Matrix Power Company

MF3000-12A series
12V/250A
Specification Document

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1. SCOPE:

This document outlines the power supply specification of MF/OEM-series.

2. Applicable Documents:

See customer's required.

3. Electric specification:

The electrical requirements that follow are to be met over the environmental ranges specified in Section 5 unless otherwise noted.

3.1 AC input requirement:

3.1.1 AC input requirement:

a. The power supply shall be capable of supplying full rated output power over two input voltages ranges rated 115 VAC and 230 VAC RMS nominal at 0℃ ~ 50℃.

b.

Input voltage range	Input frequency range	Selecting
85Vac ~ 135Vac	47Hz ~ 63Hz	Select switch
170Vac ~ 265Vac	47Hz ~ 63Hz	Select switch

c. Auto range: **option.

d. PFC function **optional

3.1.2 AC over current Protection:

The power supply shall incorporate primary fusing for input overcurrent protection. Fuses should be slow-blow type or equivalent to prevent nuisance trips.

3.1.3 Inrush Current Limiting:

Maximum inrush current from power-on (with power on at any point on the AC Sine) and including, but not limited to, three line cycles, shall be limited to a level below the surge rating of the input line cord, AC switch if present, bridge rectifier, fuse, and EMI filter components. Repetitive ON/OFF cycling of the AC input voltage should not damage the power supply or cause the input fuse to blow.

3.1.4 Input under voltage:

The power supply shall contain protection circuitry such that the application of an input voltage below the minimum specified in Section 3.1, Table 1, shall not cause damage to the power supply.

3.1.5 Electrical fast transient/burst:

No unsafe operation is allowed under any condition. No user-noticeable performance degradation up to +- 1 kV Mains, +- 500V Signal Cable, is allowed. Automatic or manual recovery is allowed for other conditions.

3.2 DC Output Requirements

3.2.1 DC Voltage Regulation

The DC output voltages shall remain within the regulation ranges shown in Table 3 when measured at the load end of the output connectors under all line, load, and environmental conditions. The voltage regulation limits shall be maintained under continuous operation for a period of time equal to or greater than the MTBF specified in Section 7.2 at any steady state temperature and operating conditions specified in Section 5.

Table 3: DC Output Voltage Regulation

Output	Range	Min.	Nom.	Max.	Unit
+12Vdc	+5-4%	+11.52	+12.00	+12.60	Volts

3.2.2 Remote Sensing

a. For the +12 V the power supply shall use remote sensing wires to achieve regulation at the output connector to compensate for voltage drop of cable, connector, and PCB trace. If the remote connection is lost to any of these outputs, then internal resistive feedback causes the power supply to regulate and prevent OVP.

b. The power supply should have remote sense return (Returns) to regulate out ground drops for +12V. The power supply will uses remote sense (+12Vs) to regulate out drops in the system for +12V outputs. Remote sense must be able to regulate out a minimum of 120mV of drop on +12V outputs. The remote sense return (GNDs) must be able to regulate out a minimum of 100mV of drop in the power ground return. The current in any remote sense line shall be less than 10mA to prevent voltage sensing errors. The power supply must operate within specification over the full range of voltage drops from the power supply's output connector to the remote sense points.

3.3 Power Distribution:

3.3.1 Output requirement:

Table 4.0: MF3000-12A Power Distribution Configuration

Outputs	MIN	MAX	Watt	Peak
12.0V	2.5A	250.0A	3000.0	300.0A

Total = 3000 Watt

3.3.2 Efficiency

a. The efficiency of the power supply should be met over the AC input range defined in Table 1, under the load conditions defined in Section 3.3, and under the temperature and operating conditions defined in Section 5. The power supply should be a typical of 72% efficient under full load as defined in the applicable configuration.

3.3.3 Output Ripple/Noise

a. The following output ripple/noise requirements should be met throughout the load ranges specified in Section 3.3, and under all input voltage conditions as specified in Section 3.1.
b. Ripple and noise are defined as periodic or random signals over a frequency band of 10 Hz to 20 MHz. Measurements shall be made with an oscilloscope with 20 MHz bandwidth. Outputs should be bypassed at the connector with a 0.1 uF ceramic disk capacitor and a 47 uF electrolytic capacitor to simulate system loading.

Table 5: DC Output Noise/Ripple

Output	Max Ripple & Noise
+12VDC	120mVpp

3.3.4 Output Transient Response

The +12VDC outputs will see transients up to 50% of the maximum output current. \ The transient slew rate will be 2.5 A/ms. The power supply should be stable under all transient conditions from any steady state load, and the over/undershoot should be within the regulation band stated in Section 3.2.1.

3.3.5 Voltage Hold-up Time

The power supply shall maintain output regulation per Section 3.2.1 despite a loss of input power at the nominal range (Low = 115 VAC, 60 Hz or 230 VAC, 50 Hz) at maximum continuous output load as applicable for a typical of 17 ms.

3.4 Timing / housekeeping / control

3.4.1 Risetime

The output voltages shall rise from <10% of nominal to within the regulation ranges specified in Section 3.2.1 within 0.1 ms to 20 ms (0.1 ms < T2 ≤ 20 ms).

