M3169 SERIES

SINGLE-OUTPUT, UP TO 1KW AC/DC POWER SUPPLY

The M3169 is a series of ruggedized, high-performance, base plate cooled, high performance, sealed enclosure 1kW single output AC to DC power supplies, for Navy shipboard, Airborne, and ground applications that are characterized by harsh and hostile environment.

The M3169 converts 85 V_{AC} -265 V_{AC} /50-60Hz or 90 V_{AC} -180 V_{AC} /400Hz, to a well-regulated, filtered and protected DC Output.

THE MAIN FEATURES OF THE M3169 ARE:

- AC/DC Single output power supply up to 1kW
- $85V_{AC}$ -$265V_{AC}$ /50-60Hz or $90V_{AC}$ -$180V_{AC}$ / 400Hz Standard Input version, single-phase
- For extended input version - **Please contact factory for more details**
- High efficiency
- Wide input range
- High power factor
- Input / Output isolation
- Optional - Remote sense compensation **- Please contact factory for more details**
- EMI filters included
- Inrush Current Limiter
- TTL logic Inhibit
- Sustains high level of shocks and vibration, salt-fog, blowing rain, sand and dust.
- Sealed enclosure
- Non-latching protections:
    - Overload/Short-circuit
    - Output Overvoltage
    - Over Temperature
    - Input Undervoltage Lockout

Standard Models List (for other voltages – consult factory)

Part number	Input		Output		Special features	Type	
	Voltage range	Frequency	Voltage	Current		A	B
M3169-100	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	5 V_{DC}	36 A		V	
M3169-101	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	12 V_{DC}	36 A		V	
M3169-102	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	24 V_{DC}	36 A		V	
M3169-103	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	28 V_{DC}	36 A		V	
M3169-104	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	48 V_{DC}	21 A		V	
M3169-105	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	270 V_{DC}	4 A		V	
M3169-106	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	28 V_{DC}	36 A	Parallel operation via output voltage droop. Voltage regulation is ±2%	V	
M3169-110	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	5 V_{DC}	36 A			V
M3169-111	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	12 V_{DC}	36 A			V
M3169-112	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	24 V_{DC}	36 A			V
M3169-113	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	28 V_{DC}	36 A			V
M3169-114	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	48 V_{DC}	21 A			V
M3169-115	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	270 V_{DC}	4 A			V
M3169-116	85V_{AC}-265V_{AC}/ 1-phase	50/60/400Hz	270 V_{DC}	4 A	Parallel operation via output voltage droop. Voltage regulation is ±2%		V

- 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.**

SPECIFICATIONS:

