

# **DESIGN REQUIREMENTS**

## **ME XL SERIES UPS SYSTEMS**

### **700 1000 1500 & 2000 WATT SYSTEMS**

---

#### **Overview:**

The M-E XL Series UPS is a true line interactive designed uninterruptible power system. This design incorporates a Toroidal transformer and constant power conditioning continuous voltage regulation and filtering of the incoming AC, as well as lightning protection and spike attenuation. This occurs at all times. The M-E XL Series of UPS systems is capable of operating at its maximum rated output in extreme and harsh environments with all existing equipment that include LED and Incandescent lamps. All input and output connections as well as visual displays and programming features are front panel mounted. In addition, the UPS use analog meters for AC voltage AC current as well as LED indicators and LCD panel for Load, Battery Charge, Battery discharge and all of the UPS functions. The front panel mounted Dial Flash timer, allows quick and easy adjustments without the use of any external connected devices. All input and output connections are of circular locking type.

#### **A) OPERATION:**

- 1) The UPS shall be capable of producing a fully conditioned, regulated sine-wave output with 5% harmonic distortion and all operational modes to all the protected equipment. This regulated sine-wave output is controlled using input and output tap switching high frequency integrated electronic circuitry.
- 2) The electronic control circuitry is constantly sampling the input AC ensuring that the output to the equipment is being regulated, conditioned and filtered at all times. The regulated output voltage that is being provided to the protected equipment will be at steady 120VAC. The UPS shall provide a controlled 120VAC to the load even when the input voltage to the UPS falls to 80VAC or is high as 135VAC. The UPS will not use the inverter/battery system during this stage.
- 3) The Toroidal Transformer shall be used in the AC input to output path in conjunction with dual stage input and output tap switching. The tap switch shall occur when the input voltage falls below 110Vac while output voltage maintains 120VAC. The second stage will boost the incoming voltage when the input voltage falls below 100VAC, while output voltage maintains 120VAC. The third stage will occur when the input voltage falls below 90VAC. while output voltage maintains 120VAC.
- 4) The Inverter shall be rated for continuous duty operation. The switching to inverter will occur in less than 4 ms. This will be precisely controlled during

- minimum or maximum loads. The inverter will be used when the voltage fluctuations or deviations are outside the preset UPS parameters or 85VAC to 135VAC or during any loss of utility power. The inverters output shall be a clean sine wave with and output distortion of less than 5% with and efficiency of 84% at 100% load.
- 5) The UPS and inverter shall be rated at 700 watts, 1000 watts, 1500 watts and 2000 watts at a continuous duty. The inverter shall be capable of provide a continuous overload of 10% over its rated output. The inverter shall be capable of providing 135% of its rated output. This will enable the UPS to support any combination of LED, incandescent or Neon regardless or power factor.
  - 6) The UPS shall be capable of providing 200% overload to any combination of signal types whether incandescent, LED or Neon during overload or inrush for a maximum of 3 seconds 150% for 30 seconds and 125% for 30 mintes This overload capability shall be in normal AC operation.

**B) BATTERY OPERATION**

- 1) Upon loss of utility power, or when the utility falls below 85VAC or goes above the 130 VAC preset limits, the UPS shall provide sine-wave AC in less than 4ms.
- 2) The UPS will operate on inverter mode, and shut down when the batteries have been depleted to predetermined voltage.
- 3) The UPS will utilize a battery protection circuit to prevent battery damage.
- 4) The UPS inverter will continue to provide sine-wave power under all of the loads operating conditions. In case of UPS, fault or battery depletion, the UPS will ensure upon return of utility power that the Utility will be bypassed to the loads and allows the equipment to resume normal operation.
- 5) The UPS inverter mode starts the flash counter operation to the preset selected time.
- 6) The UPS shall provide a low battery opto-coupler output through the DB9 port or optional relay card.

**C) RETURN OF AC**

- 1) The UPS shall be capable of operating in a power conditioning mode while the batteries are being recharged to a minimum preset level.
- 2) The UPS shall operate in a full line interactive mode during flash or normal operation.
- 3) The UPS shall provide voltage regulation with an input range of 80VAC to 135VAC.
- 4) The timer shall rest to '0'.
- 5) The event counter will add a count of 1 event.
- 6) The low battery alarm will clear when the batteries have reach a preset voltage point.

## **D) OPERATION WITHOUT BATTERIES**

The UPS shall be capable of operating without batteries for an unlimited period of time. This operation, will also provide power conditioning and continuous voltage regulation. The feature also allows the removal and installation of the batteries with the UPS in the ON position.

