

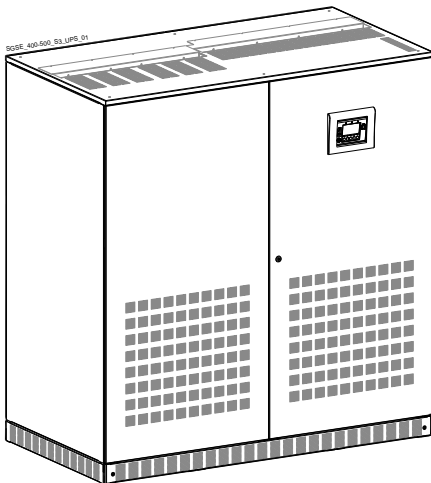
GE  
Digital Energy

# Technical Data Sheet

Uninterruptible Power Supply

*SG Series 400 & 500 PurePulse™*

400 & 500kVA / 400Vac CE / S3



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imagination at work

CE

Certified  
Quality System

ISO 9001

Model: **SG Series 400 & 500 PurePulse™ CE S3**

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<b>Up-dating</b>		
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.

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**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	400	500
Nominal output power from PF=0.9 lag. to 0.9 leading	kW	360	450
Overall efficiency at 100% load PF=1 in VFI Operation Mode / eBoost Operation Mode	%	93.3 / 98.5%	93.2 / 98.7%
Overall efficiency at 75% load PF=1 in VFI Operation Mode / eBoost Operation Mode	%	93.8 / 98.5%	93.7 / 98.7%
Overall efficiency at 50% load PF=1 in VFI Operation Mode / eBoost Operation Mode	%	94.2 / 98.3%	94.2 / 98.6%
Heat dissipation at 100% load in VFI Operation Mode, PF=0.8 lag. and charged battery	kW	21.4	27.2
Heat dissipation at 100% load in VFI Operation Mode, PF=0.9 lag. and charged battery	kW	24.1	30.6
Cooling air at PF=0.8 (25°C ÷ 30°C)	m³/h	6253	7933
Cooling air at PF=0.9 (25°C ÷ 30°C)	m³/h	7035	8925
Audible noise level	dB(A)	72	
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		
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 and fan speed regulation		
Paralleling (RPA version)	Up to 6 units for redundancy or capacity in RPA configuration (option)		

**RECTIFIER**

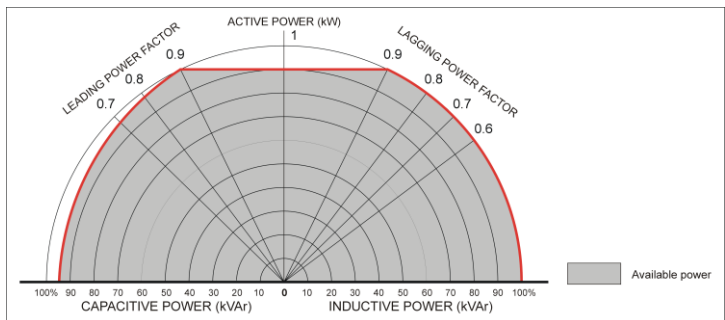
Rectifier bridge	Three phase, IGBT rectifier, PurePulse™ technology, overtemperature protection		
Standard input voltage	Nominal: 3 x 400V + N      Programmable: 3 x 380 / 415V + N Rectifier accepted ph-ph voltage range: 340V ÷ 460V		
Other input voltages	On request		
Input frequency	50/60 Hz +/-10% (45 ÷ 66 Hz)		
Power factor	0.99		
Input current THD	2% at 100% and 75% load      <3% at 50% load      <4.5% at 25% 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		

<b>Input power data</b>		kVA	400	500
Input power at inverter nominal load and charged battery	at PF=0.8 lag.	kW	343.0	429.2
	at PF=0.9 lag.	kW	385.9	482.8
Max. input power at inverter nominal load and max. battery recharge current (programmable)		kW	430	539
Max. battery charging current (programmable) at the beginning of battery recharge at nominal load	at PF=0.8 lag.	A	215	270
	at PF=0.9 lag.	A	110	140

