



M1156 SERIES

PRELIMINARY

**COMPACT, HIGH DENSITY, HIGH EFFICIENCY, SINGLE OUTPUT,
THREE-PHASE AC / DC CONVERTERS**
Up to 500 W



Applications

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

Special Features

- Miniature size
- High efficiency
- Wide input range
- Input / Output isolation
- Remote Inhibit (On/Off)
- Fixed internal switching freq.
- External sync. capability
- Power factor 0.8-0.9 @ full load
- EMI filters included
- Non-latching protections:
 - Overload / short-circuit
 - Over temperature

Electrical Specifications

AC Input

Voltage range:
115 (103-127)* V_{AC,L-N} 50/60/400 Hz, 3-phase
per MIL-STD-704A.

*Optional extended range:
(95-140 V_{AC}) Consult factory

Line/Load regulation:

Less than ±1% (low line to high line voltage, no load to full load, -55 °C to +85 °C).

Ripple and Noise:

50-150 mV_{p-p}, typical (max. 1%) without external capacitance. Additional load capacitance reduces ripple significantly.

DC Output

Voltage range: 5 to 50 V_{DC}
Current: 0 to 25 A
Power output: 0 to 500 W

Efficiency

90% - Typical (full load, room temperature)

Turn on Transient

No Voltage over shoot during power on.

Isolation

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

EMC

Designed to meet[†] MIL-STD-461F (CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS101, RS103) with M1289 line filter

Designed to also meet CE101 with M1289 line filter, for loads up to 200W.

Protections **

General

- **Over temperature protection**
Shutdown at base plate temperature of +105 °C ± 5 °C. Automatic recovery at base plate temperature lower than +95 °C ± 5 °C.

Output

- **Passive transorb on outputs**
20% above nominal voltage.
- **Current limiting**
Continuous protection (10-30% above maximum current) for unlimited time.

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

† Compliance achieved when tested with shielded cables and static resistive load.



Environmental Conditions

Designed to meet MIL-STD-810F

Temperature

Operating:

–55 °C to +85 °C (at baseplate)

Storage:

–55 °C to +125 °C (ambient)

Humidity

Method 507.4

Up to 95% RH

Altitude

Method 500.4

Procedure I (non-operational): Up to 70,000 ft.

Procedure II (operational):
Up to 40,000 ft.

Vibration

Method 514.5

Category 24 - General minimum
integrity exposure

1 hour per axis

Salt Fog

Method 509.4

Shock

Method 516.5

Saw-tooth, 20 g peak, 11 ms.

Reliability

At least 150,000 hours.

Calculated IAW MIL-HDBK-217F Notice 2 with +85 °C baseplate temperature at Ground Fix conditions.

Environmental Stress Screening (ESS)

Including random vibration and thermal cycles is also available. **Please consult factory for details.**



Pin Assignment

J1 - Input Connector

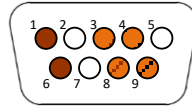
Connector type: M24308/24-37F or eq.

Mating connector type: M24308/2-1F or eq.

Pin #	Function	
1	Phase A	●
2	N.C.	
3	Phase B	●

Pin #	Function	
4	Phase C	●
5	Chassis	
6	Phase A	●

Pin #	Function	
7	N.C.	
8	Phase B	●
9	Phase C	●



J2 - Output Connector

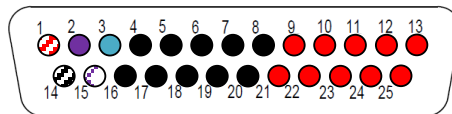
Connector type: M24308/23-39F or eq.

Mating connector type: M24308/4-3F or eq.

