

UPS Technical Specification
Manufacturer's declaration in accordance with IEC 62040-3

subclause	Characteristic of Equipment	Manufacturer's Declared Values	Manufacturer's Declared Values	
construction				
	Model catalogue reference		25kVA module and 25-250kVA UPS based on 25kVA module	50kVA module and 50-800kVA UPS based on 50kVA module
	Model rating	Output: 120 kVA pf 0.9 (108 kW) @ 400 Volts	Output: 25kVA pf 0.9 (22.5 kW) @ 400 Volts	
	Classification	VFI-SS-111	VFI-SS-111	
	Dimensions length x depth x height	900 x 804 x 1872 mm (UPS) 1125 x 804 x 1885 mm (BAT-Large)	CMS-150/25: 600*800*1600 mm CMS-250/25: 800*800*2000 mm external battery	CMS-350/50: 800*1000*2000 mm CMS-500/50: 1400*1000*2000 mm CMS-800/50: 2000*1000*2000 mm external battery
	Weight without batteries	530 kg (UPS)	CMS-150/25,150kVA: 320kg CMS-250/25,250kVA: 460kg	CMS-350/50, 350kVA: 680kg CMS-500/50, 500kVA: 900kg CMS-800/50, 800kVA: 1340kg
	Weight with batteries if integrated	1270 kg (BAT10-40x55Ah) 1430 kg (BAT10-40x67Ah) 2350 kg (BAT10-40x125Ah)	/	
ENVIRONMENTAL				
4.1.4	Ambient storage temperature range	-25 to +55°C in the protective pack	-25 to +60°C in the protective package	
4.1.2	Ambient service temperature	UPS power electronics: +0 to +45°C; Battery: +5 to +25°C without reducing the life time;	UPS: -5 to +40°C;	
4.1.1	Maximum service altitude	1000 m (3300 ft) above sea level, max. 2000 m (6600 ft) with 1% derating per +100 m (330 ft)	1000 m (3300 ft) above sea level, max. 2000 m (6600 ft) with 1% derating per +100 m (330 ft)	
4.1.3	Relative humidity range	5 to 95%, no condensation allowed	5 to 95%, no condensation allowed	
EN60529	Degree of protection	IP20	IP30	
7.3	Acoustic noise at 1 m - Normal mode - Stored energy	67 dBA (noiseless room) 70 dBA (ISO7779) 70 dBA	55 dBA (noiseless room)	
ELECTRICAL CHARACTERISTICS – INPUT				

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5.2.2 and 6.3.2.1	Rated input voltage and voltage tolerance	Rectifier input: 3x230/400V nominal; Tolerance: 190/330-276/478V (-15%, +20%) at 100% load, 161/279-276/478V (-30%, +20%) at 50% load. Bypass input: 3x230/400V nominal; Tolerance: 190/330-253/438V (-15%, +10%)	Rectifier input: 3x230/400V nominal; Tolerance: 165V~275V(single phase voltage)285V~475V(three phase voltage) Bypass input: 3x230/400V nominal; Tolerance: 165V~275V(single phase voltage)285V~475V(three phase voltage)	
5.2.2 and 6.3.2.2	Rated input frequency and frequency tolerance	50 or 60 Hz, tolerance ±3 Hz	50 or 60 Hz, tolerance ±2 Hz	
5.2.2 and 6.3.10	Rated input current	3 x 173 A r.m.s	3*34A r.m.s	3*68A r.m.s
5.2.2 and 6.3.9.2	Maximum input current	3 x 250 A r.m.s	3*48A r.m.s	3*97A r.m.s
5.2.2	Input current distortion at rated input current	5% THD (linear-load condition)	3% THD (linear-load condition)	
5.2.2 and 6.3.10	Input power factor	0.99 at 100...30% load condition 0.96 at 10% load condition	0.99 at 100...30% load condition 0.96 at 10% load condition	
5.2.2 and 6.3.3	Inrush current	<100% of rated current	0	
5.2.2	Number of input phases	Rectifier input: 3 Phases Bypass input: 3 Phases + Neutral	Rectifier input: 3 Phases+ Neutral Bypass input: 3 Phases + Neutral	
OUTPUT WAVEFORM				
5.3.1.2 5.3.1.2	Waveform – Normal mode Waveform – Stored energy mode	Sine waveform Sine waveform	Sine waveform Sine waveform	
	Transfer – Normal mode / Stored energy	No break	No break	
	Break time / make time	No break	No break	
ELECTRICAL OUTPUT CHARACTERISTICS - STATIC CHARACTERISTICS - NORMAL MODE				
5.3.2	Rated output voltage	220/380, 230/400, 240/415 V r.m	220/380, 230/400, 240/415 V r.m.s	
	Output voltage variation	±3 V r.m.s	±3 V r.m.s	

