M1912 SERIES

300W Dual Output AC to DC Baseplate Cooled Power Supply



PRODUCT DESCRIPTION

The M1912 is a series of mechanically robust, base plate cooled, high performance, 300W dual output AC to DC power supplies, for Navy shipboard, Airborne, and ground applications. The M1912 converts 115VAC – 230VAC/50-60Hz or 115VAC 400Hz, to a well-regulated, filtered and protected main DC Output 280W and Auxiliary output 20W.

The product meet MIL-STD requirements (specified herein).

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STANDARD CONFIGURATIONS

Part number	Input		Main Output		Aux Output		ON/OFF Logic
	Voltage range	Frequency	Voltage	Current	Voltage	Current	
M1912100	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	12 V_{DC}	20 A	3.3 V_{DC}	5 A	Enable
M1912101	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	12 V_{DC}	20 A	3.3 V_{DC}	5 A	Inhibit
M1912102	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	12 V_{DC}	20 A	5 V_{DC}	3.3 A	Enable
M1912103	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	12 V_{DC}	20 A	5 V_{DC}	3.3 A	Inhibit[1]
M1912104	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	24 V_{DC}	12A	3.3 V_{DC}	5 A	Inhibit[1]
M1912106	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	24 V_{DC}	12A	5 V_{DC}	3.3 A	Inhibit[1]
M1912108	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	24 V_{DC}	12A	12 V_{DC}	1.5 A	Inhibit[1]
M1912110	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	28 V_{DC}	10A	3.3 V_{DC}	5 A	Inhibit[1]
M1912112	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	28 V_{DC}	10A	5 V_{DC}	3.3 A	Inhibit[1]
M1912114	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	28 V_{DC}	10A	12 V_{DC}	1.5 A	Inhibit[1]
M1912116	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	48 V_{DC}	5.5A	3.3 V_{DC}	5 A	Inhibit[1]
M1912118	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	48 V_{DC}	5.5A	5 V_{DC}	3.3 A	Inhibit[1]
M1912120	Single-phase, 85 to 265 V_{AC}	50/60/400 Hz	48 V_{DC}	5.5A	12 V_{DC}	1.5 A	Inhibit[1]

- Note: [1]Enbale logic is available - **Contact factory for more details**.
- Additional standard configurations available. **Contact factory for more details**.
- All of our products can be configured to comply with **EU REACH** regulations. **Contact factory for more details**.
- For **CE MARKING** (IEC 62368-1) configuration - **Contact factory for more details**.

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MAIN FEATURES

- AC/DC Dual output power supply up to 300W
- Single phase input (50/60/400Hz)
- Withstands MIL-STD-1399-300B 1,000 V spikes
- Complies with MIL-STD-461F for shipboard application
- Complies with MIL-STD-167-1 (Type I) shipboard vibration
- Robust mechanical design, intended for systems that should withstand MIL-DTL-901E high impact shocks
- High power factor (Full load PF of above 0.9)
- Main output 12V to 48V @ Max 280W
- Aux. output 3.3V to 12V @ Max 20W
- High efficiency
- Full galvanic isolation between Input, Chassis and Outputs.
- Inrush Current Limiter
- External Inhibit (On/Off)
- Fixed switching freq. (250 kHz)
- EMI filters included
- Remote sense compensation for Auxiliary output
- Indefinite short circuit protection with auto-recovery
- Over-voltage shutdown with auto-recovery
- Over temperature shutdown with auto-recovery
- High density
- Conduction cooled via the baseplate
- J-STD-001B and IPC-610A Class-3 workmanship
- Conformal Coating per MIL-I-46058C and IPC-CC-830

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SPECIFICATIONS

<table>
<tr><td rowspan="4">AC
Input</td><td>Voltage and Frequency</td><td>Option 1:
85 to 265 V_{AC} ; 50/60Hz
Single-phase, 5A $_{max}$
IAW MIL-STD-1399-300B, Type I (115 V_{rms} / 60 Hz)