3.4.2 Overshoot at Turn-on/Turn-off

The output voltage overshoot upon the application or removal of the input voltage, or the assertion / deassertion of PWR_ON, under the conditions specified in Section 3.1, less than 10% above the nominal voltage. There is a smooth and continuous ramp of each DC output voltage from 10% to 90% of its final set point within the regulation band, while

loaded as specified in Section 3.3. The smooth turn-on requires that during the 10% to 90% portion of the rise time, the slope of the turn-on waveform is positive and have a value of between 0 V/ms and [Vout, nominal] V / 0.1 ms. Also, for any 5 ms segment of the 10% to 90% rise-time waveform, a straight line drawn between the end points of the waveform segment must have a slope ≥ [Vout, nominal] V / 20 ms. No voltage of opposite polarity present on any output during turn-on or turn-off.

3.4.3 Reset After Shutdown

If the power supply latches into a shutdown state due to fault condition on its outputs, the power supply shall return to normal operation only after the fault has been removed and the PWR_ON (or DC input) has been cycled OFF/ON with a minimum OFF time of 3 second.

3.5 Output protection:

3.5.1 Over voltage Protection

The over voltage sense circuitry and reference shall reside in packages that are separate and distinct from the regulator control circuitry and reference. No single point fault shall be able to cause a sustained overvoltage condition on any or all outputs. The supply shall provide latch-mode overvoltage protection as defined below.

Table 9: Overvoltage Protection

Output	Min.	Nom.	Max.	Unit
+12VDC	13.2	-----	16.8	Volt

3.5.2 Short Circuit Protection

An output short is defined as any output impedance of less than 0.1 ohms. The power supply shall shut down and latch off for shorting the +12VDC rails to return or any other rail. The power supply will shut down and latch off .

The power supply shall be capable of withstanding a continuous short-circuit to the output without damage or overstress to the unit (components, PCB traces, connectors, etc.) under the input conditions specified in Section 3.1.

3.5.3 No Load Operation

The power supply shall be turn on, and no damage or hazardous condition should occur with all the DC output connectors disconnected from the load.

3.5.4 Over current Protection: **OPTIONAL

If any one output of +12Vdc is over current then maximum load, the power supply is shut down by over current protection design, the output voltage shall drop to 0V and no any damage to the power supply.

3.5.5 Output Bypass

The output return is connected to the power supply chassis. The return will be connected to the system chassis by the system components.

4. Mechanical requirement:

4.1 Label and marking:

The label must be follow safety (UL, cUL, TUV, CE) request.

4.2 Physical dimensions:

The supply shall be enclosed and meet the physical outline of 97*200*300mm.

4.3 Airflow / Fan

Airflow will be provided by one fans of 8cm in each power module and fans out the computer chassis.

4.4 Cable: following customer's requited.

5. Environment requirements:

5.1 Environment requirement:

Operating ambient temperature: 0℃~ 50℃

The power supply be capable of supplying full rated output power over two input voltages ranges rated 115 VAC and 230 VAC RMS nominal at 25℃.

Nonoperating ambient temperature: -40℃ ~ +70℃

(Maximum rate of change of 20°C/hr.)

5.2 Thermal shock (shipping):

Nonoperating:

-40 °C to +70 °C; 15 °C/min < dT/dt < 30 °C/min;

50 cycles; Duration of exposure to temperature extremes for each half cycle shall be 30 minutes.

5.3 Humidity:

Operating: To 85% relative humidity (noncondensing)

Nonoperating: To 95% relative humidity (noncondensing)

Note: 95% RH is achieved with a dry bulb temperature of 55 °C and a wet bulb temperature of 54 °C.

5.4 Altitude:

Operating: To 10,000 ft

Nonoperating : To 50,000ft

5.5 Mechanical Shock

Nonoperating :

50 g, trapezoidal input; velocity change > 170 in/s. Three drops on each of six faces are applied to each sample.

Operational:

The unit will be able to withstand 10g acceleration peak (11msec pulse duration).

5.6 Vibration

Nonoperating :
0.01 g2 / Hz at 5Hz, sloping to 0.02 g2/Hz at 20Hz, and maintaining 0.02 g2 / Hz from 20 Hz to 500 Hz. The area under the PSD curve is 3.13 gRMS. The duration shall be 10 minutes per axis for all three axes on all samples. Also meet 5 - 17Hz, 0.1" double amplitude displacement; 17-500Hz, 1.5G acceleration; 5 to 500Hz random, 1G(RMS) acceleration.

6 . Electromagnetic Compatibility **By customer

Meet CE .
Meet FCC .
Meet CNS13438 .

7 . Reliability

7.1 Mean time between failure (MTBF):

MTBF shall be follow 570F standard.
a. Full load.
b. 230Vac input.
c. Ground benign.
d. Ambient temperature: 25℃

The calculated MTBF of the power supply shall be greater than 100,000 hours under the following conditions:

a. Full load.
b. 230Vac input
c. Ground benign
d. 25°C ambient.

7.2 Safety Requirements ** By customer

The power supply must be meet UL, c-UL, TUV, CE, FCC, CNS .