

M1963 SERIES

1-PHASE AC/DC POWER SUPPLY



PRODUCT HIGHLIGHTS

- HIGH POWER FACTOR
- TRIPLE OUTPUT
- 1-PHASE AC/DC
POWER SUPPLY
- UP TO 130 W

M1963 Series– AC/DC Power Supply

Applications

Military (Airborne, ground-fix, shipboard), Ruggedized, Telecom, Industrial Power Supply

Special Features

- Miniature size
- High efficiency
- High power factor (up to 96%)
- Input / Output isolation
- Fixed switching freq. (450 kHz for output converters)
- EMI filters included
- Remote inhibit (On/Off)
- Limited inrush current
- Non-latching protections:
 - Overload/short-circuit
 - Over temperature

Electrical Specifications

AC Input Single-phase 85 to 265 V_{AC}
50/60/400 Hz

Output Voltage Regulation

Less than ±1% (no load to full load, –40 °C to +85 °C at baseplate).

Ripple and Noise

100÷150 mV_{p-p}, typical (max. 1%) without external capacitance.

DC Output

Out #	Option	Voltage Range	Max Current	Max Power
1	A	0.8-12 V	5 A	60 W
	B	0.8-40 V	3.5 A	
2	A	0.8-12 V	5A	60 W
	B	0.8-40 V	3.5 A	
3	A	0.6-5 V	8 A	40 W

Total output power: up to 130 W

Efficiency

83% Typical (at nominal input voltage, full load, room temperature)

Turn on Transient

Voltage overshoot at during power on is less than 3% nominal voltage.

Isolation

Input to Output: 500 V_{DC} Input to Case: 500 V_{DC} Output to Case: 100 V_{DC} Output to Output: 100 V_{DC}

EMC

Designed to meet* MIL-STD-461F CE102, CS101, CS114, CS115, CS116 RE102, RS103. CE101, RE101 and RS101 optional.

Input Current Harmonics Meets current harmonics requirements of MIL-STD-1399:300B and EN 61000-3-2 Classes A, B and D.

* Compliance dependent on specific configuration, and is achieved when using shielded interconnection cable.

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Protections *

Input

- **Inrush Current Limiter**
Peak value of up to 5 times of maximum steady-state input current for inrush currents lasting longer than 50 μ s.

Output

- **Overvoltage protection**
Passive transorbs selected at 120% \pm 10% of nominal voltage.
- **Overload / short-circuit protection**
Continuous protection (constant current) for unlimited time.

General

- **Over temperature protection:**
Shutdown at baseplate temperature of $+105\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. Automatic recovery when baseplate temperature returns to $+95\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

Environmental Conditions

Designed to Meet MIL-STD-810F Temperature
Methods 501.4 & 502.4
Operating: $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ (at baseplate) Storage: $-55\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ (ambient)

Altitude

Method 500.4
Procedures I – up to 70,000 ft. (non-operational)
Procedure II – up to 40,000 ft. (operational)

Humidity

Method 507.4
Up to 95% RH

Vibration

Method 514.5
General minimum integrity exposure IAW Figure 514.5C-17
1 hour per axis.

Shock

Method 516.5
20 g, 11 ms terminal peak saw-tooth

Salt Fog

Method 509.4

Reliability

100,000 hours, calculated per MIL-STD-217F Notice 2 at $+85\text{ }^{\circ}\text{C}$ baseplate, Ground Fix conditions.

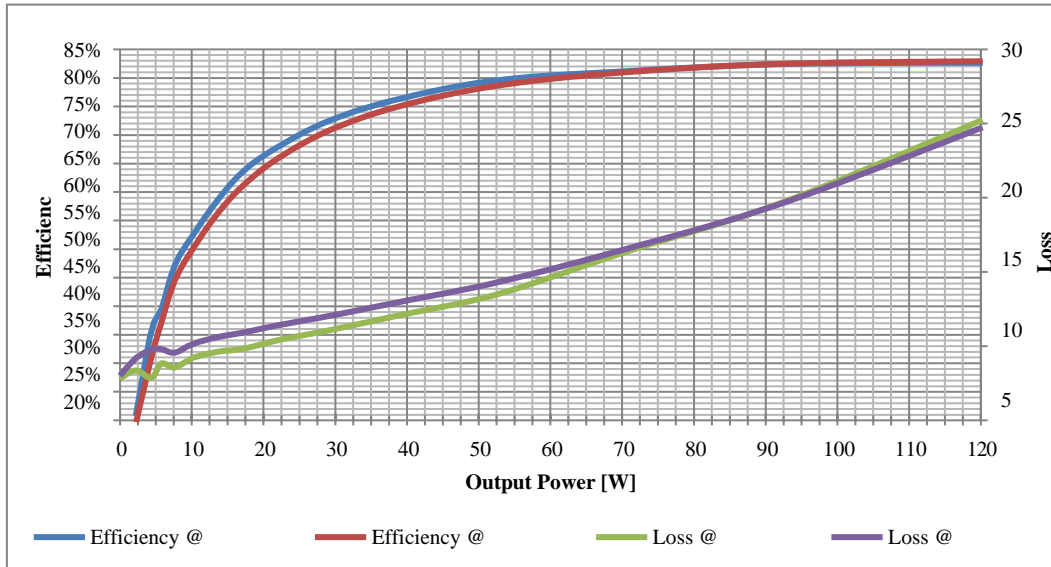
Environmental Stress Screening (ESS)

