## 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	
	100kW	150kW	150kW	200kW	200kW	200kW	
Configured Upgradability	50kW N+1	100kW N+1	100kW N+1	150kW N+1	150kW N+1	150kW N+1	
UPS Topology	Double Conv	ersion, IGBT (	Converters, thre	ee level Inverte	er		
Performance classification	VFI-SS-111						
UPS Dimensions: W x D x H (mm)	5	60 x 914 x 187	76	7	60 x 914 x 187	<b>'</b> 6	
Weight (kg) without batteries	272	306	372	358	424	490	
Degree of protection	IP21, with fro	nt door washa	ble dust filter				
Cabinet colour	Black, RAL 9	005					
Switchgear (Internal)	Optional Input Breaker, Optional Battery Breaker, Optional Maintenance Bypass  External only						
Cable entry	Bottom/Front	or Rear, option	nal Top entry	To	p/Bottom or Re	ear	
ENVIRONMENT							
Ambient storage temperature	Range of -25	to +55°C in th	e protective pa	ckage			
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			EC/EN 62040-2	•			
USER INTERFACE & COMMUNICATION							
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 Xpo					Power Xpert	
ELECTRICAL INPUT CHARACTERIST			<u> </u>			•	
Earthing system compatibility	TN. TN-S. TN	N-C. TN-C-S. 1	T (Three-phas	e. four-wire +	PE). IT		
Rated input voltage and voltage	Rectifier: 230/400Vac nominal (220/380, 240/415 Selectable) Tolerance: 196/340–276/480V (-15%,+20%) at 100% load						
tolerance	138/240–276/480V (-40%,+20%) at 50% load without battery discharge						
	<u>Bypass</u> : 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		inear load con	dition at rated i	nput 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 + N		1	T	T	1	
Rectifier input current @400V Rated: Initial/Fully Configured (rms) Max.:	76/151A 95/200A	76/226A 95/300A	151/261A 200/300A	76/301A 95/400A	151/301A 200/400A	226/301A 300/400A	
Bypass input current @400V Recommended/Maximum (rms)	145A/172A 218A/258A 289A/344A					•	
ELECTRICAL OUTPUT CHARACTER	STICS - NORI	MAL MODE					
Rated output voltage			Vac, three pha	se			
Output voltage variation					l step		
Crest factor	<1% static load, 4% with 50ms recovery from 100% load step  3:1						
Rated output frequency	50Hz (default) or 60Hz						
Output frequency variation	±0.1Hz with slew rate 1Hz/s						
	<1% linear load, <5% non-linear load						
Output frequency variation  Total output voltage distortion							



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ContainVally configured   35A   63A   63A			50/100kW	50/150kW	100/150kW	50/200kW	100/200kW	150/200kW		
Dypass, gL/gG fuse			180A/345A	180A/510A	360A/510A	180A/670A	360A/670A	540A/670A		
Overload capacity with bypass   Continuous > 100 - 125% load, 10ms 1000% load   Selected external Bypass bases or breaker may limit the overload capability	Fault clearing capability without		35A 63A							
Selected exterioal Bypass hases or breaker may limit the overtical capability	Overload capacity without bypass									
### ELECTRICAL OUTPUT CHARACTERISTICS - STORED ENERGY MODE    Transfer to/from stored energy   No break   220/380, 230/400, 240/415Vac, three phase   Cutput voltage   Capital	Overload capacity with bypass		Continuous >100-125% load, 10ms 1000% load							
### ELECTRICAL OUTPUT CHARACTERISTICS - STORED ENERGY MODE    Transfer to/from stored energy   No break   220/380, 230/400, 240/415Vac, three phase   Cutput voltage   Capital	Load power factor range	<b>;</b>	0.8 lagging to	0.8 leading w	ithout de-rating	1				
Transfer for/from stored energy										
Transfer to/from stored energy   No break   220/380, 230/400, 240/415Vac; three phase   235V; 220V   235V; 225V;										
Acceptable Number of output voltage   220/380, 230/400, 240/415Vac, three phase   235/4, 240/415Vac, three										
Crest factor   3:1   3:1   3:5										
Size					·		step			
Rated peak output voltage	<u> </u>		•	<u>aa, 170 mii 00</u>			ССР			
Solta (default) or 60Hz		ne	-							
Dutput frequency variation		90		t) or 60Hz						
