# Eaton 9SX 5-11kVA UPS Technical Specification

| **CONSTRUCTION** | | | | |
|---|---|---|---|---|
| **Model** | **9SX5Ki** | **9SX6Ki** | **9SX8Ki** | **9SX11Ki** |
| Rating | 5kVA/4.5kW | 6kVA/5.4kW | 8kVA/7.2kW | 11kVA/10kW |
| Power Factor | 0.9 | | | 0.91 |
| Technology | VFI-SS-111, on-line double conversion with power factor correction | | | |
| Dimensions: W x D x H (mm)<br>Rack Configuration: | 440 x 685 x 130 (3U) | | Power Module: 440 x 700 x 130 (3U)<br>Battery Module: 440 x 680 x 130 (3U) | |
| Dimensions: W x D x H (mm)<br>Tower Configuration: | 130 x 685 x 440 | | 260 x 700 x 440 (combined) | |
| Weight (kg) | 48kg | | Total: 84kg<br>(Power Mod: 19kg)<br>(Battery: 65kg) | Total: 86kg<br>(Power Mod: 21kg)<br>(Battery: 65kg) |
| Colour | Black, RAL 9005 | | | |
| **ENVIRONMENTAL & SAFETY** | | | | |
| Ambient storage temperature | 0°C to +35°C with batteries and -15°C to +60°C without batteries | | | |
| Ambient service temperature | Power electronics part: 0 to +40°C<br>Battery part: +5 to +25°C without reducing battery life | | | |
| Maximum service altitude | 1000m above sea level, 10% de-rating for every 1000m to 3000m maximum | | | |
| Relative humidity | 0 to 95%, no condensation allowed | | | |
| Degree of protection | IP20 (EN60529) | | | |
| Acoustic Noise @ 1m | ≤45dB 5/6kVA, ≤48dB 8kVA, ≤50dB 11kVA Online mode at nominal conditions, battery fully charged | | | |
| Safety Conformance | IEC 62040-1:2008, IEC 60950-1:2005, UL 1778 4th (5 & 6kVA UPS, 8 & 11kVA Power modules) | | | |
| Electromagnetic Compatibility | IEC 62040-2:2006 Categories C2, CISPR22 Class A, FCC part 15 Class A (5 & 6kVA UPS, 8 & 11kVA Power modules) | | | |
| Agency Markings | CE, C−Tick, UL (5 & 6kVA UPS, 8 & 11kVA Power modules) | | | |
| **POWER CONNECTIONS** | | | | |
| Input | 5/6kVA: Terminals (up to 10mm$^2$), 8/11kVA: Terminals up to 16mm$^2$ | | | |
| Output | 5/6kVA: Terminals (up to 10mm$^2$), +(2) IEC16A, +(4) IEC10A programmable Group 1, +(4) IEC10A programmable Group 2<br>8/11kVA: Terminals (up to 16mm$^2$) | | | |
| **USER INTERFACE** | | | | |
| Display | Graphical Blue LCD with LED backlight, 4x LEDs for notice and alarm | | | |
| Standard Communication Ports | 1 x USB 2.0, 1 x RS232 (DB9), 1 x Relay Port (DB9), 1 x Remote Power Off Port, 1 x Remote On/Off Port, 1 x Minislot Port (Empty) | | | |
| Relay Port Voltage Free Contacts | On Mains, On Automatic Bypass, On Battery, Battery Low, Load Protected | | | |
| Output Relay Specifications | 250V AC, 5A | | | |
| Optional | Minislot cards; Web/SNMP, Relay, ModBus | | | |
| **ELECTRICAL CHARACTERISTICS – INPUT** | | | | |
| Number of input phases | 1 Phase (Separate Rectifier and Bypass inputs available on 8-11kVA) | | | |
| Rated input voltage and voltage tolerance | Rectifier: 230Vac nominal (200, 208, 220, 240, 250V* Selectable**)<br>Tolerance: 176-276V (-23% to +20%) at 100% load,<br>150-276V (-35% to +20%) at 80% load,<br>125-276V (-45% to +20%) at 60% load,<br>100-276V (-56% to +20%) at 40% load<br>Bypass: 187-264V*** at nominal 230V (-20%, +15% of nominal)<br>*250V available only on 8/11kVA<br>**De-rate for 11kVA. 200/208/250V: -10% kVA/kW, 220V: -1% kW<br>***Can be set to 160-264V, or up to 100-264V if unsynchronised bypass transfer function is enabled | | | |



