

Eaton 93PS 8-40kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

IEC 62040-3 Subclause	MODEL RATING (1.0 p.f.)	8-20 kW	8-40 kW
	Model catalogue reference	93PS-XX(20)-YY-	93PS-XX(40)-YY-
	Number of power modules (UPM)	1	1 or 2
	Number of internal batteries	0 to 2 x 32 blocks	0 to 4 x 32 blocks
	UPS options	Long life batteries (LL) Internal maintenance bypass switch (MBS) External maintenance bypass switch External battery cabinets	
	Upgradability	Yes, up to 20kW	Yes, up to 40kW
	External paralleling	Up to 4 units with HotSync technology	
5.1.1	UPS topology	Double conversion	
5.3.4	UPS performance classification	VFI-SS-111	

MECHANICAL

	UPS dimensions (width x depth x height)	335 x 750 x 1300 mm, C-model: 335 x 750 x 645 mm	480 x 750 x 1750 mm	
	Weight, UPS and internal batteries	<u>1 x UPM</u>	<u>1 x UPM</u>	<u>2 x UPM</u>
	UPS (C-model)	86 kg	-	-
	UPS + 0 BAT	116 kg	181 kg	208 kg
	UPS + 1 BAT	198 kg	260 kg	287 kg
	UPS + 2 BAT	280 kg	342 kg	369 kg
	UPS + 3 BAT	N/A	423 kg	450 kg
	UPS + 4 BAT	N/A	505 kg	532 kg
	Weight, UPM (power module)	28 kg (< 25 kg w/o fan panel & DC capacitors)		
	Small External Battery Cabinet dimensions (width x depth x height)	335 x 750 x 1300 mm		
	Large External Battery Cabinet dimensions (width x depth x height)	761 x 750 x 1750 mm		
	UPS Cable entry	Rear		
	UPS Degree of protection	IP 20		
	UPS colour	Black; RAL 9005		
	Mean Time To Repair (MTTR)	< 8 minutes (UPM) / < 15 minutes (UPS)		

ENVIRONMENTAL

6.5.5	Acoustic noise at 1 m, in 25 °C ambient temperature	< 60 dBA in double conversion < 47 dBA in ESS
4.1.4	Ambient UPS storage temperature range	- 25 °C to + 55 °C without batteries, 0 °C to + 25 °C with batteries, indoors in the protective package

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EFFICIENCY								
5.3.2 r and 6.4.1.6	Efficiency in double-conversion, rated linear load	100% load	<u>8 kW</u> *	<u>10 kW</u> *	<u>15 kW</u> *	<u>20 kW</u>	<u>30 kW</u> *	<u>40 kW</u>
		75% load	95.9%	96.0%	95.8%	95.8%	95.8%	95.7%
		50% load	95.6%	95.8%	96.0%	96.1%	96.0%	96.1%
		25% load	94.8%	95.3%	95.8%	96.1%	96.0%	96.2%
			92.0%	93.2%	94.6%	95.2%	95.0%	95.5%
	Heat dissipation in double conversion	100% load	<u>8 kW</u> *	<u>10 kW</u> *	<u>15 kW</u> *	<u>20 kW</u>	<u>30 kW</u> *	<u>40 kW</u>
		75% load	343 W	426 W	649 W	840 W	1320 W	1720 W
		50% load	276 W	324 W	461 W	585 W	945 W	1170 W
		25% load	218 W	246 W	324 W	390 W	629 W	760 W
			174 W	183 W	212 W	240 W	395 W	450 W
	Efficiency in ESS, rated linear load		<u>8 kW</u>	<u>10 kW</u>	<u>15 kW</u>	<u>20 kW</u>	<u>30 kW</u>	<u>40 kW</u>
		100% load	98.2%	98.5%	98.6%	98.7%	98.8%	98.8%
		75% load	97.9%	98.2%	98.5%	98.6%	98.7%	98.8%
		50% load	97.1%	97.5%	98.2%	98.4%	98.5%	98.6%
		25% load	94.8%	95.5%	96.9%	97.4%	97.6%	98.0%
	* 15 kW power module							

