

M359-1 2.0KW/2.5KVA UPS for Shipboard Application

Milpower Source M359-1 is a ruggedized, high performance On-Line UPS designed for Naval Shipboard and tough industrial applications.

The main features of the M359-1 are:

- Full Compliance with MIL-STD-1399 (Section 300B), Type I Power (115VAC/60Hz).
- Internal Input Isolation Transformer.
- A front panel loaded, Plug-in Battery Pack.
- 10 minutes Holdup-time at 1.5KW.
- Real sine-wave 115VAC/60Hz output, synthesized from a crystal oscillator.
- Very low Input Current Harmonic content (MIL-STD-1399 compliant).
- Better than 98% Input Power Factor.
- Very low input-to-chassis capacitance (MIL-STD-1399 compliant).
- Full galvanic isolation between Input, Chassis GND and Output.
- 1000V / 50 μ s spike capability (MIL-STD-1399 compliant).
- Complies with MIL-STD-461F.
- Complies with MIL-S-901D (Grade A, Class I &2) and MIL-STD-167-1 (Type I).
- Remote Panel ON/OFF capability.
- By-pass mode, via internal Power Conditioner, Isolation Transformer and Relays.
- MS Power Connectors.
- RS-232 or Ethernet SNMP Control and Monitor.
- J-STD-001B and IPC-610A Class-3 Workmanship.
- Conformal Coating of PWBs per MIL-I-46058C and IPC-CC-830.

