

**M1986 Series– AC/DC Power Supply**

**M1986 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 OUTPUT
- UP TO 300 W

\* Depending on configuration

## M1986 Series– AC/DC Power Supply

### 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 freq. (250 kHz)
- 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, 5A<sub>max</sub>

IAW MIL-STD-1399-300B Type I  
(115 V<sub>rms</sub> / 60Hz)

##### **Option 2:**

103 to 127 V<sub>AC</sub> ; 400Hz

Single-phase, 5A<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 12.5 A

Power range: 0 to 300 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

For 28 V<sub>DC</sub> output, current 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.

## M1986 Series– AC/DC Power Supply

### *Electromagnetic Compatibility*

#### **EMC (MIL-STD)**

Designed to meet \* MIL-STD-461F:

Conducted Emission	CE101, CE102
Conducted Susceptibility	CS101, CS114, CS115, CS116
Radiated Emission	RE101, RE102
Radiated Susceptibility	RS101, RS103

#### **EMC (EN/IEC)**

Radiated Emission Conducted Emission	EN55032 CLASS A
Harmonic current Emission	IEC6100-3-2 CLASS A
Voltage Fluctuation & Flicker	IEC6100-3-3

#### **Immunity Test (EN/IEC)**

Test Type	Test Method	Test Type/Level/Class
ESD	EN61000-4-2	Enclosure; Contact; $\pm 4\text{kV}$ ; [B]
Radiated Immunity	EN61000-4-3	(80-6000) MHz; 10V/m; [A]
EFT	EN61000-4-4	$\pm 2\text{kV}$ ; [B]
Surge	EN61000-4-5	L-L: $\pm 1\text{kV}$ ; [B] L-E: $\pm 2\text{kV}$ ; [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.

## M1986 Series– AC/DC Power Supply

### **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 75 V<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.**

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

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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  
(AWG#20)

Pin No.	Function	
A1	NEUTRAL	•
A2	PHASE	•
A3	CHASSIS	•

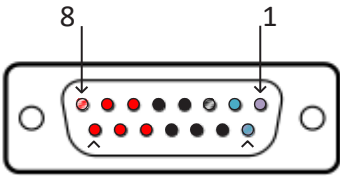


J2 - Output connector

Type: HDC15S50000-15 or eq.  
Mates with: M24308/4-2F or eq.

Pin No.	Function	
1	SYNC	•
2	INHIBIT	•
3	SENSE RTN	•
4	OUTPUT RTN	•
5	OUTPUT RTN	•
6	OUTPUT	•
7	OUTPUT	•
8	SENSE	•
9	SIGNAL RTN	•

Pin No.	Function	
10	OUTPUT RTN	•
11	OUTPUT RTN	•
12	OUTPUT RTN	•
13	OUTPUT	•
14	OUTPUT	•
15	OUTPUT	•



(Connectors shown from front view)

## M1986 Series– AC/DC Power Supply

### *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.

TTL "1" or OPEN – Power supply active (output turned on).

TTL "0" or SHORT to Signal RTN – Power supply inhibited (output turned off). If this function is not required, leave this pin unconnected.

#### **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**

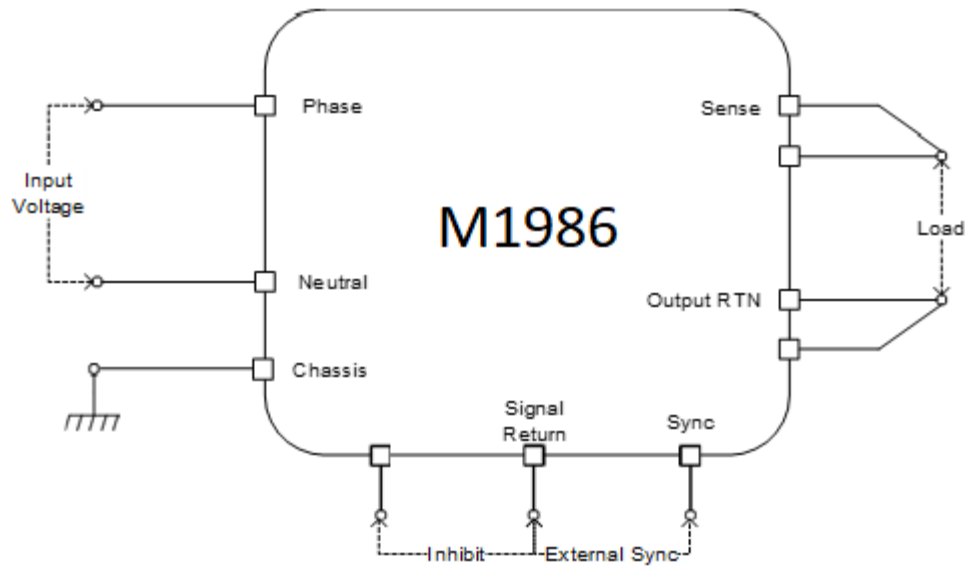
Both INHIBIT and SYNC signals are referenced to this pin. This pin is floating from both input and output.