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| **ELECTRICAL CHARACTERISTICS – INPUT (continued)** | | | | |
|---|---|---|---|---|
| **Model** | **9SX5Ki** | **9SX6Ki** | **9SX8Ki** | **9SX11Ki** |
| Operating Frequency / Tolerance | 50/60Hz Auto-sensing<br>Tolerance 50Hz nominal: 40-60Hz before transfer to battery<br>Tolerance 60Hz nominal : 50-70Hz before transfer to battery | | | |
| Input current distortion | <5% THDi (nominal input voltage, full load and battery fully charged) | | | |
| Input power factor | ≥0.99pf | | | |
| Inrush Current | ≤800% of rated RMS current | | | |
| UPS Nominal Input Current @ 230V with batteries fully charged | 21A | 25.2A | 33.1A | 45.8A |
| Recommended protection circuit rating (D Curve) | 32A | | 50A | 80A |
| **ELECTRICAL OUTPUT CHARACTERISTICS – NORMAL MODE** | | | | |
| Rated apparent/active power | 5kVA/4.5kW | 6kVA/5.4kW | 8kVA/7.2kW | 11kVA/10kW |
| Number of output phases | 1 Phase | | | |
| Load power factor range | 0.5 lagging to 0.5 leading | | | |
| Rated output voltage | 230Vac nominal (200, 208, 220, 240, 250V* Selectable**)<br>*250V available only on 8/11kVA<br>**De-rate for 11kVA: 200/208/250V -10% kVA/kW, 220V -1% kW | | | |
| Steady state voltage variation | ±1% | | | |
| Dynamic voltage regulation & recovery time | ±6% for 20%→100%→20% Resistive Load<br>±9% for 0%→100%→0% Resistive Load<br>Recovery time 100ms to 90% Vnom after 0%→100%→0% non-linear load (IEC62040-3 reference) step | | | |
| Crest factor | 3:1 | | | |
| Rated output frequency | 50Hz (default) or 60Hz | | | |
| Output frequency regulation | When synchronised: ±5% default, selectable ±1% to ±10%<br>Unsynchronised (or on battery mode or frequency converter mode) ±0.5% | | | |
| Frequency Slew Rate | 1Hz/s (0.5 Hz/s in Hot Standby configuration) | | | |
| Total output voltage distortion | <2% linear load; <5% non-linear load (IEC62040-3 reference) | | | |
| Overload capability | 100-102%: No alarm<br>102-110%: Load transfers to bypass after 2 minutes<br>110-125%: Load transfers to bypass after 1 minute<br>125-150%: Load transfers to bypass after 10 seconds<br>>150%: Load transfers to bypass after 500ms<br>Maximum current: 90A for 5/6kVA models, 120A for 8kVA, 150A for 11kVA | | | |
| Overload capability (bypass mode) | 100-125%: No alarm<br>125-150%: UPS shuts down after 1 minute<br>>150%: UPS shuts down after 1 second | | | |
| **ELECTRICAL OUTPUT CHARACTERISTICS – STORED ENERGY** | | | | |
| Rated apparent/active power | 5kVA/4.5kW | 6kVA/5.4kW | 8kVA/7.2kW | 11kVA/10kW |
| Waveform | Sine Wave | | | |
| Transfer–normal to stored energy | No break | | | |
| Load power factor range | 0.5 lagging to 0.5 leading | | | |
| Rated output voltage | 230Vac nominal (200, 208, 220, 240, 250V* Selectable**)<br>*250V available only on 8/11kVA<br>**De-rate for 11kVA: 200/208/250V -10%, 220V -1% kW | | | |
| Steady state voltage variation | ±1% | | | |
| Dynamic voltage regulation & recovery time | ±6% for 20%→100%→20% Resistive Load<br>±9% for 0%→100%→0% Resistive Load<br>Recovery time 100ms to 90% Vnom after 0%→100%→0% non-linear load (IEC62040-3 reference) step | | | |

