

KEOR COMPACT

Installation and User Manual

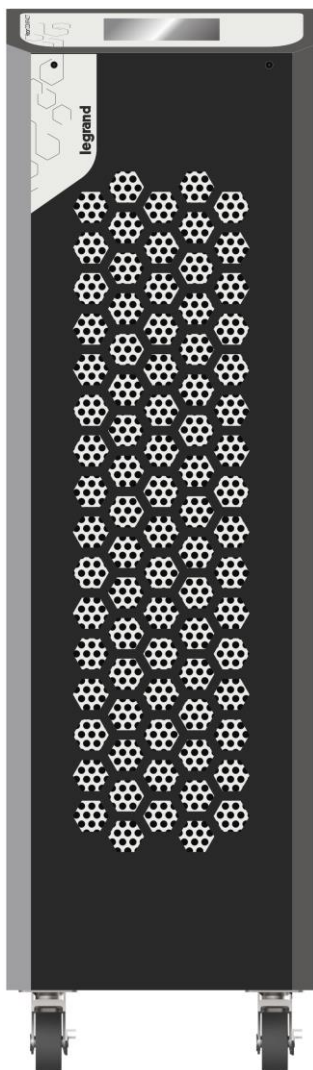


Table of Contents

1. Introduction3

2. Regulatory and safety requirements9

3. Transportation and placement14

4. Installation19

5. Configuration and start-up35

6. Maintenance46

7. Warehousing.....48

8. Dismantling49

9. Mechanical characteristics50

10. Technical data.....52

11. Tables.....56

1. Introduction

INDICATION

The instructions in this manual are intended for a **SKILLED TECHNICIAN** (paragraph 2.2.1)

1.1 Purpose of the manual

The purpose of this manual is to provide the skilled technician (see paragraph 2.2.1) with instructions for safely installing the Keor Compact UPS, also called “equipment” in the rest of the manual and carry out ordinary maintenance procedures.

Extraordinary maintenance operations are not dealt with because they are the sole preserve of the LEGRAND Technical Support Service.

The reading of this manual is essential but does not substitute the skill of technical personnel who must have received adequate preliminary training.

The intended use and configurations envisaged for the equipment as shown in this manual are the only ones allowed by the Manufacturer.

Any other use or configuration must be previously agreed with the Manufacturer in writing and, in this case, the written agreement will be attached to the installation and user manuals.

This manual also refers to laws, directives and standards that the skilled technician is required to be aware of and consult.

The original text of this publication, drafted in English, is the only reference for the resolution of disputes of interpretation linked to translations into other languages.

1.2 Symbols in the manual

Some operations are shown in graphic symbols that draw the attention of the reader to the danger or the importance they imply:



DANGER

This indication shows a danger entailing a high degree of risk that, if not avoided, will lead to death or serious injury or considerable damage to the equipment and things around it.



WARNING

This indication shows a danger entailing a medium degree of risk that, if not avoided, could lead to death or serious injury or considerable damage to the equipment and the things around it.



CAUTION

This indication shows a danger entailing a low level of risk that, if not avoided, could lead to minor or moderate injury or material damage to the equipment and the things around it.

INDICATION

This symbol indicates important information which should be read carefully.

1.3 Where and how to keep the manual

This manual must be kept in a safe, dry place and must always be available for consultation exclusively by the skilled technician.

It is recommended to make a copy of it and file it away.

If information is exchanged with the Manufacturer or the authorized assistance personnel, it is essential to refer to the equipment's rating plate data and serial number.

INDICATION

The manuals provided with the equipment are an integral part of it and must therefore be kept for its entire lifetime. In case of need (for example in case of damage that even partially compromises its consultation) the skilled technician is required to get a new copy from the Manufacturer, quoting the publication code on the cover.

1.4 Update of the manual

The manual reflects the state of the art when the equipment was put onto the market. The publication conforms to the directives current on that date. The manual cannot be considered inadequate when new standards come into force or modifications are made to the equipment.

Any addition to the manual the Manufacturer considers appropriate to send to the users, must be kept together with the manual of which they will become an integral part.

The version of the manual updated to its latest release is available on the Internet at <http://www.ups.legrand.com>

1.5 Manufacturer's liability and guarantee

The skilled technician and the operator shall scrupulously comply with the precautions and installation instructions indicated in the manuals. They must:

- always work within the operating limits of the equipment;
- always carry out constant and careful maintenance through a skilled technician who complies with all the procedures indicated in the installation and maintenance manual.

The Manufacturer declines all indirect or direct responsibility arising from:

- assembly and cabling made by personnel not fully qualified according to national standards to work on equipment presenting electrical hazards;
- assembly and cabling made without using safety equipment and tools required by national safety standards;
- failure to observe the installation and maintenance instructions and use of the equipment which differs from the specifications in the manuals;
- use by personnel who have not read and thoroughly understood the content of the user manual;
- use that does not comply with the specific standards used in the country where the equipment is installed;
- modifications made to the equipment, software, functioning logic unless they have been authorized by the Manufacturer in writing;
- repairs that have not been authorized by the LEGRAND Technical Support Service;
- damage caused intentionally, through negligence, by acts of God, natural phenomena, fire or liquid infiltration;
- damage caused using batteries and protections not specified in the manuals;
- accidents caused by a wrong assembly of the safety protections or due to the lack of application of the safety labels specified in the installation manual.

The transfer of the equipment to others also requires to hand over all the manuals. Failure to do it will automatically nullify any right of the buyer, including the terms of the guarantee where applicable.

If the equipment is sold to a third party in a country where a different language is spoken, the original owner shall be responsible for providing a faithful translation of this manual in the language of the country where the equipment will be used.

1.5.1 Guarantee terms

The guarantee terms may vary depending on the country where the UPS is sold. Check the validity and duration with LEGRAND's local sale representative.

If there should be a fault in the product, contact the LEGRAND Technical Support Service which will provide all the instructions on what to do.

Do not send anything back without LEGRAND's prior authorization.

The guarantee becomes void if the UPS has not been brought into service by a properly trained skilled technician (see paragraph 2.2.1).

If during the guarantee period the UPS does not conform to the characteristics and performance laid down in this manual, LEGRAND at its discretion will repair or replace the UPS and relative parts.

All the repaired or replaced parts will remain LEGRAND's property.

LEGRAND is not responsible for costs such as:

- losses of profits or earnings;
- losses of equipment, data or software;
- claims by third parties;
- any damage to persons or things due to improper use, unauthorized technical alterations or modifications;
- any damage to persons or things due to installations where the full compliance with the standard regulating the specific usage applications have not been guaranteed.

1.5.2 Extension of the guarantee and maintenance contracts

The standard guarantee can be consolidated in a single extension contract (maintenance contract).

Once the guarantee period has passed, LEGRAND is available for giving a technical assistance service able to meet all requirements, maintenance agreements, 24/7 availability and monitoring.

Please, contact the LEGRAND Technical Support Service for further information.

1.6 Copyright

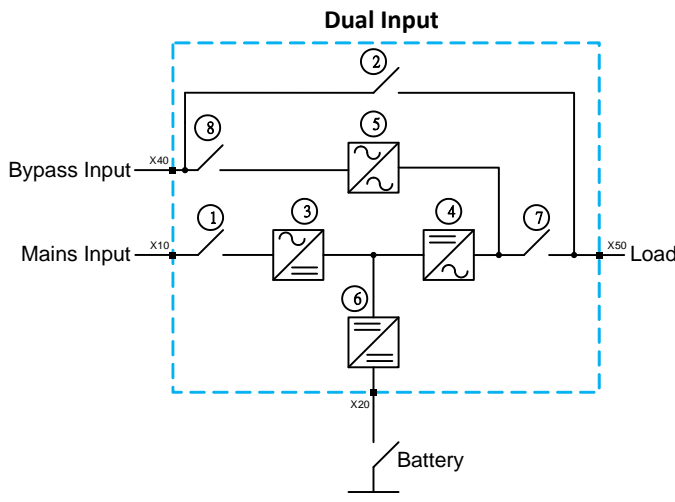
The information contained in this manual cannot be disclosed to any third party. Any partial or total duplication of the manual by photocopying or other systems, including electronic scanning, which is not authorized in writing by the Manufacturer, violates copyright conditions and may lead to prosecution.

LEGRAND reserves the copyright of this publication and prohibits its reproduction wholly or in part without previous written authorization.

1.7 General UPS description

The UPS systems described in this manual are on-line, double conversion; the inverter included in the UPS always supplies energy to the load, whether the mains is available or not (according to the battery autonomy time).

This configuration guarantees the best service to the user, as it supplies clean power uninterruptedly, ensuring voltage and frequency stabilization at nominal value. Thanks to the double conversion, it makes the load completely immune from micro-interruptions, from excessive mains variations, and prevents damage to critical loads.



The UPS uses IGBT technology with a high switching frequency in order to allow a low distortion of the current re-injected into the supply line, as well as high quality and stability of output voltage. The components used assure high reliability, very high efficiency and maintenance easiness.

- Rectifier [3]

It converts the three-phase voltage of the AC mains into continuous DC voltage using a three-phase fully controlled IGBT bridge with a low harmonic absorption.

The control electronics uses a microprocessor of latest generation that allows to reduce the distortion of the current absorbed by mains (THDi) to less than 5%. This ensures that the rectifier does not distort the supply mains, with regard to the other loads. It also avoids cable overheating due to the harmonics circulation.

- Battery charger / Booster [6]

A bi-directional DC/DC converter is placed between the battery and the DC bus.

The converter has a double function. When the mains is present and the rectifier operational the converter works as battery charger, restoring the energy lost by the battery and keeping it in floating charge. In case of mains or rectifier failure the battery supplies energy to the inverter through the converter, which works as booster stage.

As the mains is back the rectifier provides energy to the inverter and the converter restores its function as battery charger.

- Inverter [4]

It converts the direct voltage coming from the rectifier or from the DC battery into alternating AC voltage stabilized in amplitude and frequency.

The fully digital control of the output sinewave allows to achieve high performances, among which a very low voltage distortion even in presence of high-distorting loads.

- Battery

The battery can be installed inside or outside the UPS.

The battery is charged every time it has been partially or completely discharged. When its full capacity is restored, it is kept floating to compensate for any self-discharge.

- Static bypass [5]

The static bypass allows to transfer the load between Inverter and Bypass and vice-versa, in a very short time, and uses SCR's as power commutation elements.

- Maintenance bypass [2]

The maintenance bypass is used to cut off the UPS completely, supplying the load directly from the input mains in case of maintenance or serious failure.

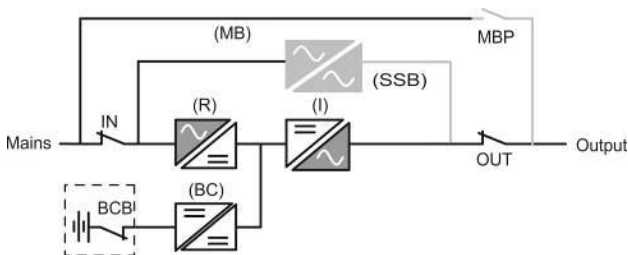
1.7.1 UPS operating modes

The UPS has four main operating modes.

- Normal operation

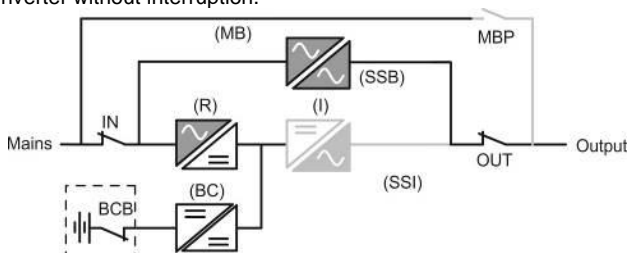
During normal operation all the circuit breakers/isolators are closed, except for MBP (maintenance bypass).

The rectifier is supplied by the AC three-phase input voltage, feeds the inverter and compensates mains voltage as well as load variations, keeping the DC voltage constant. The battery charger keeps the battery charged (floating or boost charge depending on the battery type). The inverter converts the DC voltage into an AC sinewave with stabilized voltage and frequency and supplies the load via its static switch SSB.



• Bypass operation

The load can be switched to bypass either automatically or manually. The manual changeover can be performed by display forcing the load to bypass. In case of failure of the bypass line, the load is switched back to inverter without interruption.

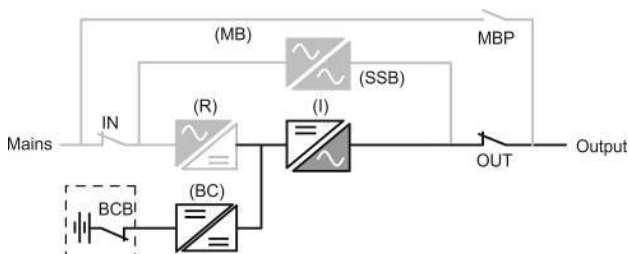


• Battery operation

In case of power failure or rectifier fault, the battery feeds the inverter without interruption through the booster converter. The battery voltage drops based on the amplitude of the discharging current. The voltage drop has no effect on the output voltage, which is kept constant by changing the PWM modulation. An alarm is activated when the battery is near the minimum discharge value.