**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		
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>400</b>	<b>500</b>
DC power at full load and PF=0.8 / PF=0.9	<b>kW</b>	<b>336.8 / 378.9</b>	<b>421.0 / 473.7</b>
DC power at full typical computer load (PF=0.66)	<b>kW</b>	<b>277.9</b>	<b>347.4</b>

<b>INVERTER</b>	
Nominal output apparent power from PF=0.6 lag. to 0.9 lag. & at 0.9 leading	400 & 500 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 with magnetic trip at max. 10In)
Crest factor	>3:1

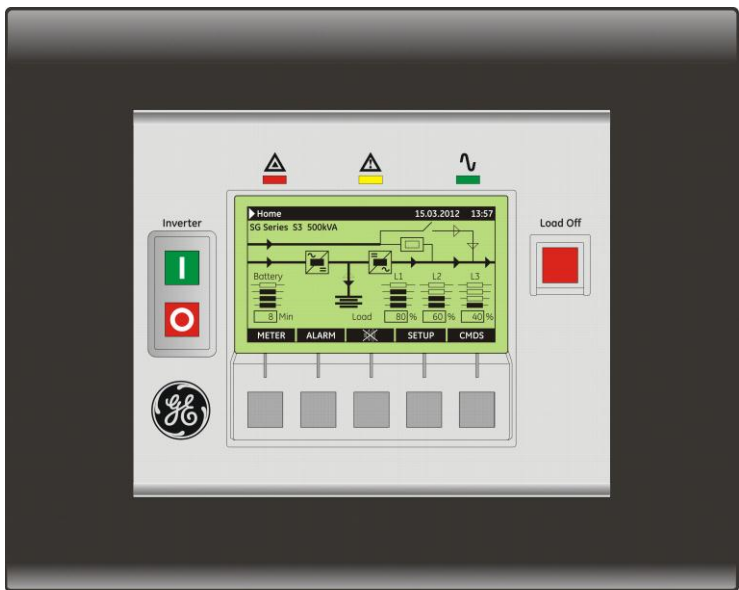
<b>eBoost™ OPERATION MODE (OPTION)</b>				
eBoost Operation Mode characteristics (option)	Output waveform		Continuously monitored	
	Inverter reaction time	ms	<2 (typical)	
Transfer limits in eBoost Operation Mode (option)	Steady-State RMS tolerance	Vrms	+/- 10	
	Instantaneous voltage distortion (w.r.t. normal sine wave)	Magnitude	Vp	+/- 50
		Duration	us	500
	Steady-State frequency tolerance	Hz	+/- 3	
Instantaneous phase shift	rad	0.15		

<b>BYPASS</b>	
Input connection	Separate for rectifier and bypass input or common to the rectifier input (option) - Static switch (SCR) on bypass - Electromechanic contactors (backfeed protection) on bypass & inverter - 2 manual switches for maintenance bypass
Primary components	
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
(available on block terminals)	
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)

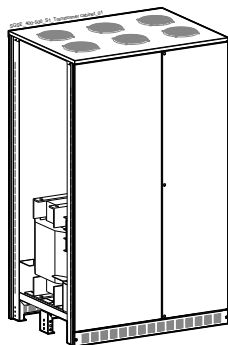
**BUILT-IN UPS OPTIONS:**

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:**

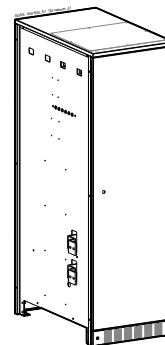
1. Rectifier or bypass or UPS input transformer

Dimensions (WxDxH):  
1300 x 950 x 1900mm



2. Battery isolator switch Q3 cabinet
3. Top entry cable cabinet
4. Battery isolator switch Q3 and Top entry cable cabinet

