

## M3916 SERIES

AC/DC POWER SUPPLY



### PRODUCT HIGHLIGHTS

- AC/DC POWER SUPPLY
- SINGLE PHASE INPUT (50/60/400Hz)
- CE MARKING (IEC 62368-1)
- HIGH POWER FACTOR
- HIGH DENSITY
- SINGLE DC OUTPUT
- UP TO 500 W



**Applications**

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

**Special Features**

- Miniature size
- High efficiency
- Wide input range
- High power factor
- Input / Output isolation
- Inrush Current Limiter
- External Inhibit (On/Off)
- Fixed switching frequency
- Externally synchronize
- EMI filters included
- Remote sense compensation
- Indefinite short circuit protection with auto-recovery
- Over-voltage shutdown with auto-recovery
- Over temperature shutdown with auto-recovery

**Electrical Specifications**

**AC Input**

**Option 1:**  
 85 to 265 V<sub>AC</sub> ; 50/60Hz  
 Single-phase, 10A<sub>max</sub>  
 IAW MIL-STD-1399-300B Type I  
 (115 V<sub>rms</sub> / 60 Hz)

**Option 2:**  
 103 to 127 V<sub>AC</sub> ; 400Hz  
 Single-phase, 10A<sub>max</sub>

**Isolation**

Input to Output: 1000 V<sub>DC</sub>  
 Input to Case: 1000 V<sub>DC</sub>  
 Output to case: 200 V<sub>DC</sub>

**Efficiency**

115 V<sub>rms</sub> / 400 Hz ≥ 80%  
 230 V<sub>rms</sub> / 50 Hz ≥ 85%  
 (24 V<sub>DC</sub> output, full load, 25°C)

**DC Output**

Voltage range: 24 to 50 V<sub>DC</sub>  
 Current range: 0 to 20 A  
 Power range: 0 to 500 W

3.3 ≤ V<sub>DC</sub> < 24V output voltages:  
**Consult factory for details**

**Line/Load regulation**

Less than 1% (no load to full load, -40 °C to +85 °C)

**Turn on Transient**

Output voltage overshoot during power on < 5%

**Load Transient Response**

Output load change from 50% -100% -50%,  
 output dynamic response < 5%.

**Ripple and Noise**

100 - 150 mV<sub>p-p</sub>, typical (max 1%)  
 without external capacitance.

<b><i>Electromagnetic Compatibility</i></b>		
<b><i>EMC (MIL-STD)</i></b>		
Designed to meet * MIL-STD-461F:		
<b>Conducted Emission</b>	CE101, CE102	
<b>Conducted Susceptibility</b>	CS101, CS114, CS115, CS116	
<b>Radiated Emission</b>	RE101, RE102	
<b>Radiated Susceptibility</b>	RS101, RS103	
<b><i>EMC (EN/IEC)</i></b>		
Radiated Emission Conducted Emission	EN55032 CLASS A	
Harmonic current Emission	IEC6100-3-2 CLASS A	
Voltage Fluctuation & Flicker	IEC6100-3-3	
<b><i>Immunity Test (EN/IEC)</i></b>		
<b>Test Type</b>	<b>Test Method</b>	<b>Test Type/Level/Class</b>
ESD	EN61000-4-2	Enclosure; Contact; ±4Kv; [B]
Radiated Immunity	EN61000-4-3	(80-6000) MHz; 10V/m; [A]
EFT	EN61000-4-4	±2kV; [B]
Surge	EN61000-4-5	L-L: ±1kV; [B] L-E: ±2kV; [B]
Conducted Immunity	EN61000-4-6	150kHz – 80MHz ; 10Vrms; [A]
Magnetic Field	EN61000-4-8	50Hz; 30A/m; [A]
Voltage dips and short interruptions	EN61000-4-11	50Hz; (100/60/30)%; [B & C]

\* Compliance achieved with shielded harness and static resistive load. Depending on actual configuration, may require an external filter (M4916).

**Protections \***

**Input**

- **Inrush Current Limiter**  
Initial input current surge to charge internal capacitances is limited internally.
- **Under Voltage Lock-Out**  
Unit protects itself (no damage) below 80V<sub>AC</sub> @ full load.