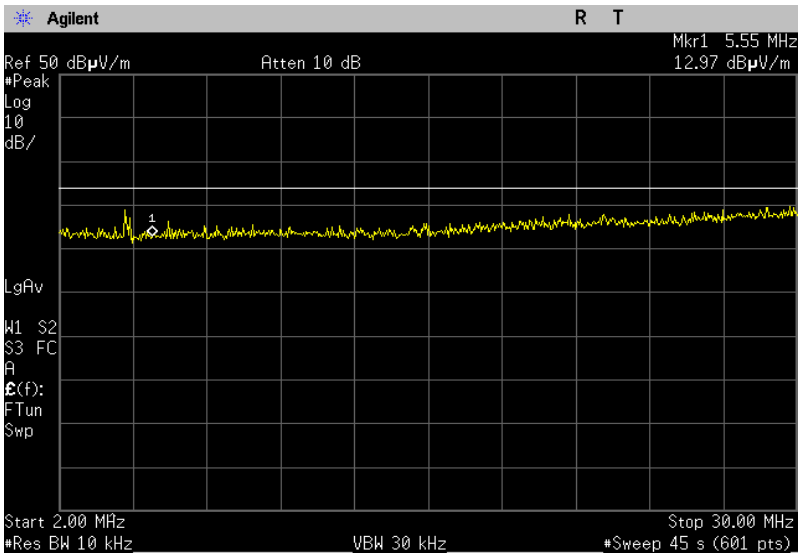
AC Input	***Voltage Range***	Option 1: 85 V_{AC} -265 V_{AC} /50 Hz - 60 Hz / Single-phase Option 2: 90 V_{AC} -180 V_{AC} /400 Hz / Single-phase For extended input version **- Please contact factory for more details**
	Isolation	1 000 V_{DC} Input to Output 1 000 V_{DC} Input and Case
	Spikes	**Optional** to withstand 1000 V spikes IAW MIL-STD-1399-300B. **please consult factory**
DC Output	***Voltage Regulation***	Up to ±2% (no load to full load, –40 °C to +85 °C and over normal input voltage range).
	Optional Remote Sense	The SENSE is used to achieve accurate load regulations at load terminals (this is done by connecting the pins directly to the load's terminals). For output voltage above 8V, the use of remote sense has a max limit of 0.25V voltage dropout between converter's output and load terminals. For output voltage below 8V, the use of remote sense has a max limit of 0.5V voltage dropout between converter's output and load terminals. When not used connect SENSE to OUT and SENSE RTN to OUT RTN.
	Ripple and Noise	(max. 1%) measured at load across 1 µF and 0.1 µF ceramic capacitors.
	Isolation	200 V_{DC} Output and Case
	Current Limit & Overload	Output turns off and on periodically (hiccup) until fault is condition removed. Protection threshold set at 120% ± 10% of maximum current
	Efficiency	Up to 83-87% - typical (nominal input voltage, full load, room temperature)
	Overvoltage Protection	• **Active Over-Voltage Protection** Internal control shuts output down if voltage exceeds 110% ± 5% of nominal. **Passive Over-Voltage Protection** A transorb, rated to 120% ± 10% of nominal voltage, is placed across the output.
	Over Temp. Protection	Unit shuts down if baseplate temperature exceeds 100 ± 5 °C. Automatic recovery upon cooldown to below 95 ± 5 °C.

Specifications (Cont.):

Environment 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)
	Humidity	Method 507.6 test Procedure 2
	Rain	Method 506.6 Procedure 1,2
	Sand & Dust	Method 510.6 Procedure 1
	Salt-fog	Method 509.6
	Altitude	Method 500.4 Procedures I – up to 70,000 ft. (non-operational) Procedure II – up to 40,000 ft. (operational)
	Temperature Shock	Method 503.6
	Mechanical Shock	Method 516.5 Procedure I 30 g, 11 ms terminal peak saw-tooth
	Vibration	Method 514.5 Procedure I Category 24 - General minimum integrity exposure
	Temperature/ Altitude DE-RATING	DE-RATE temperature linearly with altitude with a slope of - 9°C / 5000 FT TBR referenced to the maximum hot operating temperature at MSL
	Fungus	Method 508.7
EMI	***MIL-STD-461F***	MIL-STD-461F CE102, CS101, CS114, CS115, CS116, RE102, RS103
Reliability	150,000 hours, calculated per MIL-STD-217F Notice 2 at +85 °C baseplate, Ground Fixed environment.	
Form factor	7.25'' wide, 3.1'' high and 11'' deep. For detailed dimensions and tolerances see Drawing: M2169001	
Weight	4 kg	
Connectors	See Page 9-10	

