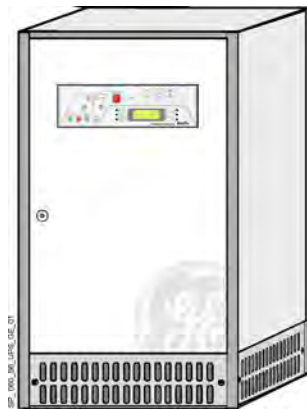




## ИБП General Electric SitePro 60-120 кВА - руководство по эксплуатации. Юниджет

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SitePro 60 kVA



SitePro 80 - 100 & 120 kVA

## OPERATING MANUAL UNINTERRUPTIBLE POWER SUPPLY

# SitePro

60 kVA Series 6H  
80 - 100 - 120 kVA Series 6G



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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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**Dear Customer,**

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

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

Please read carefully the Operating Manual, which contains all the necessary information and describes all you need to know about the use of the UPS.

Thank you for choosing **GE Digital Energy** !

Manufactured by:

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**GE Digital Energy**

General Electric Company  
6595 Riazzino (Locarno)  
Switzerland



## Preface

Congratulations on your choice of a *SitePro* Uninterruptible Power Supply (UPS). It will keep you away from any trouble due to unexpected power problems.

This manual describes how to prepare the installation site, provides weight and dimensions and procedures for moving, installing and connecting the UPS, and details of maintenance procedures suggested to preserve maximum reliability.

It explains the function of the UPS module, the purpose and location of the switches, the meaning of the system events related to the front panel indication, and provides procedures for starting and stopping the equipment.

While every care has been taken to ensure the completeness and accuracy of this manual, *GE Digital Energy* assumes no responsibility or liability for any losses or damages resulting from the use of the information contained in this document.

### WARNING!

*SitePro* 60 - 120 kVA, is a product for restricted sales distribution to informed partners.

Installation restrictions or additional measures may be needed to prevent disturbances.

We recommend that this manual be kept next to the UPS for future references.

If any problems are encountered with the procedures contained in this manual, please contact your *Service Centre* before you proceed.

This document shall not be copied or reproduced without the permission of *GE Digital Energy*.



Due to technical improvements, some of the information contained in this manual may be changed without notice.

## Safety instructions

Read carefully the safety instructions contained on the following page before the installation, start-up and maintenance of the UPS, options and battery.

Pay attention to the rectangular boxes included in the text:

*They contain important information or warning concerning electrical connections and personnel safety.*

	<b>Parallel version secured with RPA</b>
	<i>When included in the text, this symbol refers to operation needed only for parallel system.</i>



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# 1 SAFETY RULES

## Save these instructions

### GENERAL

- Move the UPS in an upright position in its original package to the final destination room. To lift the cabinets, use a forklift or lifting belts with spreader bars.
- Check for sufficient floor and elevator loading capacity.
- Check the integrity of the UPS equipment carefully.  
If you notice visible damage, do not install or start the UPS. Contact the nearest Service Center immediately.
- **WARNING! RISK OF ELECTRICAL SHOCK:** do not remove covers, there are no user serviceable parts inside.
- All maintenance and service work should be performed by qualified service personnel. The UPS contains its own energy source (battery).
- The field-wiring outlets may be electrically live, even when the UPS is disconnected from the mains.
- Dangerous voltages may be present during battery operation.  
The battery must be disconnected during maintenance or service work.
- This UPS contains potentially hazardous voltages.
- Be aware that the inverter can restart automatically after the mains voltage is restored.

### INSTALLATION

- This UPS must be installed and connected only by trained personnel.
- Verify accurately during Commissioning and Maintenance of the UPS, for the following: Damaged components, squeezed wires and cables, or not correctly inserted plugs.
- After removing the sidewalls of the UPS, make sure that all earth connections when reassembling, are correctly reattached.
- This UPS is intended for use in a controlled indoor environment free of conductive contaminants and protected against animals intrusion.
- **HIGH EARTH LEAKAGE CURRENT:** earth connection is essential before connecting to AC input!
- Switching OFF the unit does not isolate the UPS from the mains.
- Do not install the UPS in an excessively humid environment or near water.
- Avoid spilling liquids on or dropping any foreign object into the UPS.
- The unit must be placed in a sufficiently ventilated area; the ambient temperature should not exceed 35°C (95°F).
- Optimal battery life is obtained if the ambient temperature does not exceed 25°C (77°F).
- It is important that air can move freely around and through the unit. Do not block the air vents.
- Avoid locations in direct sunlight or near heat sources.

### STORAGE

- Store the UPS in a dry location; storage temperature must be within -25°C (-13°F) to +55°C (131°F).
- If the unit is stored for a period exceeding 3 months, the battery must be recharged periodically (time depending on storage temperature).

### BATTERY

- The battery-voltage is dangerous for person's safety.
- When replacing the battery, use the same number, voltage (V) and capacity (Ah).
- Proper disposal or recycling of the battery is required.  
Refer to your local codes for disposal requirements.
- Never dispose of battery in a fire: they may explode.
- Do not open or mutilate battery: their contents (electrolyte) may be extremely toxic.  
If exposed to electrolyte, wash immediately with plenty of water.
- Avoid charging in a sealed container.
- Never short-circuit battery.  
When working with battery, remove watches, rings or other metal objects, and only use insulated tools.



## Safety instructions when working with battery



**EXTERNAL BATTERY MUST BE INSTALLED AND CONNECTED TO THE UPS BY QUALIFIED SERVICE PERSONNEL.**

**INSTALLATION PERSONNEL MUST READ THIS ENTIRE SECTION BEFORE HANDLING THE UPS AND BATTERY.**

### **DANGER!**

Full voltage and current are always present at the battery terminals.

The battery used in this system can provide dangerous voltages, extremely high currents and a risk of electric shock.

They may cause severe injury if the terminals are shorted together or to ground.

You must be extremely careful to avoid electric shock and burns caused by contacting battery terminals or shorting terminals during battery installation.

Do not touch uninsulated battery terminals.

A qualified service person who is familiar with battery systems and required precautions must install and service the battery.

The installation must conform to national and local codes.

Keep unauthorised personnel away from battery.

The qualified service person must take these precautions:

- 1 Wear protective clothing, such as rubber gloves and boots and protective eye wear  
Batteries contain caustic acids and toxic materials and can rupture or leak if mistreated.  
Remove rings and metal wristwatches or other metal objects and jewelry.  
Do not carry metal objects in your pockets where the objects can fall into the battery cabinet.
- 2 Tools must have insulated handles and must be insulated so that they will not short battery terminals.  
Do not allow a tool to short between individual or separate battery terminals or to the cabinet or rack.  
Do not lay tools or metal parts on top of the battery, and do not lay them where they could fall onto the battery or into the cabinet.
- 3 Install the battery as shown on the drawing provided with the battery.  
When connecting cables, never allow a cable to short across a battery's terminals, the string of battery, or to the cabinet or rack.
- 4 Align the cables on the battery terminals so that the cable lug will not contact any part of the cabinet or rack, even if the battery is moved.  
Keep the cable away from any sharp metal edges.
- 5 Install the battery cables so the UPS or battery cabinet doors cannot pinch them.
- 6 Do not connect the battery terminal to Ground.  
If any battery terminal is inadvertently grounded, remove the source of the ground.  
Contacting any part of a grounded battery can cause a risk of electric shock.
- 7 To reduce the risk of fire or electric shock, install the battery in a temperature and humidity controlled indoor area, free of contaminants.
- 8 Battery system chassis ground (earth) must be connected to the UPS chassis ground (earth).  
If you use conduit, this ground conductor must be routed in the same conduit as the battery conductors.
- 9 Where conductors may be exposed to physical damage, protect the conductors in accordance with all applicable codes.
- 10 If you are replacing battery or repairing battery connections, shut OFF the UPS and remove the battery fuses.



## 2 INTRODUCTION

An **Uninterruptible Power Supply (UPS)** provides the power for critical loads which 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.

**SitePro** is a true double conversion On-line UPS system where the load is continuously supplied by the inverter through the rectifier.

**SitePro** can be configured, if chosen, for the **SEM** mode (Super Eco Mode) permitting the maximum energy saving

In case of trouble on the inverter 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.

### Key features:

- **More Critical equipment supported**  
Rated at 0.9 power factor **SitePro** delivers more real power than other UPS in the market. With today's trend toward power factor corrected loads, **SitePro** can support more total load than any other UPS available, allowing you to support a greater number of today's enterprise computing Power Factor Corrected (PFC) equipment.
- **No single point of failure**  
Redundant Parallel Architecture (RPA) is an exclusive **GE technology**.  
With RPA, **SitePro** UPS are controlled in a true peer-to-peer configuration where all critical elements and functions (including bypass) are redundant.  
**SitePro** is designed to be the most reliable power protection system available on the market today.
- **High Efficiency**  
Thanks to IGBT technology and the new Space Vector Modulation (SVM) strategy, **SitePro** offers high efficiency.  
Intelligent Energy Management (IEM) combined with RPA, results in the most cost efficient and reliable UPS solution in the industry.
- **Fully digital**  
Digital Signal Processor (DSP), Flash memory and SVM strategy, are the technology corner stones of new age of power quality and power reliability.
- **Extremely flexible**  
Tailor made power protection to meet your individual installation requirements, **SitePro** offers various options like input harmonic filters and our comprehensive JUMP software suite for mission control and data protection to cover all your application needs.

## 3 DESCRIPTION

### 3.1 BLOCK DIAGRAM AND MAIN ELEMENTS

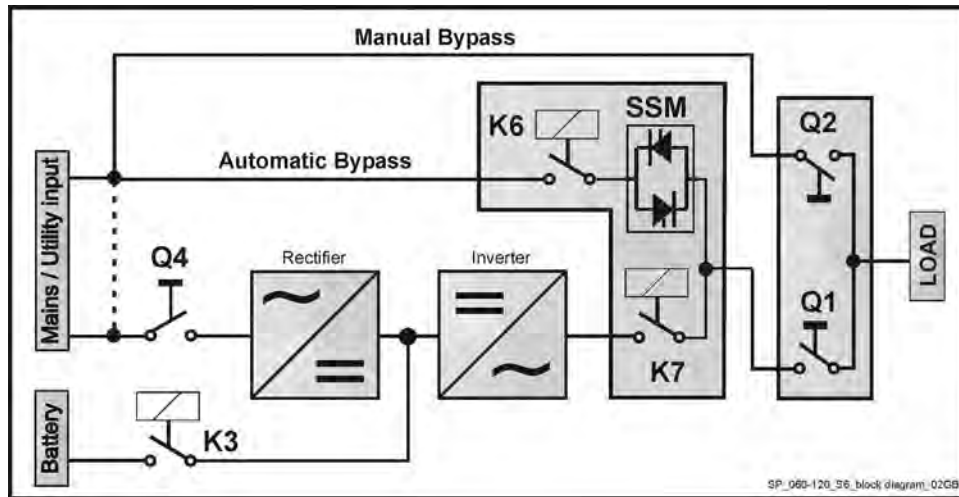


Fig. 3.1-1 Block diagram

The **SitePro** system can be divided into the following main elements:

#### Control system

**SitePro** is designed with microprocessor-controlled signal processing circuits.

The interface between the operator and the unit is provided by the monitoring system on the front panel.

This monitoring system consists of an active mimic diagram, a keyboard and a backlit display.

#### Rectifier

The standard rectifier consists of a 6-pulse SCR-bridge, which converts the 3-phase mains voltage into a controlled and regulated DC-voltage.

This regulated DC-voltage is used to supply power to the inverter, and to provide charging power to the battery.

#### Inverter

The inverter converts the DC voltage into a three-phase AC-voltage with constant amplitude and frequency, which is completely independent and isolated from the AC-input voltage.

#### Automatic bypass

The automatic bypass consists of a static semiconductor-switch (SSM: Static Switch Module), used to provide an uninterrupted transfer of the load from inverter to mains.

#### Back-feed Protection

All **SitePro** UPS's are equipped with an automatic system for the protection against voltage back feeding towards Utility, through the bypass (Applied Standard IEC 62040-1).

This protection works automatically by opening **contactor K6** (in series with the thyristors of the static switch) and eventually **K7**, and acts in case of internal defects of the system, or due to wrong manipulations on the *maintenance bypass Q2*.

#### Manual bypass

The manual bypass consists of a pair of manual switches **Q1** and **Q2**, which removes the UPS from the load for maintenance, while still supplying the load with power directly from the mains.

#### Battery

The battery supplies the DC power to the inverter when the mains is out of accepted tolerances.

## 3.2 OPERATION MODES

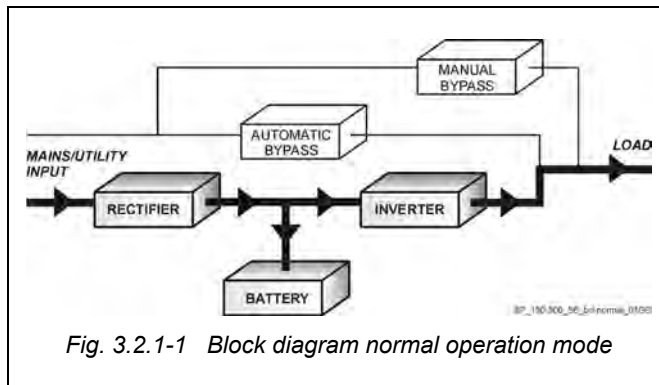
### 3.2.1 Normal operation mode

During normal operation, the rectifier converts input AC power to DC.

The DC power provides input power for the inverter and charging power for the battery.

The inverter converts the DC power to continuous and regulated AC power, which supplies the critical load.

The control panel reports the battery charge status and the expected backup time with the actual load.

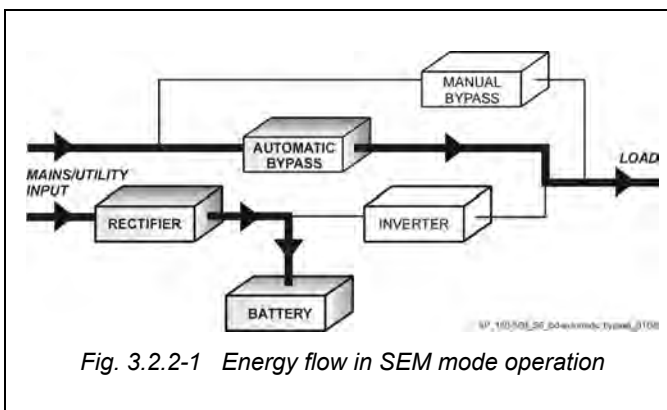


### 3.2.2 SEM mode operation (Super Eco Mode)

When the **SEM** mode is selected, and the **mains** power is available, the **load** is normally powered through the **automatic bypass**.

When the mains voltage is detected out of the prescribed tolerances, the **load** is automatically transferred to the **inverter**.

When the **mains** recovers, the **load** returns to the **automatic bypass** after a variable time defined by the control unit.



The **SEM** mode can be configured directly by the user for higher efficiency, considering the **mains** reliability and criticality of the **load**.

The selection between the two operation modes “**On-line** mode and **SEM** mode”, or switching between operation modes at required time, can be done through the UPS **console panel** (see Section 6.5-7).

## RPA

*In case of parallel system*

*SEM mode (Super Eco Mode) cannot be enabled for RPA Parallel System.*

**Attention:** A single unit equipped with a RPA - Parallel board, must be considered as parallel, thus disabling SEM.

### 3.2.3 Mains failure operation

When the mains is no longer within acceptable tolerances, the battery will provide the DC power to the inverter.

The inverter will maintain continuous AC power to the load until the battery voltage reaches the lower limit of the inverter operation capability.

During the discharge, the LCD screen displays the estimated time the battery can support the critical load. Prior to the battery completely discharging, the **"stop operation"** alarm (shutdown imminent) warns the operator that the battery is almost discharged and the UPS is about to shut down.

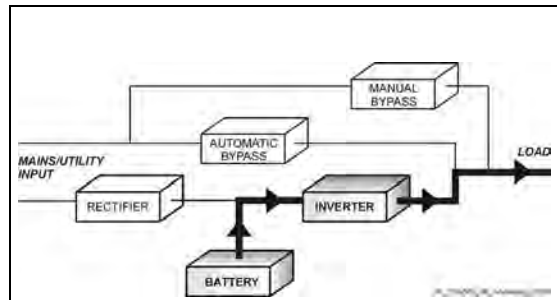


Fig. 3.2.3-1 Block diagram mains failure operation

## RPA

### In case of parallel operation

#### With a parallel system for power capacity (see Section 3.3)

- With the **bypass mains power available**, a low battery warning on any unit will cause the load to be transferred to mains (after a selectable time delay).
- With **bypass mains power not available**, a low battery warning on any unit will start the **"stop operation"** timer (adjustable).  
The load will shut down at the end of the **"stop operation"** time period.

#### With a parallel system for redundancy (see Section 3.3)

- When a battery low warning occurs on a unit not necessary to support the present load, this unit will shut down after a timeout period (selectable).
- The load is shared between the other units.  
As the warning occurs on one unit necessary to support the present load, the system starts the **"stop operation"** timeout (selectable).  
The load will shut down at the end of the **"stop operation"** time period.

### 3.2.4 Mains recovery operation

As soon as the AC input power recovers, the **rectifier will start automatically**, supplying DC power to the inverter and recharging the battery.

If the inverter was previously shut down due to low battery, the load will be initially powered by mains through the automatic bypass.

When the battery is recharged enough to ensure a minimum time of operation with the present load, **the inverter will start automatically** and the load will be transferred back to the inverter.

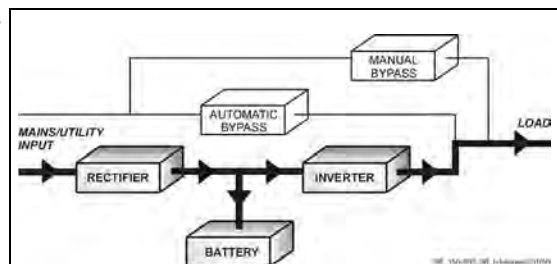


Fig. 3.2.4-1 Block diagram mains recovery operation

## RPA

### In case of parallel operation

When the AC input power recovers, **the rectifiers will start up sequentially**, according to their number in the parallel system. This minimizes the **initial inrush current**.

**The inverters will start up automatically**, but only when the battery has recharged enough for a **minimum runtime** with the present load.

**When enough inverters to supply the load have been restarted, the load will be transferred from the automatic bypass back to the inverter output.**

### 3.2.5 Automatic bypass

In normal operation, the load is supplied by the inverter.

When the control system detects a fault in the inverter, an overload condition or a short-circuit condition, the automatic bypass will transfer the critical load to the mains without interruption.

When the inverter recovers, or the overload or short-circuit condition is corrected, the load will be automatically transferred back to the inverter.

If the UPS is unable to return to normal mode following an automatic transfer to bypass mode, an alarm condition will be initiated.

A manual bypass (operator initiated) will not be considered as an alarm condition.

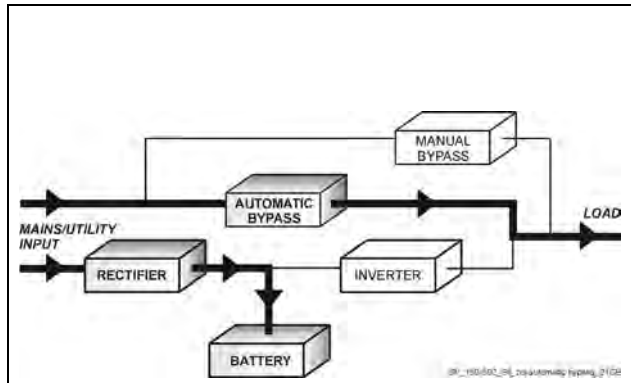


Fig. 3.2.5-1 Block diagram automatic bypass

## RPA

### In case of parallel operation

*Each unit has it's own internal bypass.*

*These units are continuously exchanging information, enabling all of the internal bypass circuits in a parallel system to operate simultaneously.*

*If the inverter of a unit fails, it's bypass circuit remains available to the parallel system.*

*It is excluded only if the unit is separated from the common bus by opening it's output switch **Q1**.*

### 3.2.6 Manual bypass

The maintenance bypass circuit consists of **Q1** and **Q2** manual switches, which permits transfer of the load directly to the unconditioned AC power without interruption, leaving the UPS available for maintenance.

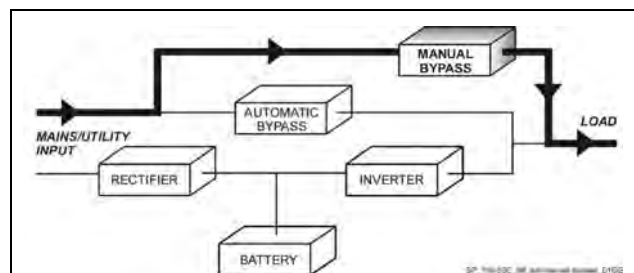


Fig. 3.2.6-1 Block diagram manual bypass



# RPA

## 3.3 PARALLEL SYSTEM OPERATION

### 3.3.1 Introduction to the parallel system

Two or more equal power units can be paralleled to increase the output power (**paralleling for capacity**) or to improve the overall reliability of an UPS system (**paralleling for redundancy**). The outputs of parallel units are connected to a common power bus, and in normal operation the units connected on the parallel bus share the load equally.

The modular concept of **SitePro** allows parallel operation of **up to 8 units**, without using paralleling switchgear, external bypass circuits or common control circuitry (see Fig. 3.3.1-1).

#### Parallel units for power capacity

Several units can be paralleled in order to achieve output power greater than the maximum power of a single unit.

The maximum total power shared between the paralleled units is equal to the **total installed nominal power**.

In the event of a failure of one unit, the power supplied by the UPS system becomes insufficient and the load will be transferred to the mains bypass source.

#### Parallel units for redundancy

The nominal power rating of the  **$n-1$  out of  $n$**  redundant paralleled modules must be equal to or greater than the required load power.

The load will be equally **shared by the  $n$  units** connected on the output bus.

Should **one of the  $n$  paralleled units** trip Off-line, the **remaining  $(n-1)$  modules** will supply the load, maintaining conditioned power to the critical load.

From this results **higher reliability and security for the load plus a higher MTBF** (Mean Time Between Failures).

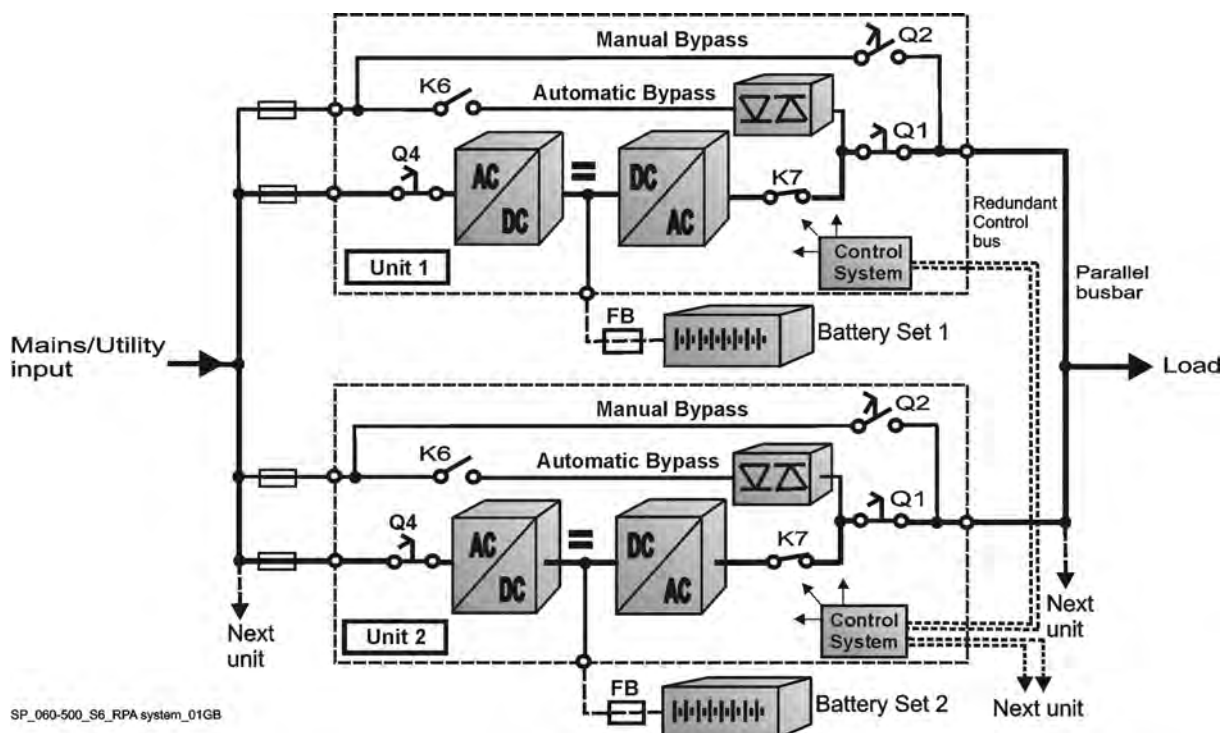


Fig. 3.3.1-1 Block diagram parallel system operation

### 3.3.2 Features of RPA parallel system

The **SitePro** parallel system is designed to provide a complete **Redundant Parallel Architecture**, and is free from common equipment.

Not only the **inverters** are redundant, but also the **bypass** functions are designed with redundant modular concept.

**When one UPS needs maintenance or service, the load is powered by the other units supplying the load bus.**

The redundant communication bus to which all units are connected keeps each unit informed about the status of all the other units.

The **control panel** located on each unit allows controlling and monitoring the status of this unit.

### 3.3.3 System control

A **high-speed redundant, serial communication** bus guarantees the exchange of data and thus the communication between the CPU's of each unit.

Each module controls its own function and operational status and communicates with all other modules, in order to act or react if necessary, adapting it to the new conditions.

### 3.3.4 Synchronisation

All units are identical, but one unit is arbitrarily selected as the reference and all the other units synchronise to this unit, which in turn, synchronises to the utility bypass voltage, as long as the latter is within tolerances.

In case of reference failure, another unit in the parallel system is automatically chosen to take over the reference role.

The bypass input for all the units of the parallel system must be supplied from the same AC source (no phase shift allowed between them).

### 3.3.5 Load sharing

On each unit of the parallel system, inverter output voltage and current are measured and applied to a load sharing bus.

An eventual difference between the units is therefore automatically equalised.



**It is strongly recommended that no transformers, automatic circuit breakers or fuses should be inserted between the unit's output and the load common busbars.**



## 4 INSTALLATION

### 4.1 TRANSPORT

#### Forklift



#### Crane

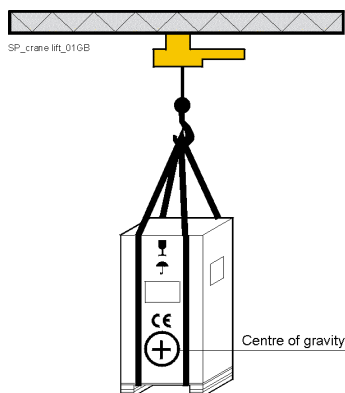


Fig. 4.1-1 UPS cabinets moving

**Transport UPS only in upright position!**

The UPS is packaged on a pallet suitable for handling with a forklift.

Pay attention to the centre of gravity.

The UPS must be moved in **upright position**. Do not tilt cabinets **more than +/- 10°** during handling.

**Move the UPS in it's original package to the final destination site.**

**Do not stack other packages on top:** the upper side of the cabinet could be damaged.

If the UPS must be lifted by crane, use suitable lifting straps and spreader bars. Note of the centre of gravity marked on the package.



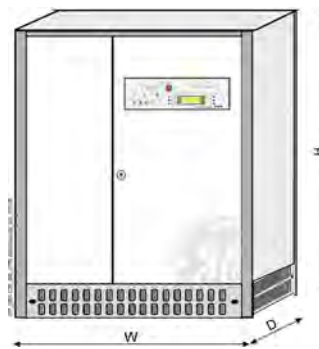
**Check for sufficient floor and elevator loading capacity.**

#### 4.1.1 Dimensions and weight



Dimensions <i>SitePro</i> 60 kVA (W x D x H)		
750 x 800 x 1450 mm		
29.53 x 31.50 x 57.09 inches		

Weight <i>SitePro</i> 60 kVA		
UPS rating	Weight kg / lbs	Floor loading kg/m <sup>2</sup> - lbs/sq.ft
60 kVA	475 / 1048	792 / 163



Dimensions <i>SitePro</i> 80, 100 & 120 kVA (W x D x H)		
1100 x 800 x 1450 mm		
43.31 x 31.50 x 57.09 inches		

Weight <i>SitePro</i> 80, 100 & 120 kVA		
UPS rating	Weight kg / lbs	Floor loading kg/m <sup>2</sup> - lbs/sq.ft
80 kVA	620 / 1367	705 / 145
100 kVA	675 / 1489	767 / 157
120 kVA	715 / 1577	813 / 167

## 4.2 DELIVERY

When delivered, inspect the **package integrity** and **the physical conditions of the cabinets** carefully.

In case of any damage sustained during transport, immediately inform the carrier and contact your local **Service Centre**.

A **detailed report** of the damage is necessary for any insurance claim.



**A DAMAGED UPS MUST NEVER BE INSTALLED OR CONNECTED TO MAINS OR BATTERY!**

## 4.3 STORAGE

### 4.3.1 Storage of the UPS

The UPS is carefully packed for transport and storage so that it is in perfect condition when installed.

Never leave a UPS outside the building and don't store the UPS one on top of the other.

It is advisable to store the UPS in its original package in a dry, dust-free room, away from chemical substances, and with a temperature range not exceeding **-25°C** (-13°F) to **+55°C** (131°F).

Some important functions of the UPS, such as the customised functions, are defined by parameters stored in a RAM memory.

The RAM is supplied by a small backup battery located on the Control Unit board.

If the storage time of the UPS exceeds **1 year**, these functions **should be verified** by an authorised *Service Centre* before putting the UPS into operation.

### 4.3.2 Storage of battery

When the delivery includes a maintenance free battery, keep in mind that they are subject to self-discharge and therefore you must recharge the battery.

The storage time without battery recharge depends on the temperature of the storage site.

The optimal temperature for battery storage is **20°C** (68°F) to **25°C** (77°F).

**Recharge stored maintenance free battery every:**

**6 months when the storage temperature is 20°C (68°F)**

**3 months when the storage temperature is 30°C (86°F)**

**2 months when the storage temperature is 35°C (95°F)**

## 4.4 PLACE OF INSTALLATION

### 4.4.1 UPS location



The installation and cabling of the UPS must be performed by a qualified service person.  
If the delivery included optional cabinets, please refer to section 8 - OPTIONS before proceeding to installation or connection.

It is important to have a clean, dust-free place provided with proper ventilation or air-conditioning to keep the ambient within the specified operating range.

The recommended air inlet temperature is from **20°C (68°F)** to **25°C (77°F)** (**max. 35°C / 95°F**). Refer to section 4.5.

Check for sufficient floor load capacity before installing the UPS and the battery.  
Refer to section 4.1.1.

For battery installation follow the local codes and the recommendation of the battery supplier.



Temperature is very important for valve regulated batteries (maintenance free).  
Operation at temperatures higher than **25°C (77°F)** will reduce life expectancy.

A single-phase power socket should be provided for connection of power tools, test equipment or connectivity devices.

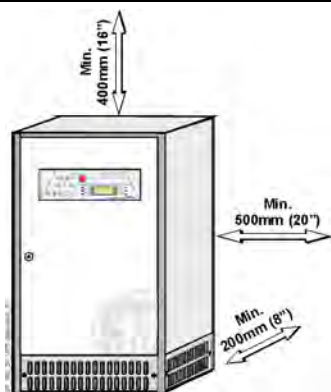


Fig. 4.4.1-1 SitePro 60 kVA disposition



Fig. 4.4.1-2 SitePro 80-120 kVA disposition

The UPS cabinet can be positioned against the wall but, in order to improve the ventilation and to make easier the maintenance operations for UPS and battery, we recommend a minimum distance of **200 mm (8")** from the wall.

The **right side** of the UPS cabinet **must be accessible** for maintenance operation.

**Clearance around the front** should be sufficient to enable free passage of personnel with the doors fully opened.

Recommended minimum clearance between ceiling and top of the UPS should be **400 mm (16")** for proper cooling air exhaust.

In case of optional cabinets (THD filters, transformers, battery), the additional cabinets must be placed **beside the left end of the UPS cabinet face**.

See chapter 8. – OPTIONS

The UPS cabinet is free standing and normally does not require bolting to the floor. In any case the cabinet basement is suitable to be floor fixed, when requested by local standards.

## RPA

In case of parallel system, try to place the UPS modules in sequence of their numbers (marked on the packing).

If the units are positioned “side by side”, the side panels must be mounted on all units.

Remove the side air inlet grids on the intermediate units to run the control bus cable connections.

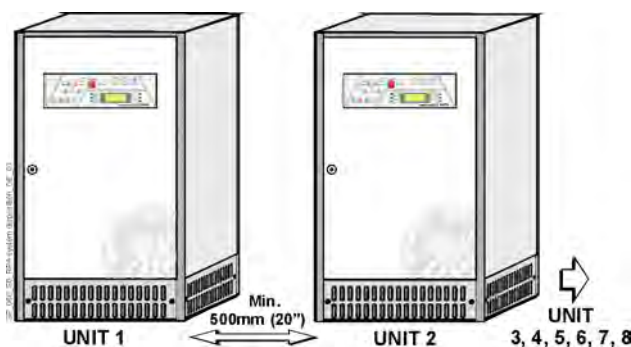


Fig. 4.4.1-3 RPA system disposition

### 4.4.2 Battery location

Batteries require a well-ventilated room with controlled temperature to obtain reliable operation.