**Output**

- **Active Over Voltage Protection**  
10% ± 2% above nominal voltage.
- **Passive Over Voltage Protection**  
Transorb at output selected 20% ± 5% above nominal voltage.
- **Over Load / Short Circuit**  
10 - 30% above maximum current, indefinitely (Hiccup).

**General**

- **Over Temperature Protection**  
Shutdown at base plate temp. above +105°C ± 5°C Automatic recovery at base plate temp. below +95°C ± 5°C

**Environmental Conditions**

Designed to Meet MIL-STD-810F

**Temperature**

Methods 501.4 & 502.4  
Operating: -40°C to +85°C (at baseplate)  
Storage: -55°C to +125°C (ambient)

**Vibration**

MIL-STD 810F, Method 514.5, Procedure I, Category 24, General minimum integrity exposure, IAW Figure 514.5C-17, 1 hour per axis

**Altitude**

Method 500.4  
Procedures I – Storage/Air transport: up to 70,000 ft. (non-operational)  
Procedure II – Operation/Air Carriage: up to 40,000 ft. (operational)

**Shock**

Method 516.5  
Procedure I  
Functional shock, 40g, 15-23ms, Terminal peak  
Sawtooth shock pulse

**Humidity**

Method 507.4  
Up to 95% RH

**Salt Fog**

Method 509.4

**Reliability**

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

**Environmental Stress Screening (ESS)**

100% of delivered power supplies are tested at low ambient temperature, high baseplate temperature and at standard room temperature.  
Additional tests, such as random vibration and thermal cycling can be added. **Consult factory for details.**

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

**Pin Assignment**

**J1 - Input connector**

Type: CBM3W3M81000/AA or eq.

Mates with:

Shell: CBM3W3S00000/AA or eq.

Pins: FS4820D/AA-15 or eq.

Pin No.	Function	
A1	NEUTRAL	●
A2	PHASE	●
A3	CHASSIS	⊕



**J2 - Output connector**

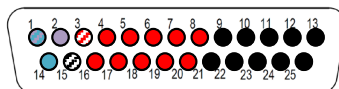
Connector type: M24308/23-39F or eq.

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	-	●



**Functions and Signals**

**SENSE**

The SENSE line is used to achieve accurate voltage regulation at load terminals. To use this feature, connect this pin directly to load's positive terminal.

If this function is not required, short SENSE pin to OUTPUT pins as close as possible to the unit.

**SENSE RTN**

The SENSE RTN line is used to achieve accurate voltage regulation at load terminals. To use this feature, connect this pin directly to load's negative terminal.

If this function is not required, short SENSE RTN pin to OUTPUT RTN pins as close as possible to the unit.

**Note:** The use of remote sense has a limit of voltage dropout between the converter's output and the load's terminals of approximately  $\pm 1V$  of nominal output voltage.

**INHIBIT**

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

OPEN – Power supply active (output turned on).

SHORT to Signal RTN – Power supply inhibited (output turned off). If this function is not required, leave this pin unconnected.

**Optional to change the logic of these signals. Please consult with the factory.**

**SYNC**

The SYNC signal is used to synchronize the power supply's switching frequency to system's clock.

Valid external clock frequency is square wave,  $500kHz \pm 25kHz$ ,  $V_{p-p} = 0V - 5V$ .

If this function is not required, leave this pin unconnected - the power supply will use its internal clock.

