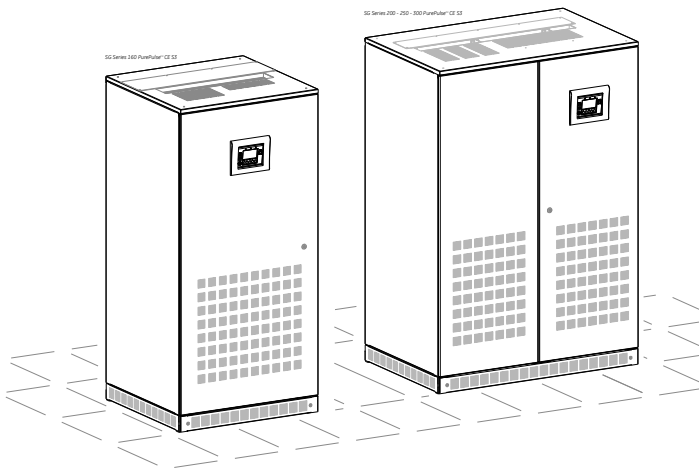


# Technical Data Sheet

Uninterruptible Power Supply

*SG Series 160 - 200 - 250 - 300 PurePulse™*

160 - 200 - 250 - 300kVA / 400Vac CE / S3



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imagination at work



Certified  
Quality System  
**ISO 9001**

Model: **SG Series 160 – 200 – 250 - 300 PurePulse™ CE S3**

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Revision	Concern	Date

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The illustrations and plans describing the equipment are intended as general reference only and are not necessarily complete in every detail.

The content of this publication may be subject to modification without prior notice.

**GENERAL DATA**

Topology	VFI, double conversion with integrated transformer				
Nominal output apparent power from PF=0.6 lag. to 0.9 lag. and at 0.9 leading	KVA	160	200	250	300
Nominal output active power from PF=0.9 lag. to 0.9 leading	kW	144	180	225	270
Efficiency at 100% load PF=1 in VFI / eBoost Operation Modes		93.6/98.4	93.7/98.4	93.4/98.4	93.5/98.5
Efficiency at 75% load PF=1 in VFI / eBoost Operation Modes	%	93.9/98.3	94.3/98.3	94.0/98.3	94.0/98.5
Efficiency at 50% load PF=1 in VFI / eBoost Operation Modes		94.2/98.1	94.6/98.1	94.1/98.1	94.2/98.3
Heat dissipation at 100% load, PF=0.8 lag. & charged battery (VFI)	kW	8.2	10.1	13.2	15.6
Heat dissipation at 100% load, PF=0.9 lag. & charged battery (VFI)	kW	9.2	11.3	14.9	17.6
Cooling air at PF=0.8 (25°C ÷ 30°C)	m³/h	2389	2940	3850	4550
Cooling air at PF=0.9 (25°C ÷ 30°C)	m³/h	2688	3308	4331	5119
Audible noise level	dB(A)	69			
Battery type	Valve regulated lead-acid (VRLA), vented lead-acid, NiCd				
Operating temperature range	UPS: 0°C ÷ 40°C				
Storage temperature range	UPS: -25°C ÷ +55°C		Battery: -20°C ÷ +40°C (higher the temperature, shorter the storage time of the battery)		
Relative Humidity	Max. 95% (non-condensing)				
Max. altitude without power derating	1000m				
Power derating (according to EN/IEC 62040-3)	1500m: -2.5% / 2000m: -5% / 2500m: -7.5% / 3000m: -10%				
Protection degree	IP 20 (IEC 60529)				
Standards	EN/IEC 62040, CE marking				
EMC (Electromagnetic Compatibility)	EN/IEC 62040-2 (Category C2 as option)				
Electrostatic discharge immunity	4kV contact / 8kV air discharge				
Internal protection	All internal live parts shrouded				
Transport	Cabinet suitable for handling by forklift				
Colour	RAL 9005 (black)				
Installation	Can be positioned against a wall and floor fixed				
Service access	Front and top access only				
External cable connections	Bottom at front of the cabinet (top as option)				
Cooling	Enforced ventilation with fan failure detection				
Paralleling (RPA version)	Up to 6 units for redundancy or capacity in RPA configuration (option)				