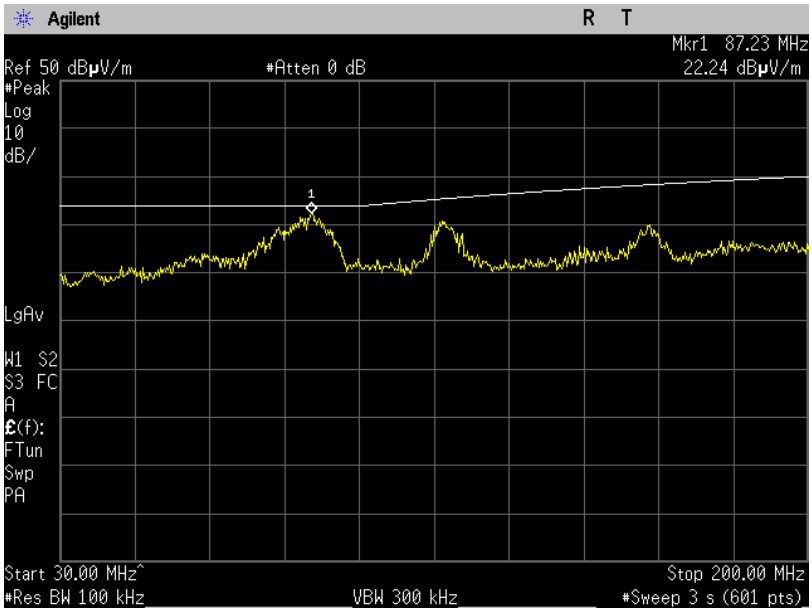
TEST RESULTS

Plot 1.2: RE102 test results within 2 – 30 MHz, vertical polarization



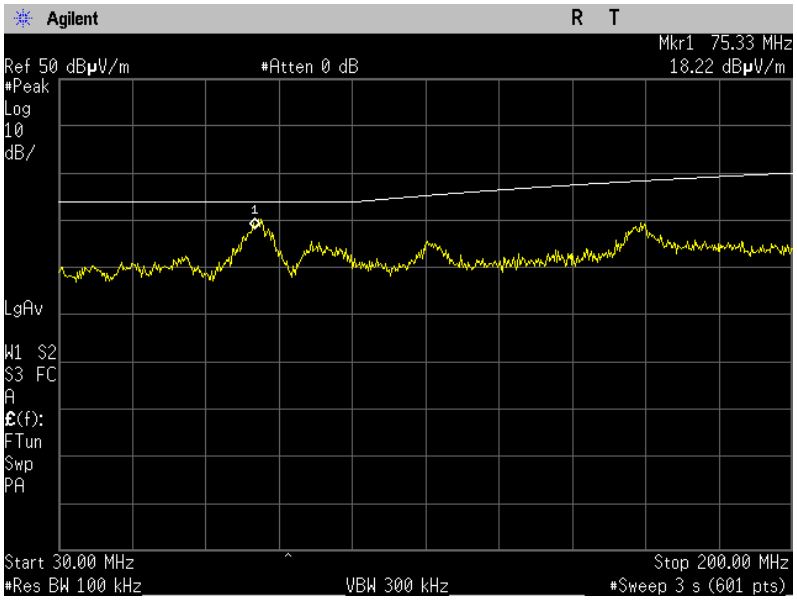
Display line is Limit

Plot 1. 4: RE102 test results within 30 – 200 MHz, vertical polarization



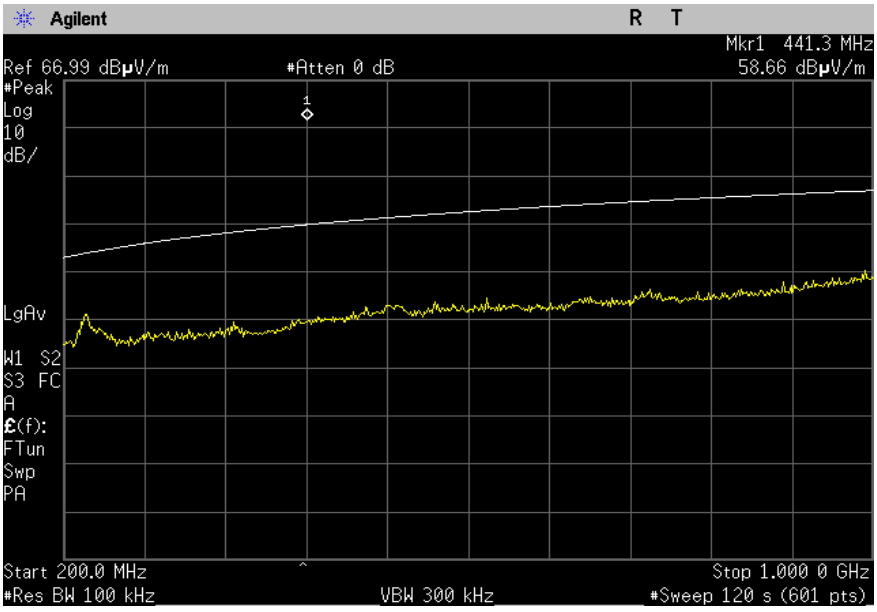
Display line is Limit

Plot 1.6: RE102 test results within 30 – 200 MHz, horizontal polarization



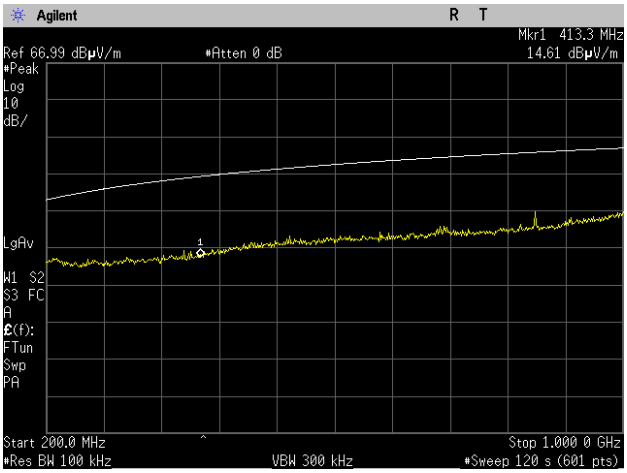
Display line is Limit

Plot 1.8: RE102 test results within 200 – 1000 MHz, vertical polarization



Display line is Limit

Plot 1.10: RE102 test results within 200 – 1000 MHz, horizontal polarization



Display line is Limit

TYPICAL TEST RESULTS - EFFICIENCY

Efficiency Percent	Output Power	Output voltage	Input Power	Input voltage	Power Dissipation
74.4	150	28	201.6129	115	51.61290323
77.7	200	28	257.40026	115	57.4002574
78.6	450	28	572.51908	115	122.519084
82.6	750	28	907.99031	115	157.9903148

PIN ASSIGNMENT: J1 - INPUT CONNECTOR

Connector type*:* D38999/24WC4PN (4#16 PINS)

Pin #	Function
A	PHASE
B	NEUTRAL
C	CHASSIS GND
D	(SPARE) NOT CONNECT

CHASSIS Note: Chassis PIN
