

M3593 Series

UNINTERRUPTIBLE POWER SUPPLY

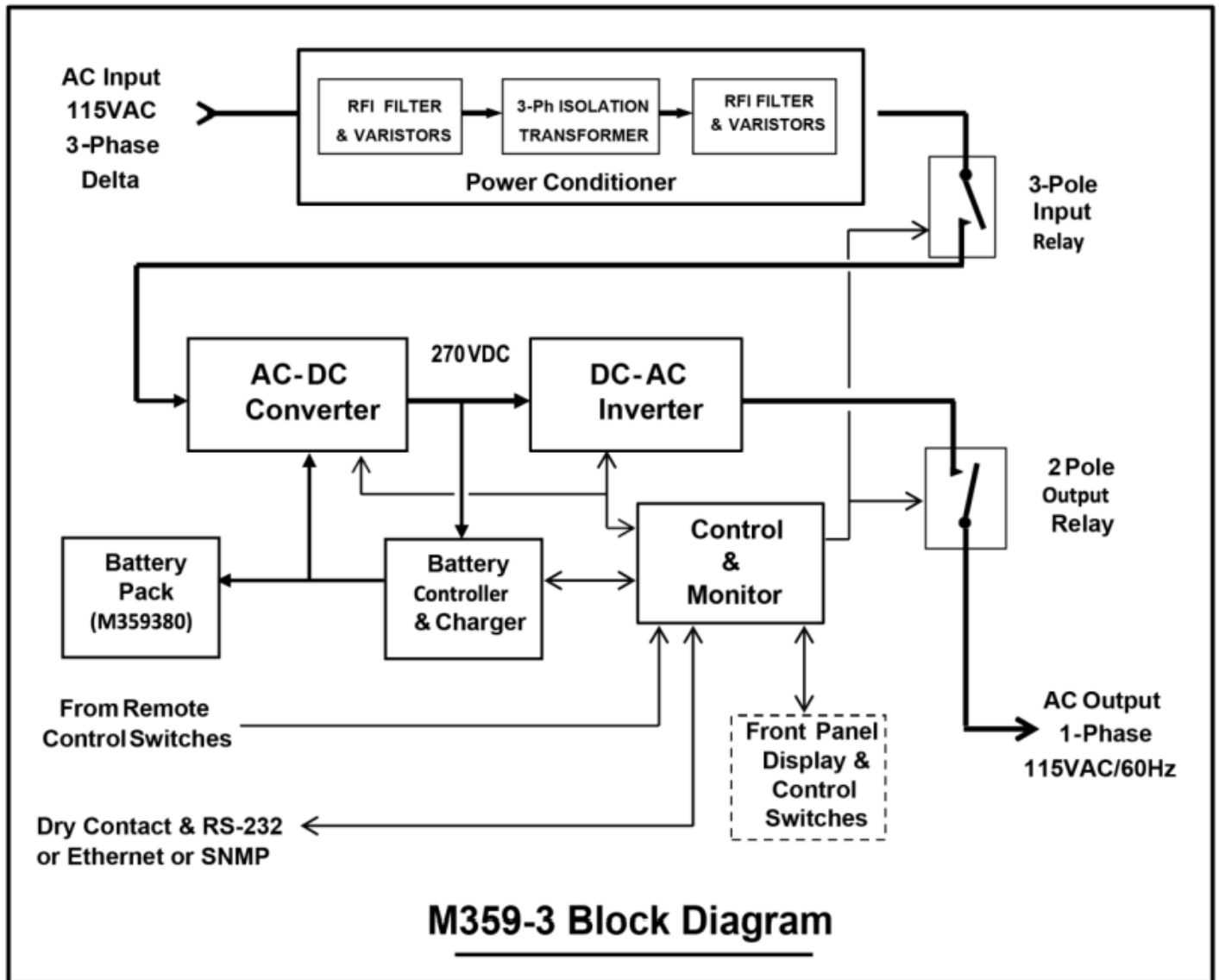


DESCRIPTION

M3593 2.0KW/2.5KVA, 3-Phase-In, 1- Phase Out UPS for Shipboard Application Rugged, 19" Rackmount, high performance On-Line UPS, designed for Naval Shipboard and tough industrial applications. It accepts 115VAC/60Hz, 3-Phase (Delta) Shipboard Power and provides an uninterrupted and isolated 115VAC/60Hz Single- phase output.

