

Eaton 91PS 8-30kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

IEC 62040-3 Subclause	MODEL RATING (1.0 p.f.)	8-30 kW	
Frame		15 kW	30 kW
	Model catalogue reference	91PS-XX(15)-YY-	91PS-XX(30)-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 15 kW	Yes, up to 30 kW
	External paralleling	Up to 4 units with HotSync technology	
5.1.1	UPS topology	Double conversion, 3-level IGBT converters	
5.3.4	UPS performance classification	VFI-SS-111	

MECHANICAL

Frame		15 kW	30 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	<u>1 x Power module</u>	<u>1 x Power module</u>	<u>2 x Power module</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 (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	100% load	<u>8 kW</u> 95.4 %	<u>10 kW</u> 95.4 %	<u>15 kW</u> 95.2 %	<u>20 kW</u> 95.6 %	<u>30 kW</u> 95.3 %
		75% load	95.2 %	95.4 %	95.3 %	95.6 %	95.6 %
		50% load	94.2 %	94.7 %	95.4 %	95.2 %	95.6 %
		25% load	90.6 %	92.0 %	94.1 %	92.8 %	94.6 %
	Heat dissipation in double conversion	100% load	<u>8 kW</u> 368 W	<u>10 kW</u> 460 W	<u>15 kW</u> 720 W	<u>20 kW</u> 880 W	<u>30 kW</u> 1410 W
		75% load	288 W	345 W	529 W	660 W	990 W
		50% load	232 W	270 W	345 W	480 W	660 W
		25% load	188 W	200 W	221 W	360 W	405 W
	Efficiency in ESS, rated linear load	100% load	<u>8 kW</u> 98.2 %	<u>10 kW</u> 98.3 %	<u>15 kW</u> 98.6 %	<u>20 kW</u> 98.6 %	<u>30 kW</u> 98.7 %
		75% load	97.8 %	98.1 %	98.4 %	98.4 %	98.6 %
		50% load	97.1 %	97.5 %	98.1 %	98.0 %	98.4 %
		25% load	94.2 %	95.3 %	96.9 %	96.6 %	97.5 %

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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 1 phase + neutral

5.2.2 d	Input power factor, double conversion 100% load 75% load 50% load 25% load	<u>8 kW</u> 0.99 0.99 0.98 0.92	<u>10 kW</u> 1.00 0.99 0.99 0.95	<u>15 kW</u> 1.00 1.00 0.99 0.98	<u>20 kW</u> 1.00 0.99 0.98 0.94	<u>30 kW</u> 1.00 1.00 0.99 0.98
5.2.2 c	Rated input r.m.s. current 380V 400V 415V	<u>8 kW</u> 18 A 17 A 17 A	<u>10 kW</u> 21 A 20 A 19 A	<u>15 kW</u> 29 A 28 A 27 A	<u>20 kW</u> 38 A 36 A 35 A	<u>30 kW</u> 57 A 54 A 52 A
5.2.2 f	Maximum input r.m.s. current	<u>8 kW</u> 18 A	<u>10 kW</u> 21 A	<u>15 kW</u> 29 A	<u>20 kW</u> 38 A	<u>30 kW</u> 57 A
5.2.2 h and 5.2.2. i	Input current distortion at rated input current Resistive load Non-linear load	<u>8 kW</u> < 4 % < 6.5 %	<u>10 kW</u> < 4 % < 6.5 %	<u>15 kW</u> < 3.5 % < 5.5 %	<u>20 kW</u> < 3.5 % < 6.5 %	<u>30 kW</u> < 3.5 % < 5.5 %
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	1 phase + 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	160 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	0.4 Hz/s	
5.3.2 d and 5.3.2 e	Maximum frequency range for synchronization with bypass	± 4 Hz as default. User settable 0.5 to 5 Hz.	
	Maximum synchronized phase error	< 2° with static balanced load	
	Maximum slew-rate when synchronizing	0.4 Hz/s	
5.3.2 k	Rated output power	15 kW frame 8 kW / 8 kVA 10 kW / 10 kVA 15 kW / 15 kVA	30 kW frame 8 kW / 8 kVA 10 kW / 10 kVA 15 kW / 15 kVA 20 kW / 20 kVA 30 kW / 30 kVA
5.3.2 l	Overload capability On inverter and on inverter, stored energy mode	Power rating 8-10 and 20 kW	Power rating 15 and 30 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 %
	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> 156 A, 300 ms	<u>2 x 15 kW UPM</u> 310 A, 300 ms

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6.4.2.10.3 and 6.4.2.10.4	Fault clearing capability	<u>1 x 15 kW UPM</u> Circuit breaker B20 / C10	<u>2 x 15 kW UPM</u> Circuit breaker B40 / C25
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	± 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		15 kW	30 kW
	Type of bypass	Static	
	Bypass rating	15 kW	30 kW
	Bypass voltage range	220 V; 230 V; 240 V tolerance -15% / +10% of rated voltage	
	Transfer time break	No break	
	Maintenance bypass	Optional; internal or external	
	Bypass fuse i ² t value, Pre-arc i ² t Total clearing i ² t	7 200 A ² s 23 000 A ² s	13 700 A ² s 46 200 A ² s
	Required external bypass protective fuse, recommended rating	80 A	160 A
	Rated conditional short-circuit current, I _{cc} Static bypass Optional integrated maintenance bypass	50 kA (internal ultra rapid fusing) 10 kA (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 336 V – 480 V 336 V – 432 V	
5.4.2.2 e	Nominal Ah capacity (C10)	9 Ah, 9 Ah Long life or 7 Ah 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> 5 A, configurable 1...18 A 1...10 A	<u>2 x 15KW UPM</u> 10 A, configurable 2...36 A 2...20 A
	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 C3
IEC 62040-4 EN 50581	Environmental Aspects - Requirements and Reporting	Yes

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