**RECTIFIER**

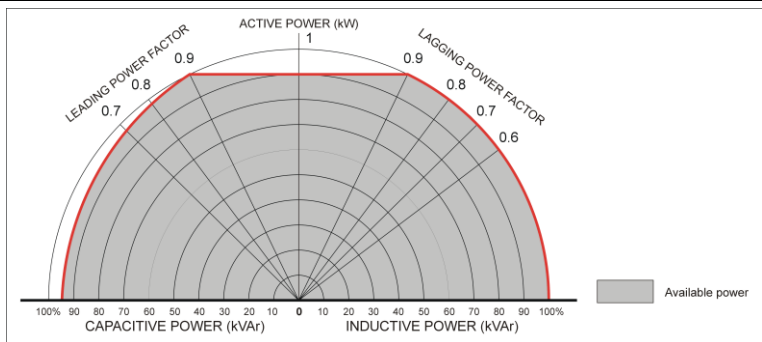
Rectifier bridge	Three phase, IGBT rectifier, PurePulse™ technology, overtemperature protection		
Standard input voltage	Nominal: 3 x 400V + N	Programmable: 3 x 380 / 415V + N	
Other input voltages	Rectifier accepted ph-ph voltage range: 340V ÷ 460V		
Input frequency	On request		
Input frequency	50/60 Hz +/-10% (45 ÷ 66 Hz)		
Power factor	0.99		
Input current THD	2% at 100% load	<2.5% at 75% load	<3% at 50% load
Inrush current	Limited by soft-start circuit		
Power walk-in	15 seconds		
Output voltage tolerance	+/- 1%		
DC voltage ripple	<1%		
DC current ripple	Max. 5% the battery capacity [Ah], expressed in A		
Battery charging characteristic	IU (DIN 41773), T° compensated floating voltage		
Battery charging current limit	Programmable		

Input power data		kVA	160	200	250	300
Input power at inverter nominal load and charged battery	at PF=0.8 lag.	kW	136.8	170.8	214.1	256.7
	at PF=0.9 lag.	kW	153.9	192.1	240.9	288.8
Max. input power at inverter nominal load and max. battery recharge current (programmable)		kW	170.5	212.7	267.8	321.1
Max. battery charging current (programmable) at the beginning of battery recharge at nominal load	at PF=0.8 lag.	A	85	105	130	160
	at PF=0.9 lag.	A	40	50	70	80

**UPS OUTPUT POWER CAPABILITY**

Output UPS power versus power factor for:

- Inductive loads
- Resistive loads
- Capacitive loads



<b>BATTERY</b>					
Battery type	Valve regulated lead-acid (VRLA)-standard, Vented lead-acid, wet battery and NiCd				
Float voltage at 20°C	400V ÷ 436V (dependent on the number of cells)				
Number of cells	VRLA at 2.27V/cell: 177÷192 cells Vented lead acid at 2.23V/cell, no boostcharge: 180÷195 cells Vented lead acid at 2.23V/cell, with boostcharge at 2.35 V/cell: 180÷185 cells NiCd at 1.41V/cell, no boostcharge: 284÷309 cells NiCd at 1.41V/cell, with boostcharge at 1.55 V/cell: 281 cells				
Min. discharge voltage (programmable)	Up to 310V (dependent on the number of cells)				
Recharge time	<5 hours up to 90% of battery capacity				
"Battery to earth" fault detection	Standard				
Automatic and manual battery test	Standard				
<b>Battery power data</b>	<b>kVA</b>	<b>160</b>	<b>200</b>	<b>250</b>	<b>300</b>
DC power at full load and PF=0.8 lag. / PF=0.9 lag.	<b>kW</b>	<b>134.7 / 151.6</b>	<b>168.4 / 189.5</b>	<b>210.5 / 236.8</b>	<b>252.6 / 284.2</b>
DC power at full typical computer load (PF=0.66 lag.)	<b>kW</b>	<b>111.2</b>	<b>138.9</b>	<b>173.7</b>	<b>208.4</b>
Matching battery cabinets	See option features on page 5				

