

# Eaton 93E 100-200kVA UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

IEC 62040-3 Subclause	MODEL RATING (0.9 p.f.)	100kVA	120kVA	160kVA	200kVA
	Model catalogue reference	93E-100/100	93E-120/120	93E-200/160	93E-200/200
5.1.1	UPS topology	Double conversion, IGBT converters			
	Upgradeability	-	-	Up to 200 kVA	-
	UPS performance	VFI-SS-111			

## MECHANICAL

	UPS dimensions (width x depth x height)	600 x 800 x 1880 mm			
	Weight (kg) without batteries	283	311	457	
	UPS Cable entry	Bottom / rear			
	UPS Degree of protection	IP20 (EN60529), with front door mounted washable dust filter			
	UPS colour	Black, RAL 9005			

## ENVIRONMENTAL

6.5.5	Acoustic noise at 1 m (ISO7779) @ 75% Load	Normal mode - ≤ 70 dBA Stored energy - ≤ 70 dBA			
4.1.4	Ambient UPS storage temperature range	- 15 °C to + 55 °C in the protective package* <i>*Recommended range for Lead Acid battery -25 °C to +25 °C.</i>			
4.2.1.1 and 5.4.2.2 h	Ambient operating temperature range	+0 to +40 °C* <i>*No output power derating required. *Recommended range for Lead Acid battery +20 °C to +25 °C.</i>			
4.2.1.1	Relative humidity range during storage and operation	5 to 95%, no condensation allowed			
4.2.1.2	Maximum service altitude	1000 m above sea level Maximum 2000 m with 1% de-rating per each add. 100m			

## EFFICIENCY

5.3.2 r and 6.4.1.6	Efficiency in double-conversion, rated linear load	100% load	93,5%	93,7%	93,3%	93,7%
		75% load	93,3%	93,8%	92,8%	93,4%
		50% load	92,5%	93,2%	91,8%	93,0%
		25% load	89,3%	90,6%	88,6%	90,2%
	Heat dissipation in double conversion	100% load	6260 W	7260 W	10340 W	12100 W
		75% load	4850 W	5350 W	8380 W	9540 W
		50% load	3650 W	3940 W	6430 W	6775 W
		25% load	2700 W	2800 W	4630 W	4890 W
		No load	2000 W	2200 W	4080 W	4080 W

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	Efficiency in HE, rated linear load				
	100% load	98%		98,5%	
	50% load	97%		97,5%	

## ELECTRICAL CHARACTERISTICS

### INPUT

5.2.1.a and 5.2.1 b	Rated input voltage Voltage tolerance Rectifier input Bypass input	220/380V; 230/400 V; 240/415 V 190/330 – 276/478 V (-15%, +20%) at 100% load, 116/201 – 276/478 V (-50%, +20%) at 50% load 207/359 – 253/438 V ( $\pm 10\%$ of nominal, selectable up to $\pm 20\%$ )			
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 k	AC power distribution system compatibility	TN-S, TN-C, TN-C-S, TT			
5.2.2 d	Input power factor, full load	0,99			
5.2.2 c	Rated input current	154 A	187 A	248 A	309 A
5.2.2 f	Maximum rectifier input current	164 A	197 A	262 A	327 A
	Bypass input current Rated Maximum	144 A 166 A	173 A 199 A	231 A 266 A	289 A 332 A
5.2.2 h and 5.2.2. i	Input current distortion at rated input current	< 5% THDi			
5.2.2 e	In-rush current	<100% of rated current			
	Rectifier ramp-up, rectifier start and load step	Yes			
	Backfeed protection	Yes, inbuilt as standard			

## ELECTRICAL CHARACTERISTICS

### OUTPUT

5.3.2 f and 5.3.2 g	Number of output phases	3 phase + neutral			
	Crest factor	2:1			
5.3.2 b	Rated output voltage	230/400 Vac, three phase (220/380, 240/415 selectable)			
5.3.2 b	Output voltage variation	$\pm 1\%$ Balanced static load, $\pm 6\%$ with 5ms recovery from 10% to 90%			