## **E) HOT SWAP BYPASS SWITCH**

- 1) The Hot Swap Bypass shall be installed with the UPS system.
- 2) The Hot Swap Bypass includes LED indicators for UPS available, Line available, UPS bypass, UPS battery mode.
- 3) The Hot Swap Bypass shall be capable of manual operation using a single button.
- 4) The Hot Swap Bypass button shall control a low voltage circuit.
- 5) The Hot Swap Bypass button will not carry any high voltage or current
- 6) The Hot Swap Bypass shall be rated at 30 amps @ 250VAC
- 7) The Hot Swap Bypass shall switch and 20ms
- 8) The Hot Swap Bypass shall switch at '0' crossing during button control or UPS failure or technician intervention.
- 9) The Hot Swap Bypass will automatically switch to line if a UPS failure has occurred.
- 10) The Hot Swap Bypass will allow removal of the UPS for service.
- 11) The Hot Swap Bypass does not require a systematic procedure to prevent load dropping.
- 12) The Hot Swap Bypass will function in (2) modes, Bypass and Auto.
- 13) The Hot Swap Bypass uses monitoring circuitry to create the '0' crossing of the sine wave.
- 14) The Hot Swap Bypass is not a transfer switch.
- 15) The Hot swap Bypass may be used as parallel UPS device.
- 16) The Hot Swap Bypass will maintain the load even if the UPS is accidentally turned OFF.
- 17) The Hot Swap Bypass is constructed of aluminum.
- 18) The Hot swap Bypass shall use an Anderson Power Pole 6 pin connector.

## **E) UPS DESCRIPTION**

The M E XL Series UPS shall consist of 3 components. The Electronics, Inverter and Hot Swap Bypass.

- 1.1 The Electronics shall consist of a true sine-wave inverter with high frequency logic control. Voltage regulating circuitry and a power conditioning circuit. The voltage regulating circuit includes input and output tap switch relays, with an isolation transformer rate at 1.5 times the inverter rating.

- 1.2 The UPS front panel shall have the following.

- A) The UPS front panel shall have all controls, connectors, timer, displays and relays.
- B) The UPS shall use a separate On and Off Control
- C) The UPS shall use multifunction LED for On Battery, Alarm, Normal. Low battery, Alarm
- D) The LCD display shall have a mimic for On Battery Normal and Bypass.
- E) The LCD display shall indicate Battery Charge state and Discharge state. Load, ON/OFF.
- F) The UPS shall use 2 Analog Meters, one for voltage that includes an input/output selector switch. The second meter displays output amperage.
- G) The UPS shall include a Resettable event counter
- H) The UPS shall include a Circular AMP Locking connector for AC input and output.
- I) The UPS shall include a Circular Amp Connector for relay outputs. Outputs consist of NO/NC, Ups on battery, AC fail, Flash, Fail.
- J) The UPS shall include a DB9 with pin assignments for low battery.
- K) The UPS shall includes an Adjustable Dial Timer. It shall be adjustable from 10 sec up to 10hrs. Indicators for timer on and counting. Dip switch for seconds minutes HRs
- L) Battery DC connector shall be an Anderson Connector flush mounted 50 amp rating
- M) Input and Output reset breaker.
- N) The UPS may be cold started using a configured battery string.
- O) The UPS may be tested using the LCD test control button.
- P) There shall be a separated Card Slot for the insertion of an optional SNMP/Web card or an additional relay output signal card.

## **F) HOT SWAP BYPASS**

The Hot Swap Bypass consists of the following:

Manual rocker switch for On/Off control, LED indicators for Line available, Bypass, UPS on Line, UPS available

### **General Hot Swap Specifications:**

120VAC nominal , 30 amps @ 250VAC two pole.

Three point voltage monitoring circuit. I/O snubber circuit.

Forced bypass override protection.

Parallel mechanical relays with '0' crossing monitoring circuit.

Low voltage control.

Break-Before-Make design with failsafe 20ms transfer.

Single Button controlled transfer to 'Line from UPS' or 'UPS to Line' in 10 to 15ms.

Failsafe transfer to line in 20 to 25ms.

**LED Indicators:** Line Available GREEN, Bypass RED, UPS available GREEN.  
**Connections:** In/Out harness, Anderson Power Pole input/output plug, 5 wire with ground. Anderson Power Pole 6 pin clip lock flush mount for UPS to bypass connection.