This pin is connected to the converter's chassis.

PIN ASSIGNMENT: J2 - OUTPUT CONNECTOR - OPTION A

Connector type*:* D38999/24WE6SN (6#12 SOCKETS) or eq.

Pin #	Function
A	VOUT
B	VOUT RTN
C	CHASSIS GND
D	VOUT
E	VOUT RTN
F	CHASSIS GND

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

CHASSIS Note: Chassis PIN
This pin is connected to the converter's chassis.

PIN ASSIGNMENT: J2 - OUTPUT CONNECTOR- OPTION B

Connector type*:* D38999/24WE6SN (6#12 SOCKETS) or eq.

Pin #	Function
A	VOUT
B	VOUT RTN
C	SENSE
D	VOUT
E	VOUT RTN
F	SENSE RTN

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

CHASSIS Note: Chassis PIN
This pin is connected to the converter's chassis.

PIN ASSIGNMENT: J2 - OUTPUT CONNECTOR - OPTION C

Connector type*:* D38999/24WE6SN (6#12 SOCKETS) or eq.

Pin #	Function
A	VOUT
B	VOUT RTN
C	INHIBIT
D	VOUT
E	VOUT RTN
F	INHIBIT RTN

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

INHIBIT Note:

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

- TTL "0" or SHORT – will turn on the power supply.
- TTL "1" or OPEN– will turn off the power supply.

The ground reference for the "INHIBIT" signal is "INHIBIT RTN".