**The optimal room temperature for the battery is 20°C (68°F) to 25°C (77°F).**

The life of valve-regulated batteries will be reduced by 50% for each additional **10°C (21°F)** that the battery ambient temperature is above **25°C (77°F)**.

The battery associated with larger UPSs is usually either rack mounted or fitted in multiple battery cabinets.

Installation and assembly must be made according to the local standards and manufacturer's recommendations.

The battery circuit breaker or battery fuse box must be mounted as near as possible to the battery.



**Battery installation and connection must be performed by qualified personnel only.**

**Read all safety instructions before proceeding with the installation.**

## 4.5 VENTILATION AND COOLING

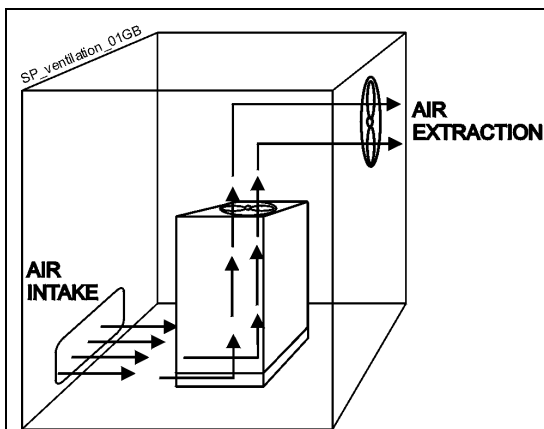


Fig. 4.5-1 Installation on plain floor

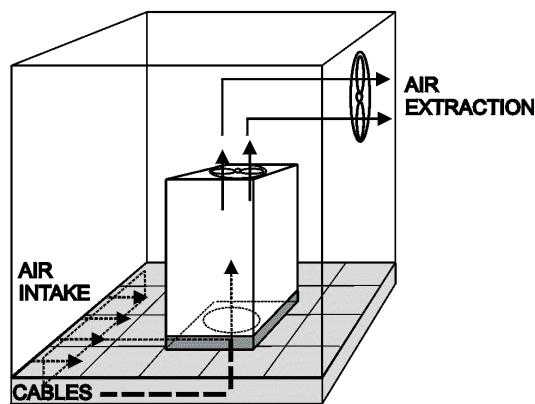
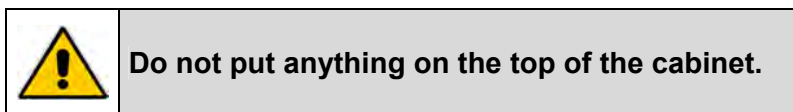


Fig. 4.5-2 Installation on raised floor

The heat produced by the UPS is transferred to the environment by its ventilation. Cooling air enters the cabinets through the air inlet (grids) located at the bottom and exhausted through the outlet on the roof. A suitable ventilation or cooling system must be installed to extract the heat from the UPS room.



**Do not put anything on the top of the cabinet.**

If the UPS is placed on a raised floor, the airflow for UPS cooling should enter from underneath the UPS, through the appropriate aperture on the raised floor.

Air filtration systems could be required when the UPS operates in a dirty environment. Contact your **Dealer** or the nearest **Service Centre** for appropriate solutions. In order to prevent overheating of the UPS, the available air intake flow rate must exceed the total air exhaust flow rate requirement of the UPS system.

The below table indicates the heat dissipation at full load at **PF = 0.8** lag. and charged battery, up to **1000 m** (3280 ft) altitude, for cooling air **25°C** (77°F) to **30°C** (86°F).

UPS	Losses		Cooling air flow	
	On-line	SEM	On-line	SEM
<b>SitePro 60 kVA</b>	3.89 kW	1.59 kW	1'140 m <sup>3</sup> /h	465 m <sup>3</sup> /h
<b>SitePro 80 kVA</b>	5.19 kW	1.85 kW	1'520 m <sup>3</sup> /h	540 m <sup>3</sup> /h
<b>SitePro 100 kVA</b>	6.02 kW	1.39 kW	1'760 m <sup>3</sup> /h	405 m <sup>3</sup> /h
<b>SitePro 120 kVA</b>	7.23 kW	1.96 kW	2'110 m <sup>3</sup> /h	575 m <sup>3</sup> /h

## 4.6 UNPACKING

The UPS and battery cabinets may be shipped packaged in carton boxes or in wooden crates (if requested).

Move the cabinets as close as possible to the final location before removing from the pallet.

If delivered in a wooden crate, remove the cabinet from the pallet with care, because of the heavy weight of the equipment.



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

Rear view **SitePro** 60 kVA

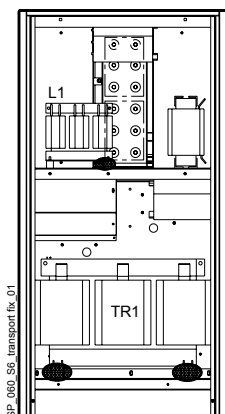


Fig. 4.6-1 Transport fastening

Rear view **SitePro** 80, 100 & 120 kVA

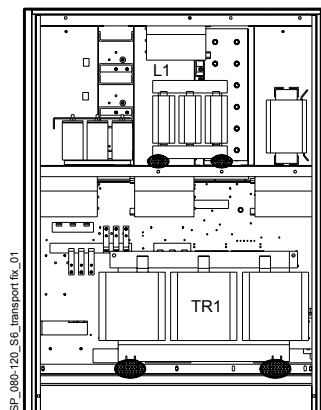


Fig. 4.6-2 Transport fastening

Remove the protective packing material and the foam cushion on the bottom of the cabinet.



The transformers and the chokes fitted in the UPS and optional cabinets are supported both at the bottom and the chassis.

**These supports must be removed before placing the cabinet in the final location.**

These supports are yellow and are indicated with an appropriate symbol on the assembly layout drawing (see Fig. 4.6-1 / 2).

Included in the delivery packing are the air inlet grids, which must be mounted on the 4 sides at the bottom of the cabinet with the screws included in the accessory bag.

If necessary, the terminal with the sensor must be mounted in the battery enclosure or cabinet (not in contact with metallic parts) and the **J3** plug must be connected to "**P1 - Power Interface**" (see section 4.8.3).

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.



**If the battery distance from the UPS is >5 m, we suggest do not use this circuit and the correct loading voltage must be installed manually according to the annual average temperature at which the battery will be working (request instructions to Service Centre or battery supplier).**

**RPA**

**For parallel systems, the delivery also includes the bus control cables for inter-connecting the UPS modules.**

## 4.7 ELECTRICAL WIRING



The installation and cabling of the UPS must be performed by a qualified service person only.

### 4.7.1 Mains input connection

Ensure that the AC and DC external isolators are OFF, and prevent their inadvertent operation.

Do not apply power to the equipment prior to the commissioning by a qualified engineer.

Before any other input connection, connect and check the PE wire.

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.

#### Separate input Rectifier & Bypass (recommended)

The bypass supply uses a different power source than is connected to the rectifier input terminals (**F1** and **F2** inputs).

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



In this case, remove the interconnection links BR1, BR2 and BR3 on the input terminals or busbars

#### 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 switch.



In this case, the interconnection links BR1, BR2 and BR3 on the input terminals or busbars must be used.

#### Separate input Rectifier & Bypass (recommended)

#### Common input Rectifier & Bypass

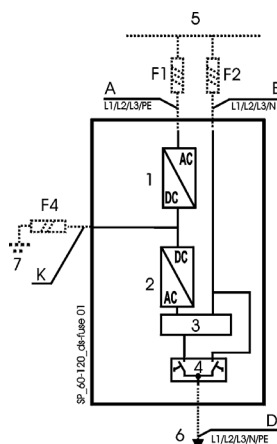


Fig. 4.7.1-1 Separate input rectifier & bypass

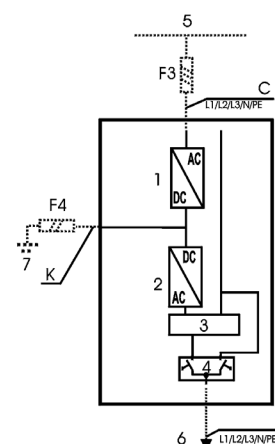


Fig. 4.7.1-2 Common input rectifier & bypass

1 = Rectifier

2 = Inverter

3 = Automatic bypass

4 = Manual bypass

5 = Mains input

6 = Load

7 = Battery



#### 4.7.2 Input/output overcurrent protection and wire sizing

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 utility, 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.

To choose the correct input fuses or circuit breaker, consider the available **short-circuit current** of the system up-stream.

The ratings indicated below do not consider any **line voltage drop**.

In case of optional input transformer the input protections should be sized to allow the transformer magnetisation inrush current.

Caution when using **four-pole circuit breakers** as protection.

A potential problem exists for situations with **non-linear loads**: **the neutral current could be greater than the phase currents**.

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



If you use **ELCB breaker** to protect the input connections, consider the **high leakage current towards the earth** generated by the noise suppression capacitors.  
If these ELCB breakers are strictly necessary, we suggest to use the largest type suitable for **non-linear current and for delayed operating**.

To ensure the circuit selectivity in case of **short-circuit in the load equipment**, special care must be taken in choosing the **fuse or circuit breaker ratings** installed in the output distribution circuits.

Due to the relatively low short-circuit capability of the UPS inverter, a short-circuit in the load will cause an immediate transfer to mains.

The largest fuse in the output distribution should be **at least 1.6 time** lower than the fuses supplying the bypass line.

If circuit selectivity is required while the load is fed from the inverter (bypass mains not available), the largest fuse or circuit breaker should be rated at no more than 20% of the UPS output current rating.

Fuses AgL / circuit breakers for 3x380/220V, 3x400/230V, 3x415/240V					Cables section (mm <sup>2</sup> ) A, B, C, D, E, K recommended by European Standards				
kVA	F1	F2	F3=F1	F4	A	B	D	C = E	K
60	3x125	3x100	3x125	2x160	3x35 + 25	4x25	4x25 + 16	4x35 + 25	2x50
80	3x160	3x125	3x160	2x250	3x50 + 25	4x35	4x35 + 25	4x50 + 25	2x120
100	3x200	3x160	3x200	2x315	3x70 + 35	4x50	4x50 + 25	4x70 + 35	2x150
120	3x250	3x200	3x250	2x355	3x120 + 70	4x70	4x70 + 35	4x120 + 70	2x185

The delivery and installation of fuses and input/output connections of the UPS are at the customer's expense, unless agreed otherwise.	Cables section (mm <sup>2</sup> ) A, B, C, D, E, K recommended in Switzerland (SEV)					
	kVA	A	B	D	C = E	K
	60	3x50 + 25	4x35	4x35 + 25	4x50 + 25	2x70
	80	3x70 + 35	4x50	4x50 + 25	4x70 + 35	2x150
	100	3x95 + 50	4x70	4x70 + 35	4x95 + 50	2x185
	120	3x150 + 95	4x95	4x95 + 50	4x150 + 95	2x240



## 4.8 WIRING CONNECTION



**The installation and cabling of the UPS must be performed by a qualified service person.**  
**If the UPS delivery includes optional cabinets, please refer to section 8 - OPTIONS before proceeding with the installation.**

### 4.8.1 Power connections for SitePro 60 kVA

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 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 regulation.
- 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.

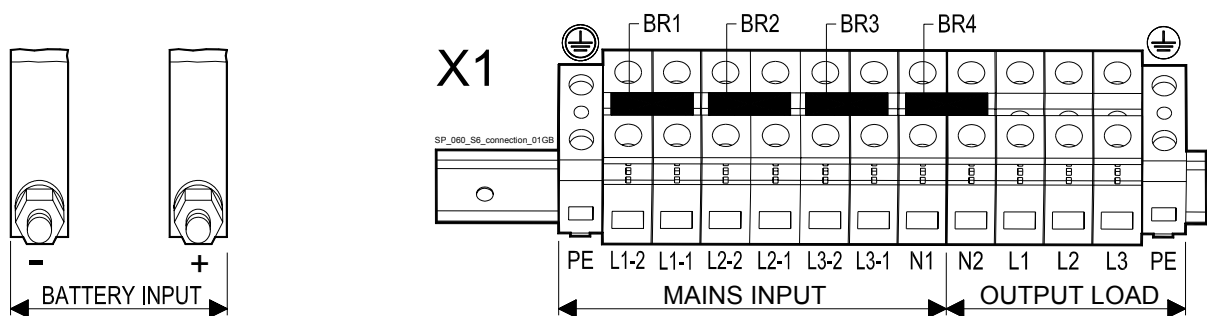


Fig. 4.8-1 Power connections enclosure

Battery power cables are connected to busbars using **M10** bolts. X1 terminals (max. rating **70mm<sup>2</sup>**)

Separate input rectifier / bypass (BR1, BR2 and BR3 must be removed)					
<b>L1-1</b>	Rectifier input L1	<b>L2-1</b>	Rectifier input L2	<b>L3-1</b>	Rectifier input L3
<b>L1-2</b>	Bypass input L1	<b>L2-2</b>	Bypass input L2	<b>L3-2</b>	Bypass input L3
<b>N1</b>	Neutral mains input			<b>PE</b>	Earth mains input

Common input rectifier / bypass (BR1, BR2 and BR3 must be fitted)					
<b>L1-1</b>	Rectifier + bypass L1	<b>L2-1</b>	Rectifier + bypass L2	<b>L3-1</b>	Rectifier + bypass L3
<b>N1</b>	Neutral mains input			<b>PE</b>	Earth mains input

Output load					
<b>L1</b> - Load L1	<b>L2</b> - Load L2	<b>L3</b> - Load L3	<b>N2</b> - Neutral output load	<b>PE</b> - Earth output load	

Battery	
<b>+</b>	Positive pole of the battery
<b>-</b>	Negative pole of the battery



**Do not insert the battery fuses before the commissioning.**



**To meet standards concerning electromagnetic compliance, the connection between the UPS and external battery must be done by using a shielded cable or suitable shielded (metal) conduit!**  
**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 transformer for galvanic isolation, the secondary of the transformer must be wye-configured with neutral solidly earthed.**

## 4.8.2 Power connections for SitePro 80, 100 and 120 kVA

Before to proceed to cable connections read carefully the following recommendations:

- Ensure that the AC and DC external isolators are Off, and prevent their inadvertent operation.
- Do not close any external isolators prior 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 regulation.
- In case of additional cabinets containing battery, filters, input/ output transformers, etc, the earth must be connected to the UPS main earth.
- Once the power cables have been connected, fix the internal safety screens and close the cabinets by fixing the external panels.

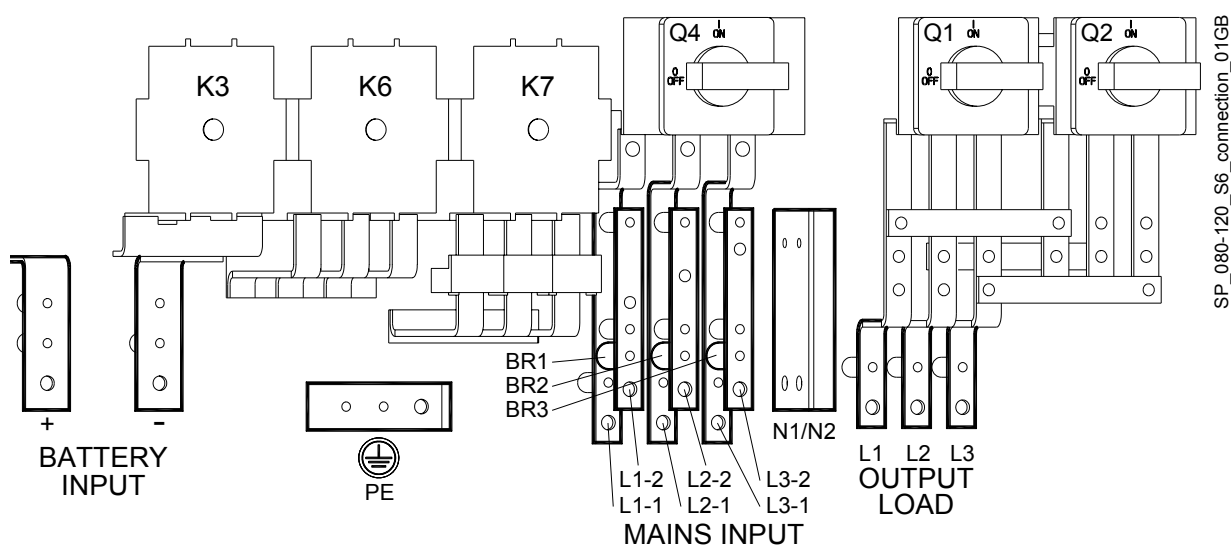



Fig. 4.8-2 Power connections enclosure


Connection on INPUT / OUTPUT bars: **M10 bolts**

Separate input rectifier / bypass (BR1, BR2 and BR3 must be removed)					
L1-1	Rectifier input L1	L2-1	Rectifier input L2	L3-1	Rectifier input L3
L1-2	Bypass input L1	L2-2	Bypass input L2	L3-2	Bypass input L3
N1	Neutral mains input			PE	Earth mains input

Common input rectifier / bypass (BR1, BR2 and BR3 must be fitted)					
L1-1	Rectifier + bypass L1	L2-1	Rectifier + bypass L2	L3-1	Rectifier + bypass L3
N1	Neutral mains input			PE	Earth mains input

Output load					
L1 - Load L1	L2 - Load L2	L3 - Load L3	N2 - Neutral output load	PE - Earth output load	

Battery	
+	Positive pole of the battery
-	Negative pole of the battery
 <b>Do not insert the battery fuses before the commissioning.</b>	

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

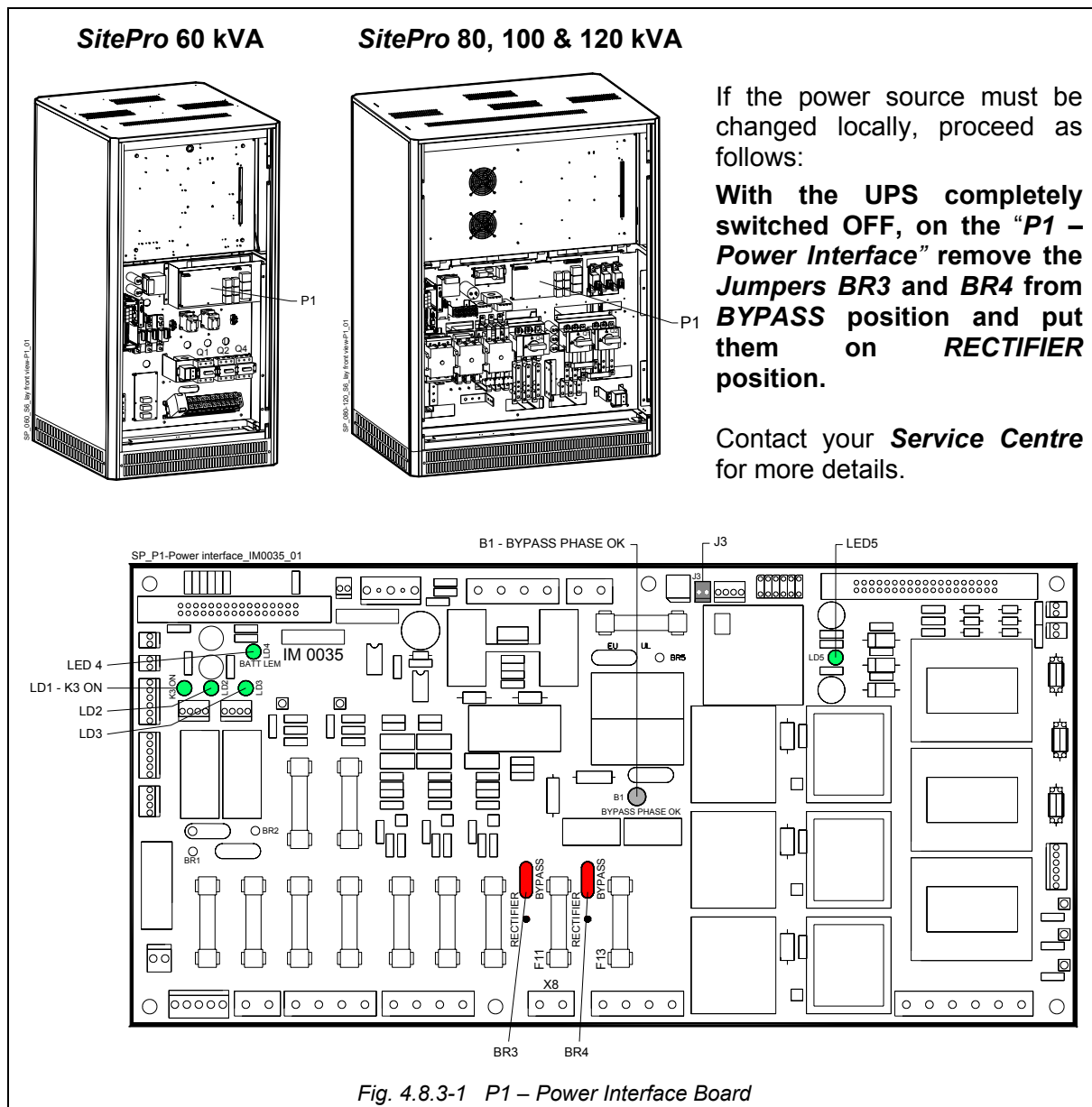
### 4.8.3 Choice of AC input for the power supply

The control and regulation circuits are supplied by two separate power supplies: one powered from AC mains input voltage and another powered by DC battery voltage.

The AC power supply can be powered either by bypass mains input (standard version, suitable in most cases) or rectifier mains input.

The input of the AC Power Supply AC must be supplied from the mains input rectifier:

- in case the UPS is used as frequency converter (mains input bypass terminals not powered);
- with separate AC inputs, following a complete battery discharge, the UPS system must be restarted only having the rectifier-input terminals powered.



#### 4.8.4 Functioning as frequency converter

When the UPS is delivered for **different output frequency with respect to the input frequency**, the automatic bypass and manual bypass functions are disabled, therefore the load cannot be transferred to mains in case of overload, short-circuit, or inverter failure.

In cases where the UPS needs to be powered down for maintenance purposes, the critical load must also be powered down during this time.

When the set-up parameters of the UPS are set for *frequency converter*, the **SEM mode** operation is automatically disabled.

##### Notices for installation:

- In order to avoid improper operation, only the rectifier input should be powered (**L1-1, L2-1 and L3-1**), **therefore BR1, BR2 and BR3, on AC input bars must be removed** (see section 4.8.1 and 4.8.2).
- Special care must be taken in choosing the **fuse ratings** installed in the output distribution (**max. 20% of the UPS rated current**).  
Avoid high inrush current due to transformer magnetisation or motor starting.

##### Notices for start-up operation:

- Since the AC-Power supply is fed from the input mains rectifier (see section 4.8.3), the control panel will be powered ON only after closing the input switch **Q4**.
- The lamp **B1 - BYPASS PHASE OK** on "**P1 - Power Interface**" (see section 4.8.3) for clockwise phase rotation check will stay **OFF**.
- After closing the output switch **Q1** the output will not yet be supplied and the LCD screen displays "**load off**".  
The output bus will be supplied only when the inverter is running and the LCD screen displays "**LOAD ON INVERTER**".
- If the UPS has been previously shut down, reset of "**load off**" must be done by pushing simultaneously for few seconds the "**load off**" push-button and the "**I**" key (*inverter ON*).

##### Notices for shut-down operation:

- The **inverter** can be switched OFF pushing the key "**O**" (*inverter OFF*) only after having pushed the push-button "**load off**" (all equipment normally powered by UPS are shut down).  
Then follow the normal shut down procedure indicated to section 5.4.1.



##### **WARNING!**

**Do not allow unattended operation of the inverter with the output switch Q1 open.**

**This is an abnormal operating mode and some important protective functions are disabled!**

**Do not allow the inverter to continue running after the "**load off**" button is activated!**

# RPA

## 4.9 POWER WIRING OF PARALLEL UNITS

To guarantee good load sharing between the units of a parallel system, we recommend to keep the cable length from the input distribution board (5) to the output distribution board (10) about the same for each unit ( $a+b = c+d = e+f = g+h = i+l = m+n = o+p = q+r$ ).

Tolerance: +/-10%.

The AC input power of all the bypass must be the same for all units of the parallel system - no any phase shift allowed between units.



**It is strongly recommended that no transformers, automatic circuit breakers or fuses be inserted between the units' output terminals and the load common busbars.**

Verify that power wiring and control wiring are run in separate conduits or cable trays.  
UPS input cable must be run in separate conduit from the output cable.

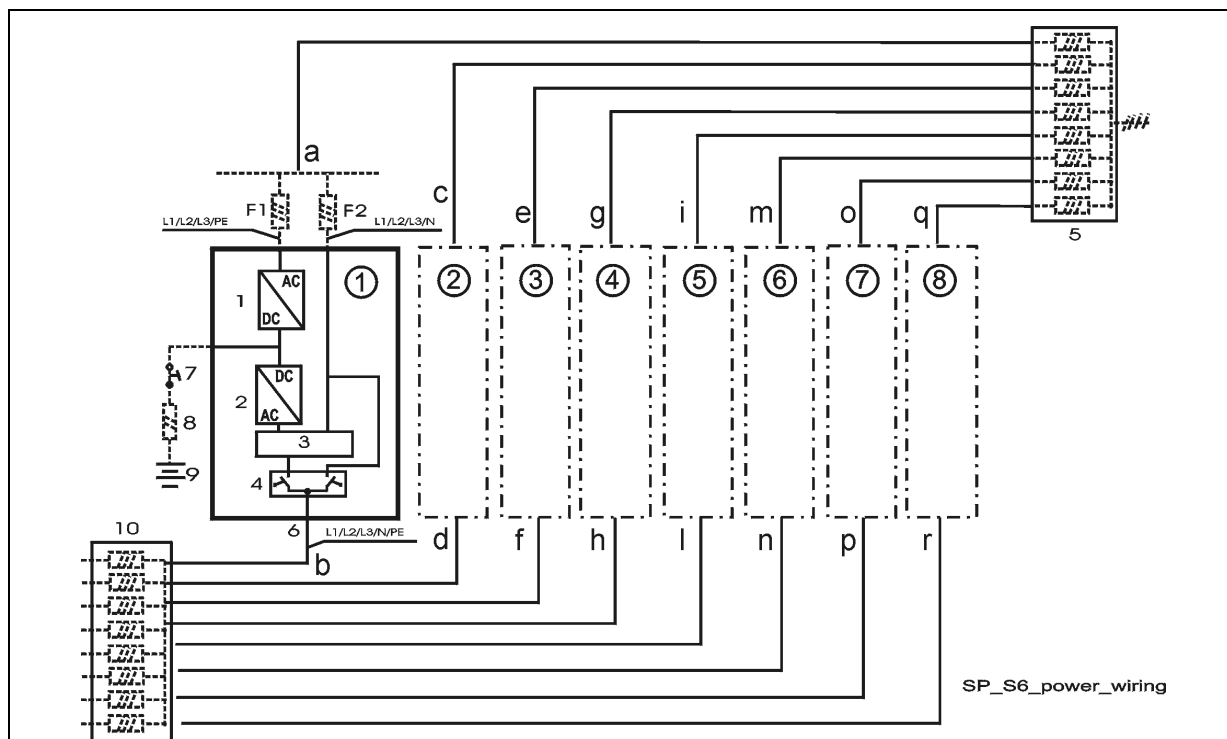


Fig. 4.9-1 RPA Parallel System

- |   |                   |
|---|-------------------|
| 1 = Rectifier                                 | ① = Unit number 1 |
| 2 = Inverter                                  | ② = Unit number 2 |
| 3 = Electronic bypass                         | ③ = Unit number 3 |
| 4 = Manual bypass                             | ④ = Unit number 4 |
| 5 = Input mains distribution                  | ⑤ = Unit number 5 |
| 6 = Unit output load                          | ⑥ = Unit number 6 |
| 7 = External battery MCB                      | ⑦ = Unit number 7 |
| 8 = External battery fuse                     | ⑧ = Unit number 8 |
| 9 = External battery                          |                   |
| 10 = Common busbar & Output load distribution |                   |

# RPA

## 4.10 PARALLEL CONTROL BUS CONNECTION

In cases of parallel operation, the communication between the units take 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.

A short control cable provided with a ferrite ring core link the parallel board “**P13 – RPA Board**” with the parallel bus socket on which must be connected the **control bus cables A** and **B**.

All the parallel units are connected to the same control bus.

This connection allows:

- the micro-processors of each unit to communicate with each other;
- the oscillators of each unit to be locked together;
- the regulation loops to compare the output current of each unit in order to equally share the load current.

For increased reliability, this connection is made with redundant cables.

In this way, communication is maintained between units in case one of the control cables should fail or be accidentally damaged or disconnected.

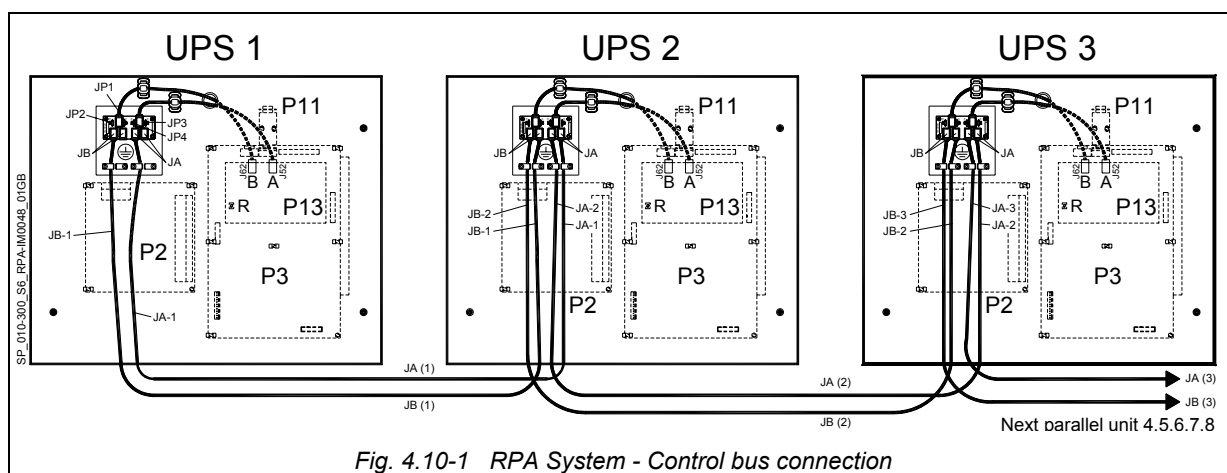
The standard length of the control bus cable between two parallel unit is **12 m / 40 ft**.

Maximal overall length of bus connection, between the first and the last unit, should not be longer than **84 m / 276 ft**.

Verify that control wiring is run in individual separate steel conduit.



**In any case the control bus cable connecting JA (1/2/3/4/5/6/7) and JB (1/2/3/4/5/6/7) should not be connected or disconnected after the system has been powered on.**



**The shield of the control bus cable, connected on JA and JB must be connected to ground with the appropriate cable clamps fitted on parallel bus socket.**

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 panel.

This number is also marked inside and outside the packaging.

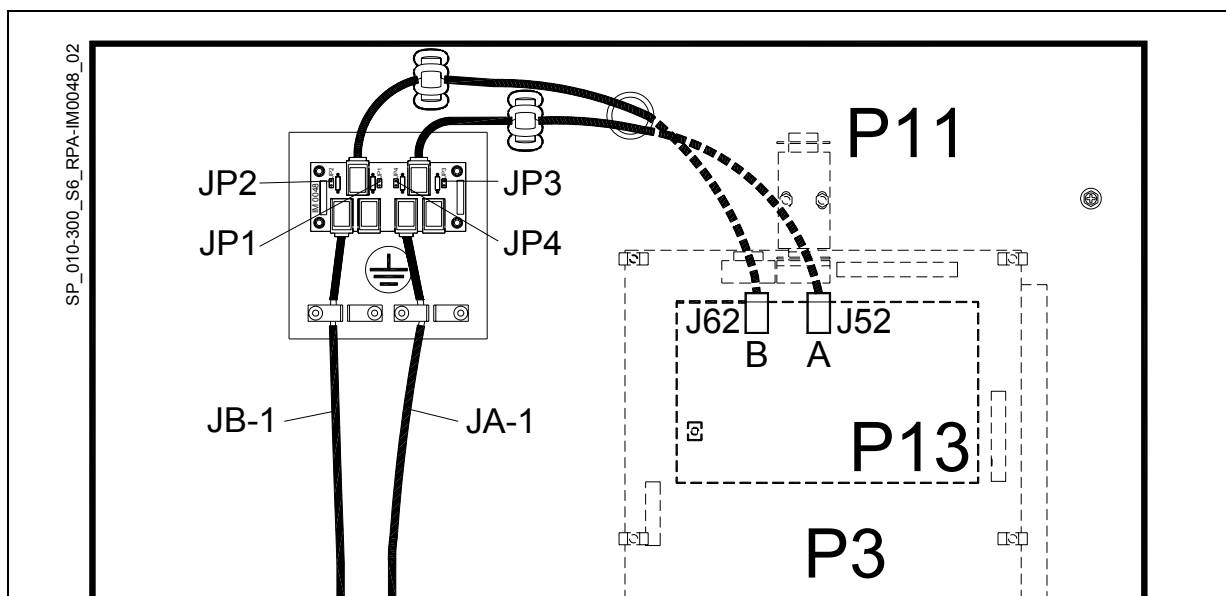


Fig. 4.10-2 Bus connection on terminal units

### Terminal units

On the parallel bus PCB **P34 - IM0048**, of the **first and last** units (terminal) of the parallel system the Jumpers **JP1**, **JP2**, **JP3** and **JP4** must be inserted.