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	Crest factor	3	3	
	Rated output frequency (nominal)	50 (default) or 60 Hz	50 (default) or 60 Hz	
6.3.2.2	Output frequency variation (synchronised if applicable)	±2 (default), ±0.5, or ±1 Hz with slew rate 1 Hz/s (default), 7 Hz/s, 3 Hz/s, 2	48-52Hz; 58-62Hz	
6.3.2.3	Output frequency synchronised phase error at change of mode	Max. 8 degrees	Max. 2 degrees	
	Rated output apparent power	120 kVA	25kVA	50kVA
	Rated output active power across linear load	108 kW	22.5kW	45kW
	Rated output active power across a reference (pf 0.7/0.9) non-linear load	84 kW / 108 kW	17.5kW/22.5kW	35kW/45kW
6.3.4.2	Total voltage distortion across a linear load	3%	1%	
6.3.8.1	Total voltage distortion across a reference non-linear load	5%	3%	
5.3.2 and 6.3.5.3	Short circuit capability	480 A, max. 300 ms	97.5	195
5.3.2 and 6.3.5.1	Overload capability	Without bypass: 10 min >100...110% (119 kW) load 1 min >110...125% (135 kW) load 10 sec >125...150% (162 kW) load With bypass: Continuous >100...110% load 10 min >110...150% load 5 ms 1000% load Note! Bypass fuses may limit the overload capability	Continuous >100...105% load 10 min >105...125% load 1 s 150% load	

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5.3.2 and 6.3.4.4	Range of load power factor permitted - linear load	Normal: 0.7 lagging – 0.9 leading; 0.8 leading with 5% derating.	Normal: 0.7 lagging – 0.8 leading -0.9 leading;	
	Number of output phases	3 Phases + Neutral	3 Phases + Neutral	
5.3.2 and 6.3.4.5	Output voltage unbalance at reference unbalance load	0	0	
5.3.2 and 6.3.4.5	Maximum phase angle variation	0°	0°	
ELECTRICAL OUTPUT CHARACTERISTICS – DYNAMIC CHARACTERISTICS - NORMAL MODE				
5.3.2 and 6.3.6.1 and 6.3.6.2	Output voltage dynamic variation during transfer normal/stored energy mode of operation and vice versa	0%	0%	
6.3.7.1 and 6.3.8.4	Output voltage dynamic variation due to load changes	± 6% with 5 ms recovery (from 10% to 90% load step)	± 2% with 20 ms recovery (from 0% to 100% load step)	
	Maximum rate of change of output frequency	0.5 (default), 2.5, or 7.5 Hz/s	0.23 Hz/s	
5.3.1	Rated output voltage	220/380, 230/400, 240/415 V r.m.s	220/380, 230/400, 240/415 V r.m.s	
6.3.4.4	Output voltage variation	±3 V r.m.s	±3 V r.m.s	
	Crest factor	3	3	
6.3.4.3	Rated peak output voltage	325 V	339 V	
5.3.2	Output frequency	50 Hz (default) or 60 Hz	50 Hz (default) or 60 Hz	
5.3.2	Output frequency variation (synchronised if applicable)	±0,005 Hz (single), ±0,07 Hz (parallel)	±0,5 Hz	
5.3.2	Rated output apparent power	120 kVA	25kVA	50kVA
5.3.2	Rated output active power across linear load	108 kW	22.5kW	45kW

