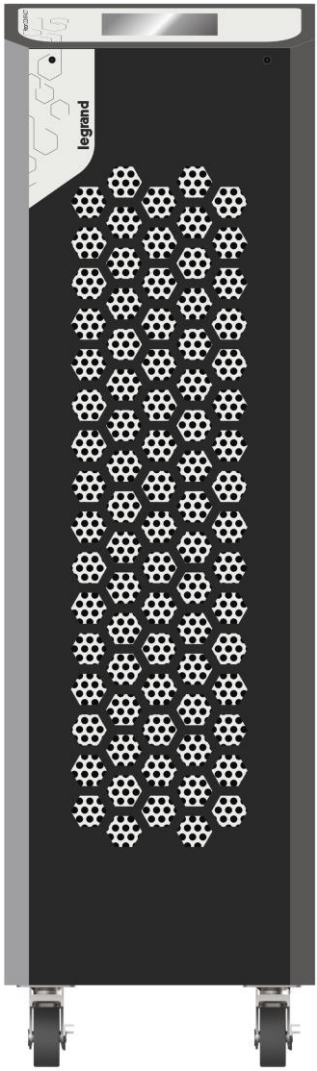
KEOR COMPACT

Installation and User Manual



LE12675AA – 2021/03

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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 hiip://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.

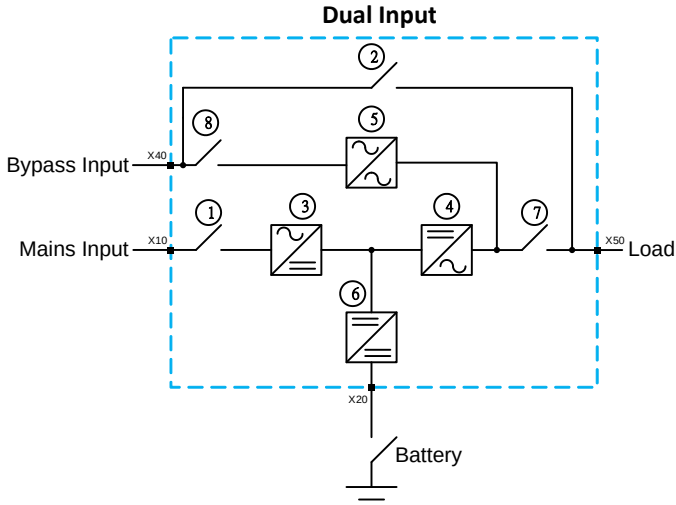
1.5.2 Extension of the guarantee and maintenance contracts

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

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]

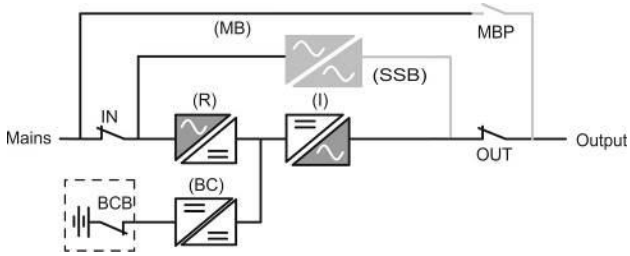
The maintenance bypass is used to cut off the UPS completely, supplying the load directly from the input mains in case of maintenance or serious failure.

1.7.1 UPS operating modes

The UPS has four main operating modes.

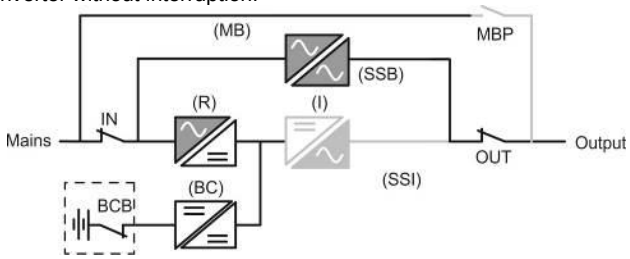
- Normal operation

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.



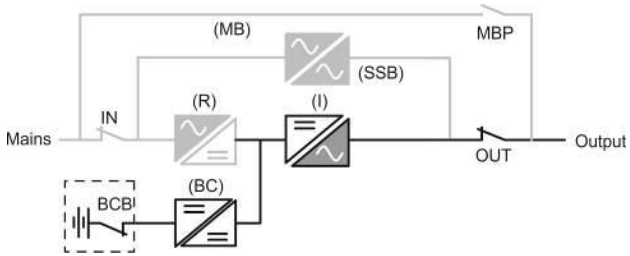
- Bypass operation

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.



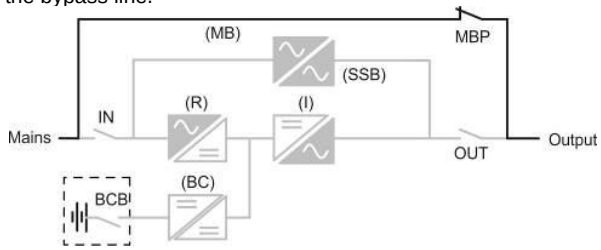
- Battery operation

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 disconnector 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

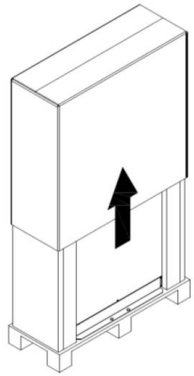
The equipment and the relative supplied accessories must be in perfect conditions.
Check that:
- the shipping data (address of the recipient, no. of packages, order no, etc.) correspond to what is contained in the delivery documentation;
- the technical rating plate data on the label applied to the UPS 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.