Total output voltage distortion   Short circuit capability for 400ms (initialfully configured)   180A/345A   180A/510A   360A/510A   360A/670A   360A/670A   540A/6		on	·	<u> </u>	⊦∩ ∩7Hz (Paral	lal evetam)				
Short circuit capability for 400ms (initial/fully configured)	<u> </u>		,	rigie module), :	LU.UTTIZ (Falal	ici əyəlcili)				
Fault clearing capability, gL/gG fuse   35A   63A   63A										
Overload capability	(initial/fully configured)			180A/510A	360A/510A		360A/670A	540A/670A		
Description				1100/ 1 1 1			1050/ 1			
Number of output phases   3 Phase	•									
Linear Load										
Linear Load										
Efficiency, Double   75% load:   96.6%   96.6%   96.6%   96.6%   96.6%   96.6%   96.7%   96.6%   96.7%   99.3%   99.3%   99.2%   99.3%   99.2%   99.3%   99.2%   99.3%   99.2%   99.3%   99.2%   99.3%   99.2%   99.3%   99.2%   99.3%   99.2%   99.3%   99.2%   99.2%   99.2%   99.2%   99.2%   99.2%   99.2%   99.	` .	•		T			T	I		
Conversion Mode @ 400V/50Hz         50% load: 25% load: 95.7%         96.6% 95.7%         96.6% 96.0%         96.7% 95.7%         96.0% 95.7%         96.7% 96.0%         96.7% 96.1%         96.7% 96.0%         96.7% 96.0%         96.7% 96.0%         96.7% 96.0%         96.7% 96.1%         96.2%         99.2%         99.3%         99.2%         99.3%         99.2%         99.3%         99.2%         99.3%         99.0%         99.0%         99.0%         99.0%         99.0%         99.0%         99.0%         99.0%         99.0%         99.0%         9								96.5%		
@ 400V/50Hz         25% load:         95.7%         95.7%         96.0%         95.7%         96.0%         96.1           Heat Dissipation, Double Conversion T5% load: Double Conversion Mode @ 400V/50Hz         1850W         1850W         3734W         1850W         3734W         5440W         25% load: 3734W         5440W         3839										
Heat Dissipation,   100% load:   1850W   1850W   3734W   1850W   3734W   5440   3839   Mode @ 400V/50Hz   50% load:   850W   850W   1706W   850W   1706W   2559   25% load:   537W   537W   1041W   537W   1041W   1690   1040W   1040										
Double Conversion   75% load:   1275W   1275W   2640W   1275W   2640W   3839   Mode @ 400V/50Hz   50% load:   850W   850W   1706W   850W   1706W   2559   25% load:   537W   537W   1041W   537W   1041W   1690   100% load:   99.2%   99.2%   99.3%   99.2%   99.3%   99.3%   99.3%   99.3%   99.3%   99.3%   99.2%   99.2%   99.1%   99.2%   99.2%   99.1%   99.2%   99.2%   99.2%   99.1%   99.2%										
Mode @ 400V/50Hz   50% load: 850W   850W   1706W   850W   1706W   2559								3839W		
100% load:   99.2%   99.2%   99.3%   99.2%   99.3%   99.2%   99.3%   99.2%   99.3%   99.2%   99.3%   99.2%   99.3%   99.2%   99.3%   99.2%				_		_		2559W		
Linear Load Efficiency, ESS Mode @ 400V/50Hz	WOOC @ 400 WOOT 12	25% load:	537W	537W	1041W	537W	1041W	1690W		
Efficiency, ESS Mode @ 400V/50Hz		100% load:	99.2%	99.2%	99.3%	99.2%	99.3%	99.3%		
@ 400V/50Hz		75% load:	99.1%	99.1%	99.2%	99.1%	99.2%	99.2%		
BYPASS CHARACTERISTICS  Automatic bypass Static bypass switch, continuously rated, no break transfer  Automatic bypass nominal rating 100kW 150kW 200kW  Automatic bypass thyristor i²t value 13,500 A²s 16,500 A²s 69,500 A²s  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-hiperiod (user adjustable)  High Alert mode UPS will stay on double-conversion for one hour (user adjustable), after which the		50% load:	99.0%	99.0%	99.0%	99.0%	99.0%	99.2%		
Automatic bypass nominal rating  Automatic bypass nominal rating  Automatic bypass nominal rating  Automatic bypass thyristor i²t value  Automatic bypass thyristor i²t value  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  Acceptable output voltage variation  Acceptable output freq. variation  UPS Audible Noise  Storm Detection  UPS locks into double-conversion mode when three power line disturbances have forced the unit to double-conversion mode when three power line disturbances have forced the unit to double-conversion three times (user adjustable) within a one-haperiod (user adjustable)  High Alert mode  UPS will stay on double-conversion for one hour (user adjustable), after which the			98.3%	98.3%	98.6%	98.3%	98.6%	98.7%		