#### **CHASSIS**

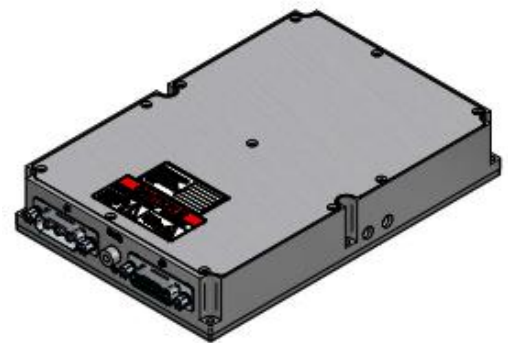
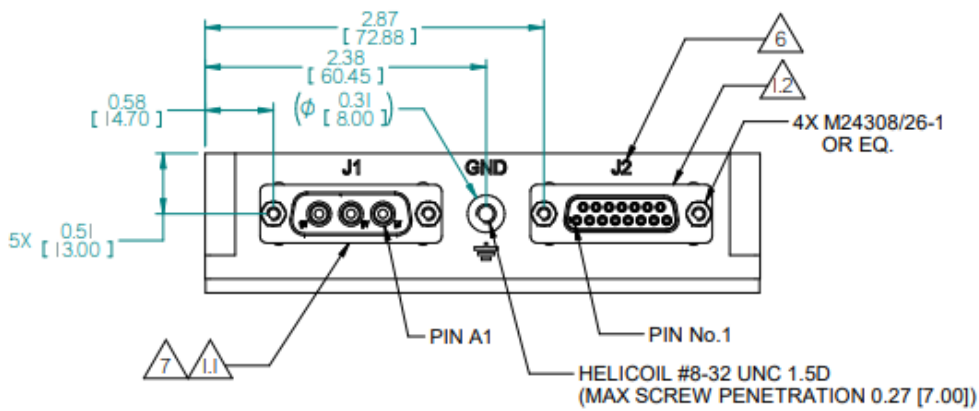
The CHASSIS pin allows additional connection of unit's chassis to system ground.

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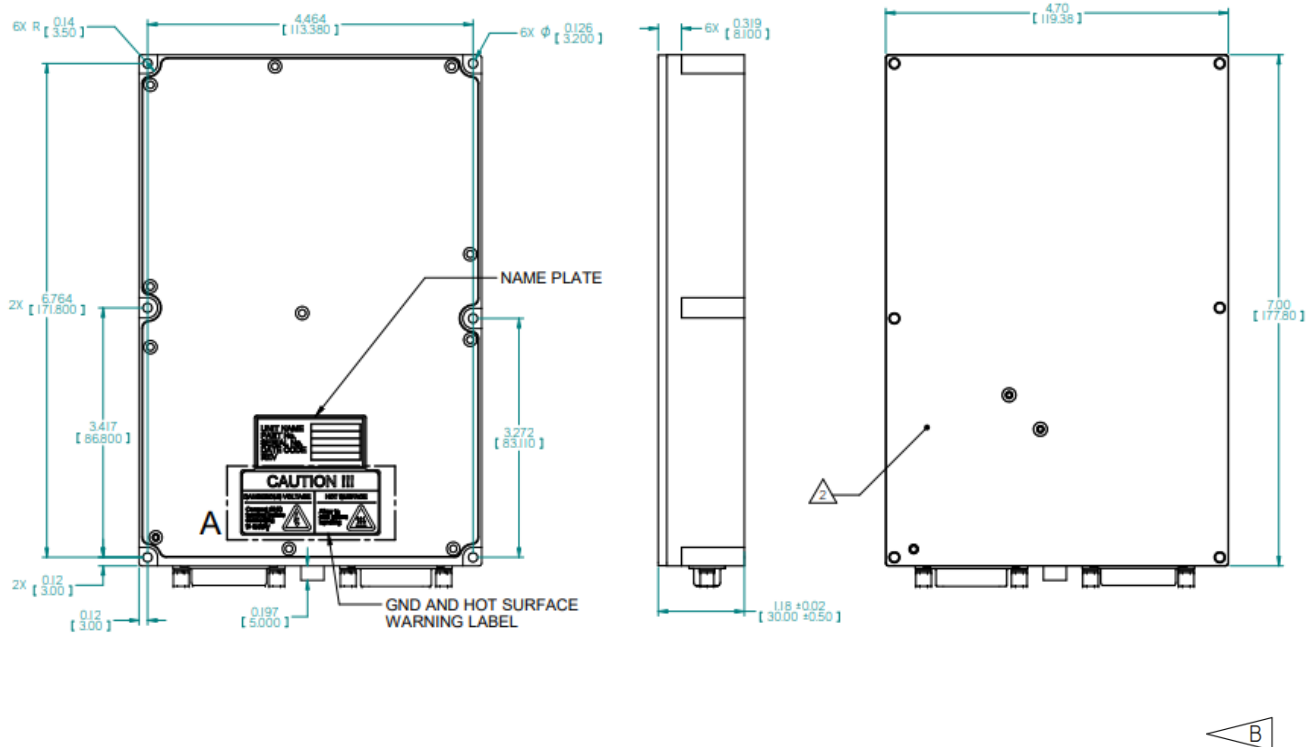
*Typical Connection Diagram*



