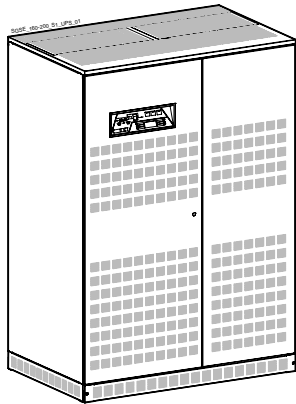
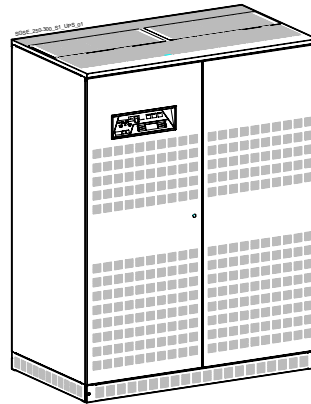


GE
Consumer & Industrial



SG-CE Series 160 - 200 kVA



SG-CE Series 250 - 300 kVA

Installation Guide
Uninterruptible Power supply
Digital Energy™
SG-CE Series
SG-CE Series PurePulse™

160 - 200 - 250 - 300 kVA
400 Vac CE / Series 1

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GE imagination at work



Certified
Quality System
ISO 9001
Reg.No.CSQ 9130.GELE

Model: **SG-CE Series 160 – 200 – 250 – 300 kVA / Series 1**
SG-CE Series 160 – 200 – 250 – 300 kVA PurePulse™ / Series 1

Date of issue: 15.02.2007

File name: ISG_SGS_XCE_M16_M30_1GB_V010

Revision: 1.0

Identification No.:

Dear Customer,

We thank you for selecting our products and are pleased to count you amongst our very valued customers at **GE**.

We trust that the use of the **SG-CE Series** Uninterruptible Power Supply system, developed and produced to the highest standards of quality, will give you complete satisfaction.

Please carefully read the *Installation Guide*.

It contains all the necessary information about the installation of the UPS.

Thank you for choosing **GE** !

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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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GE Consumer & Industrial SA
General Electric Company
CH – 6595 Riazzino (Locarno)
Switzerland



The “*Installation Guide*” is part of the “*Operating Manual*” giving all necessary information for the installation and the commissioning of the UPS.

The enclosed CD-Rom contains the complete documentation in various languages.

We strongly recommend to read carefully the *Operating Manual* on the CD-Rom before commissioning the UPS.

Content of the CD-Rom:

- **Operating Manual**

- 1 SAFETY RULES
- 2 LAYOUT
- 3 INTRODUCTION
- 4 DESCRIPTION
 - 4.1 Block diagram and main elements
 - 4.2 Operation modes
 - 4.3 Parallel system operation
 - 4.4 UPS paralleled on the same battery
 - 4.5 Service and technical support
 - 4.6 Warranty
 - 4.7 Recycling at the end of service life
- 5 INSTALLATION
 - 5.1 Transport
 - 5.2 Delivery
 - 5.3 Storage
 - 5.4 Place of installation
 - 5.5 Ventilation and cooling
 - 5.6 Unpacking
 - 5.7 Electrical wiring
 - 5.8 Electrical connection
 - 5.9 RPA Parallel system connection
 - 5.10 Control and registration of UPS data
- 6 CONTROL PANEL
- 7 LCD SCREEN
 - 7.1 Metering
 - 7.2 Alarms
 - 7.3 Parameters
 - 7.4 Edit mode
 - 7.5 User parameters
 - 7.6 Description of the Chinese LCD operation
 - 7.7 Events (alarms and messages)
- 8 OPERATION
 - 8.1 Procedures for single *SG-CE Series*
 - 8.2 Procedures for single *SG-CE Series* functioning as frequency converter
 - 8.3 Procedures for *SG-CE Series* parallel system
 - 8.4 Procedures for *SG-CE Series* parallel system with common battery
- 9 CUSTOMER INTERFACE
- 10 OPTIONS
- 11 MAINTENANCE

- **Installation Guide for option in additional cabinets** (only in English)
- **Technical Data Sheets**
- **Technical Diagrams**

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RPA

Redundant Parallel
Architecture

Parallel version secured with RPA

When included in the text, this symbol refers to operation needed only for parallel system.

1 SAFETY RULES



THE SAFETY RULES DESCRIBED IN THE ENCLOSED DOCUMENT "UPS SAFETY RULES" MUST BE STRICTLY OBSERVED.

1.1 SAFETY SYMBOLS AND WARNINGS

Safety warnings

	WARNING ! Referred to procedures or operations which could cause damages to the persons or to the system, when not correctly operated.
	NOTE ! Warns the user about important operations or procedures described in this manual.

Safety symbols

	CAUTION Related to all the potentially hazardous situations which may result in injury.
	DANGER OF PARTS ELECTRICALLY LIVE Related to all the situation with potentially hazardous voltage.
	DANGER OF EXPLOSION Used to indicate conditions where exploding parts can cause serious injury.
	DANGER OF CRUSHING Used when moving the equipment due to the heavy weight.
	DANGER OF OVERHUNG LOAD Used when the equipment is lifted by a crane.
	DANGER OF HOT SURFACE Used to indicate conditions of elevated temperature on some parts.
	DO NOT TOUCH Risk of parts with hazardous voltages or parts in movement.

2 LAYOUT

2.1 LAYOUT SG-CE Series 160 - 200 kVA

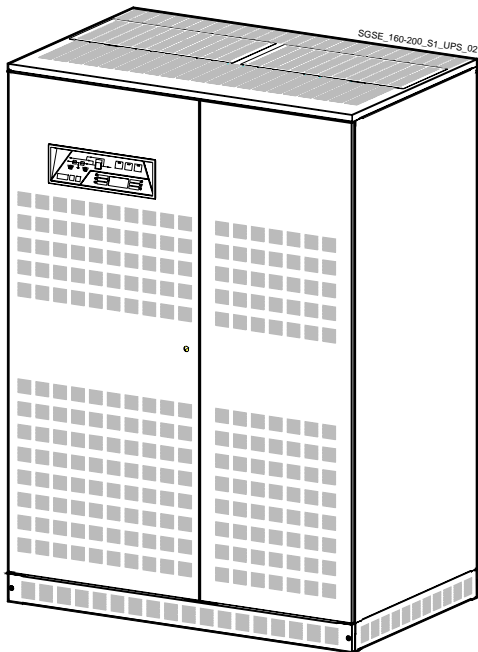


Fig. 2.1-1 General view

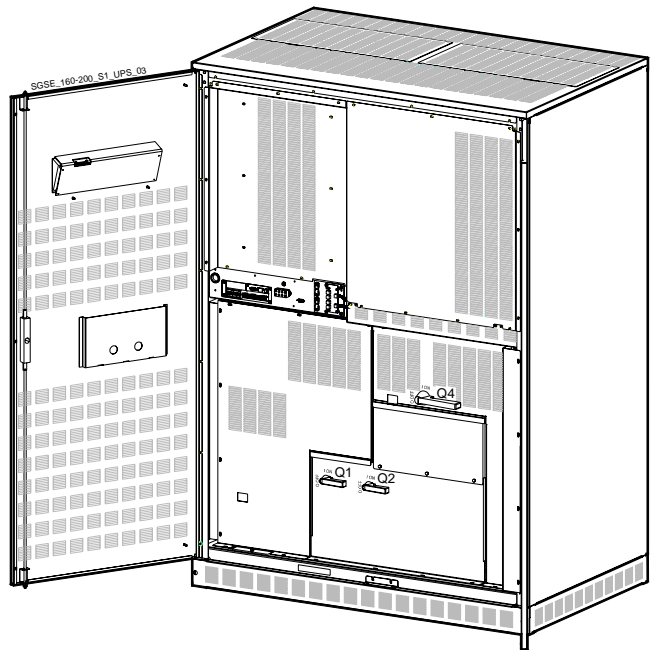


Fig. 2.1-2 General view with open door

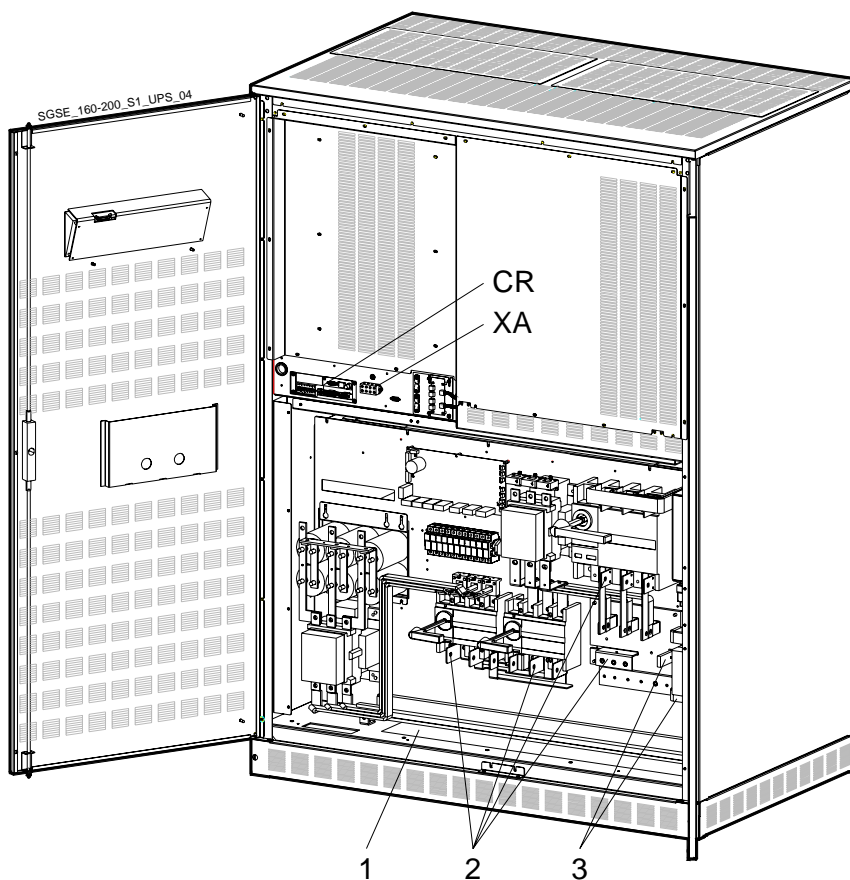


Fig. 2.1-3 General view without protection panels

- 1 Opening for bottom cable entry
- 2 Terminals for Mains Input and Load Output
- 3 Bus bars for external Battery connection
- CR Connectivity Rack
- Q1 UPS output switch
- Q2 Manual bypass switch
- Q4 Input rectifier switch
- XA Terminals for 24VDC Auxiliary Power Supply connection (option)

2.2 LAYOUT SG-CE Series 250 - 300 kVA

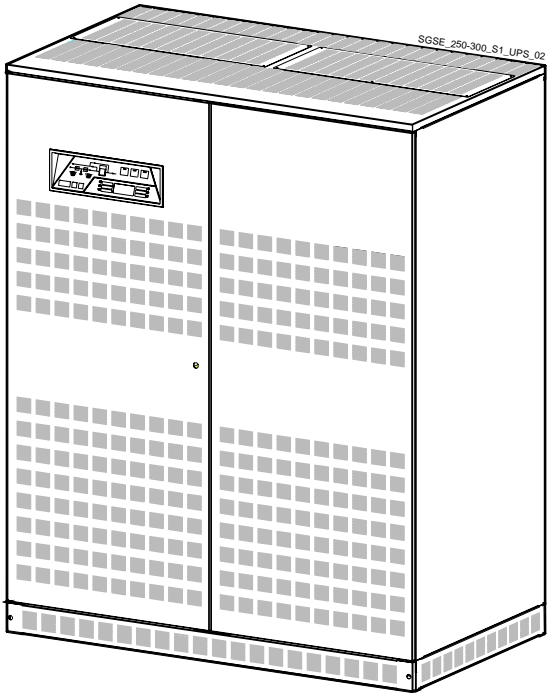


Fig. 2.2-1 General view

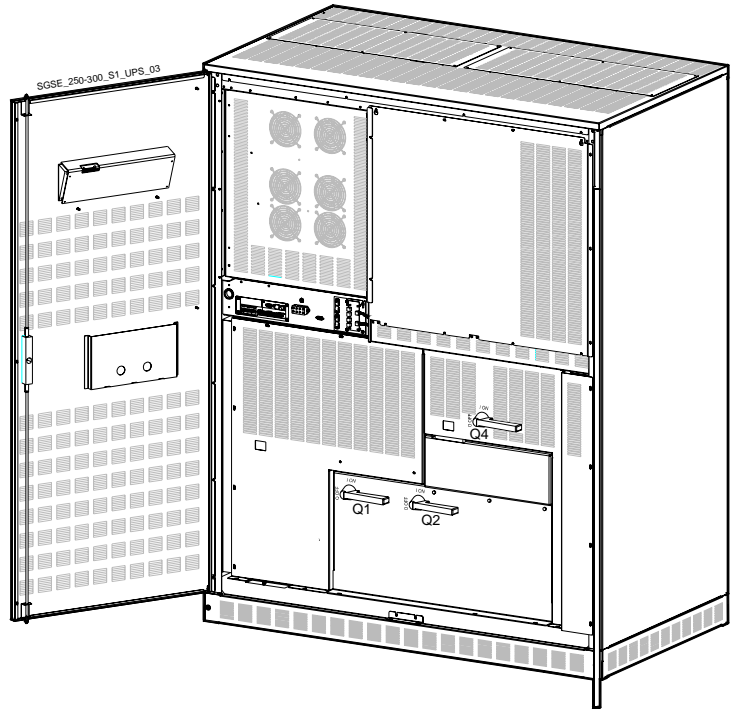


Fig. 2.2-2 General view with open door

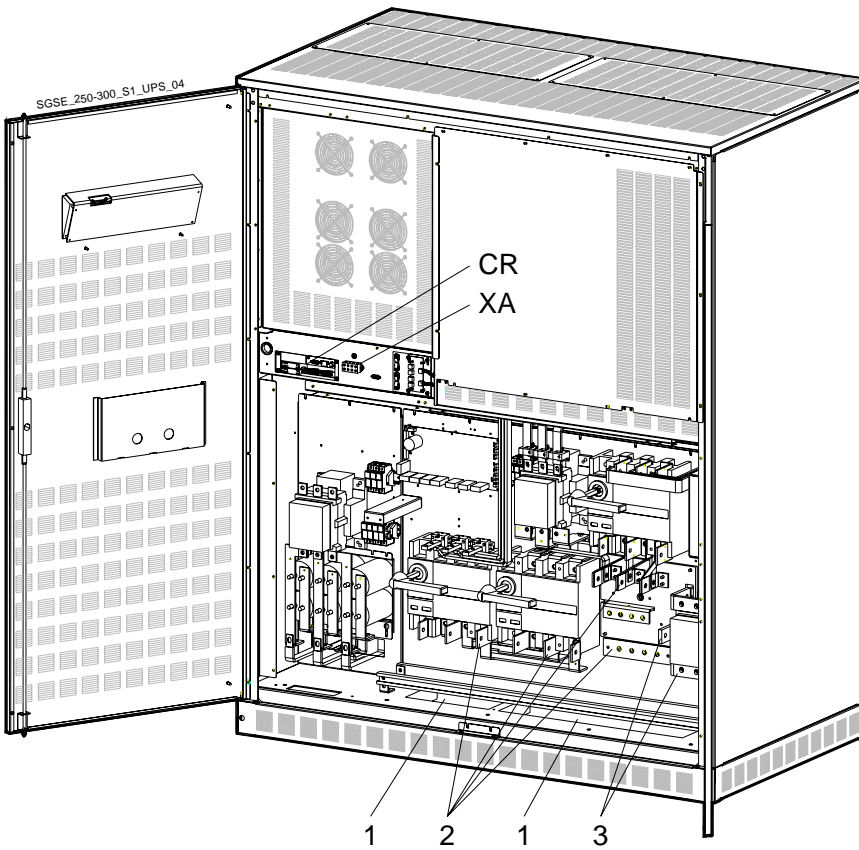


Fig. 2.2-3 General view without protection panels

- 1 Opening for bottom cable entry
- 2 Terminals for Mains Input and Load Output
- 3 Bus bars for external Battery connection
- CR Connectivity Rack
- Q1 UPS output switch
- Q2 Manual bypass switch
- Q4 Input rectifier switch
- XA Terminals for 24VDC Auxiliary Power Supply connection (option)

3 INTRODUCTION

An **Uninterruptible Power Supply** (UPS) provides the power for critical loads that need a reliable, continuous, disturbance free supply.

