Amphenol
MILITARY HIGH SPEED

M916 Series
AC-DC POWER SUPPLY

DESCRIPTION:
The M916 military power supply is a rugged AC to DC converter. It accepts an AC input range from 85 to 265VAC, 50/60/400Hz and provides a single DC output from 3.3V to 300V, up to 500W, with custom outputs available. Designed to meet military standards MIL-STD-1399, MIL-STD-810, MIL-STD-461.

FEATURES

- High efficiency
- Wide input range
- High power factor (up to 0.98)
- Power density up to 14 W/in3
- Input / Output isolation
- Inrush current limiter
- Remote inhibit (on/off)
- Fixed switching freq. (250 kHz)
- External sync. capability
- EMI filters included
- Non-latching protections:
    - o Overload/short-circuit
    - o Input under-voltage lockout
    - o Output over-voltage
    - o Over temperature

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HOW TO ORDER

PART NUMBER	Input	Output		J2 Pinout
	Voltage range	Voltage	Current	
CF-02EM916	85 to 265 VAC, 50/60/400 Hz, 1-phase	3.3 VDC	35 A	LV option
CF-02EM916	85 to 265 VAC, 50/60/400 Hz, 1-phase	5 VDC	35 A	LV option
CF-02EM916	85 to 265 VAC, 50/60/400 Hz, 1-phase	12 VDC	35 A	LV option
CF-02EM916	85 to 265 VAC, 50/60/400 Hz, 1-phase	24 VDC	20 A	LV option
CF-02EM916	85 to 265 VAC, 50/60/400 Hz, 1-phase	28 VDC	18 A	LV option
CF-02EM916	85 to 265 VAC, 50/60/400 Hz, 1-phase	48 VDC	10.5 A	LV option
CF-02EM916	85 to 265 VAC, 50/60/400 Hz, 1-phase	270 VDC	1.85 A	HV option

PRODUCT SPECIFICATIONS:

ELECTRICAL SPECIFICATIONS	
AC Input	Voltage range: 85 to 265 VAC, 50/60/400 Hz, single-phase
Output voltage regulation	Up to ±1% (Low to high input line, no load to full load, –40°C to +85°C at baseplate).
Ripple and Noise	100-150mVp-p, typical (max. 1%) without external capacitance. When connected to system capacitance ripple drops significantly.
DC Output	Voltage range: 3.3 to 300 VDC Current range: 0 to 50 A Power range: 500 W
Efficiency	85% typical (28V or 270V output, nominal input voltage, full load, room temperature)
Transient Over-and undershoot	Current change from 50 to 100% output. Impedance change less than 50 to 250 mΩ depending on output voltage within 200 to 300 µs.
Isolation	Input to Output: 1000 VDC Input to Case: 1000 VDC Output to Case: 200 VDC
EMC	Designed to meet* MIL-STD-461F CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS101, RS103
Turn on Transient	No output voltage overshoot during power on.

Protections	
Input	**Inrush Current Limiter** Initial input current surge to charge internal capacitances is limited internally.
	Under Voltage Lock-Out Output shuts down when input voltage falls below 75 ± 5 VAC. Output turns on when input voltage rises above 85 ± 5 VAC.
Output	**Active Overvoltage Protection** Secondary control shuts output down if output voltage exceeds nominal value by 10% ± 5%.
	Passive Overvoltage Protection A transorb is placed across the output, selected 20% ± 10% above nominal voltage.
	Overload / Short-circuit If the load exceeds maximum current by 20% ± 10%, the protection mechanism causes the output to hiccup (turn off and on periodically at duty-cycle lower than 50%, until load is back within normal range). CV/CC operation optional – consult factory for details
General	**Over temperature protection** Power supply shuts down if baseplate temperature exceeds +105 ± 5°C. Resumes operation automatically upon cooldown to below +95 ± 5°C.