Pin #	Function	P	
1	SENSE	+	⊗
2	SYNC	+	●
3	INHIBIT	+	●
4	OUT RTN	-	●
5	OUT RTN	-	●
6	OUT RTN	-	●
7	OUT RTN	-	●
8	OUT RTN	-	●
9	OUT	+	●

Pin #	Function	P	
10	OUT	+	●
11	OUT	+	●
12	OUT	+	●
13	OUT	+	●
14	SENSE RTN	-	⊗
15	SYNC RTN	-	⊗
16	OUT RTN	-	●
17	OUT RTN	-	●
18	OUT RTN	-	●

Pin #	Function	P	
19	OUT RTN	-	●
20	OUT RTN	-	●
21	OUT	+	●
22	OUT	+	●
23	OUT	+	●
24	OUT	+	●
25	OUT	+	●



Note: All output pins with same designation should be connected together for best performance.



Functions and Signals

INHIBIT (connector J2, pin 3)

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 **OUT RTN** 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 **OUT RTN** (connector J2, pins 4-8, 16-20).

SYNC (connector J2, pin 2)

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 250 kHz \pm 10 kHz and duty-cycle of 50% \pm 10%, TTL level.

If not required, leave open. The power supply will work at 250 kHz \pm 10 kHz (internal clock).

Signal Type: 5V TTL

Return line: This signal is referenced to **SYNC RTN** (pin 15).

SENSE (connector J2, pin 1)

Description: The **SENSE** function is used to achieve accurate load regulation at load terminals.

Operation: Connect the pins directly to the load terminals.

The correction ability is limited to 2 to 10% of nominal voltage output, and up to 2 V.

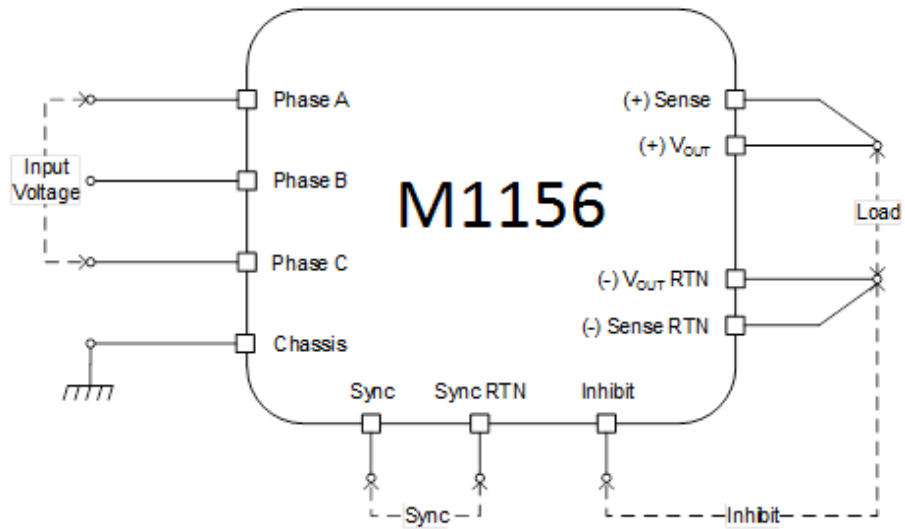
Note that if sense correction function is not needed, the sense lines must be shorted to their respective output pins: **SENSE** (pin 1) to **OUT** pins (9-13, 21-25) and **SENSE RTN** (pin 14) to **OUT RTN** (pins 4-8, 16-20).

Signal Type: 5V TTL

Return line: This signal is referenced to **SENSE RTN** (connector J2, pin 14).