In case the power provided by the *Mains Fails*, or exceeds the permitted tolerances, the power to supply the *Load* is provided by the *Battery* for the specified time at the rated *Load* (or longer at a reduced *Load*) or until the *Mains* power returns.

SG-CE Series is a true double conversion **VFI** (*Voltage Frequency Independent*) UPS system where the *Load* is continuously supplied by the *Inverter* through the *Rectifier*.

SG-CE Series can be configured, if chosen, for the **SEM** mode (*Super Eco Mode*) permitting maximum energy saving.

If the *Inverter* is not able to supply the required *Output Voltage*, or when overload or short-circuit on the output occur, the *Load* is instantly transferred to the *Mains* via the *Automatic Bypass*.

The UPS automatically returns to normal mode when the failure condition is restored.

4 DESCRIPTION

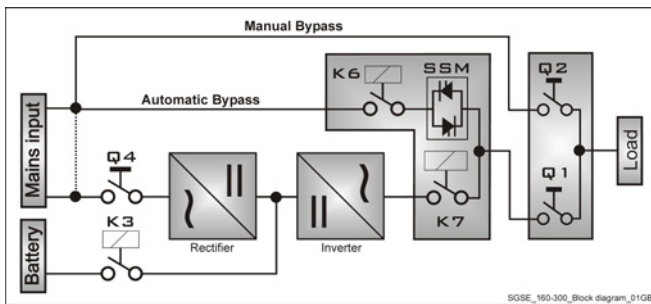


Fig. 4-1 UPS Block Diagram

SG-CE Series 160-300 kVA

The GE Digital Energy SG-CE Series is one of the best performing and most reliable three-phase UPS systems providing critical power protection for a wide range of applications.

Every SG-CE Series system operates in VFI mode (*Voltage Frequency Independent*) yielding the maximum levels of power reliability for all mission-critical processes.

With proven technology the SG-CE Series UPS provides top class reliability and performance.

With *backfeed protection* and compliance to *EMC standards* the SG-CE Series complies to current and future standards.

Reliability can be further increased by paralleling up to eight UPS units utilising GE's unique *RPA™ technology* (*Redundant Parallel Architecture*).

With *RPA* every UPS is controlled in a true *peer-to-peer* configuration with redundancy in all critical elements and functions, eliminating all single points of failure.

The decentralised bypass offers great flexibility to up or down grade the system in case future needs might change.

SG-CE Series 160-300kVA PurePulse™

GE's SG-CE Series family of UPS ranges from 160-300kVA and are available either with traditional *thyristor rectifier technology*, or with a rectifier based on GE's cutting edge *PurePulse™ technology*.

PurePulse™ is an innovative control algorithm applied on the *IGBT rectifier*.

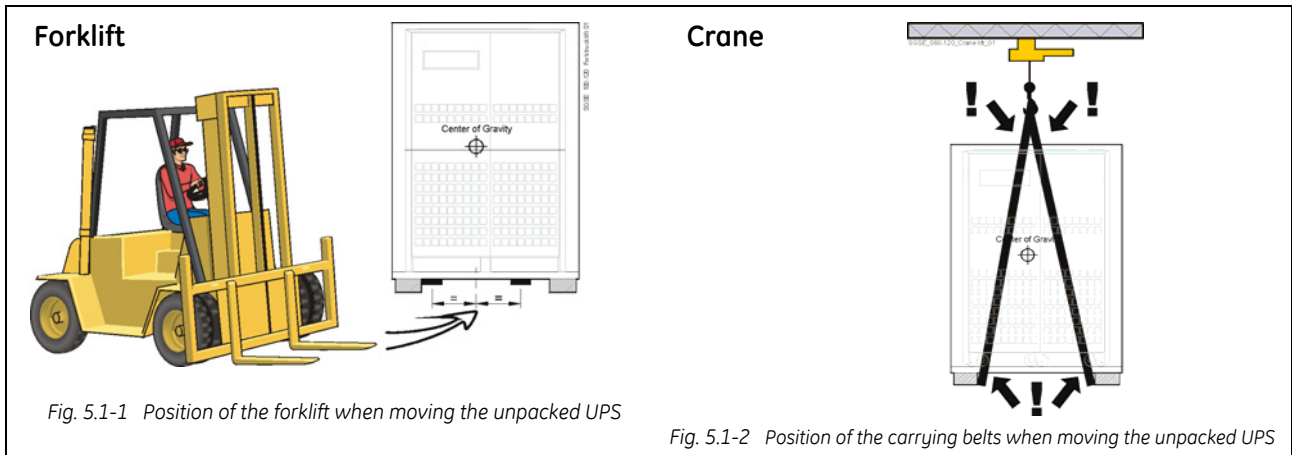
This current source rectifier assures an *Input Total Harmonic Distortion (THDi)* of less than 4%, and draws a pure sinusoidal waveform from the mains.

The advantages of GE's *PurePulse™ technology* span from savings in the sizing of upfront equipment (such as generator sets, cabling and circuit breakers) to a total elimination of costs for additional active or passive input filters.

PurePulse™ is a breakthrough innovation from GE.

5 INSTALLATION

5.1 TRANSPORT

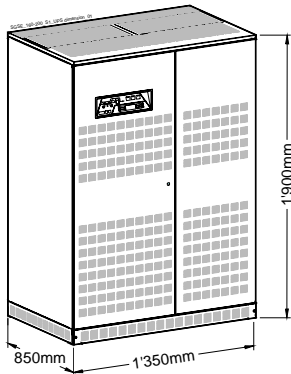


NOTE !

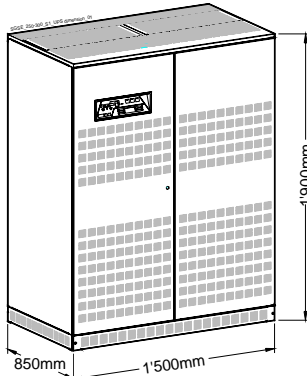
Take note of the *centre of gravity* marked on the package.
 Check for sufficient floor and elevator loading capacity.
 Transport UPS only in upright position.
 Do not stack other package on top of the UPS.
 A damaged UPS must never be installed or connected to mains or battery!

5.2 DIMENSIONS AND WEIGHTS

SG-CE Series 160 & 200 kVA



SG-CE Series 250 & 300 kVA



Dimensions and weights			
		SG-CE Series	SG-CE Series PurePulse™
160 kVA	Dimensions:	1350 x 850 x 1900 mm	1350 x 850 x 1900 mm
	Weight:	1100 Kg	1225 Kg
	Floor loading:	959 Kg/m ²	1068 Kg/m ²
200 kVA	Dimensions:	1350 x 850 x 1900 mm	1350 x 850 x 1900 mm
	Weight:	1140 Kg	1315 Kg
	Floor loading:	994 Kg/m ²	1146 Kg/m ²
250 kVA	Dimensions:	1500 x 850 x 1900 mm	1500 x 850 x 1900 mm
	Weight:	1430 Kg	1675 Kg
	Floor loading:	1122 Kg/m ²	1314 Kg/m ²
300 kVA	Dimensions:	1500 x 850 x 1900 mm	1500 x 850 x 1900 mm
	Weight:	1450 Kg	1775 Kg
	Floor loading:	1138 Kg/m ²	1393 Kg/m ²

5.3 PLACE OF INSTALLATION

Positioning of the UPS SG-CE Series 160 - 200 - 250 - 300 kVA

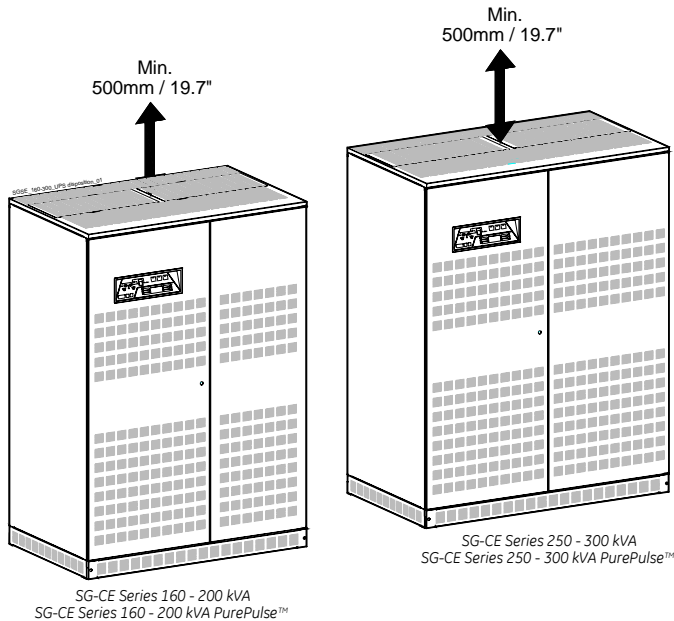


Fig. 5.3-1 Positioning of the UPS SG-CE Series 160 - 300 kVA

The rear panel of the UPS may be mounted flush to a wall or other structure.

Clearance around the front of the unit should be sufficient to enable free passage of personnel with the doors fully open, and to allow sufficient airflow to the door vents.

To guarantee proper cooling air exhaust, the recommended minimum clearance between ceiling and top of the UPS is **500 mm (19.7")**.

A single-phase power outlet (230 VAC) should be provided near the UPS for connection of power tools, test equipment or connectivity devices. This outlet must be grounded.

Opening for input and output cable connections SG-CE Series 160 - 300 kVA

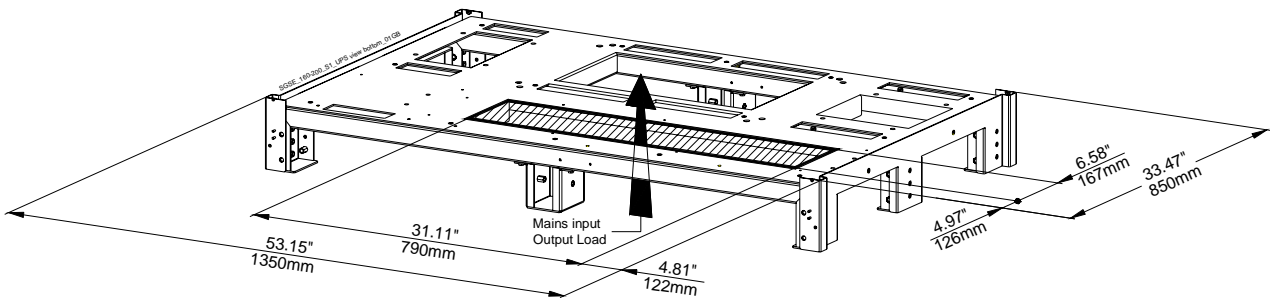


Fig. 5.3-2 SG-CE Series 160 - 200 kVA - Opening on the bottom of the cabinet for input and output cables

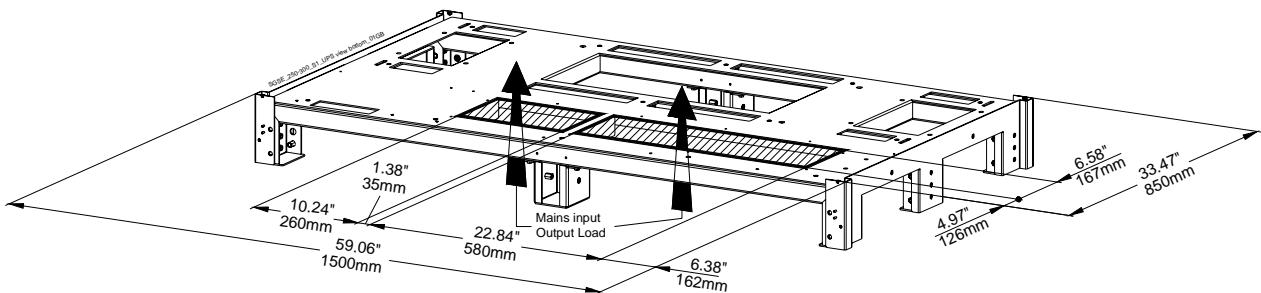


Fig. 5.3-3 SG-CE Series 250 - 300 kVA - Opening on the bottom of the cabinet for input and output cables

SG-CE Series provided an opening on the bottom of the cabinet for the connection of input and output cables.

Pay attention to the position of this opening when choosing the placement of the UPS.

The option "Top Entry Cable" allows the connection of input and output cables from the top of the UPS.

See "Operating Manual - Section 10 - Options" in the enclosed CD-Rom.