<b>INVERTER</b>	
Nominal output apparent power from PF=0.6 lag. to 0.9 lag. & at 0.9 leading	160 – 200 – 250 - 300 kVA
Nominal output voltage (on site programmable)	3 x 380V / 400V / 415V + N
Inverter bridge	SVM (Space Vector Modulation) and IGBT technology
Output transformer (for galvanic separation)	Standard
Output waveform	Sine wave
Output voltage tolerance:	
- static .....	+/- 1%
- dynamic (at load step 0 – 100 – 0%) .....	+/- 3%
- dynamic (at load step 0 – 50 – 0%) .....	+/- 2%
- recovery time to +/-1% .....	5 ms
- output voltage THD for 100% linear load .....	Max. 1.5%
- output voltage THD for 100% non-linear load (EN 62040) .....	Max. 3%
Output voltage tolerance at 100% unbalanced load (Ph-N)	+/- 3%
Output frequency	50/60 Hz (selectable)
Output frequency tolerance:	
- free-running .....	+/- 0.1%
- with mains synchronisation adjustable to .....	+/- 4%
Phase displacement:	
- at 100% balanced load .....	120°: +/- 1%
- at 100% unbalanced load .....	120°: +/- 3%
Overload capability (at 25°C ambient temperature)	125% - 10 minutes, 150% - 1 minute
Short-circuit characteristic	Electronic short-circuit protection, current limit to: 2.7 times In for 200 ms between phase and phase 4.0 times In for 200 ms between phase and N/PE
MTCB clearance capability (selectivity)	20% In within 5-10ms (with MTCB class C or magn. trip at max. 10In)
Crest factor	>3:1

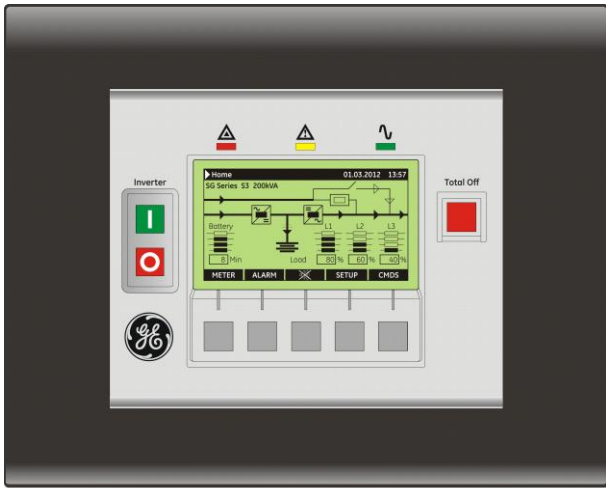
<b>eBoost™ OPERATION MODE (OPTION)</b>			
eBoost Operation Mode characteristics (option)	Output waveform		Continuously monitored
	Inverter reaction time	ms	<2 (typical)
Transfer limits in eBoost Operation Mode (option)	Steady-State RMS tolerance	Vrms	+/- 10
	Instantaneous voltage distortion (w.r.t. normal sine wave)	Magnitude Vp	+/- 50
	Steady-State frequency tolerance	Duration us	500
	Instantaneous phase shift	rad	0.15

<b>BYPASS</b>	
Input connection	Separate for rectifier and bypass input or common to the rectifier input (option)
Primary components	- Static switch (SCR) on bypass - Electromechanic contactors (backfeed protection) on bypass and inverter - 2 manual switches for maintenance bypass
Voltage limits for inverter/bypass load transfers	+/- 10% (adjustable)
Overload on bypass	150% for 1 minute & 45 times In for 10 ms, non repetitive

<b>INTERFACING</b>	
RS232 serial port	Standard
EPO - EMERGENCY POWER OFF (n/c contact, customer supplied)	Standard
Customer Interface board	Standard
6 programmable signalling voltage-free contacts .....	- Standard information for easy integration and signalling - 27 user settable signals
Connector RJ45.....	With adaptation cable for a serial port RS232 / sub DB9 connection
Input signals .....	- GEN ON (emergency power supply ON, n/o contact, customer supplied) - 1 auxiliary signal, with settable functionality

Note: all indicated values are typical. Variations may be found from one unit to another.

