Eaton 93E 80- 400kVA UPS Technical Specification

CONSTRUCTION	80kVA	100kVA	120kVA	160kVA	200kVA	300kVA	400kVA
Model	93E-100/80	93E-100/100	93E-120/120	93E-200/160	93E-200/200	93E-300/300	93E-400/400
kVA/kW Rating (all modes)	80/72	100/90	120/108	160/144	200/180	300/270	400/360
Upgradability	100kVA	-	-	200kVA	-	-	-
UPS Topology	Double Conversion, IGBT Converters						
Performance classification	VFI-SS-111						
UPS Dimensions: WxDxH (mm)	600W x 800D x 1876H					1600W x 820D x 1880H	
Degree of protection	IP20, with front door mounted washable dust filter (IP21 optional)						
Cabinet colour	Black, RAL 9005						
Cable entry	Bottom/Front or Rear, optional Top entry kit			Bottom/Rear, optional Top/Front entry kit		Bottom or Top	
Weight (kg) without batteries	283		311	457		840	970
ENVIRONMENT							
Ambient storage temperature	Range of -15 to +55°C in the protective package						
Ambient service temperature	UPS: 0 to +40°C Battery (installed separately): +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 (ISO7779)	≤65dB @ 75% Load			≤70dB @ 75% Load		≤73dB @ 75% Load	
Electromagnetic Compatibility	Immunity and emission to IEC/EN 62040-2						
USER INTERFACE & COMMUNICATIONS							
Display	Graphical LCD with blue backlight, 4x LEDs for notice and alarm						
Standard Communication Ports	2x Mini-Slot , 1x Emergency Power Off input (NC or NO), 3x Building Alarm inputs, 1x RS232 & 1x USB (exclusively for service tool use)						
Optional Communication Ports	Mini-Slot cards: Web/SNMP, Relay/RS232, Industrial Relay, ModBus						
ELECTRICAL INPUT CHARACTERISTICS							
Earthing system compatibility	TN, TN-S, TN-C, TN-C-S, TT (Three-phase, four-wire + PE)						
Rated input voltage and voltage tolerance	Rectifier: 230/400Vac nominal (220/380, 240/415 Selectable) 190/330–276/478V (-15%, +20%) at 100% load, 116/201-276/478V (-50%, +20%) at 50% load Bypass: 3 x 230/400V nominal (220/380, 240/415 Selectable) 207/359 – 253/438V (±10% of nominal, selectable up to ±20%)						
Operating frequency / tolerance	50 or 60Hz; Tolerance 42-70Hz						
Input current distortion	<5% THDi (Linear load condition at rated input current)						
Input power factor	0.99pf at 100% load						
Inrush current	≤120% of rated current for ≤2 cycles						
Number of input phases	3 phases + Neutral + PE (3 phase input)						
Rectifier input current Rated/Maximum (rms @400V)	125/131A	154/164A	187/197A	248/262A	309/327A	460/490A	613/654A
Bypass input current (rms @400V) Recommended/Max	115/133A	144/166A	173/199A	231/266A	289/332A	433/498A	577/664A
ELECTRICAL OUTPUT CHARACTERISTICS - NORMAL MODE							
Rated output voltage	230/400 Vac, three phase, (220/380, 240/415 selectable)						
Output voltage variation	±1% Balanced static load, ±6% with 5ms recovery from 10% to 90% load step, ±5% Balanced dynamic load (EN62040-3)						
Crest factor	3:1						
Rated output frequency	50 Hz (default) or 60 Hz						
Output frequency variation (synchronised if applicable)	±4Hz (default) selectable from ±1Hz to ±4Hz, with slew rate 0.5Hz/sec (default), 2.5Hz/s, or 7.5 Hz/s selectable					0.8Hz/sec	
Output frequency synchronised phase error at change of mode	Maximum of 2.5 degrees						
Total voltage distortion	<2% with linear load, <5% with non-linear load defined according to EN62040-3						
Short circuit capability, <400ms	400A	400A	480A	800A	800A	1200A	1600A

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Overload capacity w/out bypass	102–125% load 10 minutes, 126–150% load 1 minute, >151% load 150ms at 30°C						