Fixing of the UPS cabinet SG-CE Series 160 – 300 kVA on the floor

The UPS cabinet is free standing and normally does not require to be bolted to the floor.

The UPS cabinet can be fixed however to the floor by bolting it with the supporting blocks to the floor.

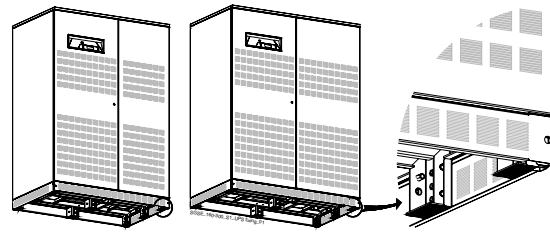


Fig. 5.3-4 Fixing of the UPS cabinet on the floor

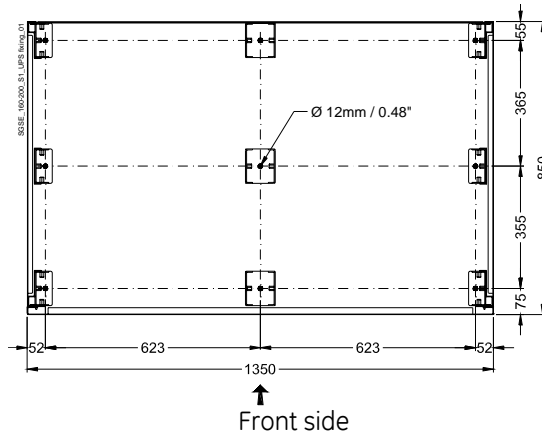


Fig. 5.3-5 SG-CE Series 160-200 kVA – UPS cabinet floor fixing points

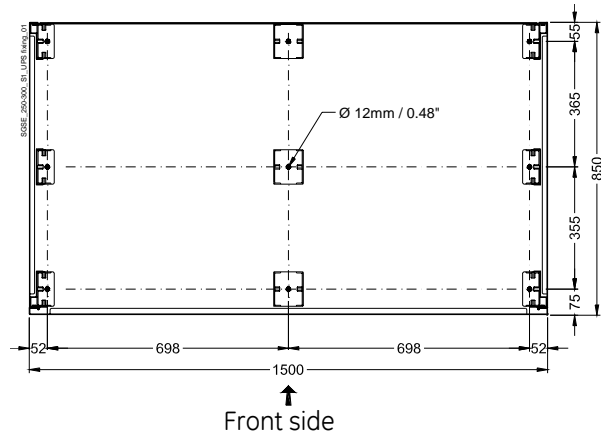


Fig. 5.3-6 SG-CE Series 250-300 kVA - UPS cabinet floor fixing points

5.4 UNPACKING

Move the equipment in its original packing, carton box or wooden case, until the place of installation and remove the packing and the transport sockets only just before installing the UPS.

Be aware of the heavy weight of the UPS, pay attention when moving the UPS cabinet.



NOTE !

Be aware of the heavy weight of the UPS, pay attention when moving the UPS cabinet.

Ensure that the cabinet is not damaged when moving by forklift.

Included in the delivery you can find the following parts:

- An accessories bag.
- Air inlet grids, which must be mounted on the bottom of the cabinet UPS with the screws included.
- Control Bus cables for inter-connecting the UPS modules (only for RPA system).
- The documentation includes the "Installation Guide" with a CD-Rom and the "UPS Safety Rules".

In addition you can find a cable (standard length: 5m) with the thermal protection sensor.

This is to compensate the battery charge voltage (only for type VRLA without maintenance) based on the working temperature.

The terminal with the sensor must be mounted in the battery cabinet and the **J10** plug must be connected to "**P1-Power Interface**". See "Operating Manual - Section 5.4 - Unpacking" in the enclosed CD-Rom.

When the sensor is disconnected, the floating voltage is calibrated for temperature = **20°C**.

If the battery cabinet is not mounted side by side the UPS, the cable connecting the temperature sensor to the UPS should be run in a protective trunk or conduit.




PACKING MATERIAL RECYCLING

GE, in compliance with environment protection, use only environmentally friendly material.

UPS packing materials must be recycled in compliance with all applicable regulations.

5.5 ELECTRICAL WIRING

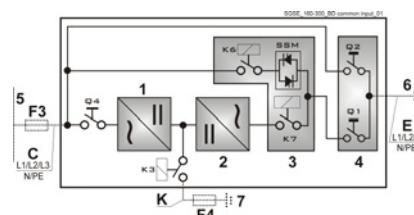


WARNING !
 UPS installation and connection must be performed by **QUALIFIED SERVICE PERSONNEL** only.
 Refer to the "*Safety prescriptions - Installation*".

5.5.1 Mains input connection


The *mains input* power connection can be common or separate for *bypass supply* and *rectifier input*, depending on the electrical system provided by the customer.

Common input Rectifier & Bypass



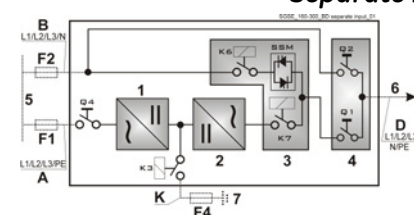
The **same power source** is to be used for both *bypass supply* and *rectifier input* (input **F3**).

Bear in mind that when the *mains fuses* are opened there is a supply failure to the *rectifier* as well as to the *bypass* and *manual bypass switch*.




In this case, the interconnection links **BR1, BR2** and **BR3** on the input terminals or bus bars **MUST REMAIN CONNECTED**.

Separate input Rectifier & Bypass (recommended)



The *bypass* and *rectifier* use different power sources (**F1** and **F2** inputs).

In this case, when the *rectifier-input fuses* are opened, the *automatic bypass* and the *manual bypass* are supplied by the other connection.



In this case, **REMOVE** the interconnection links **BR1, BR2** and **BR3** on the input terminals or bus bars. See Fig. 5.6.3-1 and 5.6.4-1.

5.5.2 Input/output over current protection and wire sizing

Fuses AgL / circuit breakers for 3x380/220V, 3x400/230V, 3x415/240V					Cables section (mm ²) A, B, C, D, E, K Recommended by European Standards (EN)				
kVA	F1	F2	F3	F4	A	B	C + E	D	K
160	3x315A	3x250A	3x315A	2x400A	3x150+95	4x120	4x150+95	4x120+70	2x240+120
160 PurePulse™	3x250A	3x250A	3x250A	2x400A	3x120+70	4x120	4x120+70	4x120+70	2x240+120
200	3x400A	3x315A	3x400A	2x500A	3x240+120	4x150	4x240+120	4x150+95	2x(2x120)+120
200 PurePulse™	3x315A	3x315A	3x315A	2x500A	3x150+95	4x150	4x150+95	4x150+95	2x(2x120)+120
250	3x500A	3x400A	3x500A	2x630A	3x(2x120)+120	4x240	4x(2x120)+120	4x240+120	2x(2x150)+150
250 PurePulse™	3x400A	3x400A	3x400A	2x630A	3x240+120	4x240	4x240+120	4x240+120	2x(2x150)+150
300	3x630A	3x500A	3x630A	2x800A	3x(2x150)+150	4x(2x120)	4x(2x150)+150	4x(2x120)+120	2x(2x240)+240
300 PurePulse™	3x500A	3x500A	3x500A	2x800A	3x(2x120)+120	4x(2x120)	4x(2x120)+120	4x(2x120)+120	2x(2x240)+240

	Cables section (mm ²) A, B, C, D, E, K Recommended in Switzerland (SEV / ASE)					
	kVA	A	B	C + E	D	K
The delivery and installation of fuses and input/output connections of the UPS are at the customer's expense, unless agreed otherwise.	160	3x185 + 95	4x150	4x185 + 95	4x150 + 95	2x(2x95) + 95
	160 PurePulse™	3x150 + 95	4x150	4x150 + 95	4x150 + 95	2x(2x95) + 95
	200	3x(2x95) + 95	4x185	4x(2x95) + 95	4x185 + 95	2x(2x150) + 150
	200 PurePulse™	3x185 + 95	4x185	4x185 + 95	4x185 + 95	2x(2x150) + 150
	250	3x(2x150) + 150	4x(2x95)	4x(2x150) + 150	4x(2x95) + 95	2x(2x185) + 185
	250 PurePulse™	3x(2x95) + 95	4x(2x95)	4x(2x95) + 95	4x(2x95) + 95	2x(2x185) + 185
	300	3x(2x185) + 185	4x(2x150)	4x(2x185) + 185	4x(2x150) + 150	2x(3x185) + 2x150
	300 PurePulse™	3x(2x150) + 150	4x(2x150)	4x(2x150) + 150	4x(2x150) + 150	2x(3x185) + 2x150

5.5.3 Installation requirements

NOTE !

The cabling of the UPS system has to be sized according to the UPS power rating. Exceptions are only allowed to suit local prescriptions. Sizing of circuit breakers, fuses and cables for input mains, output load and battery must meet the requirements of local and national electrical codes.

Before connecting the UPS, verify that the mains voltage and frequency, the output load voltage and frequency and battery data (cells number, floating voltage, autonomy) are according to the required data.

The protection of the UPS mains input must be exclusively with 3 pole breakers. Disconnection of the Neutral is not permitted.

The UPS needs the connection of the Neutral to the input, to guarantee the function in TN mode (Neutral-Earth).

Caution when using four-pole circuit breakers as protection to the UPS load. A potential problem exists for situations with non-linear loads, causing the neutral current to be higher than the phase currents.

Avoid to run the input cables in parallel with the output cables to prevent them from noise induction.

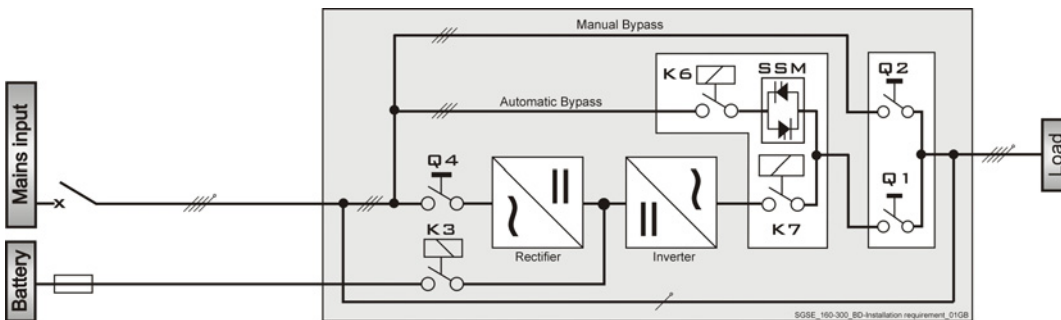
The three-phase Mains power supply must be symmetrical with respect to earth, due to the existence of voltage surge protection devices inside the UPS.

The connection of the Battery to the UPS must be protected with fuses or similar devices according to technical specifications and in accordance with local standards.

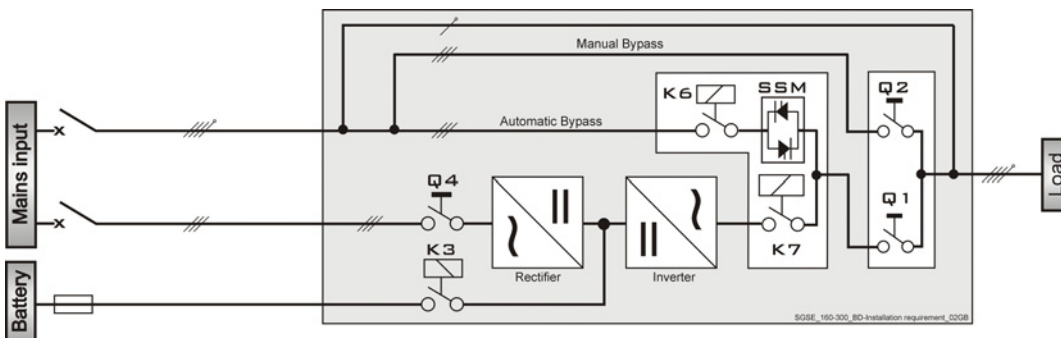


Typical examples for the connection of the SG-CE Series 160 – 300 kVA.

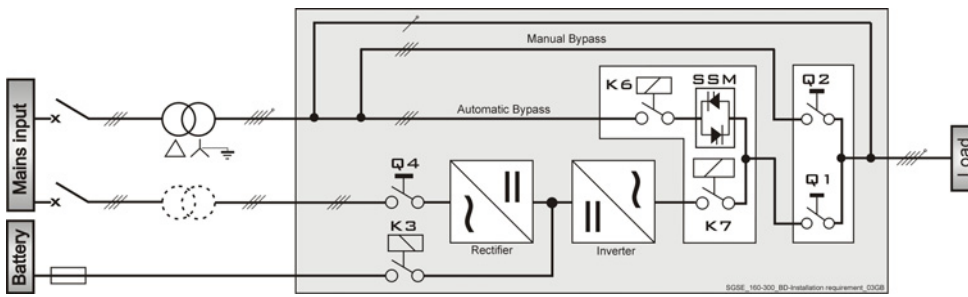
Single UPS with common input for rectifier & bypass



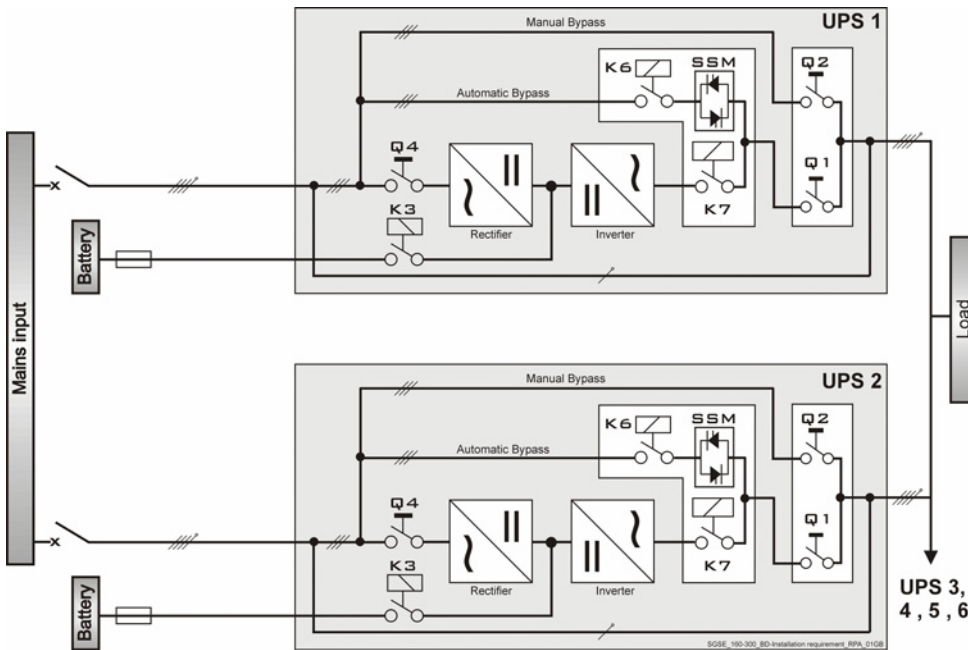
Single UPS with separate input for rectifier & bypass