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5.3.2	Rated output active power non-linear (0.9 pf) load	108 kW	22.5kW	45kW
6.3.4.4	Total output voltage distortion THDI	3% THD (linear load condition) 5% THD (non-linear load condition)	3% THD (linear load condition) 5% THD (non-linear load condition)	
5.3.2 and 6.3.5.4	Short circuit capability	480 A, max. 300 ms	97.5	195
5.3.2 and 6.3.5.2	Overload capability	10 min >100...110% (119 kW) load 1 min >110...125% (135 kW) load 10 sec >125...150% (162 kW) load 300 ms >150% load	Continuous >100...105% load 10 min >105...125% load 1 s 150% load	
5.3.2	Range of load power factors permitted	Normal: 0.7 lagging – 0.9 leading; 0.8 leading with 5% derating	Normal: 0.7 lagging – 0.8 leading -0.9 leading;	
5.3.2	Number of output phases	3 Phases + Neutral	3 Phases + Neutral	
ELECTRICAL OUTPUT CHARACTERISTICS - DYNAMIC CHARACTERISTICS - STORED ENERGY				
6.3.6.1	Output voltage dynamic variation during transfer from stored energy mode to normal mode	0%	0%	
6.3.7.1	Output voltage dynamic variation due to load changes	±6% with 5 ms recovery (from 10% to 90% load step)	± 2% with 20 ms recovery (from 0% to 100% load step)	
EFFICIENCY				
6.6.11	Efficiency Input / Output	93,6% at 100% rated linear load 92,9% at 75% rated linear load 92,5% at 50% rated linear load 89,6% at 25% rated linear load	95% at 100% rated linear load 95.4% at 75% rated linear load 95.7% at 50% rated linear load 95.1% at 25% rated linear load	95.6% at 100% rated linear load 95.9% at 75% rated linear load 96.3% at 50% rated linear load 95.6% at 25% rated linear load
6.6.11	Efficiency Input / Output	93,3% at 100% rated non-linear load 91,8% at 75% rated non-linear load 91,0% at 50% rated non-linear	94.9% at 100% rated non-linear load 95.6% at 75% rated non-linear load 95.2% at 50% rated non-linear load 94.9% at 25% rated non-linear load	94.5% at 100% rated non-linear load 94.8% at 75% rated non-linear load 95.1% at 50% rated non-linear load 94% at 25% rated non-linear load
	Heat dissipation-linear load	6900 W at 100% rated load 5300 W at 75% rated load 4200 W at 50% rated load 3700 W at 25% rated load	1200 W at 100% rated load 1000 W at 75% rated load 500 W at 50% rated load 300 W at 25% rated load	2000W at 100% rated load 1400W at 75% rated load 840 W at 50% rated load 500W at 25% rated load

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	Heat dissipation-nonlinear load	6900 W at 100% rated load 5300 W at 75% rated load 4200 W at 50% rated load 3700 W at 25% rated load	1200W at 100% rated load 800 W at 75% rated load 600 W at 50% rated load 300 W at 25% rated load	2800W at 100% rated load 1800W at 75% rated load 1100W at 50% rated load 700W at 25% rated load
SYNCHRONIZATION (if applicable)				
6.3.6.4	Acceptable voltage difference	±25%	±25%	
6.3.2.2	Range of frequency synch	±3 (default), ±0.5, or ±1 Hz with slew rate 1 Hz/s (default), 7 Hz/s, 3 Hz/s, 2 Hz/s, or ±0.5 Hz/s	48-52Hz; 58-62Hz	
6.3.6.4	Maximum phase error	8 degrees	2 degrees	
5.4 STORED ENERGY MODE OF OPERATION				
	Duration of maximum permitted stored energy time at rated load	No limit.	No limit.	
6.3.9.2	Restored energy time to 90% charge Battery rating and quantity Battery recharge profile	Max. 10 h recommended 55/67 Ah and 40 units (VRLA), max. battery voltage 240*2.35V = 564V ABM = 90% resting, 10% float charging	Max. 10 h recommended 12V XX Ah and 64units (VRLA), max. battery voltage 240*2.317V = 889V ABM = 90% resting, 10% float charging	
6.3.9.1	Battery cut-off voltage	1.75 VPC with 2 min shutdown timer; 1.56 VPC absolute value	1.67VPC absolute value	
5.8 CONTROL AND MONITORING SIGNALS				
5.8	See separate declaration for complete list of indications and remote alarm/monitoring or interface devices	See User’s Manual	See User’s Manual	
5.5.2 BYPASS CHARACTERISTICS				
5.5.2	Type of bypass	Manual and Automatic (standard)	Manual and Automatic (standard)	
5.5.2	Mechanical/static	No / Yes	No / Yes	
5.5.2	No break transfer / break transfer	No break transfer	No break transfer	
5.5.2	Break time / make	no break / no break	no break / no break	
5.5.2	Maintenance bypass	No (optional, external)	standard	
5.5.2	Bypass protection fuse or circuitbreaker rating	250 A	no bypass breaker	

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5.5.2	Galvanic isolation fitted	No (optional, external)	No (optional, external)
5.7 ELECTROMAGNETIC COMPATIBILITY			
	Immunity, see IEC/EN 62040-2	Yes (Class: restricted sales distribu	Yes
	Emission, see IEC/EN 62040-2	Yes (Class: restricted sales distribu	Yes