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.)	8-40 kW

Frame		20 kW	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 20 kW	Yes, up to 40 kW
	External paralleling	Up to 6 units with HotSync technology	
5.1.1	UPS topology	Double conversion, 3-level IGBT converters	
5.3.4	UPS performance classification	VFI-SS-111	

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MECHANICAL

Frame		20 kW	40 kW	
	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	1 x Power module	1 x Power module	2 x Power module
	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 (Power module) / < 15 minutes (UPS)		

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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
4.2.1.1 and 5.4.2.2 h	Ambient service temperature range UPS Internal battery	 0 °C to + 40 °C without output power derating + 20 °C to + 25 °C recommended for optimized battery life time
4.2.1.1	Relative humidity range	5 to 95%, no condensation allowed
4.2.1.2	Maximum service altitude	1000 m (3300 ft) above sea level at 40 °C Maximum 2000 m (6600 ft) with 1 % derating per each add. 100 m
	RoHS/WEEE compliancy	Yes

EFFICIENCY

5.3.2 r and 6.4.1.6	Efficiency in double-conversion, rated linear load	8 kW *	10 kW *	15 kW *	20 kW	30 kW *	40 kW
	100% load	95.9%	96.0%	95.8%	95.8%	95.8%	95.7%
	75% load	95.6%	95.8%	96.0%	96.1%	96.0%	96.1%
	50% load	94.8%	95.3%	95.8%	96.1%	96.0%	96.2%
	25% load	92.0%	93.2%	94.6%	95.2%	95.0%	95.5%
	Heat dissipation in double conversion	8 kW *	10 kW *	15 kW *	20 kW	30 kW *	40 kW
	100% load	343 W	426 W	649 W	840 W	1320 W	1720 W
	75% load	276 W	324 W	461 W	585 W	945 W	1170 W
	50% load	218 W	246 W	324 W	390 W	629 W	760 W
	25% load	174 W	183 W	212 W	240 W	395 W	450 W
	Efficiency in ESS, rated linear load	8 kW	10 kW	15 kW	20 kW	30 kW	40 kW
	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						

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ELECTRICAL CHARACTERISTICS

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

5.2.2 d	Input power factor, double conversion	8 kW	10 kW	15 kW	20 kW	30 kW	40 kW
	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	8 kW	10 kW	15 kW	20 kW	30 kW	40 kW
	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	8 kW	10 kW	15 kW	20 kW	30 kW	40 kW
		15 A	19 A	29 A	38 A	57 A	76 A
5.2.2 h and 5.2.2. i	Input current distortion at rated input current	8 kW	10 kW	15-40 kW			
	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					

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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 100% non-linear load	 < 1.5% < 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 Recovery time to steady state at 100% step load	4 % 100 ms	
5.3.2 c	Rated output frequency Output frequency variation Slew rate	50 or 60 Hz, configurable ± 0.1 Hz (1 x UPM), ± 0.15 Hz (2 x UPM) 0.4 Hz/s	
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 0.4 Hz/s	
5.3.2 k	Rated output power	**20 kW frame** 8 kW / 8 kVA 10 kW / 10 kVA 15 kW / 15 kVA 20 kW / 20 kVA	**40 kW frame** 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 and on inverter, stored energy mode	**15 kW Power module** (20 and 40 kW frame)		**20 kW Power module** (20 and 40 kW frame)	
		Power rating 8-10 and 20 kW	Power rating 15 and 30 kW	Power rating 8-15 and 30 kW	Power rating 20 and 40 kW
		10 min 135% 60 sec 155% 10 sec 185% 300 ms >185%	10 min 110% 60 sec 125% 10 sec 150% 300 ms >150%	10 min 135% 60 sec 155% 10 sec 185% 300 ms >185%	10 min 110% 60 sec 125% 10 sec 150% 300 ms >150%
	Overload capability ESS mode	Continuous < 110% load 20 ms 1000% load			
	Overload capability On bypass	Continuous < 125% load 20 ms 1000% load			

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5.3.2 m	Output current limitation, short-circuit capability	1 x 15 kW UPM 54 A, 300ms	1 x 20 kW UPM 72A, 300 ms	2 x 15 kW UPM 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	1 x 15 kW UPM Circuit breaker B10 / C6	1 x 20 kW UPM Circuit breaker B10 / C6	2 x 15 kW UPM Circuit breaker B16 / C10	2 x 20 kW UPM 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			

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ESS MODE CHARACTERISTICS

	Transfer time to double-conversion Mains available Mains failure	 No break Typically 2 ms
	Output voltage variation setting	± 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	UPS will stay on double-conversion for one hour (user adjustable), after which the unit will automatically return to operate on ESS.

BYPASS

Frame		20 kW	40 kW
	Type of bypass	Static	
	Bypass rating	20 kW	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	
	Maintenance bypass	Optional; internal or external	
	Bypass fuse i^2t value, Pre-arc i^2t Total clearing i^2t	standard 1000 A^2s 3700 A^2s	standard 1900 A^2s 7100 A^2s
	Required external bypass protective fuse, recommended rating	Circuit breaker C40	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)	

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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 C-model	32 blocks, 192 cells per battery string 28-40 blocks per string 28-36 blocks per string			
5.4.2.2 c	Battery voltage Internal External C-model	384 V 336V – 480V 336V – 432V			
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	**1 x 15kW UPM**	**1 x 20kW UPM**	**2 x 15KW UPM**	**2 x 20kW UPM**
	Default	5A, configurable	5A, configurable	10A, configurable	10A, configurable
	Load ≤80%	1…18A	1…25A	2…36A	2…50A
	Load >80%	1…10A	1…15A	2…20A,	2…30A
	Battery start option	Yes			

COMMUNICATION CIRCUITS

5.6	Standard connectivity ports	2 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 included as standard
	Complete list of indications and interface devices	See User's and Installation Guide

COMPLIANCE WITH STANDARDS

IEC 62040-1	Safety Access Degree of protection	Operator 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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