Automatic bypass nominal rating  Automatic bypass thyristor i²t value  Back-feed protection  Standard internal back-feed contactor  Separate bypass input feed  Manual bypass switch (internal)  Standard (single feed cable links fitted on site)  Manual bypass switch (internal)  Optional  No  ESS (Energy Saver System) MODE CHARACTERISTICS  Performance classification  Transfer time to double conversion  Acceptable output voltage variation  Acceptable output freq. variation  UPS Audible Noise  Storm Detection  High Alert mode  100kW  150kW  150kW  200kW  200k  No  Esparate bypass input feed cable links fitted on site)  No  ESS (Energy Saver System) MODE CHARACTERISTICS  Performance classification  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  WFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Transfer time to double conversion mode when three exceeded  100k	BYPASS CHARACTER	ISTICS								
Automatic bypass thyristor i²t value  13,500 A²s  16,500 A²s  69,500 A²s  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  Acceptable output voltage variation  Acceptable output voltage variation  4:3Hz  UPS Audible Noise  Storm Detection  UPS locks into double-conversion mode when three power line disturbances have forced the unit to double-conversion for one hour (user adjustable), after which the	Automatic bypass			s switch, contin	uously rated, r	o break transf	er			
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 Acceptable output voltage variation Acceptable output voltage variation 4:10% of nominal voltage 4:3Hz  UPS Audible Noise 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-hiperiod (user adjustable)  High Alert mode UPS will stay on double-conversion for one hour (user adjustable), after which the				150kW						
Separate bypass input feed  Manual bypass switch (internal)  Optional  No  ESS (Energy Saver System) MODE CHARACTERISTICS  Performance classification  Transfer time to double conversion  Acceptable output voltage variation  Acceptable output freq. variation  UPS Audible Noise  Standard (single feed cable links fitted on site)  No  No  No  No  No  ESS (Energy Saver System) MODE CHARACTERISTICS  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Mains available: No break (0ms), Mains failure: 2ms typical  ±10% of nominal voltage  ±3Hz  <47dBA @ 1m in 25°C ambient temperature  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-hip period (user adjustable)  High Alert mode  UPS will stay on double-conversion for one hour (user adjustable), after which the	Automatic bypass thyristor i <sup>2</sup> t value		13,500 A <sup>2</sup> s	16,50	00 A <sup>2</sup> s	69,500 A <sup>2</sup> s				
Manual bypass switch (internal)  Coptional  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  4cceptable output voltage variation  4cceptable output freq. variation  4drdBA @ 1m in 25°C ambient temperature  UPS Audible Noise  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-hiperiod (user adjustable)  High Alert mode  UPS will stay on double-conversion for one hour (user adjustable), after which the			Standard internal back-feed contactor							
Performance classification VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Transfer time to double conversion Acceptable output voltage variation Acceptable output freq. variation UPS Audible Noise Storm Detection UPS locks into double-conversion mode when three power line disturbances have forced the unit to double-conversion for one hour (user adjustable), after which the	Separate bypass input fe	eed	Standard (sir	ngle feed cable	links fitted on	site)				