Overload capacity with bypass	115% load continuous, 1000% for 20ms at 40°C and ≤1000m altitude Note: Selected external Bypass fuses or breaker may limit the overload capability						
Load power factor range	0.7 lagging to 0.9 leading without de-rating						
Range of frequency synchronisation with bypass	±3Hz/s default, up to 7Hz/s user settable for single UPS, up to 0.5 Hz/s for parallel UPS					0.8Hz/s	
ELECTRICAL OUTPUT CHARACTERISTICS - STORED ENERGY MODE							
Transfer to/from stored energy	No break						
Rated output voltage	230/400 Vac, three phase, (220/380, 240/415 selectable)						
Output voltage variation	±1% with Balanced static load, 0% during transfer from stored energy to normal mode, ±5% with 10ms recovery from 10% to 90% load step, ±5% Balanced dynamic load (EN62040-3)						
Crest factor	3:1						
Rated peak output voltage	325V, ±20V						
Rated output frequency	50Hz (default) or 60Hz						
Output frequency variation	±0.005Hz (single module), ±0.07Hz (Parallel system)						
Total output voltage distortion	<2% with linear load, <5% with non-linear load defined according to EN62040-3						
Short circuit capability, <400ms	400A	400A	480A	800A	800A	1200A	1600A
Overload capability	102–125% load 1 minute, 126–150% load 30 seconds, >151% load 150ms at 30°C						
Load power factor range	0.7 lagging to 0.9 leading without de-rating						
EFFICIENCY (Input/Output)							
Linear Load, Double Conversion Mode @ 400V/50Hz — 100% load:	94.0%	94.0%	94.0%	94.0%	94.0%	94.0%	94.0%
75% load:	93.8%	93.8%	93.8%	93.8%	93.8%	93.7%	94.0%
50% load:	93.1%	93.1%	93.3%	93.3%	93.3%	92.9%	92.9%
25% load:	90.3%	90.3%	90.5%	90.5%	90.5%	90.0%	90.2%
Heat Dissipation Double Conversion Mode @ 400V/50Hz — 100% load:	4596W	5745W	6894W	9191W	11489W	17234W	22979W
75% load:	3569W	4462W	5372W	7139W	8923W	13615W	17234W
50% load:	2668W	3335W	3878W	5170W	6463W	10318W	13757W
25% load:	1934W	2417W	2834W	3770W	4713W	7500W	9778W
Linear Load, HE Mode	98% at full load, 97% at half load			98.5% at full load, 97.5% at half load			
BYPASS CHARACTERISTICS							
Automatic bypass	Static bypass switch, continuously rated*, no break transfer *bypass capable of 115% continuous load						
Automatic bypass rating	100kVA		120kVA	200kVA		400kVA	
Automatic bypass SCR i^2t value	405,000 A^2s			450,000 A^2s		1805,000 A^2s	
Back-feed protection	Optional Internal back-feed contactor						
Separate bypass input feed	Standard (single feed cable links supplied for field fitting)						
Manual bypass switch (internal)	Optional			Not available			
HE (High Efficiency) MODE CHARACTERISTICS							
Performance classification	VFD, transferring to VFI (Double Conversion mode) if limits are exceeded						
Transfer time to VFI — Mains available:	No break (0ms)						
Mains failure:	4ms typical, <10ms maximum					2ms typical,< 4ms max	
Acceptable voltage variation	±10% of nominal voltage						
Acceptable output freq. variation	±4Hz						
High Alert mode	UPS will stay in double-conversion mode for one hour (user adjustable), after which the unit will automatically return to operate in HE mode						
BATTERY							
Battery nominal voltage	432V (216 Cells) or 456V (228 Cells) or 480V (240 Cells, Default)						
Float charge voltage	216/228/240 x 2.30V = 497/524/552V						
Maximum charge voltage	216/228/240 x 2.35V = 508/536/564V						
Battery cut off voltage	216 Cells = 1.8V/Cell, 228 Cells = 1.73V/Cell, 240 Cells = 1.67V/Cell						
Restored energy time to 90%	Maximum 10 hours recommended (dependant on battery size)						
Charging current (at full load)	40A			80A		120A	160A
Battery recharge profile	Advanced Battery Management (ABM®) = 90% resting,10% floating/charging (typical)						