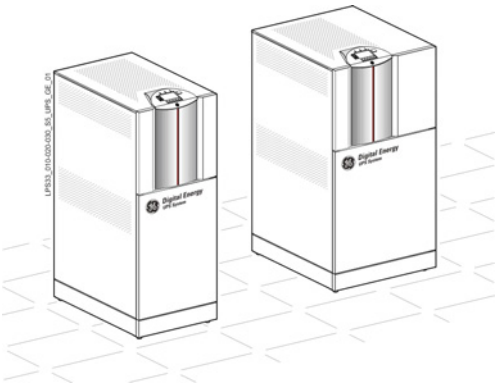
GE Digital Energy
Power Quality



Installation Guide

Uninterruptible Power supply

Digital Energy™

LP 33U Series

10 & 20 kVA

208 VAC UL / Series 1

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

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ISO 9001

Model:	***LP 33U Series / 10 & 20 kVA*** / Series 1
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Revision	Concerns	Date

Dear Customer,

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

We trust that the use of the ***LP 33U Series*** Uninterruptible Power Supply system, developed and produced to the highest standards of quality, will give you complete satisfaction.

Please carefully read the *Installation Guide*.
It contains all the necessary information about the installation of the UPS.
Thank you for choosing ***GE*** !

START UP AND COMMISSIONING

A GE Global Services Field Engineer must perform start-up and commissioning of the UPS. Please Contact GE. Global Services at least two weeks prior to schedule start-up and commissioning at 1-800-637-1738, or by E-mail at pqservices@ge.com

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

Sold in the North America by:

GE Digital Energy
Power Quality
2501 Pecan Street
Bonham, TX 75418
T: +1 800-637-1738
F: +1 903-640-0533
E: GEPQSales@ge.com
http://www.gedigitalenergy.com/ups

Your service contact:

Preface

Congratulations on your choice of a *LP 33U Series* Uninterruptible Power Supply (UPS).
It will help eliminate load disturbances due to unexpected power problem.

This *Installation Guide* describes how to prepare the installation site, and it provides weight and dimensions and procedures for moving, installing and connecting the UPS.

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

WARNING !

LP 33U Series / 10 & 20 kVA, is a product that needs to be installed by a licensed and knowledgeable contractor.

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 Center* before you proceed.

Some of the information contained in this manual may be changed without notice to reflect technical improvements.

Safety instructions

Read the safety instructions contained on the following pages carefully before the installation of the UPS, options and battery system.

Pay attention to the rectangular boxes included in the text:
They contain important information and warning concerning electrical connections and personnel safety.

RPA
Redundant Parallel Architecture

Parallel version secured with RPA

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

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1 SAFETY RULES

With this document, ***GE*** gives to the user all the necessary information about the correct use of the UPS.

Please read carefully this ***Installation Guide*** before installing or operating the UPS.
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 the nearest ***Service Center*** before you proceed.

All UPS installation, maintenance and service work should be performed by qualified service personnel only.

The KNOWLEDGE and the FULLY compliance of the safety instructions and the warning contained in this manual are

THE ONLY CONDITION

to avoid any dangerous situations during installation, operation, maintenance work, and to preserve the maximum reliability of the UPS system.

NOTE !

***LP 33U Series / 10 & 20 kVA* is a FCC Class A-UPS Product.**

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

GE

Refuses any responsibility in case of non-observance, unauthorized alterations or improper use of the delivered UPS.

SAVE THESE INSTRUCTIONS

This manual contains important instructions for models ***LP 33U Series / 10 & 20 kVA*** that should be followed during installation and maintenance of the UPS and battery.

GENERAL

- Move the UPS in an upright position in its original package to the final destination room.
- 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.
- After switching off takes 5 minutes for the DC capacitors to discharge because a lethally high voltage remains at the terminals of the electrolytic capacitors.
- All maintenance and service work should be performed by qualified service personnel. The UPS contains its own energy source (battery).
- The field-wiring terminals may be electrically live, even when the UPS is disconnected from the utility.
- 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 utility 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 GROUND LEAKAGE CURRENT: Ground connection is essential before connecting to AC input!
- Switching OFF the unit does not isolate the UPS from the utility.
- 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 104°F (40°C).
- Optimal battery life is obtained if the ambient temperature does not exceed 77°F (25°C).
- 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 -13°F (-25°C) to 131°F (55°C).
- 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 cells number, voltage (V), capacity (Ah).
- All the battery used, shall be of the same manufacturer and date of production.
- 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.
- In case of air shipment, the cables +/- going to the battery fuses/terminals shall be disconnected and isolated.

Safety instructions when working with battery

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

INSTALLATION PERSONNEL MUST READ THIS ENTIRE SECTION AND REFER TO THE BATTERY MANUFACTURERS INSTALLATION MANUAL 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 un-insulated *Battery Terminals*.

A qualified service person that is familiar with *Battery* systems and required precautions must install and service the *Battery*.
The installation must conform to national and local codes.
Keep unauthorized 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 batteries, 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* or open the *Battery System* disconnect.

Safety symbols and warnings

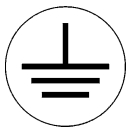
Safety warnings

The text of this manual contains some warnings to avoid risk to the persons and to avoid damages to the UPS system and the supplied critical loads.

The non-observance of the warnings reminding hazardous situations could result in human injury and equipment damages.

Please pay attention to the meaning of the following warnings and symbols.

Throughout this manual the following symbols are defined:

	**WARNING, if instruction is not followed injury or serious equipment damage may occur!**
	**CAUTION, internal parts have dangerous voltage present.** **Risk of electric shock!**
	**PE (Earth) – GND (Ground)** **PROTECTIVE GROUNDING TERMINAL:** **A terminal which must be connected to earth ground prior to making any other connection to the equipment.**
	**A terminal to which or from which an alternating (sine wave) current or voltage may be applied or supplied.**
	**A terminal to which or from which a direct current or voltage may be applied or supplied.**
	**This symbol indicated the word "phase".**
	**This symbol indicates the principal on/off switch in the on position.**
	**This symbol indicates the principal on/off switch in the off position.**

2 LAYOUT

2.1 LAYOUT *LP 33U Series / 10 & 20 KVA*

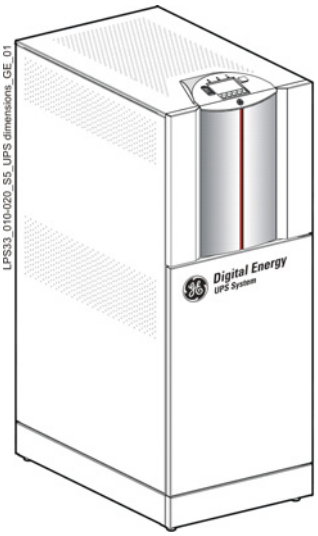


Fig. 2.1-1 General view

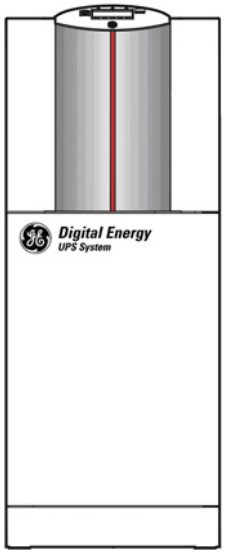


Fig. 2.1-2 Front view

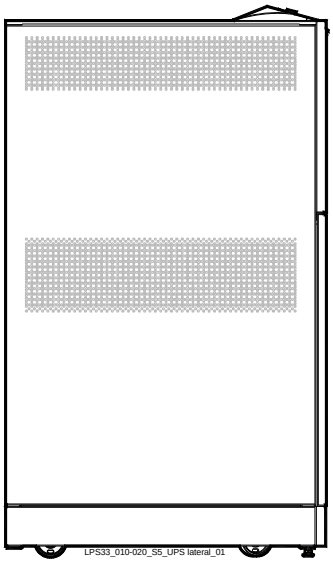


Fig. 2.1-3 Side view

Fig. 2.1-4 Control panel

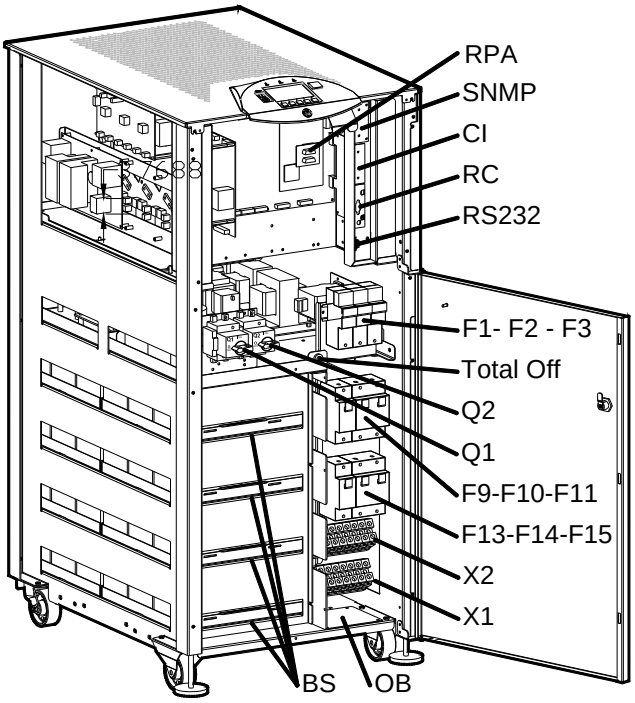


Fig. 2.1-5 Front view without panels

CI	Customer Interface (option)
BS	Battery shelf
F1 - F2 - F3	Rectifier fuses
F9 - F10 - F11	Battery fuses
F13 - F14 - F15	Battery fuses (only for 20 kVA)
OB	Opening for bottom cable entry
Q1	Output switch Q1
Q2	Output switch Q2 (Manual Bypass)
RPA	RPA board (option)
RC	Relay Card
RS232	Serial port RS232
SNMP	Advanced SNMP Card (option)
Total Off	Total Off push-button
X1	Terminals for Utility input
X2	Terminals for Load Output

3 INSTALLATION

3.1 TRANSPORT

The UPS is fixed on transport socket suitable for forklift, which includes a special layer of *Ethafoam* to protect the equipment against the transport shock.
Normally the UPS is packaged with carton box.
On request the equipment can be packaged in wooden case.

Move the UPS in its **original package** to the final destination room.

	NOTE ! **When moving the UPS, pay attention to:**	

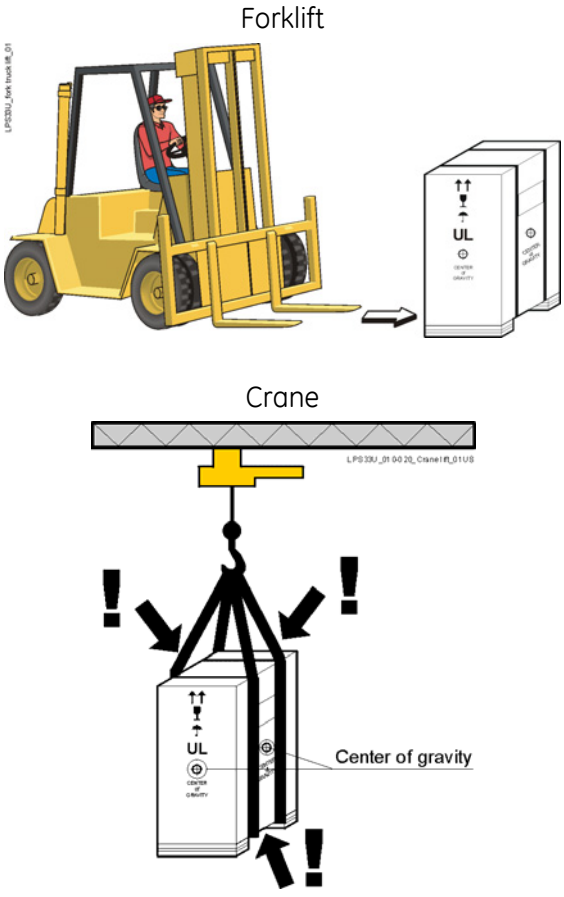


Fig. 3.1-1 LP 33U Series lifting

Forklift

The UPS may be lifted with a forklift in upright position from right and left side.

