

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_{AC} ; 50/60Hz
 Single-phase, 10A_{max}
 IAW MIL-STD-1399-300B Type I
 (115 V_{rms} / 60 Hz)

Option 2:
 103 to 127 V_{AC} ; 400Hz
 Single-phase, 10A_{max}

Isolation

Input to Output: 1000 V_{DC}
 Input to Case: 1000 V_{DC}
 Output to case: 200 V_{DC}

Efficiency

115 V_{rms} / 400 Hz ≥ 80%
 230 V_{rms} / 50 Hz ≥ 85%
 (24 V_{DC} output, full load, 25°C)

DC Output

Voltage range: 24 to 50 V_{DC}
 Current range: 0 to 20 A
 Power range: 0 to 500 W
 3.3 ≤ V_{DC} < 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_{p-p}, typical (max 1%)
 without external capacitance.

| | | |
|---------------------------------------------|----------------------------|----------------------------------|
| <i>Electromagnetic Compatibility</i> | | |
| <i>EMC (MIL-STD)</i> | | |
| Designed to meet * MIL-STD-461F: | | |
| Conducted Emission | CE101, CE102 | |
| Conducted Susceptibility | CS101, CS114, CS115, CS116 | |
| Radiated Emission | RE101, RE102 | |
| Radiated Susceptibility | RS101, RS103 | |
| <i>EMC (EN/IEC)</i> | | |
| Radiated Emission Conducted Emission | EN55032 CLASS A | |
| Harmonic current Emission | IEC6100-3-2 CLASS A | |
| Voltage Fluctuation & Flicker | IEC6100-3-3 | |
| <i>Immunity Test (EN/IEC)</i> | | |
| Test Type | Test Method | Test Type/Level/Class |
| 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_{AC} @ 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.**

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

Pin Assignment

J1 - Input connector

Type: Positronic CBM3W3M81000/AA or eq.

Mates with:

Shell: Positronic CBM3W3S00000/AA or eq.

Pins: FS4820D/AA-15 or eq.

| Pin No. | Function | |
|---------|----------|---|
| A1 | NEUTRAL | ● |
| A2 | PHASE | ● |
| A3 | CHASSIS | ● |



J2 - Output connector

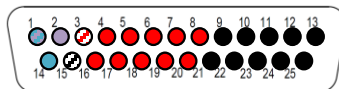
Connector type: M24308/23-39F or eq.

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.