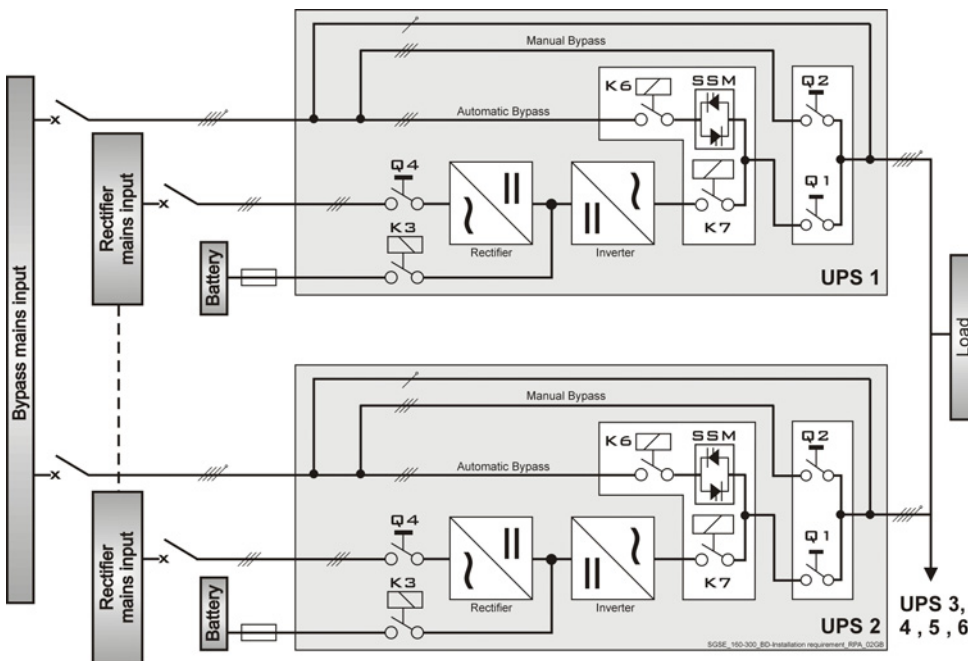
UPS single unit with separate mains input for Rectifier and Bypass and galvanic separation



UPS parallel system with common input rectifier & bypass



UPS parallel system with separate input for rectifier & bypass



5.6 ELECTRICAL CONNECTION



WARNING !

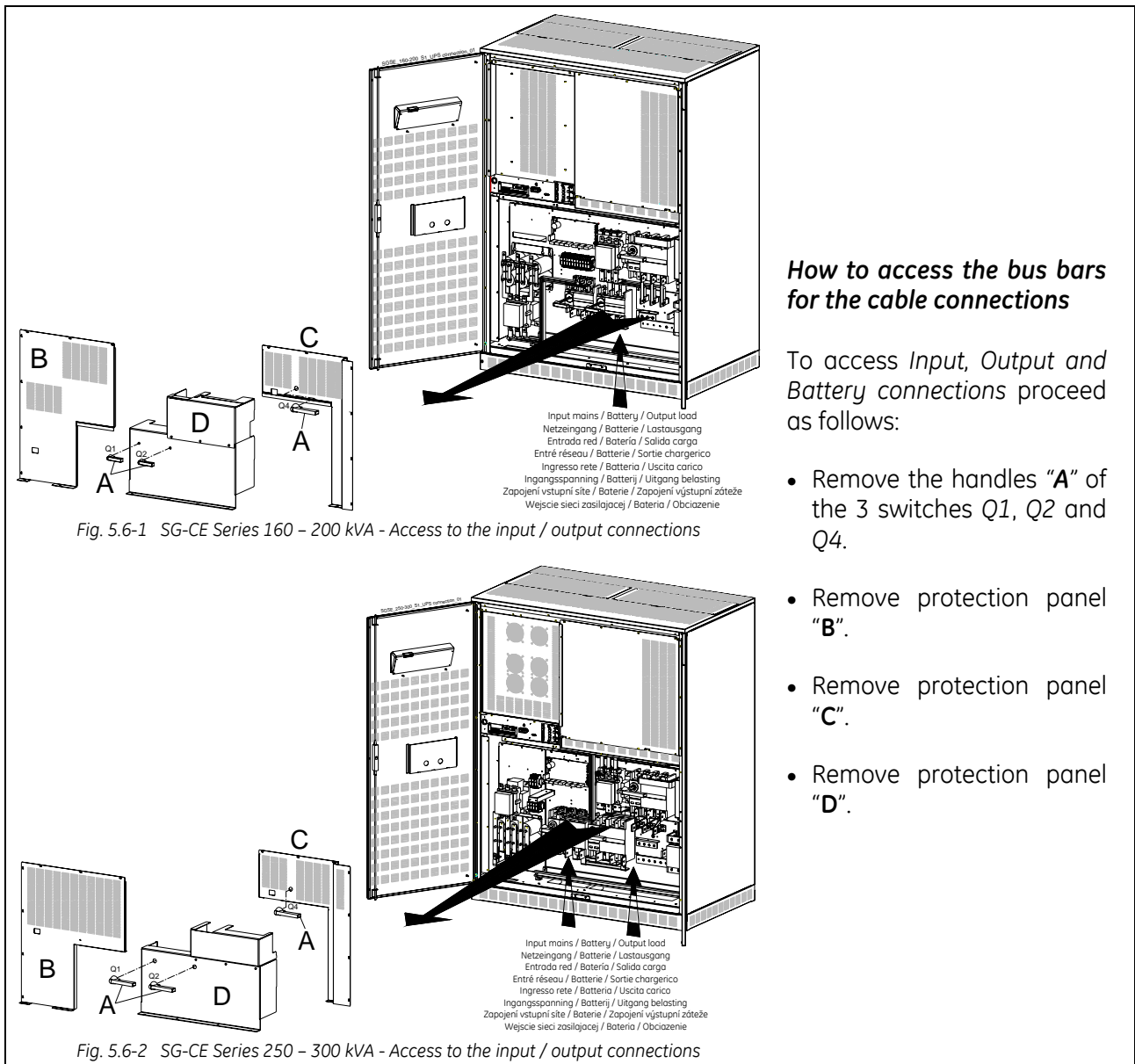
UPS installation and connection must be performed by **QUALIFIED SERVICE PERSONNEL** only.

For the installation and connections of options in separate cabinets, consult the appropriate *"Installation Guide"* in the enclosed CD-Rom.

Refer to the *"UPS Safety Rules - Installation"*.

Carefully read the following recommendations before proceeding:

- Ensure that the AC and DC external isolators are Off, and prevent their inadvertent operation.
- Do not close any external isolators prior to the commissioning of the equipment.
- The input/output cables must be put in order and fixed, taking care to avoid risk of short-circuit between different poles.
- The earthing and neutral connection of the electrical system must be in accordance with local regulations.
- In case of additional cabinets containing batteries, filters, input/ output transformers, etc, the earth must be connected to the UPS main earth.
- Once the power cables have been connected, re-install the internal safety shields and close the cabinets by re-installing all external panels.



5.6.1 SG-CE Series 160 – 200 kVA - Power connection

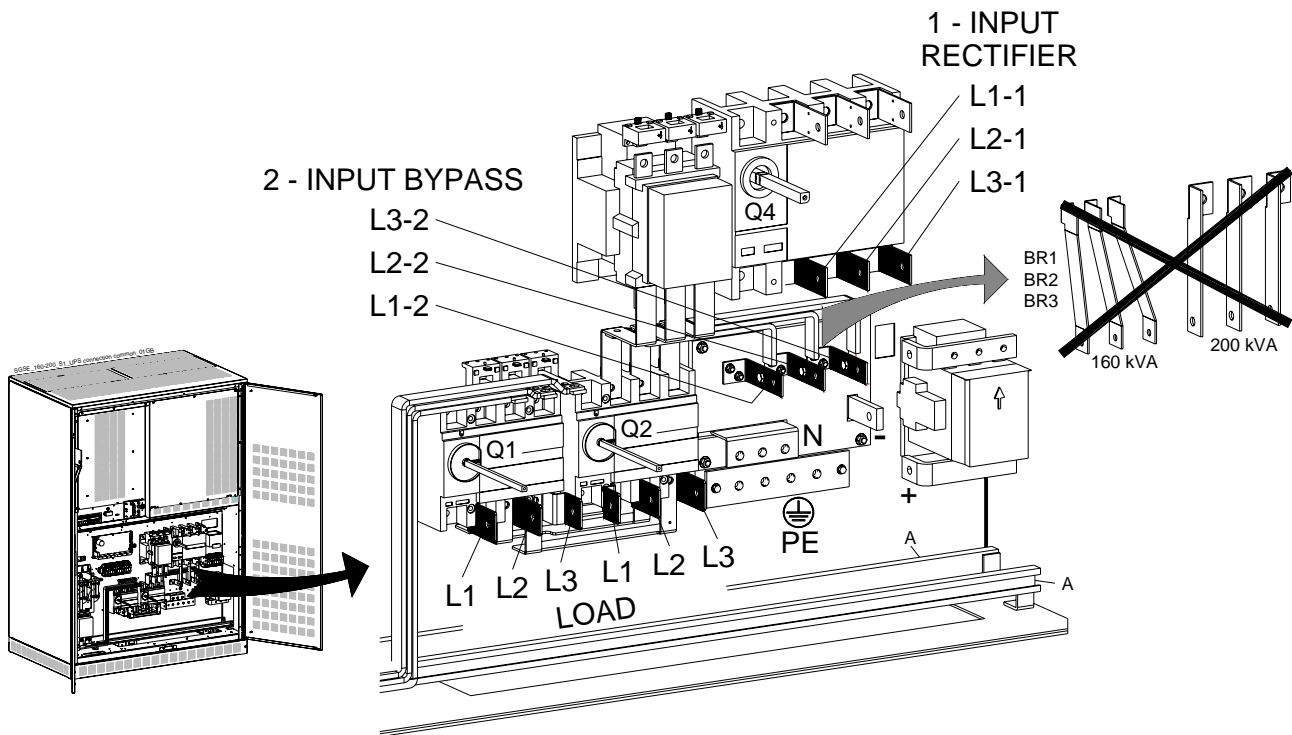





Fig. 5.6.1-1 SG-CE Series 160 –200 kVA - Power connections

Power connection cables are connected to bus bars using **M10 bolts**.
 The bolts of the connection cables must be tightened with a torque wrench at **40Nm**.
 Fix the cables on profile "A" with the enclosed cable ties.

Common Input Rectifier / Bypass			
L1-1	Rectifier + Bypass Phase L1		
L2-1	Rectifier + Bypass Phase L2	N	Neutral
L3-1	Rectifier + Bypass Phase L3	PE	Ground
	NOTE ! Bus bars BR1, BR2 and BR3 MUST REMAIN CONNECTED .		

Separate Input Rectifier / Bypass			
L1-1	Rectifier phase L1	L1-2	Bypass phase L1
L2-1	Rectifier phase L2	L2-2	Bypass phase L2
L3-1	Rectifier phase L3	L3-2	Bypass phase L3
PE	Ground	N	Neutral (Bypass)
	NOTE ! The Bus bars BR1, BR2 and BR3 MUST BE REMOVED (see Fig. 5.6.1-1).		

Output Load			
L1	Load phase L1	L2	Load phase L2
N	Neutral	L3	Load phase L3
		PE	Ground

	NOTE ! This UPS is only designed to operate in a wye-configured electrical system with a solidly grounded neutral. If the UPS is equipped with an input bypass transformer, the secondary of the transformer must be wye-configured with neutral solidly grounded.
---	---

5.6.2 SG-CE Series 250 – 300 kVA - Power connection

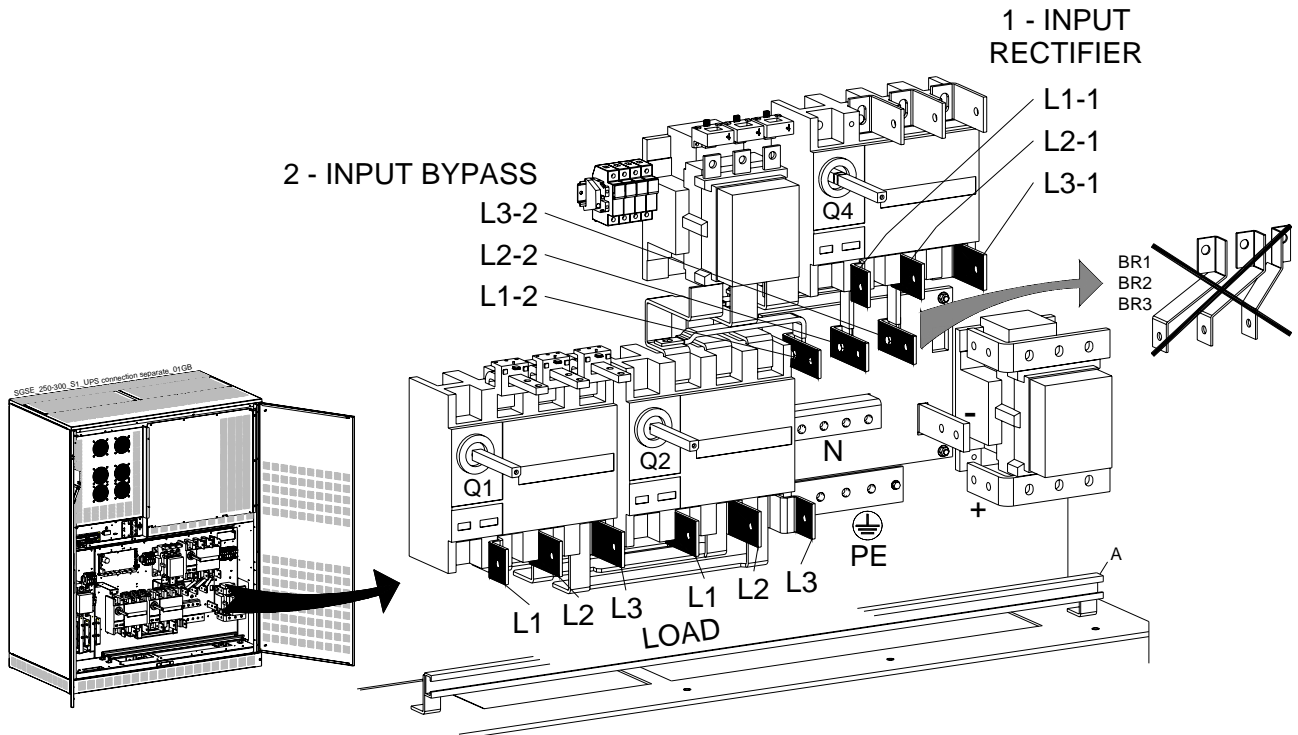





Fig. 5.6.2-1 SG-CE Series 250 – 300 kVA - Power connections

Power connection cables are connected to bus bars using **M10 bolts**.
The bolts of the connection cables must be tightened with a torque wrench at **40Nm**.
Fix the cables on profile "A" with the enclosed cable ties.

