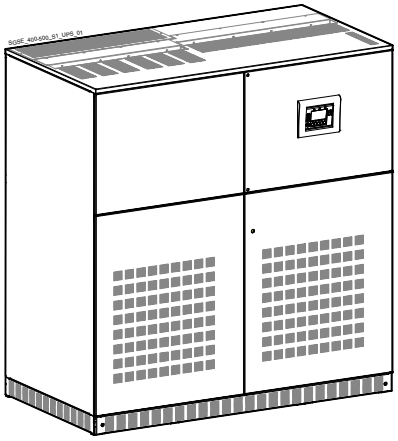
GE Digital Energy
Power Quality

Technical Data Sheet

Digital Energy™ Uninterruptible Power Supply

SG-CE Series 400 – 500 kVA PurePulse®

400 Vac CE – Series 1



GE Consumer & Industrial SA
General Electric Company
CH – 6595 Riazzino (Locarno)
Switzerland
T +41 (0)91 / 850 51 51
F +41 (0)91 / 850 51 44

www.gedigitalenergy.com

GE imagination at work

Certified
Quality System
ISO 9001

Model:	***SG-CE Series 400 – 500 kVA PurePulse®*** / Series 1
Issued by:	Product Document Department – Riazzino - CH
Date of issue:	06.07.2009
File name:	TDS_SGS_PCE_M40_M50_1GB_V020
Revision:	2.0
Identification No.	

Up-dating		
Revision	Concern	Date
2.0	ECN 1328	06.07.2009

GENERAL DATA

Topology	**VFI, double conversion with integrated transformer**		
Nominal output power from PF=0.6 lag. to 0.9 leading	**KVA/kW**	**400/360**	**500/450**
Overall efficiency at 100% load PF=0.9 lag. in VFI mode	**%**	**92.7**	**92.5**
Overall efficiency at 75% load PF=0.9 lag. in VFI mode		**93.4**	**93.3**
Overall efficiency at 50% load PF=0.9 lag. in VFI mode		**93.6**	**93.5**
Overall efficiency at 100% load in SEM mode	**%**	**98.4**	**98.5**
Heat dissipation at 100% load in VFI mode, PF=0.8 lag. & charged battery	**kW**	**25.20**	**32.43**
Cooling air (25°C ÷ 30°C)	**m^3/h**	**7350**	**9460**
Audible noise level	**dB(A)**	**72**	**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: -5% / 2000m: -9% / 2500m: -14% / 3000m: -18%**
Protection degree	**IP 20 (IEC 60529)**
Standards	**EN/IEC 62040, CE marking**
EMC	**EN/IEC 62040-2**
Electrostatic discharge immunity	**4kV contact / 8kV air discharge**
Internal protection	**All live parts shrouded**
Transport	**Cabinet suitable for handling by forklift**
Colour	**RAL 9003 (white)**
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 parallelable for redundancy or capacity in RPA configuration (optional).**

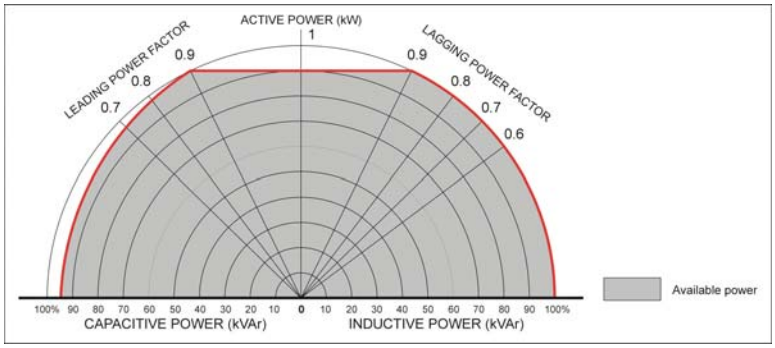
RECTIFIER

Rectifier bridge	**Three phase, IGBT rectifier, PurePulse® technology, overtemperature protection**
Standard input voltage	**Nominal: 3 x 380V / 400V / 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**

Input power data		**kVA**	**400**	**500**
Input power at inverter nominal load and charged battery	at PF=0.8 lag. at PF=0.9 lag.	**kW**	**345.2** **388.4**	**432.4** **486.5**
Max. input power at inverter nominal load and max. battery recharge current (programmable)		**kW**	**433.3**	**543.7**
Max. battery charging current (programmable) at the beginning of battery recharge at nominal load	at PF=0.8 lag. at PF=0.9 lag.	**A**	**215** **110**	**270** **140**