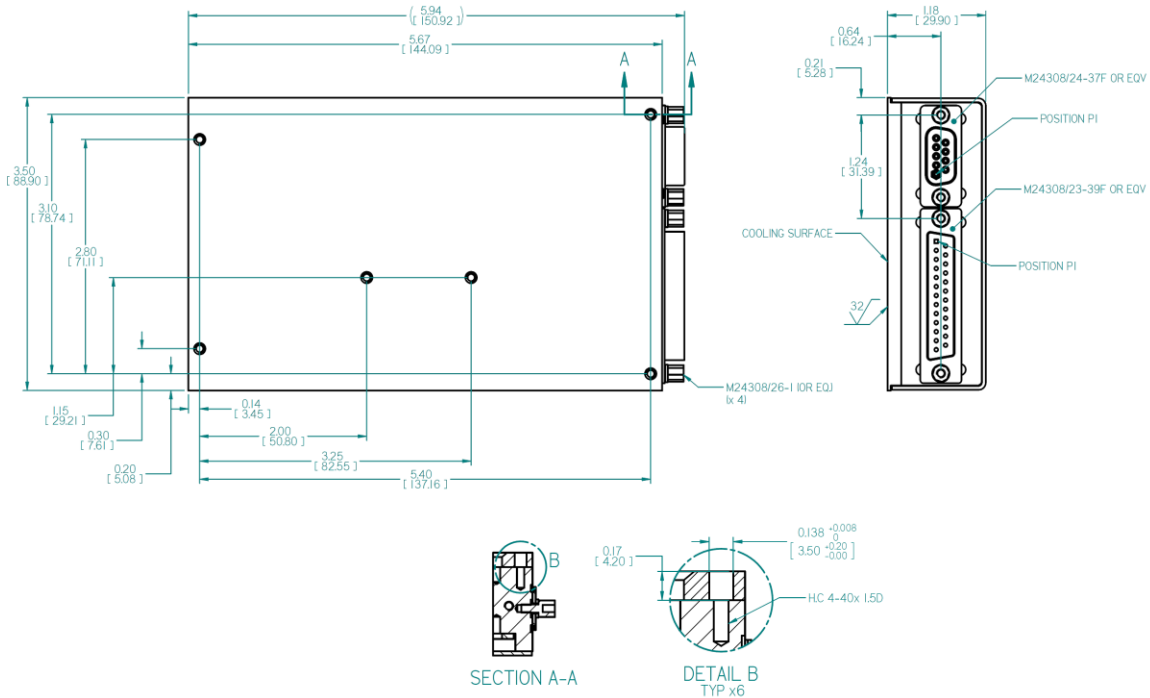


Typical Connection Diagram





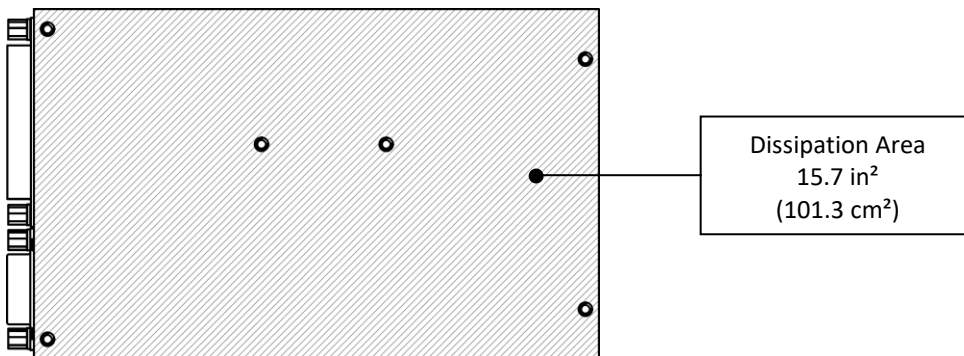
Outline Drawing



Heat Dissipation Surface

Notes

1. Dimensions are in Inches [mm]
2. Tolerance is:
 .XX ± 0.02 IN
 .XXX ± 0.01 IN
3. Weight: Approx. 1.534 lbs [696 g]





Standard Variants

Part number	Normal input voltage range	Output configuration
M1156-100	103 to 127 V _{AC} / 50 to 400 Hz	5 V _{DC} / 20 A
M1156-101	103 to 127 V _{AC} / 50 to 400 Hz	12 V _{DC} / 20 A
M1156-102	103 to 127 V _{AC} / 50 to 400 Hz	15 V _{DC} / 20 A
M1156-103	103 to 127 V _{AC} / 50 to 400 Hz	24 V _{DC} / 20 A
M1156-104	103 to 127 V _{AC} / 50 to 400 Hz	28 V _{DC} / 18 A
M1156-105	103 to 127 V _{AC} / 50 to 400 Hz	48 V _{DC} / 10.4 A

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