

# Eaton 93PM 50-200kW Scalable UPS Technical Specification

CONSTRUCTION	50/100kW	50/150kW	100/150kW	50/200kW	100/200kW	150/200kW
Model	93PM-50(100)	93PM-50(150)	93PM-100(150)	93PM-50(200)	93PM-100(200)	93PM-150(200)
Initial Rating (all operating modes)	50kVA/ 50kW	50kVA/ 50kW	100kVA/ 100kW	50kVA/ 50kW	100kVA/ 100kW	150kVA/ 150kW
Initial Internal Redundancy rating	-	-	50kW N+1	-	50kW N+1	100kW N+1
Configured Upgradability	100kW	150kW	150kW	200kW	200kW	200kW
	50kW N+1	100kW N+1	100kW N+1	150kW N+1	150kW N+1	150kW N+1
UPS Topology	Double Conversion, IGBT Converters, three level Inverter					
Performance classification	VFI-SS-111					
UPS Dimensions: W x D x H (mm)	560 x 914 x 1876			760 x 914 x 1876		
Weight (kg) without batteries	272	306	372	358	424	490
Degree of protection	IP21, with front door washable dust filter					
Cabinet colour	Black, RAL 9005					
Switchgear (Internal)	Optional Input Breaker, Optional Battery Breaker, Optional Maintenance Bypass			External only		
Cable entry	Bottom/Front or Rear, optional Top entry			Top/Bottom or Rear		

## ENVIRONMENT

Ambient storage temperature	Range of -25 to +55°C in the protective package
Ambient service temperature	Power electronics part: 0 to +40°C without de-rating Battery part: +5 to 25°C without reducing battery life
Maximum service altitude	1000m above sea level. Maximum 2000m with 1% de-rating per each additional 100m above 1000m
Relative humidity	5 to 95%, no condensation allowed
Acoustic noise at 1m	<65dBA at 100% load fully configured capacity
Electromagnetic Compatibility	Immunity and emission to IEC/EN 62040-2

## USER INTERFACE & COMMUNICATIONS

Display	7" Touchscreen Colour display and 4 separate summary LEDs for system status, door mounted LED bars for long range view of system status
Standard Communication Ports	3x Mini-Slot , 1x EPO input (NC or NO), 1x Relay output (NO/NC), 5x Building Alarm inputs, 1x USB, 1x RS232 Service Port
Optional Communication Ports	Mini-Slot cards: Web/SNMP, Relay/RS232, Industrial Relay, ModBus, Power Xpert

## ELECTRICAL INPUT CHARACTERISTICS

Earthing system compatibility	TN, TN-S, TN-C, TN-C-S, TT (Three-phase, four-wire + PE), IT						
Rated input voltage and voltage tolerance	<b>Rectifier:</b> 230/400Vac nominal (220/380, 240/415 Selectable) Tolerance: 196/340-276/480V (-15%,+20%) at 100% load 138/240-276/480V (-40%,+20%) at 50% load without battery discharge						
	<b>Bypass:</b> 230/400Vac nominal (220/380, 240/415 Selectable) Tolerance: 196/340 – 253/438V (-15%, +10% of nominal)						
Operating frequency / tolerance	50 or 60Hz; Tolerance 40-72Hz						
Input current distortion	<3% THDi (Linear load condition at rated input current)						
Input power factor	0.99pf						
Inrush current	<100% of rated current. Rectifier ramp-up 10A/s (default), configurable, min.1A/s						
Number of input phases	3 phases + Neutral						
Rectifier input current @400V Initial/Fully Configured (rms)	Rated:	76/151A	76/226A	151/261A	76/301A	151/301A	226/301A
	Max.:	95/200A	95/300A	200/300A	95/400A	200/400A	300/400A
Bypass input current @400V Recommended/Maximum (rms)	145A/172A	218A/258A		289A/344A			

## ELECTRICAL OUTPUT CHARACTERISTICS - NORMAL MODE

Rated output voltage	220/380, 230/400, 240/415Vac, three phase
Output voltage variation	<1% static load, 4% with 50ms recovery from 100% load step
Crest factor	3:1
Rated output frequency	50Hz (default) or 60Hz
Output frequency variation	±0.1Hz with slew rate 1Hz/s
Total output voltage distortion	<1% linear load, <5% non-linear load

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Short circuit capability for 400ms (initial/fully configured)	180A/345A	180A/510A	360A/510A	180A/670A	360A/670A	540A/670A
Fault clearing capability without bypass, gL/gG fuse	35A	63A				
Overload capacity without bypass	10min >102–110% load, 1min >111–125% load, 10sec 126-150% load, 300ms >150% load					
Overload capacity with bypass	Continuous >100–125% load, 10ms 1000% load *Selected external Bypass fuses or breaker may limit the overload capability					
Load power factor range	0.8 lagging to 0.8 leading without de-rating					
Range of frequency sync with bypass	±4Hz as default. User settable 0.5 to 5 Hz					