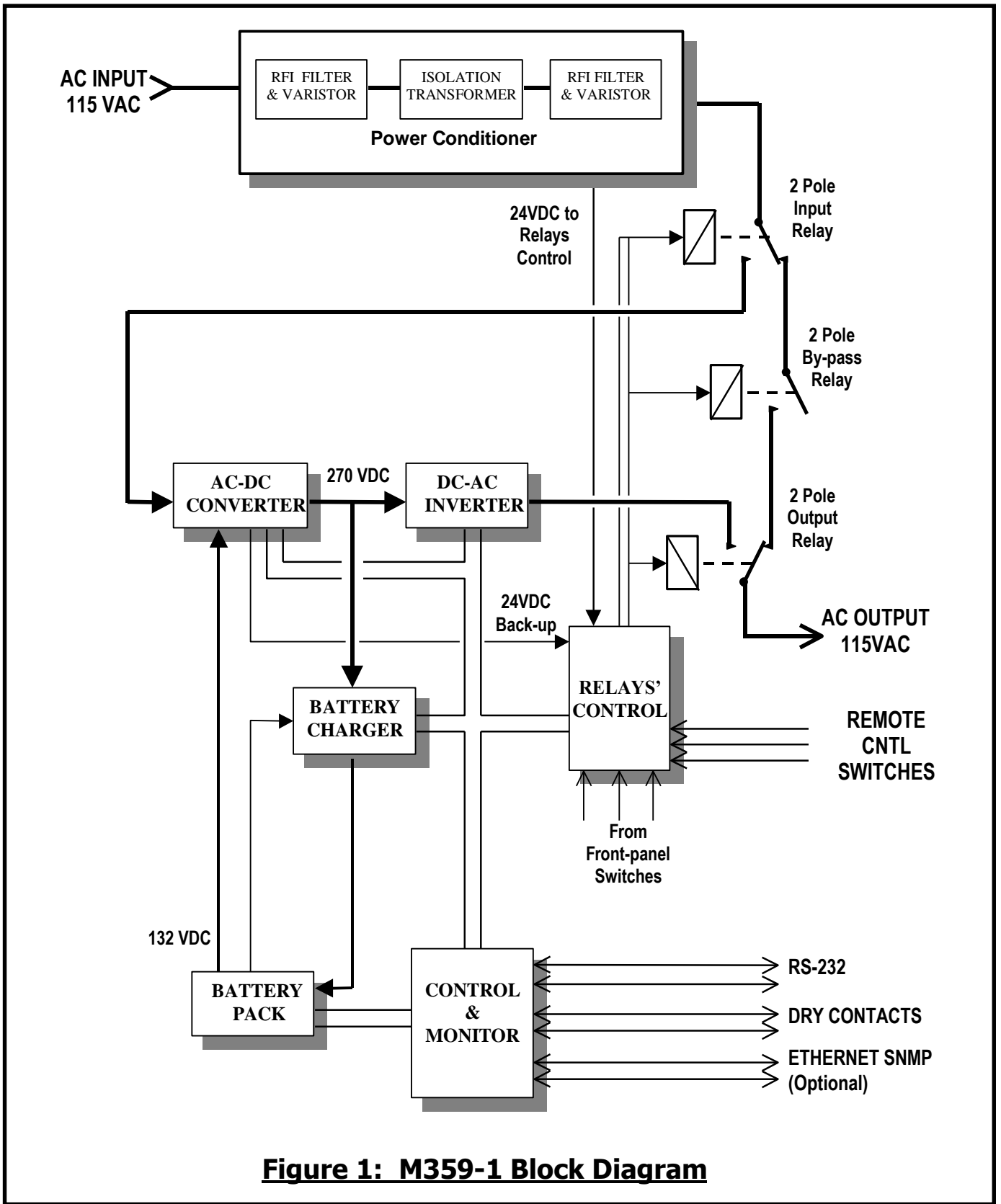


Figure 1: M359-1 Block Diagram

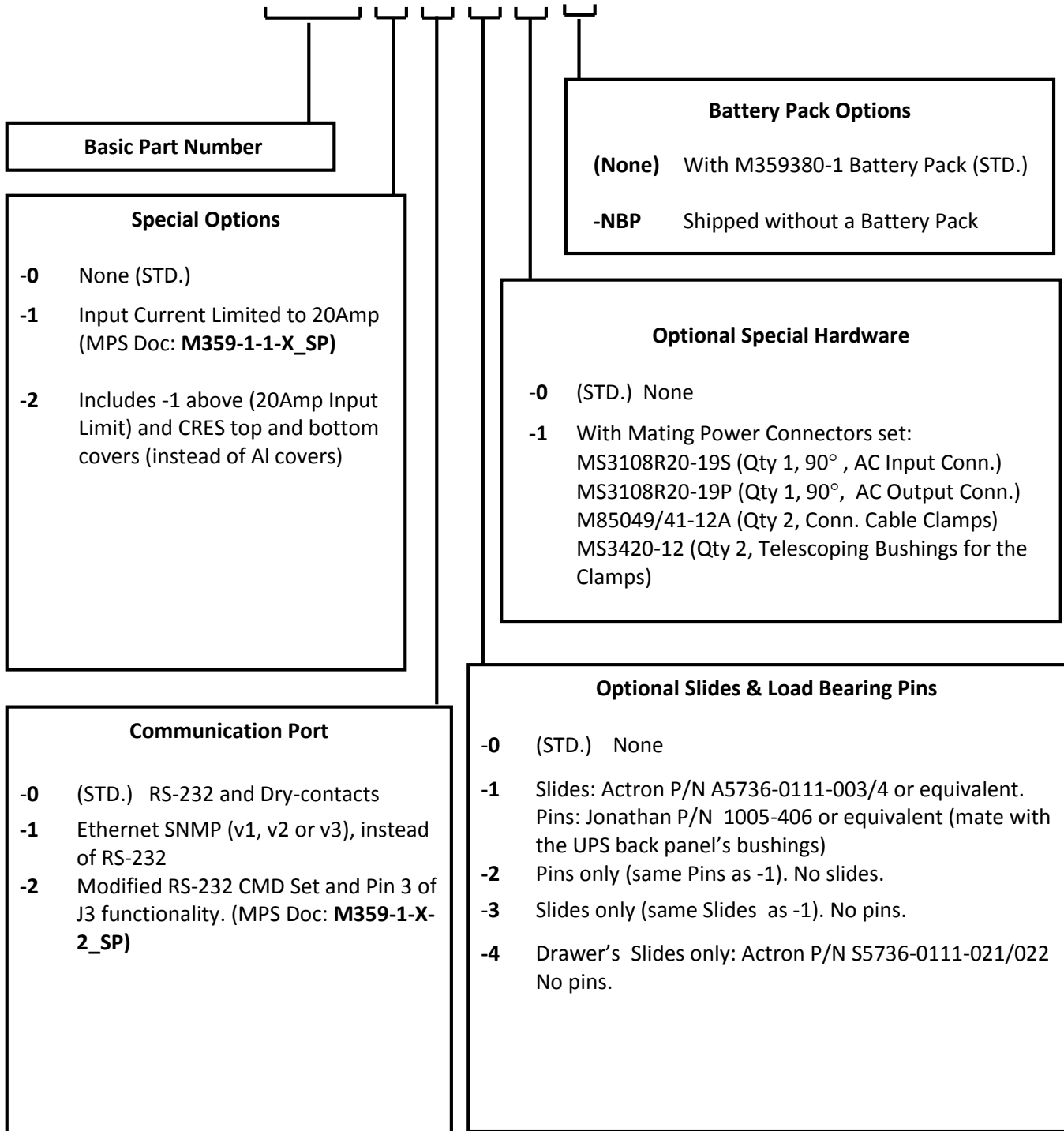
Specification

INPUT	<i>Voltage Range</i>	0 - 155VAC In Accordance with MIL-STD-1399 (Navy)
	<i>Switchover Voltage</i>	<102VAC, below this voltage the M359 may switch to Battery power. (Note: MIL-STD-1399 worst-case min. steady state voltage is 107VAC.)
	<i>Frequency</i>	48-64 Hz
	<i>Power Factor</i>	> 98%
	<i>Spikes</i>	200 joules clamping device I.A.W. MIL-STD-1399 (Navy)
	<i>Isolation</i>	Input is galvanically isolated from output and chassis (> 1 M Ω at 600VDC). Total capacitance between input and chassis is less than 0.02uf per line. Leakage current is less than 2ma. (130dB Input Isolation Transformer.) Both input wires may be "hot" I.A.W. MIL-STD-1399.
	<i>Current waveform</i>	Sinusoidal with harmonic content of less than 2.5% for harmonics between 2fo to 32fo and less than 100%/N for harmonics between N=32 and 20kHz. (I.A.W. MIL-STD-1399)
	<i>Line impedance</i>	Up to 5 ohms between 100 to 200kHz (I.A.W. MIL-STD-1399)
OUTPUT	<i>Voltage</i>	115Vac \pm 3%, grounded Neutral (Note 1).