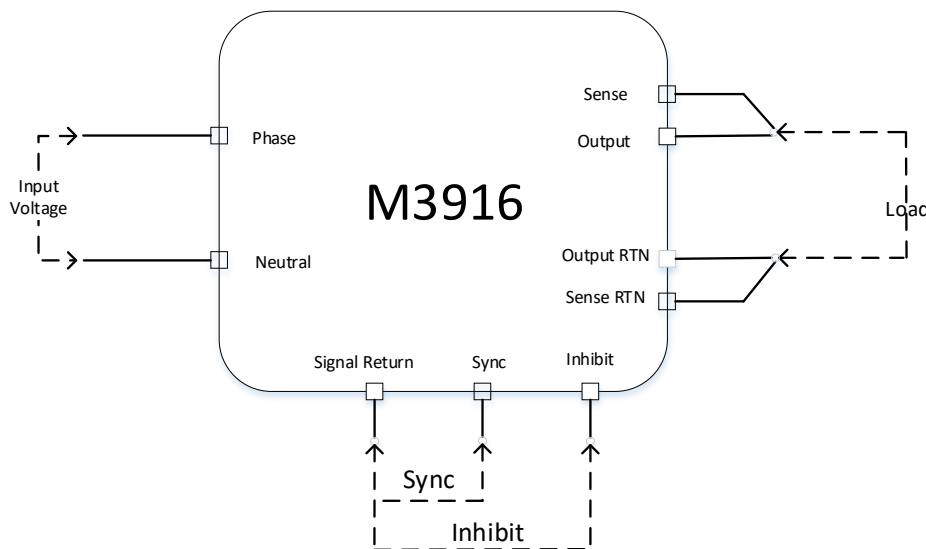
**SIGNAL RTN**

Both INHIBIT and SYNC signals are referenced to this pin. This pin is floating from both input and output.

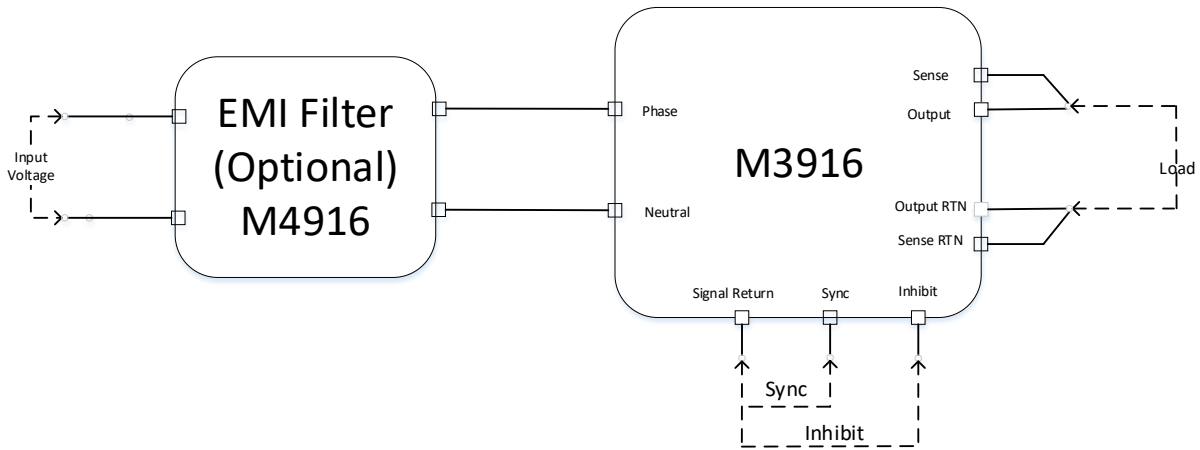
**CHASSIS**

The CHASSIS pin allows additional connection of unit's chassis to system ground.