INPUT		
5.2.1.a and 5.2.1 b	Rated input voltage Voltage tolerance Rectifier input Bypass input	220/380 V; 230/400 V; 240/415 V 187 to 276 V rated voltage -15% / +10%
5.2.1 c and 5.2.1 d	Rated input frequency Frequency tolerance	50 or 60 Hz, user configurable 40 to 72 Hz
5.2.2 a and 5.2.2 b	Number of input phases Rectifier input Bypass input	3 phases + neutral 3 phases + neutral



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5.2.2 d	Input power factor, double conversion	<u>8 kW</u>	<u>10 kW</u>	<u>15 kW</u>	<u>20 kW</u>	<u>30 kW</u>	<u>40 kW</u>
	100% load	1.00	1.00	1.00	1.00	1.00	1.00
	75% load	0.99	1.00	1.00	1.00	1.00	1.00
	50% load	0.99	0.99	1.00	0.99	1.00	1.00
	25% load	0.95	0.97	0.99	0.98	1.00	1.00
5.2.2 c	Rated input r.m.s. current	<u>8 kW</u>	<u>10 kW</u>	<u>15 kW</u>	<u>20 kW</u>	<u>30 kW</u>	<u>40 kW</u>
	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
5.2.2 f	Maximum input r.m.s. current	<u>8 kW</u> 15 A	<u>10 kW</u> 19 A	<u>15 kW</u> 29 A	<u>20 kW</u> 38 A	<u>30 kW</u> 57 A	<u>40 kW</u> 76 A
5.2.2 h and 5.2.2. i	Input current distortion at rated input current	<u>8 kW</u>	<u>10 kW</u>	<u>15-40 kW</u>			
	Resistive load	< 3%	< 3%	< 3%			
	Non-linear load	< 5%	< 5%	< 4%			
5.2.2 e	In-rush current	< Rated input current (input filter components only)					
5.2.2 k	AC power distribution system compatibility	TN, TT, IT (4-wire)					
	Rectifier ramp-up, rectifier start and load step	5 A/s (default), configurable. Minimum 1 A/s.					
	Back feed protection	Yes, for rectifier and bypass lines					

ELECTRICAL CHARACTERISTICS

OUTPUT

5.3.2 f	Number of output phases	3 phases + neutral
	Crest factor	3
5.3.2 b	Rated output voltage	220/380 V; 230/400 V; 240/415 V, configurable
5.3.2 b	Output voltage variation, steady state	< 1%
5.3.2 i	Total voltage harmonic distortion	
	100% linear load	< 1.5%
	100% non-linear load	< 3.5%
5.3.2 q	Voltage unbalance at reference unbalanced load	< 0.5%
5.3.2 j	Voltage transient (r.m.s) at 100% step load	4 %
	Recovery time to steady state at 100% step load	100 ms
5.3.2 c	Rated output frequency	50 or 60 Hz, configurable
	Output frequency variation	± 0.1 Hz (1 x UPM), ± 0.15 Hz (2 x UPM)
	Slew rate	0.8 - 1 Hz/s

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5.3.2 d and 5.3.2 e	Maximum frequency range for synchronization with bypass Maximum synchronized phase error Maximum slew-rate when synchronizing	± 4 Hz as default. User settable 0.5 to 5 Hz. < 2° with static balanced load 1 Hz/s					
5.3.2 k	Rated output power	8 kW / 8 kVA	10 kW / 10 kVA	15 kW / 15 kVA	20 kW / 20 kVA	30 kW / 30 kVA	40 kW / 40 kVA
5.3.2 l	Overload capability On inverter	10 min 102-110% load 60 sec 111-125% load 10 sec 126-150% load 300 ms >150% load					
	Overload capability On inverter, stored energy mode	10 min 102-110% load 60 sec 111-125% load 10 sec 126-150% load 300 ms >150% load					
	Overload capability ESS mode	Continuous < 110% load 20 ms 1000% load					
	Overload capability On bypass	Continuous < 125% load 20 ms 1000% load					
5.3.2 m	Output current limitation, short-circuit capability	<u>1 x 15 kW UPM</u> 54 A, 300ms	<u>1 x 20 kW UPM</u> 72A, 300 ms	<u>2 x 15 kW UPM</u> 108 A, 300ms	2 x 20 kW UPM 144A, 300 ms		
6.4.2.10.3 and 6.4.2.10.4	Fault clearing capability	<u>1 x 15 kW UPM</u> Circuit breaker B10 / C6	<u>1 x 20 kW UPM</u> Circuit breaker B10 / C6	<u>2 x 15 kW UPM</u> Circuit breaker B16 / C10	<u>2 x 20 kW UPM</u> Circuit breaker B25 / C10		
5.3.2 o and 5.3.2 p	Load power factor Rated Permitted range	1.0 0.8 lagging to 0.8 leading					