Dimensions (WxDxH):  
570 x 950 x 1900mm

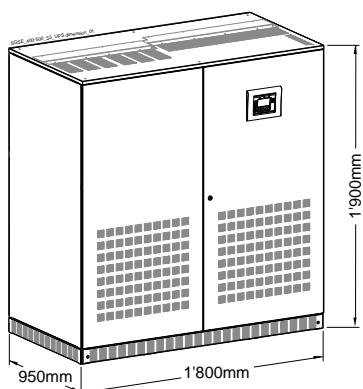


**EXTERNAL ACCESSORIES:**

- |  |                                     |
|--|-------------------------------------|
| <ol style="list-style-type: none"> <li>1. Parallel output cabinet with centralized maintenance bypass</li> <li>2. Battery fuses box</li> </ol> | <p>On request</p> <p>On request</p> |
|--|-------------------------------------|

**TECHNICAL DATA**

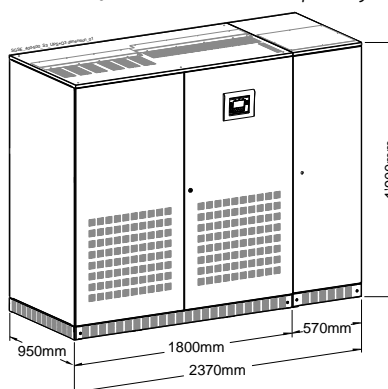
SG Series 400 & 500 PurePulse™



Dimensions (WxDxH): 1800 x 950 x 1900 mm

SG Series 400 & 500 PurePulse™

with Battery isolator switch Q3 cabinet and/or Top entry cable cabinet (option)



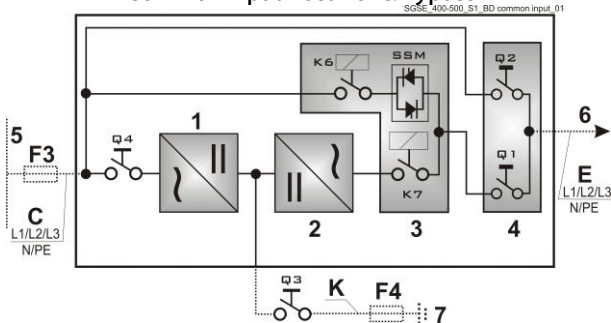
Dimensions (WxDxH): 2370 x 950 x 1900 mm

UPS model	UPS cabinet		WEIGHTS		Options in additional cabinet			
	UPS standard	Floor loading UPS standard	Built-in UPS options	eBoost™ Operation Mode	Battery Isolator switch Q3 cabinet	Top entry cable cabinet	Battery Isolator Switch Q3 and Top entry cable cabinet	Rectifier or bypass or UPS input transformer
SG Series 400 PurePulse™	2190 kg	1281 kg/m²		75 kg	180 kg	200 kg	220 kg	1350 kg
SG Series 500 PurePulse™	2470 kg	1445 kg/m²		75 kg	180 kg	200 kg	220 kg	1600 kg

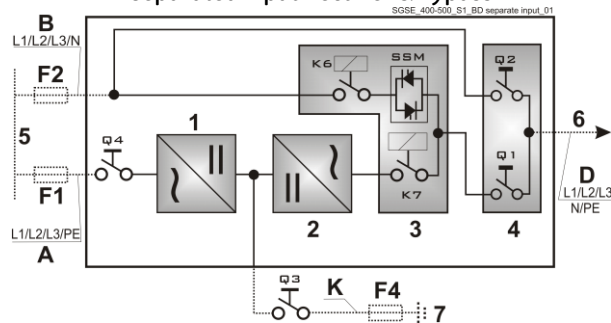
Note: Single weights have to be added up for system configuration to get the total weight!

**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
400	3x630A	3x630A	3x630A	2x1000A	3x(2x150)+150	4x(2x150)	4x(2x150)+150	2x(4x120)+2x120
500	3x800A	3x800A	3x800A	2x1250A	3x(2x240)+240	4x(2x240)	4x(2x240)+240	2x(3x240)+2x185

Cable sections recommended in Switzerland (mm <sup>2</sup> )				
kVA	A	B	C & E & D	K
400	3x(2x185)+185	4x(2x185)	4x(2x185)+185	2x(4x150)+2x150
500	3x(3x150)+240	4x(3x150)	4x(3x150)+240	2x(4x185)+2x185

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

**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 60364, IEC 61140, IEC 61557).