Option 2:
103 to 127 V_{AC} ; 400Hz
Single-phase, 5A $_{max}$</td></tr>
<tr><td>Under Voltage shutdown</td><td>Unit protects itself (no damage) below 75 VAC @ full load.</td></tr>
<tr><td>Inrush Current Limiter</td><td>Initial input current surge to charge internal capacitances is limited internally.</td></tr>
<tr><td>Isolation</td><td>Input to Output: 1000 VDC
Input to Case: 1000 VDC

<u>Note</u>: Tested during production, at system level the test Voltage limited to 250V since internal TVS installed between Neutral to
Chassis for surge protection.
If this feature not required, please consult factory.</td></tr>
<tr><td rowspan="4">DC
Output</td><td>Output Range</td><td><table><tr><td></td><td>Voltage Range</td><td>Current</td><td>Power</td></tr><tr><td>Main Output</td><td>12V to 48V</td><td>Up to 20A</td><td>Up to 280W</td></tr><tr><td>AUX Output</td><td>3.3V to 12V</td><td>Up to 5A</td><td>Up to 20W</td></tr></table>Main output and Auxiliary output are not isolated from each other.
Additional configuration available. Consult factory for details.</td></tr>
<tr><td>Voltage Regulation</td><td>Less than 1% (no load to full load, –40 °C to +85 °C)
For voltage output below 5V, Less than 3% (no load to full load, –40 °C to +85 °C)</td></tr>
<tr><td>Remote Sense</td><td>AUX SENSE
The AUX 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 AUX SENSE pin to AUX OUTPUT pins as close as possible to the unit.

AUX SENSE RTN
The AUX 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.

<u>Note</u>: The use of remote sense has a limit of voltage dropout between the converter's output and the load's terminals of approximately ±0.5V of nominal output voltage.</td></tr>
<tr><td>Turn on Overshoot</td><td>Output voltage overshoot during power on < 5%</td></tr>
</table>

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<table>
<tr><td rowspan="5"></td><td>Ripple and noise</td><td>For Vout>5V typical max 1%
For Vout< 5V typical max 2%
With 1µF external capacitance.</td></tr>
<tr><td>Isolation</td><td>Output to case: 200 VDC</td></tr>
<tr><td>Current Limit & Overload</td><td>10 - 30% above maximum current, indefinitely (Hiccup).</td></tr>
<tr><td>Efficiency</td><td>115 V_{rms} / 400 Hz ≥ 80%
230 V_{rms} / 50 Hz ≥ 84%
(Typical @ 250W load)</td></tr>
<tr><td>Overvoltage Protection</td><td>• Active Over Voltage Protection
10% ± 2% above nominal voltage.
• Passive Over Voltage Protection
Transorb/Zener at output selected 20%</td></tr>
<tr><td>Over Temp. Protection</td><td>Shutdown at base plate temp. above +105°C ± 5 °C Automatic recovery at base plate temp. below +95°C ± 5°C.</td></tr>
<tr><td>Control & Indication</td><td>ON/OFF Input</td><td>The ENABLE/ INHIBIT signal is used to turn the power supply ON and OFF.
The internal pullup voltage is 3.3V typical and the IPULLDOWN (the minimum current to RTN needed to turn on the PSU) is 3mA Typical.

Table 1 – Inhibit and Enable Functionality
<table>
<tr><td></td><td>Enable logic</td><td>Inhibit logic</td></tr>
<tr><td>'ON'</td><td>V < 0.8V – P.S 'ON'
or
Enable = 'SHORT' – P.S 'ON'</td><td>V > 2.4V – P.S 'ON'
or
Inhibit = 'OPEN' – P.S 'ON'</td></tr>
<tr><td>'OFF'</td><td>V > 2.4V – P.S 'OFF'
or
Enable = 'OPEN' – P.S 'OFF'</td><td>Inhibit = 'SHORT' – P.S 'OFF'
or
V < 0.8V – P.S 'OFF'</td></tr>
</table>
The ENABLE/ INHIBIT signal is floating form output return.