Take note of the center of gravity marked on the package.

NOTE !

Check for sufficient floor and elevator loading capacity.

Transport UPS only in upright position.

Do not stack other package on top of the UPS.

Crane

If the UPS has to be lifted by crane, use suitable carrying belts taking note of the center of gravity marked on the package.

Take all necessary precautions to avoid damage to the cabinet while hoisting the UPS

	WARNING ! **When loading / downloading and when moving the UPS, it is forbidden:** **When loading / downloading and when moving the UPS, pay attention to:**	

3.1.1 Dimensions and weights

LP 33U Series 10 & 20 kVA - DIMENSIONS	
UPS model	**Dimensions** (W x D x H)
LP 33U Series / 10 kVA	22.29 x 30.71 x 51.58" 566 x 780 x 1310 mm
LP 33U Series / 20 kVA	22.29 x 30.71 x 51.58" 566 x 780 x 1310 mm

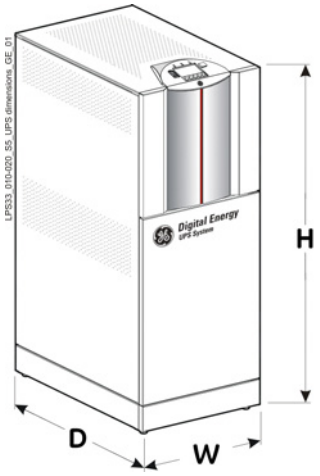


Fig. 3.1.1-1 Dimensions LP 33U Series

LP 33U Series 10 & 20 kVA - WEIGHT						
UPS model	**UPS without battery**			**UPS with battery**		
	UPS	**UPS floor loading**	**UPS with standard shipping**	**UPS with battery**	**Floor loading**	**UPS with standard shipping**
LP 33U Series 10 kVA	397 lbs 180 Kg	84 lbs/sq.ft 408 Kg/m^2	430 lbs 195 Kg	*640 - °871 lbs *290 - °395 Kg	*135 - °184 lbs/sq.ft *657 - °895 Kg/m^2	*673 - °905lbs *305 - °410Kg
LP 33U Series 20 kVA	430 lbs 195 Kg	91 lbs/sq.ft 442 Kg/m^2	464 lbs 210 Kg	410 Kg (24 Ah) 905 lbs (24 Ah)	191 lbs/sq.ft (24 Ah) 929 Kg/m^2 (24 Ah)	938 lbs (24 Ah) 425 Kg (24 Ah)

(*) Battery 12 Ah (°) Battery 24 Ah (2 x 12 Ah)

LP 33U Series 10 & 20 kVA - BATTERY TABLE			
UPS model	**Battery capacity**	**Autonomy time**	**Cabinet**
LP 33U Series 10 kVA	12 Ah	9 min.	Mounted inside the UPS cabinet (see Weight table)
	24 Ah (2 x 12 Ah)	26 min.	
LP 33U Series 20 kVA	24 Ah (2 x 12 Ah)	9 min.	Mounted inside the UPS cabinet (see Weight table)

Battery autonomy time at 100% load and PF=0.8 lag., only with *High Rate Battery*

NOTE !

The weight of each single piece is marked outside the package!

3.2 DELIVERY

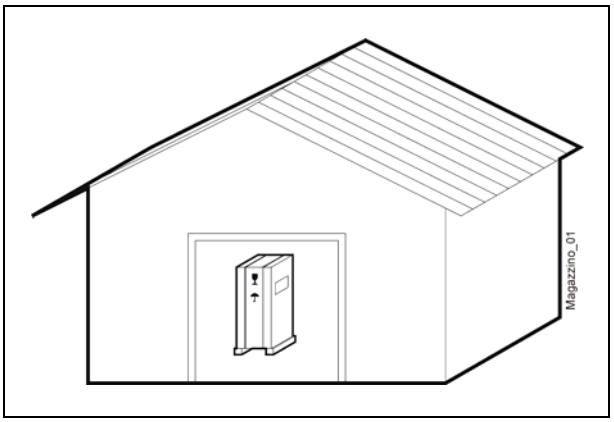
When delivered, check carefully the **package integrity** and the **physical conditions of the UPS equipment**.

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

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

	NOTE ! **A damaged UPS must never be installed or connected to *utility* or *battery*!**

3.3 STORAGE



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

Never leave an UPS outside the building and do not store the UPS one on top of the other.

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

3.3.1 Storage of the UPS

Some important functions of the UPS, such as the customized 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 authorized *Service Center* before putting the UPS into operation.

	NOTE ! **In case of storage of the UPS pay attention to:**	

3.4 PLACE OF INSTALLATION

The UPS should be installed in a **restricted area** where only qualified personnel should be admitted.

The place of installation **should be clean**, **dust-free**, and provided with proper **ventilation or air-conditioning**.

Verify for **sufficient floor load capacity** (see *Section 3.1.1*).

We strongly advice that the ambient temperature should not exceed **68° - 77°F** (20° - 25°C), max. **95°F** (35°C). See *Section 3.5*.

NOTE !

Insufficient space on both sides of the UPS in respect to the wall can cause a dangerous increase of the internal operating temperature.

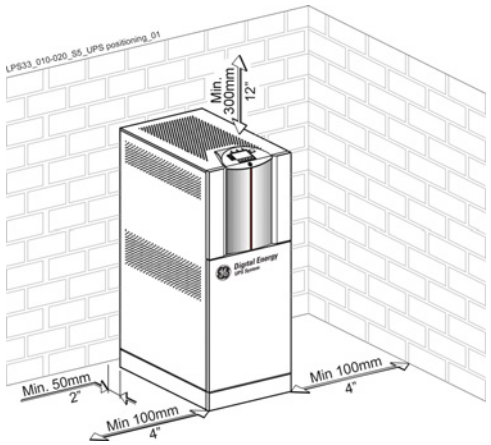


Fig. 3.4-1 LP 33U Series positioning

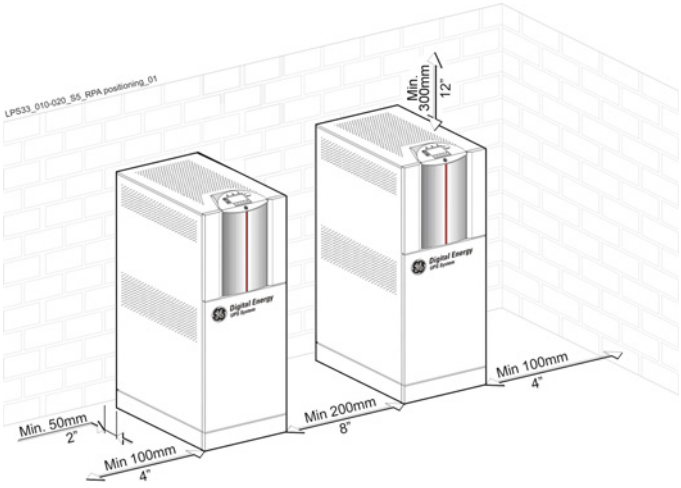


Fig. 3.4-2 LP 33U Series RPA parallel system positioning

***LP 33U Series* positioning**

For easier access in case of maintenance operation and for a free circulation around the cabinet, we recommend to maintain the following minimum distances:

Right & left side:	**4"** (100mm)
Rear side:	**2"** (50mm)
Top of the UPS:	**12"** (300mm)

RPA
Redundant Parallel Architecture

Right & left side:	**4"** (100mm)
Rear side:	**2"** (50mm)
Between units:	**8"** (200mm)
Top of the UPS:	**12"** (300mm)

NOTE !

Operating temperature is very important for *valve regulated battery* (maintenance free).

Operation at temperatures higher than 68°F (20°C) will reduce life expectancy.

Respect the prescription of the battery supplier and other local standards.

The installation and cabling of the battery must be done by qualified people.

3.5 VENTILATION AND COOLING

The heat produced by the UPS is transferred to the environment by its internal fan(s).

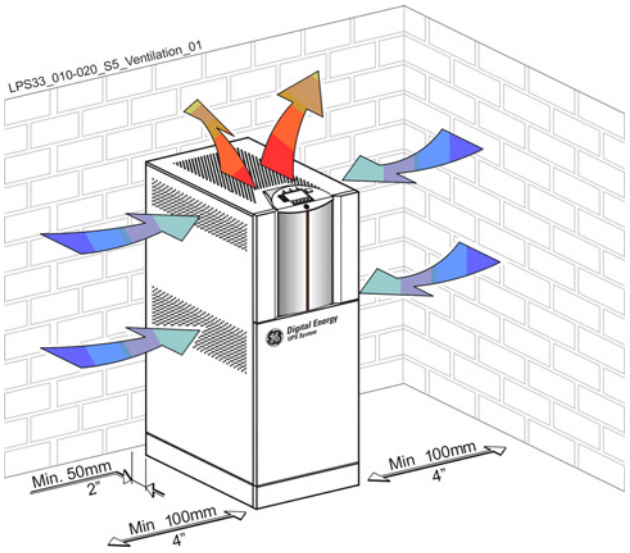


Fig. 3.5-1 Airflow through the LP 33U Series

Airflow through the UPS

It is important that the cooling air can freely flow through the air inlets and outlets of the UPS.

NOTE !

Insufficient distances on both sides of the UPS could increase the temperature inside the UPS.

Do not put any object on the top of the cabinet: it might obstruct the air flow.

Heat evacuation from UPS room

The heat must be evacuated from the environment with a proper cooling / ventilation system provided by the user.

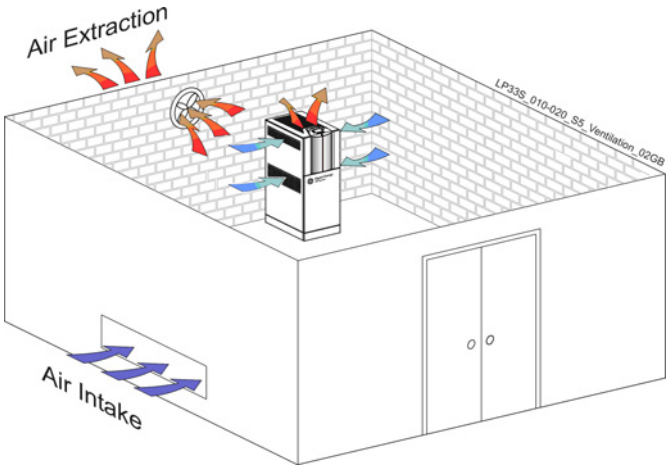


Fig. 3.5-2 Heat evacuation from UPS room

Air volume and losses of the UPS

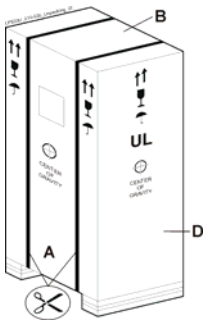
The below table indicates the heat dissipation at full load at **PF = 0.8** lag. and charged battery, up to **3,280 ft** (1,000 m) altitude, for cooling air **77°F** (25°C) to **86°F** (30°C).