ESS MODE CHARACTERISTICS

	Transfer time to double-conversion Mains available Mains failure	No break Typically 2 ms
	Output voltage variation setting	$\pm 10\%$ of nominal voltage, default
	Output frequency variation setting	± 4 Hz, default
	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	PS will stay on double-conversion for one hour (user adjustable), after which the unit will automatically return to operate on ESS.

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BYPASS

Type of bypass	Static		
Bypass rating	<u>standard</u> 20 kW	<u>super-sized</u> 40 kW	<u>standard</u> 40 kW
Bypass voltage range	220/380 V; 230/400 V; 240/415 V tolerance -15% / +10% of rated voltage		
Transfer time break	No break 2 ms typical		
Maintenance bypass	Optional; internal or external		
Bypass fuse i^2t value, Pre-arc i^2t Total clearing i^2t	<u>standard</u> 1000 A ² s 3700 A ² s	<u>super-sized</u> 1900 A ² s 7100 A ² s	<u>standard</u> 1900 A ² s 7100 A ² s
Required external bypass protective fuse, recommended rating	Circuit breaker C40	Circuit breaker C80	Circuit breaker C80
Rated conditional short-circuit current, I_{cc} Static bypass Optional integrated maintenance bypass	100kA (internal ultra rapid fusing) 10kA (see User's and Installation Guide for protective fusing)		

BATTERY CHARACTERISTICS

5.4.2.2 d	Battery technology	12 V, VRLA			
5.4.2.2 a	Battery design life	5 or 10 years			
5.4.2.2 b	Battery quantity Internal External	32 blocks, 192 cells per battery string 28-40 blocks per string			
5.4.2.2 c	Battery voltage Internal External	384 V 336V – 480V			
5.4.2.2 e	Nominal Ah capacity (C10)	9Ah, 9Ah Long life or 7Ah Long life			
5.4.2.2 f	Stored energy time	See separate declaration			
5.4.2.2 o	Recharge profile	ABM or float			
5.4.2.2 q	End of discharge voltage	1.67 VPC to 1.75 VPC Configurable or automatic (load adaptive)			
5.4.2.2 r	Charge current limit Default Load ≤80% Load >80%	<u>1 x 15kW UPM</u> 5A, configurable 1...18A 1...10A	<u>1 x 20kW UPM</u> 5A, configurable 1...25A 1...15A	<u>2 x 15kW UPM</u> 10A, configurable 2...36A 2...20A,	<u>2 x 20kW UPM</u> 10A, configurable 2...50A 2...30A
	Battery start option	Yes			

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COMMUNICATION CIRCUITS

5.6	Standard connectivity ports	Mini-slot ports for optional cards, Device USB and Host USB, RS-232 service port, relay output, 5 building alarm inputs and a dedicated EPO, Web and SNMP card
	Complete list of indications and interface devices	See User's and Installation Guide

COMPLIANCE WITH STANDARDS

IEC 62040-1	Safety Access Degree of protection	Restricted access IP 20; protection against medium sized foreign matter (incl. finger), no protection against vertically dripping water.
IEC 62040-2	Electromagnetic Compatibility Immunity Emissions	EMC Category C3 EMC Category C2
IEC 62040-4 EN 50581	Environmental Aspects - Requirements and Reporting	Yes

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