

# Eaton 93E 15-80kVA UPS Technical Specification

CONSTRUCTION	15kVA	20kVA	30kVA	40kVA	50kVA	60kVA	80kVA
Model	93E-15/15	93E-20/20	93E-30/30	93E-40/40	93E-50/50	93E-60/60	93E-80/80
kVA/kW Rating (all modes)	15/13.5	20/18	30/27	40/36	50/45	60/54	80/72
Upgradability	20kVA	-	-	-	60kVA	-	-
UPS Topology	Double Conversion, IGBT Converters						
Performance classification	VFI-SS-111						
UPS Dimensions: WxDxH (mm)	500 x 706 x960		500 x 706 x 1230	500 x 706 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	202	245
Weight (kg) with internal batteries	272	272	376	490	/	/	/
Weight (kg) with internal transformer	220	220	245	328	532	532	575
<b>ENVIRONMENT</b>							
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						
<b>USER INTERFACE &amp; COMMUNICATIONS</b>							
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						
<b>ELECTRICAL INPUT CHARACTERISTICS</b>							
Power Distribution System compatibility	TN, TN-S, TN-C, TN-C-S, TT (Three-phase, four-wire + PE)						
Rated input voltage and voltage tolerance	<b>Rectifier:</b> 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  <b>Bypass:</b> 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	76A	92A	122A
Maximum rectifier input current (rms @ 400V)	25A	33A	49A	65A	82A	98A	131
Bypass input current (rms @ 400V) Recommended/Max	22/25A	29/33A	43/50A	58/66A	72/83A	87/100A	115/133A
<b>ELECTRICAL OUTPUT CHARACTERISTICS - NORMAL MODE</b>							
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	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	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, 25% load:	88.00%	90.00%	90.00%	90.00%	88.00%	90.00%	90.00%
Double 50% load:	92.00%	92.50%	92.50%	92.50%	92.00%	92.50%	92.50%
Conversion Mode 75% load:	93.50%	94.00%	94.00%	94.00%	93.50%	94.00%	94.00%
@ 400V/50Hz 100% load:	94.00%	94.00%	94.00%	94.00%	94.00%	94.00%	94.00%
Heat Dissipation 25% load:	460	500	750	1000	1534	1500	2000
Double 50% load:	587	730	1095	1459	1957	2189	2919
Conversion Mode 75% load:	704	862	1293	1723	2154	2585	3447
@ 400V/50Hz 100% load:	862	1149	1723	2298	2872	3447	4596
Linear Load, 100% load:	98.0%						
HE Mode 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 <sup>2</sup> s		20,400 A <sup>2</sup> s		145,000 A <sup>2</sup> s		
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 Mains available:	No break (0ms)						
time to VFI 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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<b>BATTERY</b>							
Battery nominal voltage	384V (192 Cells) to 432V (216 Cells, Default) selectable.						
Float charge voltage	192/204/216 x 2.30V = 441.6/469.2/496.8V						
Maximum charge voltage	192/204/216 x 2.35V = 451.2/479.4/507.6V						
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	16A	24A
Battery recharge profile	Advanced Battery Management (ABM <sup>®</sup> ) = 90% resting, 10% floating/charging (typical)						
<b>Internal Battery Run Times 100% R load</b>							
2 x 32 x 12V9Ah Batteries	x	x	x	x	\	\	\
3 x 32 x 12V9Ah Batteries	x	x	x	x	\	\	\
4 x 32 x 12V9Ah Batteries	x	x	x	x	\	\	\

NOTE: The battery backup table is given with end voltage 1.67 VPC and temperature +25°C.

The batteries are fully charged and measured after min. (5) full discharge cycles.

Battery times are approximate and vary depending on age and temperature configuration.