UPS model	Losses		Cooling air flow	
	VFI Mode	*ECO Mode*	*VFI Mode*	*ECO Mode*
LP 33U Series / 10 kVA	3,038 BTU/hr 0.89 kW	546 BTU/hr 0.16 kW	91 CFM 154 m^3/h	30 CFM 50 m^3/h
LP 33U Series / 20 kVA	6,075 BTU/hr 1.78 kW	1,092 BTU/hr 0.32 kW	182 CFM 308 m^3/h	60 CFM 100 m^3/h

3.6 UNPACKING

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

1



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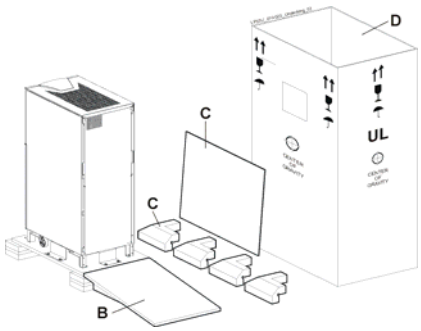

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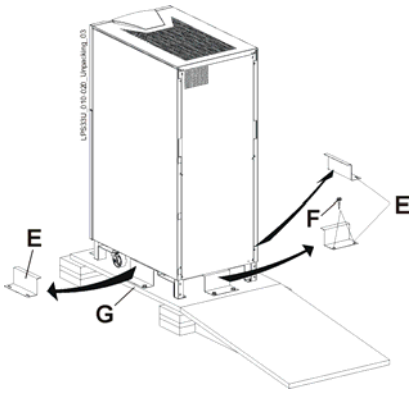

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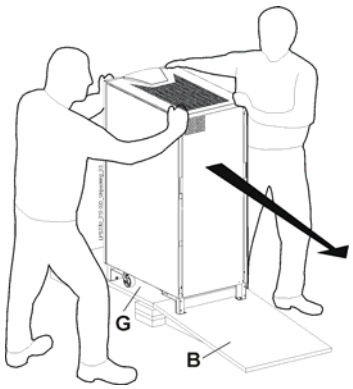


Fig. 3.6-1 LP 33U Series unpacking sequence

Procedure for the unpacking of the UPS:

- Make sure to have sufficient space around the UPS before you start unpacking.
- Cut the two straps "***A***" fixing the carton box.

- Remove the wooden top cover "***B***", which will be used as a ramp and position it as shown in the picture.
- Remove the protection "***C***" outside the cabinet and the accessories bag.
- Remove the carton box "***D***".

- Remove the 3 angle irons "***E***", which are fixing the UPS to the wooden base "***G***" by unscrewing bolts "***F***".

- Push now the UPS towards the ramp "***B***" and let it slide down the ramp.
  This has to done with the utmost care!

NOTE !

Be aware of the heavy weight of the UPS, in particular if already equipped with Batteries.

White color = without any anomaly

Red color = anomaly evidence

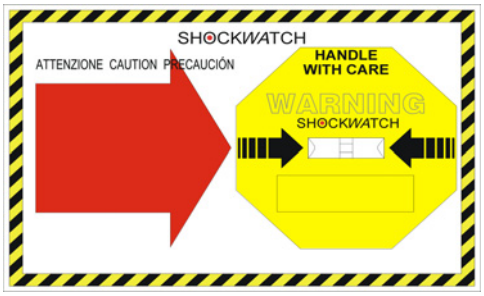


Fig. 3.6-2 ShockWatch device

Fig. 3.6-3 TiltWatch device

The package of the *LP 33U Series Series* is equipped with *ShockWatch* (indicator for shock), and *TiltWatch* (indicator for overthrow) on the outside.

These devices indicate an eventual shock or overthrow during transport.

Whenever these devices show a possible anomaly, the UPS shall not be commissioned before consulting a *"Service Center"*.

Included in the delivery you can find the following parts:

- An accessories bag.
- Control Bus cables (only for RPA system).
- CD-ROM connectivity.

Adjustable foot to block and support the *LP 33U Series*

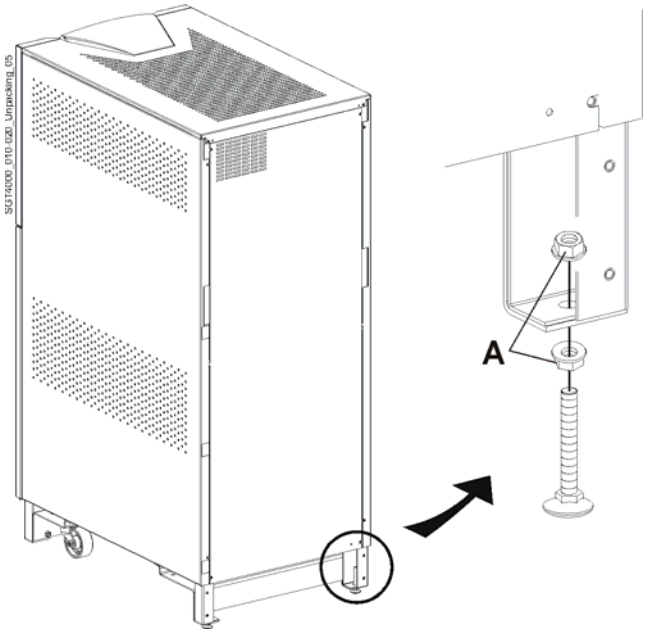


Fig. 3.6-4 Bolts to block the LP 33U Series on it's position

Make use of the 2 adjustable foot, as shown in the picture, in case you desire to block the UPS on it's position.

The height can be adjusted with the 2 enclosed nuts *"**A**"*, taking care however, that the weight of the UPS remains on the wheels.

NOTE !

The wheels are designed only for limited movements on the installation site.

NOTE !

A damaged UPS must never be installed or connected to *utility* or *battery!*

In case of any damage sustained during the transport, immediately inform the shipping agent!

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

Packing material recycling

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

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

3.7 ELECTRICAL WIRING

	**WARNING !** **UPS installation and connection must be performed by QUALIFIED SERVICE PERSONNEL only.** **It is the responsibility of the installation technician to ensure that all local and national electric codes are adhered to.**

3.7.1 Utility input connection

	**WARNING !** **Ensure that the AC and DC external isolators are OFF and locked out to prevent their inadvertent operation.** **Do not apply power to the equipment prior to the commissioning by a qualified service engineer.** **Before any other input connection, connect and check the grounding wire.**

The UPS has available input terminations for the *Rectifier* and *Bypass*.
The unit may be powered from a *common input* source or *dual input* sources (option).

Common input Rectifier & Bypass

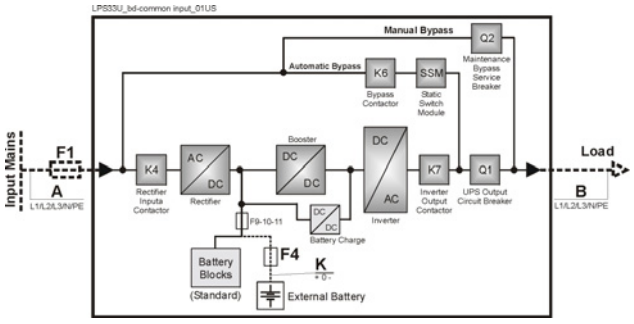


Fig. 3.7.1-1 Common Input Rectifier & Bypass

The **same power source** is to be used for both *Bypass Supply* and *Rectifier Input* (input ***F1***).

Bear in mind that when the *Utility Fuses* are opened there is a supply failure to the *Rectifier* as well as to the *Bypass* and *Manual Bypass*.

Dual input Rectifier & Bypass (option)

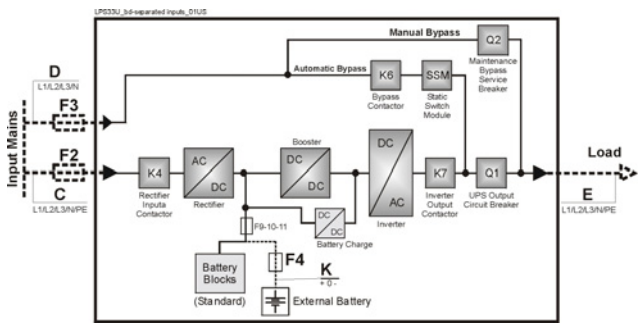


Fig. 3.7.1-2 Dual Input Rectifier & Bypass (option)

The *Bypass* and *Rectifier* inputs are to be powered from different *Utility supplies* (***F2*** and ***F3*** inputs).

In this case, when the *Rectifier Input Fuses* are opened, the *Bypass* and the *Manual Bypass* are supplied by the other source.

3.7.2 Input/output over current protection and wire sizing

The cabling of the UPS system has to be sized according to the UPS power rating.
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 ***Utility Voltage and Frequency***, the ***Output Load Voltage and Frequency*** and ***Battery Data*** (cells number, floating voltage, autonomy) are according to the required specifications.

Output load configuration may be such that one phase may carry a load current at 100% of that phases maximum current rating while the other two phases run at 0% or any combination in between.
Ensure that the load does not consist of any equipment that may require high starting currents such as electric motors, laser printers, etc.
This may cause the UPS to occasionally go into *Bypass* due to overload conditions

To choose the correct input fuses or circuit breaker, consider the available **short-circuit current** of the system up-stream.
Choose the correct fuse or breaker using current data shown in the chart and the appropriate NEC code.

The ratings indicated in the following chart do not consider any **line voltage drop**.

In case of optional input transformer the input protective devices should be sized to allow the transformer magnetization 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 ground, due to the existence of voltage surge protection devices inside the UPS.

NOTE !

If you use *ELCB breaker* (Earth Limiting Circuit Breaker) to protect the input connections, consider the high leakage current generated by the noise suppression capacitors.
If these ELCB breakers are strictly necessary, we suggest using the largest type suitable for non-linear current and for delayed operations.

To ensure coordination when the UPS is configured for *Separate Bypass* and *Rectifier Inputs*, special care must be taken in choosing the **fuse or circuit breaker ratings** installed in the output distribution circuits.
Protective devices on the output of the UPS should be coordinated with the *Bypass Input* circuit protection.
Due to the relatively low short circuit capability of the UPS inverter, a short circuit in the load will cause an immediate transfer to *Bypass*.

The largest fuse or circuit breaker in the output distribution should be rated at no more than 60% of the rating of the protective device supplying the *Bypass* line.

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

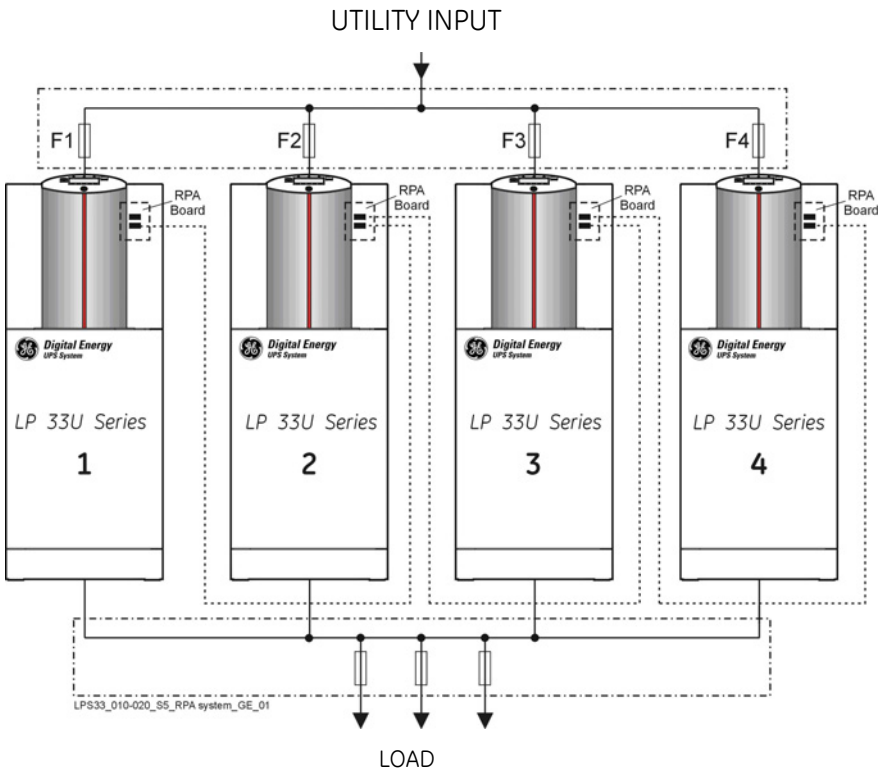


Fig. 3.7.2-1 RPA Parallel System

RPA
Redundant Parallel Architecture

In order to ensure a correct load sharing between the parallel units, when the *load* is supplied by *utility*, it is recommended to keep the cable size and length from the input distribution board to the output bus-bar the same for each parallel unit.