ENVIRONMENTAL CONDITIONS	
Designed to Meet MIL-STD-810F	
Temperature	Methods 501.4 and 502.4 Operational: –40°C to +85°C (measured at base plate) Storage: –55°C to +125°C
Altitude	Method 500.4 Procedure I up to 70,000 ft. Procedure II up to 40,000 ft.
Humidity	Method 507.4 Up to 95% RH
Vibration	Method 514.5 Procedure I Category 24 - General minimum integrity exposure
Shock	Saw-tooth, 20 g peak, 11 ms
Salt Fog	Method 509.4

Reliability
150,000 hours, calculated IAW MIL-HDBK-217F Notice 2 at +85°C (at baseplate), Ground Fix conditions.

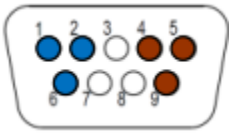
PIN ASSIGNMENT:

J1 - Input connector
Connector type: M24308/24-37F or eq.
Mates with: M24308/2-1F or eq

Pin No.	Function		
1	NEUTRAL		●
2	NEUTRAL		●
3	N/C		

Pin No.	Function		
4	PHASE		●
5	PHASE		●
6	NEUTRAL		●

Pin No.	Function		
7	N/C		
8	N/C		
9	PHASE		●

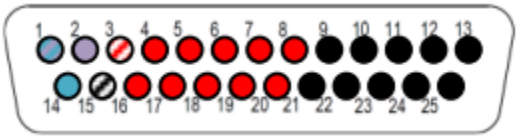


J2 - Output connector
Connector type: M24308/23-39F or eq.
Mates with: M24308/4-3F or eq.

Pin No.	Function		
1	SIGNAL RTN		●
2	SYNC		●
3	SENSE	+	●
4	VOUT	+	●
5	VOUT	+	●
6	VOUT	+	●
7	VOUT	+	●
8	VOUT	+	●
9	VOUT RTN	–	●
10	VOUT RTN	–	●

Pin No.	Function		
11	VOUT RTN	–	●
12	VOUT RTN	–	●
13	VOUT RTN	–	●
14	INHIBIT		●
15	SENSE RTN	–	●
16	VOUT	+	●
17	VOUT	+	●
18	VOUT	+	●
19	VOUT	+	●
20	VOUT	+	●

Pin No.	Function		
21	VOUT RTN	–	●
22	VOUT RTN	–	●
23	VOUT RTN	–	●
24	VOUT RTN	–	●
25	VOUT RTN	–	●

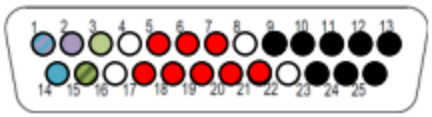


HV option: High voltage version (100 to 300 VDC)

Pin #	Function	P	
1	SIGNAL RTN	–	
2	SYNC	+	
3	BIT	+	
4	N/C		
5	OUTPUT	+	
6	OUTPUT	+	
7	OUTPUT	+	
8	N/C		
9	OUTPUT RTN	–	
10	OUTPUT RTN	–	

Pin #	Function	P	
11	OUTPUT RTN	–	
12	OUTPUT RTN	–	
13	OUTPUT RTN	–	
14	*INHIBIT*		
15	BIT RTN	–	
16	N/C		
17	OUTPUT	+	
18	OUTPUT	+	
19	OUTPUT	+	
20	OUTPUT	+	

Pin #	Function	P	
21	OUTPUT	+	
22	N/C		
23	OUTPUT RTN	–	
24	OUTPUT RTN	–	
25	OUTPUT RTN	–	



Note: All pins with identical designation/function should be connected together for best performance.

Functions and Signals

INHIBIT (connector J2, pin 14)
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. For constant operation, leave this pin unconnected.
Applying "0" or shorting this pin to its return line will turn the power supply OFF.
Signal Type: 5V TTL or dry contact (open/short).
Return line: This signal is referenced to **SIGNAL RTN** (connector J2, pin 1).

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 ± 10 kHz and duty cycle of 50% ± 10%., TTL level.