100% of delivered units undergo testing in minimum ambient temperature and maximum baseplate temperature, in addition to testing at room temperature. Additional testing such as random vibration and thermal cycling can be added upon request - **consult factory for details and quote if required.**

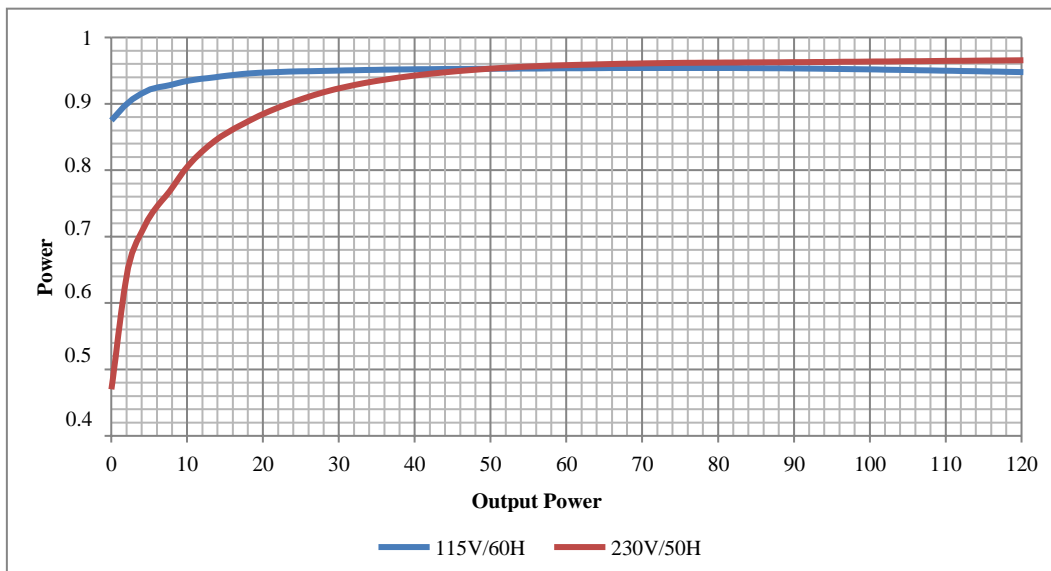
* Thresholds and protections can be modified / removed – please consult factory.

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Typical Efficiency



Typical Power Factor



Test Conditions:

Input: 115 V_{rms}

Outputs: 5 V_{DC}/ 8 A, +12 V_{DC}/ 3.5 A, -12 V_{DC}/ 3.5 A

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Typical test results PWRGOOD Signal

Resist after 5V source	PWRGOOD Voltage
1 MΩ	31mV
100 KΩ	0.14V
10KΩ	0.36V
1KΩ	1V

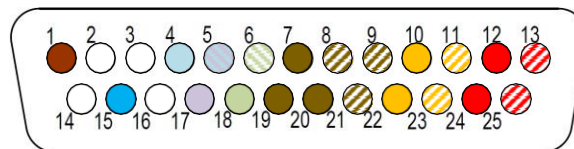
Pin Assignment

Connector type: M24308/24-39F or eq.

Mating connector type: M24308/2-3F or eq.