Optional to applied 28V between Inhibit pin to signal RTN to active the power supply (output turned on)- Please consult factory.

<u>SIGNAL RTN</u>
This signal is used as grounding for ENABLE/INHIBIT signal.
Signal RTN is isolated from output.</td></tr>
<tr><td rowspan="3">Environment</td><td>Temperature</td><td>MIL-STD-810F, Methods 501.4 & 502.4
Operating: –40°C to +85°C (at baseplate)
Storage: –55°C to +125°C (ambient)

Optional: Operating -55°C to +85°C (at baseplate).
Consult factory for details.</td></tr>
<tr><td>Humidity</td><td>MIL-STD-810F, Method 507.4
Up to 95% RH</td></tr>
<tr><td>Salt-fog</td><td>MIL-STD-810F, Method 509.4</td></tr>
</table>

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<table>
<tr><td rowspan="4"></td><td>Altitude</td><td>MIL-STD-810F, 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)</td></tr>
<tr><td>Mechanical Shock</td><td>MIL-STD-810F , Method 516.5,
● Procedure I -Functional shock, 40g, 15 -23 ms, Terminal Peak, Sawtooth shock pulse
● Procedure V - Crash Hazard, 40g, 15 -23 ms, Terminal Peak, Sawtooth shock pulse

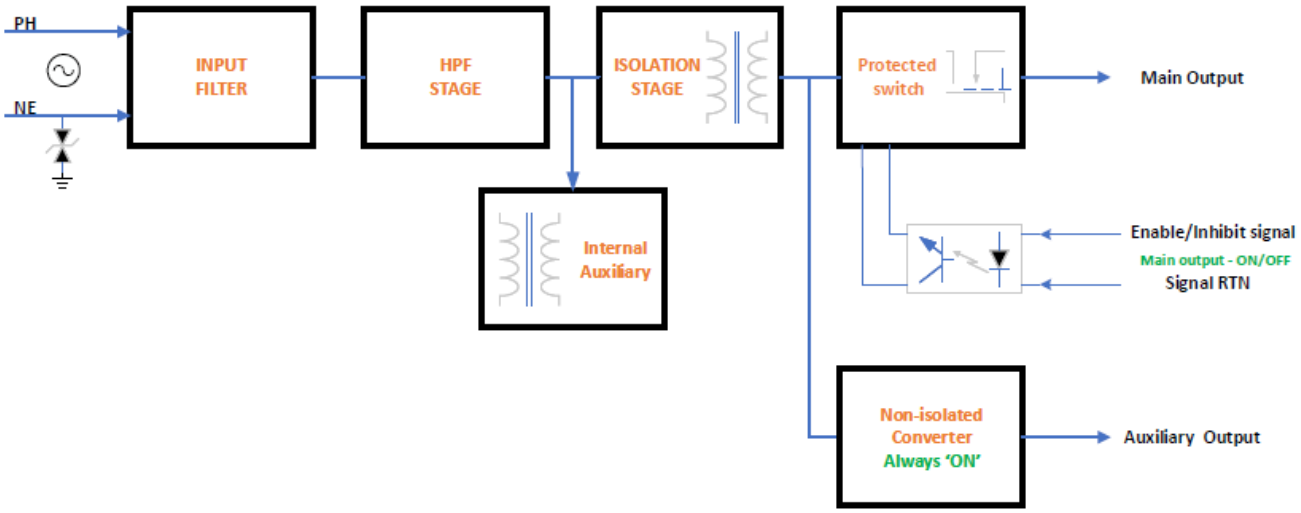
MIL-S-901D: Withstands the high-impact shipboard shock IAW MIL-S-901D, Grade A, Class I and II</td></tr>
<tr><td>Vibration</td><td>MIL-STD 810F, Method 514.5, Procedure I, Category 24, General minimum integrity exposure, IAW Figure 514.5C-17, 1 hour per axis.

