# 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<br>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)<br>190/330–276/478V (-15%, +20%) at 100% load,<br>116/201-276/478V (-50%, +20%) at 50% load<br>Bypass: 3 x 230/400V nominal (220/380, 240/415 Selectable)<br>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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| | 80kVA | 100kVA | 120kVA | 160kVA | 200kVA | 300kVA | 400kVA |
|---|---|---|---|---|---|---|---|
| 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<br>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,<br>±5% with 10ms recovery from 10% to 90% load step,<br>±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<br>*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) | | | | | | |