Utility Bypass input voltage must be the same for all units, thus avoiding phase shift or phase rotation problems.

To avoid mutual induction effect, the input cables bust be run in separate conduit from the output cables.

	**NOTE !** **No transformers, fuses or automatic circuit breakers should be inserted between the unit's output and the load common bus-bars.**

The delivery and installation of fuses and input / output connections of the UPS are at the customer's expense, unless agreed otherwise.

	**NOTE !** **It is recommended to provide an additional length of the input/output cables so that the UPS can be moved for maintenance purpose.** **It is recommended to use flexible input/output conductors with suitable length to admit a sufficient displacement.**

3.7.3 Battery over current protection and wire sizing

- Please read the safety precautions at the front of this guide carefully, and thoroughly review the battery manufacturer's installation and maintenance manual before connecting the batteries to the UPS.
- Choose an appropriate DC fuse or circuit breaker using the current data in the chart below.
- Minimum battery cable requirement is based on the current data below.

3.7.4 General data table for current protection and wire sizing

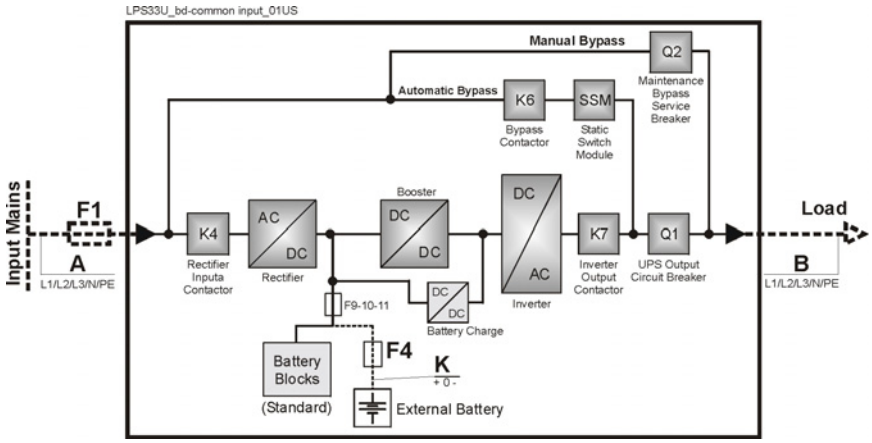


Fig. 3.7.4-1 Common Input Rectifier & Bypass

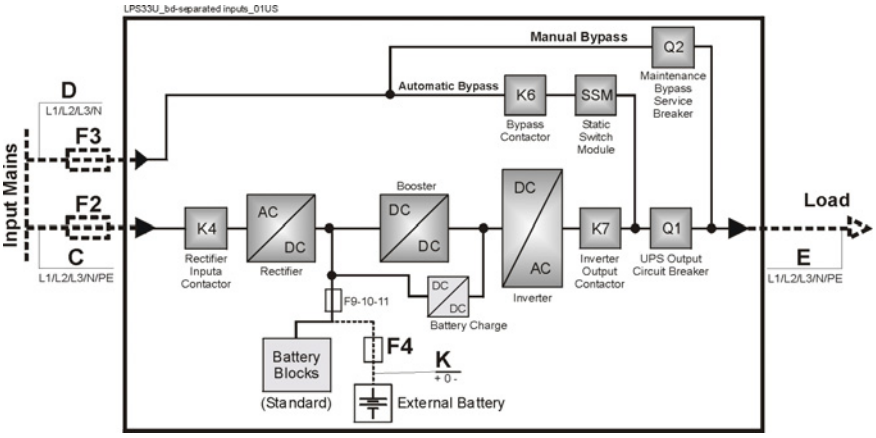


Fig. 3.7.4-2 Dual Input Rectifier & Bypass (option)

The AC values below are current ratings per phase.
These maximum and nominal ratings should be considered when choosing the appropriate AC over current protection device.
NEC (National Electric Code) Section 210-20 a rules must be applied.
DC current rating is the maximum battery discharge current which the UPS allows.

UPS Model	*AC Input*	*AC Input Rectifier*		*AC Input Bypass*	*DC Input*
	F1	F2		F3	F4
		Nom.	Max.		
LP 33U Series / 10 kVA	27.8 A	25.2 A	27.4 A	27.8 A	34.3 A
LP 33U Series / 20 kVA	55.5 A	50.4 A	54.8 A	55.5 A	68.6 A

Size of Branch Circuit Over current Protection - All Models:
"CAUTION - To reduce the risk of fire, only connect UPS to a circuit provided with (see below) maximum amperes branch circuit over current protection in accordance with the NEC (National Electric Code), NSI / NFPA 70

UPS Model	*AC Input*	*AC Input Rectifier*	*AC Input Bypass*	*DC Input*
	F1	F2	F3	F4
LP 33U Series / 10 kVA	35 A	35 A	35 A	50 A
LP 33U Series / 20 kVA	70 A	70 A	70 A	100 A

Wire sizing according to NEC Section 210-20 (a) Table 310-16
Use 167°F (75°C) copper wire

Wiring requirements:

AC INPUT:	**3-Phase, 4 wire plus Ground**
AC OUTPUT:	**3-Phase, 4 wire plus Ground**
DC INPUT:	**3 wire (positive, negative and neutral) plus Ground**

Maximum cable diameter that terminals can accept.
Refer to torque specifications table for torque requirements.

UPS Model	Rectifier Input	Bypass Input	DC Input	AC Output	GND
LP 33U Series / 10 kVA	4 AWG	4 AWG	4 AWG	4 AWG	4 AWG
LP 33U Series / 20 kVA	4 AWG	4 AWG	4 AWG	4 AWG	4 AWG

NEC SECTION 210-20 (a)

Table 310-16. Allowable Ampacities of Insulated Conductors Rated O Through 2000 Volts, 60°C Trough 90°C (140°F Trough 194°F) Not More than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried), Based on Ambient Temperature of 30°C (86°F).

Size	Temperature Rating of Conductor (See table 310-13)					
	60°C (140°F)	75°C (167°F)	90°C (194°F)	60°C (140°F)	75°C (167°F)	90°C (194°F)
AWG or kcmil	Types TW, UF	Types FEPW, RH, RHW, THHW, THW, THWN, XHHW, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2,ZW-2	Types TW, UF	Types RH, RHW, THHW, THW, THWN, XHHW, USE	Types TBS, SA, SIS, THHN, THHW, THW-2, THWN-2, RHH, RHW-2, USE-2, XHH, XHHW, XHHW-2, ZW-2
	COPPER			ALUMINUM or COPPER-CLAD ALUMINUM		
18	---	---	14	---	---	---
16	---	---	18	---	---	---
14	20	20	25	---	---	---
12	25	25	30	20	20	25
10	30	35	40	25	30	35
8	40	50	55	30	40	45
6	55	65	75	40	50	60
4	70	85	95	55	65	75
3	85	100	110	65	75	85
2	95	115	130	75	90	100
1	110	130	150	85	100	115
1/0	125	150	170	100	120	135
2/0	145	175	195	115	135	150
3/0	165	200	225	130	155	175
4/0	195	230	260	150	180	205
250	215	255	290	170	205	230
300	240	285	320	190	230	255
350	260	310	350	210	250	280
400	280	335	380	225	270	305
500	320	380	430	260	310	350
600	355	420	475	285	340	385
700	385	460	520	310	375	420
750	400	475	535	320	385	435
800	410	490	555	330	395	450
900	435	520	585	355	425	480
1000	455	545	615	375	445	500
1250	495	590	665	405	485	545
1500	520	625	705	435	520	585
1750	545	650	735	455	545	615
2000	560	665	750	470	560	630
CORRECTION FACTORS						
Ambient Temp. (°C)	For ambient temperatures other than 30°C (86°F), multiply the allowable ampacities shown above by the appropriate factor below					
21 - 25	1.08	1.05	1.04	1.08	1.05	1.04
26 - 30	1.00	1.00	1.00	1.00	1.00	1.00
31 - 35	0.91	0.94	0.96	0.91	0.94	0.96
36 - 40	0.82	0.88	0.91	0.82	0.88	0.91
41 - 45	0.71	0.82	0.87	0.71	0.82	0.87
46 - 50	0.58	0.75	0.82	0.58	0.75	0.82
51 - 55	0.41	0.67	0.76	0.41	0.67	0.76

3.8 WIRING CONNECTION

WARNING!

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

3.8.1 Power connections

Input/output and DC connections are provided with terminal blocks.
Please refer to chart for torque specifications.

Carefully read the following recommendations before proceeding:

- Ensure that the AC and DC external isolators are OFF and locked to prevent their inadvertent operation.
- Do not close any external isolators prior the commissioning of the equipment.
- The preferred power cable entry location for installation purposes is from the bottom right side of the UPS (see *Fig 3.8.1-1)*.
  For cable entry from the bottom remove the cover plate and provide for a suitable isolated protection cover.
- The input/output cables must be connected in clockwise phase rotation for both *Bypass* and *Rectifier Input Terminals* if separate, taking care to avoid risk of short circuit between different poles.
- The grounding and neutral connection of the electrical system must be in accordance with local regulations.
- In case of additional cabinets containing batteries, input/ output transformers, etc, their ground terminals must be connected to the UPS main ground terminal.
- Once the power cables have been connected, re-install the internal safety shields and close the cabinets by re-installing all external panels.

Torque Specifications Mechanical Terminals Input / Output / Battery and GND			
UPS Model	**WIRE SIZE RANGE**	**Lb - in**	**Nm**
LP 33U Series / 10 kVA	Max 4 AWG	27	3
LP 33U Series / 20 kVA	Max 4 AWG	27	3

Access to the terminals for the cable connections

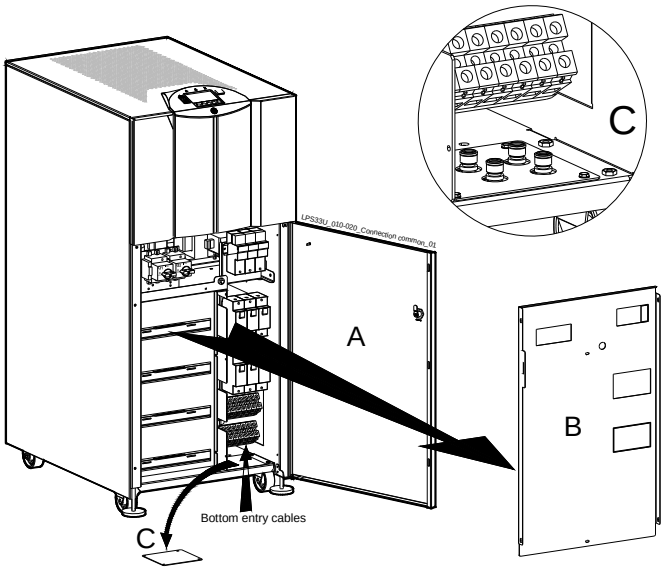


Fig. 3.8.1-1 Access to the input / output connections

To access input, output and battery connections proceed as follows:

- Open the front door "**A**" of the cabinet.
- Remove the protection panel "**B**".
- Remove the plate "**C**" for bottom cable entry.

