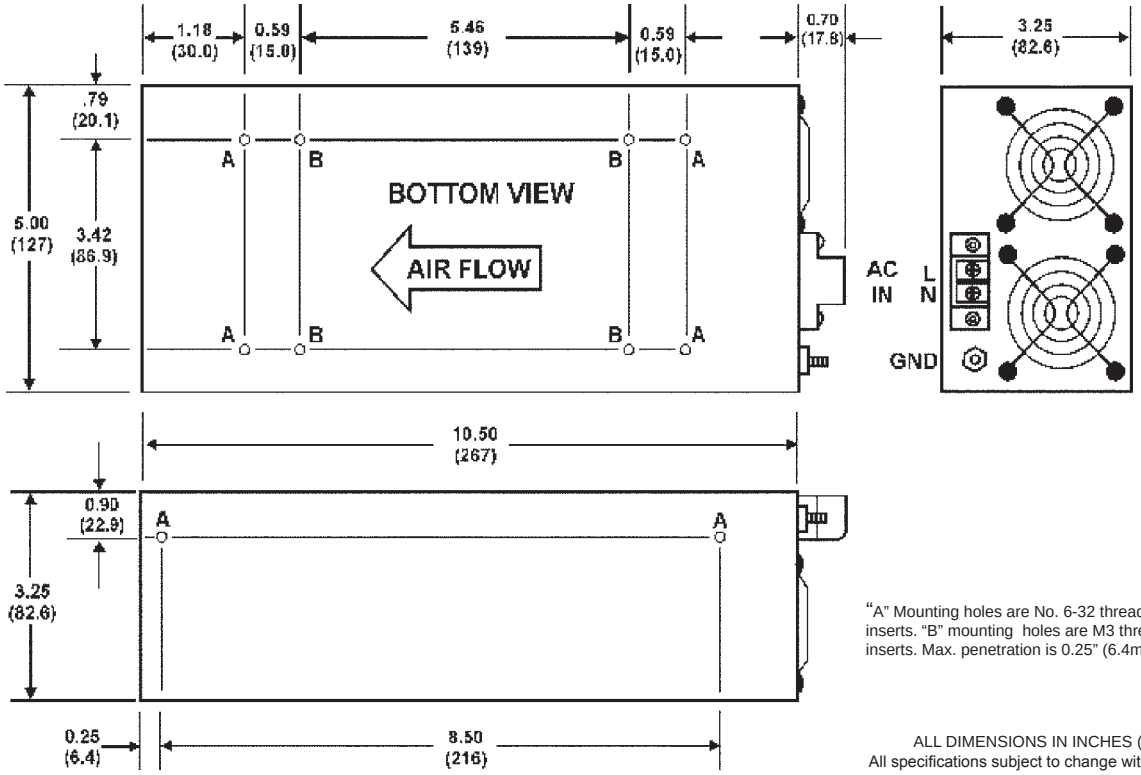
OUTPUT CONNECTORS		
J1	AMP 173981-0	10-PIN
J2	LMI 9105.102.02	2-PIN
J3	AMP 171825-2	2-PIN

OUTPUT MATING CONNECTORS		
J1	AMP 1-1757780	10-PIN
J3	AMP 172142-2	2-PIN

Kit Order Code: 775-1417-0000



MOUNTING



"A" Mounting holes are No. 6-32 threaded inserts. "B" mounting holes are M3 threaded inserts. Max. penetration is 0.25" (6.4mm).

ALL DIMENSIONS IN INCHES (mm).
All specifications subject to change without notice.

SPECIFICATIONS

Typical at 115/230VAC Line, Full Load and 25°C Unless Otherwise Noted (115/230).

INPUT

Input Voltage Range	85-264VAC, Single Phase
Power Factor	0.99
Input Frequency	47-63Hz
Inrush Limiting	30A Peak
Input Current, Full Load	
800W	7.9A, 120VAC; 4.1A, 230VAC
1000W	9.9A, 120VAC; 5.2A, 230VAC
Input EMI Filter, Conducted	EN55022 Curve B FCC20780 pt. 15J Curve B
Harmonic Distortion	EN61000-3-2
Input Immunity, Conducted	
Fast Transients, Line-Line	±2kV (EN610000-4-4 Level 3)
Surges, Line-Line	±2kV (EN610000-4-5 Level 2)
Surges, Line-Ground	±2kV (EN610000-4-5 Level 3)
Input Protection	Internal Fuse

OUTPUT

Voltage Adjustment Range	±5%
Total Regulation [1]	1.0%
Ripple & Noise, Pk-Pk [2]	1%
Holdup	15mS
Dynamic Response [3]	300µS
Temperature Coefficient	±0.02%/°C
Minimum Load	0A
Overload Protection	Constant Current Limiting
Overvoltage Protection	Power Shutdown
Remote Sense	Up to 0.25V Per Wire
Efficiency	85% at Full Load

SAFETY STANDARDS UL60950-1, CSA22.2 No.60950-1, EN60950-1

GENERAL SPECIFICATIONS

Switching Frequency	150kHz Nominal
Isolation, class 1 [4]	3000VAC Input - Output >1500VAC Input - Ground >50VDC Output - Ground

ENVIRONMENTAL

Operating Temperature	0°C to 70°C Ambient
Derating	2.5%/°C, 50°C to 70°C
Storage Temperature	-40°C to 85°C
Cooling	Integral Ball Bearing Fans

PHYSICAL SPECIFICATIONS

Case Material	Aluminum
Dimensions, Inches(mm)	3.25 H x 5 W x 10.5 D (82.6 x 127 x 267)

NOTES:

1. No load to full load, including line regulation and load regulation.
2. Whichever is greater, 20MHz bandwidth. Measured with 0.1µF ceramic and 10µF tantalum capacitors in parallel across the output.
3. <4% deviation recovering to within 1% for 25% load change.
4. Input - output isolation figure is for isolation components only. 100% production Hipot tested.

SET-UP AND TESTING

STEP 1. Connect a 50% load at the output.

STEP 2. Connect the sense leads with proper polarity to their respective loads. Make sure that the inhibit input is at TTL HI or open.

STEP 3. Connect a three-wire AC power cord to the correct input terminals for line, neutral and ground.

STEP 4. Plug the AC power cord into the outlet. Check the output voltage, at its load, against its specification with a digital voltmeter.

STEP 5. Connect output to actual load, plug in power cord and recheck output voltages.

IN CASE OF TROUBLE...

1. Check AC Input connections.
2. Check for shorted output.
3. Check if OVP is engaged.
4. Check if output is held off by inhibit control.
5. Check if overtemperature protection is activated.
6. Check if remote sense leads are connected.
7. If a problem can't be solved, call UNIPOWER for assistance: 954-346-2442.

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