

Eaton 93PS 8-40kW Standard UPS Technical Specification

CONSTRUCTION	8kW	10kW	15kW	20kW	30kW	40kW
Model	93PS-8(20)	93PS-10(20)	93PS-15(20)	93PS-20(20)	93PS-30(40)	93PS-40(40)
Initial Rating (Initial Rating)	8kVA/8kW	10kVA/10kW	15kVA/10kW	20kVA/20kW	30kVA/30kW	40kVA/40kW
Initial Internal Redundancy Rating	-	-	-	-	15kW N+1	20kW N+1
Configured Upgradability	Up to 20kVA				Up to 40kW	
External Paralleling	Up to 4 units with Hot Sync® technology					
UPS Topology	Double Conversion, IGBT Converters, three level Inverter					
Performance Classification	VFI-SS-111					
UPS Dimensions: W x D x H (mm)	335 x 750 x 1300				480 x 750 x 1750	
Weight (kg) excluding batteries	116	116	116	116	208	208
Weight per Module (kg)	28 kg (<25kg w/o fan panel & DC capacitors)					
Degree of protection	IP20					
Cabinet Colour	Black; RAL 9005					
Switchgear (Internal)	Optional Maintenance Bypass Switch					
Cable Entry	Rear					
Mean Time To Repair (MTTR)	<30 minutes					

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	<60 dBA in double conversion, <47 dBA in ESS
Electromagnetic Compatibility	Immunity and emission to IEC/EN 62040-2

USER INTERFACE & COMMUNICATIONS

Display	5" Touchscreen Colour display
Standard Communication Ports	2 x Mini-Slot, 1 x EPO input (NC/NO), 1 x Relay output (NO/NC), 5 x Building Alarm inputs, 2 x USB, 1 x 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, TT						
Rated input voltage and voltage tolerance	<u>Rectifier:</u> 230/400Vac nominal (220/380, 240/415 Selectable) Tolerance: 187/324-276/480V (-18%,+20%) at 100% load <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 60 Hz, user configurable; Tolerance 40-72 Hz						
Input power factor	0.99pf						
Inrush current	<100% of rated current. Rectifier ramp-up 5A/s (default), configurable, min. 1A/s						
Number of phases	3 phases + neutral						
Rated input r.m.s. current	380V	13 A	16 A	24 A	32 A	48 A	63 A
	400V	12 A	15 A	23 A	30 A	46 A	61 A
	415V	12 A	15 A	22 A	29 A	44 A	58 A
Maximum input r.m.s. current		15 A	19 A	29 A	38 A	57 A	76 A
Bypass input current @400V Recommended/Maximum (rms)		12/17A	15/21A	22/32A	29/42A	44/64A	59/85A
Input current distortion at rated input current (THDi)		<5%	<4%	<3%			

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ELECTRICAL OUTPUT CHARACTERISTICS - NORMAL MODE							
Rated output voltage	220/380V; 230/400V; 240/415V, configurable						
Output voltage variation	<1% static load, 4% with 100ms recovery from 100% load step						
Crest factor	3:1						
Rated output frequency	50Hz (default) or 60Hz						
Output frequency variation	±0.1 Hz						
Slew rate	0.8-1 Hz/s						
Total output voltage distortion	<1% for linear load; <5% for non-linear load						
Voltage unbalance at reference unbalanced load	<0.5%						
Output current limitation, short-circuit capability	72 A, 300ms			144 A, 300ms			
Overload capability without bypass	10 min 102-110% load, 60 sec 111-125% load, 10 sec 126-150% load, 300 ms >150% load						
Overload capability with bypass	Continuous < 125% load, 20 ms 1000% load						
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	220/380V; 230/400V; 240/415V, three phase						
Output voltage variation	<1%						
Crest factor	3:1						
Rated output frequency	50Hz (default) or 60Hz						
Output frequency variation	± 0.1Hz						
Total voltage harmonic distortion							
100% linear load	<1%						
100% non-linear load	<5%						
Short circuit capability	72 A, 300ms			144 A, 300ms			
Overload capability	10 min 102-110% load 60 sec 111-125% load 10 sec 126-150% load 300 ms >150% load						
Load power factor range	0.8 lagging to 0.8 leading without de-rating						
EFFICIENCY							
Efficiency in double-conversion, rated linear load	100%	95.9%	96.1%	96.0%	95.9%	96.1%	95.7%
	75%	95.5%	95.8%	96.1%	96.1%	96.1%	96.0%
	50%	94.5%	95.1%	95.8%	96.1%	95.9%	96.1%
	25%	91.5%	92.5%	94.3%	95.1%	94.6%	95.5%
Heat dissipation in double conversion	100%	328 W	390 W	600 W	820 W	1170 W	1720 W
	75%	270 W	315 W	489 W	585 W	878 W	1200 W
	50%	220 W	245 W	315 W	390 W	615 W	780 W
	25%	170 W	188 W	214 W	245 W	405 W	450 W
Efficiency in ESS, rated linear load	100%	98.2%	98.4%	98.6%	98.6%	98.8%	98.8%
	75%	97.8%	98.1%	98.4%	98.6%	98.7%	98.8%
	50%	96.9%	97.5%	98.1%	98.3%	98.4%	98.6%
	25%	94.6%	95.5%	96.9%	97.3%	97.4%	98.0%

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BYPASS CHARACTERISTICS

Automatic bypass	Static bypass switch, continuously rated, no break transfer					
Bypass voltage rating	220/380V; 230/400V; 240/415V tolerance -15% / +10% of rated voltage					
Automatic bypass thyristor i ² t value: Pre-arc i ² t Total clearing i ² t	<u>standard</u> 360 A ² s 2500 A ² s	<u>super-sized</u> 1900 A ² s 7100 A ² s		1900 A ² s 7100 A ² s		
Back-feed protection	Standard internal back-feed contactor					
Required external bypass protective fuse, recommended rating	Circuit breaker C32				Circuit breaker C 63	
Manual bypass switch (internal)	Optional					

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; Mains failure: Typically 2 ms					
Acceptable output voltage variation	± 10% of nominal voltage, default					
Acceptable output freq. variation	± 4 Hz, default					
Storm Detection	UPS locks into double-conversion mode when three power line disturbance 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 on ESS					

BATTERY

Battery nominal voltage	336V (28 x 12V, 168 Cells) or 384V (32 x 12V, 192 Cells) or 480V (40 x 12V, 240 Cells)					
Float charge voltage	2.30V per Cell					
Maximum charge voltage	240 x 2.35V = 564V					
Battery technology	Valve Regulated Lead Acid, 5 or 10 year design life					
Maximum Charging current (Default/Maximum)	5A/25A				10A/50A	
Restored energy time to 90%	Typically 10 x Discharge time (dependent on configuration)					
Battery recharge profile	Advanced Battery Management (ABM®) = 90% resting, 10% floating/charging					
Battery cutt off voltage	1.67 to 1.75 VPC, Configurable or automatic (load adaptive)					
Battery start option	Yes					