Eaton 93E 15-80kVA UPS Technical Specification

CONSTRUCTION	15kVA	20kVA	30kVA	40kVA	60kVA	80kVA
Model	93E-15/15	93E-20/20	93E-30/30	93E-40/40	93E-60/60	93E-80/80
kVA/kW Rating (all modes)	15/13.5	20/18	30/27	40/36	60/54	80/72
Upgradability	20kVA	-	-	-	-	-
UPS Topology	Double Conversion, IGBT Converters					
Performance classification	VFI-SS-111					
UPS Dimensions: WxDxH (mm)	500 x 710 x960		500 x 710 x 1230	500 x 710 x 1500	600 x 800 x 1876	
Degree of protection	IP20, with front door mounted washable dust filter(IP 21 optional)					
Cabinet colour	Black, RAL 9005					
Cable entry	Bottom/Rear					
Weight (kg) without batteries	72	72	91	120	202	245
Weight (kg) with internal batteries	272	272	376	490	/	/
Weight (kg) with internal transformer	220	220	245	328	532	575
ENVIRONMENT						
Ambient storage temperature	Range of -15 to +55°C in the protective package					
Ambient service temperature	UPS: 0 to +40°C, 35°C continuous Battery: +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)	≤55dB @ 75% Load		≤62dB @ 75% Load		≤65dB @ 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						
Power Distribution 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)					
Rated rectifier input current (rms @ 400V)	23A	31A	46A	61A	92A	122A
Maximum rectifier input current (rms @ 400V)	25A	33A	49A	65A	98A	131
Bypass input current (rms @ 400V) Recommended/Max	22/25A	29/33A	43/50A	58/66A	87/100A	115/133A
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					

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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					
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	80A	80A	120A	160A	240A	360A
Overload capacity w/out bypass	102–110% load 60 minutes,111–125% load 10 minutes, 126–150% load 1 minute, >151% load 500ms 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					
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	80A	80A	120A	160A	240A	360A
Overload capability	102–125% load 1 minute, 126–150% load 30 seconds, >151% load 500ms 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 — 25% load:	88.00%	90.00%	90.00%	90.00%	90.00%	90.00%
50% load:	92.00%	92.50%	92.50%	92.50%	92.50%	92.50%
75% load:	93.50%	94.00%	94.00%	94.00%	94.00%	94.00%
100% load:	94.00%	94.00%	94.00%	94.00%	94.00%	94.00%
Heat Dissipation Double Conversion Mode @ 400V/50Hz — 25% load:	460	500	750	1000	1500	2000
50% load:	587	730	1095	1459	2189	2919
75% load:	704	862	1293	1723	2585	3447
100% load:	862	1149	1723	2298	3447	4596
Linear Load, HE Mode — 100% load:	98.0%					
50% load:	97.5%					
BYPASS CHARACTERISTICS						
Automatic bypass	Static bypass switch, continuously rated*, no break transfer *bypass capable of 115% continuous load on 15-80kVA models					
Automatic bypass rating	30kVA			40kVA	80kVA	
Automatic bypass SCR i^2t value	10200A^2s			20,400 A^2s	145,000 A^2s	
Back-feed protection	Optional Internal back-feed contactor					
Separate bypass input feed	Optional					
Manual bypass switch (internal)	Standard					
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					
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					

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BATTERY						
Battery nominal voltage	2.0V/ Cell (192 -240cell continual adjustable. The default is 432V(216 cells)					
Float charge voltage	2.30V/Cell					
Maximum charge voltage	2.35V/Cell					
Battery cut off voltage	With <10% load, 1.75V/Cell. With >10%load, 1.67V/Cell					
Restored energy time to 90%	Maximum 10 hours recommended (dependant on battery size)					
Charging current (at full load)	5.3A	5.3A	8A	10.6A	16A	24A
Battery recharge profile	Advanced Battery Management (ABM®) = 90% resting,10% floating/charging (typical)					