Common Input Rectifier / Bypass			
L1-1	Rectifier + Bypass Phase L1		
L2-1	Rectifier + Bypass Phase L2	N	Neutral
L3-1	Rectifier + Bypass Phase L3	PE	Ground
	NOTE! Bus bars BR1, BR2 and BR3 MUST REMAIN CONNECTED.		

Separate Input Rectifier / Bypass			
L1-1	Rectifier phase L1	L1-2	Bypass phase L1
L2-1	Rectifier phase L2	L2-2	Bypass phase L2
L3-1	Rectifier phase L3	L3-2	Bypass phase L3
PE	Ground	N	Neutral (Bypass)
	NOTE! The Bus bars BR1, BR2 and BR3 MUST BE REMOVED (see Fig. 5.6.2-1).		

Output Load			
L1	Load phase L1	L2	Load phase L2
N	Neutral	PE	Ground
		L3	Load phase L3

	NOTE! This UPS is only designed to operate in a wye-configured electrical system with a solidly grounded neutral. If the UPS is equipped with an input bypass transformer, the secondary of the transformer must be wye-configured with neutral solidly grounded.
---	--

5.6.3 Battery connection

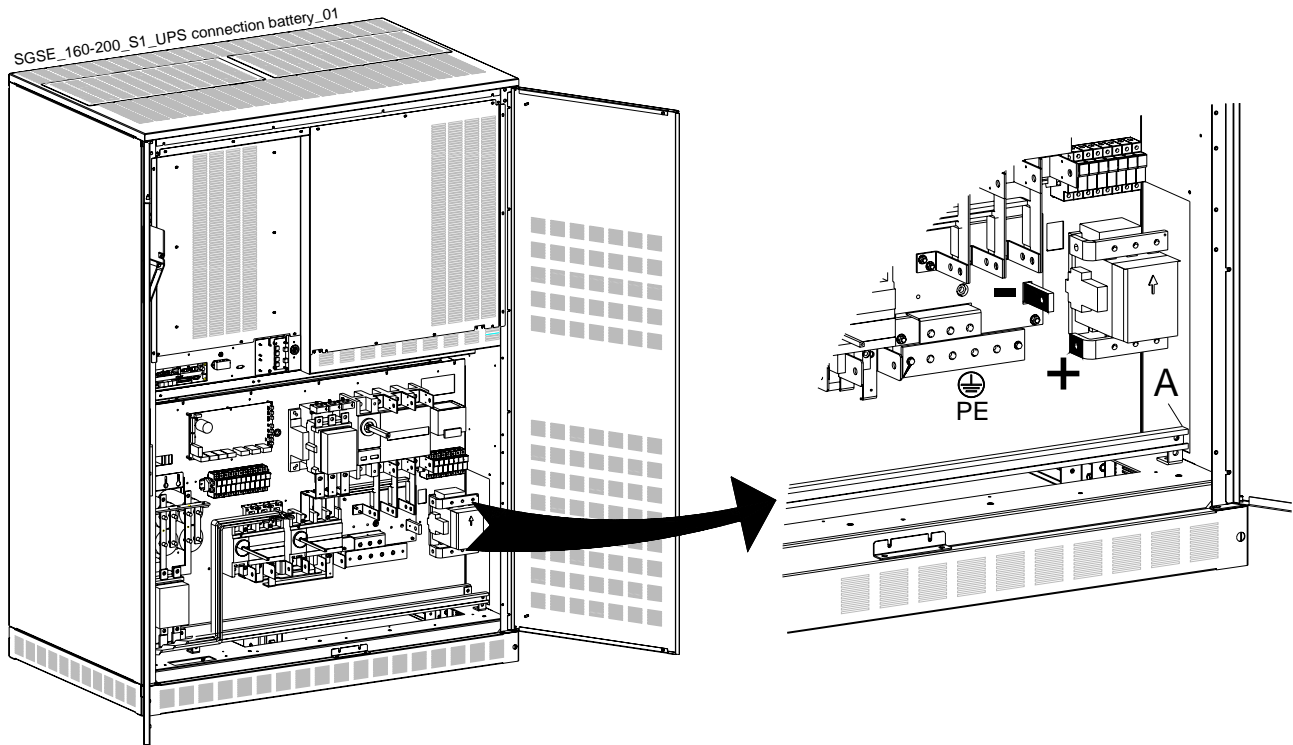




Fig. 5.6.3-1 Battery connection

Battery power cables (+ / - / PE) are connected to bus bars using **M10 bolts**.

The bolts of the connection cables must be tightened with a torque wrench at **40Nm**.

Fix the cables on profile "**A**" with the enclosed cable ties.

Battery	
+ Positive pole of the battery	- Negative pole of the battery
	<p>WARNING ! Do not insert the <i>Battery Fuses</i> before the commissioning!</p>

	<p>NOTE !</p> <p>To meet standards concerning electromagnetic compliance, the connection between the UPS and external <i>Battery</i> must be done by using a shielded cable or suitable shielded (steel) conduit!</p> <p>This UPS is only designed to operate in a wye-configured electrical system with a solidly grounded neutral.</p> <p>If the UPS is equipped with an input bypass transformer, the secondary of the transformer must be wye-configured with neutral solidly grounded.</p>
---	--

5.7 RPA PARALLEL SYSTEM CONNECTION



WARNING !

This operation must be performed by trained personnel before the initial start-up.
ENSURE THAT THE UPS INSTALLATION IS COMPLETELY POWERED DOWN

5.7.1 Parallel control bus connection

In case of parallel operation, the communication between the units takes place through the **Control Bus Cables**. Each parallel unit is equipped with an additional board "**P13 - RPA Board**" where the connectors **J52 (A)** and **J62 (B)** are located.

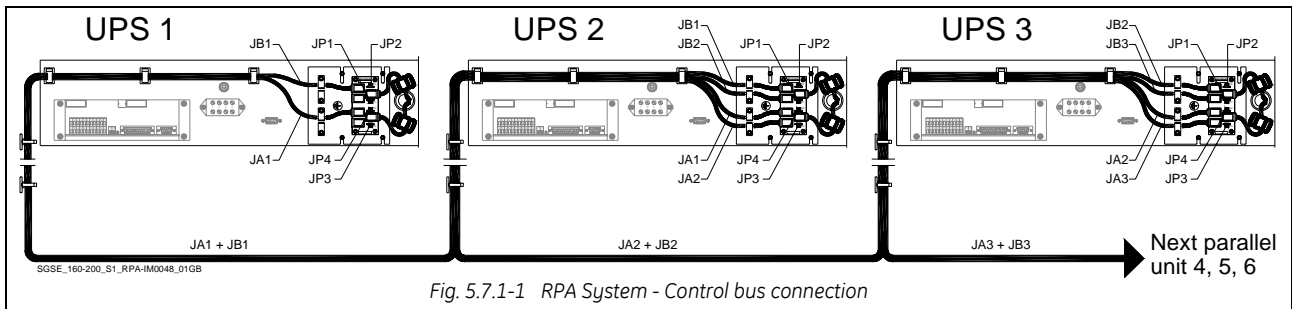
The standard length of the control bus cable between two parallel units is **12 m / 40 ft**.

The maximal overall length of bus connection, between the first and the last unit, should not exceed **84 m / 276 ft**. Verify that control wiring run in an individual separate steel conduit.



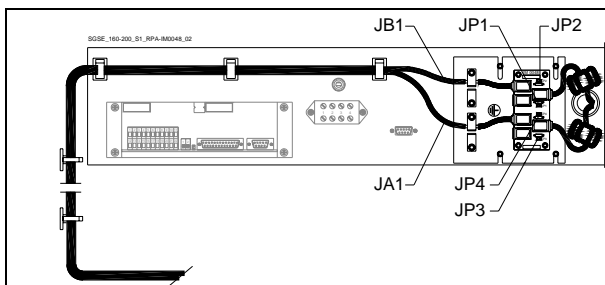
NOTE !

Under no circumstance should the control bus cable connecting **JA (1/2/3/4/5)** and **JB (1/2/3/4/5)** be connected or disconnected after the system has been powered On.



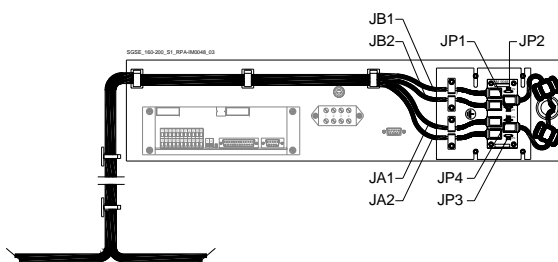
It is important to place the units in sequence of their assigned number.

A unit number from **1 to 8** is defined by the setting of parameters and displayed on the control panel (**P1 to P6**). This number is also marked inside and outside the packaging.



First and last units

On the parallel bus PCB **P34 - Bus Interface (IM0048)**, of the **first and last** units (terminal) of the parallel system the Jumpers **JP1, JP2, JP3** and **JP4** **MUST BE INSERTED**.



Intermediate units

On the parallel bus PCB **P34 - Bus Interface (IM0048)** of the **intermediate** units of the parallel system the Jumpers **JP1, JP2, JP3** and **JP4** **MUST BE REMOVED**.

5.7.2 Control bus cable location



WARNING !

This installation must be verified by trained personnel before the initial start-up.
ENSURE THAT THE UPS INSTALLATION IS COMPLETELY POWERED DOWN.

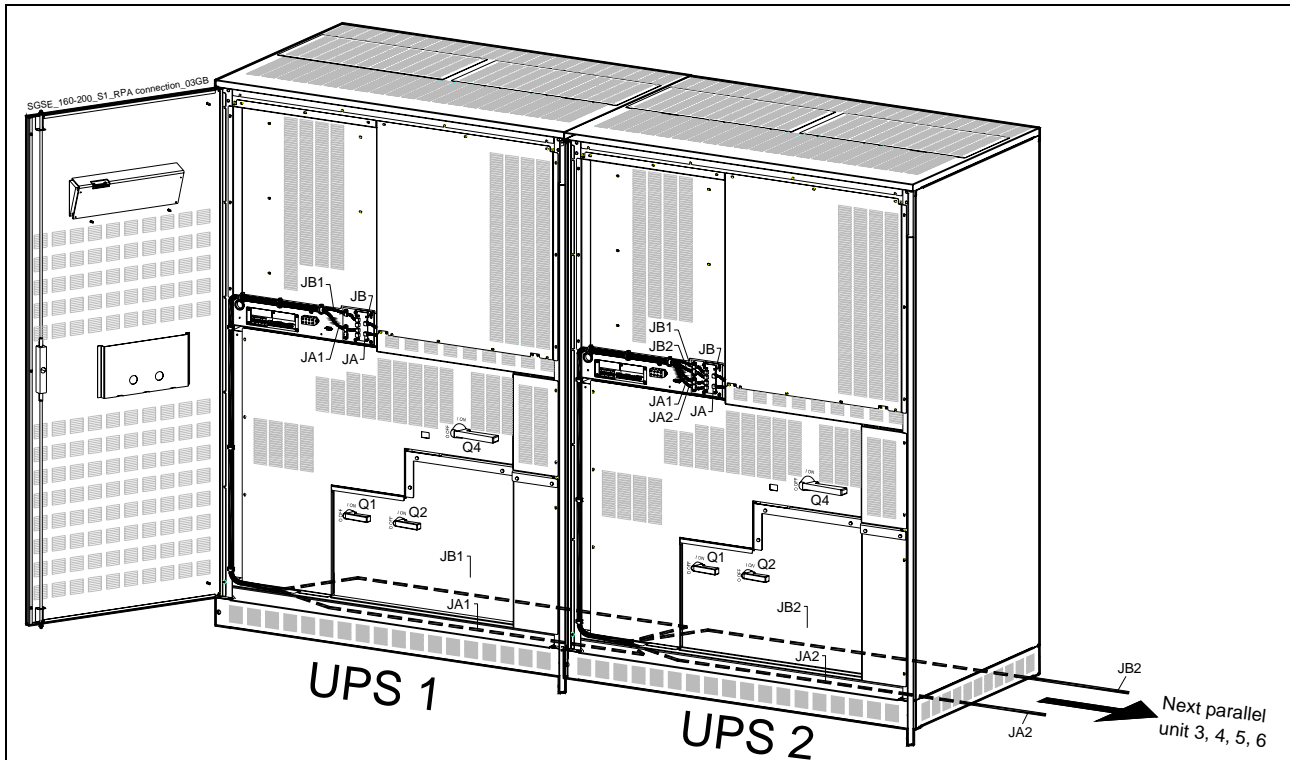


Fig. 5.7.2-1 Control Bus cable routing and connection

Control bus cables routing

Place and fix the cables *JA-1/2/3/4/5* and *JB-1/2/3/4/5* inside the UPS cabinets in the position illustrated in the drawing Fig. 5.7.2-1.



NOTE !

Pay attention when cabling and routing the bus cables *JA* and *JB* inside the UPS cabinet.

In case one unit should be removed from the parallel system, the bus cables *JA* and *JB* must be removed from the cabinet WITHOUT DISCONNECTING them from the metal plate where the sockets *JA* and *JB* are located.

It is important that the cable *JA* must be the same length as cable *JB*.



NOTE !

Connection and commissioning of an additional UPS to an existing parallel system must be performed by a service engineer from of your *Service Centre*.