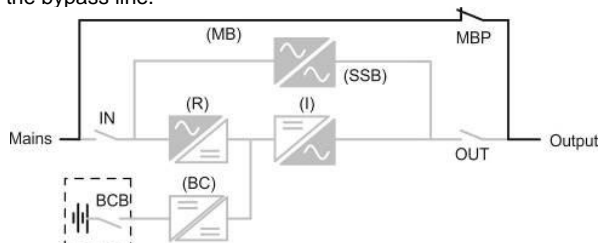
In case the supply is restored before the battery is completely discharged, the system will be switched back to normal operation automatically. In the opposite case, the inverter shuts down and the load is switched to the bypass line. If the bypass line is not available or is out of tolerance, the loads supply is interrupted as soon as the battery reaches the discharge limit threshold (black-out).

As soon as the supply is restored, the battery charger will recharge the battery. In the standard configuration, the loads are supplied again via static switch SSB when mains is available again. The inverter is restarted when the battery has partially restored its capacity.



• Maintenance mode

The maintenance bypass operation is necessary whenever the UPS functionality is tested, or during maintenance or repair work. During this mode, the UPS is completely shut down and the load is directly supplied by the bypass line.



2. Regulatory and safety requirements



DANGER

Before carrying out any operation on the equipment, it is necessary to read the entire manual carefully, especially this chapter. Look after this manual carefully and consult it repeatedly during installation and maintenance by a skilled technician.

2.1 General notes

The equipment has been made for the applications given in the manual. It may not be used for purposes other than those for which it has been designed, or differently from those specified in this manual.

The various operations must be carried out according to the criteria and the chronology described in this manual.

2.2 Definitions of “Skilled Technician” and “Operator”

2.2.1 Skilled technician

The professional that will carry out the installation, start up and ordinary maintenance is called “Skilled Technician”.

This definition refers to people qualified by LEGRAND who have the specific technical qualification and are aware of the method of installing, assembling, repairing, bringing online and using the equipment safely.

In addition to the requirements listed in the paragraph below for a general operator, the Skilled Technician is qualified according to national safety standards to work under dangerous electrical voltage and uses the personal protective equipment required by national safety standards for all the operations indicated in this manual (see the examples listed in paragraph 2.3).

INDICATION

The safety manager is responsible for protection and company risks prevention according to what is indicated in European directives 2007/30/EC and 89/391/EEC regarding safety in the workplace.

The safety manager must ensure that all the people working on the equipment have received all the instructions concerning them in the manual, especially those contained in this chapter.

2.2.2 Operator

The professional assigned to the equipment for normal use is called “Operator”.

This definition refers to people who know how to operate the equipment defined in the user manual and have the following requisites:

- technical education, which enables them to operate according to safety standards in relation to the dangers linked to the presence of electric current;
- training on the use of personal protective equipment and basic first aid interventions.

The company safety manager, in choosing the person (operator) who uses the equipment, must consider

- the person's work fitness according to the laws in force;
- the physical aspect (not disabled in any way);
- the psychological aspect (mental stability, sense of responsibility);
- the educational background, training and experience;
- the knowledge of the standards, regulations and measures for accident prevention.

He shall also provide training in such a way as to provide thorough knowledge of the equipment and its component parts.

Some typical activities the operator is expected to carry out are:

- the use of the equipment in its normal functioning state and the restore of the functioning after it shuts down;
- the adoption of the necessary provisions for maintaining the quality performance of the UPS;
- the cleaning the equipment;
- cooperation with personnel responsible for ordinary maintenance activities (skilled technicians).

2.3 Personal Protective Equipment



DANGER

The UPS poses a considerable risk of electric shocks and a high short circuit current. During installation, use and maintenance operations, the equipment mentioned in this section must be used.

People responsible for operating this equipment and/or passing close to it must not wear garments with flowing sleeves, nor may laces, belts, bracelets or other metal pieces that might cause a danger.

The following list sum up the minimum Personal Protective Equipment to wear always. Additional requirements may be needed according to national safety standards.



Anti-accident and non-sparking shoes with rubber sole and reinforced toe



Protective gloves for handling operations



Isolated rubber gloves for operations of connection and work under hazardous voltage



Protective garments for electrical work



Protective face and head shield



Isolated tools

INDICATION

The skilled technician must work on electrical insulated carpet and he must not wear any kind of metal objects like watches, bracelets, etc.

2.4 Hazard signs in the workplace

The following signs must be exhibited at all points of access to the room where the equipment is installed:



Electric current

This sign indicates the electrical live parts.



How to proceed in an emergency

Do not use water to quench fires but just the extinguishers specially designed for putting out fires in electrical equipment.



No smoking

This sign indicates that smoking is not allowed.

2.5 Signs on the equipment

Displayed on the UPS are explanatory plates that can vary depending on the country the equipment is intended for and constructional standards applied.

Make sure the instructions are adhered to. Removing these plates and working in a way that differs from what written there, is strictly prohibited.

The plates must always be clearly read, and they must be cleaned periodically.

If a plate deteriorates and/or it is no longer legible, even partially, the Manufacturer must be contacted for another one.



CAUTION

The plates must not be removed or covered. No other plates may be affixed to the equipment without the Manufacturer's prior written authorisation



WARNING

Potential risks can be drastically reduced by wearing the Personal Protective Equipment listed in this chapter, which are indispensable. Always operate with due care around dangerous areas marked by the appropriate warning notices on the equipment.

2.6 General warnings



DANGER

The UPS works with dangerous voltages. Only skilled technicians qualified and authorized by LEGRAND must perform the installation and ordinary maintenance operations. No part of the UPS can be repaired by the operator. Extraordinary maintenance operations must be carried out by LEGRAND Technical Support Service personnel.



DANGER

Before beginning any installation and/or maintenance operation, make sure that all the DC and AC power sources are disconnected.

The UPS and the external battery cabinet, if present, must be installed with an earth connection to avoid high leakage currents. First connect the earthing cable.

Check during each installation and/or maintenance operation the continuity of the earthing system.

**DANGER**

The UPS is powered by its own DC energy source (batteries). The output terminals may have a dangerous voltage even if the UPS is not connected to the AC power network.
Disconnect all batteries before performing any installation and/or maintenance operation.

**WARNING**

A battery can present a risk of electrical shock and burns by high short-circuit circuit current. Failed batteries can reach temperatures that exceed the burn thresholds for touchable surfaces. The following precautions should be observed when working on batteries:

- a) remove watches, rings or other metal objects.
- b) use tools with insulated handles.
- c) wear rubber gloves and boots.
- d) do not lay tools or metal parts on top of batteries.
- e) disconnect the charging source prior to connecting or disconnecting battery terminals.
- f) determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).
- g) never leave live cable terminals without an insulated protection.
- h) When replacing batteries, replace with the same type and number of batteries or battery packs. There is the risk of explosion if batteries are replaced by an incorrect type.

Do not dispose of batteries in a fire. The batteries may explode.

Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic. The batteries installed inside the cabinet must be disposed of correctly. For the disposal requirements refer to local laws and relevant standards.

INDICATION

The UPS functions with TT, TN-C and TN-S systems. Input/Bypass and output neutral are not referenced to the same neutral potential.

For TN-C systems, it is necessary to bridge together the input, bypass and output neutral on the terminals during the installation.

**CAUTION**

Do not open the battery breakers while the UPS is powering the loads in battery mode.

**WARNING**

To reduce the risk of fire or electric shock, the UPS must work in closed, clean environments with controlled temperature and humidity. It must be kept away from inflammable liquids and corrosive substances. The room temperature must not be above +40°C (+104°F) and the relative humidity must be a maximum of 95% not condensing.

**CAUTION**

Keor Compact 10 kVA is a category C2 UPS product. In a residential environment, this product may cause radio interference, in which case the user may be required to take additional measures. All the other models of Keor Compact are products for commercial and industrial application in the second environment - installation restrictions or additional measures may be needed to prevent disturbances.

**CAUTION**

- The equipment must be maintained and used according to the instructions of this manual.
- The departmental manager must instruct the operating and maintenance personnel on the safe use and maintenance of the equipment.
- Only specifically trained, highly skilled personnel are allowed access to the equipment in order to perform maintenance. While the maintenance operation is being carried out, signs saying "Maintenance work in progress" must be affixed in the department in such a way that they can be easily seen from any access area.
- Any intervention on the equipment must be done only after it has been disconnected from the power supply network by means of a switch disconnecter and must be locked with an appropriate padlock.
- The UPS must not be turned on if liquid is leaking from the batteries.
- The equipment used for any maintenance operations (pliers, screwdrivers etc.) must be electrically insulated.
- Depositing flammable material near the equipment is strictly forbidden. The equipment should always be locked, and only specifically trained personnel are allowed access to it.
- Do not disable any safety, notification or warning device and do not ignore any alarm, warning message or notice, no matter whether they are generated automatically or represented by plates fixed to the equipment.
- Do not run the equipment with fixed protections not installed (panels etc.).
- In case of breaking, buckling or malfunctioning of the equipment or parts of it, repair or replace immediately.
- For no reason can the structure of the equipment, the devices mounted on it, the operation sequence etc., be modified, manipulated or tampered with in any way, without prior consultation with the Manufacturer.
- When replacing fuses, only use ones of the same type.
- The replacement of the batteries is an operation intended to be carried out by a skilled technician.
- Keep a register in which to enter the date, time, type, performer's name and any other useful information about each and any routine and extraordinary maintenance operation.
- Do not use oils or chemical products for cleaning because they could scratch, corrode or damage certain parts of the equipment.
- The equipment and workplace must be kept completely clean.
- Upon completion of the maintenance operations, before connecting the power supply, carefully check that no tools and/or material of any kind have been left next to the equipment.

2.7 How to proceed in an emergency

The following information are general. For the specific interventions consult the regulations in force in the country where the equipment is installed.

2.7.1 First-aid procedures

When administering first aid, adhere to the company rules and the usual procedures.

2.7.2 Fire procedures

Do not use water to quench fires but just the extinguishers specially designed for putting out fires on electrical equipment.

3. Transportation and placement

3.1 Visual check

On delivery of the UPS, carefully inspect the packaging and the equipment for any damage that might have occurred during transport. Check there is no damage to the indicator on the outer label reading "Shock Watch".

If there is possible or ascertained damage, immediately inform:

- the transporter;
- the LEGRAND Technical Support Service.

Check that the equipment corresponds with the items indicated in the delivery documentation.

If the UPS must be stored, follow the instructions of Chapter 7.

3.2 Equipment check

The equipment and the relative supplied accessories must be in perfect conditions.

Check that:

- the shipping data (address of the recipient, no. of packages, order no, etc.) correspond to what is contained in the delivery documentation;
- the technical rating plate data on the label applied to the UPS correspond with the material described in the delivery documentation;
- the documentation accompanying the equipment includes the installation and user manuals.

In case of discrepancy, immediately inform the LEGRAND Technical Support Service before commissioning the equipment.

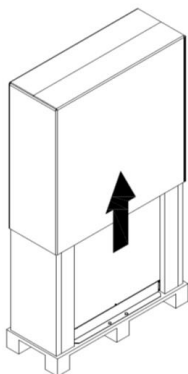
INDICATION

The installation manual must be used and consulted only by skilled technicians.