	<i>Power Rating</i>	2.0KW (2.5KVA) Continues, up to ambient temperature of +40°C. Derate linearly to 1.5KW at +52°C (ambient), (Note 2).
	<i>Frequency</i>	60Hz \pm 0.2% (digitally synthesized from a crystal oscillator)
	<i>Waveform</i>	Sinusoidal , THD of 2% (linear load), 6% (non-linear)
BATTERY	<i>Type</i>	Front Panel Loaded, Hot-swap Plug-in, encapsulated, sealed, maintenance-free, lead-acid, Battery Pack.
	<i>Capacity</i>	2KW for at least 5 minutes. 1.5KW for at least 10 minutes.
	<i>Charger</i>	Low ripple, regulated voltage, float-charger, with current limiting and temperature compensation. Fully charges the battery within 6 hours (following 5-min. discharge at 2.0 kW).
	<i>Protection</i>	Battery is protected from over-discharge and thermal runaway by internal protection circuit.
	<i>Monitor</i>	The Battery charge level and internal impedance are monitored by the UPS micro-controller.
EMC	<i>RFI</i>	MIL-STD-461F Requirements: RE101, RE102, CE101, CE102, CS101, CS116 (AC Input) and RS103.
	<i>ESD</i>	All I/O lines are protected from ESD.