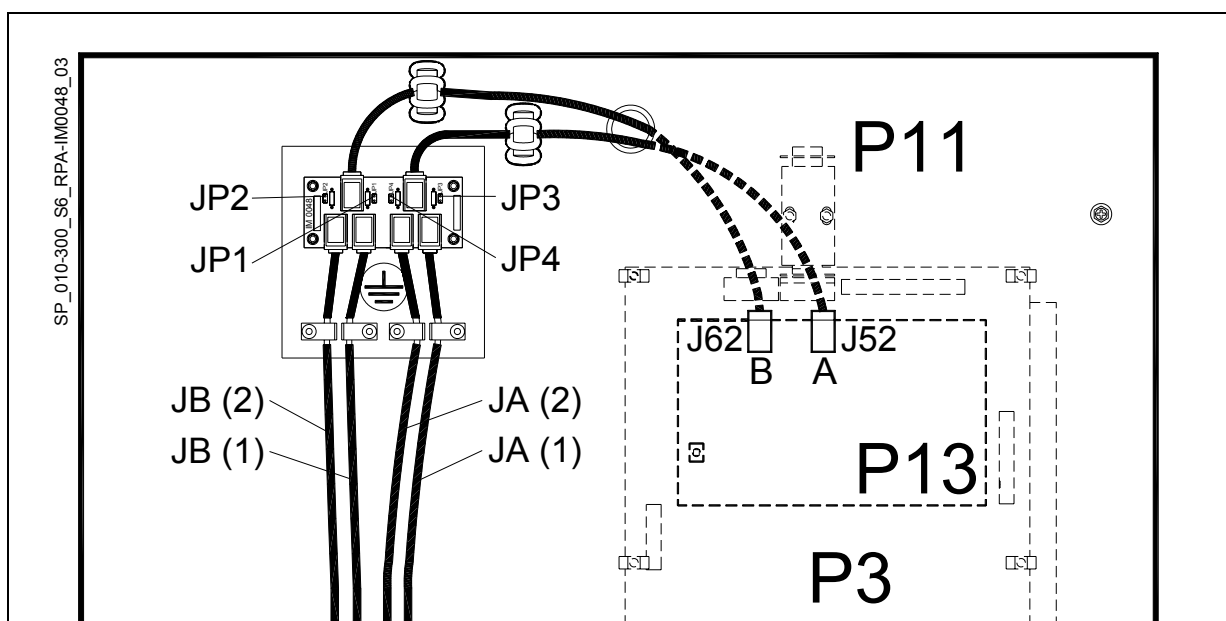


Fig. 4.10-3 Bus connection on intermediate units

### Intermediate units

On the parallel bus PCB **P34 - IM0048** of the **intermediate units** of the parallel system the Jumpers **JP1**, **JP2**, **JP3** e **JP4** must be removed.



In a parallel system composed by 2 or more units, only the **first and last** units (having 1 input **JA** e **JB** free) have the Jumper **JP1**, **JP2**, **JP3** and **JP4** inserted on parallel bus PCB **P34 - IM0048** (see Fig. 4.10-2/3).



# RPA

## 4.11 CONTROL BUS CABLE LOCATION



### Warning!

This operation must be performed by trained personnel before the initial start-up (ensure that the UPS installation is completely powered down).

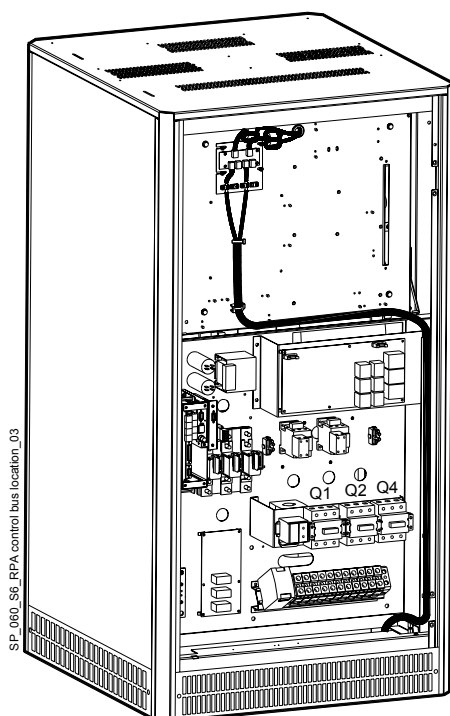


Fig. 4.11-1 View electronic module

### Access to the control bus connection.

The control bus connection between parallel units must be made on the front of the **electronic module** fitted behind the front door

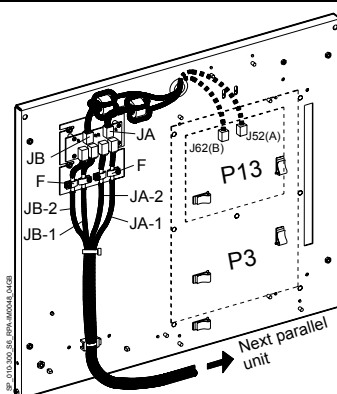


Fig. 4.11-2 Front view electronic module on intermediate unit

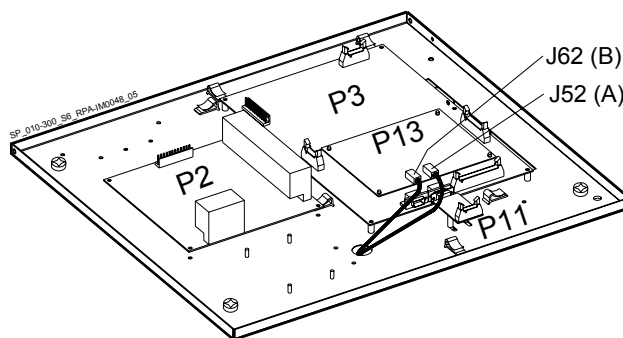


Fig. 4.11-3 Internal view electronic module

### Control bus cables connection.

- Plug the cables **JA** (1/2/3/4/5/6/7) and **JB** (1/2/3/4/5/6/7) onto the RJ connectors **JA** and **JB** located on parallel bus PCB **P34 - IM0048** (going to **P13** – RPA Board **J52** and **J62**).
- Fix both cables **JA** (1/2/3/4/5/6/7) and **JB** (1/2/3/4/5/6/7) to parallel bus socket connecting the cable shield to ground by means the cable clamps "**F**".



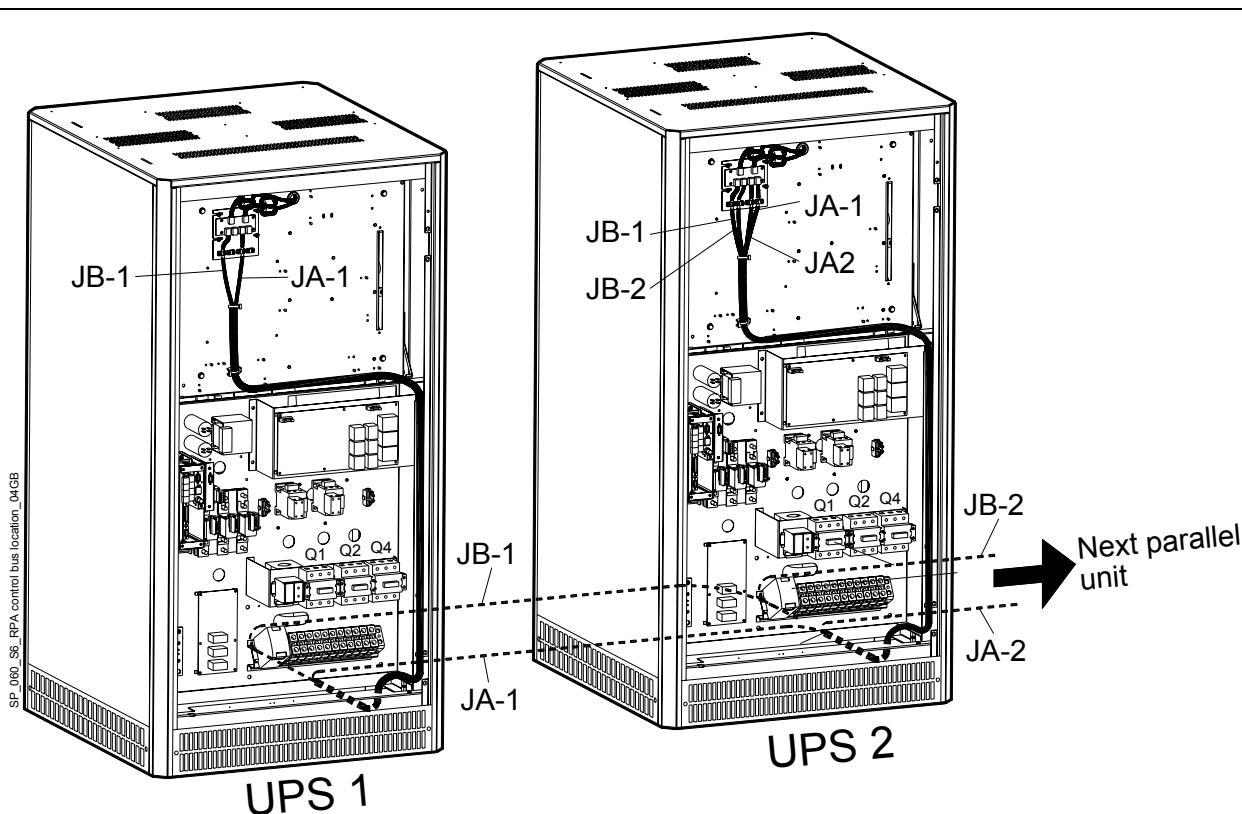


Fig. 4.11-4 Control Bus cable routing and connection

### Control bus cables routing

Place and fix the cables **JA-1/2/3/4/5/6/7** and **JB-1/2/3/4/5/6/7** inside the UPS cabinets in the position illustrated in the drawing.



**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 disconnect them from the metal plate where are located the sockets *JA* and *JB*.**

For reliability reasons the cables **JA-1/2/3/4/5/6/7** and **JB-1/2/3/4/5/6/7** connecting the units should be run in separated protected conduits (as indicated in fig. 4.11-4) separated from the power cables.

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



**The connection of the control bus cable in a UPS system already powered requires a special reset operation, which can be made by only a trained operator.**

# RPA

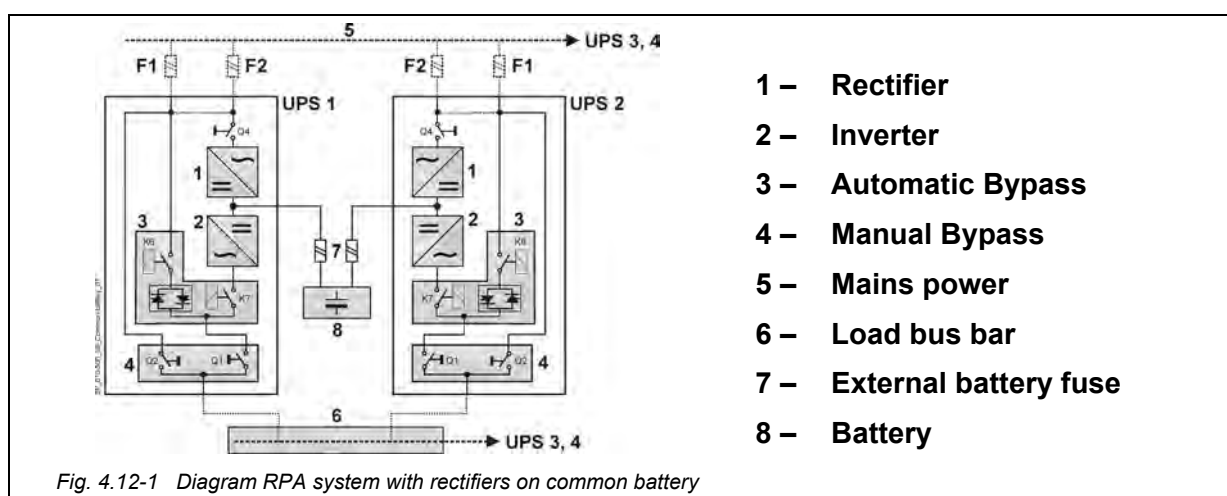
## 4.12 RECTIFIERS PARALLELED ON THE SAME BATTERY



A parallel system with a common battery for two or more rectifiers, requires a particular installation and adequate setting of some parameters, (accessible only through password), and can therefore only be done by a qualified engineer from GE.

Usually each rectifier-inverter unit runs with own battery.

In case of parallel units are running with a common battery (max. 4 UPS - see Fig 4.12-1), the sharing circuit between individual rectifier is integrated in the communication bus of the system in order to assure an equal sharing of the rectifiers output currents.



### Pay attention to the following recommendations:

- The units delivered for this functioning mode needs a special parameters setting, so they must be prepared in advance before the installation.
- The installation must be performed only with the UPS system must be completely shut down.
- The AC rectifiers input power (5) must be the same, with the right phase rotation for each unit.
- Each rectifier must be set for the same floating DC voltage and the same battery current limitation.
- It is recommended to install the fuses / MCB (7) on each line connecting the rectifiers to the common battery for maintenance / safety reasons (for fuses rating see section 4.7.2).
- In case one must be powered down for maintenance, switch-OFF the concerned unit before open the DC fuses/MCB on the battery line (7).
- It is recommended to connect an external NO free contact “battery fuses” to the UPS and to enable the function by setting the parameter (see section 7.1).
- If an emergency generator set supply the UPS, and the free contact “Generator ON” is connected to the Customer interface, connect a separate NO free contact on each parallel unit.
- The parameters enabling the battery test, both manual and automatic, must be set in the same mode on all the units having the rectifiers on common battery.
- Do not connect the temperature sensor (standard delivery on **SitePro** 10 – 60 kVA) for automatic battery floating voltage compensation.
- Do not enable the function *Boost charge* (parameter 87).

## 5 OPERATION

### 5.1 LAYOUT

#### 5.1.1 Layout SitePro 60 kVA

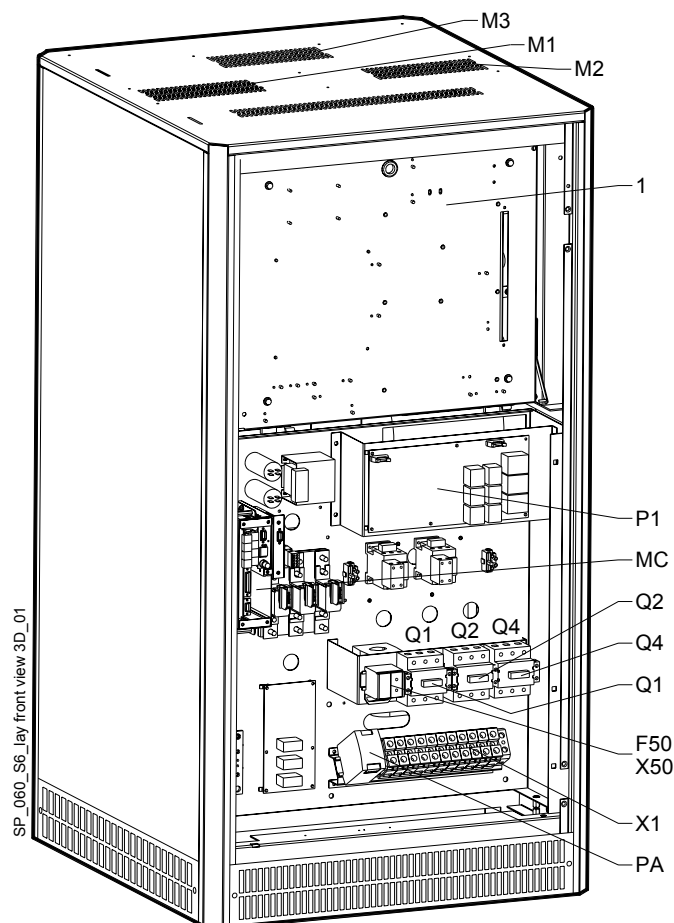


Fig. 5.1.1-1 Internal view with open doors

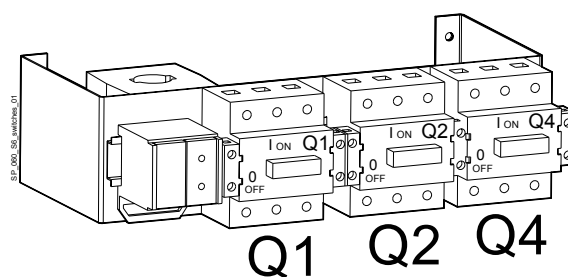


Fig. 5.1.1-2 Manual operated switches



Fig. 5.1.1-3 Control Panel

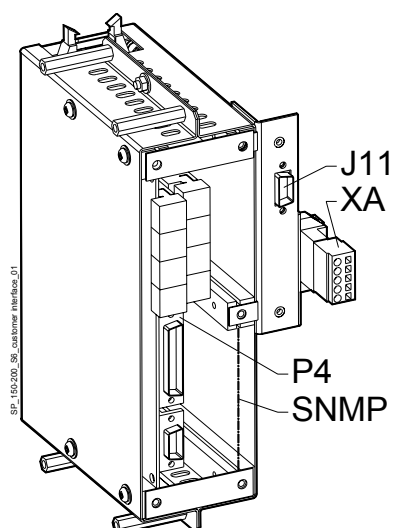


Fig. 5.1.1-4 Multislot for connectivity

- 1 Electronic Module
- F50 Fuse for plug X50 supply
- J11 RS 232 Port for old Protocol (TLC)
- M1 Outlet grid fan M1
- M2 Outlet grid fan M2
- M3 Outlet grids fans M3
- MC Multislot for connectivity
- P1 Power Interface Board
- P4 Customer Interface Board
- PA 24VDC Auxiliary Power Supply (option)
- Q1 UPS output switch
- Q2 Manual bypass switch
- Q4 Input rectifier switch
- SNMP Slot for SNMP Card (option)
- X1 Terminals for Input / Output
- XA 24 VDC supply connector (option)
- X50 Plug for connectivity device

### 5.1.2 Layout SitePro 80, 100 and 120 kVA

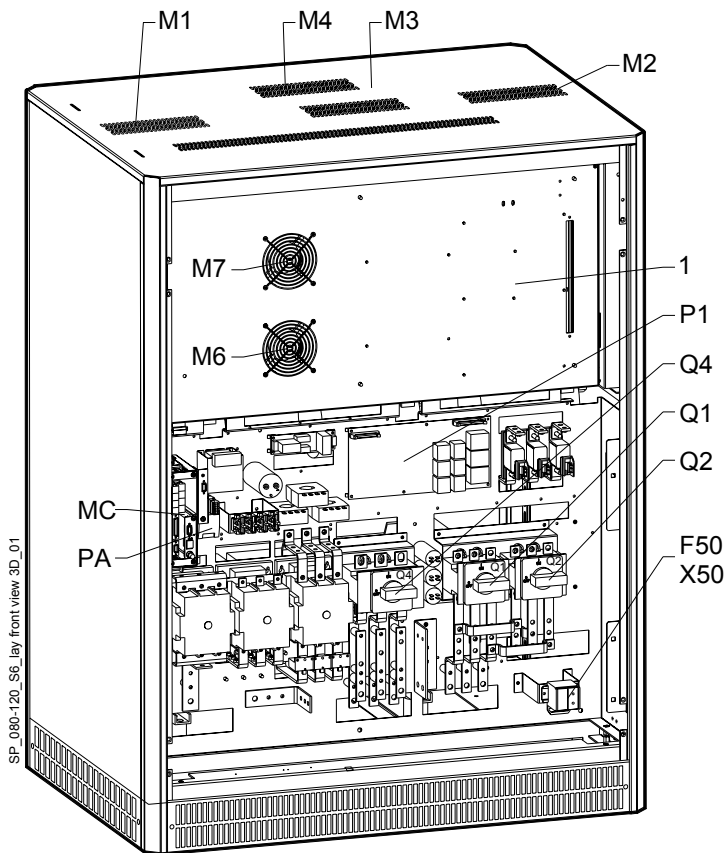


Fig. 5.1.2-1 Internal view with open doors

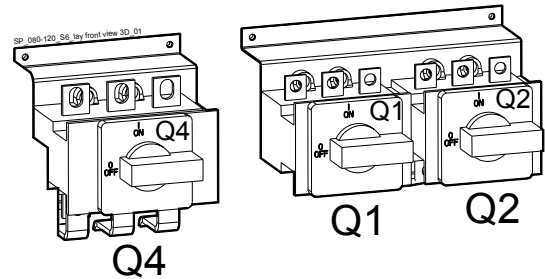


Fig. 5.1.2-2 Manual operated switches



Fig. 5.1.2-3 Control Panel

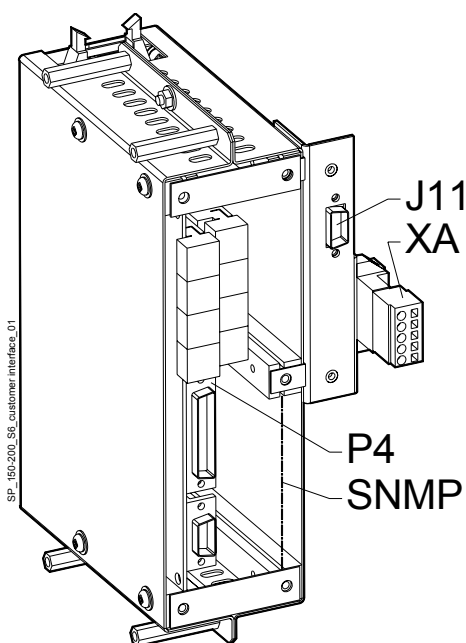


Fig. 5.1.2-4 Multislot for connectivity

- 1 Electronic Module
- F50 Fuse for plug X50 supply
- J11 RS 232 Port for old Protocol (TLC)
- M1 Outlet grid fan M1
- M2 Outlet grid fan M2
- M3 Outlet grids fans M3
- M4 Outlet grid fan M4
- M5 Outlet grid fan M5
- M6 Outlet grid fan M6
- M7 Outlet grid fan M7
- MC Multislot for connectivity
- P1 Power Interface Board
- P4 Customer Interface Board
- PA 24VDC Auxiliary Power Supply (option)
- Q1 UPS output switch
- Q2 Manual bypass switch
- Q4 Input rectifier switch
- SNMP Slot for SNMP Card (option)
- XA 24 VDC supply connector (option)
- X50 Plug for connectivity device

## 5.2 CONTROL PANEL

SP-S6-control panel\_02

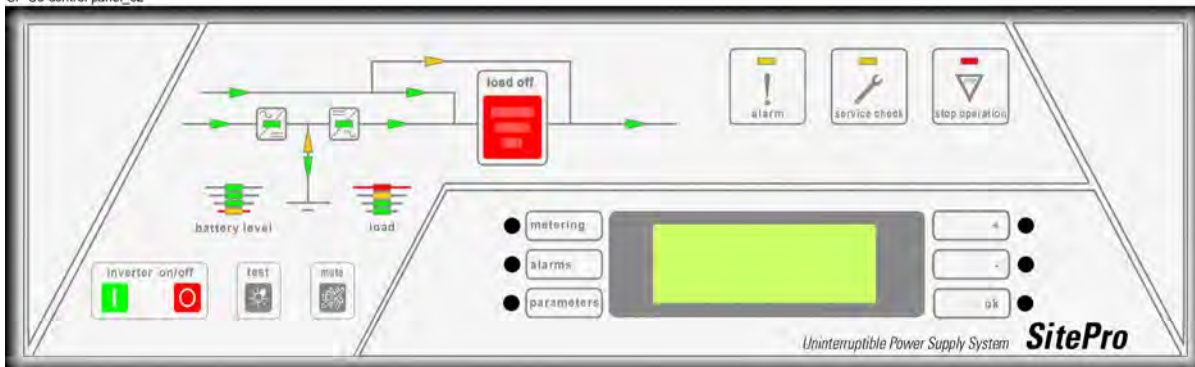
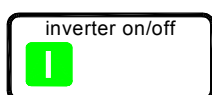


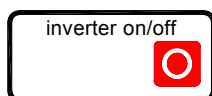
Fig. 5.2-1 Control Panel

### 5.2.1 Table of functions and indications on control panel



Key to switch the **inverter ON**

(This key is also used to **reset "load off"** if pressed simultaneously with **load off** push button).



Pressing this key once transfers the **load to the mains**.

Pressing the key a second time within 6 sec. switches the **inverter OFF**. This key is also used as the EPO (Emergency Power Off) reset.

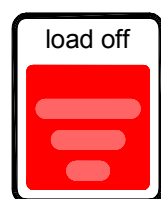


Key to **reset general alarm and buzzer**.



Key to **test** the control panel LED's and buzzer.

(Pressing this key causes all the LED's to light and the buzzer to sound 3 times).



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

By pressing it, you immediately **separate the UPS from the load**.

**Attention:** "**load off**" cannot disconnect the UPS from the **load** with **Q2** closed.

To reset "**load off**": push and hold the "**load off**" push-button and the "**I**" key (Inverter On) simultaneously for some seconds.

**RPA** For parallel system, pressing "**load off**" on one unit connected on parallel bus, all the units are separated from the load. The "**load off**" reset must be done only on one unit connected on the parallel bus (switch **Q1** closed).



**Special care must be taken in using this command, in order to avoid accidental load disconnection.**



**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 chapter 9 – Maintenance )

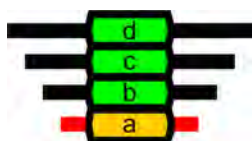
The **LED is ON** also when the output switch **Q1** is open, indicating that the *inverter* is in service mode, not supplying the load.



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.**

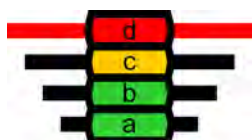


battery level

**All LEDs ON** indicate that the battery is fully charged.

**LED a** Yellow  
(fixed: indicating last 25 % of battery backup)  
(blinking: indicating battery backup ≤5%)

**LED b, c, d** Green  
(each one indicating 25 % of battery backup)



load

**LEDs ON** indicate the load status of the UPS.

<b>LED d</b>	red	≥100 % load
<b>LED c</b>	yellow	100% load
<b>LED b</b>	green	66% load
<b>LED a</b>	green	33% load

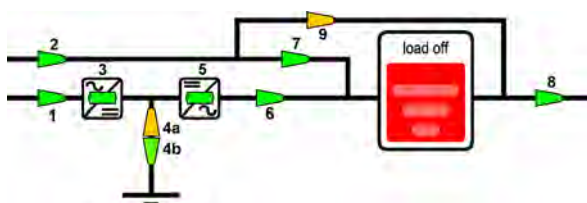


Fig. 5.2.1-1 LED's on synoptic diagram

#### Definition of the LEDs on mimic diagram

<b>LED 1</b>	=	Input mains rectifier (green)
<b>LED 2</b>	=	Input mains bypass (green)
<b>LED 3</b>	=	Rectifier ON (green)
<b>LED 4a</b>	=	Discharging (yellow)
<b>LED 4b</b>	=	Charging (green)
<b>LED 5</b>	=	Inverter ON (green)
<b>LED 6</b>	=	Load on inverter (green)
<b>LED 7</b>	=	Load on mains (green)
<b>LED 8</b>	=	Output load voltage (green)
<b>LED 9</b>	=	Manual bypass (Q2) ON (yellow)

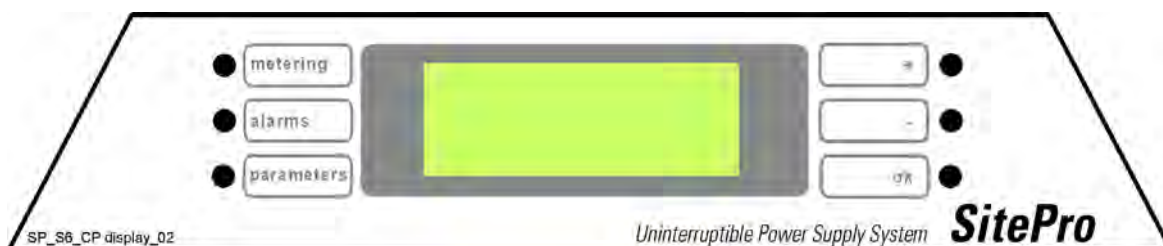


Fig. 5.2.1-2 LCD screen

#### User LCD Interface

Consists of an LCD screen, 4 lines with 20 characters each and six keys. It offers:

- UPS operating, AC and DC metering information.
- History of alarms and events.
- Possibility to adapt the functionality on the unit data to the customer needs by changing parameters.

# RPA

*This symbol refers to needed operation only for parallel system.*

*These steps are not applicable for single units.*

## 5.3 START-UP PROCEDURES

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.

**Only open the front door, do not remove any panels.**

**Now you can initiate the start-up procedure of the UPS system.**

There is no need for any specific knowledge if you carefully follow the step by step instructions given here, but we recommend that at least the initial procedure should be performed by trained personnel only.

Check after every step for correct reaction of the UPS, eventually measuring voltages and currents for confirmation, before you proceed to the next step.

If you encounter any problems following the procedures contained in this section, you should contact the Service dept of the distributor from whom the equipment was purchased.

There are different start-up procedures, as described on the following pages, depending on the configuration and the initial state of the UPS system:

- **Initial Start-up of UPS single and parallel system.**

This procedure describes how to switch on a single UPS or a complete UPS parallel system.

Initial start-up following the installation means that the load is not being initially supplied and the system is still completely powered OFF.

- **Start-up single and parallel system following maintenance shut down.**

In case of previous maintenance shut down procedure, the load is still powered by the maintenance switch(es) **Q2**.

This procedure describes how to transfer the load back on to the UPS.

- **Start-up an additional unit in a redundant parallel system.**

The load is fully supplied by the other units connected to the parallel bus.

The unit on which we are operating will be connected on the parallel busbar sharing the load with each other's.



### WARNING!

**Do not allow unattended operation of the inverter with the output switch Q1 open. This is an abnormal operating mode and some important protective functions are disabled!**

**Do not allow the inverter to continue running after the “load off” button is activated!**

### 5.3.1 Initial start-up

	<p>Before proceeding to turn on the UPS system, ensure that the AC and DC external isolators are OFF, and prevent their inadvertent operation.</p> <p>Ensure that the output load distribution can be powered and all the output isolators are open.</p>
--	--

Open the front door and make sure that:

- All the **connections** to the input/output terminals of the UPS have been made correctly.
- The **safety screens** are fixed in their position.
- The switches **Q1**, **Q2** and **Q4** are **OFF (0)** and the external **battery circuit breaker or battery fuses** are open.

#### FOR THE SINGLE VERSION PERFORM THE FOLLOWING OPERATIONS

- Switch-ON the mains voltage** from the input distribution (both rectifier and bypass if separated).  
At this stage the electronic power supply is switched ON and the buzzer sounds.  
**LED 2** must be ON.  
The control panel must be lit, and the LED **“service check”** is ON.  
On the LCD panel you can see that the **auto-test procedure** is running.  
If the test results OK, **“SELF TEST OK”** will appear on the display.  
The main screen will indicate the status **“load off”**.  
Verify/set the real clock time (refer to section 6.3 - Parameters).
- Check for correct phase rotation of input mains on “P1 - Power Interface”:**
  - Lamp B1 ON:** the phase rotation (clockwise) **is correct** (see Fig. 4.8.3-1).
  - Lamp B1 OFF:** the phase rotation (anti-clockwise) **is not correct** (see Fig. 4.8.3-1).  
In this case switch OFF the mains, reverse two phases between them on the line supplying the UPS and repeat the procedure from point 1.**LED 2** on the control panel **must be lit**.
- Close the input switch Q4.**  
**LED 1** must be lit and **LED 3** (inside rectifier symbol) must blink.  
The rectifier starts up automatically, supplying the DC circuit, and charging the DC capacitors.  
After some seconds, the **contactor K3** closes (the green **LED 1 - K3 ON** on “P1 - Power Interface” lights up -see Fig. 4.8.3-1).  
The **LED 3** (inside rectifier symbol) stops blinking and stays ON, indicating that the DC link has reached the floating voltage.
- Battery coupling to DC link.**  
Close the external battery circuit breaker or battery fuses, after checking the right polarity.  
The **battery** is now connected to the DC link. **LED 4b** should be lit indicating battery charge.  
The **buzzer** switch OFF and LED **“alarm”** is OFF.
- Close the output switch Q1.**  
The UPS output terminals must be supplied by the mains power through the automatic bypass.  
The LCD display must indicate the status **“LOAD ON BYPASS”**.  
Now the control panel should indicate a normal situation (No alarms).  
LED **“service check”** is OFF. LEDs **1, 2, 3, 4b, 7** and **8** light up. LEDs **4a, 5, 6** and **9** are OFF.





## 6. Inverter start.

Press the key **"I"** on the control panel.

The **inverter** will start up. **LED 5** (inside inverter symbol) must be blinking.

In a short time, when the inverter voltage is confirmed, the LED will stop blinking and stay fixed lit.

The load will be automatically transferred from mains to inverter.

LEDs **1, 2, 3, 4b, 5, 6** and **8** are now lit. LEDs **4a, 7** and **9** are OFF.

The LCD panel must display the main screen, indicating the status **"LOAD ON INVERTER"** and the value of the battery reserve.

## 7. Load supply.

Your **SitePro** UPS is now running, supplying power to the output.