**FRONT PANEL CONTROLS, SIGNALS AND ALARMS**



The control panel, positioned on the UPS front door, acts as the UPS user interface and comprises of the following elements:

- Back lit Graphic Display (LCD) with the following characteristics:
  - Multilanguage communication interface: English, German, Italian, Spanish, French, Finnish, Polish, Portuguese, Czech, Slovakian, Chinese, Swedish, Russian and Dutch;
  - Graphic diagram indicating UPS status.
- Command keys and parameters setting.
- UPS status control LED.

**OPTIONS**

**COMMUNICATION:**

1. Additional Customer Interface Card
2. 3-ph SNMP/WEB plug-in Adapter
3. GE Power Diagnostics
4. GE Data Protection
5. RSB - Remote Signalling Box (cable for connection to UPS not included)

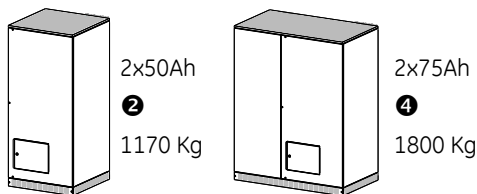
**BUILT-IN UPS OPTIONS:**

1. eBoost™ Operation Mode
2. RPA kit (Redundant Parallel Architecture)
3. Kit for common input mains
4. Auxiliary Power Supply (APS) 24VDC
5. Surge suppressors

**OPTIONS IN ADDITIONAL CABINETS:**

Dimensions (WxDxH):      ❶ 500x850x1900mm    ❷ 850x850x1900mm    ❸ 1000x850x1900mm    ❹ 1500x850x1900mm

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Rectifier or bypass or UPS input transformer</li> <li>2. EMC filter EN/IEC 62040-2 Category C2 (Class A)</li> <li>3. Top entry cables cabinet</li> <li>4. Special voltages: input and/or output</li> <li>5. Empty battery cabinets</li> <li>6. Battery cabinet 2x50Ah (without fuses)</li> <li>7. Battery cabinet 2x75Ah (without fuses)</li> </ol> | }      ❷ 160 & 200 kVA /    ❸ 250 & 300 kVA<br>}      ❶<br>}      On request<br>}      ❷      ❹ |
|---|---|



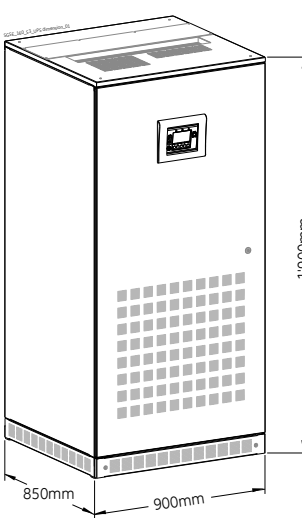
UPS	At 75% load PF 0.8				At 100% load PF 0.8			
	2x50Ah	2x75Ah	4x50Ah	4x75Ah	2x50Ah	2x75Ah	4x50Ah	4x75Ah
160	9 min.	15 min.	22 min.	36 min.	6 min.	11 min.	16 min.	25 min.
200	6 min.	12 min.	17 min.	27 min.	–	8 min.	12 min.	19 min.
250	–	8 min.	13 min.	21 min.	–	6 min.	8 min.	15 min.
300	–	–	10 min.	17 min.	–	–	6 min.	12 min.

These runtimes can be achieved only with our High Rate batteries

**EXTERNAL ACCESSORIES:**

- |  |            |
|--|------------|
| 1. Parallel output cabinet with centralized maintenance bypass | On request |
| 2. Battery fuses box   | On request |

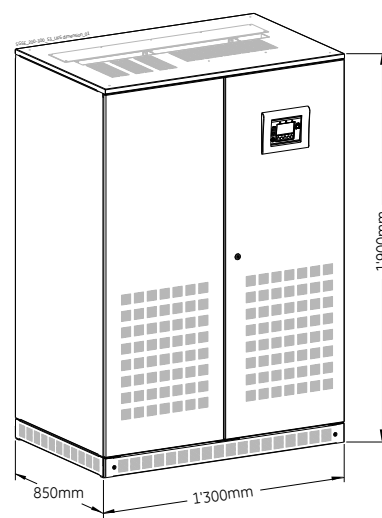
**TECHNICAL DATA**



Dimensions (WxDxH):  
900mm x 850mm x 1900mm

**WEIGHTS (kg)**

UPS Rating (kVA)	UPS cabinet		Built-in UPS options	Options in additional cabinet		
	UPS standard (kg)	Floor loading UPS standard (kg/m <sup>2</sup> )	eBoost™ Operation Mode (kg)	Rectifier or bypass transformer (850/1000x850x1900mm)	EMC filter EN/IEC 62040-Cat. C2 (500x850x1900mm)	Top entry cables cabinet (500x850x1900mm)
160	1050	1373	20	800	230	125
200	1220	1105	30	800	230	125
250	1470	1331		900	230	125
300	1560	1412		900	230	125