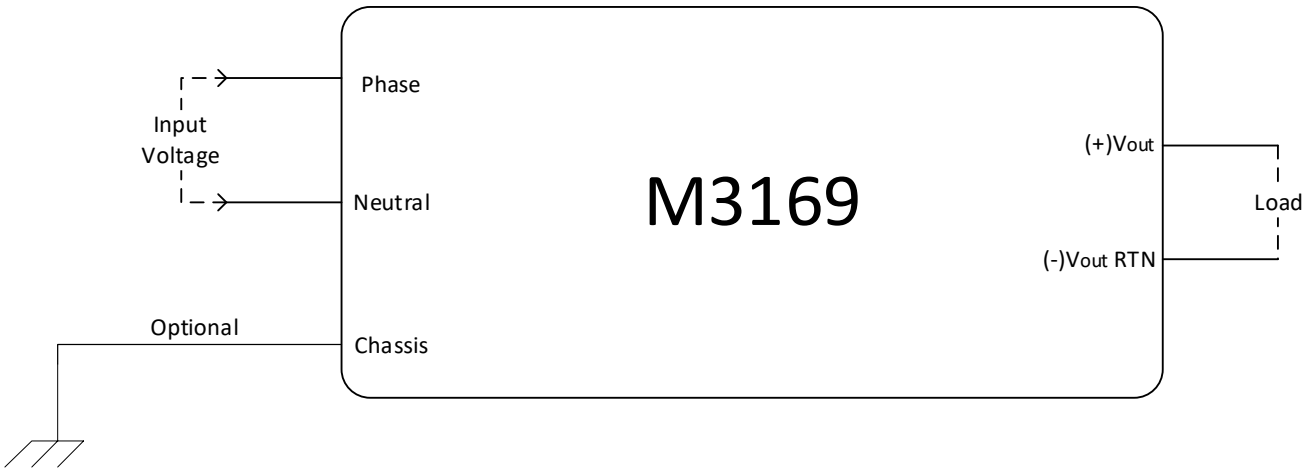
PIN ASSIGNMENT: J2 - OUTPUT CONNECTOR - OPTION D

Connector type*:* D38999/24WE6SN (6#12 SOCKETS) or eq.

Pin #	Function
A	VOUT
B	VOUT RTN
C	VOUT RTN
D	VOUT
E	VOUT RTN
F	VOUT

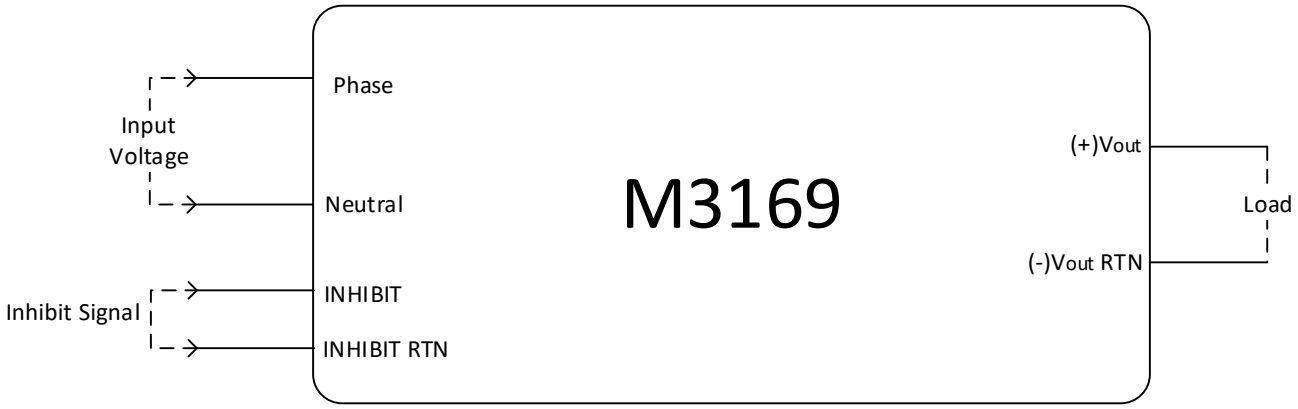
Note: All pins with identical function/designation should be connected together for optimal performance.