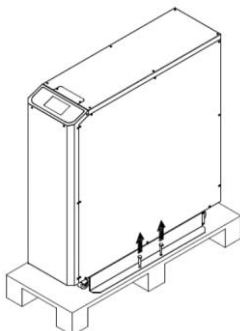
3.3 Unpacking

To remove the packaging material, comply with the following procedure:

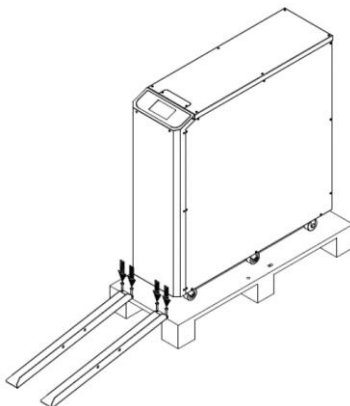
- bring the UPS to the installation site using a forklift and/or a transpallet with suitable characteristics;
- remove the packaging material, cut straps and cardboards protecting the UPS;



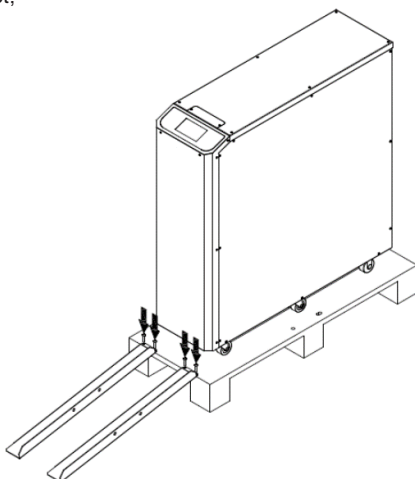
- unscrew the fastening rail kits on the right and left side;



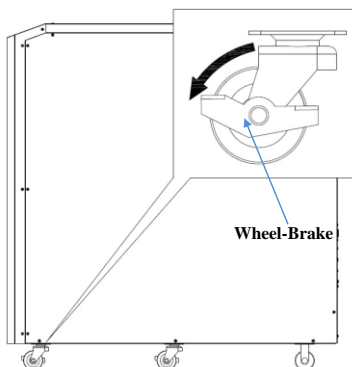
- put two fastening rail kits on the pallet edge and make them steady by fastening four screws in the pallet;



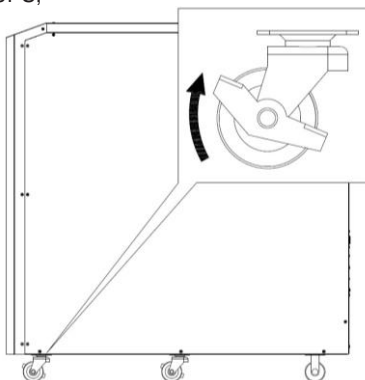
- remove the UPS from the pallet;



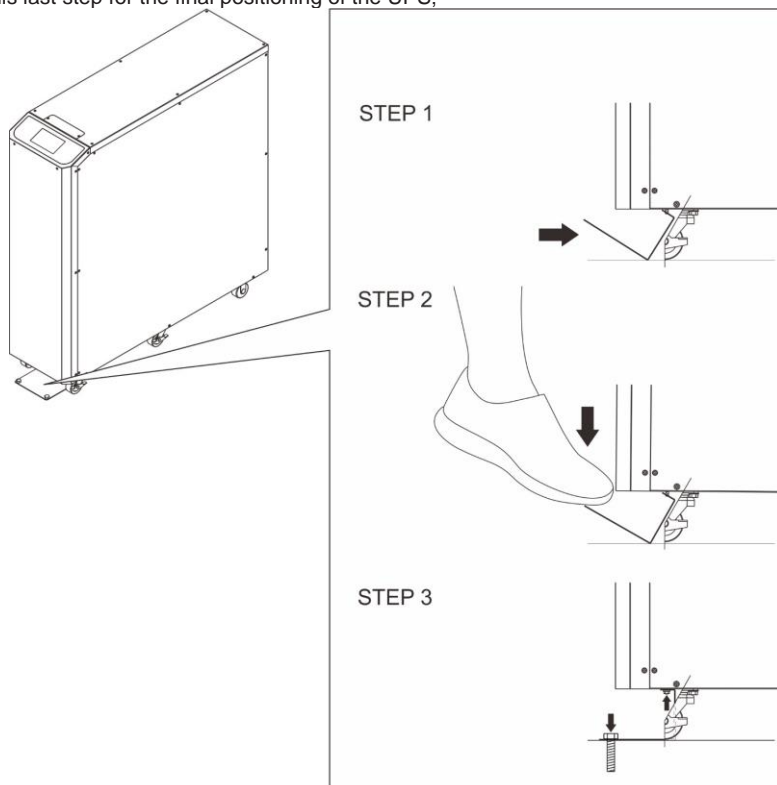
- block the wheel-brakes to fix the UPS;



- raise the wheel-brakes to move the UPS;



- follow this last step for the final positioning of the UPS;



3.4 Movement



WARNING

The UPS must be placed and stand in a vertical position throughout the transportation. It shall also be packed properly.

Move the UPS very carefully, lifting it as little as possible and avoiding dangerous swings or falls.

Follow always the directions indicated in the symbols present on the packaging. The equipment must always be handled by trained and instructed personnel. Comply with the safety regulations in force in your country relative to the usage of lifting equipment and/or accessories.

The Keor Compact UPS has six wheels at the bottom of the cabinet. Before installations and while it is still empty, it can be moved by hand by at least two people.

For any lifting, use a forklift or a transpallet with an adequate carrying capacity, placing the forks in the specific spaces of the base and making sure they come out on the other side by at least twenty centimetres.

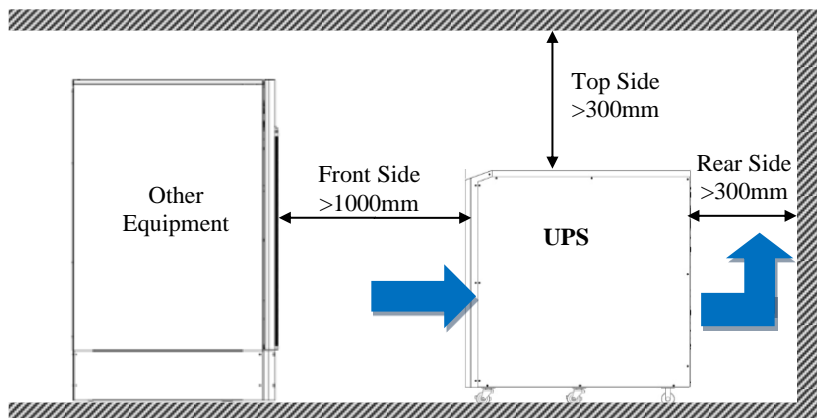


CAUTION

Do not move the UPS after the installation

3.5 Positioning constraints

The UPS must be positioned respecting the following conditions:



- keep at least 1000 mm of free space in front of the UPS for air flow and future maintenance purposes;
- keep at least 300 mm of free space in rear of the UPS for air-flow space;
- keep at least 300 mm of free space in the top of UPS for maintenance operations;
- temperature and humidity must be within permitted limits;
- fire regulations must be respected;
- the wiring must be simply made;
- front and rear accessibility must be available for assistance or periodic servicing;
- the cooling flow of air must be guaranteed;
- the air conditioning system must be adequately sized;
- dust, corrosive and explosive atmospheres must be absent;
- the installation site must be free of vibration;
- the support surface must be sized for the weight necessary to support the equipment.

To safeguard the batteries as well as possible it is necessary to bear in mind that their average lifetime is strongly influenced by the operating room temperature.

Position the UPS in an environment with a temperature range between +20°C (+68°F) and +25°C (+77°F) to guarantee the optimum life of the batteries.

Before proceeding with the installation operations, make sure that there is enough lighting to clearly see every detail. Provide artificial lighting if the natural lighting does not satisfy this requirement.

In case of maintenance operations in places that are not sufficiently well lit, portable lighting systems must be used, avoiding shadows that prevent or reduce visibility on the point where you intend to work or on the surrounding areas.

4. Installation



DANGER

All UPS installation operations must be carried out exclusively by a **SKILLED TECHNICIAN** (paragraph 2.2.1).

4.1 Safety regulations



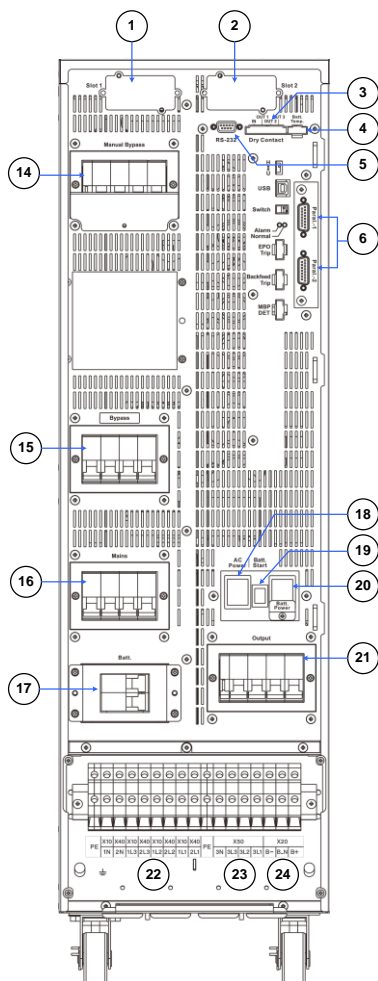
DANGER

Before carrying out any installation operation you must read and apply the following:

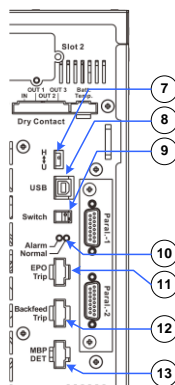
- The UPS has a high leakage current. The earthing connection must be connected before cabling the UPS input. The switchgear must have a safe connection with the earthing and an adequate protection as required by the installation standards.
- The UPS must only be installed in a fixed way with a thermal-magnetic circuit breaker placed upstream of it. Connection to the mains via traditional type plug is not allowed.
- The switchgear or the disconnector switch must be installed near the equipment and must be easily accessible.
- Do not carry out the installation in presence of water or humidity.
- Open only the UPS panels necessary for the electrical connections. After that, close and fix them.
- Check there is no mains voltage on the equipment.
- Check that the loads are off and disconnected from the UPS.
- Check that the UPS is OFF, and no voltage is present.
- Check that the fuse breakers on the external battery cabinets (if present) are open.
- Check that the mains input voltage and frequency correspond with the values indicated in the technical data on the UPS rating plate.
- Check that the earthing has been carried out in compliance with IEC (International Electrotechnical Commission) standards or local regulations.
- Check that the electrical system has been fitted with the necessary differential and thermal-magnetic protections upstream of the UPS.

4.2 Views

4.2.1 Rear View



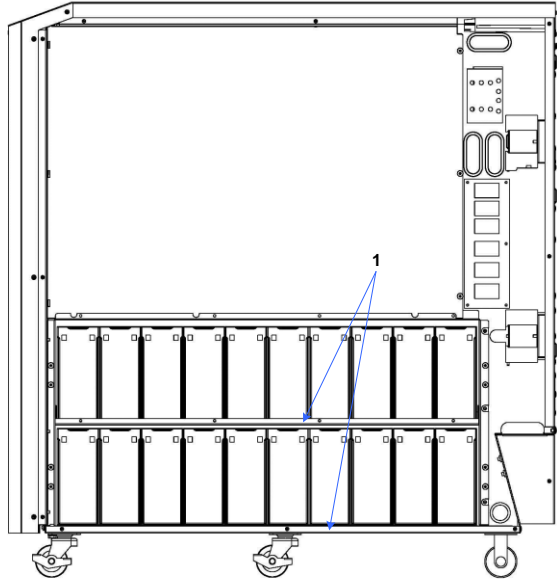
1. Communication Slot 1
2. Communication Slot2
3. Dry Contacts
4. External Battery Temperature Connector
5. RS-232 Port for Setting Software
6. Parallel Communication Ports (Option)



7. Communication Selector for Service Only
8. USB Port for Service Only
9. Terminal Resistor Setting Switch for Parallel Communication
10. Status LED Indicators
11. EPO
12. Backfeed Protection
13. MBP Detector

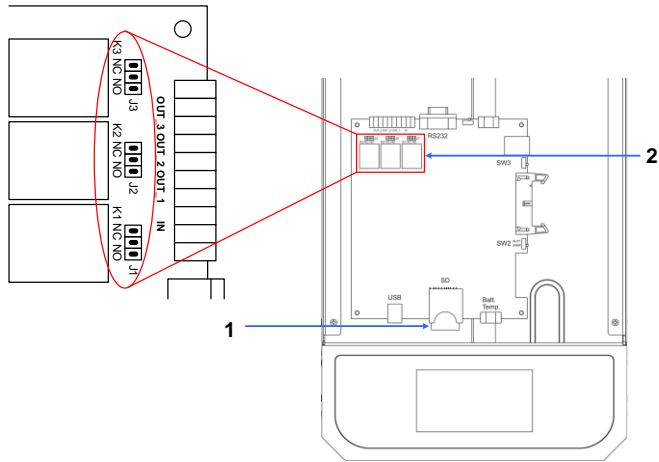
14. Manual Bypass Breaker
15. Bypass Input Breaker
16. Mains Input Breaker
17. Battery Breaker
18. AC Working Power
19. Batt. Start
20. Batt. Working Power
21. Output Breaker
22. X10/X40: Mains/Bypass Input Connections Terminal (1N, 2N, 1L3, 2L3, 1L2, 2L2, 1L1, 2L1)
23. X50: Output Connection Terminals (3N, 3L3, 3L2, 3L1)
24. X20: External Battery Connection Terminals(B-, B_N, B+)

4.2.2 Internal Right View



1. Battery Tray

4.2.3 Internal Top View



1. SD Card Slot

2. Jumpers (J1~J3) for each output contact

4.3 Electrical connections

The electrical hook-up of the UPS to the switchgear or to the external battery cabinets is part of the installation that is not normally performed by the UPS manufacturer. For this reason, the indications that follow are to be considered approximate and it is recommended that the electrical connections are based on local installation standards.

After removing the UPS from the packaging and positioning it in its definitive place, the skilled technician can begin to make the electrical connections.