Type I vibration IAW MIL-STD-167-1A</td></tr>
<tr><td>Fungus</td><td>Does not support fungus growth (MIL-STD-810G, Method 508.6)</td></tr>
<tr><td rowspan="3">EMC</td><td>Designed to meet
*
MIL-STD-461F</td><td>
<table>
<tr><td>Conducted Emission</td><td>CE101, CE102</td></tr>
<tr><td>Conducted Susceptibility</td><td>CS101, CS114, CS115, CS116</td></tr>
<tr><td>Radiated Emission</td><td>RE101, RE102</td></tr>
<tr><td>Radiated Susceptibility</td><td>RS101, RS103</td></tr>
</table>
* All tests are at full load and in accordance with the provisions of MIL-STD-461F – with shielded Output and Signals cables.
</td></tr>
<tr><td>EN/IEC</td><td>
<table>
<tr><td>Radiated Emission
Conducted Emission</td><td>EN55032 CLASS A</td></tr>
<tr><td>Harmonic current Emission</td><td>IEC6100-3-2 CLASS A</td></tr>
<tr><td>Voltage Fluctuation & Flicker</td><td>IEC6100-3-3</td></tr>
</table>
</td></tr>
<tr><td>Immunity Test (EN/IEC)</td><td>
<table>
<tr><th>Test Type</th><th>Test Method</th><th>Test Type/Level/Class</th></tr>
<tr><td>ESD</td><td>EN61000-4-2</td><td>Enclosure; Contact; ±4Kv; [B]</td></tr>
<tr><td>Radiated Immunity</td><td>EN61000-4-3</td><td>(80-6000) MHz; 10V/m; [A]</td></tr>
<tr><td>EFT</td><td>EN61000-4-4</td><td>±2kV; [B]</td></tr>
<tr><td>Surge</td><td>EN61000-4-5</td><td>L-L: ±1kV; [B]
L-E: ±2kV; [B]</td></tr>
<tr><td>Conducted Immunity</td><td>EN61000-4-6</td><td>150kHz – 80MHz ; 10Vrms; [A]</td></tr>
<tr><td>Magnetic Field</td><td>EN61000-4-8</td><td>50Hz; 30A/m; [A]</td></tr>
<tr><td>Voltage dips and short interruptions</td><td>EN61000-4-11</td><td>50Hz; (100/60/30)%; [B & C]</td></tr>
</table>
</td></tr>
</table>

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Cooling Requirements	The M1912 is a baseplate cooled unit. The base of the M1912 should be thermally attached to a suitable heatsink that maintains it below +85 °C.
Form factor	119.4 mm wide, 30 mm high and 177.8 mm deep. The base should be mechanically and thermally attached to a user provided coldplate (see Page 9 and 10). For detailed dimensions and tolerances see Drawing: M1912-100
Weight	1150g (Typical)
Reliability	150,000 hours, calculated IAW MIL-HDBK-217F Notice 2 at +65°C baseplate, Ground fixed conditions.