NOTE !

Drill in the plate "C" appropriate holes for cable conduits (max. 4 x 1"1/4").
Please remove the plate "C" before drilling any wholes.
See *Fig 3.8.1-1* for details "C".

3.8.2 Internal fuse ratings

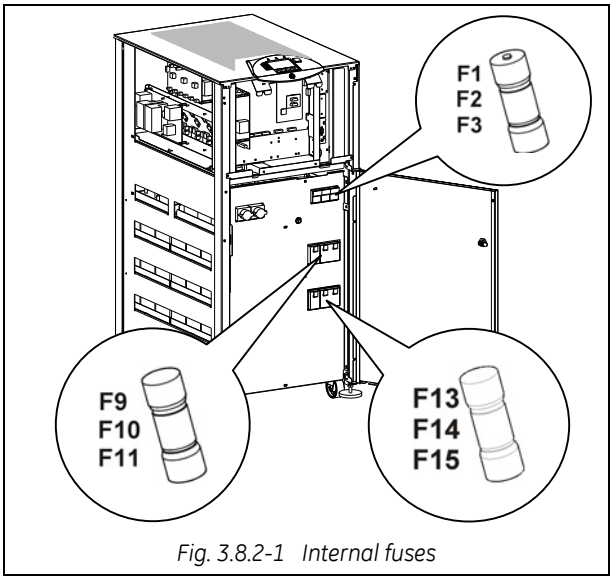


Fig. 3.8.2-1 Internal fuses

***LP 33U Series* internal fuses**

The UPS is equipped with ***rectifier input fuses F1, F2, F3*** and ***battery fuses F9, F10, F11*** and ***F13, F14, F15*** (only for *LP 33U Series / 20 kVA*).

In case of replacement the same type and the same rating must be used (see table below).

NOTE !

Rectifier input fuses F1, F2, F3

The fuses must be inserted in the fuse holder with blown fuse indicator upwards (see label on fuse holder).

UPS	Fuses type URD 660/690 VAC	Fuses type AJT40 660 VAC	Fuses type AJT40 660 VAC
	F1 - F2 - F3	**F9 - F10 - F11**	**F13 - F14 - F15** (only for *LP 33U Series / 20 kVA)*
LP 33U Series / 10 kVA	40 A (14 x 51 mm)	40 A (27 x 63 mm)	-
LP 33U Series / 20 kVA	80 A (22 x 58 mm)	40 A (27 x 63 mm)	40 A (27 x 63 mm)

3.9 ELECTRICAL CONNECTIONS

WARNING !

The connections to and from the UPS must be executed by QUALIFIED PERSONNEL ONLY.

Refer to the "*Safety prescriptions - Installation*" described in section 1.

3.9.1 Common input utility

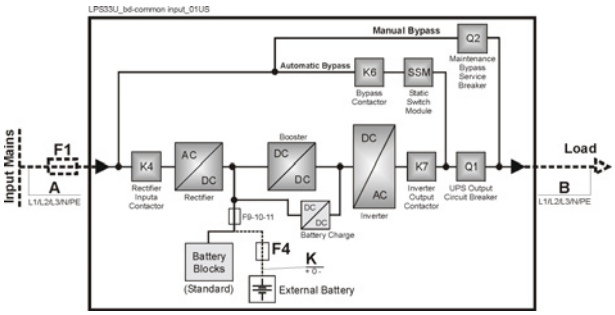


Fig. 3.9.1-1 Common input utility

Common input utility

The UPS delivered in standard version has *common input utility*.
Only one input line (*F1*) supplies both *rectifier* and *bypass* input terminals.

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

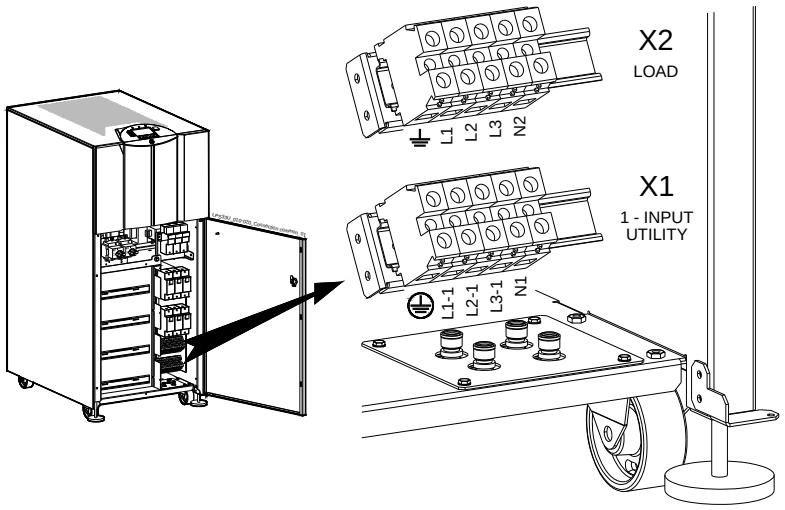


Fig. 3.9.1-2 Power connections Common Input Utility

Input utility connection

L1-1	=	Rectifier + Bypass Phase A
L2-1	=	Rectifier + Bypass Phase B
L3-1	=	Rectifier + Bypass Phase C
N1	=	Neutral utility
PE	=	Earth

Output load connection

L1	=	Load phase A
L2	=	Load phase B
L3	=	Load phase C
N2	=	Neutral load
PE	=	Earth load

Max. rating ***X1*** and ***X2*** terminals:
4 AWG (25mm²)

NOTE !

For UPS correct operation, the input utility phase rotation must be clock-wise.

Inside the UPS, all neutrals *N1* and *N2* are connected together.

Connect wire to the *Terminals* using appropriate tools and appropriate torque.
Torque specification for *Input / Output* and *DC* power connections on *Terminals*: ***Section 3.8.1***.

NOTE !

This UPS is designed to operate in a wye-configured electrical system with a solidly grounded neutral.

3.9.2 Dual input utility (option)

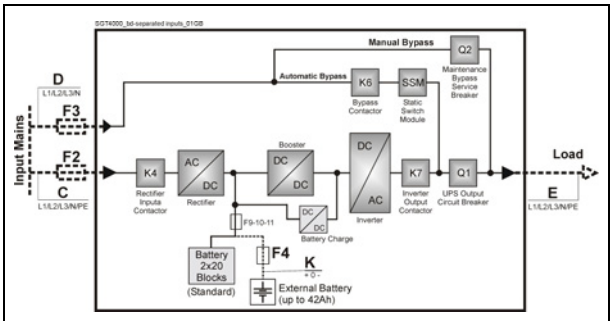


Fig. 3.9.2-1 Dual input utility (option)

Dual input utility

On request, the UPS can be delivered for *dual input utility*.

Two independent lines (F2 and F3) supply separately the rectifier and the bypass inputs

With this configuration, when the rectifier-input fuses are opened, the automatic bypass and the maintenance bypass are supplied by the other line.

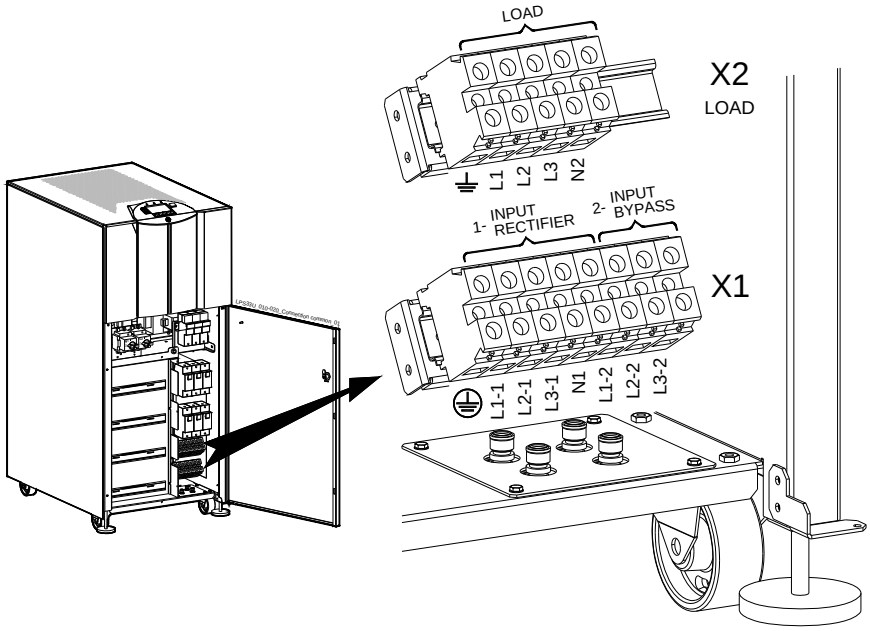


Fig. 3.9.2-2 Power connections Dual Input Utility

Rectifier input utility

L1-1	=	Rectifier Phase A
L2-1	=	Rectifier Phase B
L3-1	=	Rectifier Phase C
N1	=	Neutral utility
PE	=	Earth

Bypass input utility

L1-2	=	Bypass Phase A
L2-2	=	Bypass Phase B
L3-2	=	Bypass Phase C
(N1	=	Neutral utility)
PE	=	Earth

Output load

L1	=	Load phase A
L2	=	Load phase B
L3	=	Load phase C
N2	=	Neutral load
PE	=	Earth load

Max. rating ***X1*** and ***X2*** terminals: **4 AWG** (25mm²)

NOTE !

For UPS correct operation, the input utility phase rotation must be clock-wise.

Neutral of *rectifier* input and neutral of *bypass* input must be coming from the same input bar.

Inside the UPS, all neutrals *N1* and *N2* are connected together.

Connect wire to the *Terminals* using appropriate tools and appropriate torque.
Torque specification for *Input / Output* and *DC* power connections on *Terminals*: ***Section 3.8.1***.

NOTE !

This UPS is designed to operate in a wye-configured electrical system with a solidly grounded neutral.

3.9.3 External battery connection to *LP 33U Series / 10 kVA*

Before proceeding to an external battery connection, follow the ***Safety rules*** concerning the battery. Make sure that the UPS is not powered, and remove the external battery protections and the fuses ***F9, F10, F11*** at the front of the UPS cabinet.

ATTENTION !

Before closing the battery fuses *F9, F10 and F11*, verify for correct polarity of the battery connection.