**Dimensions:**  
7.00”H x 7.00”W x 3.5”D

## G) ME XL GENERAL SEPCIFICATIONS

### UPS Specifications:

Nominal Input:	100/110/115/120VAC
Input Voltage Range:	80VAC to 135VAC
Input Frequency:	50/60Hz
Input Configuration:	2 wire plus ground
Input Protection:	10, 15, 20, 35 AMP 700, 1000, 1500, 2000 watts.
Power Rating	700 watts, 1000 watts, 1500 watts, 2000watts.
Output Current:	5.8 amps, 8.3 amps, 12.2 amps, 17.0 amps
Output regulation:	+/- 4% with 100% resistive load
Output regulation w/low battery	+/- 4%
Output Wave form:	Sine wave
Output Distortion:	5%
Power Factor Correction:	Yes
Harmonics filtering:	Yes Using Toroidal Transformer, isolating that is rated at 150% of the watt rating of the UPS
Overload:	1000, 1500, 2200, 3200 watts 5 minutes P.F C load
Efficiency On Line:	96%
Efficiency on Battery:	85%
Fault Clearing:	Current limit then shut down, then to bypass
Short Circuit Protection:	Input and Output Resetable Breaker
Load Power Factor:	.6 lead to .6 lagging
DC Voltage:	24VDC (700 & 1000) 48VDC (1500 & 2000)
Charger:	5 amps @ 24VDC 2.5 @ 48VDC with temperature Compensation.
DC Connection:	Anderson 50 amp & 150 amp
AC connection:	AMP circular 35 pin (700 & 1000) or 7 pin (1500, 2000)

### UPS COOLING

The UPS consists of (2) cooling 12VDC fans. These operate as a forced plenum input and forced output. Each fan is controlled by the DC power supply.

<b>Relay Connection:</b>	Amp 14 pin connector
<b>UPS Mechanical:</b>	5.10H x 12.0D x 1TW, ME XL 700 & 1000 7.5H x 14D x 17W ME XL 1500 & 2000
<b>Environmental:</b>	The UPS shall meet or exceed NEMA temperature Standards.
<b>Wiring Harness:</b>	The wiring harness/assemblies shall consists of 1 AMP circular connector and 1 Anderson Power Pole connector for AC UPS to Bypass. This Shall be 6' in length. Battery cable assemblies shall consist of 1 x 6' #6 Conductors with Anderson DC connectors 50 amp or 150 amp rating with the needed battery interconnect cables.
<b>Relays Ratings:</b>	Each Form C relays shall be rated for a minimum of 5 amps.
<b>DB9:</b>	The RS 232 shall be included with graphical Real time software. A well with the capability Of providing a battery low alarm signal. Graphical Software and Cable included.
<b>Batteries:</b>	45AH, 55AH, 100AH AGM outdoor rated batteries -20C to +74C operation Battery Warmer not required.
<b>Options:</b>	SNMP/WEB monitoring. 7/24 Adjustable timer. Parallel operation for redundancy Charger capacity up to 30 amps for long back up times and quick recharge. Hot Swap Bypass With alternate input option with monitoring circuitry for second input. Rack-Mount Hot swap Bypass Switch.

## H) SNMP

Supports TCP/IP, UDP, SNMP. HTTP protocol, This provides the user with SNMP MIB for UPS monitoring and UPS status. Remotely provides UPS real time information including Data logging and UPS status in Real Time.  
Allow the identification and monitoring of an unlimited number of UPS systems.

Each system has its' own identification. The system will send warning messages to the user if the UPS status has changed. Use Internet Explorer for Remote Viewing.

- 1) UPS load
- 2) Battery Charger status
- 3) UPS operation Normal/Alarm
- 4) Input Voltage
- 5) Output Voltage
- 6) Battery Voltage
- 7) UPS Temperature
- 8) UPS information logging
- 9) Remote UPS battery testing.
- 10) Send output email if UPS status has changed
- 11) Built in reset with panel mounted led indicators for SNMP status.

**LED(1)** Green LED: Status receiving  
Yellow: Data Transmitting

**LED(2)**  
Green: SNMP connecting  
Yellow: SNM P functioning

### **BROWSING Internet Explorer.**

- 1) UPS monitoring
- 2) UPS Information
- 3) UPS Control

Can be used to remotely service and test the UPS batteries.

### **Logging:**

Date Time Voltage Load Temp Alarm Battery Status.

### **(I) TIMER 7/24**

The timer is internally mounted in the UPS. It includes 2 DB(9 connectors. The first provides the connection and programming to the timer. The Second provides the RELAY signal output to the controller.

This timer is completely programmable to any number of flash delays related to the time of day. It allows the complete flexibility of flash delay or skipping the flash during that particular event related to traffic flow and even holidays,

- 1) 7 days 24Hrs Flash delay timing.
- 2) Perpetual Clock.

- 3) Maximum of 31 setting per day.
- 4) Timing resolution to the minute.
- 5) 4 Possible commands per event.
- 6) Serial Port for schedule entry and editing.
- 7) Real-time operation, editing functions will not interrupt the units functions.
- 8) J-Tag port for instant preload of complete 7-day schedule file.
- 9) SPDT 10 amp 240VAC /24VDC ratings.
- 10) Input Voltage 110 to 240VAC or 24VDC unregulated supply.
- 11) Plus! Capable of scheduling for holidays or specific year/dates.
- 12) Capable of operating at 2400 baud micro-modem for direct phone connection
- 13) Capable of operating at 1200 to 230,000 baud rate on a serial port.
- 14) Capable of log retention.
- 15) OPTIONAL LED DISPLAY

**Warranty**

Standard (2) two year on all components excluding batteries parts and labor, FOB  
Factory or Authorized Repair Depot