Insert the loads one by one to the output of the UPS.

Check the output current value of **L1, L2** and **L3** and check for correct load balance.

## 8. Operation mode selection.

**SitePro** is delivered normally selected for permanent *On-line* operation.

*SEM* mode can be enabled and the *SEM START* time & *SEM STOP* time can be programmed for each day of the week (see *Section 6.5-7*).



The battery must be charged for at least 10 hours, in order to ensure the full backup runtime in the case of a mains failure.

# RPA

For parallel systems perform the following procedure on each unit, starting from unit no. 1.

1. **Switch ON the mains voltage** – As for the single version.
2. **Check for correct phase rotation** – As for the single version.
3. **Close the input switch Q4** – As for the single version.
4. **Battery coupling to DC link** – As for the single version.  
**Warning: in case of parallel system with rectifiers on common battery, the operation must be performed within 15 seconds following the blinking lighting of LED 3.**  
 When finished, all the rectifiers are operating and charging the battery.  
 There is no alarm condition.  
 Verify on the display screens (metering mode) the right DC voltage of each unit.
5. **Close the output switch Q1 on each unit.**  
 When the last **Q1** will be closed the output will be supplied by the mains through all the **bypass**.  
 The **LCD display** on each unit must indicate the status **“LOAD ON BYPASS”**.  
 Now the **control panel** of each unit should indicate the following situation:  
 LED **“service check”** is OFF.  
 LEDs **1, 2, 3, 4b, 7** and **8** light up. LEDs **4a, 5, 6** and **9** are OFF.
6. **Inverter start.**  
 Press the key **“I”** on the control panel of the unit no. 1.  
**The inverter will start up.**  
**LED 5** (inside inverter symbol) must be blinking.  
 In a short time, as the inverter voltage is confirmed, the **LED** will stop blinking and the output will be automatically transferred from mains to inverter.  
**LED 6 becomes ON and LED 7 turns OFF.**  
**Press** the key **“I”** on the control panel of **each other parallel units**.  
 After a few seconds the **inverters starts up**.  
**LED 5** initially blinks and becomes lit when the inverters are automatically coupled on the parallel bus bar.  
 The LCD panel of each unit must display the main screen, indicating the status.  
**“LOAD ON INVERTER”** and the value of the battery reserve.  
 LEDs **1, 2, 3, 4b, 5, 6, 8** are ON and LEDs **4a, 7, 9** are OFF on each unit.
7. **Load supply.**  
 Your UPS parallel system is now running, supplying power to the output.  
 Insert the loads one by one to the output of the UPS.  
 Check on display screen the output current value of **L1, L2, L3** and check for correct **load** balance.  
 Verify that the load should be equally shared between the parallel units.



**The battery must be charged for at least 10 hours, in order to ensure the full backup runtime in the case of a mains failure.**

### 5.3.2 Start-up procedure after maintenance shut down.

	<p>UPS system has been turned <b>OFF</b> following the maintenance shut down procedure and the load is still powered by the maintenance switches Q2. The load must be transferred back to the UPS system.</p>
--	---

Open the front door and make sure that:

- The **safety screens** are fixed in their position.
- The **switches Q1** and **Q4** are OFF (0) and the external **battery circuit breaker or battery fuses** are open. The **switch Q2** must be closed.
- The electronic power supply and the control panel are ON. **LEDs 2, 8, 9, "alarm"** and **"service check"** are ON.  
The **LCD panel** (main screen) must indicate the status **"load off"**.

#### FOR THE SINGLE VERSION PERFORM THE FOLLOWING OPERATIONS

- If not already supplied (separate mains inputs), switch-ON the mains power to the **rectifier** input.
- Close the input switch Q4.**  
**LED 1** must be lighted and **LED 3** (inside rectifier symbol) must blink.  
The rectifier starts up automatically, supplying the DC circuit, and charging the DC capacitors. After some seconds, the **contactor K3** closes (the green **LED 1 - K3 ON** on "P1 - Power Interface" lights up -see Fig. 4.8.3-1).  
The **LED 3** (inside rectifier symbol) stops blinking and stay ON, indicating that the DC link has reached the floating voltage.
- Battery coupling to DC link.**  
Close the external battery circuit breaker or battery fuses, after checking the right polarity. The **battery** is now connected to the DC link. **LED 4b** should be lit indicating battery charge. The **buzzer** switch OFF and LED **"alarm"** is OFF.



**Incorrect operation could disconnect the load!**

- Close the output switch Q1.**  
The load is now **supplied by the mains** through both the automatic and manual bypass. The LCD panel (main screen) must indicate the status **"LOAD ON BYPASS"**.  
**LED 2, 7, 8 and 9** is ON and **"service check"** is OFF.  
(In case the **"load off"** has been previously activated, a reset is needed to enable the bypass).
- Now open the maintenance switch Q2. LED 9 is OFF.**  
The load is now supplied only through the electronic bypass. The control panel should now indicate a normal situation (No alarms).  
**LED 1, 2, 3, 4b, 7 and 8** are ON. **LED 4a, 5, 6 and 9** are OFF. LED **"Service check"** is OFF.
- Inverter start.**  
Press the key **"I"** on the control panel.  
**The inverter will start up. LED 5** (inside inverter symbol) blinks.  
In a short time, when the inverter voltage is confirmed, the LED stops blinking and stays continuously lit. The **load** will be automatically transferred from mains to **inverter**.  
**LEDs 1, 2, 3, 4b, 5, 6 and 8** are now lit. **LEDs 4a, 7 and 9** are OFF.  
The LCD panel must display the main screen, indicating the status **"LOAD ON INVERTER"** and the value of the battery reserve.

**RPA**

For parallel system perform the following procedure on each unit, starting from unit no. 1.

1. If not already supplied (separate mains inputs), switch-ON the mains power to the **rectifier** input.
2. **Close the input switch Q4** – As for the single version.
3. **Battery coupling to DC link** – As for the single version.  
When finished, all the rectifiers are operating and charging the battery.  
There is no alarm condition.  
Verify on the display screens (metering mode) the right DC voltage of each unit.



**Incorrect operation could disconnect the load!**

4. **Close the output switch Q1 on each unit.**  
After **closing the last Q1** of the system, **the bypass will automatically be switched ON** and the parallel bus will be supplied by the mains voltage.  
The LCD panel (main screen) of each unit must indicate the status **“LOAD ON BYPASS”**.  
**On each unit LED 2, 7, 8, 9 are ON** and **“service check” is OFF**.  
(In case the **“load off”** has been previously activated, a reset is needed to enable the bypass).
5. **Now open the maintenance switch Q2 on each unit.**  
**LED 9** turns OFF when opening the last **Q2**.  
Now the control panel of each unit should indicate the following situation:  
**LED 1, 2, 3, 4b, 7 and 8** light up.  
**LED 4a, 5, 6 and 9** are OFF.  
**LED “service check”** is OFF.
6. **Inverter start.**  
**Press the key “ON”** on the control panel of **each unit**.  
**Inverters** start up (**LED 5** blinks).  
Once the inverter output voltage is OK on each unit, **LED 5** turns ON.  
The **load** will be automatically transferred from **utility to the inverters** as soon as sufficient capacity on the **inverter** side is achieved.  
The **LCD panel** of each unit must display the main screen, indicating the status **“LOAD ON INVERTER”** and the value of the battery reserve.  
**LEDs 1, 2, 3, 4b, 5, 6, 8** are ON and **LEDs 4a, 7, 9** are OFF on each unit.  
**Verify on display screen that the load should be equally shared between the parallel units.**



**The battery must be charged for at least 10 hours, in order to ensure the full backup runtime in the case of a mains failure.**

# RPA

## 5.3.3 Start-up an additional unit in a redundant parallel system.



### Initial situation:

The **load** is still powered by the other units supplying the parallel bus. This unit will be powered on and connected to the parallel bus in order to share the load with each other's.

**Warning!** The high speed bus cable connecting **J52 (A)** and **J62 (B)** in any case cannot be connected or disconnected after the system has been powered on.

The bus terminals must be properly connected before powering the additional unit.

Open the front door of this unit only, and make sure that:

- The **switches Q1, Q2** and **Q4** and the external **battery circuit breaker** or battery fuses are open.
- Apart from the **hinged lockable door**, all the **other panels** are mounted and correctly grounded.
- The **protection panels** are fastened in their correct position.

- Switch-ON the mains voltage** from the input distribution (both **rectifier** and **bypass** if separated).

At this stage the electronic power supply and the buzzer are switched on.

The control panel must be lit, and the LED **"service check"** is **ON**.

On the **LCD panel** you can see that the **auto-test procedure** is running.

If the test results OK, the main screen will indicate the status **"load off"**.

- Check for correct phase rotation of input mains on "P1 - Power Interface":**

- Lamp B1 ON:** the phase rotation (clockwise) **is correct** (see Fig. 4.8.3-1).
- Lamp B1 OFF:** the phase rotation (anti-clockwise) **is not correct** (see Fig. 4.8.3-1).  
In this case switch OFF the mains, reverse two phases between them on the line supplying the UPS and repeat the procedure from point 1.  
**LED 2** on the control panel **must be lit**.

- Close the input switch Q4.**

**LED 1** must be lighted and **LED 3** (inside rectifier symbol) must blink.

The rectifier starts up automatically, supplying the DC circuit, and charging the DC capacitors.

After some seconds, the **contactor K3** closes (the green **LED1 - K3 ON** on **"P1 - Power Interface"** lights up -see Fig. 4.8.3-1).

The **LED 3** (inside rectifier symbol) stops blinking and stay ON, indicating that the DC link has reached the floating voltage.

- Battery coupling to DC link.**

**Warning:** in case of parallel system with rectifiers on common battery, the operation **must be performed within 15 seconds** following the blinking lighting of **LED 3**.

Close the external battery circuit breaker or battery fuses, after checking the right polarity.

The **battery** is now connected to the DC link. **LED 4b** should be lit indicating battery charge.

The **buzzer switch OFF** and LED **"alarm"** is **OFF**.



**Incorrect operation could disconnect the load!**

- Press, only on this unit, the push-button "load off".**

- Close circuit breaker Q1 on this unit.** The **LED 6, 8** and **"service check"** switch OFF.

- Press the key "I" on the control panel of this unit. Inverter starts up (LED 5 blinks).**

Once inverter output voltage is OK, **LED 5** becomes **fix** and the output will be automatically connected on the parallel busbar sharing the load with each other's. **LED 6** is now lighted.

Verify on display screen that the load should be equally shared between the parallel units.

**RPA**

*This symbol refers to needed operation only for parallel system.*

*These steps are not applicable for single units.*

## 5.4 SHUT DOWN PROCEDURES

Different procedures can be followed to turn Off the UPS parallel system:

- ***Complete Shut Down SitePro single and parallel UPS system.***

The UPS system and the critical load have to be completely powered down.

- ***Maintenance Shut Down SitePro single and parallel UPS system.***

The UPS system has to be turned OFF, while providing the load power by mains through the maintenance bypass switches Q2.

- ***Shut down of a single unit SitePro in a parallel system.***

One unit of the redundant parallel system has to be turned OFF, while the load is shared between the other units of the parallel system.

### 5.4.1 Complete Shut Down

	<p>Follow this procedure only in case the UPS system and the load must be completely powered-down.</p> <p>Initial situation: The load is powered by the unit(s) supplying the parallel bus. The UPS parallel system must be completely powered down.</p>
--	--

With the UPS in normal operation and the inverter supplying the load, the **switches Q1** and **Q4** are **ON**, **Q2** is **OFF**, and the **external battery circuit breaker or battery fuses** inserted.

#### FOR THE SINGLE VERSION PERFORM THE FOLLOWING OPERATIONS

1. **Press key "O" on the control panel and keep it pressed until the inverter switch OFF.**  
**LED 5** and **6** will be OFF, **LED 7** will be ON.  
 If the key "O" is not maintained pressed the load will be automatically transferred back to the inverter and the inverter stay ON.  
 The **LCD display** must indicate "**LOAD ON BYPASS**".  
 The **LEDs 1, 2, 3, 4b, 7** and **8** are ON.  
 The **LEDs 4a, 5, 6** and **9** are OFF.

	<p>Before doing the next operation, make sure that you have shut down all equipment, which is normally powered by the UPS.</p>
--	--

2. **On the control panel, press the push-button "load off" protected by the sliding red cover.**  
 The output contactor K6 open and the UPS output will be powered down.  
 Open the front lockable door and:
3. **Turn the input rectifier switch Q4 OFF (0 position).**
4. **Turn the output switch Q1 OFF (0 position).**
5. **Disconnect the battery by removing the external battery circuit breaker or fuses.**  
 The electronic boards and the control panel are still supplied from AC power supply.
6. **Disconnect the mains from the input distribution.**  
 The UPS will shut down completely.  
 All the **LEDs** and the **LCD display** on the panel must be OFF.

	<p><b>Warning!</b></p> <p>It will take 15 minutes for the DC capacitors to discharge.</p> <p>Open only the front door, do not open any other part of the UPS.</p>
--	---



# RPA

For parallel system perform the following procedure on each unit, starting from unit no. 1.



## Caution!

Before doing the following operations, make sure that you have shut down all equipment, which is normally powered by the UPS.

1. **Switch OFF all the inverters by pressing the key "O" on the control panel of each unit.**



Pressing the key "OFF" the inverter shuts down and it will stay OFF.

As soon as the no-redundancy condition is achieved, by pressing the key "OFF" the load is transferred to the mains, the inverter remains operating, and the load will be re-transferred to the inverter.

In this case keep the key "O" pressed until the *inverter* switches OFF (**LED 5** and **6** turns OFF, **LED 7** turns ON).

The **LCD display** must indicate "**LOAD ON BYPASS**".

The **LEDs 1, 2, 3, 4b, 7** and **8** are ON.

The **LEDs 4a, 5, 6** and **9** are OFF.

2. **On the control panel, press the push-button "load off" protected by the sliding red cover only on one unit connected to the parallel bus.**

The output contactor K6 on each unit open, and the UPS output will be powered down.

Open the front lockable door and:

3. **Turn the input rectifier switch Q4 OFF (0 position) on each unit.**
4. **Turn the output switch Q1 OFF (0 position) on each unit.**
5. **Disconnect the battery on each unit by removing the external battery circuit breaker or fuses.**  
The electronic boards and the control panels are still supplied from AC power supply.
6. **Disconnect the mains from the input distribution of each unit.**  
The units will shut down completely.  
All the **LEDs** and the **LCD display** on the panels must be OFF.



## Warning!

It will take 15 minutes for the DC capacitors to discharge.

Open only the front door, do not open any other part of the UPS.

### 5.4.2 Maintenance shut down of UPS system

	<p><b>Warning!</b> Not following this procedure can cause protected loads to shut down! Never close or open either <b>Q1</b> or <b>Q2</b> with the inverter running.</p> <p><b>Initial situation:</b> The load is powered by the UPS. The complete UPS system has to be turned OFF, while providing the load power by mains through the maintenance bypass switch <b>Q2</b>.</p>
--	--

With the UPS in normal operation and the *inverter* supplying the *load*, the **switches Q1** and **Q4** are **ON**, **Q2** is **OFF**, and the **external battery circuit breaker** or **battery fuses** inserted.

#### FOR THE SINGLE VERSION PERFORM THE FOLLOWING OPERATIONS

1. **Press key "O" on the control panel and keep it pressed until the inverter switch OFF.**  
**LED 5** and **6** will be OFF and **LED 7** will be ON.  
If the key "O" is not maintained pressed the *load* will be automatically transferred back to the *inverter* and the *inverter* Stay ON.  
The **LCD display** must indicate "**LOAD ON BYPASS**".  
The **LEDs 1, 2, 3, 4b, 7** and **8** are ON.  
The **LEDs 4a, 5, 6** and **9** are OFF.

	<p><b>Warning!</b> Not following this procedure can cause protected loads to shut down!</p>
--	---

Open the front lockable door and:

2. **Close the maintenance switch Q2.**  
**LED 9** is now ON.  
The *load* is now **supplied by the mains** also through manual bypass.
3. **Open the output switch Q1.**  
**LED "service check"** is ON.  
The *load* is now supplied only through the **manual bypass**.
4. **On the control panel, press the push-button "load off" protected by the sliding red cover.**  
The output contactor **K6** open and **LED 7** is OFF.  
The **LCD display** must indicate "**load off**".  
Proceed now to power down the **rectifier** and **DC link**.
5. **Turn the input rectifier switch Q4 OFF (0).**
6. **Disconnect the battery by remove the external battery circuit breaker or battery fuses.**  
The electronic boards and the control panel are still powered from AC power supply through the plug **X8** on the "**P1 - Power Interface**" (**Warning!** This board will remain powered from the mains throughout this procedure!).  
The *load* is now powered from the mains through maintenance switch **Q2**.

	<p><b>Warning!</b> It will take 15 minutes for the DC capacitors to discharge. Open only the front door, do not open any other part of the UPS.</p>
--	---

**RPA**

For parallel system perform the following procedure on each unit, starting from unit no. 1.

1. **Switch OFF all the inverters by pressing the key "O" on the control panel of each unit.**



While the system is redundant, pressing the key "OFF" shuts down the inverter and it will stay OFF.

When the system is non-redundancy, pressing the key "O" will transfer the load to the utility, the **inverter** remains operating, and the **load** will be re-transferred to the **inverter**.

In this case keep the key "O" pressed until the **inverter switches OFF** (**LED 5** and **6** turns OFF, **LED 7** turns ON).

The **LCD display** must indicate "**LOAD ON BYPASS**".

The **LEDs 1, 2, 3, 4b, 7** and **8** are ON.

The **LEDs 4a, 5, 6** and **9** are OFF.



**Warning!**  
Not following this procedure can cause protected loads to shut down!

Open the front door and:

2. **Close the maintenance switch Q2 on each unit.**  
**LEDs 9** will be ON on all the units when closing the first **Q2**  
The **load** is now supplied by the mains also through all the manual bypass.
3. **Open the output switch Q1 on each unit.**  
**LEDs "Service check"** are ON on each unit.  
The **load** is now supplied only through the manual bypass.
4. **On the control panel, press the push-button "load off" protected by the sliding red cover on all the units of the parallel system.**  
The output contactor K6 will open on each unit.  
The **LCD display** must indicate "**load off**" and **LED 7** is OFF.  
**Proceed now to power down the rectifiers and DC links.**
5. **Turn the input rectifier switch Q4 OFF (0 position) on each unit.**
6. **Disconnect the battery by removing the external battery circuit breaker or battery fuses on each unit.**  
The electronic boards and the control panels are still powered from AC power supply through the plug **X8** on the "**P1 - Power Interface**".  
(**Warning!** This board will remain powered from the mains throughout this procedure!).  
The **load** is now powered from the mains through maintenance switches **Q2**.

**Warning!**

It will take 15 minutes for the DC capacitors to discharge.

Open only the front door, do not open any other part of the UPS.

# RPA

## 5.4.3 Shut down of a single unit UPS in a parallel system

	<p><b>Initial situation:</b> The load is powered by the UPS redundant parallel system. One unit of the system has to be turned Off, while the load is shared between the other units supplying the parallel bus.</p> <p><b>Warning!</b> The control bus cable connecting J52 (A) and J62 (B) cannot be connected or disconnected after the system has been powered on.</p>
--	--

1. Press key “O” and keep it pressed until the inverter switches OFF, and LED 5 is OFF on the control panel only of this unit.

With **redundant system**, pressing the key OFF the **inverter** shuts down and it will stay OFF.  
(If by pressing the key “O” the **load** is transferred to the **mains** and the **inverter** remains operating, it means the system is not redundant.  
In this case is not possible to switch-OFF one unit without transferring the load on mains).

The **LCD display** of this unit must indicate “**LOAD ON INVERTER**”.  
The **LEDs 1, 2, 3, 4b** and **8** are ON.  
The **LEDs 4a, 5, 6, 7** and **9** are OFF.

	<p><b>Warning!</b> Not following this procedure can cause protected loads to shut down!</p>
--	---

Open the front door of this unit and:

2. Open the circuit breaker Q1 only on this unit.  
LED 7 and “service check” is now lit, LED 6 is OFF.
3. Press the push-button “load off” only on this unit underneath the sliding red safety cover.  
LED 7 is OFF.
4. Open the circuit breaker Q4 only on this unit.  
The **rectifier** turns OFF.
5. Disconnect the battery by removing the external battery circuit breaker or battery fuses only of this unit.

	<p><b>Warning!</b> It will take 15 minutes for the DC capacitors to discharge.</p>
--	--

Verify on **LCD screen** (battery metering) the DC voltage level.

6. Open the mains input isolators (rectifier and bypass if separated) only of this unit.  
The **LCD screen** and all the **LEDs** of the mimic diagram must be OFF.

	<p><b>Warning!</b> Output bus bars are still live!</p>
--	--

## 6 LCD SCREEN

This user interface consists in **a permanent back lit LCD screen** having:

- **4 lines with 20 characters** (standard version for Latin characters);

or

- **2 lines with 10 – Chinese / 20 characters - Latin fonts** (option for Chinese language markets);
- **and 6 keys** (the function is described for each operating mode).

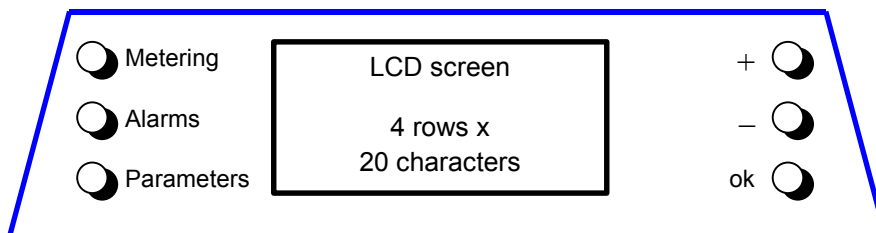
The operation is extremely simple and is structured on three important main menus related to the UPS operation, as follows:

**Metering** A UPS must offer some metering information for the user to be able to examine the operating status at any time.

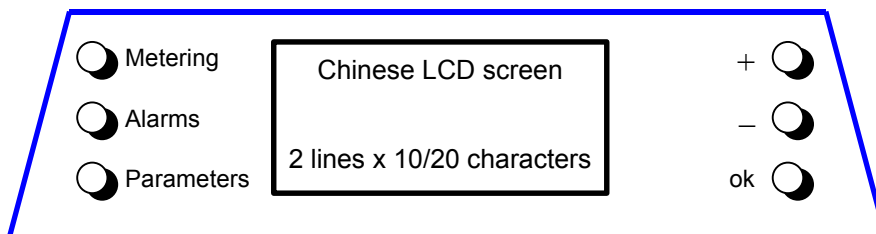
**Alarms** In the event of mains failures or abnormal functioning the UPS must keep a history of what has happened as a series of events.

**Parameters** The user must be able to program certain functions of the UPS (user parameters, accessible without password) to his needs.

### LCD screen standard version



### LCD screen Chinese version (option – see section 6.6)



The 3 buttons existing on the left side of the screen are used to activate the operating modes, while the buttons on the right side are used to carry out functions inside these operating modes.

## 6.1 METERING MODE

The Metering mode is entered any time the **metering** button is pressed. While in this mode the LCD will display a series of screens containing metering information.

In this mode the buttons perform the following functions:

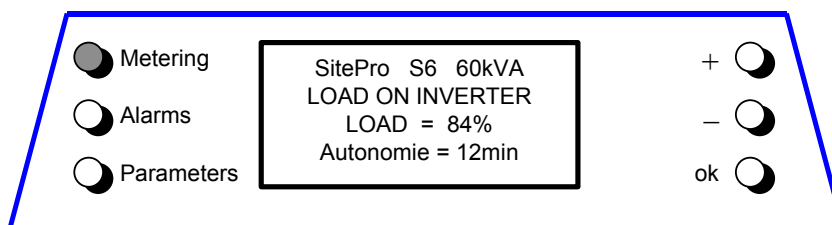
<b>metering</b>	scrolls forward to the next screen;
<b>alarms</b>	abandons the Metering mode and enters the Alarms mode;
<b>parameters</b>	abandons the Metering mode and enters the Parameters mode;
<b>+</b>	scrolls forward to the next screen;
<b>–</b>	scrolls backward to the previous screen;
<b>ok</b>	displays the main screen for this mode.

### Main screen

This screen displays the current status of the UPS in a condensed form.

The information offered by this screen consists of:

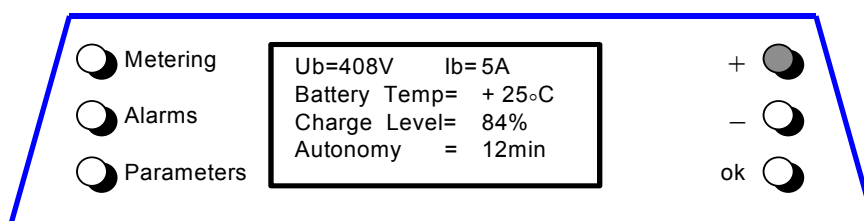
- the type of the machine: family name, series number (P + unit number for parallel version from 1 to 8) and power range
- the status of the load (referred to the most loaded phase - for RPA: respect to the rated power of Parallel System);
- the estimated battery backup time in minutes with the present load.



### Battery datascreen

This screen displays:

- the battery voltage;
- the battery current (negative values correspond to the discharge of the battery);
- the temperature of the battery (XXX indicates sensor disabled);
- the current charge level;
- the estimated backup time with the present load.

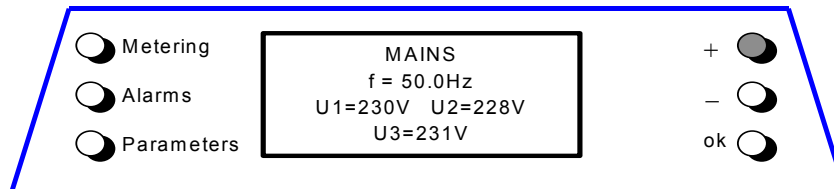


### Bypass Mains data screen

This screen refers to the AC source supplying the bypass.

This screen displays:

- the frequency;
- the voltage levels of the three phase voltages.

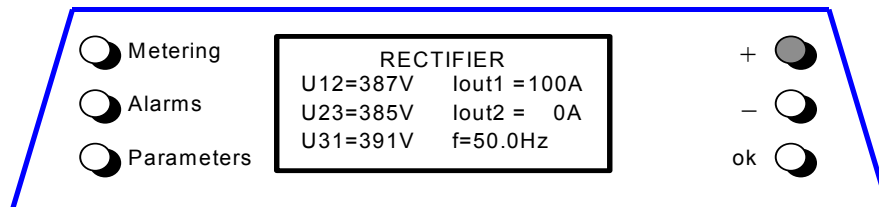


### Rectifier Mains data screen

This screen refers to the AC source supplying the rectifier.

This screen displays:

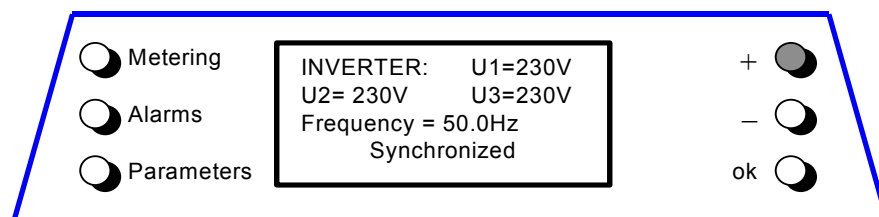
- I1 = output current rectifier bridge
- I2 = output current 2<sup>nd</sup> rectifier bridge (optional 12 pulses rectifier only);
- the voltage levels between the three phases (line-to-line);
- the input frequency of the rectifier.



### Inverter data screen

This screen displays:

- the voltage level of the three phase voltages (line-to-neutral);
- the output frequency of the inverter;
- the synchronisation status of the inverter with respect to mains.

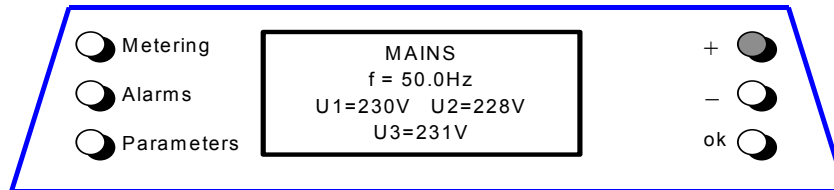




### Bypass Mains data screen

This screen refers to the AC source supplying the bypass. This screen displays:

- the frequency;
- the voltage levels of the three phase voltages.

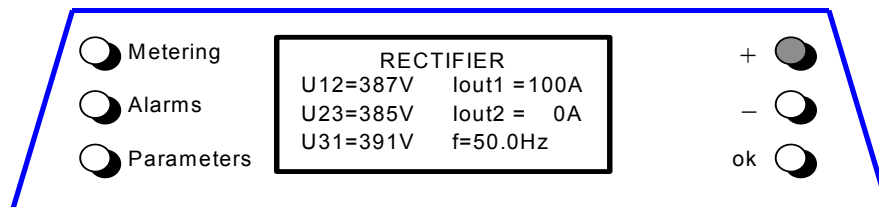


### Rectifier Mains data screen

This screen refers to the AC source supplying the rectifier.

This screen displays:

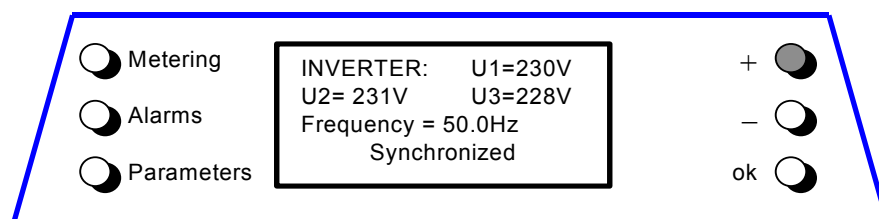
- I1 = output current rectifier bridge
- I2 = output current 2<sup>nd</sup> rectifier bridge (optional 12 pulses rectifier only);
- the voltage levels between the three phases (line-to-line);
- the input frequency of the rectifier.



### Inverter data screen

This screen displays:

- the voltage level of the three phase voltages (line-to-neutral);
- the output frequency of the inverter;
- the synchronisation status of the inverter with respect to mains.



## Status Load screen

This screen displays:

- the load level in kVA (for RPA: only this unit);
- the load level as a percentage of the nominal rated load (for RPA: only this unit);
- the source of the power supplied to the load.

<input type="radio"/> Metering	LOAD ON UPS	<input checked="" type="radio"/> +
<input type="radio"/> Alarms	Load = 48.00kVA	<input type="radio"/> -
<input type="radio"/> Parameters	Percentage = 80%	<input type="radio"/> ok
	LOAD ON INVERTER	

## Load on phases screen 1

This screen displays for each phase:

- the output phase voltage and current as RMS values (for RPA: total value of Parallel System);
- the output load as percent (for RPA: respect to the rated power of Parallel System).

<input type="radio"/> Metering	LOAD ON PHASES	<input checked="" type="radio"/> +
<input type="radio"/> Alarms	U1=230V I= 72A 80%	<input type="radio"/> -
<input type="radio"/> Parameters	U2=228V I= 45A 50%	<input type="radio"/> ok
	U3=231V I= 72A 80%	

## Load on phases screen 2

This screen displays for each phase:

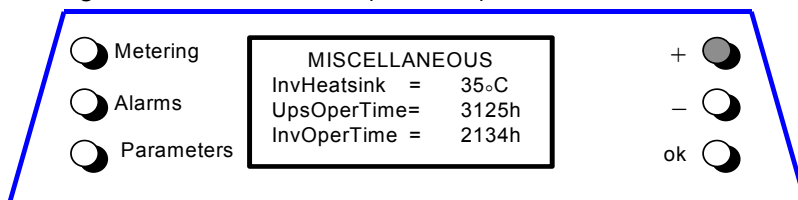
- the load active power (kW) (for RPA: total value of Parallel System);
- the load apparent power (kVA) (for RPA: total value of Parallel System).

<input type="radio"/> Metering	LOAD ON PHASES	<input checked="" type="radio"/> +
<input type="radio"/> Alarms	L1= 14.40kW 16.00kVA	<input type="radio"/> -
<input type="radio"/> Parameters	L2= 9.00kW 10.00kVA	<input type="radio"/> ok
	L3= 14.40kW 16.00kVA	

### Miscellaneous screen

This screen displays:

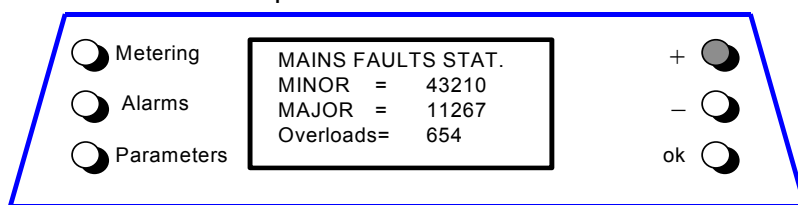
- the temperature of the inverter bridge;
- the total operating time for the UPS (in hours);
- the total operating time for the inverter (in hours).



### Mains Faults Statistics screen

This screen displays:

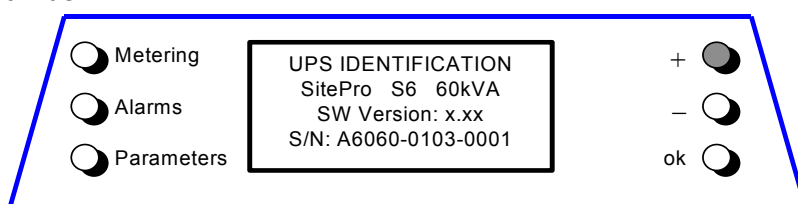
- the total number of minor mains faults (bypass mains out of tolerance faults);
- the total number of major mains faults (rectifier mains out of tolerance faults);
- the total number of detected output overloads.