OPERATIONAL BLOCK DIAGRAM



PIN ASSIGNMENT

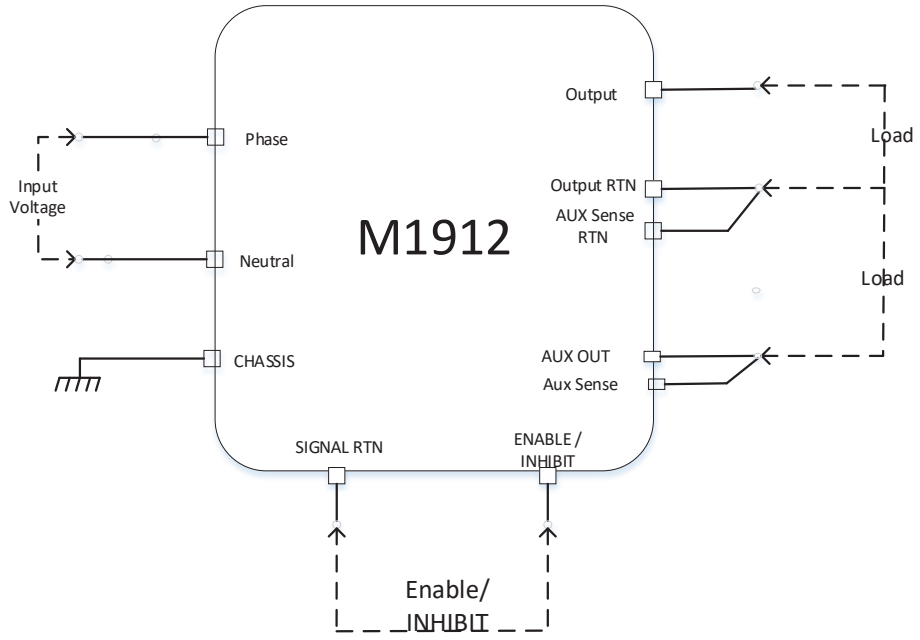
J1 – AC Input connector	
Type: Positronic CBM3W3M550000 OR EQ.	
Mates with: Shell: positronic CBM3W3S00000 + Pins: FC4016D-15 (X3) – #16 CRIMP CONTACTS	
Pin	**Fucntion**
A1	NEUTRAL
A2	PHASE
A3	CHASSIS *

J2 – DC Output connector			
Type: HDC25S50000-15 OR EQ.			
Mates with: M24308/4-3Z OR EQ.			
Pin	**Fucntion**	**Pin**	**Fucntion**
1	AUX SENSE RTN	14	AUX SENSE
2	SIGNAL RTN	15	N/A
3	ENABLE/ INHIBIT	16	AUX OUTPUT
4	AUX OUTPUT	17	OUTPUT RTN
5	OUTPUT RTN	18	OUTPUT RTN
6	OUTPUT RTN	19	OUTPUT RTN
7	OUTPUT RTN	20	OUTPUT RTN
8	OUTPUT RTN	21	OUTPUT RTN
9	OUTPUT RTN	22	OUTPUT
10	OUTPUT	23	OUTPUT
11	OUTPUT	24	OUTPUT
12	OUTPUT	25	OUTPUT
13	OUTPUT		

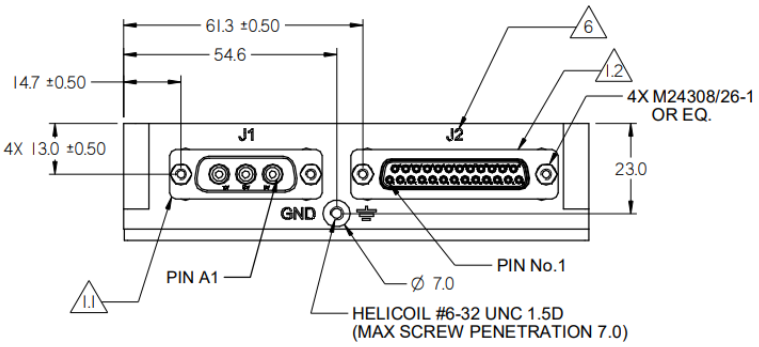
* The CHASSIS pin allows additional connection of unit's chassis to system ground.