ENVIRONMENT	<p>Temperature</p> <p>Humidity</p> <p>Altitude</p> <p>Orientation</p> <p>Mechanical Shock</p> <p>Vibration</p>	<p>Non operating: -40 to +72°C (Note 3) Operating: 0 to + 52°C (Note 2)</p> <p>Up to 95%, non-condensing.</p> <p>Operating: Up to 10,000 feet. Non-operating: (Air transport) 40,000 feet.</p> <p>May be installed at any orientation.</p> <p>When packed, withstands the free fall drop and edgewise drop IAW Methods 5007.1 and 5008.1 of Federal Test Method standard 101C. When operating, withstands the high-impact shipboard shock IAW MIL-S-901D, Grade A, Class I and II.</p> <p>Type I vibration IAW MIL-STD-167-1. Random vibration IAW MIL-STD-810D, Cat. 9, Proc. I (test condition I-3.2.11, Fig. 514.3-34)</p>
INDICATIONS & CONTROLS	<p>Visual Indications (Front panel)</p> <p>Test Mode</p> <p>Audible Alarm</p> <p>Power Switches</p> <p>Remote Control</p>	<p>10-segment tri-color Bar Graph for load level display. 10-segment Bar Graph for battery charge level display. "Output OK", "Output Fail" and "Standby" status lamps. "Input OK" and "Input Fail" status lamps. "On Batt " status lamp. "Batt Passed" and "Batt Failed" lamps for battery self-test. "Low Batt" warning lamp. "Overload Shutdown" status lamp. "Overtemp warning" and "Overtemp Shutdown" lamps.</p> <p>When test mode is invoked by pressing the push-button on the front panel, the UPS performs battery impedance testing without interrupting the output power (even if the battery fails) utilizing a proprietary time-sharing circuit. The test results are displayed on the panel indicators. End-to-End testing of the UPS is accomplished by cycling the INPUT UPS/BY-PASS switch on the front panel.</p> <p>The UPS will beep when it operates on battery power or during over-temperature condition. The alarm may be silenced by pressing the "Alarm Off" push-button on the front panel.</p> <p>The M359 has three double-pole power relays, one on the input, one on the output and a third relay that bypasses the UPS section. The front panel switches allow the user to control these three power relays.</p> <p>Connector J4 on the back panel, allows the controlling of the M359 by a remote 28Vdc/0.25A single pole, On/Off switch (Remote Power On/Off) and a 28Vdc/0.25A, ON-ON, single pole switch (Remote UPS/By-Pass Select).</p>

How to Order

Order P/N: M359-1 -0 -0 -0 -0



Basic Part Number

Special Options

- 0 None (STD.)
- 1 Input Current Limited to 20Amp (MPS Doc: **M359-1-1-X_SP**)
- 2 Includes -1 above (20Amp Input Limit) and CRES top and bottom covers (instead of AI covers)

Communication Port

- 0 (STD.) RS-232 and Dry-contacts
- 1 Ethernet SNMP (v1, v2 or v3), instead of RS-232
- 2 Modified RS-232 CMD Set and Pin 3 of J3 functionality. (MPS Doc: **M359-1-X-2_SP**)

Battery Pack Options

- (None) With M359380-1 Battery Pack (STD.)
- NBP Shipped without a Battery Pack

Optional Special Hardware

- 0 (STD.) None
- 1 With Mating Power Connectors set:
MS3108R20-19S (Qty 1, 90°, AC Input Conn.)
MS3108R20-19P (Qty 1, 90°, AC Output Conn.)
M85049/41-12A (Qty 2, Conn. Cable Clamps)
MS3420-12 (Qty 2, Telescoping Bushings for the Clamps)

Optional Slides & Load Bearing Pins

- 0 (STD.) None
- 1 Slides: Actron P/N A5736-0111-003/4 or equivalent. Pins: Jonathan P/N 1005-406 or equivalent (mate with the UPS back panel's bushings)
- 2 Pins only (same Pins as -1). No slides.
- 3 Slides only (same Slides as -1). No pins.
- 4 Drawer's Slides only: Actron P/N S5736-0111-021/022 No pins.