FEATURES

- 19" Rack-mount, 3U high and 22" deep.
- A front panel loaded, Plug-in Battery Pack.
- Internal 3-phase, 60Hz Input Isolation Transformer.
- Full Compliance with MIL-STD-1399, Section 300B, Type I Power (115VAC/60Hz).
- Very low Input Current Harmonic content (MIL-STD-1399 compliant).
- Better than 98% Input Power Factor.
- Full galvanic isolation between Input, Chassis GND and Output.
- 115VAC/60Hz, low-distortion sine-wave output, synthesized from a crystal oscillator.
- Over-load, Over-voltage and Over temperature Protection.
- Immune to MIL-STD-1399, Section 300B 1,000V spikes.
- 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.
- Standard Mil-type (metal-shell) circular power connectors.
- RS-232 or Ethernet SNMP v1, v2 or v3 Control and Monitor.
- J-STD-001B and IPC-610A Class-3 Workmanship.
- MIL-I-46058C and IPC-CC-830 Polyurethane conformal coating on PWBs.



Specifications

INPUT	Type	115VAC/60Hz, 3-Phase Delta, Type I per MIL-STD-1399, Section 300B.
	Voltage Range	0 - 155VAC (L-L), in accordance with MIL-STD-1399, Section 300B.
	Switchover Voltage	Below 103VAC(L-L) the M359 may switch to Battery power. (92VAC @1,800W)
	Frequency	48-64 Hz
	Power Factor & Efficiency	P.F: > 0.98 @ full-load. Efficiency (full-load) is higher than 84%
	Spikes	Withstands the 1,000V Spikes specified by MIL-STD-1399, Section 300B.
	Isolation	Compatible with Ungrounded Shipboard Power. AC Input is isolated from AC Output and chassis (> 10 M Ohm at 600VDC). Less than 0.02µF from each AC Input line to Chassis. Less than 2mA leakage to chassis.
	Current Harmonic Distortion	Less than 2.5% from 2nd to 32nd harmonics and less than 100%/N for harmonics between 32nd and 20kHz (I.A.W. MIL-STD-1399, Section 300B).
	Inrush Current	Limited Per MIL-STD-1399, Section 300B, (less than 50ARMS).
	Input Current	Less than 16Amp (per phase) when loaded by 1,800W. Internally Limited to 20 Amp per Phase during over-load condition
	Power Interrupts	No damage and no Output interrupt for all conditions of MIL-STD-1399 (300B)
OUTPUT	Voltage	Single-phase, 115 ±3VAC, Grounded Neutral (Note 1).
	Frequency	60Hz ± 0.2% (digitally synthesized from a crystal oscillator)
	Power Rating	2.0KW/2.5KVA up to +45°C. 1.8KW/2.25KVA up to +55°C.
	Waveform	Sinusoidal, THD of 2% (linear load), 6% (non-linear)
	Over voltage Protection	Automatic shutdown if output voltage exceeds 125Vrms
	Overload Protection & Current Limit	Output protected from overload/short-circuit condition with automatic recovery upon overload removal. Output current is Internally limited to 40 Amp peak.

BATTERY	Type	A Front Panel Loaded, Hot-swap Plug-in, encapsulated Battery Pack (Model M359380).
	Holdup Time	10 minutes (minimum) into 1.5KW AC Load.
	Charger	Low ripple, regulated float-charger, with current limiting and temperature compensation. Fully charges the battery within 6 hours (following a full discharge at 1.5 kW).
	Protection	Protected from over-discharge and thermal runaway by internal protection circuit.
	Monitor	The batteries charge level, temperature and health are monitored by the UPS microcontroller.
EMC	MIL-STD-461F	CE101, CE102, CS101, CS106, CS114, CS116 RE101, RE102, RS101 and RS103
	DC Magnetic Field	1600A/m (20 Oersteds) per DOD-STD-1399.

Notes

1. The Output Neutral Grounding Link is accessible to the user and can be removed in order to allow grounding at a userselected location, or in order to obtain a floating output (not recommended).
2. At ambient temperature above 45°C, the maximum steady-state output power should be linearly derated by 20W/25VA per each °C above 45°C, down to 1.8KW/2.25KVA at 55°C. For short term loading (less than 5 minutes) no derating isrequired.