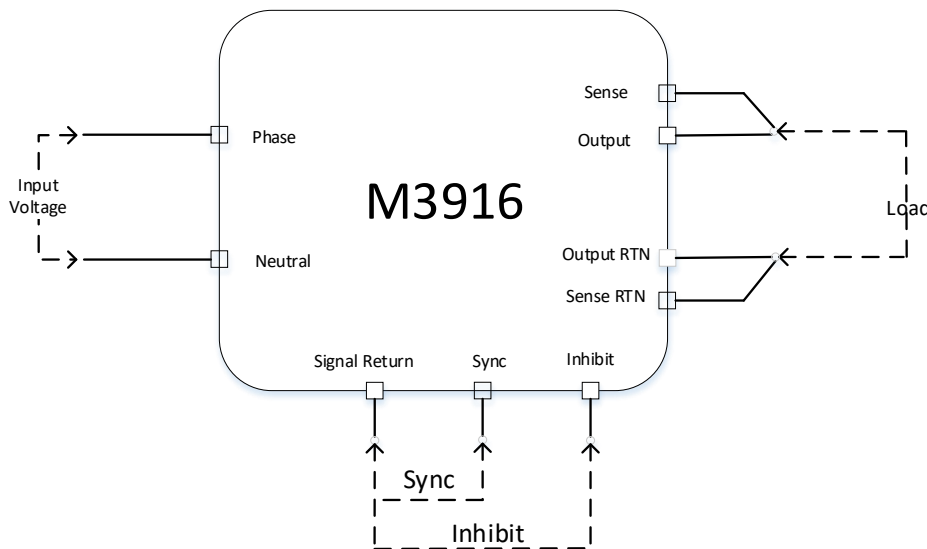
SIGNAL RTN

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

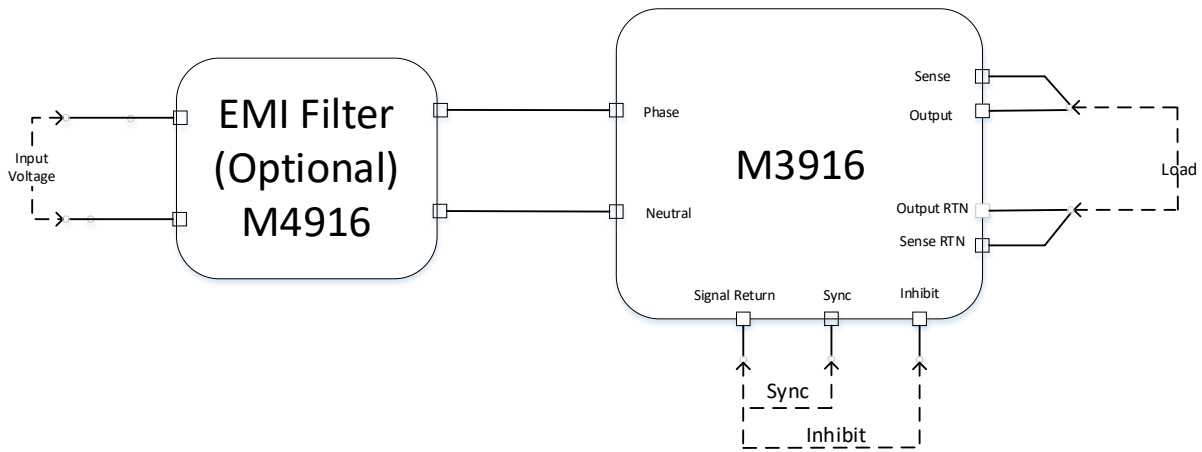
CHASSIS

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

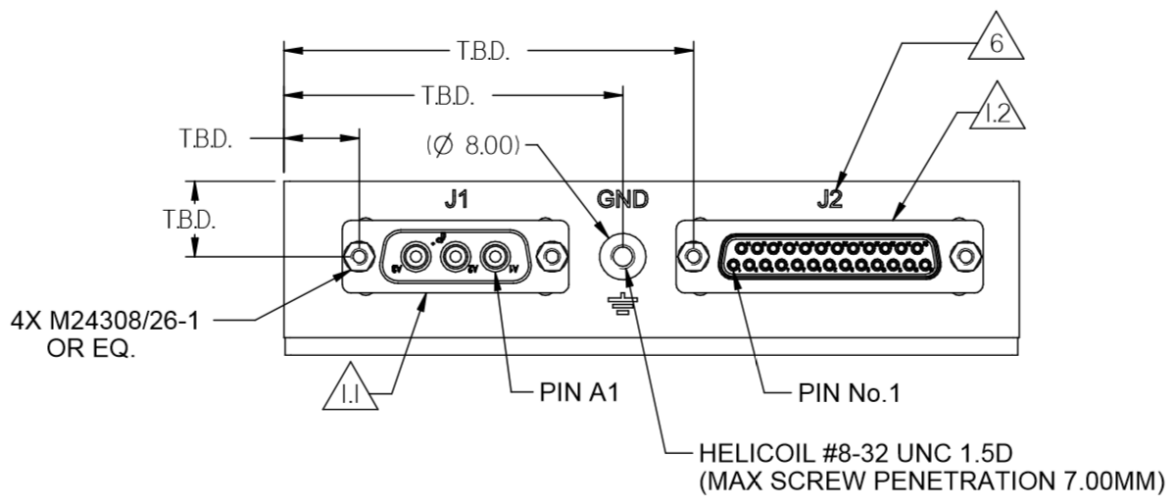
Typical Connection Diagram

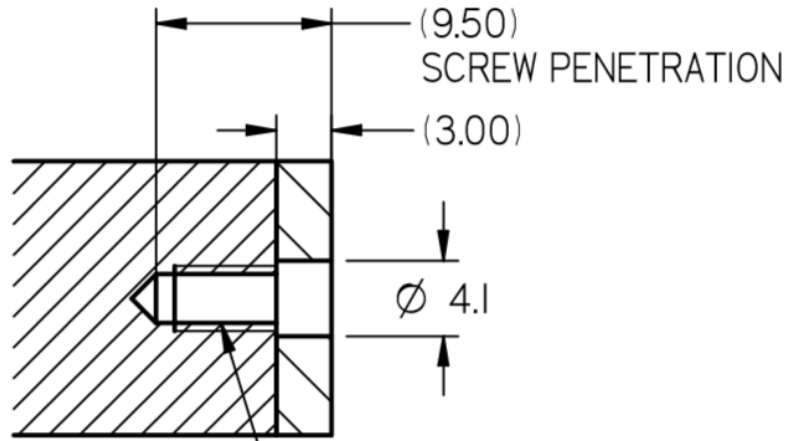


Optional Connection Diagram with external EMI Filter