WARNING

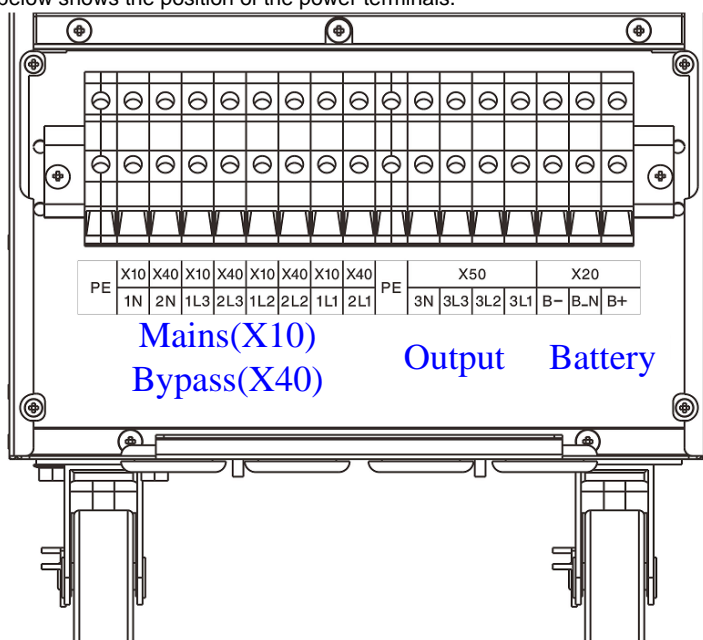
The choice of cables type and their cross sections depending on the rated current and their installations must be made as indicated by the local installation standards and it is a responsibility of the skilled technician.

The input current and the output power of the UPS are indicated in chapter 10 and the battery current in table 4 of chapter 11.

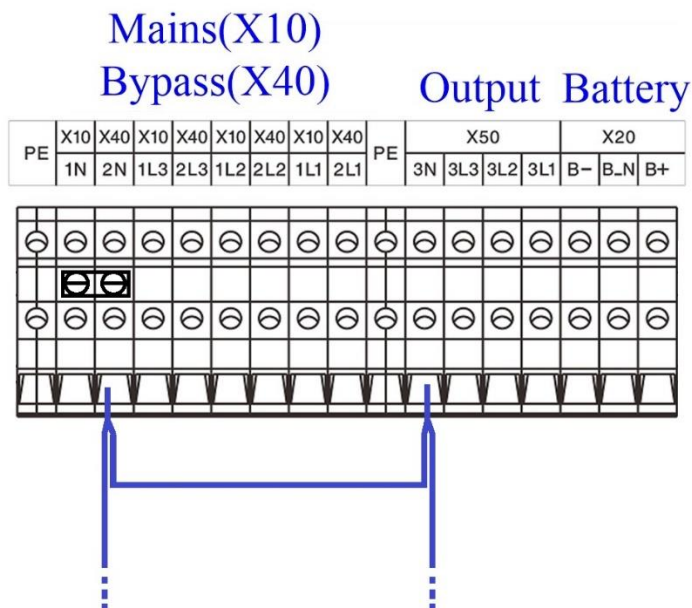
INDICATION

Chapter 11 includes tables with the recommended cables, fuses, automatic and differential breakers.

The drawing below shows the position of the power terminals.



If the UPS is installed in a TN-C system, it is necessary to connect together the input, bypass and output neutral on the terminals during the installation as shown in the following picture. For the connecting cable between X40-2N and X50-3N, use a cable with a maximum cross section of 10 mm² to be terminated together with the neutral cable with a tube terminal.



4.3.1 Protective devices

To ensure proper protection from overloads or output short-circuits and from electrical shocks, it is necessary to install adequate automatic residual-current and thermal-magnetic breakers upstream of the UPS on the input line and on the bypass line (if separate).

They must be selected according to the indications in the tables shown in chapter 11.

To ensure adequate protection of the UPS electronics, it is necessary to install upstream of the UPS, on the input line (if the bypass line is common) or only on the bypass line (if separate from the input line), adequate fuses according to the indications given in Table 5 in Chapter 11.

4.3.2 Earthing connection

Before carrying out any other installation operation, connect the earthing wiring coming from the low voltage switchgear to the PE terminal.

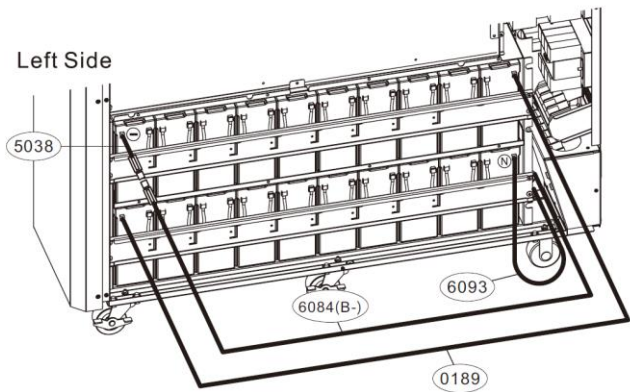
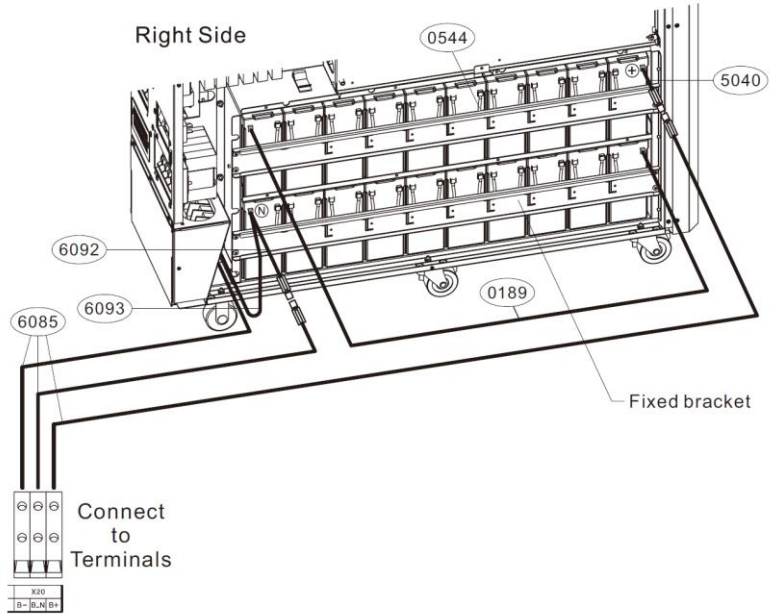
The minimum cross-sectional area of the earthing conductor must be chosen according to the following criteria:

- if the cross-sectional area S of the phase conductors is $S \leq 16 \text{ mm}^2$, the minimum cross-sectional area of the earthing conductor must be the same as the phase conductors;
- if the cross-sectional area S of the phase conductors is $16 \text{ mm}^2 < S \leq 35 \text{ mm}^2$, the minimum cross-sectional area of the earthing conductor must be 16 mm^2 ;
- if the cross-sectional area S of the phase conductors is $S > 35 \text{ mm}^2$, the minimum cross-sectional area of the earthing conductor must be $S/2 \text{ mm}^2$.

4.3.3 Internal battery installation

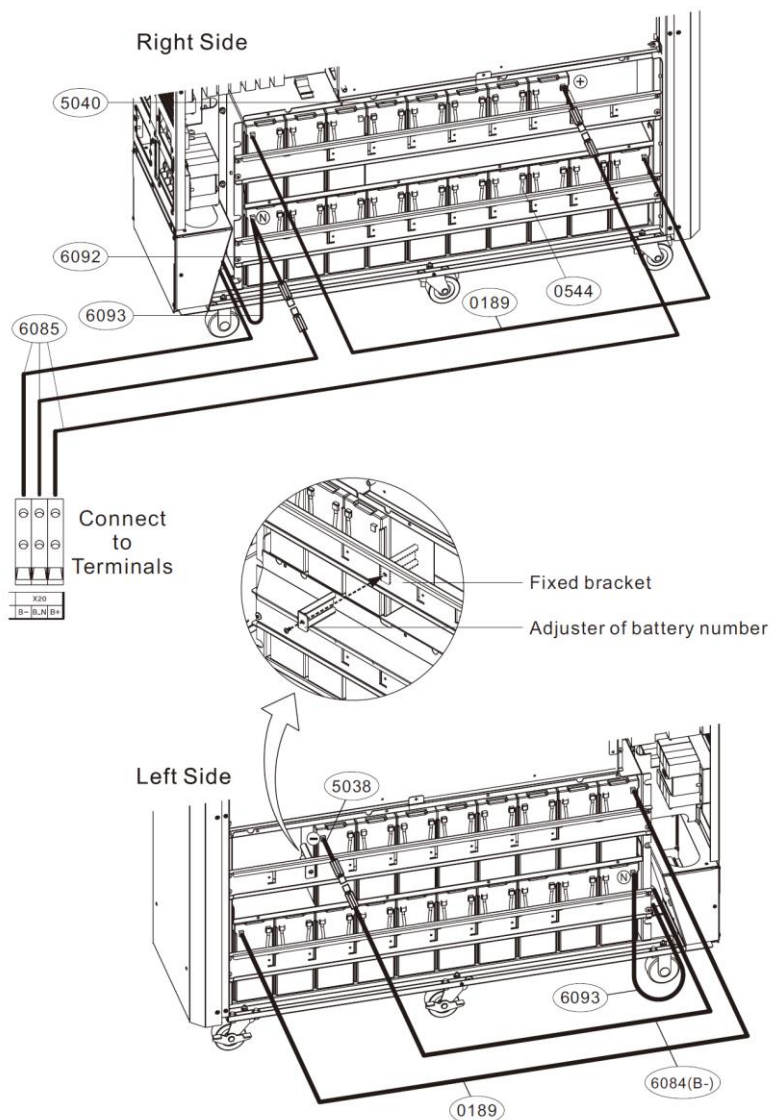
4.3.3.1 Keor Compact 20 kVA

40 PCS



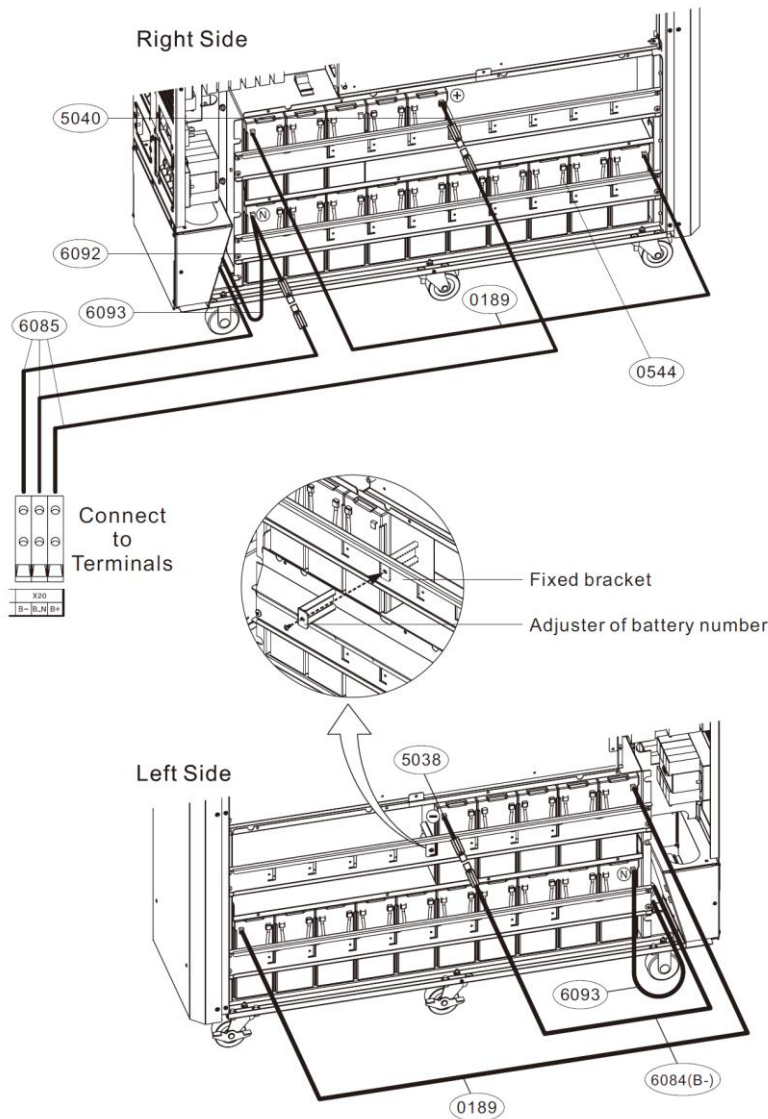
4.3.3.2 Keor Compact 15 kVA

36 PCS



4.3.3.3 Keor Compact 10 kVA

30 PCS



4.3.4 Terminals configuration

The electrical configuration must be done on the distribution terminal strip.



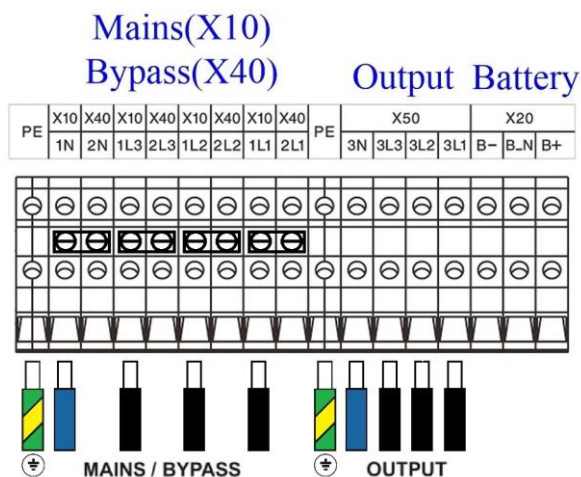
WARNING

Always check that the connection jumper screws are tightened properly.