Pin No.	Function	P	
1	LINE (IN)	~	●
2	N/C		
3	N/C		
4	INHIBIT	+	○
5	SIGNAL RTN	-	○
6	PWR GOOD RTN	-	○
7	OUT 3	+	●
8	OUT 3 RTN	-	○
9	OUT 3 RTN	-	○
10	OUT 2	+	●
11	OUT 2 RTN	-	○
12	OUT 1	+	●
13	OUT 1 RTN	-	○

Pin No.	Function	P	
14	N/C		
15	NEUTRAL (IN)	0	○
16	N/C		
17	SYNC	+	○
18	PWR GOOD	+	○
19	OUT 3	+	●
20	OUT 3	+	●
21	OUT 3 RTN	-	○
22	OUT 2	+	●
23	OUT 2 RTN	-	○
24	OUT 1	+	●
25	OUT 1 RTN	-	○



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Functions and Signals

INHIBIT (pin 4)

Description: The **INHIBIT** signal is used to turn the power supply ON and OFF.

Operation: Applying "1" or leaving open will turn the power supply ON.

Applying "0" or shorting this pin to its return line will turn the power supply OFF. For constant operation, leave this pin unconnected.

Signal Type: 5V TTL or dry contact (open/short).

Return line: This signal is referenced to **SIGNAL RTN** (pin 5).

SYNC (pin 17)

Description: The **SYNC** signal can be used to allow the power supply switching frequency to synchronize with a system clock.

Operation: Apply a square wave clock with frequency in the range of 450 kHz \pm 10 kHz and duty-cycle of 50% \pm 10%, TTL level.

If not required, leave open. The power supply will work at 450 kHz \pm 10 kHz (internal clock).

Signal Type: 5V TTL

Return line: This signal is referenced to **SIGNAL RTN** (pin 5).

PWR GOOD (pin 18)

Description: The **PWR GOOD** signal indicates the status of the output voltage.

Operation: When the output voltages rise above 90% \pm 5% of its nominal value, pin 18 will be pulled down to pin 6 through a 100 Ω \pm 1% resistor and three phototransistors.

When one of the output voltages falls below 90% \pm 5% of its nominal value, pin 18 will be in high impedance mode.

If not used, leave the signal unconnected.

This signal is the series connection of three opto-couplers and a 100 Ω resistor to limit the current.

Signal Type: Isolated open collector.

Return line: This signal is referenced to **PWR GOOD RTN** (pin 6) and is floating from all other pins.

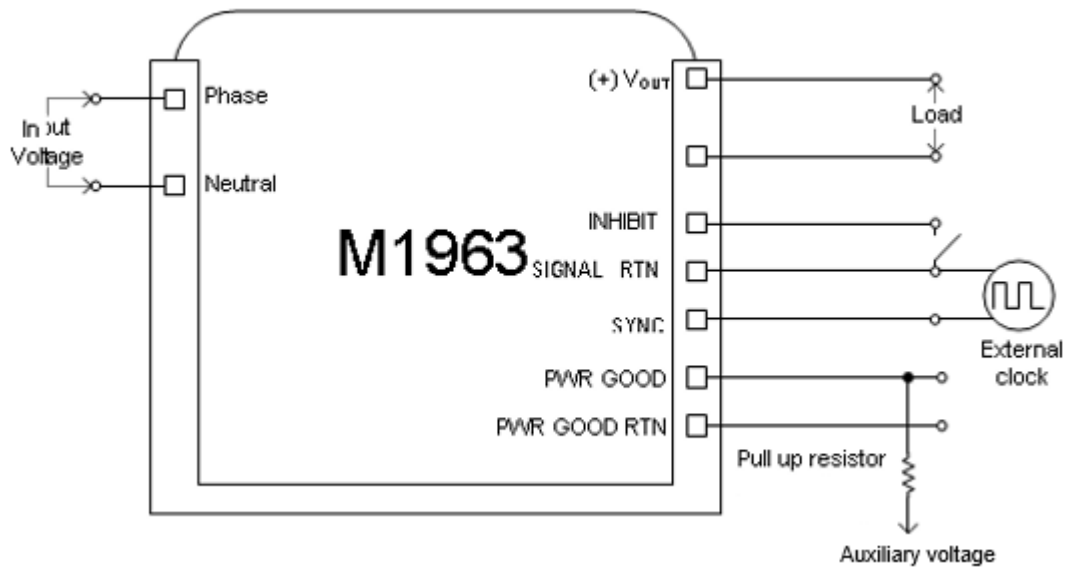
WARNING: Mind the polarity! Connecting a reverse polarity voltage source with current limit higher than 30mA to this signal will result in permanent damage to the converter.

SIGNAL RTN (pin 5)

Description: Both **INHIBIT** and **SYNC** signals are referenced to this pin.