UPS OUTPUT POWER CAPABILITY

Output UPS power versus power factor for:
- Inductive loads
- Resistive loads
- Capacitive loads



BATTERY			
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**		
Battery power data	**kVA**	**400**	**500**
DC power at full load and PF=0.8 lag.	**kW**	**338.6**	**423.3**
DC power at full load and PF=0.9 lag.	**kW**	**380.9**	**476.2**
DC power at full typical computer load (PF=0.66 lag.)	**kW**	**277.9**	**347.4**

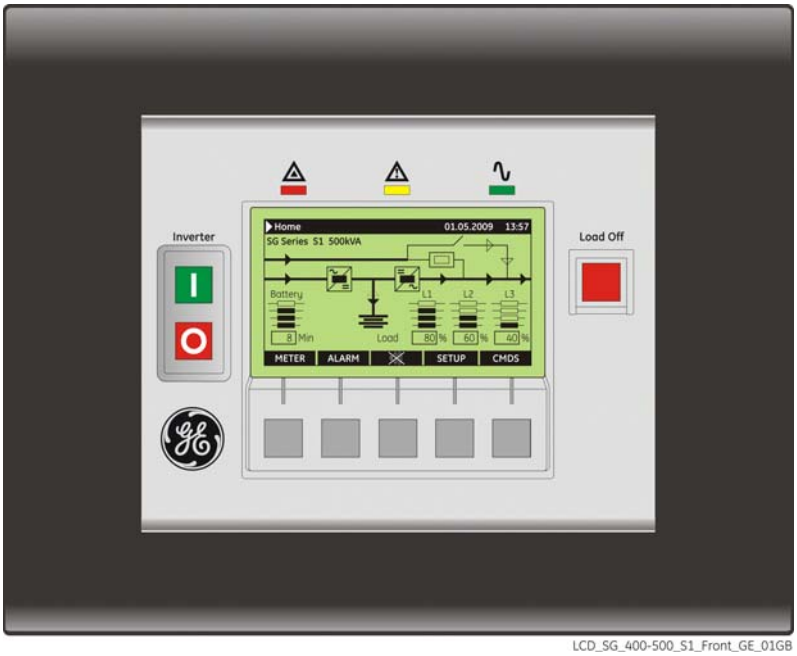
INVERTER	
Nominal output power at PF=0.6 ... 0.9 lag.	**400 - 500 kVA**
Nominal output voltage (on site programmable)	**3 x 380V / 400V / 415V + N**
Inverter bridge	**SVM (Space Vector Modulation) and IGBT technology**
Output transformer (for galvanic separation)	**Standard**
Output waveform	**Sine wave**
Output voltage tolerance: - static ..... - dynamic (at load step 0 – 100 – 0%) ..... - dynamic (at load step 0 – 50 – 0%) ..... - recovery time to +/-1% ..... - output voltage THD for 100% linear load ..... - output voltage THD for 100% non-linear load (EN 50091)	 **+/- 1%** **+/- 3%** **+/- 2%** **5 ms** **Max. 1.5%** **Max. 3%**
Output voltage tolerance at 100% unbalanced load (Ph-N)	**+/- 3%**
Output frequency	**50/60 Hz (selectable)**
Output frequency tolerance: - free-running ..... - with mains synchronisation adjustable to	 **+/- 0.1%** **+/- 4%**
Phase displacement: - at 100% balanced load ..... - at 100% unbalanced load	 **120°: +/- 1%** **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**

BYPASS	
Input connection	**Separate (dual input-recommended) or common to the rectifier input**
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	**200% for 3 minutes & 45 times In for 10 ms, non repetitive**

INTERFACING	
6 programmable signalling voltage-free contacts (available on block terminals)	**- Standard information for easy integration and signalling - 27 user settable signals**
Connector RJ45	**Standard**
Input signals	**- EMERGENCY POWER OFF** (n/c contact, customer supplied) **- 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



LCD_SG_400-500_S1_Front_GE_01GB

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)

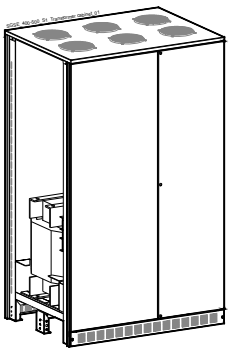
BUILT-IN UPS OPTIONS:

1. RPA kit (Redundant Parallel Architecture)
2. Kit for common input mains
3. Auxiliary Power Supply (APS) 24Vdc
4. Surge suppressors

OPTIONS IN ADDITIONAL CABINETS:

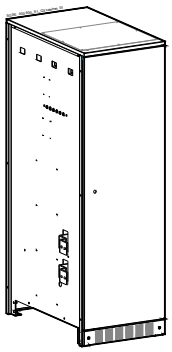
1. Rectifier or bypass or UPS input transformer

   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

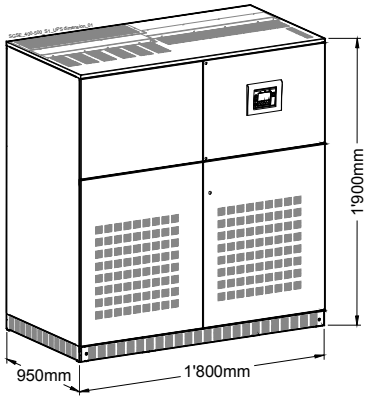


EXTERNAL ACCESSORIES:

1. ISM - Intelligent Synchronization Module	350mm x 190mm x 584mm
2. Parallel output cabinet with centralized maintenance bypass	On request
3. Battery fuses box	On request

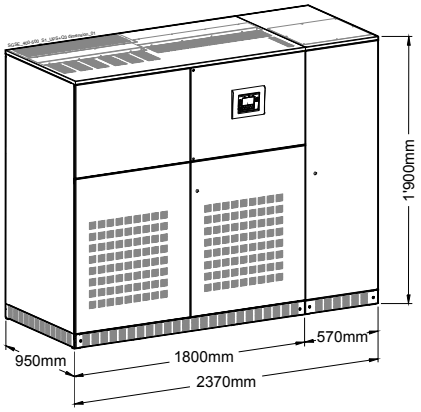
TECHNICAL DATA

SG-CE Series 400 & 500 kVA



Dimensions (WxDxH): 1800 x 950 x 1900 mm

SG-CE Series 400 & 500 kVA
with Battery isolator switch Q3 cabinet and/or Top entry cable cabinet (option)



Dimensions (WxDxH): 2370 x 950 x 1900 mm

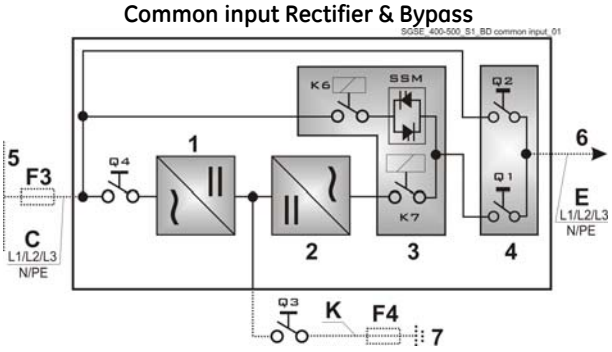
WEIGHTS

UPS model	UPS cabinet		Options in additional cabinet			
	UPS standard	Floor loading UPS standard	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-CE Series 400 kVA PurePulse®	2280 kg	1334 kg/m²	180 kg	200 kg	220 kg	1350 kg
SG-CE Series 500 kVA PurePulse®	2550 kg	1492 kg/m²	180 kg	200 kg	220 kg	1600 kg

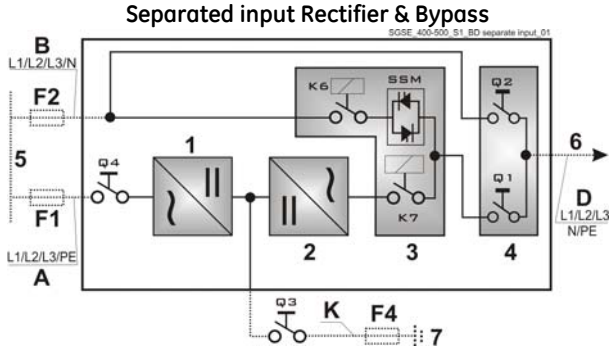
Note: Single weights have to be added up for system configuration to get the total weight!

UPS BLOCK DIAGRAM, PROTECTIONS AND CABLE SECTIONS

Common input Rectifier & Bypass



Separated input Rectifier & Bypass



1 = Rectifier
2 = Inverter
3 = Electronic Bypass
4 = Manual Bypass
5 = Mains
6 = Load
7 = External Battery
F4 = External Battery Fuses

Protections and cable sections

kVA	Protections for mains voltages 3x380/220V, 3x400/230V, 3x415/240V: Fuses AgL or equivalent MTCB				Cable sections recommended by European Standards Alternatively, local standards to be respected: Cable sections (mm²)			
	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

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*

Cable sections recommended in Switzerland (mm²)				
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

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).