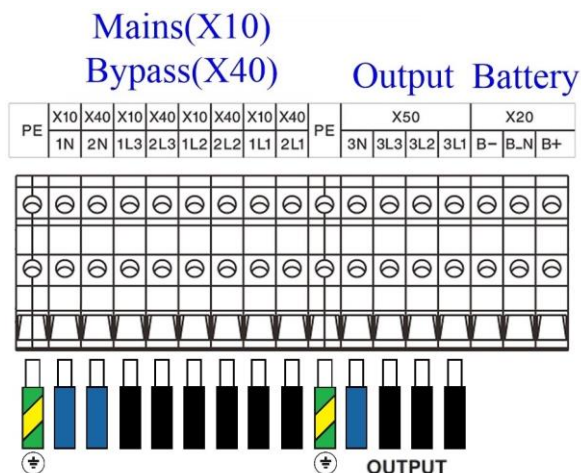
4.3.4.1 Factory configuration: THREE PHASE input – THREE PHASE output with common bypass input line

The UPS default configuration is set in the factory according to the following diagram.

To use this configuration, no further action is necessary; it is however recommended that a check is made of the correct configuration of the connection jumper.



4.3.4.2 THREE PHASE input - THREE PHASE output connection with separate bypass input line



4.3.5 Input cables installation

The installation must be done according to the following steps:

- check that the available mains power is at least the same of the UPS nominal power;
- check that the cables to connect to the UPS are isolated upstream and no voltage is present;
- check that the earthing cable from the low voltage switchgear is properly connected (see paragraph 4.3.2);
- connect the input neutral cable of the input line to the X10 – 1N terminal;
- connect the cables L1, L2, L3 of the input line to the terminals X10 – 1L1, X10 – 1L2, X10 – 1L3, being careful to observe the phase sequence (L1, L2, L3).



WARNING

The neutral input cable must always be connected.

4.3.6 Bypass cables installation

The default configuration for the is bypass line in common with the input line.

To perform a dual input installation with a separate bypass line, the following requirements must be met:

- the two lines must be supplied by the same MV/LV transformer source (same electrical potential). If this is not the case, an insulation transformer should be added in the bypass line upstream the UPS;
- separate protective devices are required for each line.

The UPS does not modify the neutral configuration of the system. The mains, bypass and output neutral are connected internally to each other.

If there is the need to have a separate bypass line, the installation must be done according to the following steps:

- check that the available bypass power is at least the same of the UPS nominal power;
- check that the cables to connect to the UPS are isolated upstream and no voltage is present;
- check that the earthing cable from the low voltage switchgear is properly connected (see paragraph 4.3.2);
- connect the bypass neutral cable of the bypass line to the X40 – 2N terminal;
- remove the three jumpers linking terminals X10 – 1L1 with X40 – 2L1, X10 – 1L2 with X40 – 2L2 and X10 – 1L3 with X40 – 2L3;
- connect the cables L1, L2, L3 of the bypass line to the terminals X40 – 2L1, X40 – 2L2, X40 – 2L3, being careful to observe the phase sequence (L1, L2, L3).



WARNING

The neutral bypass cable must always be connected.

4.3.7 Output cables installation

The installation must be done according to the following steps:

- check that the nominal power of the UPS is at least the same of the nominal power of the load;
- check that the cables to connect to the UPS are isolated upstream and no voltage is present;
- check that the earthing cable from the low voltage switchgear is properly connected (see paragraph 4.3.2);
- connect the neutral cable of the output line to the X50 – 3N terminal;
- connect the cables L1, L2, L3 of the output line to the terminals X50 – 3L1, X50 – 3L2, X50 – 3L3, being careful to observe the phase sequence (L1, L2, L3).

INDICATION

Provide a separate switchgear for the load. The following information must be indicated on the system switchgear by means of stickers or similar:

- maximum nominal power of the total load;
- maximum nominal power of the load at the load outlets;
- if a common switchgear is used (mains and UPS power outlets), make sure that there is an indication of the power source on every power outlet ("Mains" or "UPS").



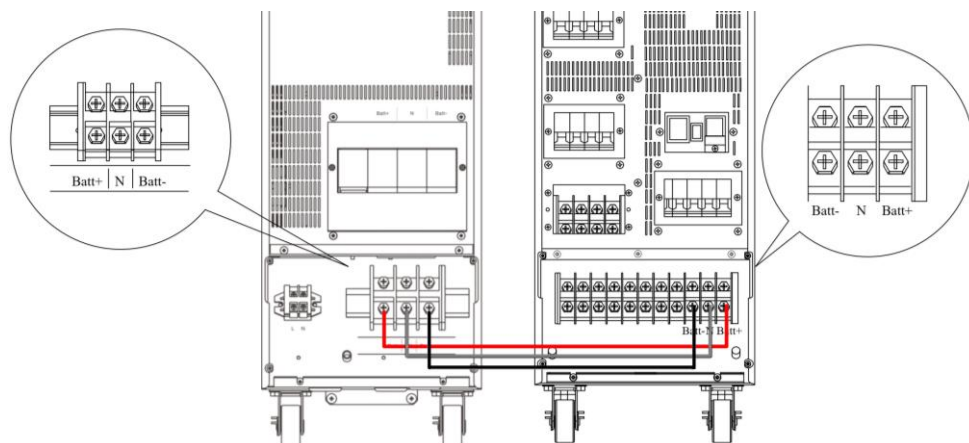
WARNING

The neutral output cable must always be connected.

4.3.8 Battery cables installation for external battery cabinets

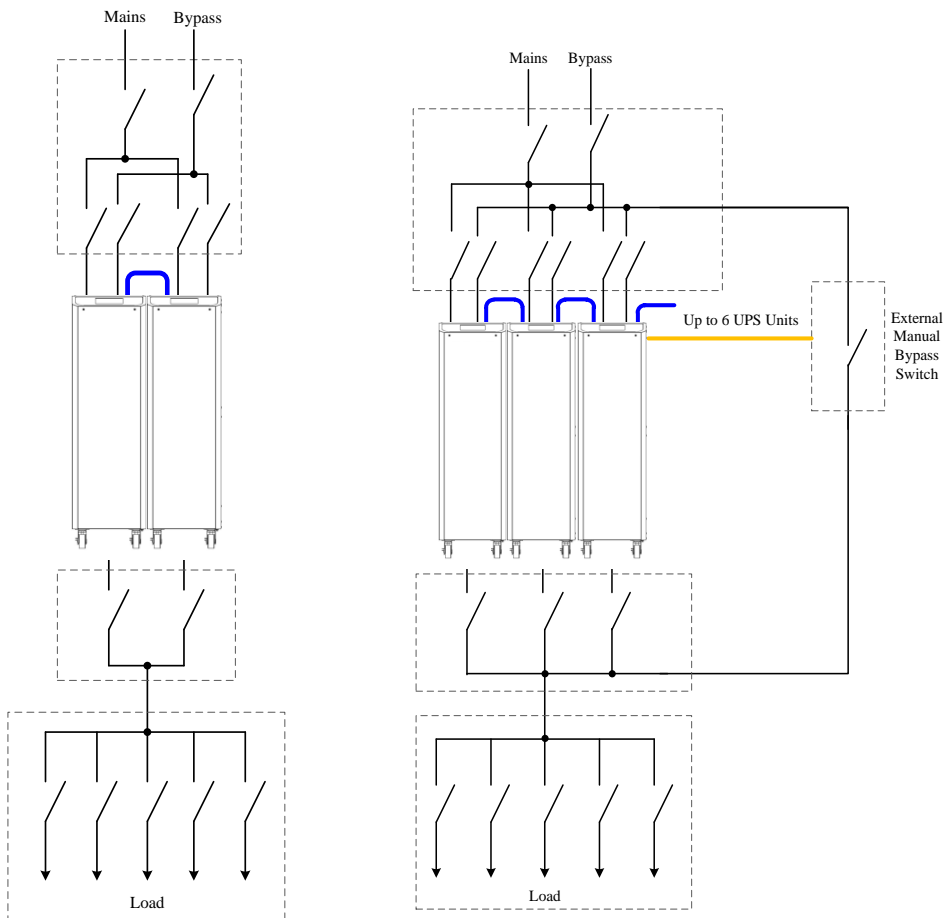
If there are external battery cabinets, follow the instructions in the installation manual of the external battery cabinets and perform the installation according to the following steps:

- Make sure all battery breakers are open;
- check that the cables for connecting the UPS are insulated upstream and that there is no voltage;
- check that the grounding cable of the low voltage cabinet is correctly connected (see paragraph 4.2.3);
- connect the positive cables of the battery cabinets to terminal X20 - B+ ;
- connect the negative cables of the battery cabinets to terminal X20 - B-;
- connect the neutral cables of the battery cabinets to terminal X20 - B_N.



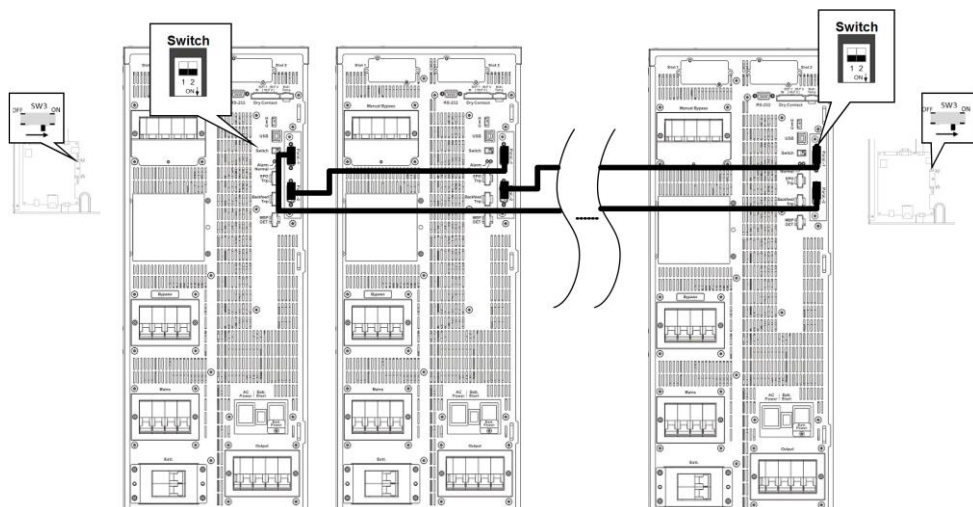
4.4 Parallel connections

The UPS can be operated in parallel to extend the capacity and to enhance the system reliability. Up to 6 UPS units can be operated in parallel.

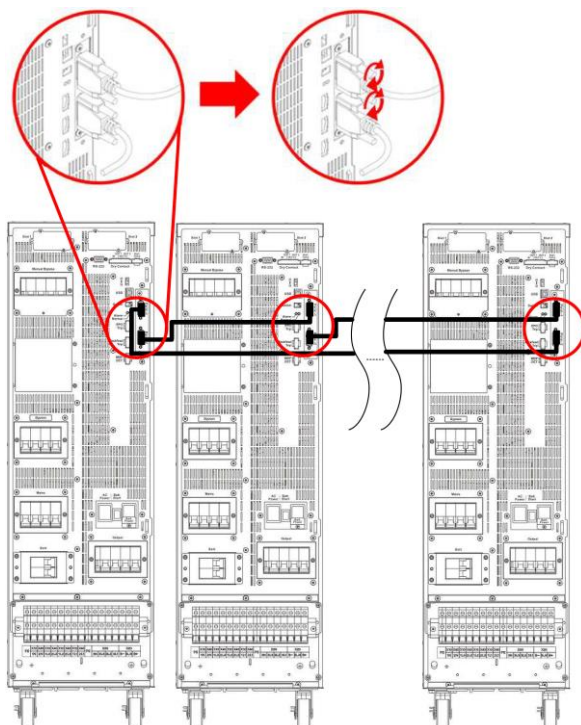


Ensure this for a correct parallel connection:

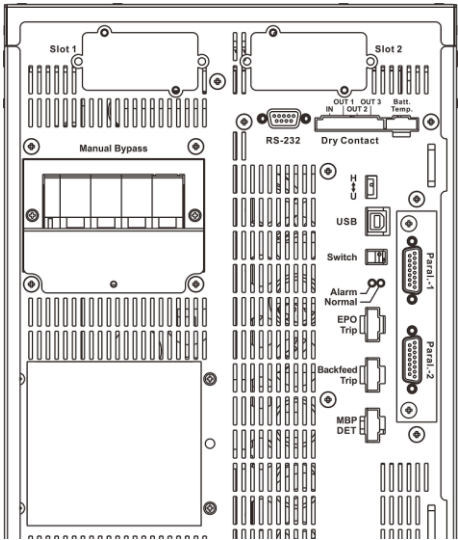
- each UPS must be equipped with the parallel card;
- the size and length of the input and output cables must be identical for all UPS units;
- the phase rotation must be the same for each UPS unit;
- it is recommended to use an external bypass cabinet to facilitate maintenance and system testing for parallel operation system;
- parallel communication cables are requested to connect the UPS units to each other.
- the parallel communication cables must be connected in a ring topology, and the maximum total length of the parallel communication cables must be less than 38 meters. To ensure good communication quality you must set the Switch & SW3 of the two farthest UPS to the "ON" position as shown below.