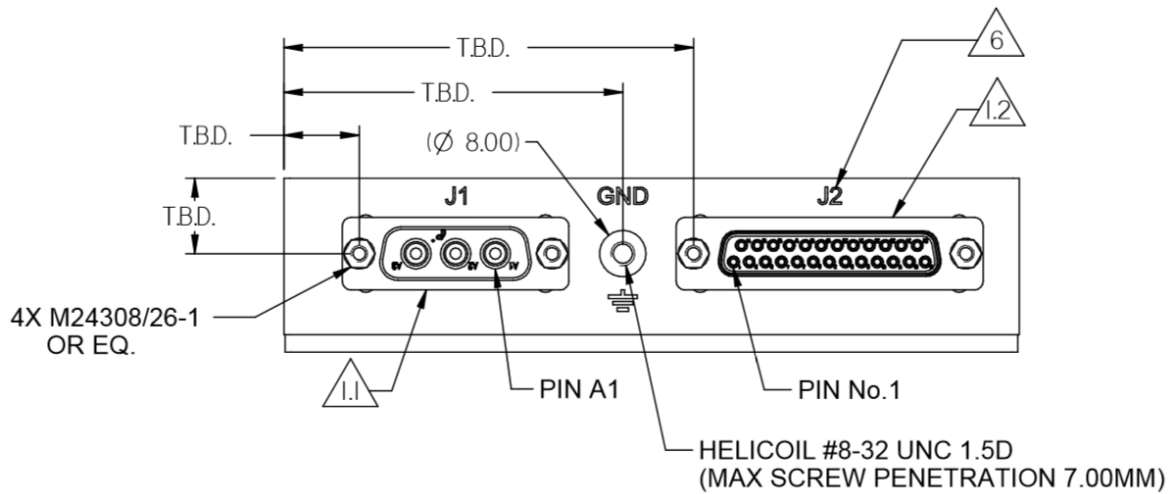
**Typical Connection Diagram**

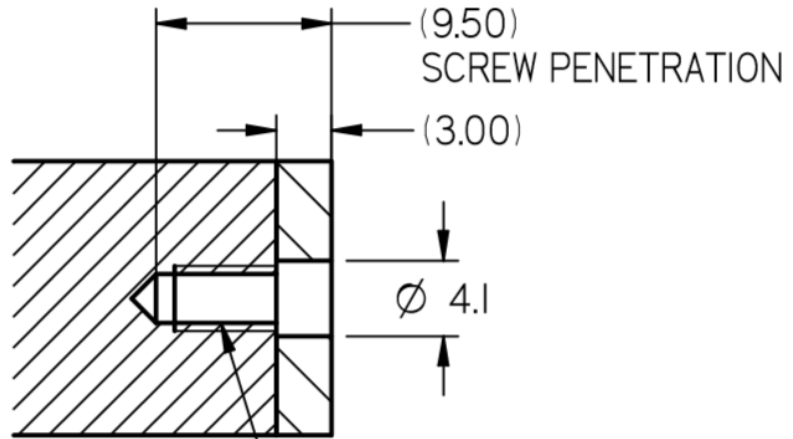


**Optional Connection Diagram with external EMI Filter**



**Outline Drawing**

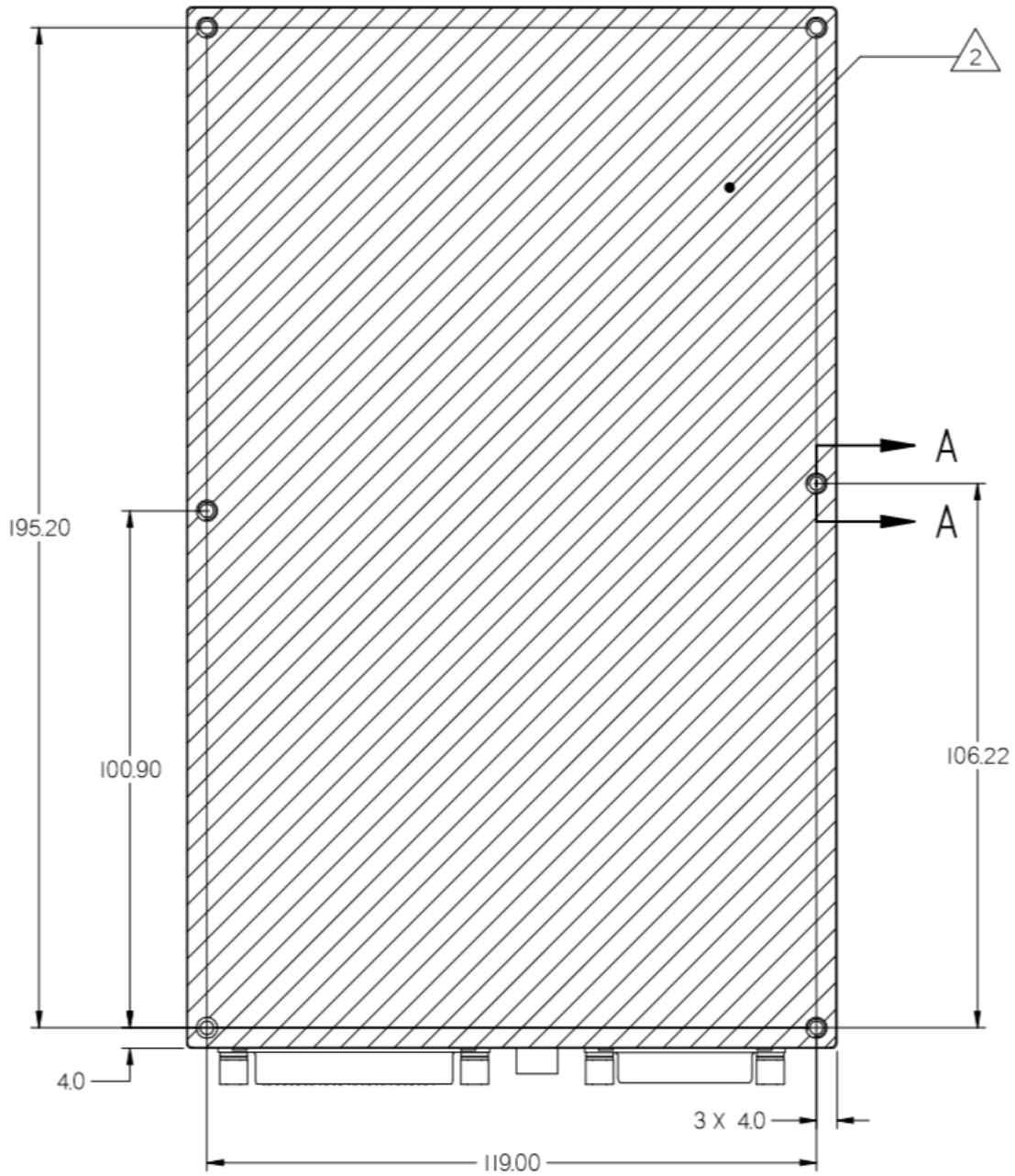




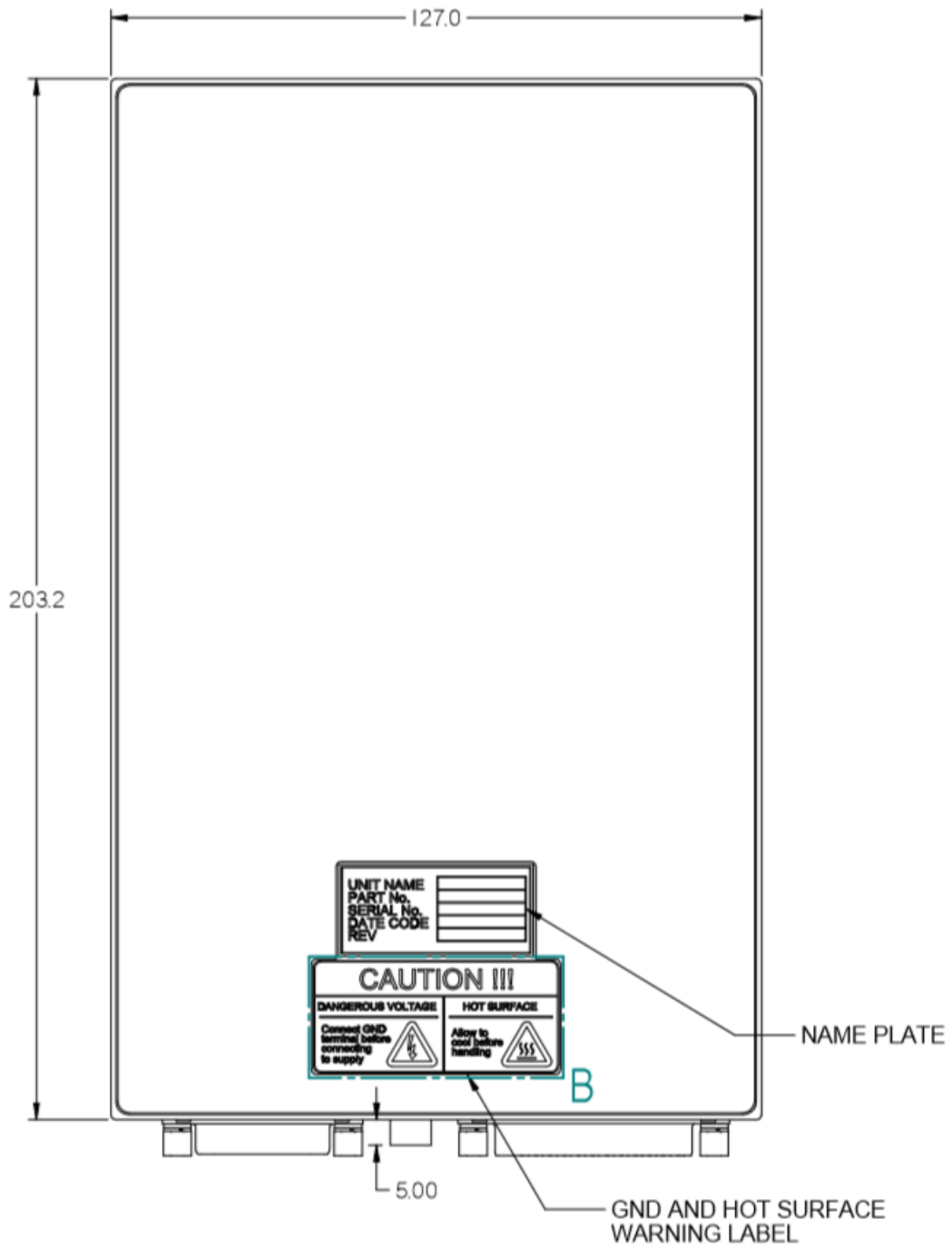
6X SECTION A-A

HELICOIL #6-32 UNC 1.5D

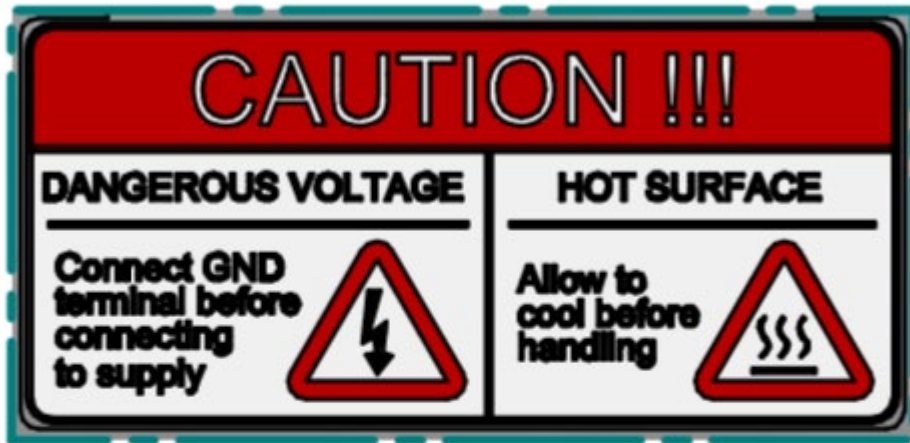








3:



## DETAIL B

### NOTES :

#### I. CONNECTORS:

I.1: J1 - INPUT CONNECTOR - CBM3W3M81000 OR EQ.

I.2: J2 - OUTPUT CONNECTOR - HDC25S50000-15 OR EQ