### UPS identification screen

This screen displays:

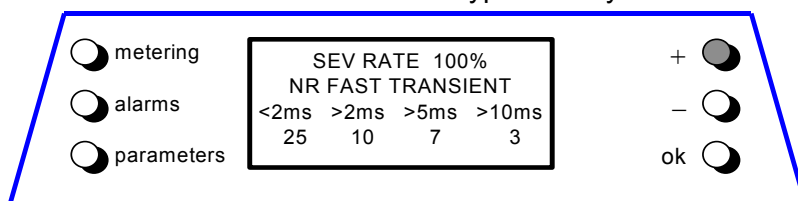
- the UPS family and the power range;
- the software version (on control board);
- the serial number.



### SEM mode statistic screen (Super Eco Mode)

This screen displays:

- the statistic evaluation in % (100= good; 0= bad) of the utility, for the SEM mode operation;
- the number of fast transients occurred on the bypass utility on the last seven days.





## 6.2 ALARMS

The Alarms mode is entered any time the **alarms** button is pressed.

The LCD will display a series of screens corresponding to the last 256 events, one event per screen.

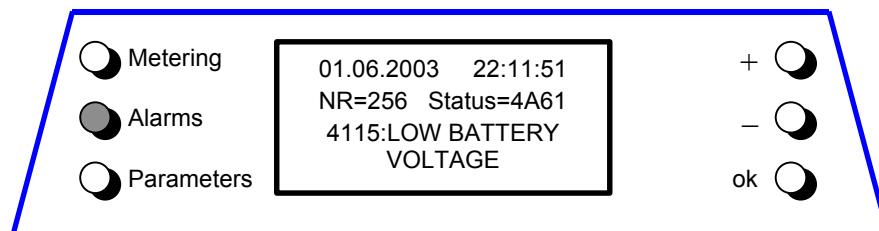
The buttons perform the following functions:

<b>metering</b>	abandons Alarms mode and enters Metering mode;
<b>alarms</b>	next screen;
<b>parameters</b>	abandons the Alarms mode and enters the Parameters mode;
<b>+</b>	scrolls forward to the next screen;
<b>-</b>	scrolls backward to the previous screen;
<b>OK</b>	display the main screen for this mode.

The events displayed are the standard **GE** events as described in the **section 6.7 - EVENTS (Alarms & Messages)**.

The information displayed includes:

- the exact date and time when the event occurred;
- the number of the event, 255 being the most recent event, and 0 the oldest;
- the standard **GE** code for the event and the machine status word;
- an explicit text description of the event.



The initial screen of this mode is the one showing the most recent event.

## 6.3 PARAMETERS

The Parameters mode is entered any time the **parameters** button is pressed.

The LCD will display a series of screens containing the user parameters, accessible without password protection.

The buttons perform the following functions:

<b>metering</b>	abandon Parameters mode and enter Metering mode;
<b>alarms</b>	abandon Parameters mode and enter Alarms mode;
<b>parameters</b>	scroll forward to the next screen;
<b>+</b>	scroll forward to the next screen;
<b>-</b>	select from the current screen the parameter to edit;
<b>OK</b>	start the editing for the currently selected parameter.

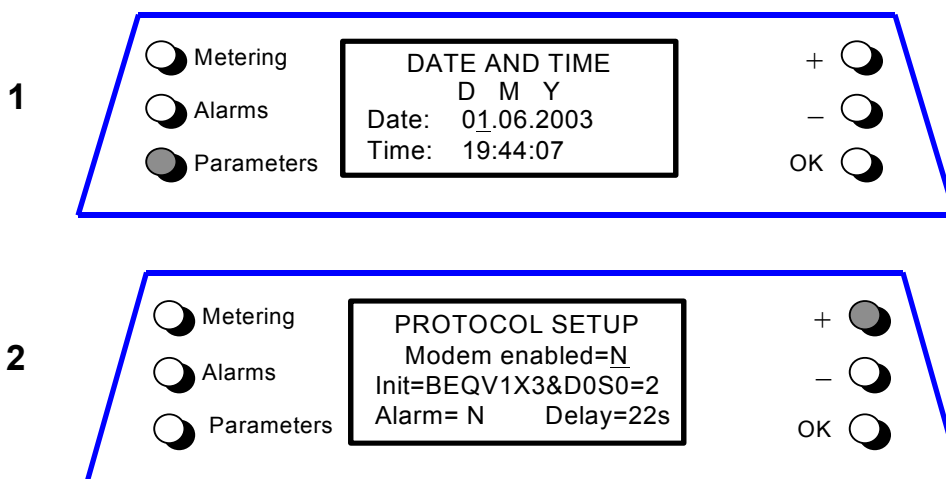


**During Parameters mode there is no means to perform scroll back on the display.**

### Example of operation within Parameters mode:

Purpose: to correct a wrong telephone number previously stored in Tel2.

- 1 – entering Parameters mode (**parameters**). The first screen is displayed;
- 2 – scroll to the next screen (**+**). The second screen is displayed;
- 3 – scroll to the next screen (**+**). The third screen is displayed;
- 4 – move the selection (underscore cursor) to the next parameter in this page (**-**);
- 5 – move the selection to the next parameter in page (**-**);
- 6 – enter Edit mode for the currently selected parameter (**OK**);





3

<input checked="" type="radio"/> Metering	Tel1:002186394567	+	<input checked="" type="radio"/>
<input type="radio"/> Alarms	Tel1 enabled: N	-	<input type="radio"/>
<input type="radio"/> Parameters	Tel2:004017464340	OK	<input type="radio"/>
	Tel2 enabled: N		

4

<input type="radio"/> Metering	Tel1:002186394567	+	<input type="radio"/>
<input type="radio"/> Alarms	Tel1 enabled: N	-	<input checked="" type="radio"/>
<input type="radio"/> Parameters	Tel2:004017464340	OK	<input type="radio"/>
	Tel2 enabled: N		

5

<input type="radio"/> Metering	Tel1:002186394567	+	<input type="radio"/>
<input type="radio"/> Alarms	Tel1 enabled: N	-	<input checked="" type="radio"/>
<input type="radio"/> Parameters	Tel2:004017464340	OK	<input type="radio"/>
	Tel2 enabled: N		

6

<input type="radio"/> Metering	EDIT MODE	+	<input type="radio"/>
<input type="radio"/> Alarms	PHONE NUMBER 2	-	<input type="radio"/>
<input type="radio"/> Parameters	004017464340	OK	<input checked="" type="radio"/>
	+ SCROLL - CHANGE		

## 6.4 EDIT MODE

The Edit mode is entered from the Parameters mode when the **OK** button is pressed. During this mode the LCD will display a special editing screen for the parameter being edited.

The screen contents during Edit mode is:

- on the first line of the screen it is clearly indicated the special operating mode;
- on the second line you will find the name of the parameter being edited;
- on the third line is displayed the current value of the parameter;
- the fourth line contains a condensed help text.

During the Edit mode the buttons perform the following functions:

<b>metering</b>	exits Edit mode and enters Metering mode; any changes are discarded;
<b>alarms</b>	exits Edit mode and enters Alarms mode; any changes are discarded;
<b>parameters</b>	exits Edit mode and enters Parameters mode; any changes are discarded;
<b>+</b>	scroll from editable position to editable position;
<b>–</b>	change the currently selected editable position;
<b>OK</b>	return to Parameters mode after saving the changes.

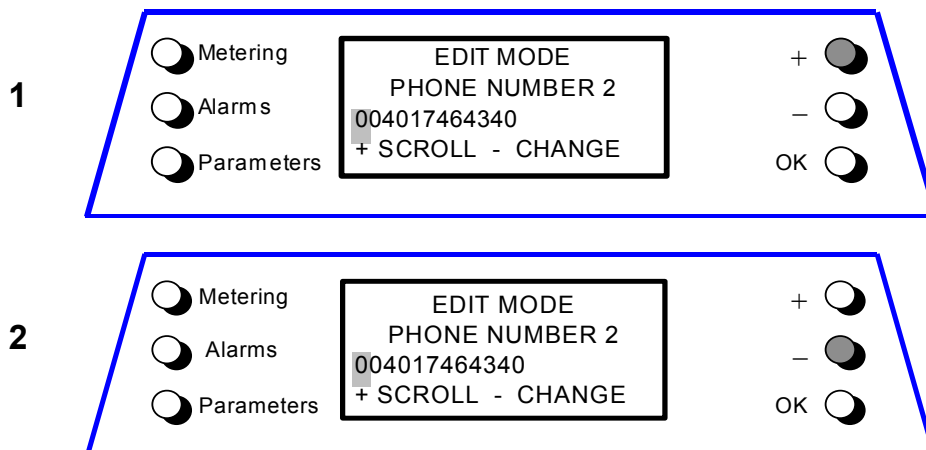
### Examples of operation during Edit mode

There are **three types of parameters** having differences in behaviour during Edit mode. Depending the type of parameters, there are different ways to select and to change the needed values.

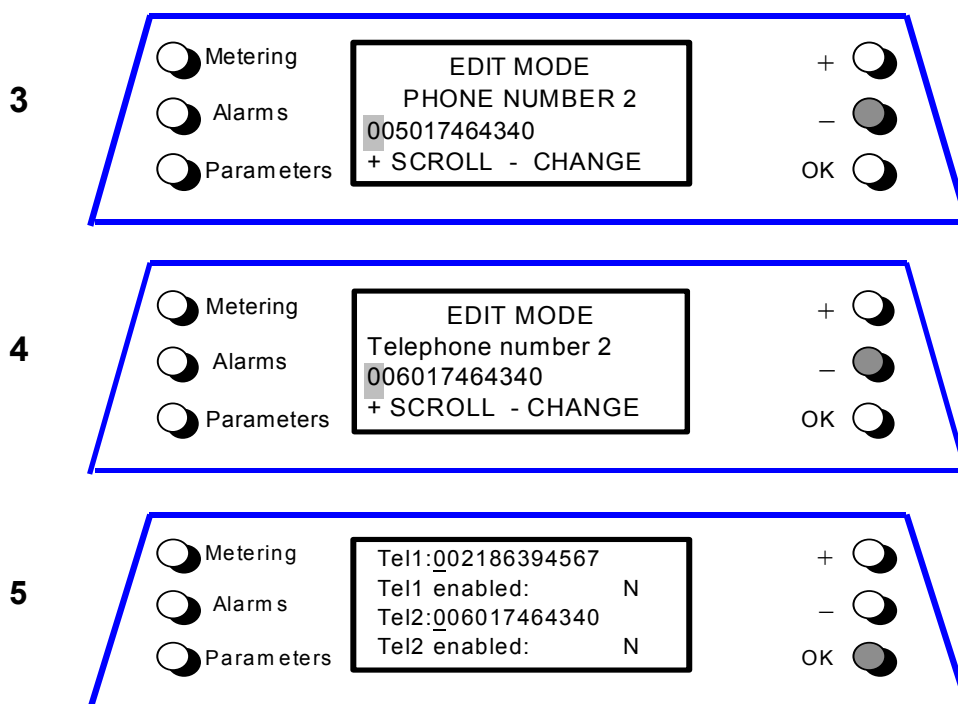
**Type 1:** Parameters having a **large range of values** (numeric value).

As continuation of the previous example, the telephone number stored in Tel2 must be changed:

- 1 – move the selection (**block cursor**) to the next character;
- 2 – move the selection to the next character;
- 3 – change the selected character;
- 4 – change the selected character;
- 5 – press OK: the screen will return to Parameters mode saving the new value.







## Type 2: Parameters having a limited range of values.

For example the parameter **Printer Baud Rate** has the range {600, 1200, 2400, 4800 and 9600}.

It is no need there to edit this parameter digit by digit.

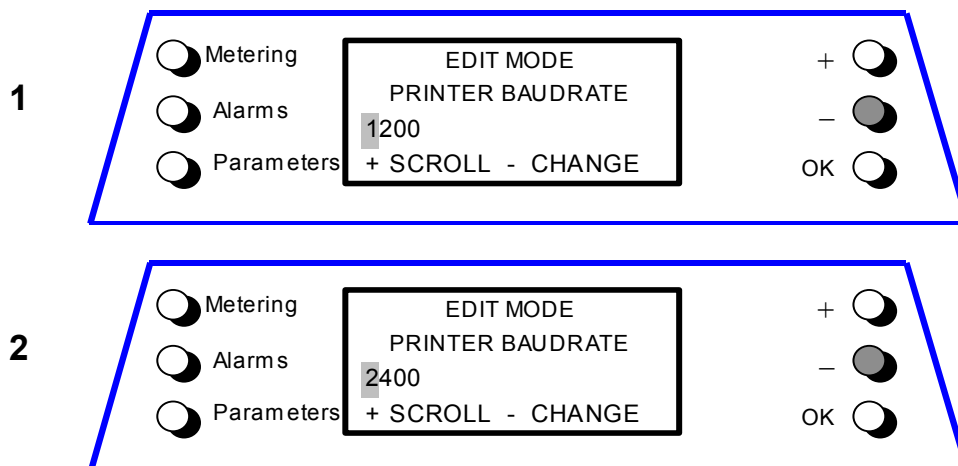
By pressing the **[-]** button the next value within the range is automatically provided by the software.

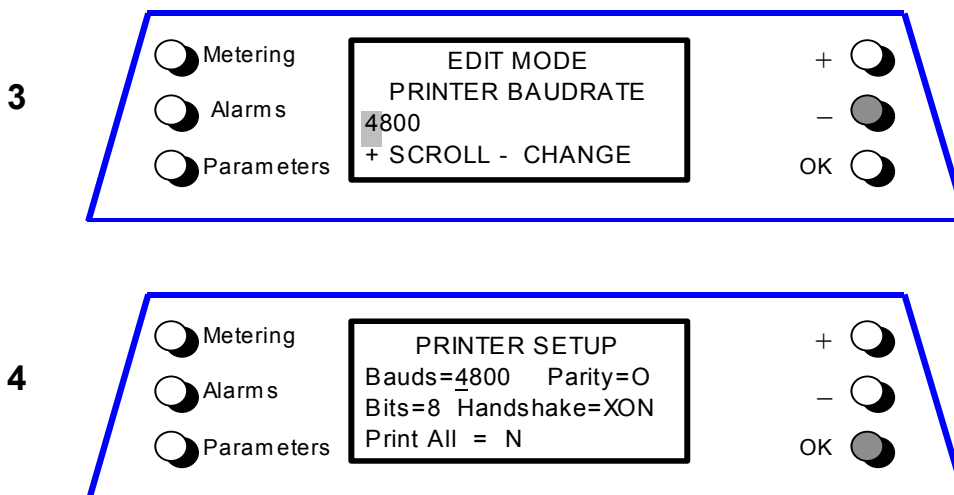
1 – enter Edit mode for Printer Baud Rate, initial value = 1200;

2 – change to 2400;

3 – change to 4800;

4 – press OK: the screen will return to Parameters mode saving the new value.





**Type 3: Boolean parameters** used to simulate command buttons.

The Boolean parameters have a range of **Yes/No**.  
Only the user performs the modification of the value.

These “Type 3” parameters are used **to initiate an action**. There are two possibilities:

- A.** 1 – the user wants the UPS to start the action => the user sets the parameter to “Yes”;  
2 – the UPS finishes the action => the UPS sets the parameter to “No”.
- B.** 1 – the user wants the UPS to start the action => the user sets the parameter to “Yes”;  
2 – the user wants to abort the action => the user sets the parameter to “No”.

The actions that can be performed using such software buttons are:

- print the metering information;
- print the last 256 events;
- print the values of the parameters;
- print all the information obtainable from the UPS.

### Returning from the Edit mode

Normally **OK** button is used to return from the Edit mode.  
Then the UPS will perform some validity tests on the new value.  
If these tests are successful then the new value is saved and used.  
If these tests fail the Edit mode is not exited.



**The validity tests performed by the UPS are not exhaustive.  
You should not rely exclusively on these tests.  
Care should be taken when modifying the values of the parameters.**

For all parameters except the LCD Contrast parameter **the new value is saved and used after the OK button was pressed**.

In the case of the LCD Contrast parameter the new value is used immediately in order to obtain a better visual feedback.

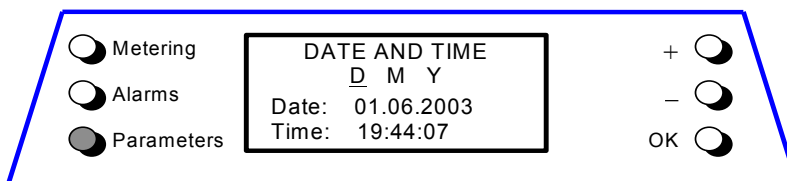
## 6.5 MEANING OF THE USER PARAMETERS

Pressing the **Parameters** button displays a series of screens containing the user parameters on the **LCD panel**.

This first parameter level is not protected by password, therefore the user can freely adapt these parameters to their needs.

The meaning of the user parameters and their use is described below (buttons performance is described to chap. 6.3).

### 1. Date & Time set-up



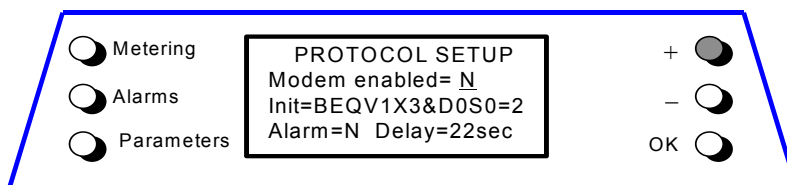
**Date** You can adjust the date of the real time clock existing in the UPS by the means of this parameter.

The value you enter is thoroughly checked to be a correct date in the format "dd.mm.yy".

**Time** You can adjust the time of the real time clock existing in the UPS by means of this parameter.

The value you enter is thoroughly checked to be a correct time in the format "hh.mm.ss". The time is specified in 24-hour format.

### 2. Protocol Set-up



**Modem enabled** – You can enable/disable with **Y/N** the remote control through modem calls by using this parameter.

For modem connection, the default setting is for serial port **J3** on **P4** – *Customer Interface*.

**Init** This parameter presents the modem initialisation string. It can be 39 characters long.

When editing this parameter the UPS considers that a blank character terminates the string.

If no blank character is found then all 39 characters are used.

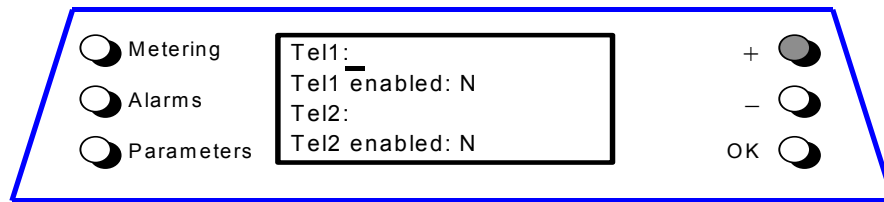
**Alarm** This **Y/N** parameter controls the automatic events signalling through modem.

If this parameter is set to **Yes** the **UPS itself will call** the remote location when a new event occurs.

**Delay** This parameter controls the delay between the occurrence of a new event and the modem dialing.

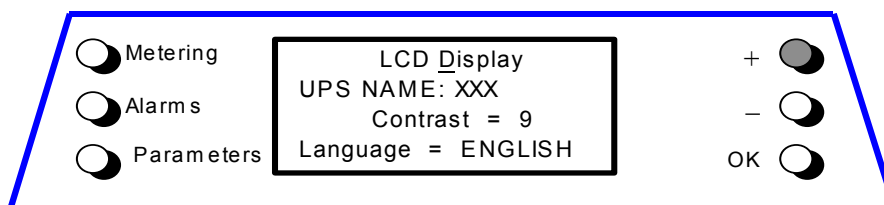
It is useful because since the events typically do not occur isolated but in certain sequences, you can eliminate the need for multiple dial-outs for such a sequence of events.

### 3. Telephone numbers



- Tel 1** This parameter specifies a **first telephone number** to be used for **modem dial-out**.  
The telephone number has a maximum **39 characters** and cannot contain **blanks**.  
If the desired number is shorter than 39 characters, the string will finish with blanks.
- Tel 1 enabled** This parameter **Y/N** specifies if the **first** telephone number will be used for dial-out.
- Tel 2** A **second** dial-out number.
- Tel 2 enabled** This parameter **Y/N** specifies if the **second** telephone number will be used for dial-out.
- Tel 3** A **third** dial-out number.
- Tel 3 enabled** This parameter **Y/N** specifies if the **third** telephone number will be used for dial-out.
- Tel 4** A **fourth** dial-out number.
- Tel 4 enabled** This parameter **Y/N** specifies if the **fourth** telephone number will be used for dial-out.

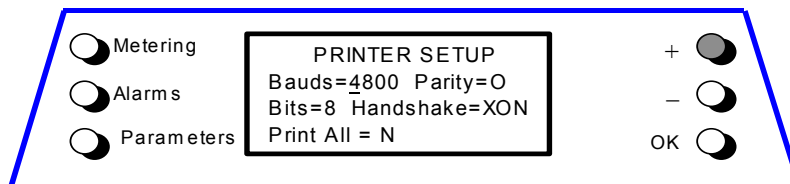
### 4. LCD Display



- UPS Name** The user can choose the name of the UPS model shown on the main page.
- LCD Contrast** This parameter controls the **contrast of the LCD screen** in ten steps.  
It can be adapted depending on the room lighting.  
This compensation is not possible on the Chinese display version.
- LCD Language** This parameter allows the choice of **language used** to display the information.  
Valid choices are **English, German, Italian, Spanish, French, Finnish, Tschech, Slovak, Polish, and Portuguese**.

## 5. Printer Set-up

The UPS is capable of communicating to a serial printer, to printout disparate information. Please be sure to have a **serial** printer, that is a printer with a serial RS232 interface. This is the **only** printer-interface supported by the UPS.




**Baud Rate** This parameter controls the **baud rate** used for data transmission. Although different values can be selected, you have to introduce **2400 Bauds**, which is the only valid parameter.

**Parity** This parameter controls the parity used for data transmission. Odd (**O**) even (**E**) and “no parity” (**X**) can be selected. Nevertheless the only valid value is **NO PARITY (X)**.

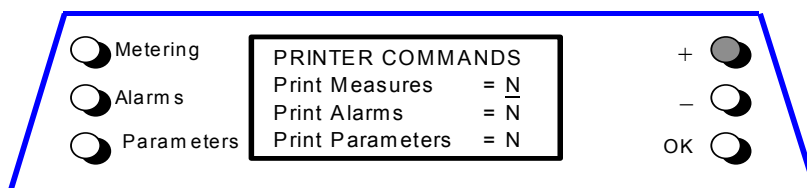
**Bits** This parameter controls the length of the data word on the serial line during data transmission. **7** or **8** bits are offered as choice. Please select **8 bits**, as this is the only valid value.

**Handshake** This parameter is used to determine the communication protocol used when printing. Valid values are “**XON**” standing for the **XON/XOFF** protocol or “**NO**” standing for **any protocol**.

**Print All** This parameter **Y/N** is used to print **all the available information** in the sequence Metering, Alarms, User and Service Parameters.

 **Please configure your printer with the same parameters introduced in the UPS, that is: 2400/8/N (2400 bits/sec, 8 bits, no parity).**

## 6. Printer commands



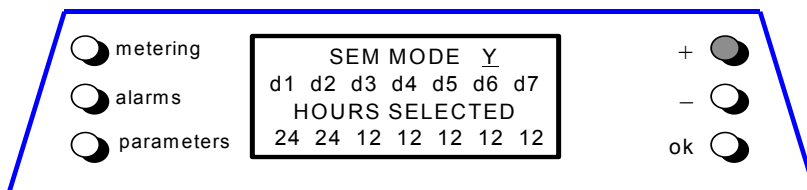
**Print Measures** This **Y/N** parameter is used to print **only the measurement data**.

**Print Alarms** This **Y/N** parameter is used to print **only the sequence of all Alarms/Events**.

**Print Parameters** This **Y/N** parameter is used to print **only the list of User & Service Parameters**.

 **After each printing command the corresponding parameter will be set again to N.**

## 7. Operation SEM mode selection (*Super Eco Mode*)



### SEM MODE:

This parameter (values **Y** / **N**) enables or disables the operation in **SEM mode** (*Intelligent Energy Management*).

If the value is **Y** and the current time is in the interval for the current day, the **SEM mode** is active.

The activation / disactivation of **SEM mode** is indicated each time in the event list.

In order to check the *inverter* function, at least **1 minute** of *On-line* mode must be programmed during the week (the **Y** / **N** parameter is automatically disabled if this condition is not satisfied). In case this minimum time in *On-line* mode is not respected, the **SEM mode** will be disabled.

If the value is **N**, the UPS is normally operating in **On-line** / **double conversion** mode at all times.

### d1 ÷ d7: Enabling time in function of weekdays.

For the weekdays from **d1** to **d7** (*Saturday* to *Friday*) the edit mode (edit day) allows to define time intervals when the UPS is operating in **SEM mode**.

The hour is given in 24-hour format.

These intervals are defined by:

**SEM START:** the hour of the day after which the **SEM mode** is enabled.  
The **SEM mode** is enabled until the following **SEM STOP** time is reached (the **SEM STOP** time of the same day if this is later than the **SEM START** time, the **SEM STOP** time of the following day otherwise).

**SEM STOP:** the hour of the day before which the **SEM mode** is enabled.

The **SEM mode** is enabled starting from the preceding **SEM START** time (the **SEM START** time of the same day if this is earlier than the **SEM STOP** time, the **SEM START** time of the previous day otherwise).

Identical times for **SEM START** and **SEM STOP** maintain the existing mode only in case the previous command was **SEM START** and the following command will be **SEM STOP**.

### HOURS SELECTED:

The number of **SEM mode** hours per weekday (from **d1** - *Saturday* to **d7** - *Friday*) is displayed in the operation mode parameter window (ceiling value).

To better understand the **SEM** programming modes, some typical examples are shown:

#### Example 1:

For continuous **SEM mode** set the **SEM START** times to **00:00** and the **SEM STOP** times to **23:59** for all weekdays, but almost **1 day must have 1 minute of On-line** programming: i.e **d2 - Sunday** 00:00 to 23:58).

Weekday	d1 - Saturday	d2 - Sunday	d3 - Monday	d4 - Tuesday	d5 - Wednesday	d6 - Thursday	d7 - Friday
<b>SEM START</b>	00:00	00:00	00:00	00:00	00:00	00:00	00:00
<b>SEM STOP</b>	23:59	23:58	23:59	23:59	23:59	23:59	23:59

**Example 2:****SEM STOP before SEM START.**

SEM START 18:00, SEM STOP 06:00 for weekday **d4 - Tuesday**.

Means that on **d4 - Tuesday** the SEM mode is active between 00:00 and 06:00 and between 18:00 and 23:59.

Weekday	d1 - Saturday	d2 - Sunday	d3 - Monday	d4 - Tuesday	d5 - Wednesday	d6 - Thursday	d7 - Friday
<b>SEM START</b>	00:00	00:00	00:00	18:00	00:00	00:00	00:00
<b>SEM STOP</b>	23:59	23:59	23:59	06:00	23:59	23:59	23:59

**Example 3:****SEM mode during the night and week-end.**

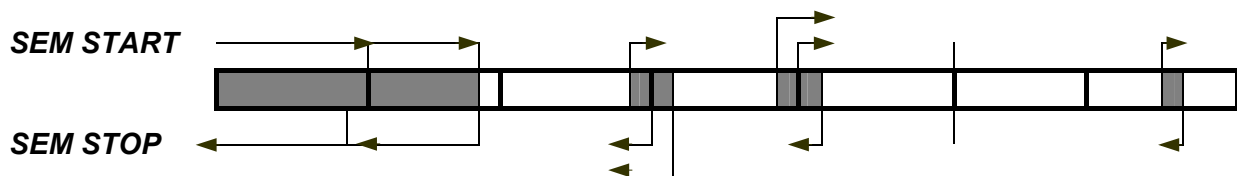
If the SEM mode must be enabled all nights (**d3 - Monday ÷ d7 - Friday**) between 18:00 in the evening and 06:00 of the following morning and during all Saturday (**d1**) and Sunday (**d2**), the corresponding parameters are:

Weekday	d1 - Saturday	d2 - Sunday	d3 - Monday	d4 - Tuesday	d5 - Wednesday	d6 - Thursday	d7 - Friday
<b>SEM START</b>	00:00	00:00	18:00	18:00	18:00	18:00	18:00
<b>SEM STOP</b>	23:59	23:59	06:00	06:00	06:00	06:00	06:00

**Example 4:**

If the SEM mode must be enabled on **Monday (d3)** and **Tuesday (d4)** between 18:00 in the evening and 06:00 of the following morning, on **Friday (d7)** between 12:00 and 13:00, during all **Saturday (d1)** and on **Sunday (d2)** until 20:00, the corresponding parameters are.

Weekday	d1 - Saturday	d2 - Sunday	d3 - Monday	d4 - Tuesday	d5 - Wednesday	d6 - Thursday	d7 - Friday
<b>SEM START</b>	00:00	00:00	18:00	18:00	00:00	00:00	12:00
<b>SEM STOP</b>	23:59	20:00	23:59	06:00	06:00	00:00	13:00



In dark colour are displayed the times with SEM mode operation.

The arrows indicate the conditions given by the SEM START and SEM STOP times introduced with the parameters.

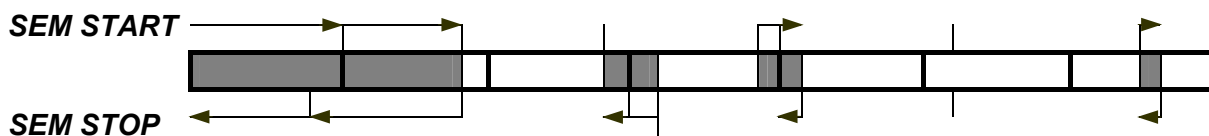
Note that on day **d6 - Tuesday** the interval has length 0 (zero), therefore the SEM mode is not enabled on this day.



### Example 5:

An equivalent set of parameters for Example 4 is.

Weekday	d1 - Saturday	d2 - Sunday	d3 - Monday	d4 - Tuesday	d5 - Wednesday	d6 - Thursday	d7 - Friday
<b>SEM START</b>	00:00	00:00	18:00	18:00	06:00	09:00	12:00
<b>SEM STOP</b>	23:59	20:00	18:00	06:00	06:00	09:00	13:00



The *SEM mode* is active from 18:00 of weekday **d3 - Monday** until 06:00 of weekday **d4 - Tuesday** (as indicated by the *SEM STOP* time of weekday **d4 - Tuesday**).

The *SEM STOP* time of weekday **d3 - Monday** has no effect as it is followed by the *SEM STOP* time of weekday **d4 - Tuesday**.

It can be, without change of meaning, any time between 18:00 and 23:59.

Similarly, the *SEM mode* is active from 18:00 of weekday **d4 - Tuesday** until 06:00 of weekday **d5 - Wednesday**.

The *SEM START* time of weekday **d5 - Wednesday** has no effect as it is preceded by the *SEM START* time of weekday **d4 - Tuesday**.

It can be, without change of meaning, any time between 00:00 and 06:00.



To avoid undesired *SEM mode* operation, verify:

- Date and Time (first page of parameter).
- *SEM mode* screen how many hours of *SEM mode* operation have been selected for each day of the week.



**NOTE !**

The *SEM mode* will be active only if the load previously have been supplied from the inverter.

## 6.6 DESCRIPTION OF THE CHINESE LCD OPERATION

All the functions implemented for the standard 4 x 20 LCD are implemented in the Chinese version too.

Due to the limitation of the number of characters the viewing of various screens is implemented by scrolling.

The main differences in operation are described below.

### Changing the language

Changing the language from Chinese to English and vice versa is possible in any moment by pressing simultaneously the **metering** and **parameters** keys.

Another possibility is to change the language from the *PARAMETERS* menu when the *language set up screen* is displayed.

The procedure is like for the standard 4 x 20 LCD.

### Metering

The screens are displaying the same information as per the standard LCD.

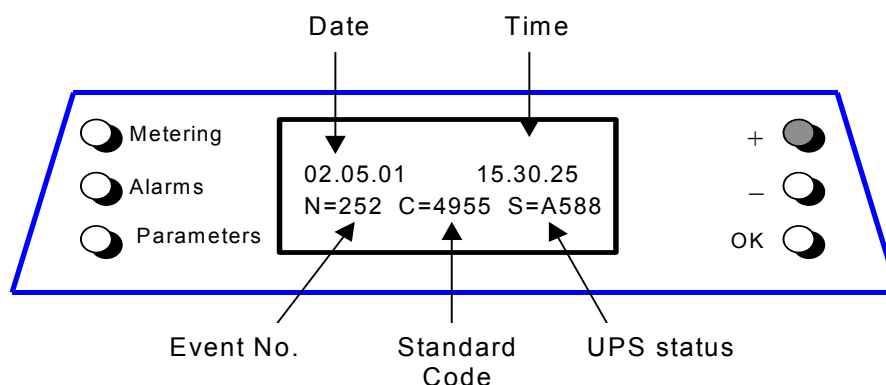
The information is split in more parts than on the standard LCD.

For scrolling the screens the **+**, **-** and **metering** keys can be used.

### Alarms

The alarms/events are described only using the numeric codes.

For alarms/events meaning please refers to the alarms codes list (see section 6.7.1).



### Parameters

All the parameters are the same as for the standard LCD, but they are displayed *one for each screen*. In this way the *scroll back* is also possible, with the “-” key (not possible on the standard LCD).