### ELECTRICAL OUTPUT CHARACTERISTICS - STORED ENERGY MODE

Transfer to/from stored energy	No break					
Rated output voltage	220/380, 230/400, 240/415Vac, three phase					
Output voltage variation	<2% static load, 4% with 50ms recovery from 100% load step					
Crest factor	3:1					
Rated peak output voltage	325V, ±20V					
Rated output frequency	50Hz (default) or 60Hz					
Output frequency variation	±0.005Hz (single module), ±0.07Hz (Parallel system)					
Total output voltage distortion	5%					
Short circuit capability for 400ms (initial/fully configured)	180A/345A	180A/510A	360A/510A	180A/670A	360A/670A	540A/670A
Fault clearing capability, gL/gG fuse	35A	63A				
Overload capability	10min >102–110% load, 1min >111–125% load, 300ms >125% load					
Load power factor range	0.8 lagging to 0.8 leading without de-rating					
Number of output phases	3 Phase					

### EFFICIENCY (Input/Output, initial load)

Linear Load	100% load:	96.3%	96.3%	96.4%	96.3%	96.4%	96.5%
Efficiency, Double Conversion Mode	75% load:	96.6%	96.6%	96.6%	96.6%	96.6%	96.7%
@ 400V/50Hz	50% load:	96.6%	96.6%	96.7%	96.6%	96.7%	96.7%
	25% load:	95.7%	95.7%	96.0%	95.7%	96.0%	96.1%
Heat Dissipation, Double Conversion Mode @ 400V/50Hz	100% load:	1850W	1850W	3734W	1850W	3734W	5440W
	75% load:	1275W	1275W	2640W	1275W	2640W	3839W
	50% load:	850W	850W	1706W	850W	1706W	2559W
	25% load:	537W	537W	1041W	537W	1041W	1690W
Linear Load	100% load:	99.2%	99.2%	99.3%	99.2%	99.3%	99.3%
Efficiency, ESS Mode	75% load:	99.1%	99.1%	99.2%	99.1%	99.2%	99.2%
@ 400V/50Hz	50% load:	99.0%	99.0%	99.0%	99.0%	99.0%	99.2%
	25% load:	98.3%	98.3%	98.6%	98.3%	98.6%	98.7%

### BYPASS CHARACTERISTICS

Automatic bypass	Static bypass switch, continuously rated, no break transfer					
Automatic bypass nominal rating	100kW	150kW		200kW		
Automatic bypass thyristor i <sup>2</sup> t value	13,500 A <sup>2</sup> s	16,500 A <sup>2</sup> s		69,500 A <sup>2</sup> s		
Back-feed protection	Standard internal back-feed contactor					
Separate bypass input feed	Standard (single feed cable links fitted on site)					
Manual bypass switch (internal)	Optional			No		

### ESS (Energy Saver System) MODE CHARACTERISTICS

Performance classification	VFD, transferring to VFI (Double Conversion mode) if limits are exceeded
Transfer time to double conversion	Mains available: No break (0ms), Mains failure: 2ms typical
Acceptable output voltage variation	±10% of nominal voltage
Acceptable output freq. variation	±3Hz
UPS Audible Noise	<47dBA @ 1m in 25°C ambient temperature
Storm Detection	UPS locks into double-conversion mode when three power line disturbances have forced the unit to double-conversion three times (user adjustable) within a one-hour period (user adjustable)
High Alert mode	UPS will stay on double-conversion for one hour (user adjustable), after which the unit will automatically return to operate in ESS mode

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<b>EARTH LEAKAGE CURRENTS (initial load)</b>						
Online/Bypass @ full resistive load	40mA		0.7A	40mA	0.7A	0.5A
Stored Energy @ full resistive load	20mA		0.9A	20mA	0.9A	0.6A
<b>BATTERY</b>						
Battery nominal voltage	432V (36 x 12V, 216 Cells) or 480V (40 x 12V, 240 Cells) Default = 480V					
Float charge voltage	216 x 2.30V = 497V or 240 x 2.30V = 552V					
Maximum charge voltage	216 x 2.35V = 508V or 240 x 2.35V = 564V					
Battery technology	Valve Regulated Lead Acid, 5 or 10 year design life					
Stored energy time	See separate information					
Maximum Charging current (Initial/Fully Configured)	16.5/33A	16.5/50A	33/50A	16.5/66A	33/66A	50/66A
Restored energy time to 90%	Typically 10 x Discharge time					
Battery recharge profile	Advanced Battery Management (ABM <sup>®</sup> ) = 90% resting, 10% floating/charging					
Battery cut off voltage	1.67 to 1.75 VPC, Configurable or automatic (load adaptive)					
Battery start option	Yes, standard					