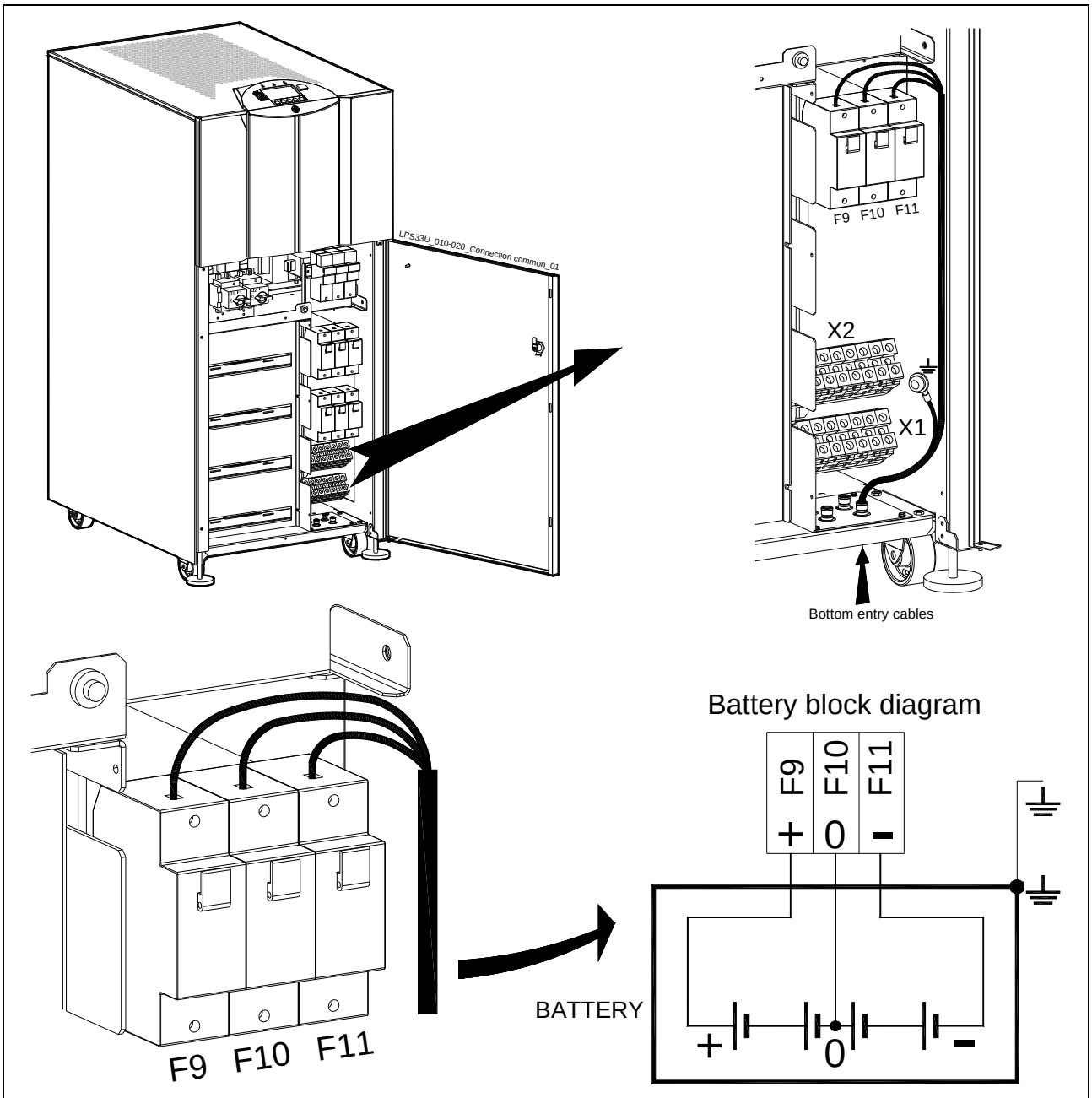


Fig. 3.9.3-1 External battery connection to LP 33U Series / 10 kVA

F9 (+) = Positive pole **F10 (0)** = Central point of battery blocks **F11 (-)** = Negative pole

NOTE !

Clamp the input battery cables with the included cable-ties

3.9.4 Kit for external battery connection to *LP 33U Series / 20 kVA*

Before proceeding to an external battery connection, follow the ***Safety rules*** concerning the battery.

Make sure that the UPS is not powered, and remove the external battery protections and the fuses ***F9, F10, F11*** and ***F13, F14, F15*** at the front of the UPS cabinet.

ATTENTION !

Before closing the battery fuses *F9, F10, F11 and F13, F14, F15*, verify for correct polarity of the battery connection.

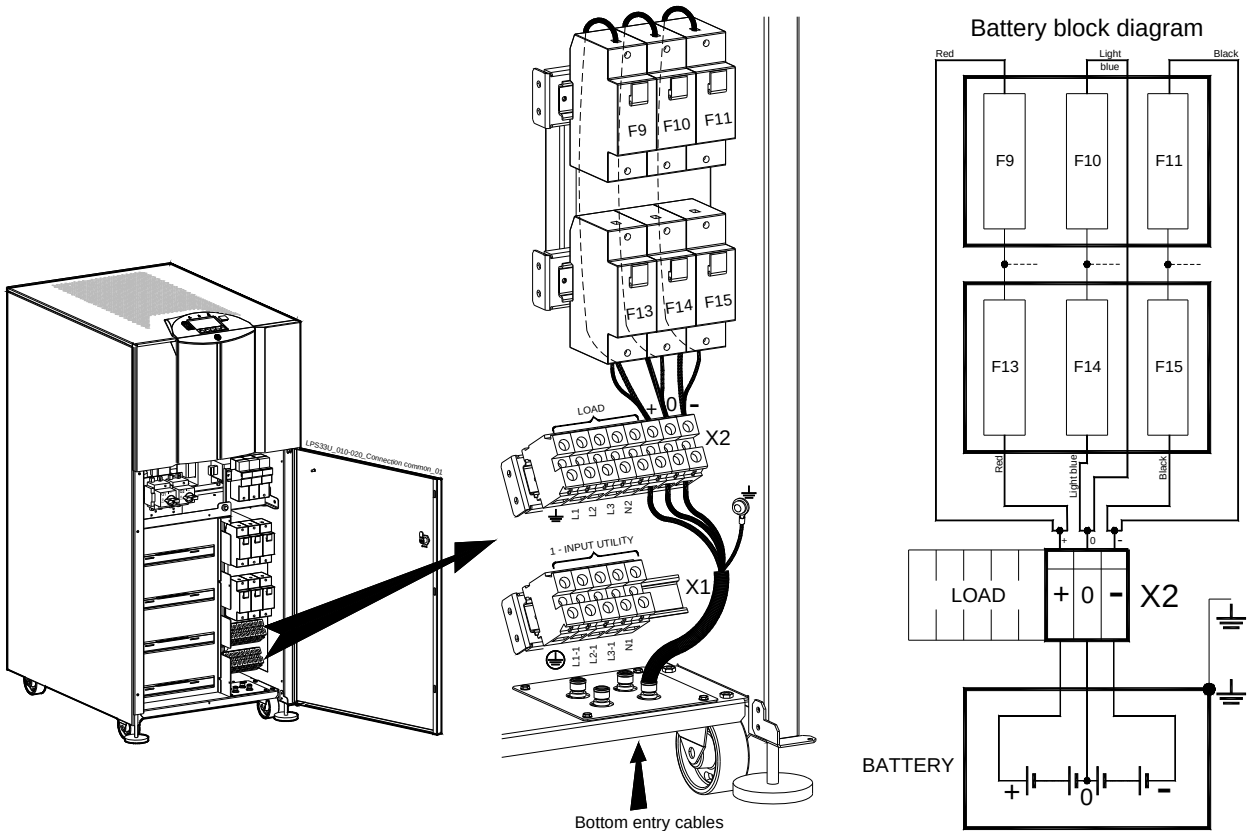


Fig. 3.9.4-1 Kit for external battery connection to LP 33U Series / 20 kVA

F9 (+) **F13 (+)**	= Positive pole	**F10 (0)** **F14 (0)**	= Central point of battery blocks	**F11 (-)** **F15 (-)**	= Negative pole

NOTE !

The length of the cables connecting the 3 terminals (*X2 - +, 0, -*) to the fuses *F9, F10, F11* and *F13, F14, F15 must be the same.*

Clamp the input battery cables with the included cable-ties.

3.9.5 RPA system - Control bus connection

WARNING !

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

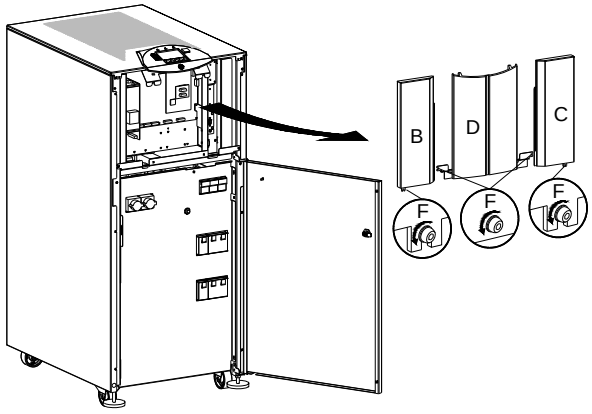


Fig. 3.9.5-1 Access to the RPA board

Access to the RPA board

1 - Open the front door "***A***" of the cabinet.

2 - Remove the protection covers "***B, C, D***" *fixed with screws* "***F***".

NOTE !

When fixing again the protection covers, make sure that the screws *"F"* are as tight as possible since they serve also as earth connection.

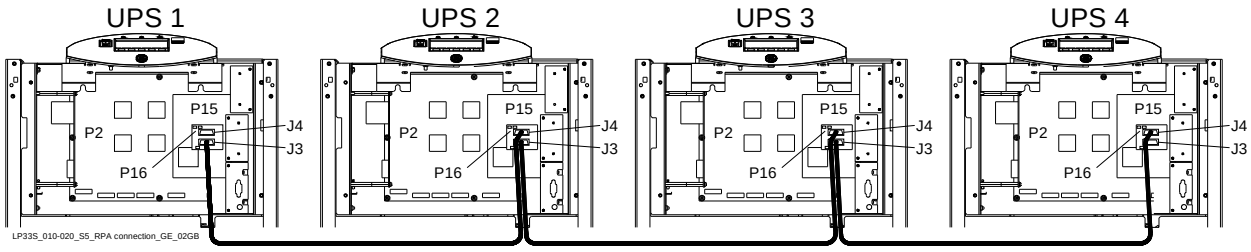


Fig. 3.9.5-2 Bus connection RPA parallel system

Bus connection RPA parallel system

Connect the control bus cable between the parallel units as indicated in the diagram *Fig. 3.9.5-2*. Provide that the connectors ***J3*** and ***J4*** are properly fixed with the included screws.

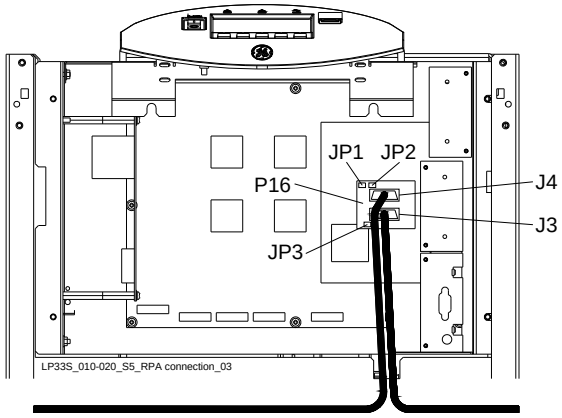


Fig. 3.9.5-3 Connection to Board P16

NOTE !

The jumper *JP1 - JP2 - JP3* must be removed only on the intermediate units, where the connectors *J3* and *J4* are both inserted.

Do not insert or remove *J3* and *J4* from the board *"P16 - Connector adapter RPA"* when the parallel system is operating.