If not required, leave open. The power supply will work at 250 kHz ± 10 kHz (internal clock).
Signal Type: 5V TTL
Return line: This signal is referenced to **SIGNAL RTN** (connector J2, pin 1).

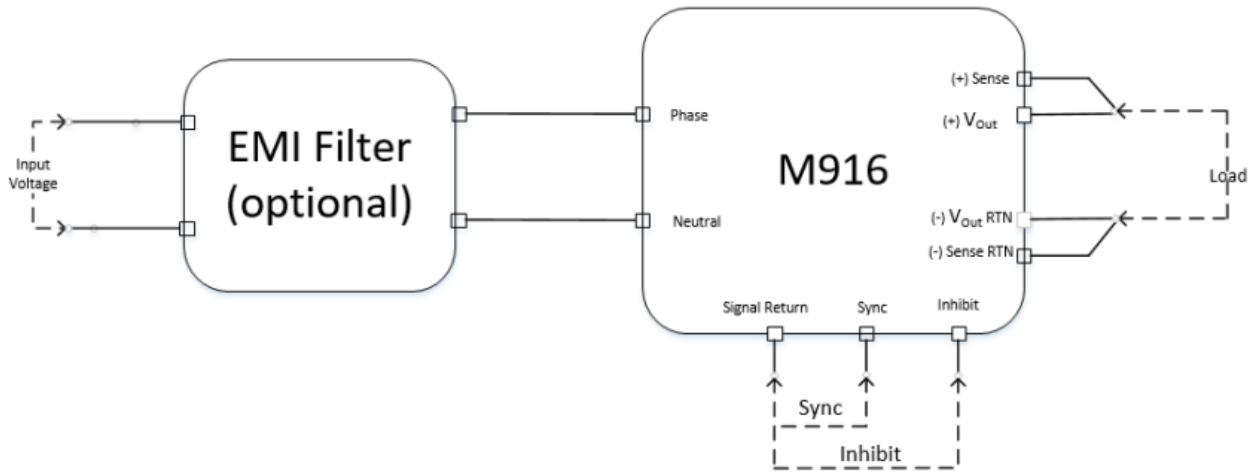
SENSE (connector J2, pin 3) **[LOW VOLTAGE VERSION ONLY]**
Description: The **SENSE** measurement is used to compensate for voltage drop across the output wires by sensing the voltage at the load and correcting the increasing the output voltage accordingly, to provide the desired voltage at the load's terminals.
Operation: Connect the **SENSE** (connector J2, pin 3) to the positive load terminal, and the **SENSE RTN** (connector J2, pin 15) to the negative (return) load terminal.
The sense compensation is typically limited to 5% or 0.5V – the lesser of the two.

If not used, connect **SENSE** directly to **OUTPUT** pins, and the **SENSE RTN** pin directly to the **OUTPUT RTN** pins.
IMPORTANT: to avoid damage to the converter and/or the load - DO NOT LEAVE THE Sense/Sense RTN PINS UNCONNECTED.