*Outline Drawing*



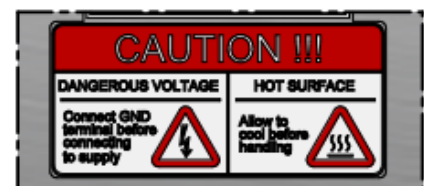
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### NOTES :

- CONNECTORS:
  - J1 - INPUT CONNECTOR - CBM3W3M81000 OR EQ.
  - J2 - OUTPUT CONNECTOR - HDC15S50000-15 OR EQ.
- HEAT DISSIPATION AREA - TOTAL AREA 20,300mm<sup>2</sup>
- WORKMANSHIP SHALL BE MIL-STD-454, REQ. 9
- MTL. AL 6061-T651& AL 5052-H32
- CHROMATE CONVERSION COATING PER MIL -DTL-5541F, TYPE 2 CLASS 1A
- ENGRAVING:
 

CHARACTERS HEIGHT: 3 (mm), DEPTH: 0.4 (mm).  
ENGRAVING FILLED WITH BLACK COLOR.
- SUPLIED WITH CABLE P/N: M1986701\_H99 (ENRCON P/N: 24-005401)



### DETAIL A

UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN INCH [mm]  
TOLERANCES ARE:

DECIMALS  
.XX  $\pm$  .01 [0.3]  
.XXX  $\pm$  .006 [0.15]  
DO NOT SCALE DRAWING

ANGLES  
 $\pm$  1°



## M1986 Series– AC/DC Power Supply

### Standard Configurations

Part number	Input		Output	
	Voltage range	Frequency	Voltage	Current
M1986-802*	1-phase, 85 to 265 V <sub>AC</sub>	50 / 60 / 400 Hz	12 V <sub>DC</sub>	20 A
M1986-803*	1-phase, 85 to 265 V <sub>AC</sub>	50 / 60 / 400 Hz	24 V <sub>DC</sub>	12.5 A
M1986-804*	1-phase, 85 to 265 V <sub>AC</sub>	50 / 60 / 400 Hz	28 V <sub>DC</sub>	10.7 A
M1986-805*	1-phase, 85 to 265 V <sub>AC</sub>	50 / 60 / 400 Hz	48 V <sub>DC</sub>	6.2 A
M1986-102	1-phase, 85 to 265 V <sub>AC</sub>	50 / 60 / 400 Hz	12 V <sub>DC</sub>	20 A
M1986-103	1-phase, 85 to 265 V <sub>AC</sub>	50 / 60 / 400 Hz	24 V <sub>DC</sub>	12.5 A
M1986-104	1-phase, 85 to 265 V <sub>AC</sub>	50 / 60 / 400 Hz	28 V <sub>DC</sub>	10.7 A
M1986-105	1-phase, 85 to 265 V <sub>AC</sub>	50 / 60 / 400 Hz	48 V <sub>DC</sub>	6.2 A

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

\***Note:** Only -8XX configurations are CE certified.

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

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