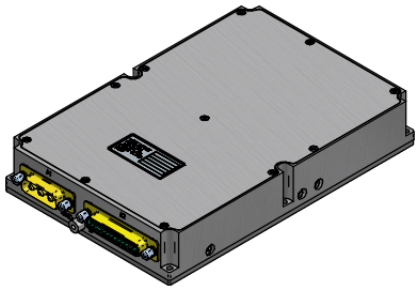
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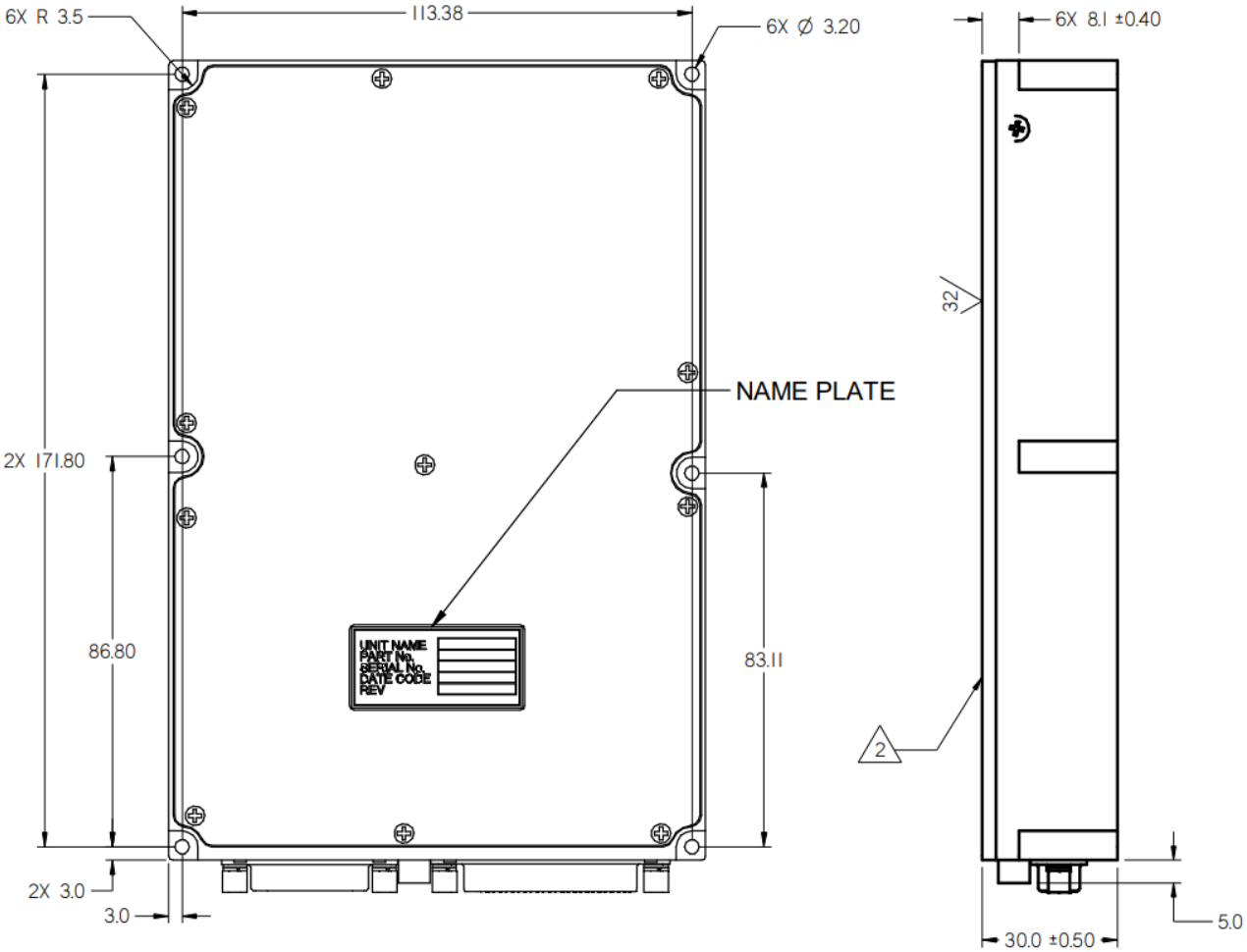
TYPICAL CONNECTION DIAGRAM