## 6.7 EVENTS (ALARMS AND MESSAGES)

Each of the following listed events can be displayed on the LCD screen or on PC where the ARGUS - Control Network is installed.

Alarms and Messages are differently specified because the **Alarms** are indicating an abnormal functioning of the UPS (which are additionally signalled with the *LED "alarm"* and acoustically with the **buzzer**), while the **Messages** indicate the various states of operation of the UPS (stored in the events list, but no activating the *LED "alarm"* and the buzzer).

When in the Alarms mode, the *LCD screen displays* a time ordered sequence of screens corresponding to the last 256 alarms & messages, each screen indicating:

the number of the event (255 = the most recent).      the standard code and the status word.  
the date and time when the event occurred.      an explicit text description of the events.

### 6.7.1 Alarms list

Code	Alarms	Meaning
4000	SETUP VALUES LOST	Parameters are lost and have been replaced with default values.
4004	UPS FAILURE	The master unit detected the slave unit missing on the communication bus even though switch Q1 is still closed.
4100	RECTIFIER FUSES FAILURE	The u-switch mounted on the rectifier input fuses indicates a blown fuse, and consequently it is shut down. Clearance of this condition allows you to restart the rectifier.
4104	BATTERY FUSES	This function, when enabled on input programmable relays (password required), warns the user about the external battery fuses failure or MCB opening, signalled by NO free contact.
4105	RECTIFIER OVERTEMPERATURE	Temperature sensor indicates a situation of overtemperature on the Rectifier bridge. Only the alarm is given. The rectifier, when in an Off state, cannot start as long as this condition persists.
4106	RECTIFIER TRANSFORMER OVERTEMPERATURE	The temperature sensor inside the input transformer winding indicates overtemperature. Only the alarm is given. The rectifier, when in an Off state, cannot start as long as this condition persists.
4110	RECTIFIER MAINS OUT OF TOLERANCE	Rectifier input mains is out of tolerance (voltage, frequency or phase).
4115	LOW BATTERY VOLTAGE	The battery has been discharged and reached "stop operation" time-out (default 3 minutes), and the inverter will be shut down. It will restart automatically only when the battery has recharged enough for a minimum runtime.
4116	HIGH BATTERY VOLTAGE	Dangerous high UDC-Voltage. Causes inverter shutdown. Inverter restarts automatically after battery returns to normal floating voltage.



Code	Alarms	Meaning
4117	BATTERY EARTH FAULT	A leakage current to earth has been detected on the DC circuit.
4118	BATTERY FAULT	During battery test the voltage falls under the critical level (depending setting parameters). Battery test is stopped.
4130	TURN ON RECT. OR SHUTDOWN UPS	Rectifier and inverter are OFF. The DC power supply is discharging the battery slowly. Rectifier must be restarted or battery must be disconnected in order to avoid damage.
4140	RECTIFIER CONTROL FAILURE	Rectifier voltage hasn't reached the set value (probably fault on regulation loop). LED 3 on control panel is blinking.
4301	INVERTER FUSES FAILURE	Inverter output fuses blown (F5, F6, F7). Signalled by trip indicators. Inverter can be started manually after replacement of fuses.
4304	K7 CLOSING FAILURE	K7 not closed despite a closing command being done. Signalled by auxiliary contact. Load will be supplied by mains.
4305	K7 OPENING FAILURE	K7 not open despite an opening command being done. Signalled by auxiliary contact. Load will be supplied by mains.
4307	INVERTER TRANSFORMER OVERTEMPERATURE	The temperature inside the inverter transformer indicates overtemperature. Elapsed "stop operation" time, inverter shutdown. With mains OK, load is transferred on mains.
4308	DC FUSES FAILURE	Blown input DC fuse(s) F1 of the inverter. Inverter cannot be started as long as present. Signalled by trip indicators.
4309	DRIVER FAILURE	An abnormal condition has been detected on one or more Skiip power modules of the inverter (temperature or overcurrent). Inverter shutdown and cannot be started as long as the alarm is present.
4312	INV. VOLTAGE OUT OF TOLERANCE	Inverter output voltage is out of the tolerances defined in parameter ( $\pm 10\%$ ). Inverter is switched OFF.
4320	ISMAX DETECTION	Detection of inverter- bridge (Is) current limit causing the inverter OFF and automatic re-start. After 3 times the inverter switches-Off, and it can be restarted manually.
4340	INVERTER CONTROL FAILURE	The "Slave" oscillator is not in synchrony with the Master; thus causing the shutdown of it's inverter. If after a restart the condition remains, the LED inside the Inverter symbol on the panel will not light up, indicating that this inverter cannot supply the load anymore.
4347	OSCILLATOR FAILURE	The oscillator frequency of this particular unit is out of tolerance, and cannot become Master. If this unit were already Master, another unit takes over to be Master.
4404	K6 CLOSING FAILURE	K6 open despite a closing command being done. Signalled by auxiliary contact. The load cannot be supplied by electronic bypass.



Code	Alarms	Meaning
4405	K6 OPENING FAILURE	K6 closed despite an opening command being done. Signalled by auxiliary contact.
4406	SSM FAILURE	A faulty current has been detected in the static-switchline causing the opening of the contactor K6 for 10 sec. After 3 times the K6 remains definitively open. The alarm reset can be done by service parameter (password required).
4410	BYPASS MAINS OUT OF TOLERANCE	The mains bypass voltage is out of the tolerances defined in parameters ( $\pm 10\%$ ). K6 opens, synchronisation with mains is inhibited and transfer to mains is blocked.
4420	K3 CLOSING FAILURE	K3 (when installed) not closed despite a closing command is done, or battery fuses F8 / F9 or switch Q3a not closed. Inverter is switched OFF. It can be restarted manually after recovery of the alarm condition.
4421	K3 OPENING FAILURE	K3 (when installed) not open despite an opening command is done, or battery fuses F8 / F9 or switch Q3a not open. Be aware the DC capacitors could remain charged.
4520	NO INVERTER POWER	The load supplied by mains is over 100%. The load remains blocked on mains until alarm overload is active.
4530	LOAD LOCKED ON MAINS	Load is locked on mains because 3 transfers on mains have been detected in a short time, defined by parameter (default 30 seconds). The transfer will be free after a time defined by parameter (default 30 sec.).
4531	LOAD ON MAINS BY ERROR DETECTOR	Load is transferred to mains because the error detector detected a disturbance on the output voltage.
4563	EMERGENCY OFF ACTIVATED	Alarm after detection of an EPO from an external safety device connected on Customer Interface Board. Consequently K6, SSM (K3) opened and shut down inverter and Rectifier.
4570	OVERLOAD	The UPS-System is in an overload condition $>125\%$ on inverter, or $>150\%$ on Mains. With mains unavailable, a sequence of "stop operation" starts. Time out depends on load quantity.
4571	OVERLOAD: LOAD ON MAINS	With mains bypass supply available and load $>115\%$ , the load is transferred on mains. Load will be transferred again automatically on inverter when load $<100\%$ .
4581	INVERTER AND MAINS NOT SYNCH.	The voltages of mains and inverter are not synchronised, which causes the opening of K6.
4697	BATTERY OVERTEMPERATURE	The battery temperature exceeds the value inserted in parameter. Disabled with parameter (service only).
4698	BATTERY POWER INSUFFICIENT	In case of mains failure, with the actual load, the run time would be below Stop operation time (3 minutes).



Code	Alarms	Meaning
4700	DC LOW	Battery voltage is at the lowest limit. Will stay Off inverter until the battery voltage reaches the value in parameter.
4900	LOAD LOCKED ON INVERTER	The load is locked on inverter after 3 load transfers within 30 seconds. After time out of the value in parameter (default 30 sec), bypass will be free.
4955	OVERTEMPERATURE	An over-temperature condition has been detected on inverter. Elapsed “stop operation” time, inverter shutdown. With mains OK, load is transferred on mains.
4998	LOAD OFF DUE TO EXTENT. OVERLOAD	Load Off after time-out of “stop operation” for overload on inverter or bypass (time depending on the % of overload).
4999	LOAD OFF DUE TO UBATT. OR TEMP.	Load Off after time-out of “stop operation” with missing mains due to battery low voltage or over-temperature condition.



### 6.7.2 Messages list

Code	Message	Meaning
4002	WATCHDOG RESET	The microprocessor has detected an incorrect operation: transfers the load on mains and performs a program reset. The inverter will restart automatically and will supply the load.
4111	RECTIFIER MAINS OK	Rectifier input mains is again within the admitted tolerance (voltage, frequency and phase).
4119	BATTERY TEST STARTED	Start of manual or automatic battery test. Rectifier output voltage is decreased to the value defined by parameters.
4120	BATTERY TEST STOPPED	End of manual or automatic battery test. Rectifier output voltage is restored to floating voltage.
4161	RECTIFIER ON	Rectifier received the command to switch ON
4162	RECTIFIER OFF	Rectifier received the command to switch OFF for: input mains out of tolerance / EPO / UDC max.
4163	GENERATOR ON	Customer interface (X1 - 11, 22) received a Gen-set ON signal. Operating mode depend on setting of parameters.
4164	GENERATOR OFF	Customer interface (X1 - 11, 22) received a Gen-set OFF signal. Function Bypass enabled depends on setting of respective parameter.
4302	INVERTER CANNOT BE TURNED ON	Inverter cannot be switched on because one of the following conditions is still present: <ul style="list-style-type: none"><li>• Overtemperature.</li><li>• Low battery voltage.</li><li>• Inverter fuses.</li><li>• Overload.</li><li>• K7 opening failure</li><li>• High battery voltage.</li><li>• DC low.</li><li>• EPO</li></ul>
4303	INVERTER CANNOT BE TURNED OFF	Inverter cannot be switched OFF, because the load cannot be switched to mains (voltage out of tolerance, not synchrony, BP blocked).
4361	INVERTER ON	The command to start the inverter has been activated on the control panel.
4362	INVERTER OFF	The command to switch OFF the inverter has been activated by the control panel or automatically for alarm presence.
4411	BYPASS MAINS OK	Bypass input mains is again within tolerance (voltage, frequency and phase).
4500	COMMAND LOAD OFF	Disconnection of the load by opening K6 and K7 for: EPO / Load Off / Overload / Stop operation
4521	NO BYPASS POWER	With the load supplied by electronic bypass, a mains failure or K6 opening occurred.
4534	MULTIPLE LOAD TRANSFER	2 transfers inverter- mains has been detected in a short time, defined by parameter (default 30 sec.).
4535	BYPASS LOCKED	Bypass to mains not enabled due to settings of parameters. Contactor K6 is open.





Code	Message	Meaning
4536	BYPASS FREE	Settings of parameters enable Bypass transfer on mains. Contactor K6 can be closed.
4561	LOAD OFF	Push-button "load off" on the UPS Control Panel has been pressed, with the output circuit breaker Q1 closed.
4562	DETOUR ON	The auxiliary contact indicates that manual bypass Q2 was closed.
4564	DETOUR OFF	The auxiliary contact indicates that manual bypass Q2 was opened.
4567	COMMAND LOAD ON MAINS	The control unit received a command to transfer the load on mains.
4568	COMMAND LOAD ON INVERTER	The control unit received a command to transfer the load on inverter.
4572	NO MORE OVERLOAD	End of the overload condition detected with alarm 4570.
4580	INVERTER AND MAINS SYNCHRONIZED	The voltages of Inverter and mains bypass are synchronised.
4582	COMMAND NOT TO SYNCHRONIZE	Command not to synchronise with mains has been done for mains BP out of tolerance (4410) or setting parameters.
4583	COMMAND TO SYNCHRONIZE	Command to synchronise with mains has been done for mains BP OK (4411) or setting parameters.
4600	COMMAND UPS ON	The SEM mode function has been disabled or the programmed time is expired. The UPS returns to On-line mode supplying the load normally by inverter.
4601	COMMAND UPS STAND BY	The function SEM mode is enabled, and according to the time program the UPS will run in SEM mode, supplying the load normally by mains.
4602	Q1 OPEN	The auxiliary contact indicates that the output switch Q1 was opened.
4603	Q1 CLOSED	The auxiliary contact indicates that the output switch Q1 was closed.
4699	BATTERY TEST IMPOSSIBLE	Not possible to start battery test (is postponed): <ul style="list-style-type: none"><li>• No mains rectifier or bypass.</li><li>• Battery not fully charged.</li><li>• Load is below 10% or above 80%.</li></ul>
4763	REMOTE CONTROL ON	Inverter can be started or shutdown by remote control. Commands source can be chosen depending on the value of parameter (service only): 0 = Only local panel; 1 = Only serial port on CI; 2 = Both.
4764	REMOTE CONTROL OFF	Inverter cannot be started or shutdown by remote control. Commands source can be chosen depending on the value of parameter (service only): 0 = Only local panel; 1 = Only serial port on CI; 2 = Both.



### 6.7.3 Event report *SitePro*

In case of failure or malfunctioning, before calling the nearest **Service Centre**, please note the most important data of your UPS and the most recent events.

In order to make the diagnosis easier from our Diagnostic Centre we suggest you make a copy of this page, fill it in with the requested data and send it by fax.

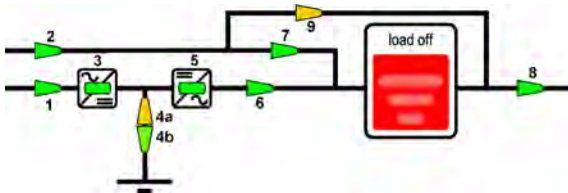
Unit No.: \_\_\_\_\_ Series-No.: \_\_\_\_\_ UPS rating: \_\_\_\_\_ kVA

Customer: \_\_\_\_\_ Place: \_\_\_\_\_

Date: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ Sent by: \_\_\_\_\_

1. Record the exact **UPS status** on the panel when the failure appeared

2. On the LCD panel, enter the ALARMS MODE and record the **alarms/messages** in the list below indicating at least 3 events before the failure time.  
**Remark:** Exact data and time are very important.



LED 1 ☐ ON ☐ OFF  
LED 2 ☐ ON ☐ OFF  
LED 3 ☐ ON ☐ OFF  
LED 4a ☐ ON ☐ OFF  
LED 4b ☐ ON ☐ OFF  
LED 5 ☐ ON ☐ OFF  
LED 6 ☐ ON ☐ OFF  
LED 7 ☐ ON ☐ OFF  
LED 8 ☐ ON ☐ OFF  
LED 9 ☐ ON ☐ OFF  
LOAD \_\_\_\_\_ %  
BATTERY \_\_\_\_\_ min

Description of repair actions taken:

.....  
.....  
.....

Actual situation:

.....  
.....  
.....

Remarks:

.....  
.....

Event No.	Event Code	UPS Status	Date	Time h.m.s
255				
254				
253				
252				
251				
250				
249				
248				
247				
246				
245				
244				
243				
242				
241				
240				
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238				
237				
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235				
234				
233				
232				
231				

## 7 CUSTOMER INTERFACE

### 7.1 CUSTOMER INTERFACE

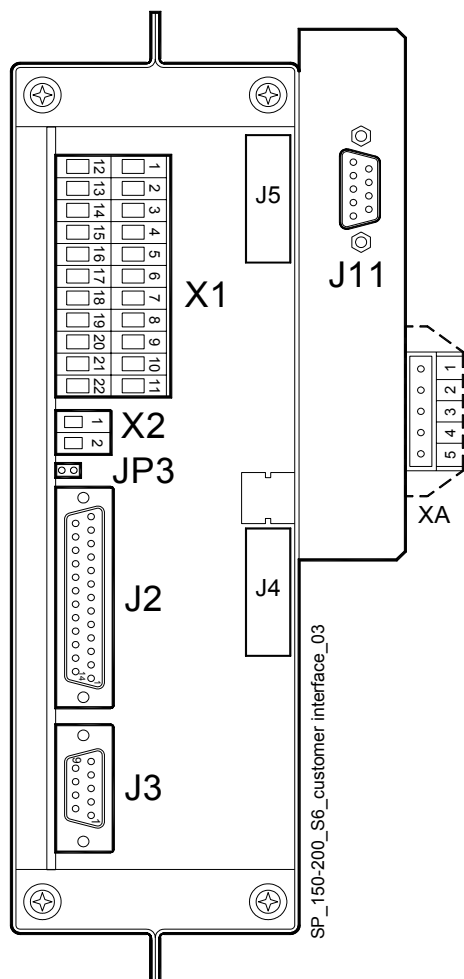


Fig. 7.1-1 Customer interface

Serial port J3 - RS 232 (sub D - female 9 pin) Suitable for JUMP protocol		
Pin 2: TX (out)	Pin 3: RX (in)	Pin 5: GND
Serial port J11 - RS 232 (sub D - female 9 pin) Suitable for Argus, LinC and InterlinC protocol		
Pin 2: TX (out)	Pin 3: RX (in)	Pin 5: GND
J2 (subD-female 25p) – Output signals on voltage free contacts		
J2/1, 2, 3	- NO, C, NC	- Mains failure (def. Param. RL=1)
J2/4, 5, 6	- NO, C, NC	- Load on inverter (def. Param. RL=3)
J2/7, 8, 9	- NO, C, NC	- Stop operation (def. Param. RL=5)
J2/14, 15, 16	- NO, C, NC	- Load on mains (def. Param. RL=2)
J2/17, 18, 19	- NO, C, NC	- General alarm (def. Param. RL=4)
J2/20, 21, 22	- NO, C, NC	- Acoustic alarm (def. Param. RL=6)
<div>⚠</div> <b>Signals on terminals X1 and on connector J2 are in parallel and therefor not separated galvanically from each other.</b> <b>The programmable signals on X1 and J2 will be disabled with Q1 open, with the exception of the signals for “16 - Manual bypass ON” and “26 - EPO”.</b>		
X1 – Output signals on voltage free contacts - terminals		
X1/1, 2, 3	- NO, C, NC	- Mains failure (def. Param. RL=1)
X1/4, 5, 6	- NO, C, NC	- Load on inverter (def. Param. RL=3)
X1/7, 8, 9	- NO, C, NC	- Stop operation (def. Param. RL=5)
X1/12, 13, 14	- NO, C, NC	- Load on mains (def. Param. RL=2)
X1/15, 16, 17	- NO, C, NC	- General alarm (def. Param. RL=4)
X1/18, 19, 20	- NO, C, NC	- Acoustic alarm (def. Param. RL=6)
X2 - Terminals EPO connection		
X2 / 1, 2 or J2 / 12, 25	NC	EPO (Emergency Power Off)
<b>Note: to enable this function, remove Jumper JP3.</b>		
Input contacts		
X1/10, 21 or J2/10, 23	Programmable (default = RL1)	
X1/11, 22 or J2/11, 24	Programmable / Generator ON (NO) (default = RL2)	

**NO** = normally open      **C** = common      **NC** = normally closed

The connectors **J4** and **J5** can be used for additional **SNMP Card**, **Environmental Card** (not available yet) or an additional **Customer Interface** (installation only when the UPS is switched Off).

**XA**: 24VDC / 1A connector for supply (option).

Programmable user relays	Programmable functions on contacts (X1- J2)
<p>On terminals <b>X1</b> or <b>J2</b> connector, six of the following <b>26 signals</b> can be selected from the display, entering with the appropriate <b>password</b>.</p> <div> <div> 0- No information 1- Buzzer 2- General alarm 3- Load on mains 4- Stop operation 5- Load on inverter 6- Mains failure 7- DC overvoltage 8- Low battery 9- Overload 10- Overtemperature 11- Inverter-mains not synchrony 12- Bypass locked 13- Bypass mains failure </div> <div> 14- Rectifier mains failure 15- Battery discharge 16- Manual bypass ON 17- Rectifier ON 18- Inverter ON 19- Boost charge 20- Battery earth fault 21- Battery fault 22- Relay input 1 23- Relay input 2 24- Relay output ON 25- Relay output OFF 26- EPO 27- SEM Mode ON </div> </div>	<p>Some UPS functions can be activated with parameters when an external Normally Open contact is closed on:  <b>X1/10, 21 - J2-10, 23</b> or <b>X1/11, 22 - J2/11, 24</b></p> <p>Selectable functions by changing <b>parameters</b> (password required) are:</p> <div> <div> <b>No function</b> <b>Inverter OFF</b> <b>Status relay</b> <b>External bypass ON</b> </div> <div> <b>Inverter ON</b> <b>Print all</b> <b>Generator ON</b> <b>Battery fuses</b> </div> </div> <p><b>Voltage free contacts:</b> Max. DC / AC: 24V / 1.25A IEC 950 (SELV circuit) Min. signal level: 5VDC/50mA</p>

### 7.1.1 Serial Ports

The **SitePro** is equipped with 2 serial ports.  
Each of them uses a specific communication protocol.

**A serial port J3 - RS-232 (sub D, 9 pin female)** that allows:

- Total remote management of the system using new generation software **JUMP** (Java Universal Management Platform) for system protection and management of systems using **GE** UPS's.

**JUMP** system is written in JAVA and supports virtually all platforms having **JAVA** runtime environment version 1.1 or higher.

**RPA**

The serial port **J3 - RS-232** is enabled on all the units of the parallel system.

**A serial port J11 - RS-232 (sub D, 9 pin female)**, located on the frame beside the customer interface board, that allows:

- Total remote management of the system on PC by means of **the ARGUS - Control Network Software** (optional).

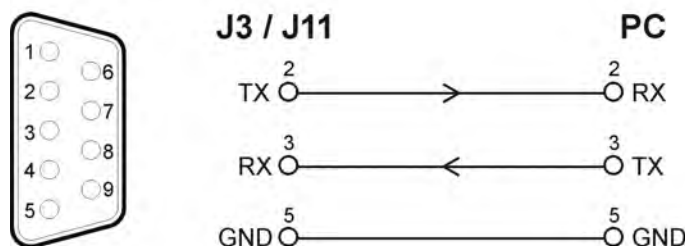
This software enables the user to monitor the status of remote UPS' from any computer connected to a modem, or through a direct link to the UPS.

To connect the UPS to the **Ethernet network**, it is advisable to use a specific **SNMP Card** (see section 8.2 - Communication Options).

Nevertheless it is possible to connect to the Port **J11** a **LinC Box** and an **SNMP Box**.

- Connection of a serial printer.  
From the display panel it is possible to select printing of measurements, alarms and parameters (see section 6.5 - User Parameters).

#### Serial port J3 and J11 connection to PC



SP\_S6\_J3-J11 serial port connection PC\_01

Fig. 7.1.1-1 Serial port J3 and J11 connection to PC

**RPA**

The serial port **J11 - RS-232** is enabled only one unit of the parallel system (normally unit no. 1).

Do not use the serial port **J11** on the other units of the same parallel system.



Communication on **J11** port is enabled also in case the **J3** connector is already connected.

### 7.1.2 Output free potential contacts

The interface board provide 6 voltage free relay contacts giving some UPS critical alarms and operation mode.

These signals are available either on connector **J2- (sub D, female 25 pin)** or terminal blocks **X1**.

The meaning of the alarms on the free contacts in standard configuration (default) is the following:

<b>X1 / 1, 2, 3</b>	or	<b>J2 / 1, 2, 3</b>	<b>(NO, C, NC)</b>	<b>Mains failure</b>	(def. Par. RL=1)
<b>X1 / 4, 5, 6</b>	or	<b>J2 / 4, 5, 6</b>	<b>(NO, C, NC)</b>	<b>Load on inverter</b>	(def. Par. RL=3)
<b>X1 / 7, 8, 9</b>	or	<b>J2 / 7, 8, 9</b>	<b>(NO, C, NC)</b>	<b>Stop operations</b>	(def. Par. RL=5)
<b>X1 / 12, 13, 14</b>	or	<b>J2 / 14, 15, 16</b>	<b>(NO, C, NC)</b>	<b>Load on mains</b>	(def. Par. RL=2)
<b>X1 / 15, 16, 17</b>	or	<b>J2 / 17, 18, 19</b>	<b>(NO, C, NC)</b>	<b>General alarm</b>	(def. Par. RL=4)
<b>X1 / 18, 19, 20</b>	or	<b>J2 / 20, 21, 22</b>	<b>(NO, C, NC)</b>	<b>Acoustic alarm</b>	(def. Par. RL=6)

**In case different alarms or operating status are required, they can be configured** on the same terminals via software from the control panel.

The configuration can be changed in “Parameters” mode by an expert operator using the appropriate password (see selectable alarm list on section 6.2).



**The programmable signals on X1 and J2 will be disabled with Q1 open, with the exception of the signals for “16 - Manual bypass ON” and “26 - EPO”.**

### 7.1.3 Programmable input free contacts

Some programmable UPS functions (indicated in section 7.1), can be activated by closing an external contact, if connected, on:

<b>X1 / 10, 21</b>	or	<b>J2 / 10, 23</b>	<b>User input 1 (default = Not used)</b>	<b>(RL1)</b>
<b>X1 / 11, 22</b>	or	<b>J2 / 11, 24</b>	<b>User input 2 (default = Emergency GEN ON)</b>	<b>(RL2)</b>

### 7.1.4 Gen Set signalling (GEN ON)

If an emergency generator set supplies the UPS in case of mains failure and the generator is particularly unstable in frequency, it should be suitable to install the signal “**Generator ON**” on **X1 / 11, 22** or **J2 / 11, 24** (this input is programmed as default for this function).

When this contact closes, it causes the change of certain functions (programmable) such as:

- Enabling or disabling of synchronisation and consequently the load transfer to generator.
- The battery recharge inhibition during the generator operation, or after what delay from generator start the battery will start to be recharged.

**RPA**

***In a parallel system a separate NO contact must be connected individually to each unit.***

### 7.1.5 AUX external maintenance bypass.

If the UPS system is equipped with an external maintenance bypass switch, it is possible to connect a NO (normally open) voltage free aux. contact from the external bypass switch to the programmable input **X1 / 10, 21** or **J2 / 10, 23**, making the UPS operate as if the internal switch **Q2** has closed.

This function can be activated by changing a dedicated parameter (password required).

When this NO contact closes, the output inverter contactor **K7** is automatically opened and the load transfer back to inverter will be inhibited.

**RPA**

*In a parallel system, the input on customer interface of each unit must be connected to a separate AUX contact of the external maintenance bypass switch.*

### 7.1.6 EPO (Emergency Power Off) Input contact

An external Emergency switch (Normally Closed voltage-free contact) can be connected on terminals **X2 / 1, 2** or connector **J2 / 12, 25** of the **P4 - Interface Customer**.

Remove the cable short-circuiting terminals **X2** when using this external switch.



To enable this function, remove jumper **JP3** on the **P4 - Customer Interface**, when the cables have been already connected on **X2** or **J2**.

In case of parallel **Customer Interface** (up to 3) the **EPO** contact must be connected to one **Customer Interface** only, but the bridge on **X2** and jumper **JP3** on the **P4 - Customer Interface** must be removed on all other boards.

**RPA**

*In a parallel system a separate NC contact must be connected individually to each unit*

When operated, this switch causes the immediate shutdown of the rectifier and the inverter; the static-switch and the bypass contactors **K6** and **K7** open.



**Be aware: the reliability of the system is depending on this contact!**

Following an Emergency operation, when the contact on **X2 / 1, 2** close again, a **reset must be done by pressing the key "O"** (inverter OFF – see section 5.2.1) on the control panel, in order to restart the UPS normal operation.

**RPA**

*In case of parallel system press the key "O" (inverter OFF – see section 5.2.1) on the control panel of each unit connected on parallel bus having the switch **Q1** closed.*

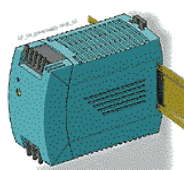


## 8 OPTIONS

### 8.1 BUILT IN UPS OPTIONS

#### RPA

REDUNDANT PARALLEL ARCHITECTURE



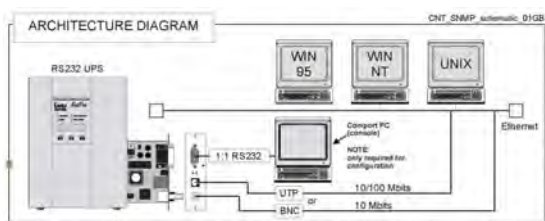
#### RPA Kit

Redundant Parallel Architecture.

Up to 8 units parallelable for redundancy or capacity in RPA configuration

#### Auxiliary Power Supply (APS) 24 VDC / 1A

### 8.2 COMMUNICATION OPTIONS

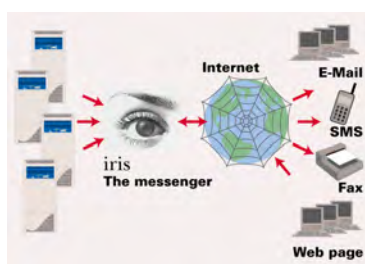


#### SNMP Card

Simple Network Management Protocol.

The SNMP Card is an Interface to the Ethernet Network, and provides UPS information via the standard SNMP protocol.

The UPS can therefore be managed by a Network Management System (NMS) or by our applications (for instance JUMP), which uses this information to determine the state of the UPS in order to guarantee safe and orderly shutdown of the server, when needed.

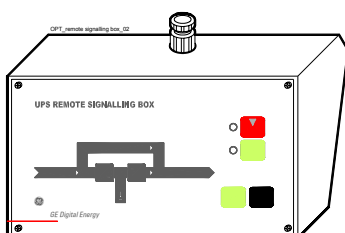


#### IRIS Service

Internet Remote Information System for UPS System.

#### ARGUS PowerFLAG PowerJUMP

#### ARGUS / Power Flag / JUMP Software



#### Remote Signalling Box (RSB)

Equipped with mimic diagram, general alarm, stop operation, alarm reset and lamp.

The cable for connection to UPS not included.

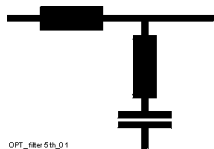


### 8.3 OPTIONS IN ADDITIONAL CABINETS



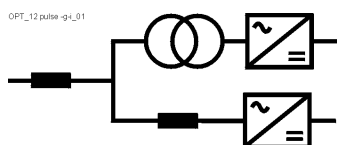
#### Rectifier and/or bypass transformer

Located in additional cabinet (❶).



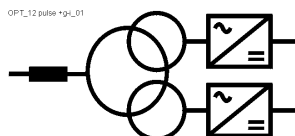
#### 5<sup>th</sup> harmonic filter

Located in additional cabinet (❶).



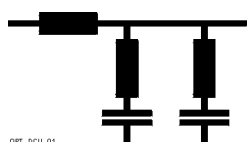
#### 12 pulses rectifier without galvanic isolation

Located in additional cabinet (❶).



#### 12 pulses rectifier with galvanic isolation

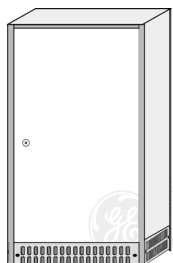
Located in additional cabinet (❶).



#### DCU

Distortion Control Unit with dynamic filtering of 5<sup>th</sup>, 7<sup>th</sup>, 11<sup>th</sup> and 13<sup>th</sup> harmonics.

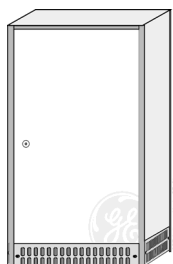
Located in additional cabinet (❶).



#### Empty battery cabinets

Dimensions (W x D x H):

- ❶ 500 x 800 x 1450 mm (19.69 x 31.50 x 57.09 inches)
- ❷ 750 x 800 x 1450 mm (29.53 x 31.50 x 57.09 inches)
- ❸ 1100 x 800 x 1450 mm (43.30 x 31.50 x 57.09 inches)



#### Centralised maintenance bypass for RPA configuration

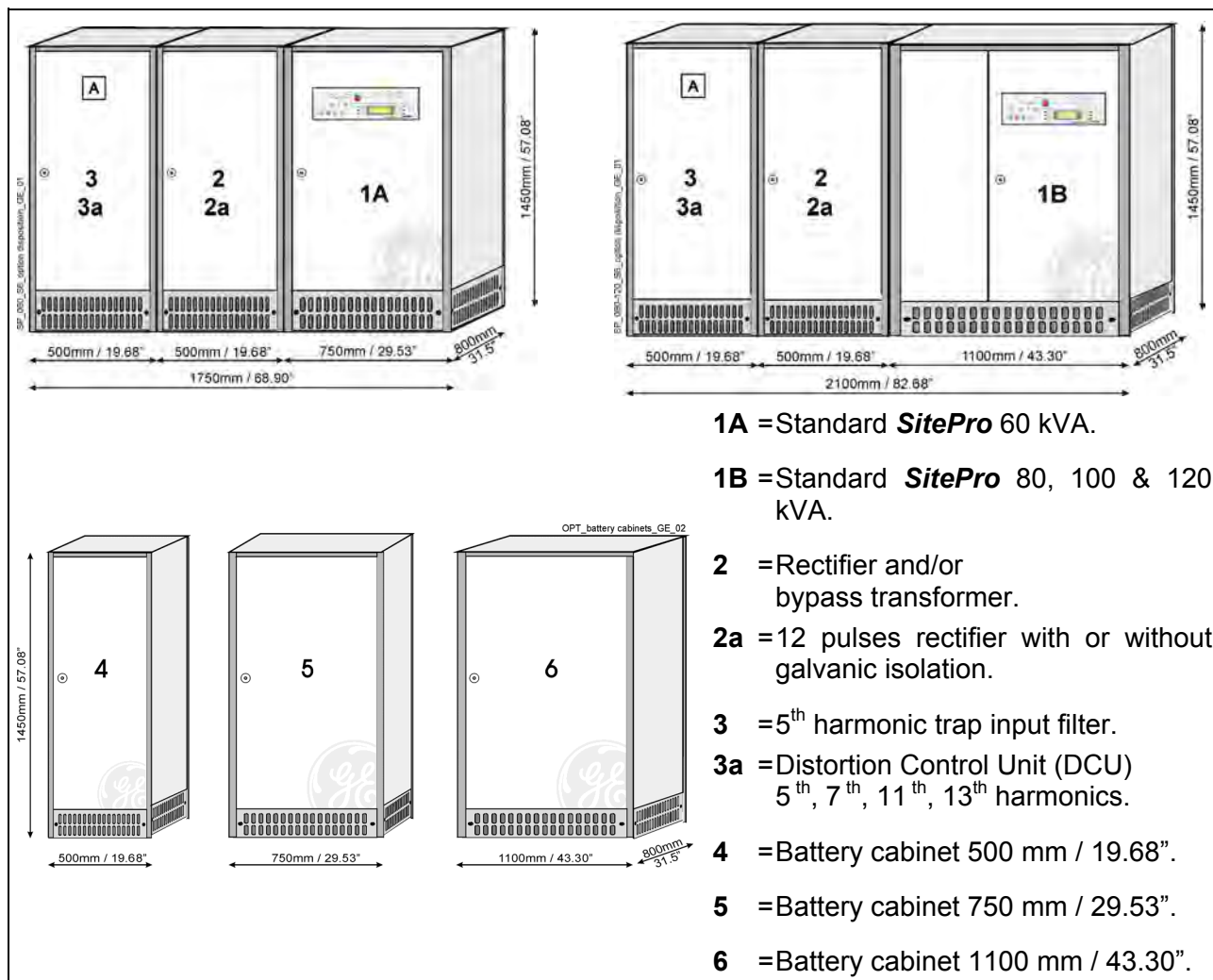
See section 8.5.