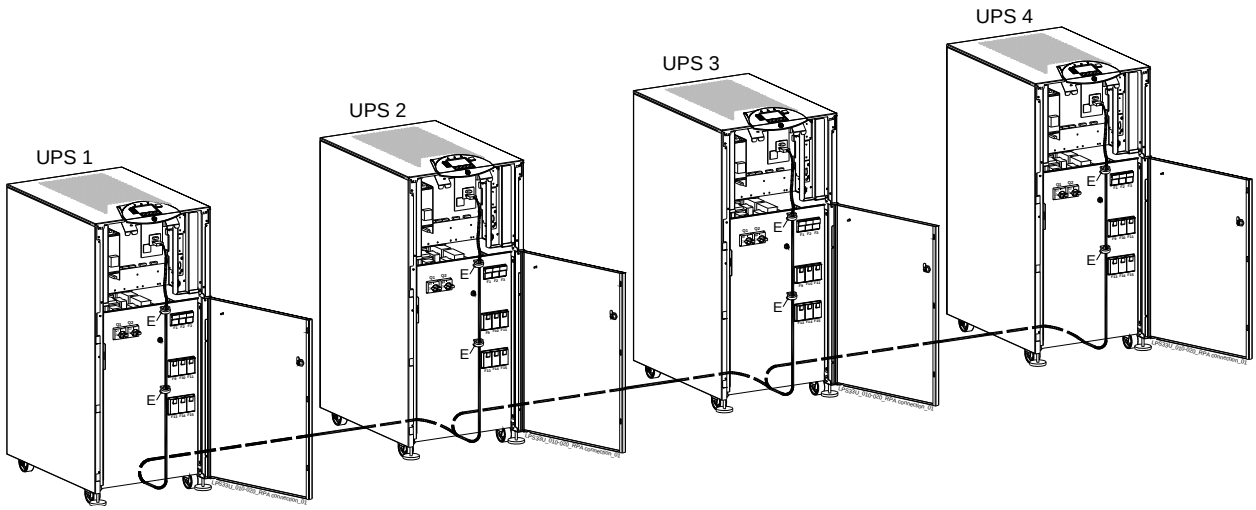


Fig. 3.9.5-4 Control bus location RPA parallel system

Control bus location RPA parallel system

Place the cables and connect them as indicated in the diagram *Fig. 3.9.5-4* following these procedures:

- Fix the *control bus cables* with the appropriate tie-wrap "***E***".
- Place the cables between the parallel units in separated protected conduit to avoid they could be accidentally interrupted.
- Put in place the front screens "***B, C** and **D**" (Fig. 3.9.5*-1) paying attention to not damaging the control bus cables.

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

A unit number from ***1*** to ***4***, is defined by the setting of parameters and displayed on the ***control panel***. This number is also marked inside and outside the packaging.

The standard length of the control bus cable between two parallel unit is **26 ft / 8 m**.

3.9.6 UPS FUNCTIONING as FREQUENCY CONVERTER

When the UPS ***LP 33U Series*** is delivered as frequency converter (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 ***ECO Mode*** operation is automatically disabled.

The UPS delivered as *frequency converter* has the following differences:

- *Automatic bypass disabled* by setting of dedicated parameter (access protected by password reserved to service engineer).
- The handle of the switch *Q2 - manual bypass* is removed to avoid accidental wrong manipulations.
- *Mains bypass* disabled by removing the fuse *F3* fitted on the board *P1 – Power Supply*.

WARNING !

In case a UPS delivered as frequency converter should be set on site for UPS standard version, the operation must be performed by a qualified service engineer.

Notices for installation:

- For UPS with *common AC input* follows the standard procedure described in *Section 3.9.1*.

Notices for start up procedures:

- Follow the standard procedure indicated in *Operating Manual*.

Notices for shutdown procedures:

- Follow the standard procedure indicated in *Operating Manual*.

NOTE !

The inverter can be turned off only by pressing the *"Total Off" key*.

4 CUSTOMER INTERFACE

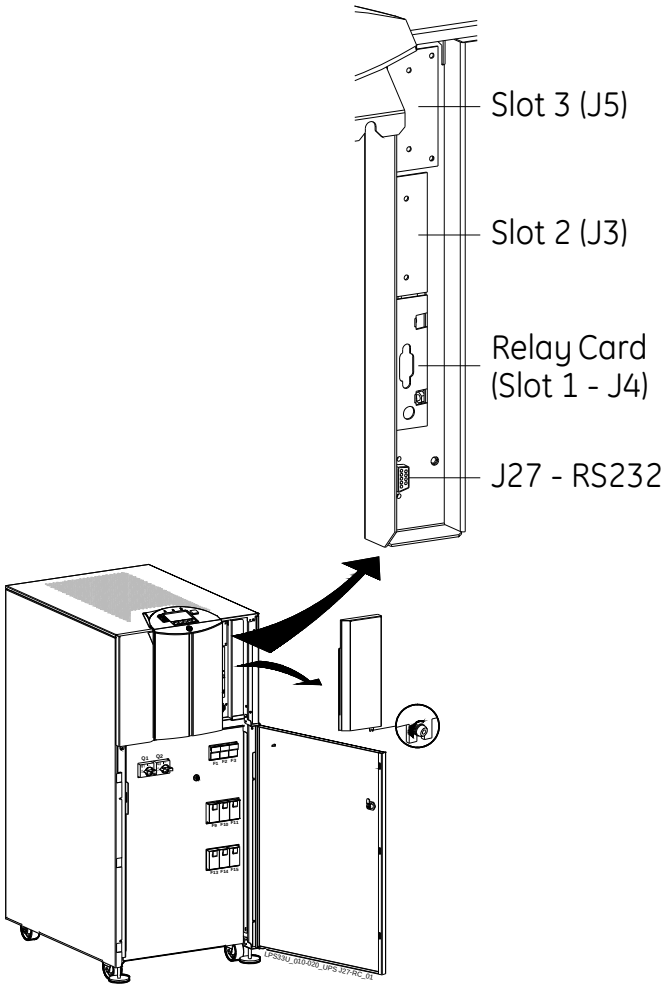


Fig. 4-1 Slot connectivity

LP 33U Series is supplied by a standard ***Serial Port J27 - RS232*** (see *Section 4.1*) and a ***Relay Card*** (see *Section 4.2*).

List of possible connectivity configurations on LP 33U Series			
Slot 1 – J4	**Slot 2 – J3**	**Slot 3 – J5**	**Slot 1 – J4 + Slot 2 – J3**
Relay Card (standard)			
Relay Card (standard)	Advanced SNMP Card (Optional)		
Relay Card (standard)	Advanced SNMP Card (Optional)	Advanced SNMP Card (Optional)	
			Customer Interface (optional)
		Advanced SNMP Card (Optional)	Customer Interface (optional)

4.1 SERIAL PORT J27 - RS232

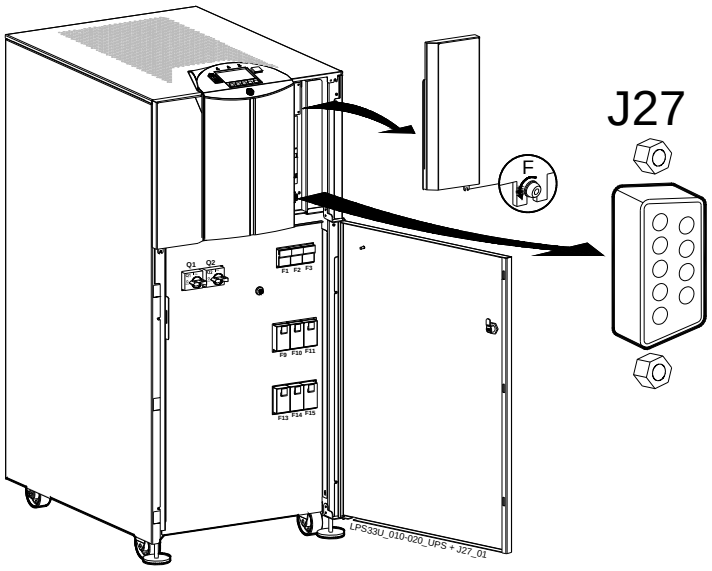


Fig. 4.1-1 Serial Port J27 – RS232

Serial Port J27 - RS232
(sub - D, female 9 pin)

Total remote management of the system using software *GE Power Diagnostics, GE Data Protection* or *GE Service Software* for system protection and management of the UPS systems.

RPA
Redundant Parallel Architecture

The serial port *J27 - RS232* is enabled on all the units of the parallel system.

Serial port *J27 – RS232* connection to PC with RS232 1:1 cable DB9m – DB9f

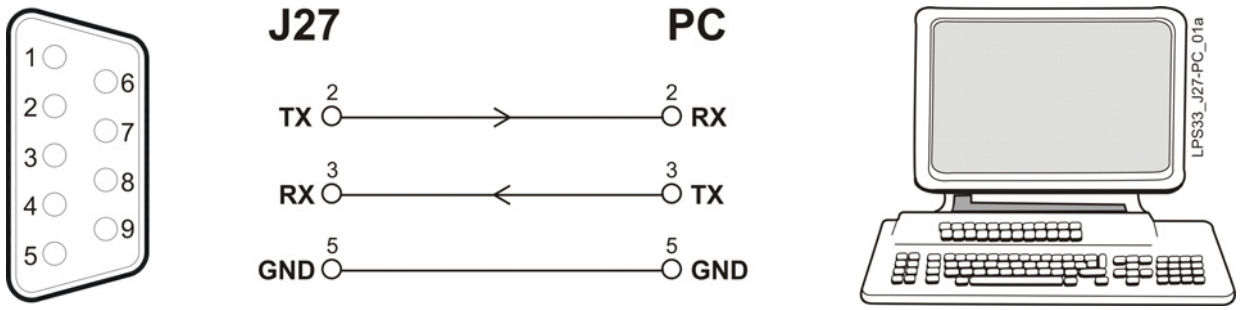


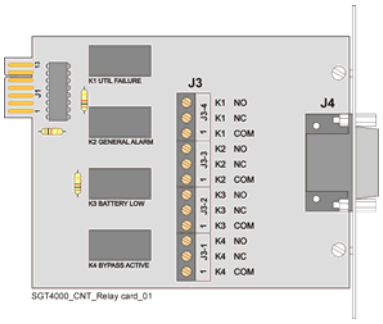
Fig. 4.1-2 Serial port J27 - RS232 connection to PC

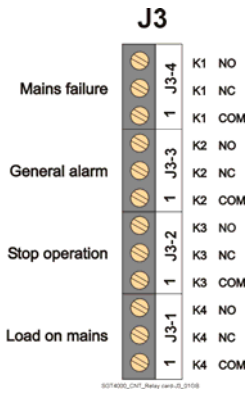
4.2 RELAY CARD

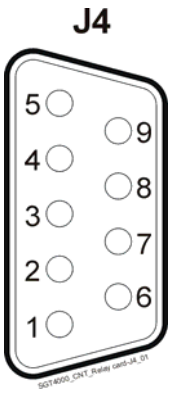
WARNING !

Connections described in this chapter shall be done only by a trained person or *SERVICE ENGINEERS*.

The ***Relay Card***, allows the programming of **4 output channels** on dry contacts, which can be read on either terminal ***J3*** or plug ***J4*** (sub - D - male 9 pin).







1	(Not connected)
2	(Not connected)
3	General alarm (NO)
4	Mains failure (NC)
5	C (common)
6	Load on mains (NO)
7	Stop operation (NO)
8	C (common)
9	Mains failure (NO)

NO = Normally Open **C** = Common **NC** = Normally Closed

Voltage free contacts: Max.: 60 Vdc or 30 Vac / 0.5A
Min. signal level: 5 Vdc / 5mA

Fig. 4.2-1 Relay Card

Output signals on voltage-free contacts

On terminals ***J3*** or ***J4*** connector 4 of the following 28 signals can be selected from the display (access only with password): *SETUP / SETUP / **LEVEL 2: SERVICE***.

0 - No signal
1 - Buzzer
2 - General alarm (NO)
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 syncrony
12 - Bypass locked
13 - Bypass mains failure
14 - Rectifier mains failure
15 - Battery discharge
16 - Manual bypass ON
17 - Rectifier ON
18 - Inverter ON
19 - Battery boostcharge
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 (Emergency Power Off)
27 - ECO Mode ON
28 - General alarm (NC)

NOTE !

The function *GEN-ON* is not available on the *Relay Card*.
In case this function is needed, the optional *Customer Interface* card must be installed (see *Section 4.4.1*).

4.3 EPO (EMERGENCY POWER OFF)

WARNING !

Connections described in this chapter shall be done only by a trained person or *SERVICE ENGINEERS*.