6 CONTROL PANEL

6.1 CONTROL PANEL

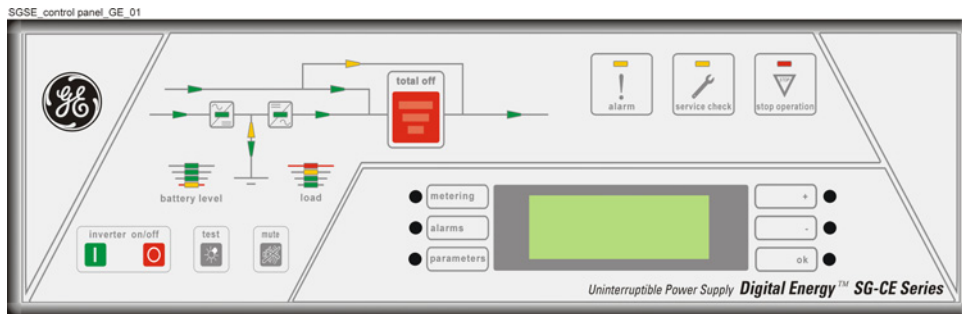
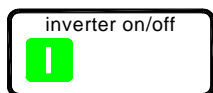


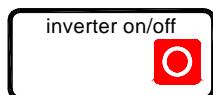
Fig. 6.1-1 Control panel

6.2 TABLE OF FUNCTIONS AND INDICATIONS ON CONTROL PANEL



Key to switch the Inverter ON (I).

This key is also used to reset "total off" if pressed simultaneously with total off push button.



Key for Inverter shutdown (O).

Press key to transfers the Load to Mains.
Keep pressed for 5 seconds to shutdown the Inverter.
This key is also used as the EPO (Emergency Power Off) reset.

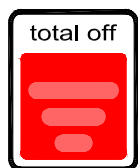


Key to reset general alarm and buzzer.



Key to test the control panel LEDs and buzzer.

Pressing this key causes all the LEDs to light and the buzzer to sound 3 time.



The push-button "total off" is protected by a red cover.

By pressing it, you immediately separate the UPS from mains and the Load.

Attention: "total off" cannot disconnect the UPS from the Load with Q2 closed.

To reset "total off": push and hold the "total off" push-button and the "I" key (inverter on) simultaneously for some seconds.

	<p>For parallel system: if "total off" is pressed on one unit connected to the parallel bus (switch Q1 closed), all the units are separated from the load. The "total off" reset must be done only on one unit connected to the parallel bus (switch Q1 closed).</p>
--	---

	<p>NOTE ! Special care must be taken in using this command, in order to avoid accidental Load disconnection.</p>
--	---



General alarm condition.

It blinks when one or more alarm is activated. The internal buzzer is ON.

The LED remains lighted (with alarm condition still present) and the buzzer stops as the key "mute" has been pressed.



LED ON indicates that a regular maintenance service is needed.

May be reset by a *SERVICE TECHNICIAN* only.
See "Operating Manual - Section 11 – Maintenance" in the enclosed CD-Rom.

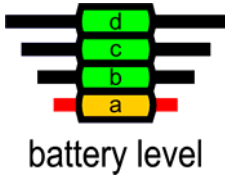
The LED is ON also when the output switch Q1 is open, indicating that the *Inverter* is in *service mode*, not supplying the load.



a) LED ON indicates that the **Battery** reserve lasts for only **3 more minutes** (selectable).

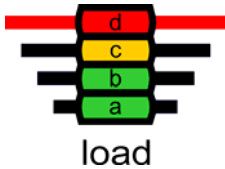
b) LED ON in case of **overtemperature or overload >125%** together with missing *Mains*.

After the timeout the Inverter will shut down.



All LEDs ON indicate that the Battery is fully charged.

- LED a Yellow:
- Fixed: indicating last 25 % of Battery backup.
 - Blinking: indicating Battery backup $\leq 5\%$.
- LED b, c, d Green:
- Each one indicating 25 % of Battery backup.



LEDs ON indicate the load status of the UPS.

- | | | |
|-------|--------|-------------------|
| LED d | red | $\geq 100\%$ load |
| LED c | yellow | 100% load |
| LED b | green | 66% load |
| LED a | green | 33% load |

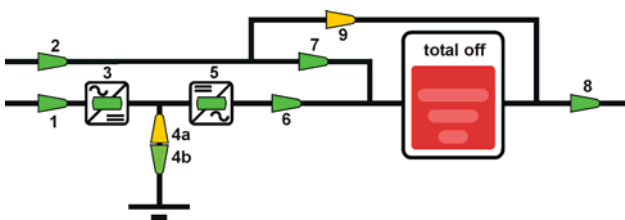


Fig. 6.2-1 LEDs on synoptic diagram

LEDs on synoptic diagram.

- | | | |
|--------|---|--------------------------------|
| LED 1 | = | Input Mains Rectifier (green) |
| LED 2 | = | Input Mains Bypass (green) |
| LED 3 | = | Rectifier ON (green) |
| LED 4a | = | Discharging (yellow) |
| LED 4b | = | Charging (green) |
| LED 5 | = | Inverter ON (green) |
| LED 6 | = | Load on Inverter (green) |
| LED 7 | = | Load on Mains (green) |
| LED 8 | = | Output Load Voltage (green) |
| LED 9 | = | Manual Bypass (Q2) ON (yellow) |

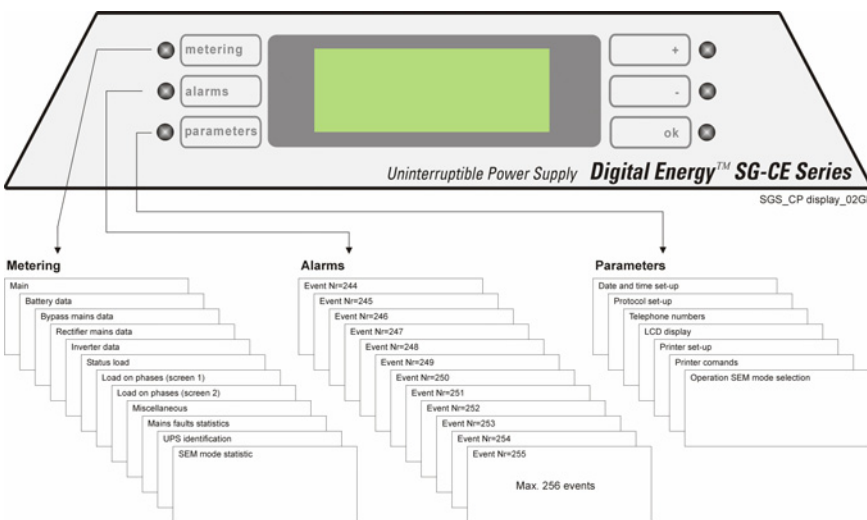


Fig. 6.2-2 LCD screen


User LCD Interface

Consist of an LCD screen, 4 lines with 20 characters each and six keys.

It offers:

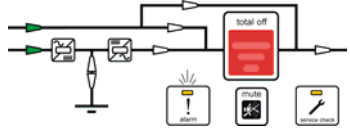
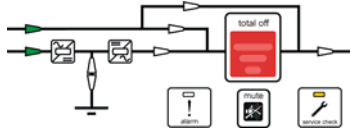
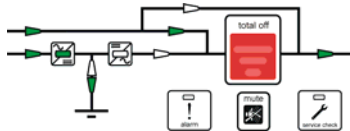
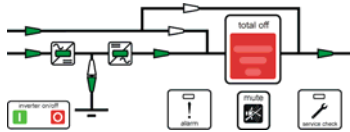
- UPS operating, AC and DC metering information.
- History of events (alarms and messages).
- Functionality can be programmed to meet customer needs by changing parameters.


7 OPERATION

	<p>NOTE !</p> <p>Verify that the input/output connections have been performed by qualified personnel before connecting mains input voltage and verify that the equipment is correctly grounded.</p> <p>If you encounter any problems during the following procedures, you should not continue, but contact your <i>Service Centre</i>.</p>
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7.1 PROCEDURES FOR SINGLE SG-CE Series

7.1.1 Start-up of the SG-CE Series

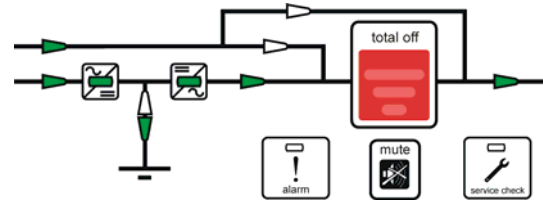
<p>Verify with open front door: Switch Q1, Q2, Q4 and the external Battery Switch or Fuses must be open (Pos. O).</p>	
<p>1. Connect the Mains power on the UPS.</p> <p>(In case of separate inputs for <i>Rectifier</i> and <i>Bypass</i>, connect both).</p> <ul style="list-style-type: none"> • Power supply starts up, indicated by flashing <i>alarm</i> and <i>buzzer</i> sound. • LEDs as indicated will be lit. • Press <i>mute</i>, to reset <i>alarm</i> and <i>buzzer</i>. 	
<p>2. Close Q4 (Pos. I).</p>	
<p>3. Close Q1 (Pos. I).</p> <ul style="list-style-type: none"> • <i>Bypass Mains</i> connects to the output. • <i>Rectifier</i> starts automatically, blinking LED indicates Soft-start. • At the end of <i>Rectifier</i> Soft-start, LED remains lit. • LED <i>service check</i> turns OFF. 	
<p>4. Connect the Battery to the UPS by closing the external Battery Switch or Fuses.</p>	
<p>5. Press "inverter on" (I) key.</p> <ul style="list-style-type: none"> • Soft-start of <i>Inverter</i> indicated with blinking LED. • At the end of Soft-start the LED remains lit. • Automatic transfer from <i>Bypass</i> to <i>Inverter</i>. • UPS output LED indicates <i>Load on Inverter</i>. <p>The LCD screen must display the status "LOAD ON INVERTER".</p>	
<p>END OF PROCEDURE</p>	

	<p>NOTE !</p> <p>The Battery must be charged for at least 10 hours, in order to ensure the full backup runtime in case of a Mains Failure.</p>
---	---

7.1.2 Maintenance shutdown (Load on Q2)

Initial status:

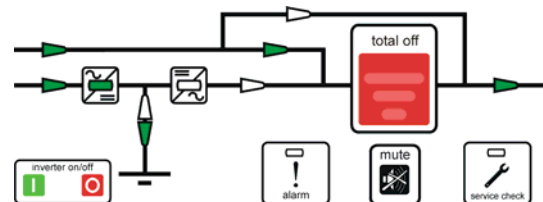
Load supplied from Inverter.



1. Press "inverter off" (O) key and hold until the LED inside the Inverter symbol turns OFF.

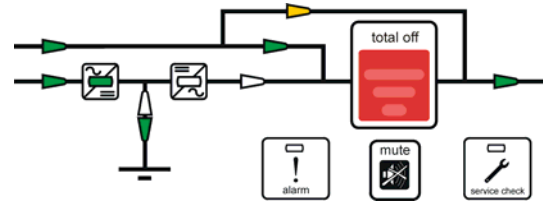
- Load is transferred to Mains.
- Inverter shuts down.
- LED Inverter must be OFF.

The LCD screen must display the status "**LOAD ON BYPASS**".



2. Close Q2 (Pos. I).

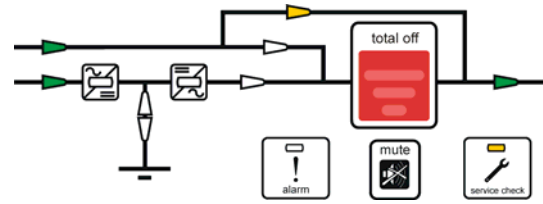
- Load is now supplied parallel through Bypass and Q2.
- LED for Manual Bypass lights up.



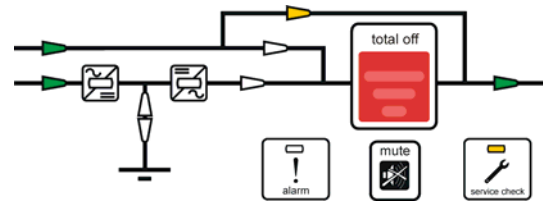
3. Open Q1 (Pos. 0) and then press "total off" button.

- Load is now supplied from Manual Bypass.
- Rectifier shuts down and all output and input contactors are opened.

The LCD screen must display the status "**LOAD OFF**".

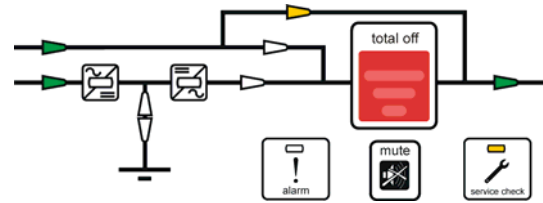


4. Open Q4 (Pos. 0).



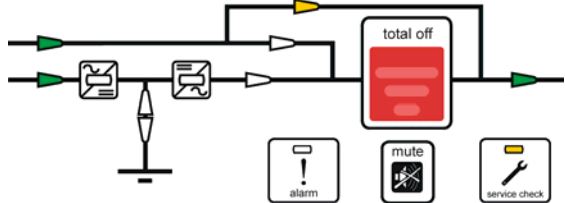
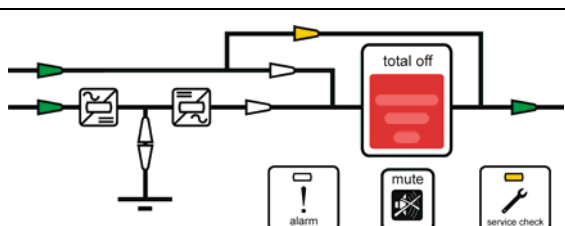
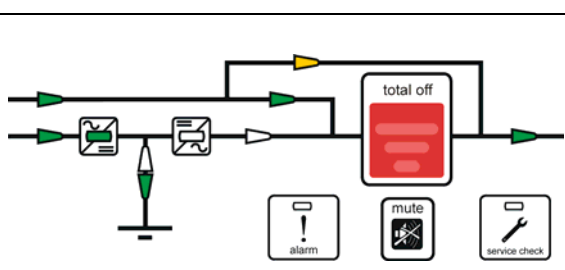
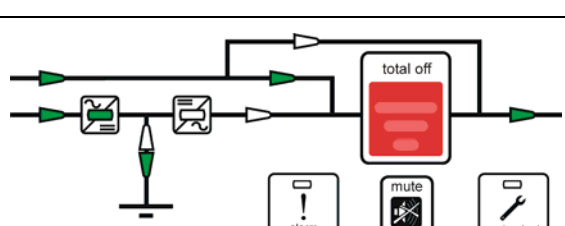
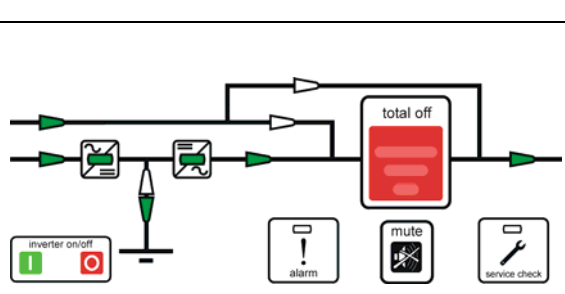
5. Disconnect the Battery from the UPS.