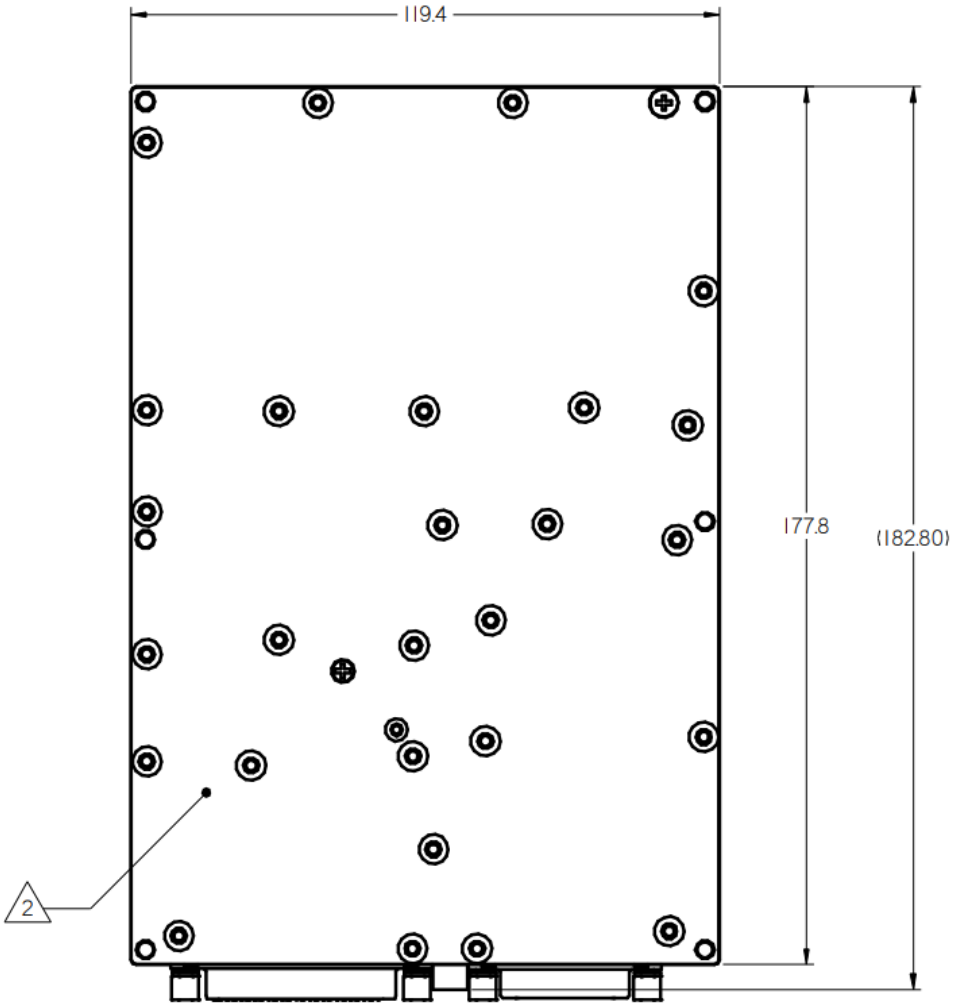
OUTLINE DRAWING







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NOTES :

1. CONNECTORS:
   1.1: J1 - INPUT CONNECTOR - CBM3W3M550000 OR EQ.
   1.2: J2 - OUTPUT CONNECTOR - HDC25S50000-15 OR EQ.
2. HEAT DISSIPATION SURFACE - TOTAL AREA 20,300mm²
3. WORKMANSHIP SHALL BE MIL-STD-454, REQT. 9
4. MTL. AL 6061-T651& AL 5052-H32
5. CHROMATE CONVERSION COATING PER
   MIL -DTL-5541F,TYPE 1 OR 2 CLASS 1A
6. ENGRAVING:
CHARACTERS HEIGHT: 3 (mm), DEPTH: 0.4 (mm).
ENGRAVING FILLED WITH BLACK COLOR.

- These figures are for reference only. For more details, please contact us.

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