ENVIRONMENT	Temperature	Non-operating: -40 to +72°C Operating: 0 to + 55°C
	Humidity	Up to 100% RH per MIL-STD-810G, Method 507.5 Proc II.
	Altitude	Non-operating: (Air transport) 40,000 feet.
	Orientation	May be installed at any orientation.
	Mechanical Shock	High-impact shipboard shock IAW MIL-S-901D, Grade A, Class I and II.
	Vibration	Type I Deck Mounted vibration IAW MIL-STD-167-1. Random vibration I.A.W. MIL-STD-810D, Cat. 9, Proc. I (test condition I-3.2.11, Fig. 514.3-34)

INDICATIONS & CONTROLS	Visual Indications (Front panel)	<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 LEDs. “Input OK” and “Input Fail” status LEDs. “On Batt “ status LED. “Batt Passed” and “Batt Failed” LEDs for battery self-test. “Low Batt” warning LED. “Overload Shutdown” status LED. “Overtemp warning” and “Overtemp Shutdown” LEDs</p>
	Test Mode	When Battery-operation Test is invoked, the UPS performs a UPS and battery-test without interrupting the output power (even if the battery fails).
	Audible Alarm	The UPS beeps when operating on battery power or during over-temperature condition. The alarm may be silenced by pressing the “Alarm Off” push-button on the front panel.
	Power Switches	The M359 has two power relays controlled by the Front-panel switches; a 3-pole relay on the input and a 2-pole relay on the output.
	Remote Control	Supports a remote On/Off control by a low-power (28Vdc/0.5A) remotely located control switch.
INTERFACE	Discrete interface	<p>Four dry contacts indicating the following conditions: “UPS ON” (Output OK) “Battery Voltage Low” “Input Power Loss” (Battery Operation) “Fault Detect”</p> <p>A “Battery-saving Shutdown” input (via opto-isolator) allows the user to shut down the UPS during Battery-operation. When the AC input recovers the UPS will automatically turn ON</p>
	Ethernet SNMP Port	RJ-45, CAT-5 SNMP v1, v2 or v3 Port with Server/ Client Monitor Software. Allows monitoring of the UPS (using MIBs). Supports user defined event-triggered shutdown. Supports different shutdown timing for each Client in the net. Supports delayed (after Server shutdown) UPS shutdown.
	Serial Interface	<p>Optional (instead of Ethernet) RS-232 Serial port provides Status messages, accepts User’s commands and allows the setting of User-Programmable Options.</p> <p>RS-232 Status message: Input OK, Output OK, On Battery, Low Battery, OverTemperature Warning, Battery Test Passed/Failed, Load Level, Battery Charge Level, status of all User Programmable Options and Failure diagnostic.</p> <p>RS-232 Commands: UPS Shutdown, UPS Standby, Initiate Battery Test, Enable/Disable Periodic Battery Test, Enable/Disable Battle Mode, Enable/Disable Audible Alarm, Protection Reset (resets all latching protection circuits), System Reset (forces all User Programmable Options into their default state and resets all latching protection circuits). For the complete set of the available Status messages and Commands, refer to the “UPS_Soft_1” Software Interface Manual.</p>

MTBF	150,000 hours (at typical below-deck Naval environment)
SCREENING	Available upon request.
ACOUSTIC NOISE	Less than 54dBA (measured 3 ft from Front Panel, under normal operating conditions).
FUNGUS	Does not support fungus growth, in accordance with MIL-STD-810G, Method 508-6.
WEIGHT and SIZE	137 Pounds. (85 Pounds without the Battery Pack.) 19", 3-U, 22" deep, Rack mount or Hard mount.

HOW TO ORDER

Standard Part Number	(1)(2)(3)(4)(5) CF-02EM3593-0-0-0-0-__
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Special (1)	
-0	None (STD.)
-1	Reserved: (53711-7147026)

Communication (2)	
-0	RS-232 and Dry-contacts
-1	Ethernet SNMP (v1, v2 or v3), instead of RS-232 (Consult Mil-power Source Sale)

Optional Slides & Load Bearing Pins (3)	
-0	None (STD.)
-1	Slides: MPS P/N left side 24-002598, right side 24-002599 Pins: MPS P/N 24-000759 (mate with the UPS back panel's bushings)
-2	Pins only (same as -1, but no slides).

Optional Special Hardware (4)	
-0	None (STD.)
-1	With Mating Power Connectors set: (Consult Milpower Source Sale)

Battery Pack Options (5)	
(NONE)	With M359380-1 Battery Pack (STD.)
1 or -NBP	Without a Battery Pack
-2	With M359380-5 (W/Captive Hardware) Battery Pack

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PRELIMINARY

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40-60 Delaware Avenue
Sidney, NY 13838
amphenol-aerospace.com | amphenolmao.com

Jared Sibrava | +1 (607) 643-1845 | jsibrava@amphenol-aao.com
amphenol-aerospace.com