- Wait **5 minutes** for DC-Link Capacitors discharge.



END OF PROCEDURE

7.1.3 From Manual Bypass (Q2) to normal function VFI

<p>Initial status: Load supplied from Manual Bypass.</p>	
<p>1. Close Q4 (Pos. I).</p>	
<p>2. Close Q1 (Pos. I).</p> <ul style="list-style-type: none"> • Bypass connects to Load. LED Load on Bypass lights up. • Rectifier starts automatically and LED in Rectifier symbol and LED Battery charge light up. • LED service check turns OFF. 	
<p>3. Connect the Battery to the UPS by closing the external Battery Switch or Fuses.</p>	
<p>4. Open Q2 (Pos. O).</p> <ul style="list-style-type: none"> • Load is now supplied from Bypass. • LED Manual Bypass turns OFF. 	
<p>5. Press "inverter on" (I) key.</p> <ul style="list-style-type: none"> • Soft-start of Inverter, indicated with blinking LED. • At the end of Soft-start the LED remains lit. • Automatic transfer from Bypass to Inverter. • UPS output LED indicates Load on Inverter. <p>The LCD screen must display the status "LOAD ON INVERTER".</p>	
<p>END OF PROCEDURE</p>	

7.1.4 Complete UPS shutdown

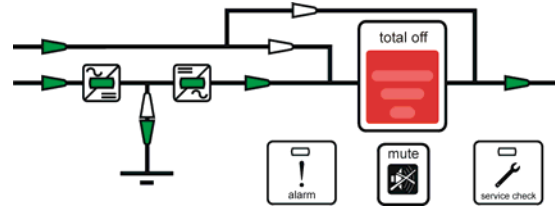


NOTE !

The *UPS System* and the *Load* have to be completely powered down.

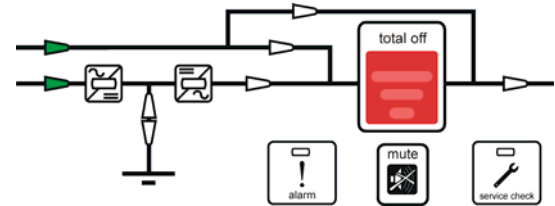
Initial status:

Load supplied from Inverter.



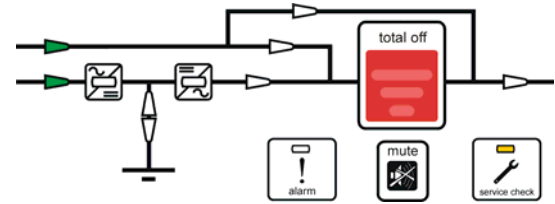
1. Press "total off" button.

- Load is disconnected from UPS.
- Rectifier and Inverter are shutdown, all output and input contactors will be opened.
- LEDs, Rectifier, Inverter and Load are OFF.

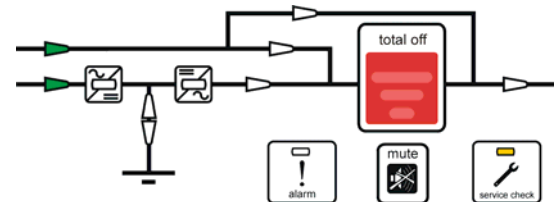


2. Open Q1 (Pos. 0).

- LED service check lights up.

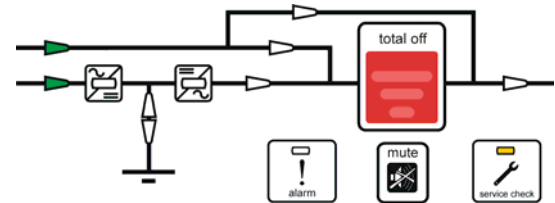


3. Open Q4 (Pos. 0).



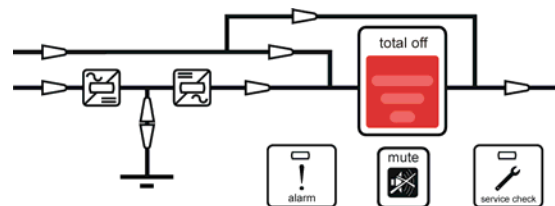
4. Disconnect the Battery from the UPS.

- Wait **5 minutes** for DC-Link Capacitors discharge.



5. Disconnect the Mains.

- All LEDs are OFF.



END OF PROCEDURE

7.2 PROCEDURES FOR SG-CE Series PARALLEL SYSTEM

7.2.1 Parallel System start-up

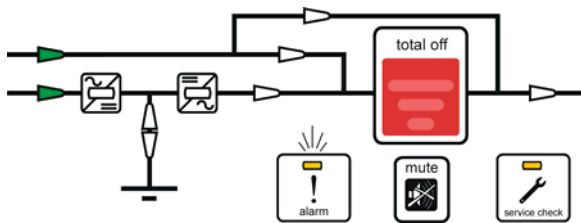
Verify on all *Units*, with open front door:

Switch **Q1, Q2, Q4** and the external **Battery Switch** or **Fuses** must be open (Pos. O).

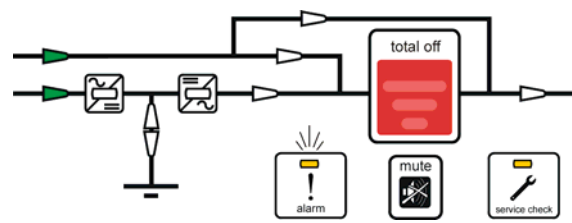
1. Connect the Mains power on all Units.

(In case of separate inputs for *Rectifier* and *Bypass*, connect both).

- Power supply starts up, indicated by flashing *alarm* and *buzzer sounds*.
- LEDs as indicated will be lit.
- Press *mute*, to reset *alarm* and *buzzer*.

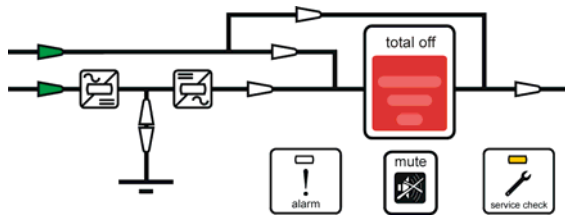


Synoptic diagram of first unit

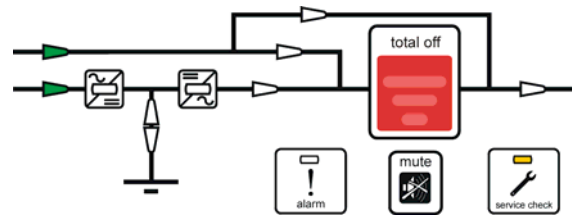


Synoptic diagram of other units

2. Close Q4 (Pos. I) on all Units.



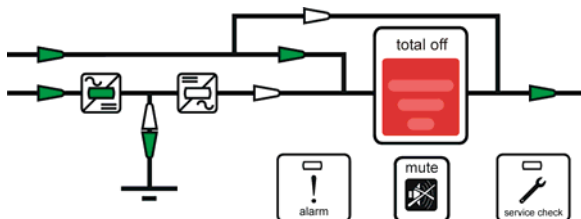
Synoptic diagram of first unit



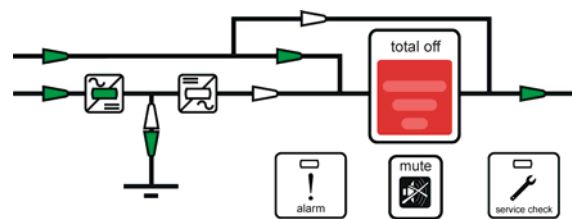
Synoptic diagram of other units

3. Close Q1 (Pos. I) on all Units.

- When closing **Q1** on the last unit of the parallel system, the *Bypass* of all *Units* connects to the *Load*.
- At the end of *Rectifier* Soft-start, the *LED* remains lit.
- *LEDs* *service check* turn OFF.



Synoptic diagram of first unit



Synoptic diagram of other units

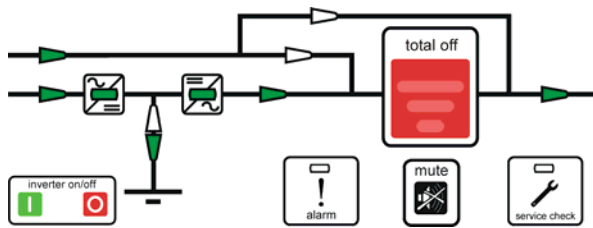
Continue ►

4. Connect the Battery to all Units by closing the external Battery Switches or Fuses in sequence.

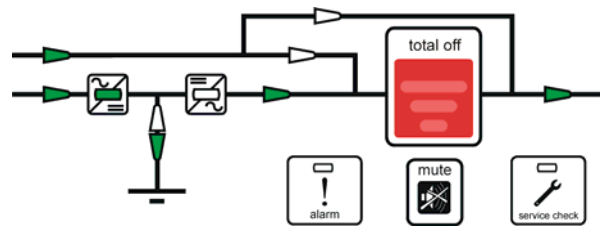
5. Press "inverter on" (I) key on first unit.

- Soft-start of *Inverter*, indicated with blinking *LED*.
- At the end of Soft-start the *LED Inverter* remains lit.
- In case of sufficient output power, the output will transfer to *Inverter*.
- UPS output *LED* indicates *Load on Inverter*.

The *LCD* screen must display the status "**LOAD ON INVERTER**".



Synoptic diagram of first unit



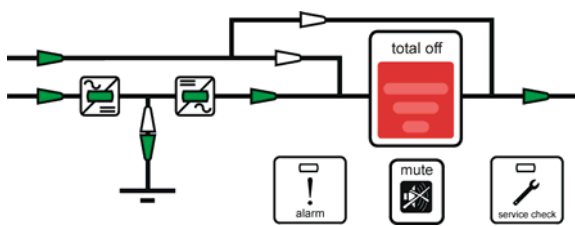
Synoptic diagram of other units

6. Press "inverter on" (I) key on all other units.

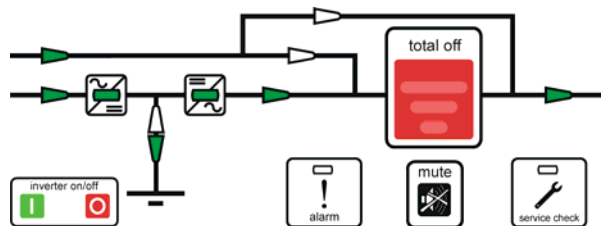
(Do not start the next *Inverter* until the sequence of the previous ends).

- As soon as the output power of the *Inverters* is sufficient to supply the *Load*, the output of the units with running *Inverter* will transfer to *Inverter*.
- UPS output *LED* indicates *Load on Inverter*.

The *LCD* screen must display the status "**LOAD ON INVERTER**".



Synoptic diagram of first unit



Synoptic diagram of other units

END OF PROCEDURE

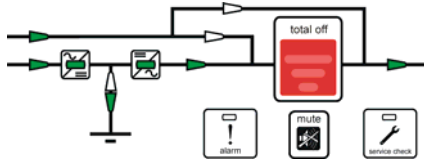


NOTE !

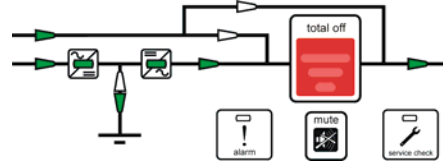
The **Battery** must be charged for at least 10 hours, in order to ensure the full backup runtime in case of a **Mains Failure**.

7.2.2 Maintenance system shutdown (Load supplied from Q2 on all units)

Initial status: **Load supplied from all Inverters.**



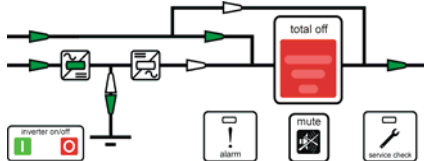
Synoptic diagram of first unit



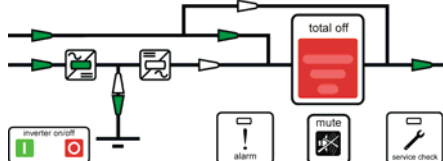
Synoptic diagram of other units

1. Press "inverter off" (O) key on all Units, and hold until the LED inside the Inverter symbol turns OFF.

At no redundancy, the system will transfer to Mains supply.



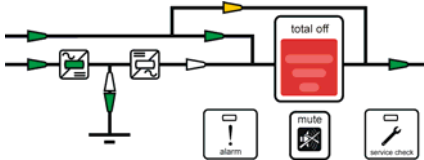
Synoptic diagram of first unit



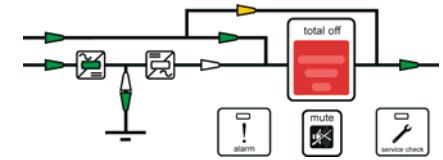
Synoptic diagram of other units

2. Close Q2 (Pos. I) on all Units.

Load is now supplied from Mains in parallel from Bypass and Manual Bypass Q2 of all Units.



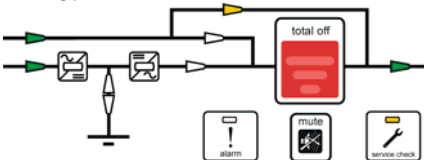
Synoptic diagram of first unit



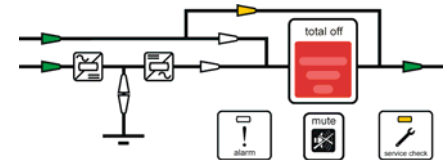
Synoptic diagram of other units

3. Open Q1 (Pos. O) and then press "total off" button on all Units.

- The Bypass of all Units will disconnect and all Rectifiers are shutdown.