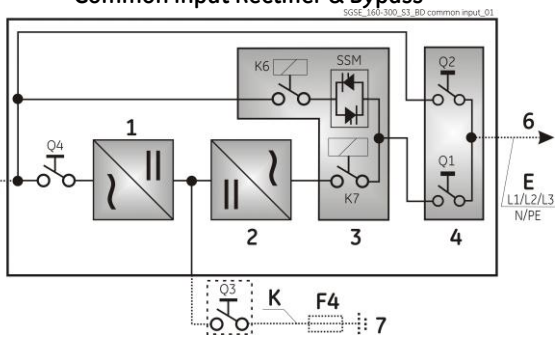


Dimensions (WxDxH):  
1300mm x 850mm x 1900mm

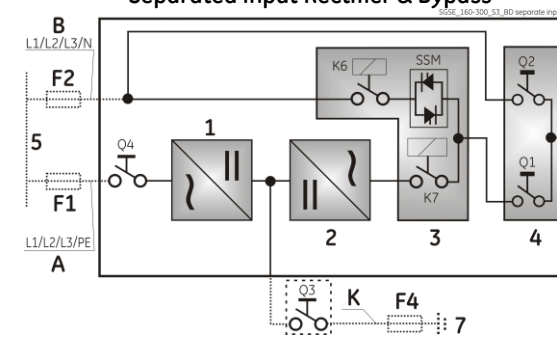
Note: Single weights have to be added up for system configuration to get the total weight!

**UPS BLOCK DIAGRAM, PROTECTIONS AND CABLE SECTIONS**

**Common input Rectifier & Bypass**



**Separated input Rectifier & Bypass**



1 = Rectifier  
2 = Inverter  
3 = Automatic Bypass  
4 = Manual Bypass

5 = Mains  
6 = Load  
7 = External Battery  
F4 = External Battery Fuses

Protections and cable sections								
Protections for mains voltages 3x380/220V, 3x400/230V, 3x415/240V				Cable sections recommended by European Standards Alternatively, local standards to be respected				
kVA	Fuses AgL or equivalent MTCB				Cable sections (mm <sup>2</sup> )			
	F1	F2	F3	F4	A	B	C & E & D	K
160	3x250A	3x250A	3x250A	2x400A	3x120+70	4x120	4x120+70	2x240+120
200	3x315A	3x315A	3x315A	2x500A	3x150+95	4x150	4x150+95	2x(2x120)+120
250	3x400A	3x400A	3x400A	2x630A	3x240+120	4x240	4x240+120	2x(2x150)+150
300	3x500A	3x500A	3x500A	2x800A	3x(2x120)+120	4x(2x120)	4x(2x120)+120	2x(2x240)+240

Cable sections recommended in Switzerland (mm <sup>2</sup> )				
kVA	A	B	C & E & D	K
160	3x150+95	4x150	4x150+95	2x(2x95)+95
200	3x185+95	4x185	4x185+95	2x(2x150)+150
250	3x(2x95)+95	4x(2x95)	4x(2x95)+95	2x(2x185)+185
300	3x(2x150)+150	4x(2x150)	4x(2x150)+150	2x(3x185)+2x150

F1, F2, F3, F4, A, B, C, D, E, (K): supplied by customer  
K: supplied by GE Digital Energy only with battery  
F4 and Q3: can be supplied by GE Digital Energy

**IMPORTANT NOTE !**

The UPS is designed for TN System. The input neutral shall be grounded at source and shall never be disconnected. 4 pole breaker shall not be used at the UPS input (see also IEC 60634, IEC 61140, IEC 61557).