2. HEAT DISSIPATION AREA - 25,590 mm<sup>2</sup>

3. WORKMANSHIP SHALL BE MIL-STD-454, REQT. 9

4. MATERIAL: ALUMINUM 6061-T651& AL 5052-H32

5. FINISH: CHEMICAL CONVERSION COAT PER MIL-DTL-5541, TYPE II, CLASS IA.

#### 6. ENGRAVING:

- CHARACTERS: HEIGHT 3mm, WIDTH 0.6mm, DEPTH 0.4mm.

- ENGRAVING FILLED WITH BLACK COLOR.

#### Notes

1. Dimensions are in inches [mm]
2. Tolerance is:
  - .X ± 0.3 in
  - .XX ± 0.15 in
3. Weight: 1.4 kg, Typical

*Standard Configurations*

Part number	Input		Output	
	Voltage range	Frequency	Voltage	Current
M3916-803	1-phase, 85 to 265 V <sub>AC</sub>	50 / 60 / 400 Hz	24 V <sub>DC</sub>	20 A
M3916-804	1-phase, 85 to 265 V <sub>AC</sub>	50 / 60 / 400 Hz	28 V <sub>DC</sub>	18 A
M3916-805	1-phase, 85 to 265 V <sub>AC</sub>	50 / 60 / 400 Hz	48 V <sub>DC</sub>	10.5 A

- These configurations are REACH Compliant.
- The aluminum parts are chromate conversion coated per MIL-DTL-5541F, Type II CLASS 1A or eq.

Additional standard configurations available. **Consult factory for details.**

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