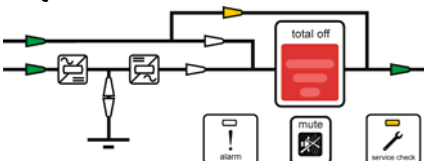


Synoptic diagram of first unit

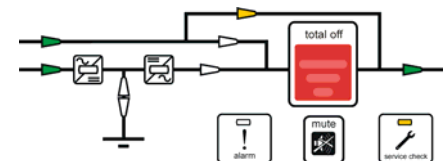


Synoptic diagram of other units

4. Open Q4 (Pos. O) on all Units.



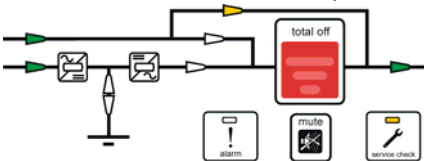
Synoptic diagram of first unit



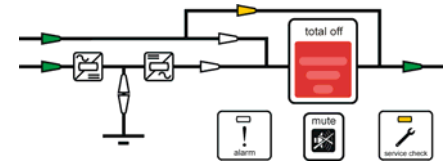
Synoptic diagram of other units

5. Disconnect the Battery from all Units.

- Wait 5 minutes for DC-Link Capacitors discharge.



Synoptic diagram of first unit

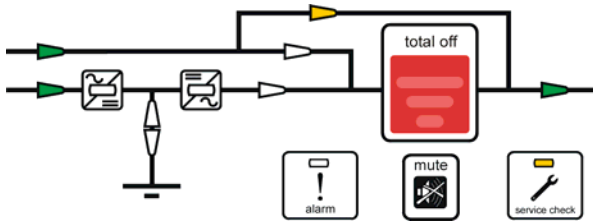


Synoptic diagram of other units

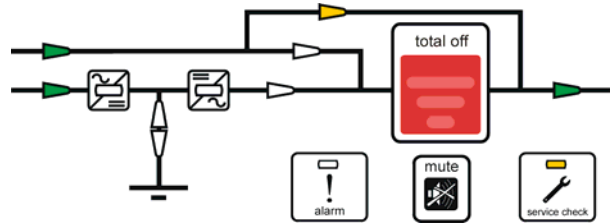
END OF PROCEDURE

7.2.3 From Manual Bypass (Q2) to normal function VFI

Initial status: **Load supplied from Manual Bypass.**
All Q2 of the system are closed.

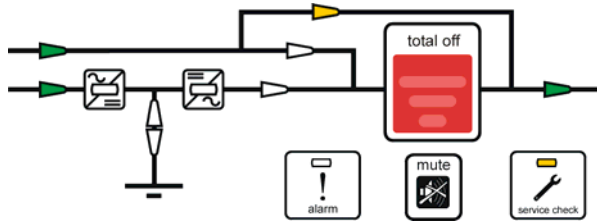


Synoptic diagram of first unit

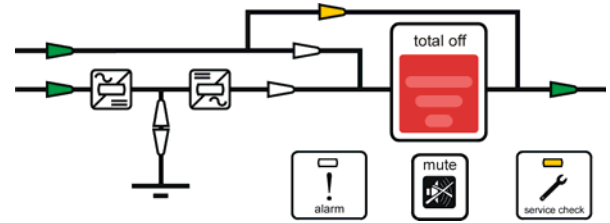


Synoptic diagram of other units

1. Close Q4 (Pos. I) on all Units.



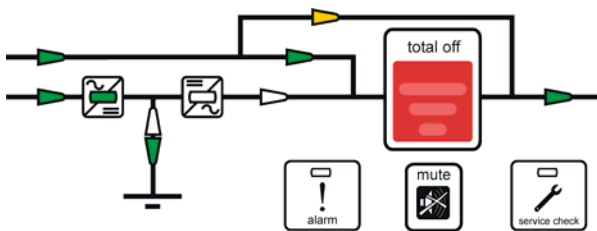
Synoptic diagram of first unit



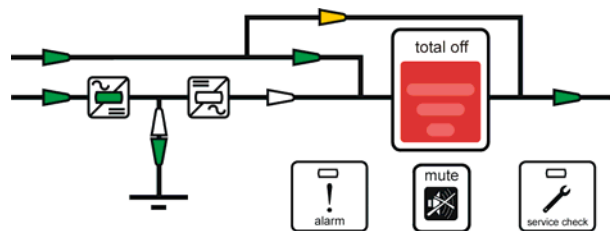
Synoptic diagram of other units

2. Close Q1 (Pos. I) on all Units.

- The Rectifiers will start automatically and at the closure of Q1 of the last Unit, the Bypass of all Units will be activated.



Synoptic diagram of first unit



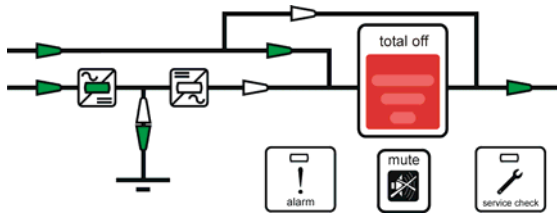
Synoptic diagram of other units

3. Connect the Battery to all Units by closing the external Battery Switches or Fuses.

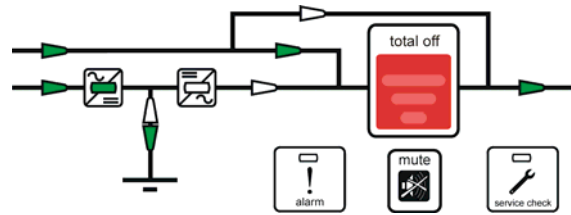
Continue ►

4. Open Q2 (Pos. 0) on all Units.

- Load is now supplied from Automatic Bypass.



Synoptic diagram of first unit

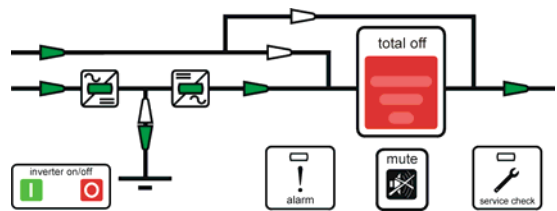


Synoptic diagram of other units

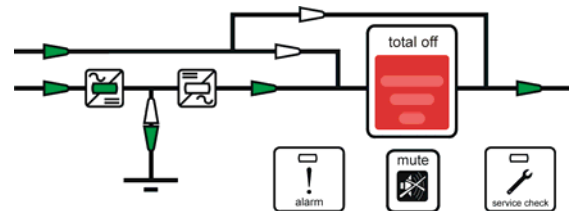
5. Press "inverter on" (I) key on first unit.

- Soft-start of Inverter, indicated with blinking LED.
- At the end of Soft-start the LED Inverter remains lit.
- In case of sufficient output power, the output will transfer to Inverter.
- UPS output LED indicates Load on Inverter.

The LCD screen must display the status "LOAD ON INVERTER".



Synoptic diagram of first unit



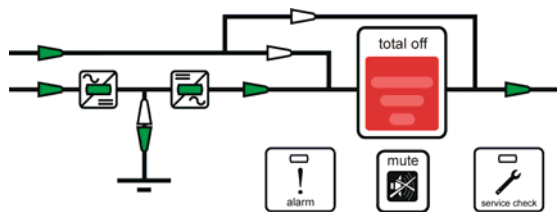
Synoptic diagram of other units

6. Press "inverter on" (I) key on all other units.

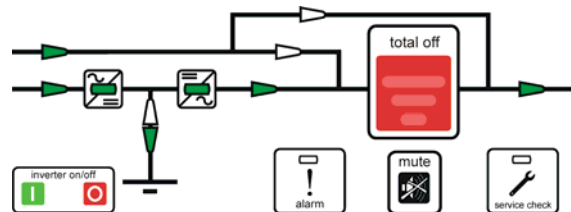
(Do not start the next Inverter until the sequence of the previous one ends).

- As soon as the output power of the Inverters is sufficient to supply the Load, the output of the units with running Inverter will transfer to Inverter.
- UPS output LED indicates Load on Inverter.

The LCD screen must display on all Units the status "LOAD ON INVERTER".



Synoptic diagram of first unit



Synoptic diagram of other units

END OF PROCEDURE

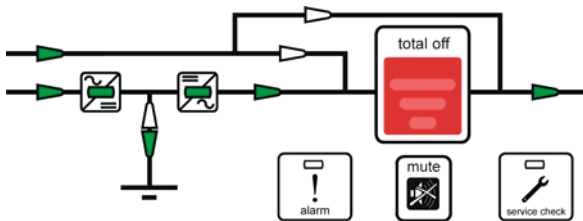
7.2.4 Parallel system shutdown



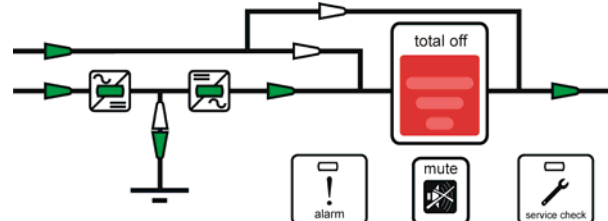
NOTE !

The UPS System and the Load have to be completely powered down.

Initial status: **Load supplied from all Inverters.**



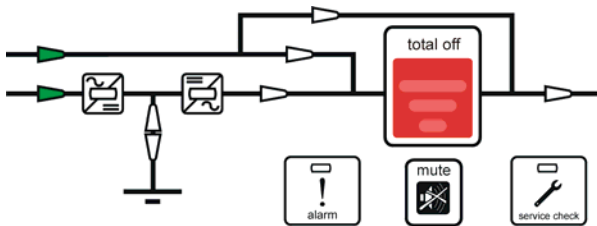
Synoptic diagram of first unit



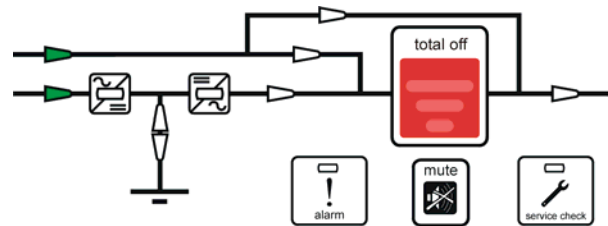
Synoptic diagram of other units

1. Press "total off" button on any one of the units.

- Load is disconnected from UPS.
- Rectifier and Inverter are shut down and all output and input Contactors will be opened.
- LEDs, Rectifier, Inverter and Load are OFF.



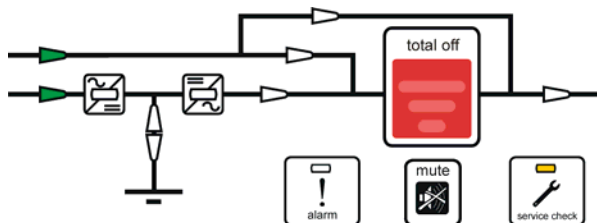
Synoptic diagram of first unit



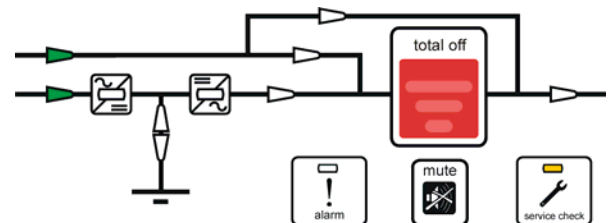
Synoptic diagram of other units

2. Open Q1 (Pos. 0) on all Units.

- LEDs service check lights up.



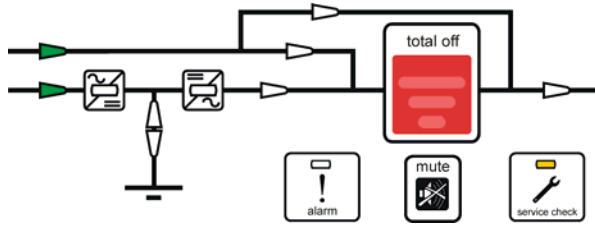
Synoptic diagram of first unit



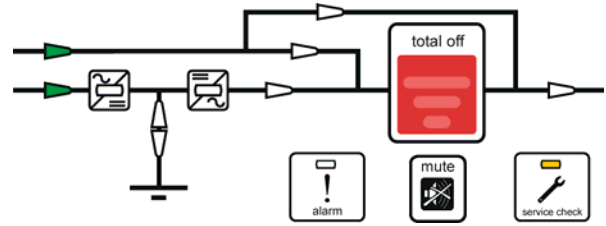
Synoptic diagram of other units

Continue ►

3. Open Q4 (Pos. 0) on all Units.



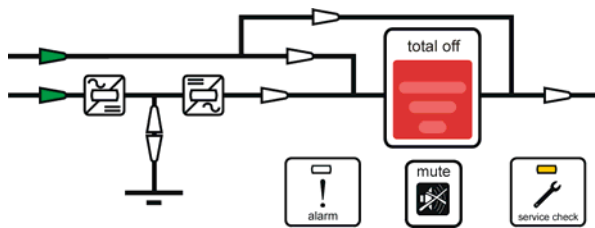
Synoptic diagram of first unit



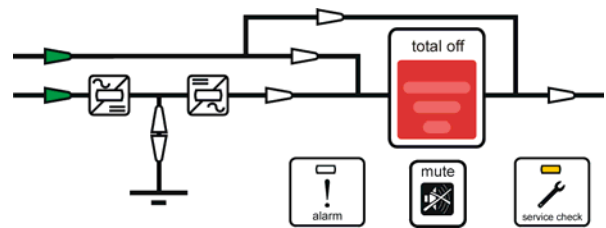
Synoptic diagram of other units

4. Disconnect the Battery from all Units.

- Wait 5 minutes for DC-Link Capacitors discharge.



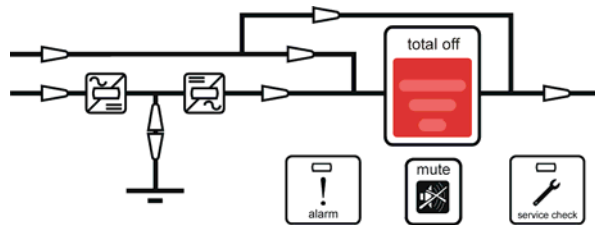
Synoptic diagram of first unit



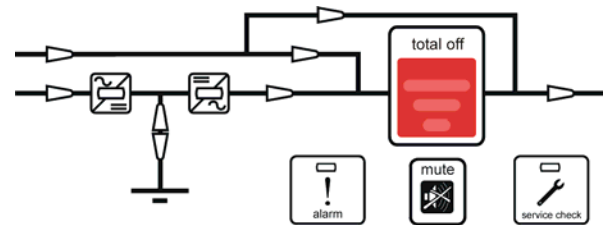
Synoptic diagram of other units

5. Disconnect the Mains supply from all Units.

- All LEDs are OFF.



Synoptic diagram of first unit



Synoptic diagram of other units

END OF PROCEDURE