#### Top cable entry box

Dimensions (W x D x H): 100 x 800 x 1450 mm  
(19.69 x 31.50 x 57.09 inches)

## 8.4 DISPOSITION OPTIONS



The following table shows the weights in **kg / lbs** of the most common configurations:

UPS	UPS standard	Rectifier and/or bypass transformer	12 pulses rectifier with galvanic isolation in additional cabinet	12 pulses rectifier without galvanic isolation in additional cabinet	Input filter 5 <sup>th</sup> in additional cabinet	DCU 5 <sup>th</sup> , 7 <sup>th</sup> , 11 <sup>th</sup> , 13 <sup>th</sup> harmonics in additional cabinet	Empty Battery Cabinet 4 = 500 mm 5 = 750 mm 6 = 1100 mm
	(1)	(2)	(2a)	(2a)	(3)	(3a)	(4) / (5) / (6)
<b>60 kVA</b>	475 kg 1048 lbs	430 kg 948 lbs	330 kg 728 lbs	285 kg 629 lbs	150 kg 331 lbs	200 kg 441 lbs	100/150/205 kg 221/331/452 lbs
<b>80 kVA</b>	620 kg 1367 lbs	460 kg 1015 lbs	420 kg 926 lbs	310 kg 684 lbs	200 kg 441 lbs	220 kg 485 lbs	100/150/205 kg 221/331/452 lbs
<b>100 kVA</b>	675 kg 1489 lbs	490 kg 1081 lbs	470 kg 1037 lbs	360 kg 794 lbs	220 kg 485 lbs	230 kg 508 lbs	100/150/205 kg 221/331/452 lbs
<b>120 kVA</b>	715 kg 1577 lbs	520 kg 1147 lbs	510 kg 1125 lbs	380 kg 838 lbs	230 kg 508 lbs	250 kg 552 lbs	100/150/205 kg 221/331/452 lbs

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

For additional options refer to the technical data sheet in section annexe.

## 8.5 CONNECTION FOR OPTIONS

**The installation and cabling of the options must be performed by qualified service person.**

### 8.5.1 5<sup>th</sup> Harmonic filter for SitePro 60 kVA

The “**Input filter for 5<sup>th</sup> harmonics**” is a passive filter realized by coils and capacitance designed to compensate current harmonics generated by the UPS rectifier.

In particular the filter is designed to compensate the 5<sup>th</sup> harmonic.

It is also designed to compensate the rectifier power factor from 0.80 to 0.90 (lagging).

The filter is started by the **PCB P50 - IM0041**, at about 40÷50% load; the second PCB step available is not used.

The filter insertion can be regulated by setting the threshold levels on the **PCB P50 - IM0041**; the above mentioned levels are set to avoid over capacity compensation on the input mains; consequently the modification require a preliminary analysis on the input mains.

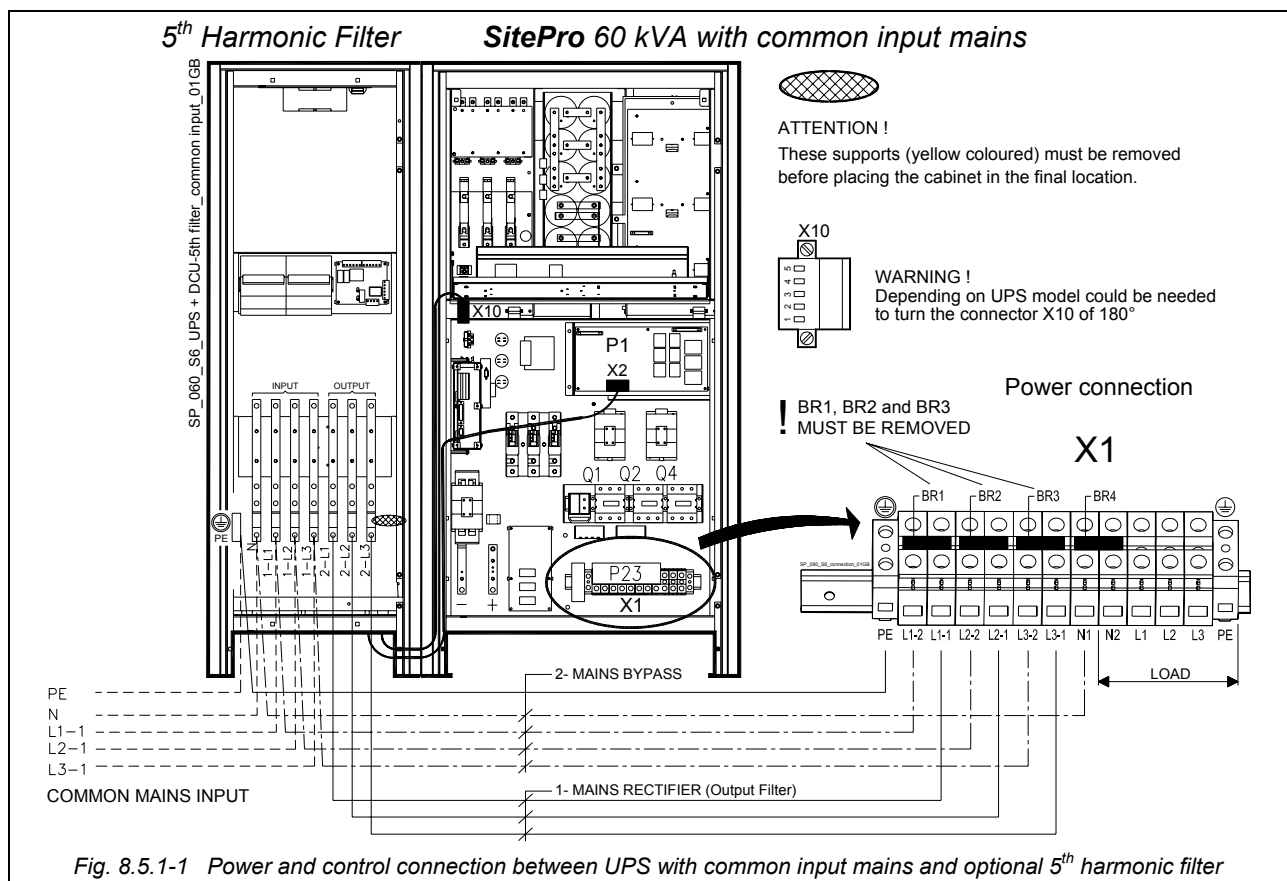
#### Positioning and assembly

For the **SitePro 60 kVA** the “**5<sup>th</sup> Harmonic Filter**” is housed in a **matching cabinet 500 mm (19.7”) wide** which must be located adjacent to the left side of the UPS cabinet.

Align and push them together the UPS and filter cabinets, paying attention loose cables are not trapped between the cabinet frames.

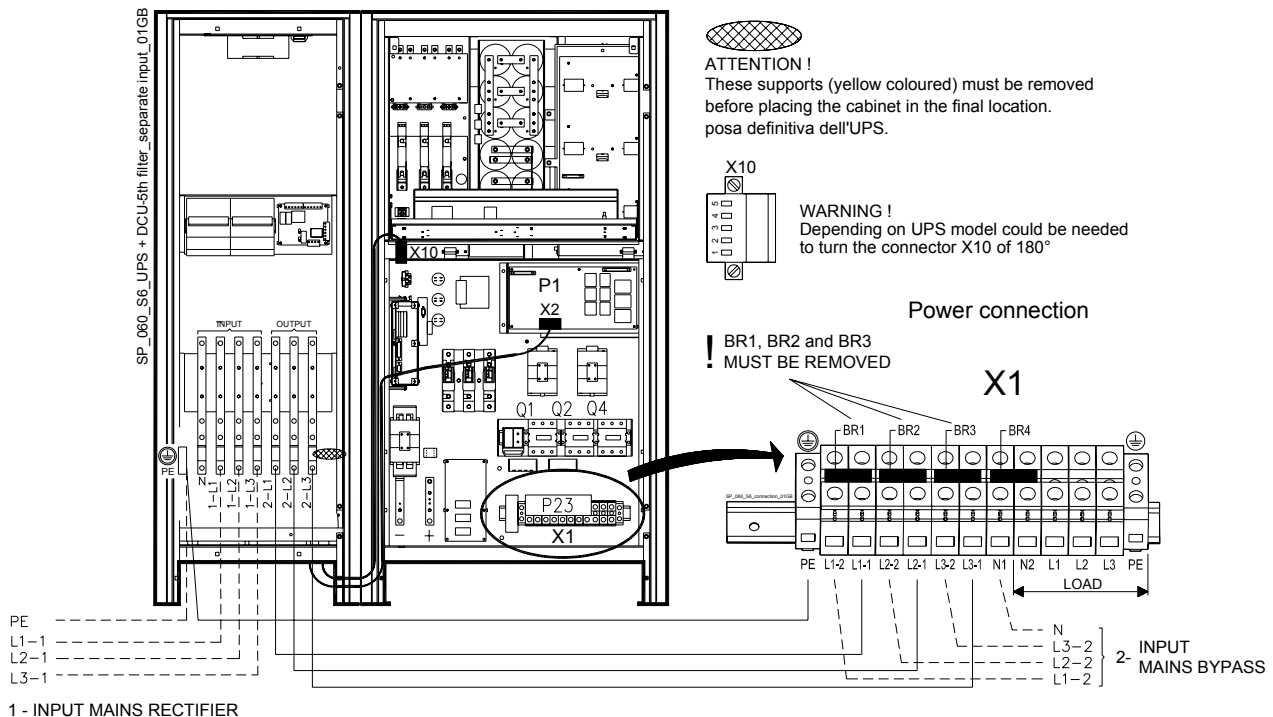
Once finally positioned the two cabinets, connect the cables following Fig. 8.5.1-1/2.

**The air inlet grids on the bottom of the UPS where the 2 cabinets touch must be removed.**



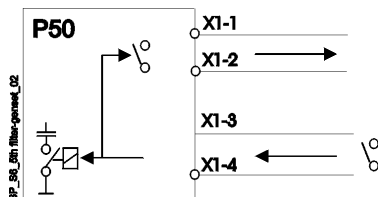
### 5<sup>th</sup> Harmonic Filter

### SitePro 60 kVA with separate input mains



The interconnection links BR1, BR2 and BR3 on input bus bars must be removed.

### Gen-set operation signalling



Output Gen-On free contact to UPS provided by the customer (see Section 7.1.4)

Input Gen-On free contact to UPS provided by the customer

If required during emergency Gen-set operation, the filter can be deactivated by closing an external voltage free contact, if connected, on **PCB P50 - X1 / 3-4**.

In this case the signal routed to the UPS cabinet (Customer Interface) must be taken on **PCB P50 - X1 / 1-2**.

### 8.5.2 5<sup>th</sup> Harmonic filter for *SitePro* 80, 100 and 120 kVA

The “**Input filter for 5<sup>th</sup> harmonics**” is a passive filter realized by coils and capacitance designed to compensate current harmonics generated by the UPS rectifier.

In particular the filter is designed to compensate the 5<sup>th</sup> harmonic.

It is also designed to compensate the rectifier power factor from 0.80 to 0.90 (lagging).

The filter is started by the **PCB P50 - IM0041**, at about 40÷50% load; the second PCB step available is not used.

The filter insertion can be regulated by setting the threshold levels on the **PCB P50 - IM0041**; the above mentioned levels are set to avoid over capacity compensation on the input mains; consequently the modification require a preliminary analysis on the input mains.

## Positioning and assembly

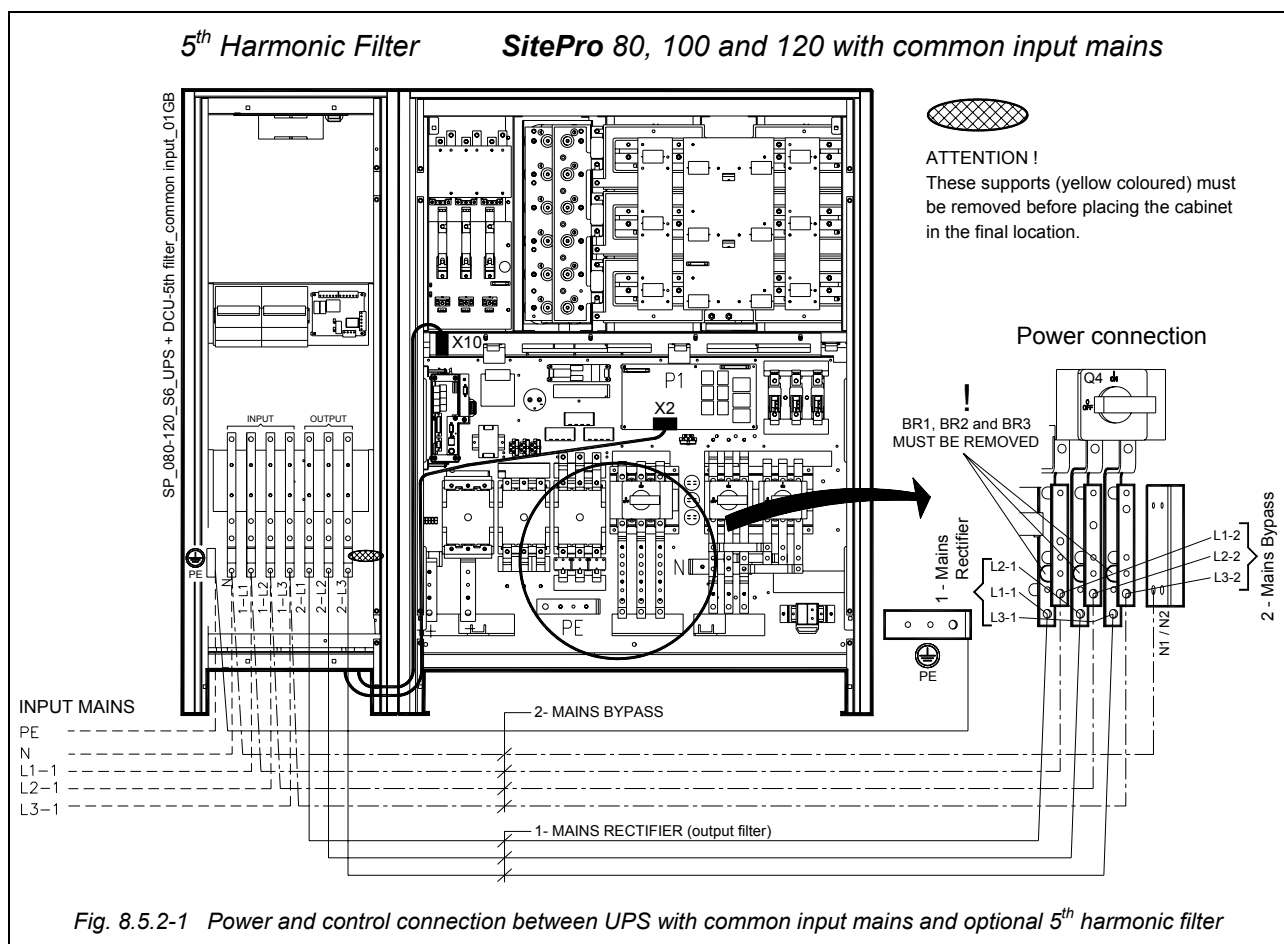
For **SitePro 80, 100 and 120 kVA** the “**5<sup>th</sup> Harmonic Filter**” is housed in a **matching cabinet 500 mm (19.7”) wide** which must be located adjacent to the left side of the UPS cabinet.

Align and push them together the UPS and filter cabinets, paying attention loose cables are not trapped between the cabinet frames.

Once finally positioned the two cabinets, connect the cables following Fig. 8.5.2-1/2.

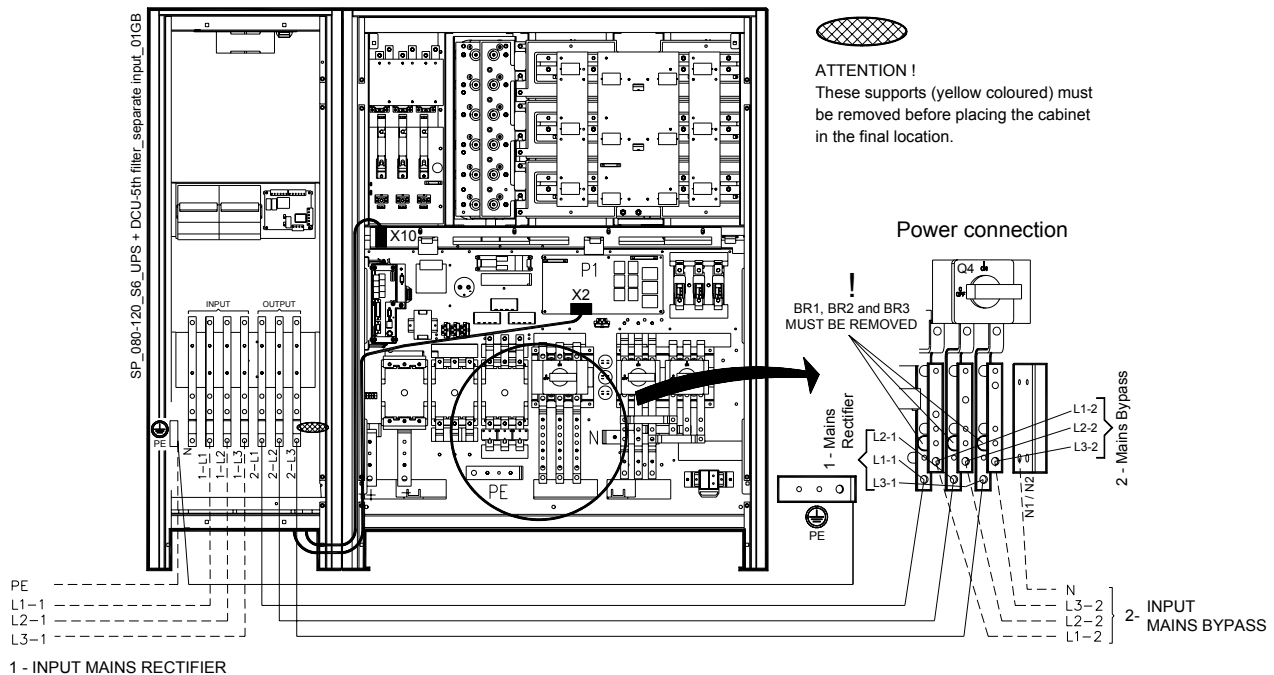


**The air inlet grids on the bottom of the UPS where the 2 cabinets touch must be removed.**



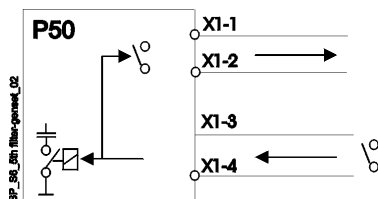
### 5<sup>th</sup> Harmonic Filter

### SitePro 80, 100 and 120 with separate input mains



The interconnection links BR1, BR2 and BR3 on input bus bars must be removed.

### Gen-set operation signalling



Output Gen-On free contact to UPS provided by the customer (see Section 7.1.4)

Input Gen-On free contact to UPS provided by the customer

If required during emergency Gen-set operation, the filter can be deactivated by closing an external voltage free contact, if connected, on **PCB P50 - X1/ 3-4**.

In this case the signal routed to the UPS cabinet (Customer Interface) must be taken on **PCB P50 - X1/ 1-2**.

### 8.5.3 12 pulse rectifier without galvanic isolation for SitePro 60 kVA

12 pulse rectifier without galvanic isolation

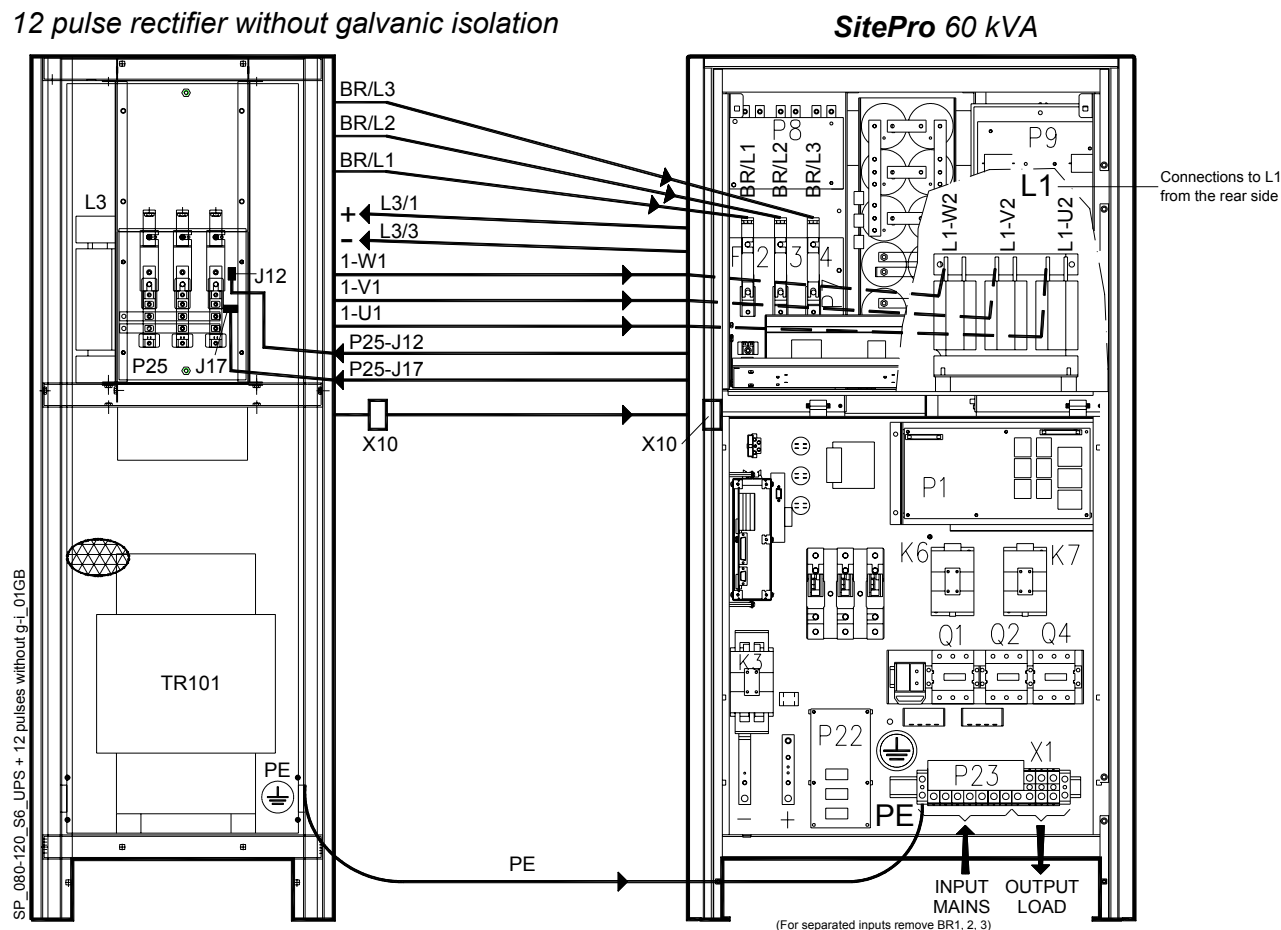


Fig. 8.5.3-1 Power and control connections between UPS and optional 12 pulses rectifier

Align and push together both cabinets, routing the power and the control cables already connected on one cabinet through the dedicated apertures on the side panel.



**The air inlet grids on the bottom of the UPS where the 2 cabinets touch must be removed.**

Connection	Already connected on:	To
Cable <b>BR/L1</b>	Cabinet option: <b>BR/L1</b>	UPS: <b>BR/L1</b>
Cable <b>BR/L2</b>	Cabinet option: <b>BR/L2</b>	UPS: <b>BR/L2</b>
Cable <b>BR/L3</b>	Cabinet option: <b>BR/L3</b>	UPS: <b>BR/L3</b>
Cable <b>1-U1</b>	Cabinet option: <b>L4 – 1U1</b>	UPS: <b>L1 – 1U2</b>
Cable <b>1-V1</b>	Cabinet option: <b>L4 – 1V1</b>	UPS: <b>L1 – 1V2</b>
Cable <b>1-W1</b>	Cabinet option: <b>L4 – 1W1</b>	UPS: <b>L1 – 1W2</b>
Cable <b>+</b> (red)	UPS: <b>L2-1 /+ (red)</b>	Cabinet option: <b>L3-1 /+ (red)</b>
Cable <b>-</b> (blue)	UPS: <b>L2-3 /- (blue)</b>	Cabinet option: <b>L3-3 /- (blue)</b>
Cable <b>PE</b>	Cabinet option: <b>PE</b>	UPS: <b>PE</b>
Cable with connector <b>X10</b>	Cabinet option: <b>X10</b>	UPS: <b>X10</b> connector
Cable with connector <b>J12</b>	UPS	Cabinet option: <b>J12 – P25 IM6343</b>
Flat cable with connector <b>J17</b>	UPS	Cabinet option: <b>J17 – P25 IM6343</b>



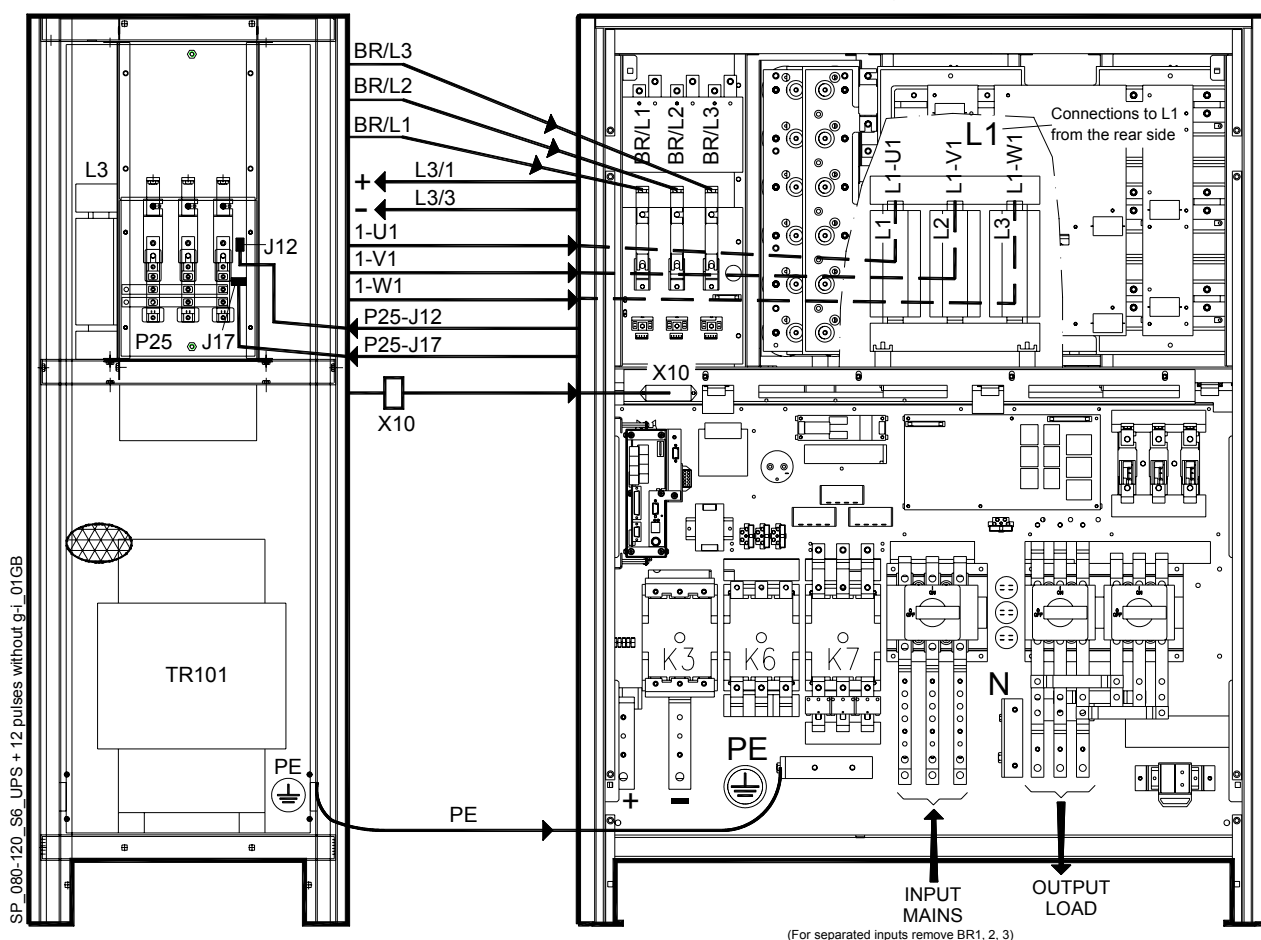
**These supports must be removed before placing the cabinet in the final location.**



#### 8.5.4 12 pulse rectifier without galvanic isolation for *SitePro* 80, 100 & 120 kVA

*12 pulse rectifier without galvanic isolation*

### SitePro 80, 100 & 120 kVA



*Fig. 8.5.4-1 Power and control connections between UPS and optional 12 pulses rectifier*

Align and push together both cabinets, routing the power and the control cables already connected on one cabinet through the dedicated apertures on the side panel.



**The air inlet grids on the bottom of the UPS where the 2 cabinets touch must be removed.**

Connection	Already connected on:	To
Cable <b>BR/L1</b>	Cabinet option: <b>BR/L1</b>	UPS: <b>BR/L1</b>
Cable <b>BR/L2</b>	Cabinet option: <b>BR/L2</b>	UPS: <b>BR/L2</b>
Cable <b>BR/L3</b>	Cabinet option: <b>BR/L3</b>	UPS: <b>BR/L3</b>
Cable <b>1-U1</b>	Cabinet option: <b>L4 – 1U1</b>	UPS: <b>L1 – 1U1</b>
Cable <b>1-V1</b>	Cabinet option: <b>L4 – 1V1</b>	UPS: <b>L1 – 1V1</b>
Cable <b>1-W1</b>	Cabinet option: <b>L4 – 1W1</b>	UPS: <b>L1 – 1W1</b>
Cable + <b>(red)</b>	UPS: <b>L2-1 /+ (red)</b>	Cabinet option: <b>L3-1 / + (red)</b>
Cable – <b>(blue)</b>	UPS: <b>L2-3 /- (blue)</b>	Cabinet option: <b>L3-3 / - (blue)</b>
Cable <b>PE</b>	Cabinet option: <b>PE</b>	UPS: <b>PE</b>
Cable with connector <b>X10</b>	Cabinet option: <b>X10</b>	UPS: <b>X10</b> connector
Cable with connector <b>J12</b>	UPS	Cabinet option: <b>J12 – P25 IM6343</b>
Flat cable with connector <b>J17</b>	UPS	Cabinet option: <b>J17 – P25 IM6343</b>



**These supports must be removed before placing the cabinet in the final location.**

### 8.5.5 DCU with dynamic filtering of 5<sup>th</sup>, 7<sup>th</sup>, 11<sup>th</sup> and 13<sup>th</sup> harmonics for SitePro 60 kVA

**DCU** (Distortion Control Unit) filter is a passive filter realized by coils and capacitance designed to compensate current harmonics generated by the UPS rectifier.

In particular the **DCU** is designed to compensate the following harmonics order: 5<sup>th</sup>, 7<sup>th</sup>, 11<sup>th</sup> and 13<sup>th</sup>.

It is also designed to compensate the rectifier power factor from 0.80 to 0.98 (lagging).

The filter is connected in two different steps; by the **PCB P50 - IM0041**; as follow described:

- The first step at about 40÷50% load, connecting the 5th and 7th harmonic filters.
- The second step at about 70÷75% load, connecting the 11th and 13th harmonic filters.