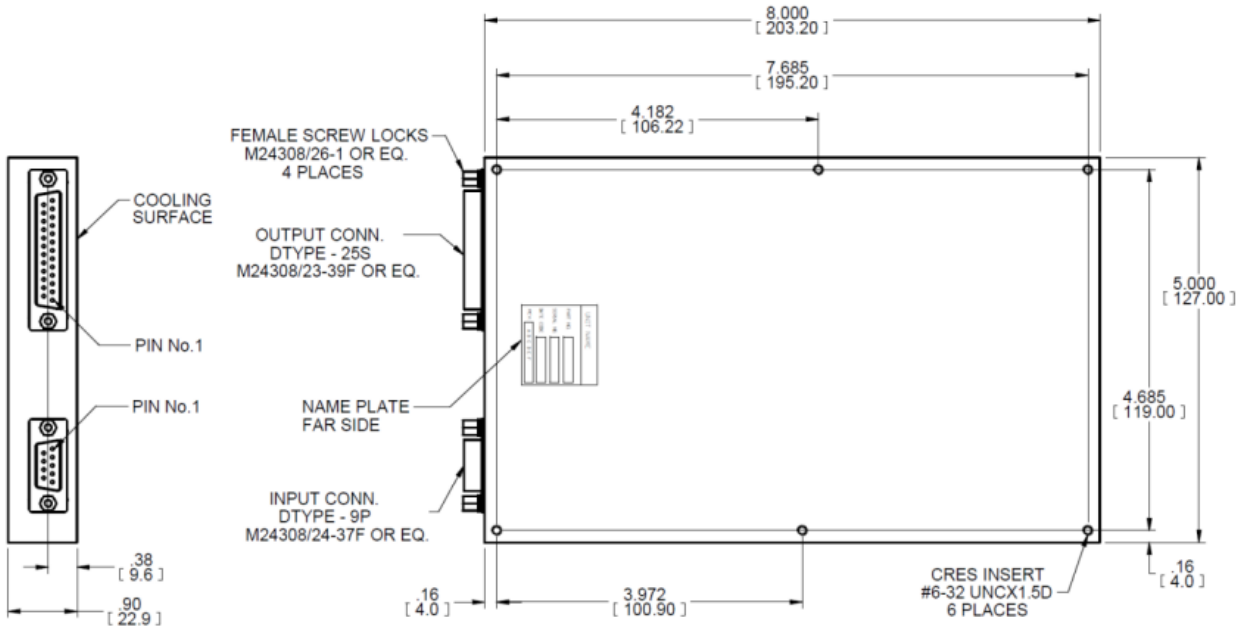
BIT (connector J2, pin 3) **[HIGH VOLTAGE VERSION ONLY]**
Description: The BIT signal indicates failure when one of the following occurs:
o Input voltage falls below 85 ± 5 Vrms or rises above 255 ± 5 Vrms.
o Output voltage falls below Under-Voltage Limit threshold or rises above Over-Voltage Limit threshold for at least 100 ms.

Operation: This signal can be in one of two states:
Fail: Pins BIT and BIT RTN open
Good: Pins BIT and BIT RTN are shorted together through an internal phototransistor.
Signal Type: Opto-isolated open collector.
Polarity of externally applied voltage is (+) to BIT pin and (-) to BIT RTN pin.
Absolute maximum voltage allowable across pins BIT and BIT RTN: 30 V.
Absolute maximum current allowable through pins BIT and BIT RTN: 10 mA.
Return line: This signal is referenced to BIT RTN (connector J2, pin 15).

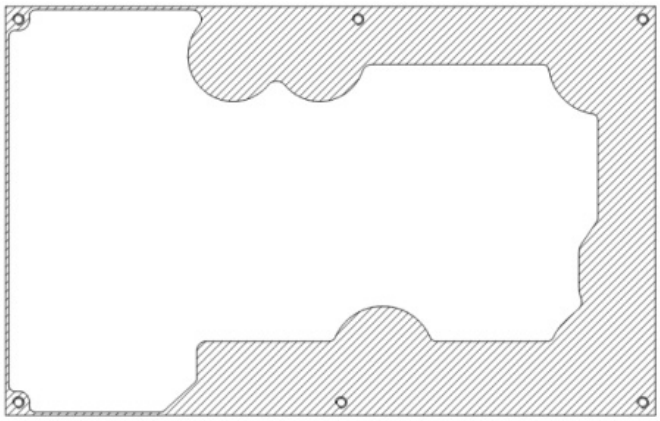
TYPICAL CONNECTION DIAGRAM:



OUTLINE DRAWING:



HEAT DISSIPATION SURFACE:



Dissipation Area
13.9 in²
(8,952 mm²)

Notes
1. Dimensions are in inches [mm]
2. Tolerance is:
   .XX ± 0.01 in
   .XXX ± 0.008 in
3. Weight: Approx. 33.3 oz (944 g)

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