# Eaton 9SX 5-11kVA UPS Technical Specification

| ELECTRICAL OUTPUT CHARACTERISTICS – STORED ENERGY (continued) | | | | |
|---|---|---|---|---|
| **Model** | **9SX5Ki** | **9SX6Ki** | **9SX8Ki** | **9SX11Ki** |
| Crest factor | 3:1 | | | |
| Rated output frequency | 50Hz (default) or 60Hz | | | |
| Output frequency regulation | ±0.5% | | | |
| Total output voltage distortion | <2% linear load; <5% non-linear load (IEC62040-3 reference) | | | |
| Efficiency | >91% | | | |
| Overload capability | 102-130% 10s, >130% 100ms | | | |
| **EFFICIENCY (Input/Output)** | | | | |
| Efficiency at 100% load (On Line Mode/High Efficiency Mode) | >93.5% / 98% | | >94.5% / >98% | >95% / 98% |
| Battery Management | Advanced Battery Management (ABM®) = 90% resting, 10% floating/charging. Automatic battery testing, deep discharge protection, automatic recognition of battery modules, float temperature compensation - 3mV per °C (25°C nominal) | | | |
| Battery Nominal Voltage | 5/6kVA:180V (90 Cells),8/11kVA: 240V (120 cells) | | | |
| Charging Current | 5/6kVA: 1A ±20%, 8/11kVA: 1.7A ±20% (Additional 12A for 8/11kVA available with Supercharger option) | | | |
| UPS Standard Battery Configuration | 5/6kVA: 15 x 12V 5 Ah internal batteries, VRLA, AGM<br>8/11kVA battery module (EBM): 20 x 12V 7 Ah batteries, VRLA, AGM | | | |
| EBM Configuration | 5/6kVA: 2 strings of 15 x 12V 5 Ah batteries<br>8/11kVA: 1 string of 20 x 12V 7 Ah batteries | | | |
| Battery Replacement | Hot-swappable internal and external batteries | | | |

| **Battery Run Times 9SX5Ki*** | **Internal** | **+ 1 EBM** | **+ 2 EBMs** | **+ 3 EBMs** | **+ 4 EBMs** |
|---|---|---|---|---|---|
| Minutes @ 100% load, 0.9pf | 3.5 | 20 | 38 | 54 | 80 |
| Recharge time to 90% capacity | 1.5h | 7.1h | 13.7h | 19.4h | 27.4h |
| **Battery Run Times 9SX6Ki*** | **Internal** | **+ 1 EBM** | **+ 2 EBMs** | **+ 3 EBMs** | **+ 4 EBMs** |
| Minutes @ 100% load, 0.9pf | 3 | 16 | 28 | 47 | 58 |
| Recharge time to 90% capacity | 1.5h | 7.1h | 13.7h | 19.4h | 27.4h |

Note: 4 EBMs recommended for 5/6kVA, maximum 12 EBMs possible

| **Battery Run Times 9SX8Ki*** | **Std EBM** | **+1 EBM** | **+2 EBMs** | **+3 EBMs** | **+4 EBMs** | **+5 EBMs** |
|---|---|---|---|---|---|---|
| Minutes @ 100% load, 0.9pf | 3.5 | 12 | 21 | 29 | 42 | 51 |
| Recharge time to 90% capacity | 1.2h | 3.8h | 5.8h | 8.4h | 13h | 14h |
| **Battery Run Times 9SX11Ki*** | **Std EBM** | **+1 EBM** | **+2 EBMs** | **+3 EBMs** | **+4 EBMs** | **+5 EBMs** |
| Minutes @ 100% load, 0.9pf | 2 | 6 | 10 | 18 | 24 | 33 |
| Recharge time to 90% capacity | 0.7h | 2.3h | 4.1h | 6.5h | 10.4h | 13.9h |

Note: 6 EBMs recommended for 8/11kVA, maximum 12 EBMs (or 400Ah) possible with additional charger (Supercharger option)
Contact Eaton for run times with 7-12 EBMs or large external batteries.

*Battery times are approximate and vary depending on age, temperature, load configuration and battery charge.

| BYPASS CHARACTERISTICS | |
|---|---|
| Type of bypass | Automatic Static Bypass<br>Common Mains & Bypass input for 5/6kVA<br>Separable Mains & Bypass input for 8/11kVA |
| Transfer | 0ms (10ms or 20ms unsynchronised transfer to bypass can be selected)<br><10ms transfer time when exiting from High Efficiency mode |