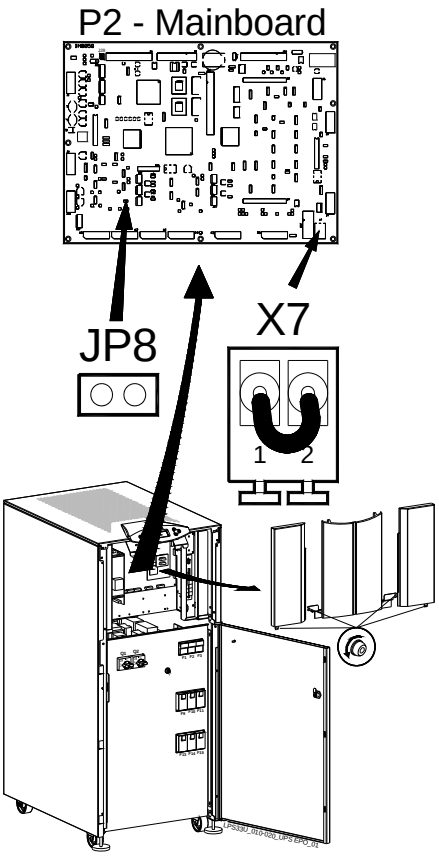


Fig. 4.3-1 Terminals X7 - EPO

An external Emergency switch (*NC* - Normally Closed voltage-free contact) can be connected on terminals ***X7 / 1, 2*** of the ***P2 – Mainboard.***

NOTE !

To enable this function, remove jumper *JP8* on the *P2 - Mainboard*, when the cables have been already connected on *X7 / 1, 2*.

RPA Redundant Parallel Architecture

In a parallel system a separate NC (Normally Closed) contact must be connected individually to each unit.

When activated, this switch causes the immediate shutdown of *booster*, *battery-charger*, *inverter*; and the *contactors K4, K6* and *K7*.

NOTE !

This procedure could imply a load shutdown.

When the *EPO* has been activated, the system must be restored as follows:

- Press the push-button ***EPO*** (contact on *X7 / 1, 2* is closed again).
- Press the key *"**O**"* (*Inverter OFF* – see *Section 6.2 of Operating Manual*) on the *control panel*.
- Press the key *"**I**"* (*Inverter ON* – see *Section 6.2 Operating Manual*) on the *control panel*.

RPA Redundant Parallel Architecture

In case of a Parallel System press the key "O" (Inverter OFF) on the control panel of each unit connected on the parallel bus and having its output switch Q1 closed.

4.4 CUSTOMER INTERFACE BOARD (OPTION)

WARNING !

The installation and cabling of the options must be performed by QUALIFIED SERVICE PERSON.

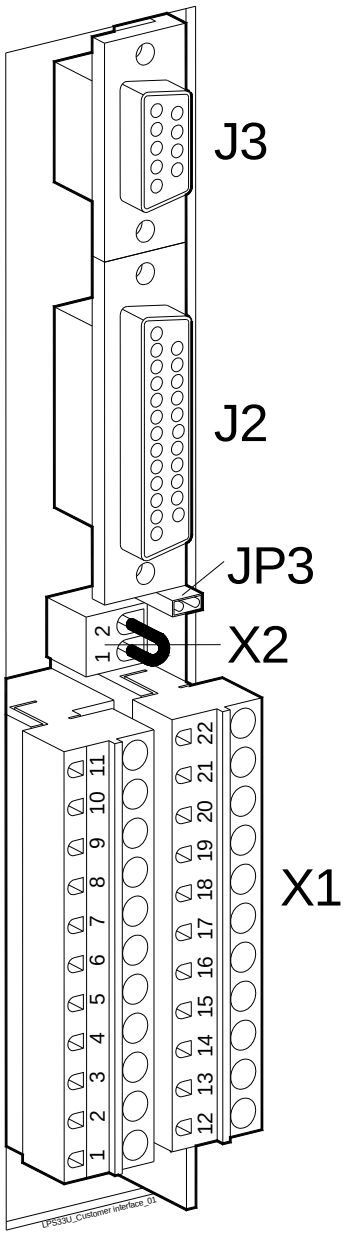


Fig. 4.4-1 Customer Interface

C = Common
NO = Normally Open
NC = Normally Closed

Serial port J3 - RS232 (sub - D - female 9 pin)	
Total remote management of the system using software *GE Power Diagnostics, GE Data Protection* or *GE Service Software* for system protection and management of the UPS systems.	**Pin 2**: TX (out) **Pin 3**: RX (in) **Pin 5**: GND

J2 (sub – D female 25p) – Output signals on voltage-free contacts		
J2 / 1, 2, 3	NO, C, NC	Utility failure
J2 / 4, 5, 6	NO, C, NC	Load on inverter
J2 / 7, 8, 9	NO, C, NC	Stop operation
J2 / 14, 15, 16	NO, C, NC	Load on utility
J2 / 17, 18, 19	NO, C, NC	General alarm (NO)
J2 / 20, 21, 22	NO, C, NC	Buzzer

Signals on terminals *X1* and on connector *J2* are in parallel and therefore not separated galvanically from each other.
The programmable signals on *X1* and *J2* will be disabled with *Q1* open, with the exception of the signals for:

16 – Manual bypass ON ***25 – Relay output OFF***
24 – Relay output ON ***26 – EPO***

X1 – Output signals on voltage-free contacts		
X1 / 1, 2, 3	NO, C, NC	Utility failure
X1 / 4, 5, 6	NO, C, NC	Load on inverter
X1 / 7, 8, 9	NO, C, NC	Stop operation
X1 / 12, 13, 14	NO, C, NC	Load on utility
X1 / 15, 16, 17	NO, C, NC	General alarm (NO)
X1 / 18, 19, 20	NO, C, NC	Buzzer

X2 – Terminals EPO connection (Emergency Power Off)		
X2 / 1, 2 or **J2 / 12, 25**	NC	EPO (Emergency Power Off)

To enable this function, remove jumper *JP3* on the *Customer Interface* and the cable on the terminal *X2 / 1, 2*.
(See *Fig. 4.4-1*).

Verify if the cable on the terminal *X7 / 1, 2* and jumper *JP8* on the *P2 – Mainboard* are OFF (see *Fig. 4.4-3*).

Programmable functions on input contacts	
X1/10, 21 or **J2/10, 23**	Programmable
X1/11, 22 or **J2/11, 24**	Programmable / Generator ON (NO)

Output signals on voltage-free contacts
On terminals ***X1*** or ***J2*** connector 6 of the following 28 signals can be selected from the display (access only with password): *SETUP* / *SETUP* / ***LEVEL 2: SERVICE***.

0 -	No signal	15 -	Battery discharge
1 -	Buzzer	16 -	Manual bypass ON
2 -	General alarm (NO)	17 -	Rectifier ON
3 -	Load on mains	18 -	Inverter ON
4 -	Stop operation	19 -	Battery boostcharge
5 -	Load on inverter	20 -	Battery earth fault
6 -	Mains failure	21 -	Battery fault
7 -	DC overvoltage	22 -	Relay input 1
8 -	Low battery	23 -	Relay input 2
9 -	Overload	24 -	Relay output ON
10 -	Overtemperature	25 -	Relay output OFF
11 -	Inverter-mains not syncrony	26 -	EPO (Emergency Power Off)
12 -	Bypass locked	27 -	*ECO Mode* ON
13 -	Bypass mains failure	28 -	General alarm (NC)
14 -	Rectifier mains failure		

Programmable functions on input contacts (X1 - J2)	
Some UPS functions can be activated by parameters (access with password only) when an external NO contact is closed on:	
No function	**Inverter On**
Inverter OFF	**Generator ON**
Print all	**Status relay**
Voltage free contacts:	Max. DC / AC: 24 V / 1.25 A IEC 60950 (SELV circuit) Min. signal level: 5 Vdc / 5 mA

Gen Set signaling

If an Emergency generator set supplies the UPS in case of utility failure and the generator is particularly unstable in frequency, it should be suitable to install the signal "generator on" on terminals ***X1 / 11, 22*** (Normally Open voltage-free contact) or on connector ***J2 / 11, 24*** (see *Fig. 4.4.1-1 / X1* and *J2*).
Since the Parameter for of the reading of the Generator function is password protected, call the nearest *Service Center* for it's activation.

When this contact closes, it causes the change of certain settable functions such as:

- Enabling or disabling of synchronization 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.

Consult your nearest Service Center at **+1-800-637-1738**, or by E-mail at **pqservices@ge.com** for more information.

EPO (Emergency Power Off)

An external Emergency switch (*NC - Normally Closed* voltage-free contact) can be connected on terminals ***X2 / 1, 2*** or connector ***J2 / 12, 25*** of the *Customer Interface* (see *Fig. 4.4.1-1 / X2* & *J2*).

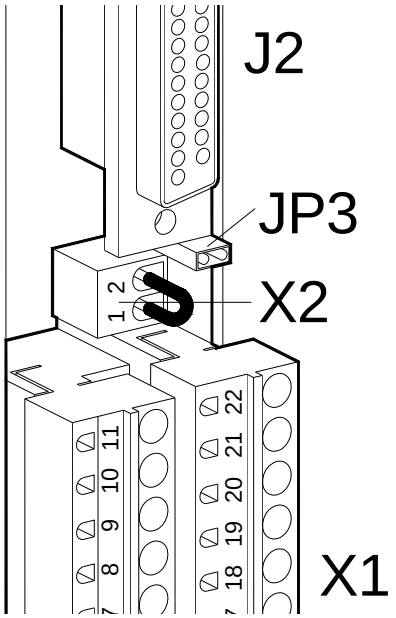


Fig. 4.4.1-2 PCB Customer Interface

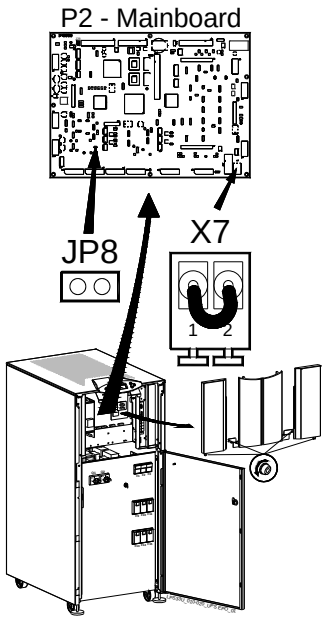


Fig. 4.4.1-3 PCB P2 - Mainboard

NOTE !

To enable this function, remove jumper *JP3* on the *Customer Interface* and the cable on the terminal *X2 / 1, 2* (see *Fig. 4.4.1-2).*

Verify if the cable on the terminal *X7 / 1, 2* and jumper *JP8* on the control board *P2 – Mainboard* are OFF (see *Fig. 4.4.1-3).*

RPA Redundant Parallel Architecture

In a parallel system a separate NC* (Normally Closed) *contact must be connected individually to each unit.

When activated, this switch causes the immediate shutdown of *booster*, *battery-charger*, *inverter*; and the *contactors K4, K6* and *K7*.

NOTE !

This procedure could imply a load shutdown.

When the *EPO* has been activated, the system must be restored as follows:

- Press the push-button ***EPO*** (contact on *X7 / 1, 2* is closed again).
- Press the key *"**O**"* (*Inverter OFF* – see *Section 6.2 of Operational Manual)* on the *control panel*.
- Press the key *"**I**"* (*Inverter ON* – see *Section 6.2 Operational Manual*) on the *control panel*.

RPA Redundant Parallel Architecture

In case of a Parallel System press the key "O" (Inverter OFF) on the control panel of each unit connected on the parallel bus and having its output switch Q1 closed.

5 NOTES

5.1 NOTES FORM

It is recommended to note in this section ***Notes***, with date and short description all the operations performed on the UPS, as: maintenance, components replacement, abnormal situations, etc.

Date	*Description*	*Done by*