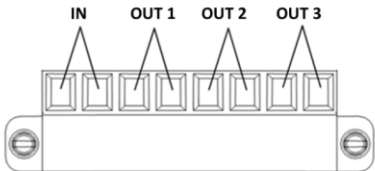
The parallel communications cable must be plugged as shown below.



4.5 Communication devices



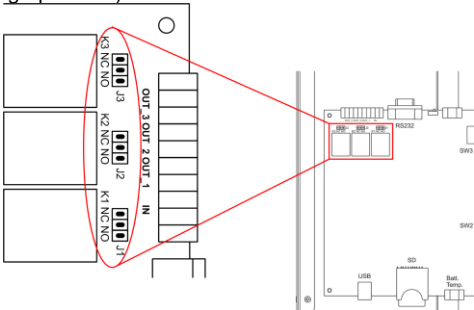
- Dry Contacts
- The UPS provides 3 output dry contacts and 1 input contact.



Default Definition	
General alarm	OUT-1
Load on inverter	OUT-2
Load on Bypass	OUT-3
Normal mode	IN

Specification of Output dry contacts : 250 VAC/ 2 A; 30 VDC/2 A

There are 3 jumpers (J1~J3) to set NC/NO for each output contact. Jumper (J1~J3) are displayed in Internal Top View (see paragraph 4.2.3).



Short/circuit the input contact to send a command to the UPS.

- Communication Slot1

This slot can install relay card or RS-485 MODBUS card.

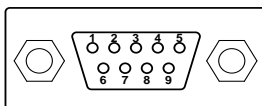
- Communication Slot2

This slot can install Relay card or SNMP card. Ensure the SW2 switch to correct position when this slot is used.

- Batt. Temp.

Connect to external battery temperature sensor.

- RS-232



2 - TX (OUT)

3 - RX (IN)

5 - Ground

Baud Rate	57600bps
Data Length	8 bits
Stop Bit	1 bit
Parity	None

This port is available to change the settings of the UPS by software.

- Paral-1 and Paral-2

Parallel communication ports. Specific cables are required to connect the UPS units to each other to operate in parallel mode (see paragraph 4.5).

- H↔U - communication selector

This switch is to select HMI or USB port. Ensure the switch is on “H” position for ensure HMI port is workable.

- USB

This port is for service only.

- Switch

It is used as a terminal resistor for parallel communication. To ensure good parallel communication quality, set the switch of the two farthest UPS to the “ON” position (see paragraph 4.5).

- LED Status Indicators

Normal: The UPS is normal.

Alarm: The UPS has some abnormal conditions.

- EPO - Emergency Power Off

The EPO contact allows to turn off the UPS in case of emergency.

- Backfeed Trip

The UPS provide a backfeed protection contact to trip the external electromechanical device for isolation from the power circuit. The backfeed protection is for ensuring personnel safety against any risk of accidental energy return to the input circuit. It imposes the automatic opening of a switching device in case of a malfunction of the static switch.

- MBP Det.

In case an external manual bypass switch has been installed with the UPS system, this detector should be connected to the auxiliary of external manual bypass switch.

There are two switches visible in the Internal Top View:

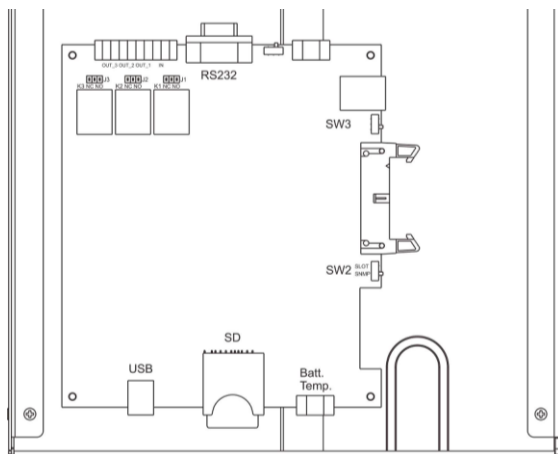
- SW2

When Relay card is installed on Slot2, switch to "Slot" position.

When SNMP card is installed on Slot2, switch to "SNMP" position.

- SW3

To ensure good parallel communication quality, set the switch of the two farthest UPS to the "ON" position.



5. Configuration and start-up



DANGER

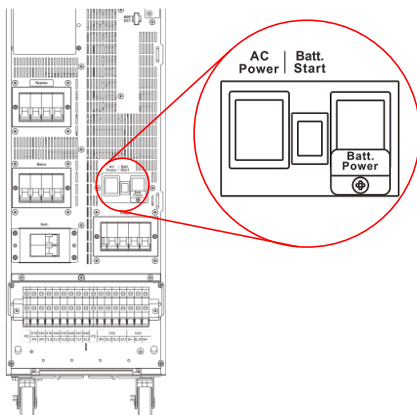
All the configurations and start-up operations must be carried out exclusively by a **SKILLED TECHNICIAN** (paragraph 2.2.1).

5.1 Pre-start-up checks

Before powering the equipment, carry out the following checks:

1. Close all the distribution panels on the UPS cabinet.
2. Check that the mains input disconnecter is open (OFF position).
3. Check that the bypass input disconnecter is open (OFF position).
4. Check that the output disconnecter is open (OFF position).
5. Check that the battery disconnectors of the external battery cabinets are open.
6. Check that the maintenance switch is open (OFF position).
7. Check that all UPS switches on the rear are turned OFF.
8. Check that the input, bypass and output wiring has been done and that all the connections have been tightened up properly.
9. Check the correct phase sequence of the input and bypass line (if separate).
10. Check that the parameters (voltage and frequency) of the mains input are compatible with those shown on the UPS rating plate.

5.2 Start-up procedures



- **AC Power**

This is the auxiliary power switch needed to turn ON the UPS in normal mode. Do not turn OFF the switch while the UPS is working.

- **Batt. Start**

This button is needed only for the cold start-up (see paragraph 5.2.2).

- **Batt. Power**

This switch is needed only for the cold start-up (see paragraph 5.2.2).

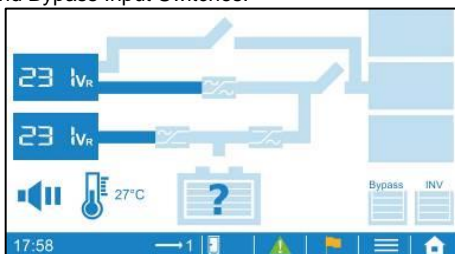
5.2.1 Start-up in normal mode

In Normal mode, grid power is passed through rectifier then used to charge the battery and provide power through the Inverter simultaneously.

Different output voltages settings can be set. The three options are 380/220V, 400/230V and 415/240V. These can be fine-tuned by $\pm 8V$.

1- In the rear of UPS, turn ON the **AC Power** switch.

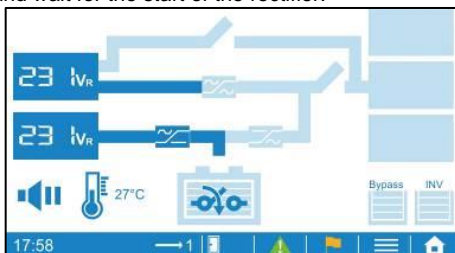
2- Close the UPS Mains Input and Bypass Input Switches.



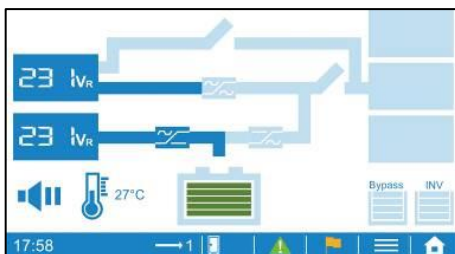
3- Check that the parameters in the configuration setting of the UPS correspond to the UPS installation (see paragraph 5.4.3)

4- Select **Home** → **Command** → **Operation** → **Normal Mode** on the LCD panel.

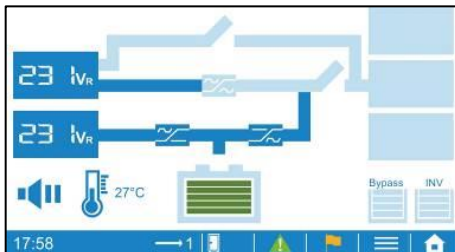
5- Return to the Mimic Display and wait for the start of the rectifier.



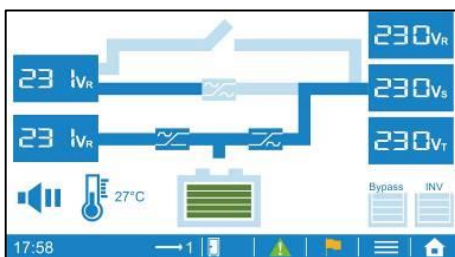
6- Close the battery breakers only after the rectifier has been turned on.



7- The inverter will be started and supply output voltage.



8- Close the UPS Output Switch to supply the power to the load.



5.2.2 Cold start

- 1- Close the battery breakers.
- 2- Turn ON the **Batt. Power** switch in the rear of UPS.
- 3- In the rear of UPS, push and hold down the button "**Batt. Start**" at least for seven seconds.
- 4- Select **Home** → **Command** → **Operation** → **ColdStart Precharge Ready** on the LCD panel.

If you want switch to normal mode operation, apply the procedure of the previous paragraph. Once the UPS is working in normal mode, turn OFF the **Batt. Power** switch in the rear of the UPS.

5.2.3 Start-up in Eco mode

This mode effectively improves the overall efficiency. Grid power is routed through the Static Switch to the load. At the same time, grid power continues to charge the battery in DC/DC mode through the rectifier. The Inverter is also kept ready to switch power supply modes at any time.

Select **Home** → **Command** → **Operation** → **Eco mode** on the LCD panel.

5.2.4 Start-up in Converter mode

Converter mode allows the user to provide a power supply with constant voltage and constant frequency based on their power requirements. The frequency can be set to 50Hz or 60Hz. The voltage options are 380/220V, 400/230V and 415/240V. These can be fine-tuned by $\pm 8V$.

Select **Home** → **Command** → **Operation** → **Converter mode** on the LCD panel.

5.3 Other procedures

5.3.1 Shutdown

- 1- Select **Home** → **Command** → **Operation** → **Shutdown** on the LCD panel.
- 2- After the UPS turned off and the power to the loads has been cut off, turn OFF the output breaker at the back of the UPS.
- 3- Turn OFF all the battery breakers.
- 4- Turn OFF the input and bypass breakers at the back of the UPS.

5.3.2 Switch to bypass

During the normal mode operation of the UPS, select **Home** → **Command** → **Operation** → **Load on Bypass** on the LCD panel.

The inverter will be shutdown and the bypass line will supply power to the load.


5.3.3 Switch from normal mode to maintenance mode (manual bypass)

The load transfer operation on manual bypass is carried out without discontinuity of power supply on the loads. To perform the transfer procedure correctly, check that there are no alarms on the system. In manual bypass, the load is powered directly from the input mains, so continuity of power supply to the loads cannot be guaranteed.

- 1- During the normal mode operation of the UPS, select **Home** → **Command** → **Operation** → **Load on Bypass** on the LCD panel.
- 2- The inverter will be shutdown and the bypass line will supply power to the load.
- 3- Turn OFF all battery breakers.
- 4- Turn ON the maintenance breaker.
- 5- Select **Home** → **Command** → **Operation** → **Shutdown** on the LCD panel.
- 6- Turn OFF the Output and Mains/Bypass Input switches.
- 7- Turn OFF the **AC Power** and **Batt. Power** switches at the back of the UPS.

5.3.4 Switch from maintenance mode (manual bypass) to normal mode

Using this procedure, you can reboot the system without having to power down the loads.

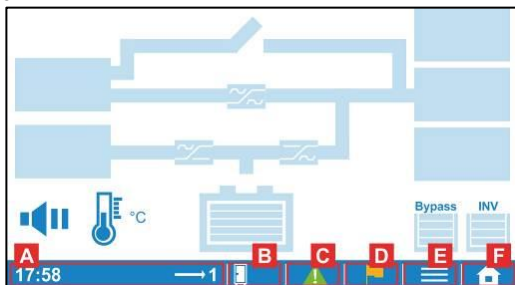
- 1- Turn ON the **AC Power** switch at the back of the UPS.
- 2- Turn ON the Output and Mains/Bypass Input switches.
- 3- Select **Home** → **Command** → **Operation** → **Load on Bypass** on the LCD panel.
- 4- Turn OFF the maintenance breaker.
- 5- Select **Home** → **Command** → **Operation** → **Normal Mode** on the LCD panel.
- 6- Return to **Mimic Display**. Wait for the rectifier to start. The icon  will show you when you can close the battery breakers.



5.4 Front Panel

The UPS is equipped with an LCD touch screen which provides a simple and intuitive user interface. The touch screen is organized with a home page, through which it is possible to access all the main sections, and with a mimic diagram which shows the energy flow and the main input/output operating parameters.

5.4.1 Touch screen sections

The bottom part of the touch screen contains tap-sensible areas which lead to different sections of the UPS monitoring interface.