Performance classification  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Transfer time to double conversion  Acceptable output voltage variation  Acceptable output freq. variation  4:3Hz  UPS Audible Noise  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-hiperiod (user adjustable)  High Alert mode  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  VFD, transferring to VFI (Double Conversion to Himits are exceeded  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferring to VFI (Double Conversion mode) if limits are exceeded  Legal Storm Detection  VFD, transferrin	Manual bypass switch (internal)		Optional No							
Transfer time to double conversion  Acceptable output voltage variation  Acceptable output freq. variation  Acceptable Noise  UPS Audible Noise  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-hiperiod (user adjustable).  High Alert mode  Mains available: No break (0ms), Mains failure: 2ms typical  ±10% of nominal voltage  ±3Hz  47dBA @ 1m in 25°C ambient temperature 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-hiperiod (user adjustable).  UPS will stay on double-conversion for one hour (user adjustable), after which the double-conversion for one hour (user adjustable).	ESS (Energy Saver Sys	stem) MODE C	HARACTERIS	STICS						
Acceptable output voltage variation  Acceptable output freq. variation  43Hz  UPS Audible Noise  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-hip period (user adjustable)  High Alert mode  #10% of nominal voltage  #3Hz  UPS ambient temperature  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-hip period (user adjustable)  UPS will stay on double-conversion for one hour (user adjustable), after which the	Performance classification	on	VFD, transfe	rring to VFI (Do	ouble Conversi	on mode) if lim	nits are exceede	ed		
Acceptable output voltage variation  Acceptable output freq. variation  43Hz  UPS Audible Noise  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-hip period (user adjustable)  High Alert mode  #10% of nominal voltage  #3Hz  UPS ambient temperature  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-hip period (user adjustable)  UPS will stay on double-conversion for one hour (user adjustable), after which the										
Acceptable output freq. variation  UPS Audible Noise  47dBA @ 1m in 25°C ambient temperature 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-hip period (user adjustable) High Alert mode UPS will stay on double-conversion for one hour (user adjustable), after which the			+	•	-,, :::::::::::::::::::::::::::::::::::	- ··· ·/P·				
UPS Audible Noise  47dBA @ 1m in 25°C ambient temperature 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-hiperiod (user adjustable) High Alert mode UPS will stay on double-conversion for one hour (user adjustable), after which the			5							
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-hoperiod (user adjustable)  High Alert mode  UPS will stay on double-conversion for one hour (user adjustable), after which the										
forced the unit to double-conversion three times (user adjustable) within a one-hiperiod (user adjustable)  High Alert mode  UPS will stay on double-conversion for one hour (user adjustable), after which the							er line disturba	nces have		
High Alert mode UPS will stay on double-conversion for one hour (user adjustable), after which the	Claim Databatan		forced the unit to double-conversion three times							
	High Alert mode				nversion for on	e hour (user a	djustable), after	which the		
and the determination of the control							. ,,			



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

				-			
	50/100kW	50/150kW	100/150kW	50/200kW	100/200kW	150/200kW	
<b>EARTH LEAKAGE CURRENTS (init</b>	ial load)				•		
Online/Bypass @ full resistive load	40	mA	0.7A	40mA	0.7A	0.5A	
Stored Energy @ full resistive load	20	20mA		20mA	0.9A	0.6A	
BATTERY							
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®) = 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						