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		load step ±5% Balanced dynamic load (EN62040-3)			
	Rated peak output voltage	325 V, ± 20 V			
5.3.2 i	Total voltage harmonic distortion 100% linear load 100% non-linear load	< 2% < 8%			
5.3.2 q	Voltage unbalance at reference unbalanced load Phase displacement at reference unbalanced load	< 2% <2.5 deg.			
5.3.2 j	Voltage transient (r.m.s) Recovery time to steady state	0% during transfer from stored energy to normal mode ±6% with 5 ms recovery from 10% to 90% load step			
5.3.2 c	Rated output frequency Output frequency variation Slew rate	50 (default) or 60 Hz ± 4 Hz (default) selectable from ± 1Hz to ± 4 Hz 0,5 Hz/s (default), 2,5 Hz/s, or 7,5 Hz/s selectable			
5.3.2 d and 5.3.2 e	Maximum frequency range for synchronization with bypass Maximum slew-rate when synchronizing	±3 Hz as default, up to ±7 Hz user settable  up to 0,5 Hz/s			
5.3.2 k	Rated output power	100kVA/90kW	120kVA/108kW	160kVA/144kW	200kVA/180kW
5.3.2 l	Overload capability On inverter @ 30 °C	10 min 102-125% load 60 s 126-150% load 500 ms >151% load			
	Overload capability On inverter, stored energy mode @ 30 °C	1 min 102-125% load 30 s 126-150% load 500 ms >151% load			
	Overload capability On bypass @ 40 °C and ≤1000m altitude	Continuous < 115% load 20 ms 1000% load Selected external Bypass fuses or breakers may limit the overload capability			
5.3.2 m	Output current limitation, short-circuit capability	430 A, 100 ms + 164 A, 300 ms	480 A, 100ms+ 197 A, 300 ms	860 A, 100 ms + 328 A, 300 ms	
5.3.2 o and 5.3.2 p	Load power factor range	From 0,8 lagging to 0,9 leading without de-rating			

## HE MODE CHARACTERISTICS

	Transfer time to double-conversion Mains available	No break
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	Mains failure	< 4 ms in normal transfer conditions, < 10 ms maximum			
	Acceptable output voltage variation	10 %			
	Acceptable output frequency variation	±4 Hz			
	High Alert mode	Yes The UPS will stay on double-conversion for one hour (user adjustable), after which the unit will automatically return to operate on HE.			

## BYPASS

	Automatic bypass	Static Bypass, continuously rated, no break transfer			
	Bypass rating	100 kVA	120 kVA	200 kVA	
	Bypass voltage range	3 x 230/400 Vac nominal (220/380, 240/415 Selectable)			
	Transfer time break	no break			
	Maintenance bypass	Internal: Option External: Option		External: Option	
	Rated conditional short-circuit current, $I_{CC}$ Static bypass Optional Internal Maintenance Bypass	65 kA* 10kA* <i>*using external Eaton Bussmann 170M ultra-rapid protective fuse</i>			
	Rated conditional short-circuit current, $I_{CC}$ Static bypass Optional Internal Maintenance Bypass	10 kA** 10kA** <i>**using external gG protective fuse</i>			
	Bypass thyristor $i^2t$ value, $T_{vj} = 25^{\circ}\text{C}$ , 8,3 to 10 ms $T_{vj} = 130^{\circ}\text{C}$ , 8,3 to 10 ms	405000 A <sup>2</sup> S 320000 A <sup>2</sup> S	405000 A <sup>2</sup> S 320000 A <sup>2</sup> S	450000 A <sup>2</sup> S 336000 A <sup>2</sup> S	
	Required external bypass protective fuse, recommended rating (ultra-fast fuse)	200 A	200 A	315 A	350 A

## 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	36 blocks, 216 cells per battery string or 38 blocks, 228 cells per battery string or 40 blocks, 240 cells per battery string (default)			
5.4.2.2 c	Battery voltage	432 V (216 Cells) or 456 V (228 Cells) or 480 V (240 Cells, Default)			

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5.4.2.2 f	Recharge time to 90 % capacity	Maximum 10 hours recommended (dependent on battery size)			
5.4.2.2 o	Recharge profile	Advanced Battery Management (ABM <sup>®</sup> ) = 90% resting, 10% floating/charging (typical)			
5.4.2.2 q	End of discharge voltage	216 Cells = 1.8V/Cell, 228 Cells = 1.73V/Cell, 240 Cells = 1.67V/Cell			
5.4.2.2 r	Charging current (at full load)	40 A		80 A	

## COMMUNICATION CIRCUITS

5.6	Display	Graphical LCD with blue backlight, 4x LEDs for notice and alarm
	Standard connectivity ports	2x Mini-Slot , 1x Emergency Power Off input (NC or NO), 3x Signal inputs, 1x RS232, 1x USB (
	Optional	Mini-Slot cards; Web/SNMP, Industrial Relay, ModBus
	Complete list of indications and interface devices	See User's Manual

## COMPLIANCE WITH STANDARDS

IEC 62040-1	Safety Access Degree of protection	Restricted access IP 20; protection against medium sized foreign matter (incl. finger)
IEC 62040-2	Electromagnetic Compatibility Immunity Emissions	IEC/EN 62040-2, Category C3 IEC/EN 62040-2, Category C3