The two steps can be regulated by setting the threshold levels on the **PCB P50 - IM0041**; the above mentioned levels are set to avoid over capacity compensation on the input mains; consequently the modification require a preliminary analysis on the input mains.

#### Positioning and assembly

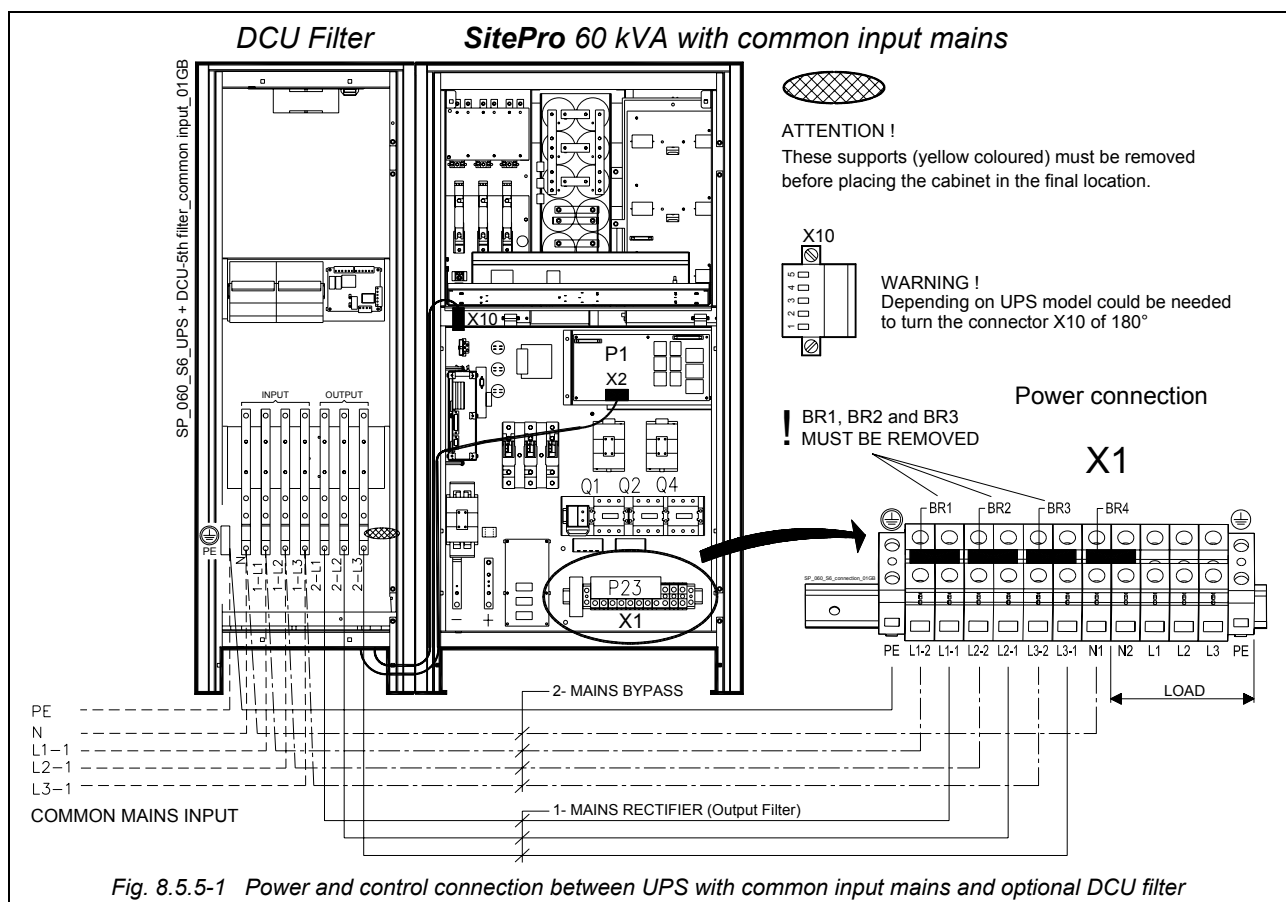
For the **SitePro 60 kVA** the “**DCU**” is housed in a **matching cabinet 500 mm (19.7”) wide** which must be located adjacent to the left side of the UPS cabinet.

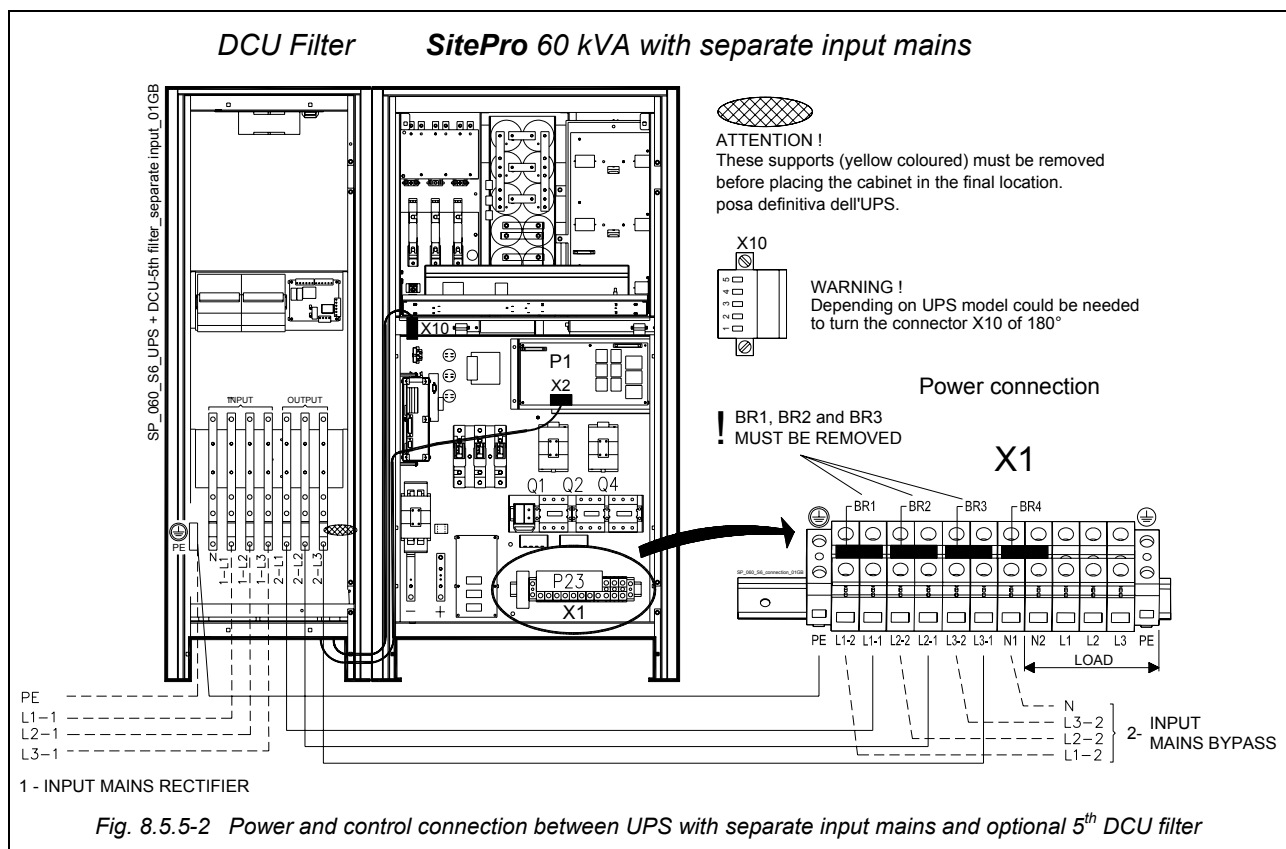
Align and push them together the UPS and filter cabinets, paying attention loose cables are not trapped between the cabinet frames.

Once finally positioned the two cabinets, connect the cables following Fig. 8.5.5-1/2.



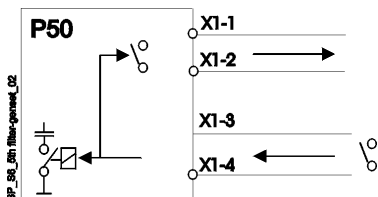
**The air inlet grids on the bottom of the UPS where the 2 cabinets touch must be removed.**





**The interconnection links BR1, BR2 and BR3 on input bus bars must be removed.**

### Gen-set operation signalling



Output Gen-On free contact to UPS provided by the customer (see Section 7.1.4)

Input Gen-On free contact to UPS provided by the customer

If required during emergency Gen-set operation, the filter can be deactivated by closing an external voltage free contact, if connected, on **PCB P50 - X1/ 3-4**.

In this case the signal routed to the UPS cabinet (Customer Interface) must be taken on **PCB P50 - X1/ 1-2**.

### 8.5.6 DCU with dynamic filtering of 5<sup>th</sup>, 7<sup>th</sup>, 11<sup>th</sup>, 13<sup>th</sup> harmonics for SitePro 80, 100, 120 kVA

**DCU** (Distortion Control Unit) filter is a passive filter realized by coils and capacitance designed to compensate current harmonics generated by the UPS rectifier.

In particular the **DCU** is designed to compensate the following harmonics order: 5<sup>th</sup>, 7<sup>th</sup>, 11<sup>th</sup> and 13<sup>th</sup>.

It is also designed to compensate the rectifier power factor from 0.80 to 0.98 (lagging).

The filter is connected in two different steps; by the **PCB P50 - IM0041**; as follow described:

- The first step at about 40÷50% load, connecting the 5th and 7th harmonic filters.
- The second step at about 70÷75% load, connecting the 11th and 13th harmonic filters.

The two steps can be regulated by setting the threshold levels on the **PCB P50 - IM0041**; the above mentioned levels are set to avoid over capacity compensation on the input mains; consequently the modification require a preliminary analysis on the input mains.

#### Positioning and assembly

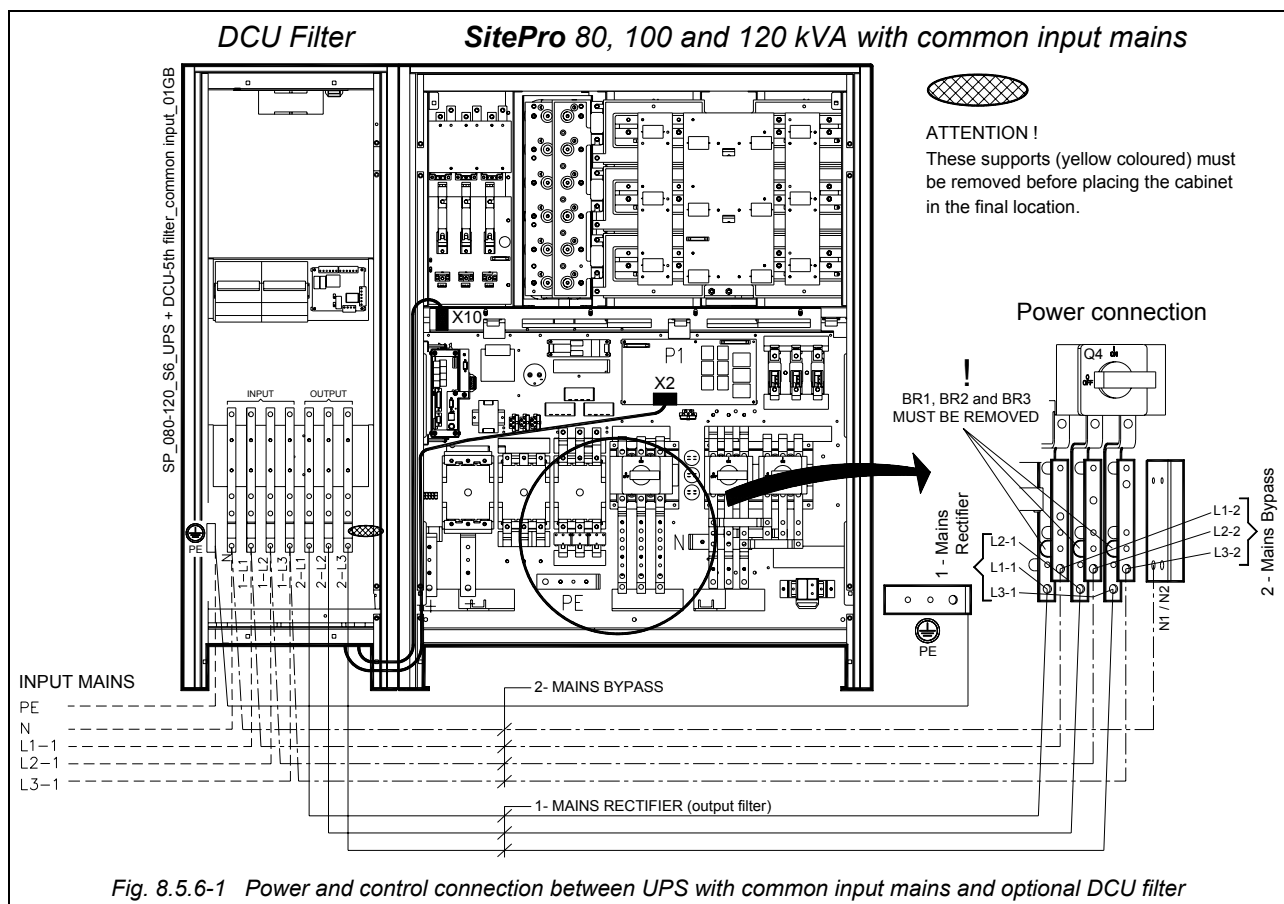
For the **SitePro 80, 100 and 120 kVA** the “**DCU**” is housed in a **matching cabinet 500 mm (19.7”) wide** which must be located adjacent to the left side of the UPS cabinet.

Align and push them together the UPS and filter cabinets, paying attention loose cables are not trapped between the cabinet frames.

Once finally positioned the two cabinets, connect the cables following Fig. 8.5.6-1/2.



**The air inlet grids on the bottom of the UPS where the 2 cabinets touch must be removed.**



### DCU Filter

### SitePro 80, 100 and 120 kVA with separate input mains

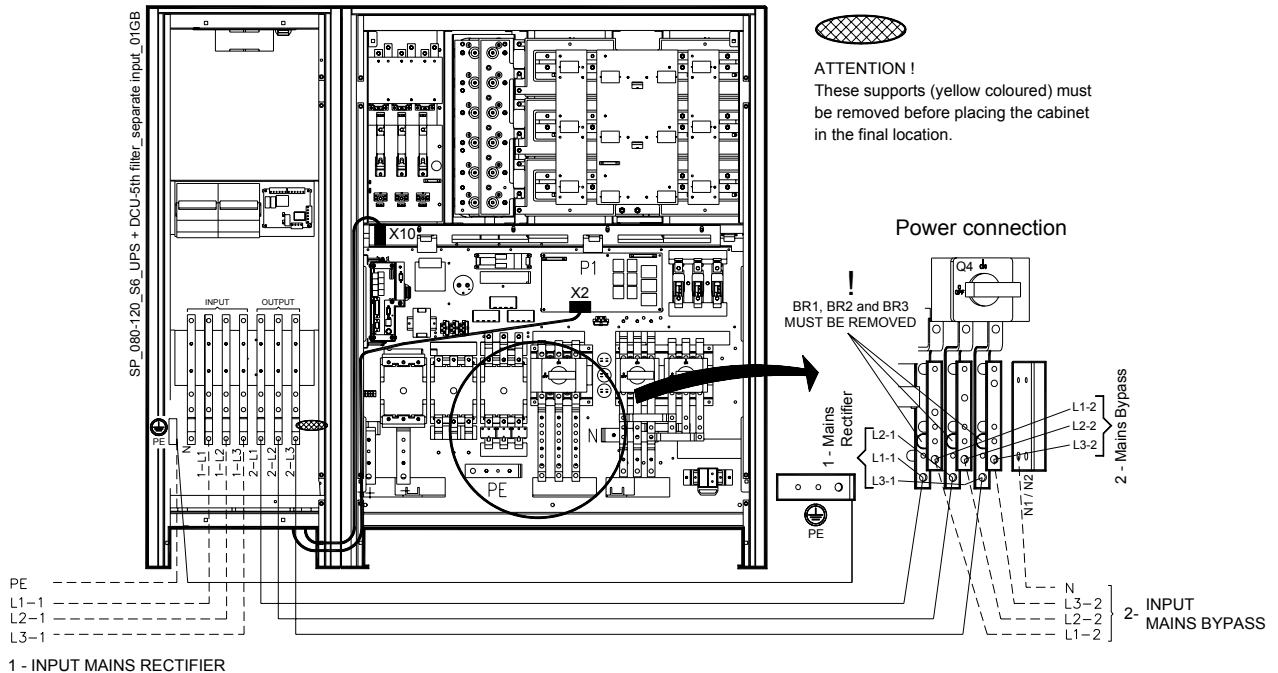
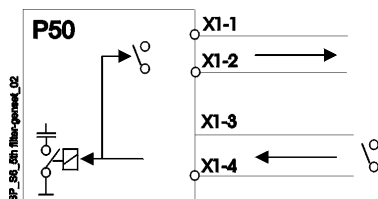


Fig. 8.5.6-2 Power and control connection between UPS with separate input mains and optional DCU filter



The interconnection links BR1, BR2 and BR3 on input bus bars must be removed.

### Gen-set operation signalling



Output Gen-On free contact to UPS provided by the customer (see Section 7.1.4)

Input Gen-On free contact to UPS provided by the customer

If required during emergency Gen-set operation, the filter can be deactivated by closing an external voltage free contact, if connected, on **PCB P50 - X1/ 3-4**.

In this case the signal routed to the UPS cabinet (Customer Interface) must be taken on **PCB P50 - X1/ 1-2**.

### 8.5.7 Top cable entry box

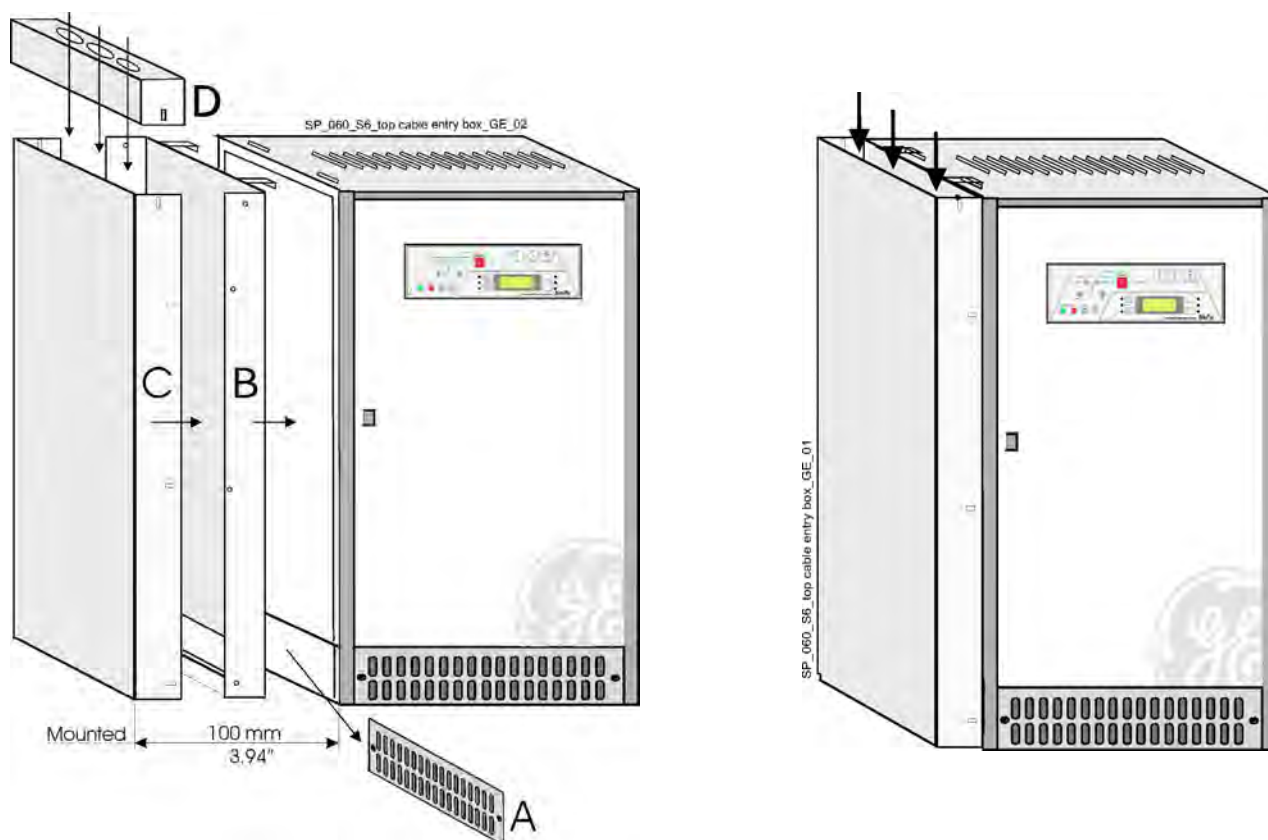


Fig. 8.5.7-1 Top cable entry box assembly

In case the power cables enter the UPS cabinet by the top, an optional **“Top Cable Entry Box”** must be provided.

Remove the bottom grid **“A”** from the left side of the UPS cabinet.

Locate the piece **“B”** against the left side of the UPS cabinet and hook it up to the slits at the top of the UPS cabinet.

Drill the removable cover **“D”** with appropriate hole and install the cable glands (not provided with the equipment).

Run the power cables through the cable glands, feed them through the aperture at the bottom of the UPS cabinet and connect them to the input/output terminals.

Fix the side cover **“C”** and the top cover **“D”** using the screws fitted on both sides.

**If the UPS is equipped with optional “5<sup>th</sup> Harmonic Input Filter” cabinet, the “Top Cable Entry Box” must be installed against the left side of the filter cabinet.**

**If the UPS is equipped with additional cabinets, the optional “Top Cable Entry Box” must be installed against the left side of the first cabinet on the left.**

## 8.5.8 Remote Signalling Box (RSB)

The optional **Remote Signalling Box** allows monitoring of the operation of the UPS, using the potential free contacts fitted on the **"P4 - Customer Interface Board"** of the UPS. It can be used by simply putting the box on a desktop or on a wall or, removing the box, it can be surface mounted.

The remote panel contains an internal buzzer and the following status indicators:

- **Mimic diagram** with LED's indicating the operation of rectifier and inverter, and the power source supplying the critical load.
- **Alarm** (LED light and audible alarm) indicating a critical situation on the UPS.
- **Stop** indicating the UPS is preparing to shut down in a short time.
- **Mute** push button to reset the buzzer.
- **Test** push button checks all the LEDs and the buzzer of the remote panel.

The cable connecting the RSB to the UPS cabinet must be min. 16 wires / 0.25 mm<sup>2</sup>.

The connectors **C** and **B** are included in the delivery of the option RSB (cable connecting UPS with RSB not included). Maximal admitted length = 300 m (985 ft).

It must be wired at one end with a D - female plug- 25 pin (**J2 – P4 Customer Interface Board**).



**The alarms on free potential contacts can be connected on terminals X1 instead J2 (see correlation X1 – J2 in section 7.1).**

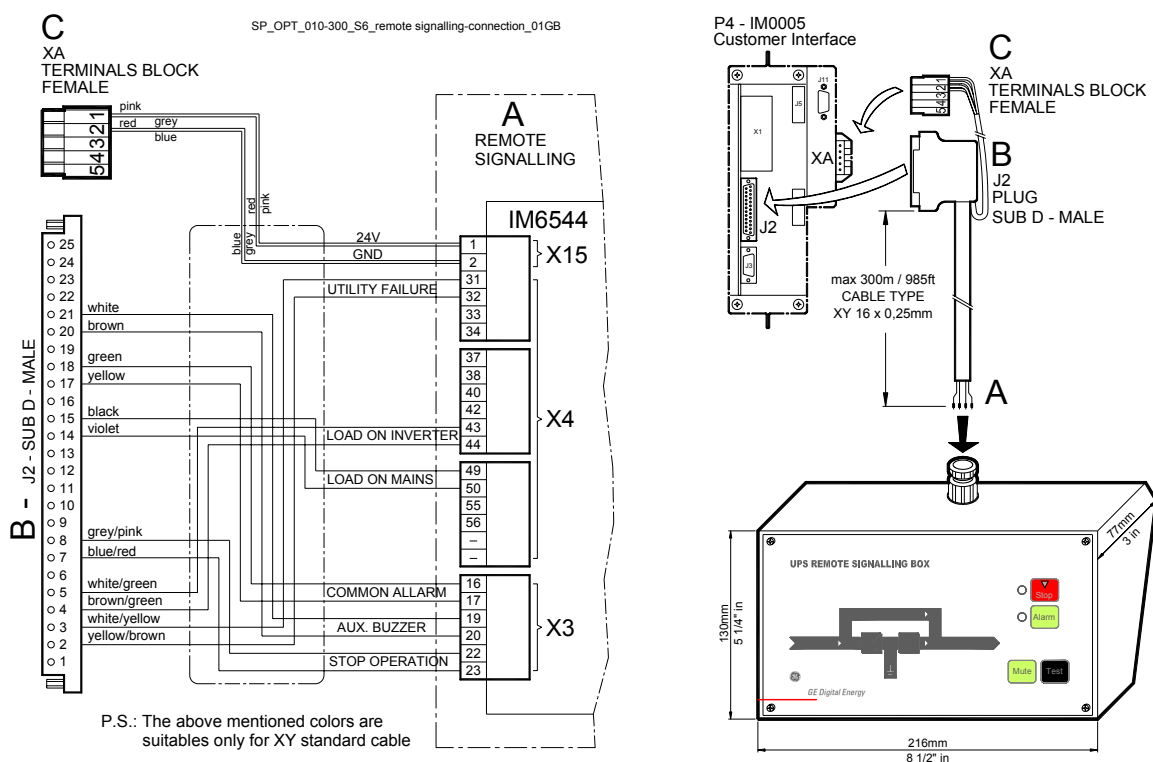


Fig. 8.5.8-1 Remote Signalling Box connection

- A** Terminals **X3**, **X4** and **X15** fitted inside the *Remote Signalling Box*.
- B** Plug **J2** (sub D - male -25 pin) must be connected to the connector **J2** (sub D - female-25 pin) located on **"P4 - Customer Interface Board"**.
- C** Terminals block **XA** for 24 VDC / 1A supply *Remote Signalling Box*.



If the remote signal panel is plugged on connector **J2**, the **terminal blocks X1 cannot be used to drive an external alarms monitoring device**, because it is supplied by the internal UPS low voltage power supply.



### 8.5.9 Centralised maintenance bypass for RPA configuration

The centralised maintenance cabinet allows the supply of the load directly from mains power, enabling the UPS system to be totally powered down for maintenance purposes. The size and weight of the cabinet may change according to the rating and the number of the parallel units.

**Cable rating:** mains power input and output load cables must be rated to support the full nominal load of the UPS system.  
The cables between each individual unit and the output cabinet must be sized to suit the units rating, according to the table on Section 4.7.2.

**The maintenance bypass supply (I) must be taken from the same power distribution source connected to the UPS bypass input of each unit (A, B, C, D, E, F, G and H).**

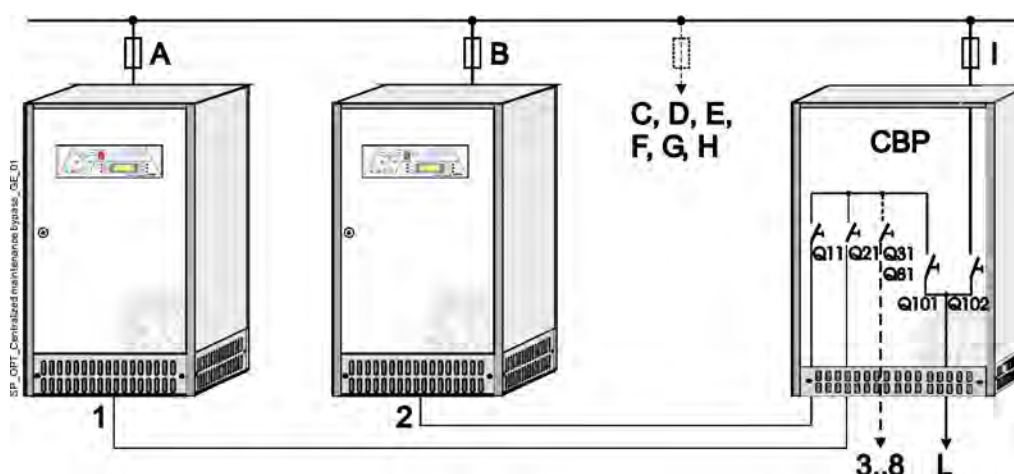


Fig. 8.5.9-1 Centralised maintenance bypass for RPA configuration

<b>A</b>	= Mains power input unit 1	<b>1</b>	= Unit 1
<b>B</b>	= Mains power input unit 2	<b>2</b>	= Unit 2
<b>CH</b>	= Mains power input to other parallel units	<b>3..8</b>	= Output other parallel units
<b>I</b>	= Mains power input to optional centralised maintenance bypass	<b>CBP</b>	= Optional cabinet with common busbar and centralised maintenance bypass.
<b>L</b>	= Load supply		

**For more information refers to the detailed schematics in the appendix.**

This optional cabinet enables the user to perform the load transfer between mains and UPS system without operating with the maintenance switches **Q2** located in each parallel unit.

**In this case the maintenance switch Q2 located in each unit should never be used.**

Referring to sections “Start-up following a Maintenance shutdown” and “Maintenance shut down”, **instead to operate on each unit** when mentioned “switch ON **Q2** on each unit” or “switch OFF **Q2** on each unit”, **operate with the common switch Q102.**

**In case the unit must be completely isolated from the output bus-bar, prior to connection or disconnection the units from the parallel bus by using the corresponding switches Q11, Q21, Q31, Q41, Q51, Q61, Q71 and Q81 follow these instructions:**

**Open the switch Q11 - Q81 inside the optional cabinet only after the corresponding inverter has been switched off and separated from the parallel bus, by using the output switches Q1 located inside the UPS cabinet.**

**Connect a unit with the parallel bus by closing the output switch Q1, (located inside each UPS cabinet), being sure the corresponding switch Q11–Q81 has been already turned on.**



## 9 MAINTENANCE

A UPS system, like other electrical equipment, needs periodic preventive maintenance.

**A regular maintenance check of your installation guarantees higher reliability of your safe power supply.**

Preventive maintenance work on the UPS can be done only by trained Service technicians.

We therefore recommend you sign a Maintenance and Service contract with the local **Service Centre** organisation.

### Service check

If this lamp lights up during the normal operation, that means that the unit has not been serviced for the last **20'000 hours** by an **GE** trained technician.

We highly recommend that you contact your *Service Centre* for preventive maintenance work.

### Fans and ventilation

We recommend a periodic cleaning of the ventilation channels and grids on the UPS system, in order to guarantee proper air circulation in the unit and in the battery.

We recommend replacement of the fans in the units every **20'000 hours**.

### Other components with limited lifetime

We recommend the replacement of components such as filter capacitors and lithium battery for the backup of data on the control boards of the units every **50'000 hours**.

### Battery

We recommend a periodic manual battery test, especially if the automatic battery test is disabled, in order to verify if the battery can provide the expected backup time in case of mains failure.

We recommend this test be performed at least every **1 month**, especially if the battery is not sufficiently discharged during normal operation.

The discharge time you use should be at least half of the battery runtime.

For automatic battery test setting, a special code is required to enter User set-up parameters.

Please consider that, if you did a full battery test to verify the full runtime of the battery, the charger needs at least **8 hours** to recharge the battery up to **90%** of its capacity.

### Long shut-down periods of the UPS-system

To guarantee that the battery is fully charged, the UPS system should be in operation for at least **12 hours every 3 months**.

If not the battery may be permanently damaged.



### UPS room conditions and temperature

The UPS room and the battery room have to be maintained clean and free from dust.

A high temperature of the UPS room and of the battery room affect the lifetime of several components inside the equipment.

The battery is very sensitive to room temperatures above **25°C (77°F)**.

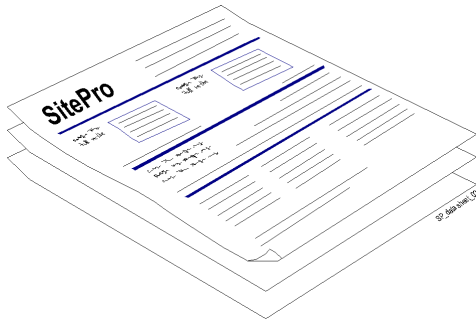
### Preventive maintenance program:

- a) Cleaning, a visual inspection and a mechanical inspection of the UPS modules;
- b) Replacement of defective parts or the preventive replacement of parts with a defined life time
- c) “Updating” of the equipment (technical improvements subsequent to the delivery).
- d) Check the calibration of DC voltage and Inverter output voltage and frequency.
- e) Check of the settings of the electronic regulation, the control and the alarm circuits of the rectifier(s) and inverter(s).
- f) Functional checks on thyristors, diodes, transformers, filter components, e.g. to ensure that they are operating within the specified design parameters.
- g) Overall performance test including a mains failure simulation with and without the load.
- h) Monitoring battery operation in discharge and recharge mode including any boost charge duties.



## 10 ANNEX

### 10.1 TECHNICAL DATA SHEETS



Can be found included in the last section and are listings of the technical data of the UPS.

### 10.2 TECHNICAL DIAGRAMS



These are included in the last sections and include assembly layouts and functional drawings.

### 10.3 LIST OF SPARE PARTS



On the last pages of the *Operating Manual* a list of spare parts can be found.