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Typical Connection Diagram



Note: PWR GOOD- the load for the pull-up resistor and the auxiliary voltage shown in this diagram should be less than 1mA. The system designer must select the actual values such that no damage can occur to the internal components of the power supply – **consult factory for more information**

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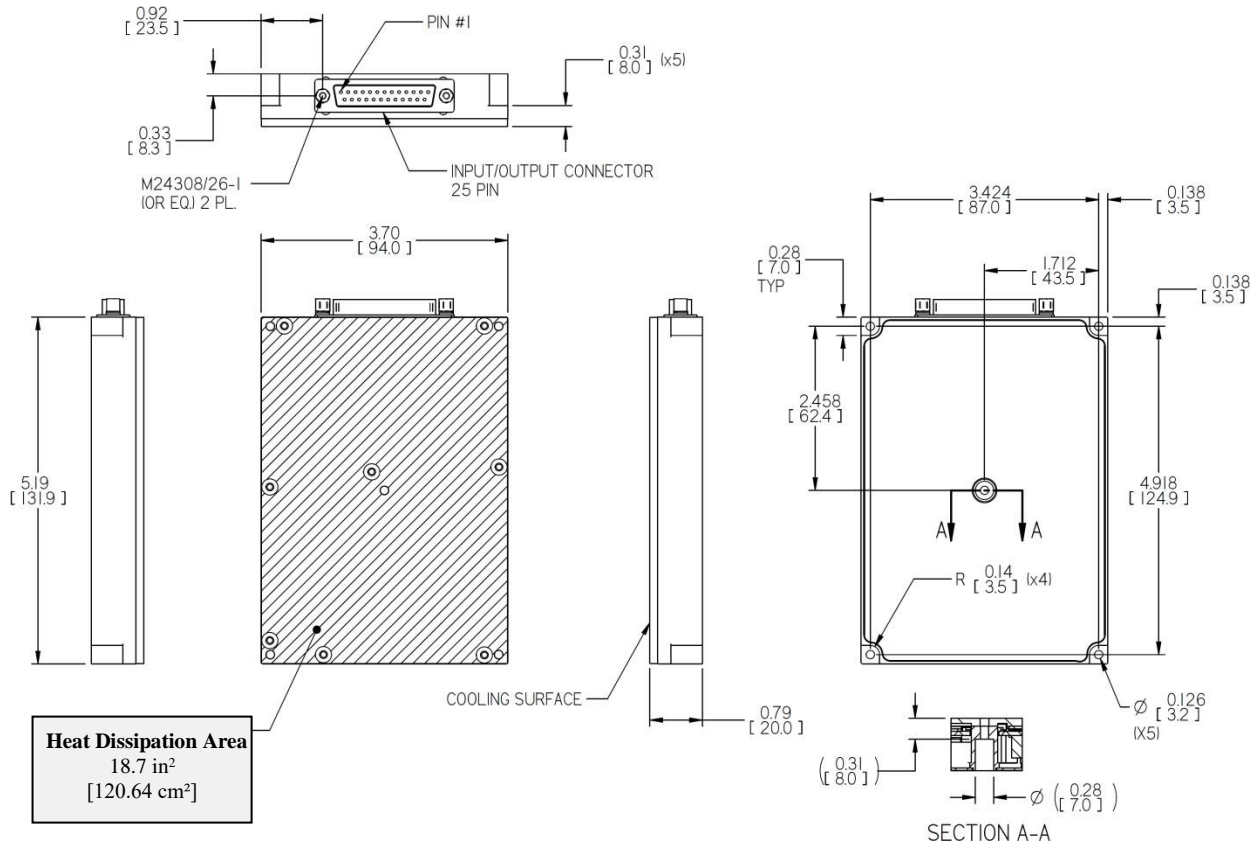
Standard Configurations

Part Number	Input	Output #1		Output #2		Output #3	
		Voltage	Current	Voltage	Current	Voltage	Current
M1963-100	85-260VAC Single Phase 50/60/400Hz	12 V _{DC}	3 A	12 V _{DC}	3A	5 V _{DC}	8A
M1963-101	85-265VAC Single Phase 50/60/400Hz	28 V _{DC}	2 A	28 V _{DC}	2A	3.3 V _{DC}	5A
M1963-102	85-265VAC Single Phase 50/60/400Hz	5 V _{DC}	5 A	5 V _{DC}	5A	5 V _{DC}	8A
M1963-103	85-265VAC Single Phase 50/60/400Hz	12 V _{DC}	5 A	12 V _{DC}	5 A	NA	NA

Note: Specifications are subject to change without prior notice by the manufacturer.

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Outline Drawing



Notes

1. Dimensions are in inches [mm]
2. Tolerance is:
.XX ± .02 in
.XXX ± .010 in
3. Weight: approx. 14.46 oz [410 g]

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Label position