BLOCK DIAGRAM – OPTION A

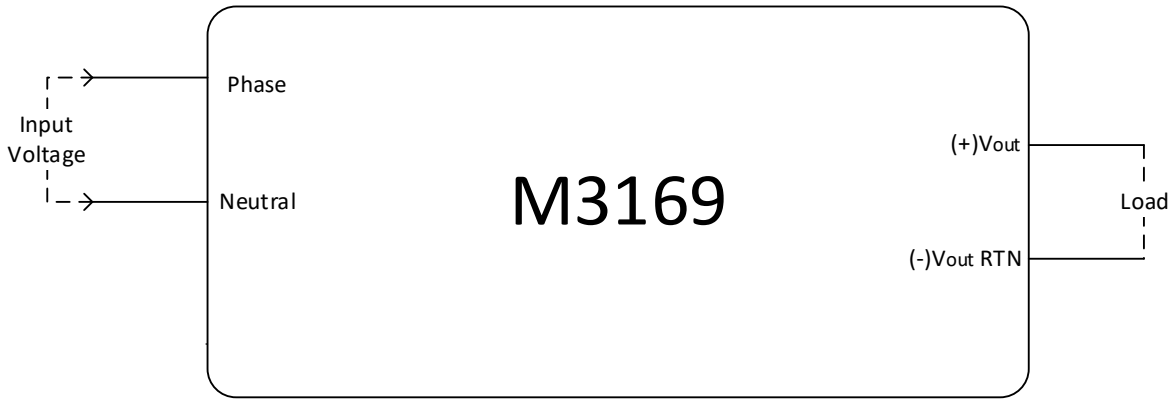


BLOCK DIAGRAM – OPTION B

BLOCK DIAGRAM – OPTION C

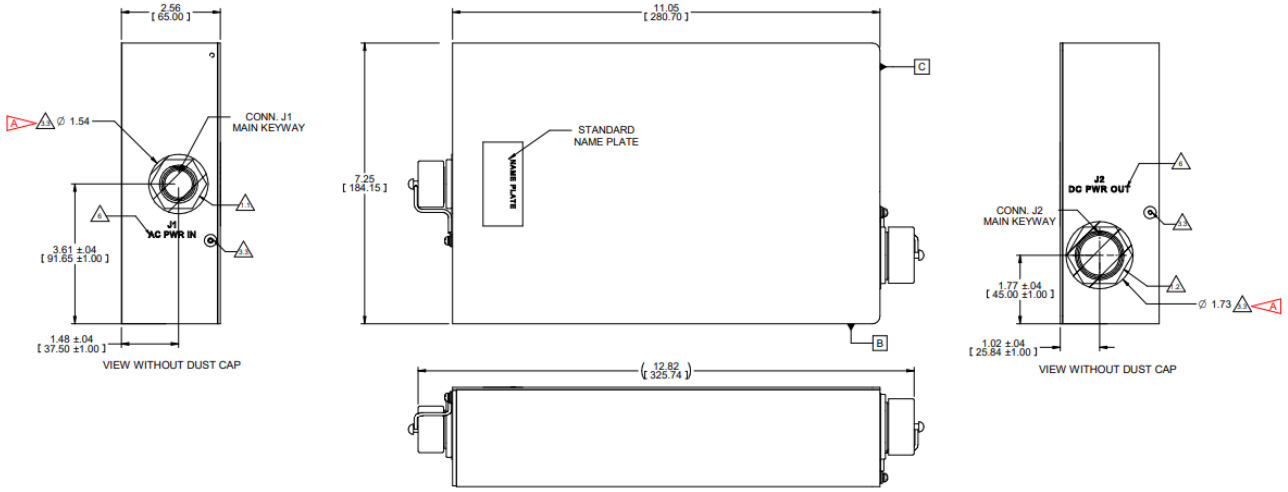


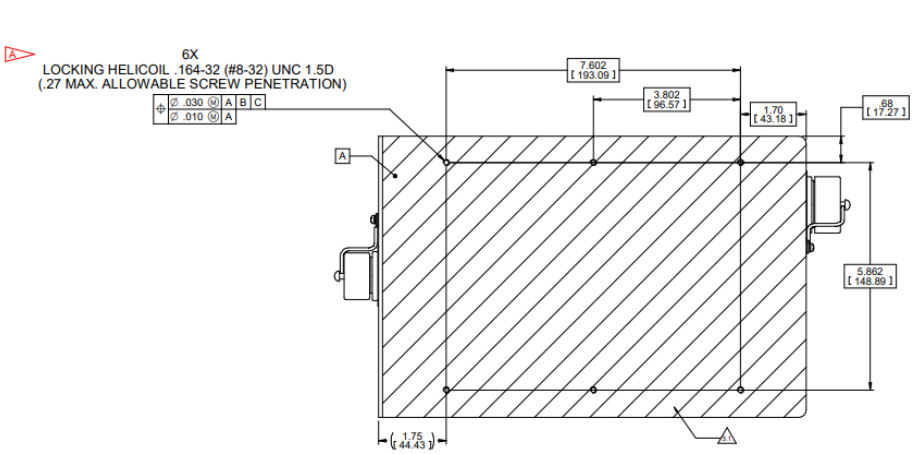
BLOCK DIAGRAM – OPTION D

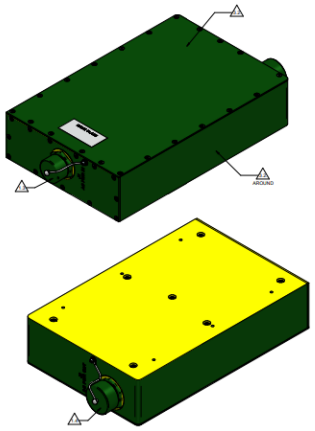


OUTLINE DRAWING:

For detailed dimensions and tolerances see Drawing: M3169001







NOTES:

1. CONNECTORS:
   1.1. J1- CONN. AC PWR IN, P/N D38999/24WC4PN OR EQ.
   1.2. J2- CONN. DC PWR OUT, P/N D38999/24WE6SN OR EQ.
   1.3. CONN. J1 DUST CAP, P/N D38999/33W13R OR EQ.
   1.4. CONN. J2 DUST CAP, P/N D38999/33W17R OR EQ.
2. MATERIAL: AL 6061-T651, AL 5052-H32, OR EQ.
3. COATINGS AND PAINT:
   3.1. INTERNAL AND UNPAINTED SURFACES:
   CHROMATE CONVERSION COATING PER MIL-DTL-5541 TYPE II CLASS 3 CLEAR.
   3.2. EXTERNAL SURFACES:
   PRIMER: PER MIL-PRF 23377K OR EPOXY PER MIL-DTL-53022E. THICKNESS: 15-25 MICRON.
   TOP COAT: FED-STD-595 34094 GREEN 383 CAMO. THICKNESS: 45-60 MICRON.
   3.3. PREVENT PAINT FROM CROSSHATCHED AREAS, CONNECTORS, THREADS, DUST CAPS, SCREWS AND HARDWARE.
4. WORKMANSHIP SHALL BE MIL-STD-454, REQT. 9.
5. MAX WEIGHT: 10.35 LBS.
6. ENGRAVING:
   6.1. CHARACTER HEIGHT: .15 IN.
   6.2. CHARACTER DEPTH: .02 IN.
   6.3. FONT: ARIAL.
   6.4. CHARACTER ARE CENTRALLY LOCATED.
   6.5. FILL ENGRAVING WITH BLACK LUSTERLESS EPOXY PAINT. COLOR PER FED-STD 595 N0. 37038.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN [IN]. DO NOT SCALE DRAWING	GENERAL TOLERANCES .XX ± .03 .XXX ± .020 ANGELES ± 1.0°

Please note: Specifications are subject to change without prior notice by the manufacturer.