- [A] Display the current time and the status of the UPS
- [B] Indicate Single or Parallel system, and select the desired UPS unit to check the information
 - 1 Single unit
 - 2 Parallel system
- [C] Shows the alarm messages
 -  The green icon indicates that no alarm is present
 -  The red icon indicates the presence of alarms
- [D] Shows the UPS status
- [E] Enters the Sub-Menu, if available in that specific page
- [F] Opens the Menu page (Home)


5.4.2 Menu pages

The Menu page can be opened by tapping the icon . The pages can be changed by sliding on the screen until the required section is shown. The sections available are:

- Mimic Display;
- Command;
- Monitor;
- Configuration;
- Management;
- Setting;
- Event Log;
- Permission Setting.




Each menu also contains sub-sections, which can be accessed by pressing the icon . When entering the *Command* menu, the following page is shown:



By pressing the icon , the sub-sections can be shown or hidden.



Some function pages will also show command buttons.

Button	Assigned functions
	➤ Save the new settings
	➤ Reload the data
	➤ Go to mimic display

The structure of the menu and sub-menu is shown in the following table.

Menu	Sub-menu	Functions
Mimic Display	-	Display the UPS status, alarms, operating mode and measurements. See paragraph 5.3.4.
Command ¹	<i>Operation</i>	<ul style="list-style-type: none"> • Normal mode • ECO mode • Converter mode • Shutdown • Load on bypass • Cold start precharge ready
	<i>Buzzer & Alarm</i>	<ul style="list-style-type: none"> • Enable/disable buzzer • Clear latched alarms and silence buzzer
	<i>Other</i>	<ul style="list-style-type: none"> • Force Charger ON • Recover backfeed protection signal • Clear UPS Maintenance Alarm
	<i>Battery Test</i>	<ul style="list-style-type: none"> • Battery Test • Turn OFF the Battery Test
Monitor	<i>Identification</i>	Display UPS information
	<i>Real Time Information</i>	Display real time measurements of input, output, bypass and battery
	<i>Maintenance Code</i>	Display the maintenance code for technician to check the status of the UPS
	<i>Version</i>	Display the control MCU software and firmware version
Configuration	<i>Alarm</i>	Set alarm latch function <ul style="list-style-type: none"> • General alarm • Mains alarm • Bypass alarm • Over temperature • Battery low • Inverter overload • Bypass overload • EPO activated
	<i>Mains</i>	Select the measurements on mimic display

	<i>Bypass</i>	
	<i>Output</i>	
Management	<i>Schedule</i>	Display the schedule
	<i>Schedule setting ¹</i>	Define the schedule for the ECO mode operation
	<i>Battery test schedule ¹</i>	Define the schedule for the battery test
Setting	<i>Language</i>	Select the display language
	<i>Update Prog.</i>	Upgrade the software of LCD touch display
	<i>General</i>	Set the turn off time of LCD backlight
	<i>Date and Time</i>	Set date and time
	<i>Peripherals ¹</i>	Set communication card
	<i>Parameters ¹</i>	Set the UPS parameters
Event log	-	Display the event log list of UPS.
Permission setting	<i>Login / Logout</i>	Login with the password. ²
	<i>Password Modification ¹</i>	Change the user password.

⁽¹⁾ This function menu is only shown after login, refer to *Permission setting*

⁽²⁾ Default password is 1234

5.4.3 Parameters section

The *Parameters* page is a sub-section of the *Setting* menu.

Locate the *Setting* icon on the home page and tap on it to open the relevant section; the following page will appear.



Tap the arrow to scroll the sub-sections and select *Parameters*.

In the following page enter the password and press *Enter* to enable the modification of the UPS parameters. The parameters cannot be modified in normal operation mode but only when the UPS is in bypass mode.

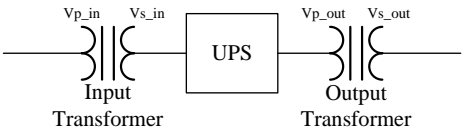
<i>Parameters</i>	<i>Content</i>	<i>Range</i>	<i>Default</i>
Battery	Independent/Common	Ind. / Common	Common
	Total cell number	180 ÷ 240 ¹	240
	Capacity	1 ÷ 1000	9
	Voltage temperature/compensation	Yes / No	No
	Detect the batt. connecting	Yes / No	Yes
	Charger current	0.0 ÷ 1.0	0.1
	CV Charger voltage [V/cell]	2.000 ÷ 2.550	2.300
	FV Charger voltage [V/cell]	2.000 ÷ 2.550	2.250
	Low battery voltage [V/cell]	1.850 ÷ 1.883	1.850
	Weak battery voltage [V/cell]	1.600 ÷ 1800	1.670
	Battery test 2 minutes	Yes / No	Yes
Output	Output voltage	220 – 230 - 240	230
	Output frequency	50 - 60	50
	Fine adjustment voltage	-8 ÷ 8	0
Transformer	Input transformer	No / Mains & Bypass	No
	Input transformer ratio ²	0.00 ÷ 10.00	0
	Output transformer	No / Yes	No

	Output transformer ratio ²	0.00 ÷ 10.00	0
Other	Unit number	1 ÷ 6	1
	Number of units in parallel system	1 ÷ 6	1
	Set EPO logic	NO/NC	NO

⁽¹⁾ The Range setting for 10kVA is 156 ~ 240 and 15-20kVA is 192 ~ 240.

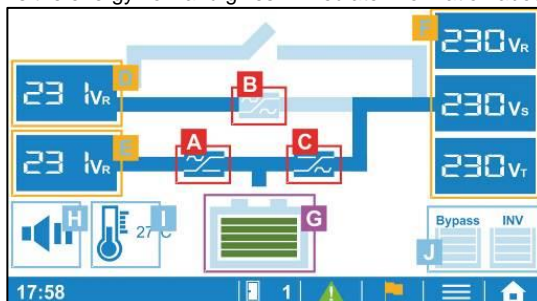
⁽²⁾ Transformer ratios can be calculated as following:

Input transformer ratio = V_{p_in}/V_{s_in} ; Output transformer ratio = V_{s_out}/V_{p_out}



5.4.4 Mimic display

The mimic display shows the energy flow and gives immediate information about the UPS status.



[A] Rectifier

[B] Static switch

[C] Inverter



→ The part is not activated



→ The part is activated and correctly operating



→ Abnormal condition or failure

[D] Displays the bypass input measurements

[E] Displays the mains input measurements

[F] Displays the UPS output measurements

Any abnormal measurement will have a red background

Tap on the desired section to change the measure parameters.

Press for 3 seconds to check the real time information.

[G] Displays the battery status.

Press for 3 seconds to check the real time information.



→ The battery is not connected



→ The battery is charging



→ The battery is discharging

[H] Silences the buzzer

Tap on it to silence the alarm.

Press for 3 seconds to enable/disable the buzzer.



→ Buzzer is enabled



→ Buzzer is disabled

[I] Displays the UPS internal temperature

Press for 3 seconds to check the real time information.

[J] Overload counter

6. Maintenance



DANGER

INSTALLATION and ORDINARY MAINTENANCE operations must be carried out only by SKILLED TECHNICIANS (paragraph 2.2.1).

EXTRAORDINARY MAINTENANCE operations must be carried out only by LEGRAND TECHNICAL SUPPORT SERVICE.

LEGRAND declines all liability for any injury or damage caused by activities carried out differently from the instructions written in this manual.

6.1 Preventive maintenance

The UPS does not contain parts for preventative maintenance by the operator.

The operator must regularly perform:

- a general external cleaning;
- a check to verify there is no alarm indication on the display;
- a check to verify the correct functioning of the ventilating fans.

6.2 Periodical checks

The correct functioning of the UPS must be guaranteed by periodical maintenance inspections. These are essential to safeguard the reliability of the equipment.

These inspections should also be made to determine if components, wiring, and connections exhibit evidence of overheating.

During a maintenance inspection, the skilled technician must carry out the following checks:

- no alarm presence;
- list of the memorised events;
- correct function of the static and maintenance bypass;
- integrity of the electrical installation;
- flow of cold air;
- battery status;
- characteristics of the applied load;
- conditions of the installation location.



Contact the LEGRAND Technical Support Service in case of problems.

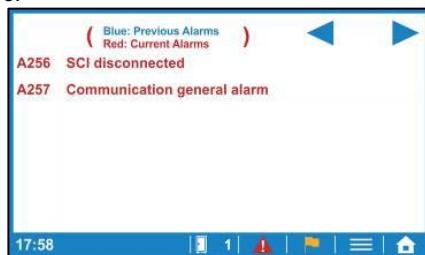


WARNING

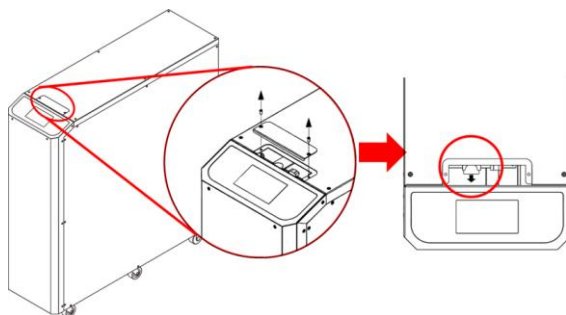
The periodical checks involve operations inside the UPS in presence of dangerous voltages. Only maintenance personnel trained by LEGRAND are authorized to intervene.

6.3 Ordinary maintenance


In case of failure, the display area on the control panel will highlight the problem area in red. The "Alarm" symbol  will also blink to warn that there is a problem with the UPS. Click  to have an alarm list as the below picture.

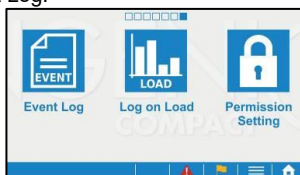


It is recommended to export the event log and the UPS information from LCD panel to the SD card.



To ensure this, follow these steps:

1. Make sure the SD card has been inserted on the LCD panel.
2. On LCD, select  → Event Log.



3. Before the export, refresh the log on the LCD panel.
4. After all log has been showed, touch again for 2 seconds.
5. The LCD panel will show " Export ? ". Then select " Enter ".
6. The event log and machine information will be saved on SD card named xxxx_KN_xx_IDx_XXXXXX_Log.txt and xxxx_KN_xx_IDx_XXXXXX_Inf.mch. Send these files to LEGRAND Technical Support Service.

6.4 Extraordinary maintenance

Contact the LEGRAND Technical Support Service if there are failures that require the access to internal parts of the UPS.

7. Warehousing



DANGER

All storage operations must be carried out only by a **SKILLED TECHNICIAN** (paragraph 2.2.1)



DANGER

A **SKILLED TECHNICIAN** must check that there is no voltage present before disconnecting the cables. All the battery isolator switches on the UPS and on the external battery cabinets must be open.

7.1 UPS

The UPS must be stored in an environment with a room temperature between -20°C (-4°F) and +50°C (+122°F) and humidity less than 90% (not condensing).

7.2 Batteries

It is possible to store batteries without recharging them in the following conditions:

- up to 6 months if the temperature is between +20°C (+68°F) and +30°C (+86°F);
- up to 3 months if the temperature is between +30°C (+86°F) and +40°C (+104°F);
- up to 2 months if the temperature is over +40°C (+104°F).



CAUTION

Batteries must never be stored if partially or totally discharged.

LEGRAND is not liable for any damage or bad functioning caused to the UPS by wrong warehousing of the batteries.

8. Dismantling



DANGER

Dismantling and disposal operations must be carried out only by a **SKILLED TECHNICIAN** (paragraph 2.2.1).

The instructions in this chapter are to be considered indicative: in every country there are different regulations regarding the disposal of electronic or hazardous waste such as batteries. It is necessary to strictly adhere to the standards in force in the country where the equipment is used.

Do not throw any component of the equipment in the ordinary rubbish.

8.1 Battery disposal

Batteries must be disposed of in a site intended for the recovery of toxic waste. Disposal in the traditional rubbish is not allowed.

Apply to the competent agencies in your countries for the proper procedure.



Pb



WARNING

A battery may constitute a risk of electric shock and high short-circuit current.

When working on batteries, the prescriptions indicated in chapter 2 must be adhered to.

8.2 UPS dismantling

The dismantling of the UPS must occur after the dismantling of the various parts it consists of.

For the dismantling operations, it is necessary to wear the Personal Protective Equipment mentioned in paragraph 2.3.

Sub-divide the components separating the metal from the plastic, from the copper and so on according to the type of selective waste disposal in the country where the equipment is dismantled.

If the dismantled components must be stored before their disposal, be careful to keep them in a safe place protected from atmospheric agents to avoid soil and groundwater contamination.