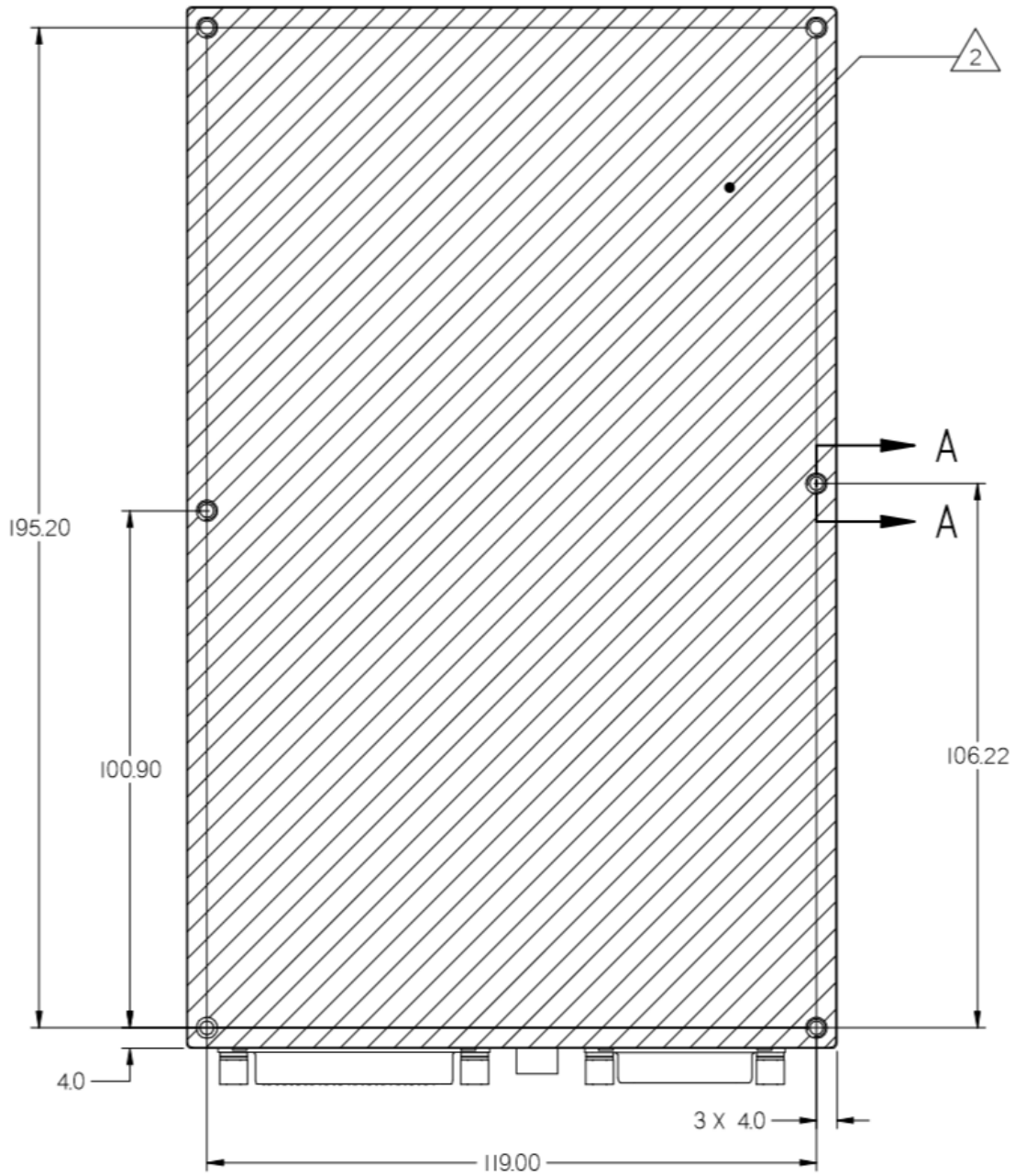
Outline Drawing



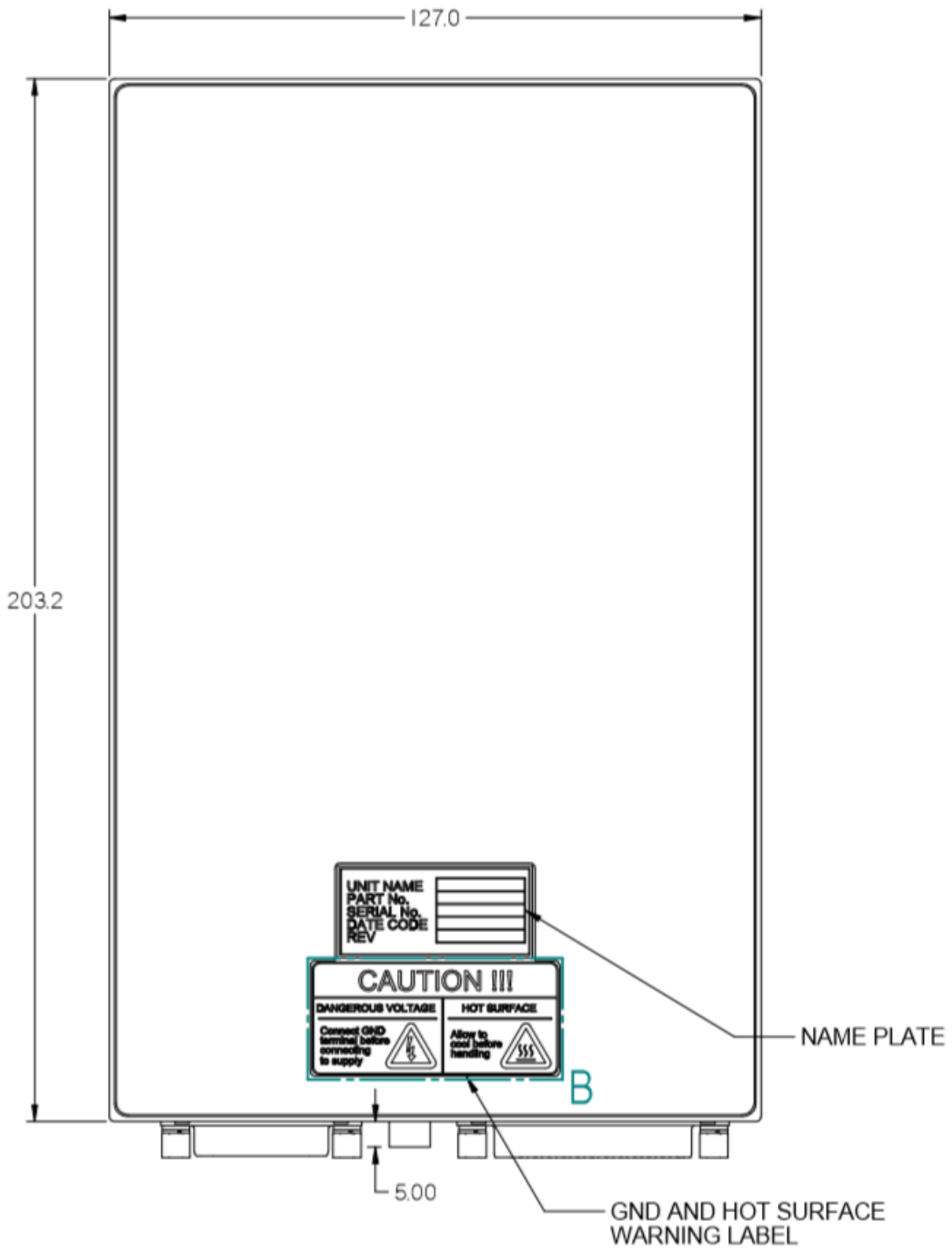


6X SECTION A-A

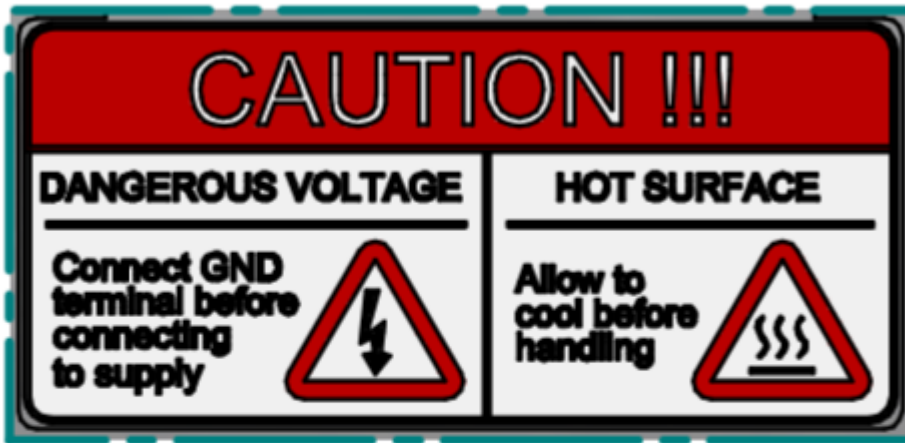
HELICOIL #6-32 UNC 1.5D







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 mm²

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

4. MATERIAL: ALUMINUM 6061-T65I& AL 5052-H32

5. FINISH: CHEMICAL CONVERSION COAT PER MIL-DTL-554I, 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 _{AC} | 50 / 60 / 400 Hz | 24 V _{DC} | 20 A |
| M3916-804 | 1-phase, 85 to 265 V _{AC} | 50 / 60 / 400 Hz | 28 V _{DC} | 18 A |
| M3916-805 | 1-phase, 85 to 265 V _{AC} | 50 / 60 / 400 Hz | 48 V _{DC} | 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.