

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) Rack Configuration:	440 x 685 x 130 (3U)		Power Module: 440 x 700 x 130 (3U) Battery Module: 440 x 680 x 130 (3U)	
Dimensions: W x D x H (mm) Tower Configuration:	130 x 685 x 440		260 x 700 x 440 (combined)	
Weight (kg)	48kg		Total: 84kg (Power Mod: 19kg) (Battery: 65kg)	Total: 86kg (Power Mod: 21kg) (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 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 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

Eaton 9SX 5-11kVA UPS Technical Specification

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**) Tolerance: 176-276V (-23% to +20%) at 100% load, 150-276V (-35% to +20%) at 80% load, 125-276V (-45% to +20%) at 60% load, 100-276V (-56% to +20%) at 40% load Bypass: 187-264V*** at nominal 230V (-20%, +15% of nominal) *250V available only on 8/11kVA **De-rate for 11kVA. 200/208/250V: -10% kVA/kW, 220V: -1% kW ***Can be set to 160-264V, or up to 100-264V if unsynchronised bypass transfer function is enabled

ELECTRICAL CHARACTERISTICS – INPUT

Model	9SX5Ki	9SX6Ki	9SX8Ki	9SX11Ki
Operating Frequency / Tolerance	50/60Hz Auto-sensing Tolerance 50Hz nominal: 40-60Hz before transfer to battery 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**) *250V available only on 8/11kVA **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 ±9% for 0%→100%→0% Resistive Load 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% 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)			

Eaton 9SX 5-11kVA UPS Technical Specification

Overload capability	100-102%: No alarm 102-110%: Load transfers to bypass after 2 minutes 110-125%: Load transfers to bypass after 1 minute 125-150%: Load transfers to bypass after 10 seconds >150%: Load transfers to bypass after 500ms Maximum current: 90A for 5/6kVA models, 120A for 8kVA, 150A for 11kVA
Overload capability (bypass mode)	100-125%: No alarm 125-150%: UPS shuts down after 1 minute >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**) *250V available only on 8/11kVA **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 ±9% for 0%→100%→0% Resistive Load Recovery time 100ms to 90% Vnom after 0%→100%→0% non-linear load (IEC62040-3 reference) step			

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 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 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

Eaton 9SX 5-11kVA UPS Technical Specification

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 Common Mains & Bypass input for 5/6kVA Separable Mains & Bypass input for 8/11kVA
Transfer	0ms (10ms or 20ms unsynchronised transfer to bypass can be selected) <10ms transfer time when exiting from High Efficiency mode