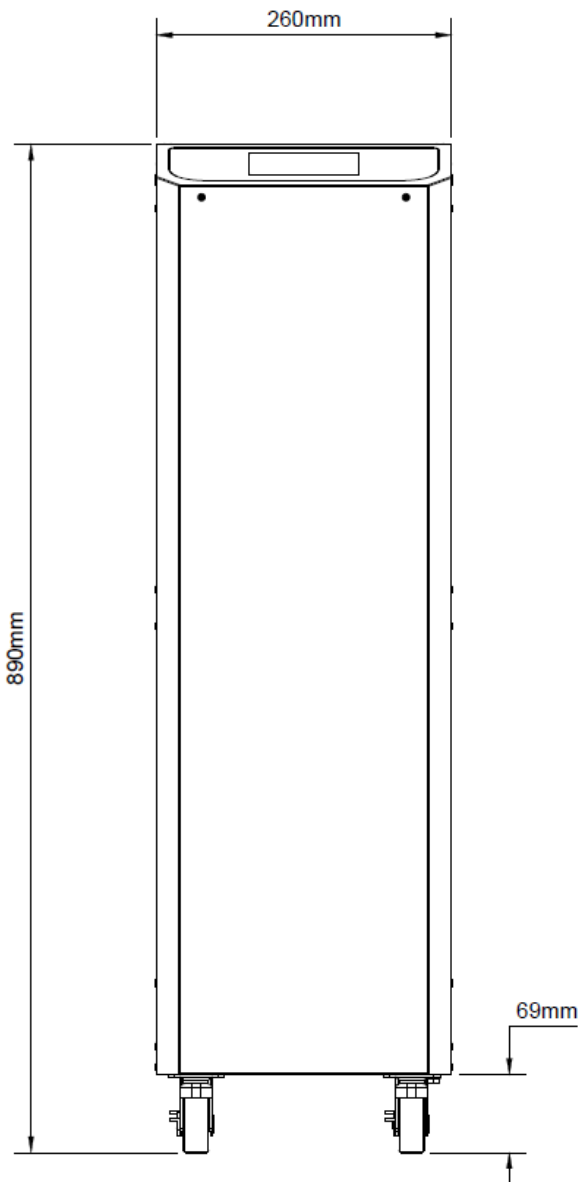
8.3 Electronic component dismantling

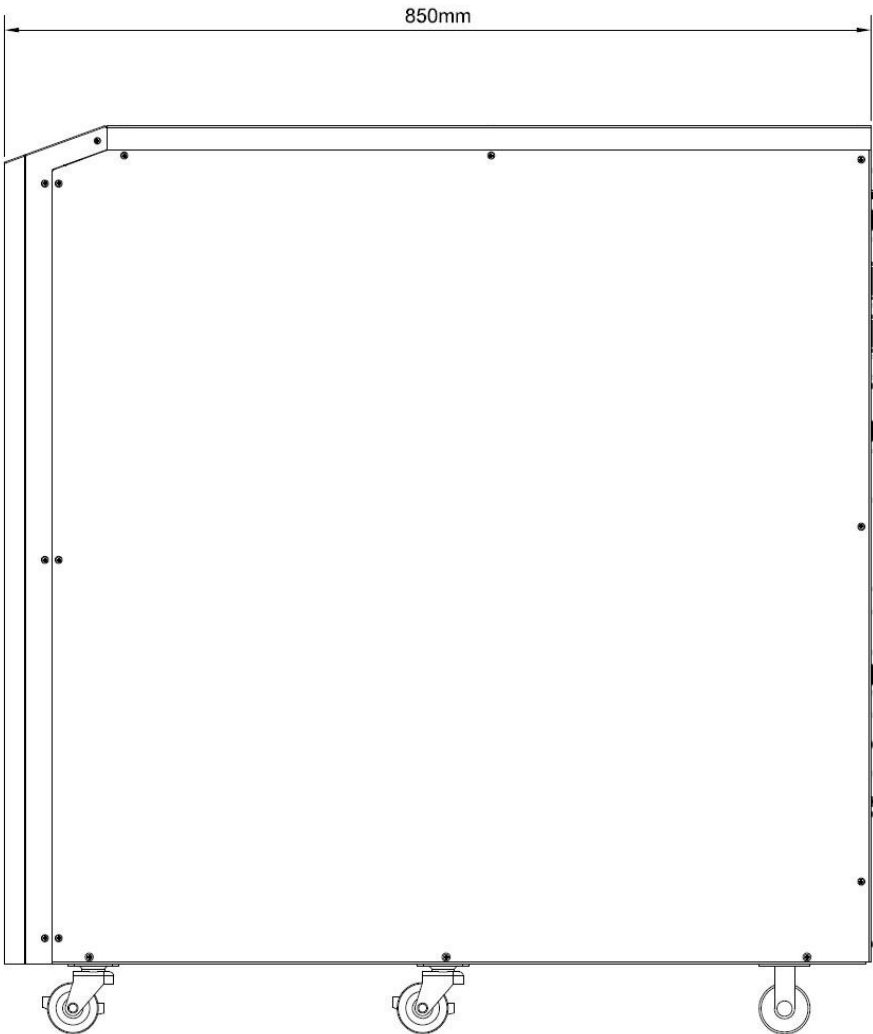
For the disposal of electronic waste, it is necessary to refer to the relevant standards.



This symbol indicates that in order to prevent any negative effects on the environment and on people, this product should be disposed of separately from other household waste, by taking it to authorised collection centres, in accordance with the EU countries local waste disposal legislations. Disposing of the product without following local regulations may be punished by law. It is recommended to check that this equipment subject to WEEE legislations in the country where it is used.

9. Mechanical characteristics





10. Technical data

MAIN FEATURES

	3 111 00 3 111 01 Keor Compact 10	3 111 02 3 111 03 Keor Compact 15	3 111 04 3 111 05 Keor Compact 20
Nominal Power (kVA)	10	15	20
Active Power (kW)	9	13,5	18
Technology	online, double conversion VFI-SS-111 (EN62040-3)		
IN/OUT configuration	Three-phase / Three-phase		
Dual Input	available		
Architecture	Stand-alone or Distributed Parallel up to 6 units		
Wave form during operation in normal/battery mode	Pure sine wave		
Bypass	Automatic (static and electromechanical) Manual (for maintenance)		

INPUT ELECTRICAL CHARACTERISTICS

	3 111 00 3 111 01 Keor Compact 10	3 111 02 3 111 03 Keor Compact 15	3 111 04 3 111 05 Keor Compact 20
Maximum input current (A)	17.4	25.6	34.4
Input voltage (V)	$400 \pm 20\%$ at full load $400 - 40\% \sim -20\%$ at half load (3F+N+PE)		
Input frequency (Hz)	40 ~ 70		
Input Power Factor	> 0.99		
Total harmonic distortion of the input current	THDi < 3% (at full load)		
Compatibility with Diesel Generators	available		

OUTPUT ELECTRICAL CHARACTERISTICS

	3 111 00 3 111 01 Keor Compact 10	3 111 02 3 111 03 Keor Compact 15	3 111 04 3 111 05 Keor Compact 20
Maximum output current (A)	15.2	22.8	30.4
Output voltage (V)	380/400/415 \pm 1% (with static load) (3F+N+PE)		
Output frequency (Hz)	50 / 60		
Range of the output frequency	\pm 0.01 % (free running)		
Power Factor	0.9		
Crest factor admitted on the output current	3:1		
Total harmonic distortion of the output voltage	THDv < 2% (at full linear load) THDv < 5% (at full non-linear load)		
Efficiency in Normal Mode (AC/AC online)	up to 95%		
Efficiency in Eco Mode	Up to 98.5%		
Overload capacity	110% for 60 minutes 125% for 10 minutes 150% for 1minutes <105% overload continuously without alarm >= 105% <110% continuously with alarm		

BYPASS ELECTRICAL CHARACTERISTICS

	3 111 00 3 111 01 Keor Compact 10	3 111 02 3 111 03 Keor Compact 15	3 111 04 3 111 05 Keor Compact 20
Bypass voltage (V)	380/400/415 \pm 10% (adjustable \pm 5% ~ \pm 15%) (3F+N+PE)		
Bypass frequency (Hz)	50 / 60		
Range of the bypass frequency	\pm 1 / \pm 3 (selectable)		

BATTERIES AND BATTERY CHARGER CHARACTERISTICS

	3 111 00 3 111 01 Keor Compact 10	3 111 02 3 111 03 Keor Compact 15	3 111 04 3 111 05 Keor Compact 20
Battery type	VRLA 12V		
Number of internal batteries installed	30 – 9Ah (3 111 01)	36 – 9Ah (3 111 03)	40 – 9Ah (3 111 05)
Cold start	available		
Charging current (A)	3.5 at 100% load 7.0 at 80% load* 10 at 60% load*	5 at 100% load 10 at 80% load* 15 at 60% load*	7 at 100% load 14 at 80% load* 21 at 60% load*

(*) enabling by SW

FEATURES

	3 111 00 3 111 01 Keor Compact 10	3 111 02 3 111 03 Keor Compact 15	3 111 04 3 111 05 Keor Compact 20
Display	4.3" Colorful LCD Touch Screen		
Communication ports	RS232 port dry contacts 2 Communication Slots for SNMP Card <i>(optional)</i> RS-485 MODBUS Card <i>(optional)</i> Programmable Dry Contact Card <i>(optional)</i>		
Protections	Backfeed protection embedded Emergency Power Off (EPO) Electronic against overloads, short-circuit and excessive battery discharge		

MECHANICAL CHARACTERISTICS

	3 111 00 (*) 3 111 01 Keor Compact 10	3 111 02 (*) 3 111 03 Keor Compact 15	3 111 04 (*) 3 111 05 Keor Compact 20
Dimensions W x D x H (mm)	260 x 850 x 890		
Color	RAL9017 (Black-cabinet) RAL9003 (White-control panel)		
Ventilation	Forced with FANs from front to rear		
Transport Packaging	Carton Box on Pallet		
Net weight with batteries (kg)	149	166	176
Net weight without batteries (*) (kg)	74 (*)	76 (*)	76 (*)

ENVIRONMENTAL CONDITIONS

	3 111 00 3 111 01 Keor Compact 10	3 111 02 3 111 03 Keor Compact 15	3 111 04 3 111 05 Keor Compact 20
Operating temperature (°C)	0 ÷ +40 (+20 ÷ +25 recommended for longer battery life)		
Relative humidity during operation	20% ÷ 95% non-condensing		
Storage temperature (°C)	-20 ÷ +70 (excluding batteries)		
Noise level at 1 meter (dBA)	< 52		
Ingress Protection Marking	IP 20		
Operating height	up to 1000 meters above sea level without derating (power derate -1% every additional 100 meters)		
Heat dissipation with full load and battery in recharge (W)	600	900	1300

REFERENCE DIRECTIVES AND STANDARDS

Safety	2014/35/EU Directive EN 62040-1
EMC	2014/30/EU Directive EN 62040-2
Performance and test requirements	EN 62040-3

11. Tables

CAUTION

The choice of the type and section of the power cables must be done according to the voltage and rated current as well as the local wiring standards and regulations. It is a responsibility of the installation engineer.

The input current and the output power of the UPS are indicated in chapter 10 and the battery current in table 4 of this chapter.

The following tables give an indication of the wire cross sections to use if the wires are unipolar with simple PVC installation and installation in tube in the air.

TABLE 1
Minimum wire cross sections recommended for Keor Compact UPS

POWER	INPUT CABLE	BYPASS CABLE	OUTPUT CABLE
10 kVA	1 x 4 mm ² per pole	1 x 4 mm ² per pole	1 x 4 mm ² per pole
15 kVA	1 x 6 mm ² per pole	1 x 6 mm ² per pole	1 x 6 mm ² per pole
20 kVA	1 x 10 mm ² per pole	1 x 6 mm ² per pole	1 x 6 mm ² per pole

The recommended maximum length of cabling is less than 10 meters.

Over-size the neutral line N by 1.7 times of the phase line for non-linear loads.

TABLE 2
Automatic breaker recommended for input and bypass line

POWER	AUTOMATIC CIRCUIT BREAKER
10 kVA	I _N =20 A curve C I _{cp} =10kA
15 kVA	I _N =25 A curve C I _{cp} =10kA
20 kVA	I _N =40 A curve C I _{cp} =10kA

Curve D breaker is recommended for motor loads with high starting currents.

TABLE 3
Residual current breaker recommended for input and bypass line

POWER	RESIDUAL CURRENT BREAKER (I Δ n)
10 kVA	≥ 300 mA type B
15 kVA	
20 kVA	

TABLE 4
Maximum battery current during discharge at full load and minimum wire cross sections recommended for connecting the UPS to the external battery cabinets

POWER	MAXIMUM BATTERY CURRENT (32 battery blocks)	MINIMUM WIRE CROSS SECTION
10 kVA	31 A	10 mm ² per pole
15 kVA	46.5 A	16 mm ² per pole
20 kVA	62 A	16 mm ² per pole

The recommended maximum length of cabling is less than 10 meters.

Over-size the neutral line N by 1.7 times of the phase line for non-linear loads.

TABLE 5
Recommended fuses to be installed on the bypass line to protect the UPS electronic

POWER	FUSES
10 kVA	Bussmann FWP-32A14F or Bussmann FWP-32A22F
15 kVA	Bussmann FWP-50A14F or Bussmann FWP-50A22F
20 kVA	

LEGRAND
Pro and Consumer Service
BP 30076 - 87002
LIMOGES CEDEX FRANCE
www.legrand.com

Installer stamp

Legrand reserves at any time the right to modify the contents of this booklet and to communicate, in any form and modality, the changes brought to the same.