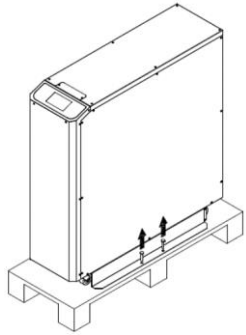
INDICATION
The installation manual must be used and consulted only by skilled technicians.

3.3 Unpacking

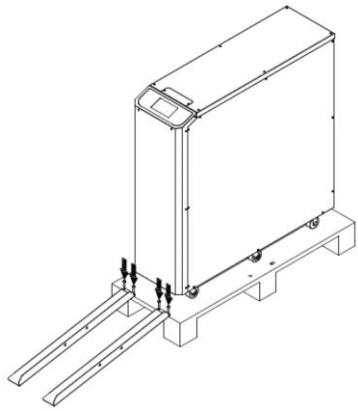
To remove the packaging material, comply with the following procedure:
- bring the UPS to the installation site using a forklift and/or a transpallet with suitable characteristics;
- remove the packaging material, cut straps and cardboards protecting the UPS;



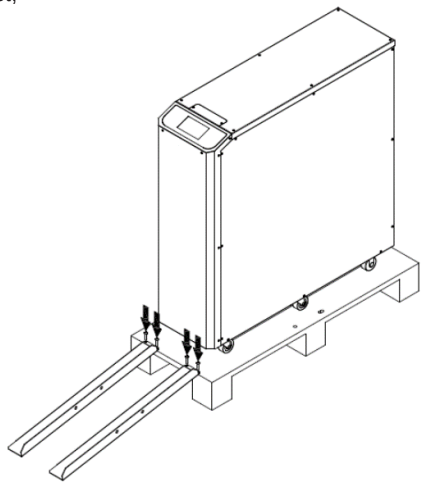
- unscrew the fastening rail kits on the right and left side;



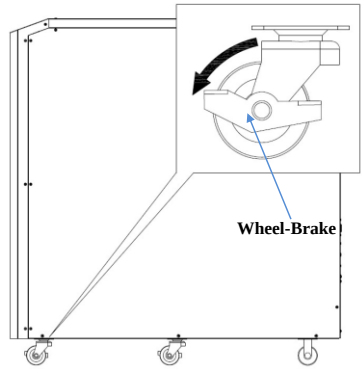
- put two fastening rail kits on the pallet edge and make them steady by fastening four screws in the pallet;



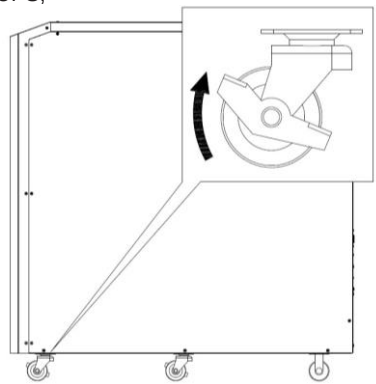
- remove the UPS from the pallet;



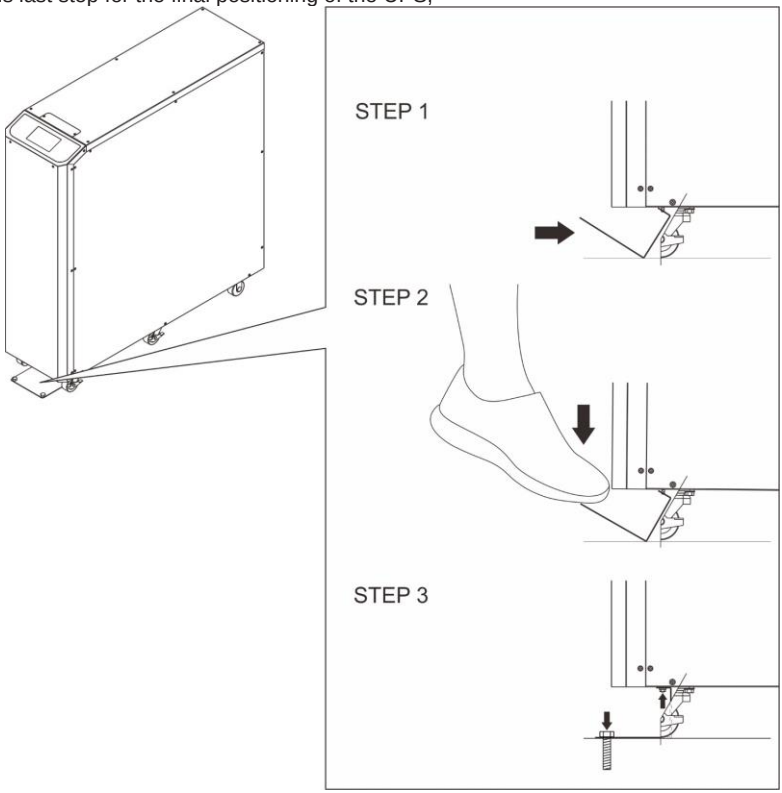
- block the wheel-brakes to fix the UPS;



- 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.

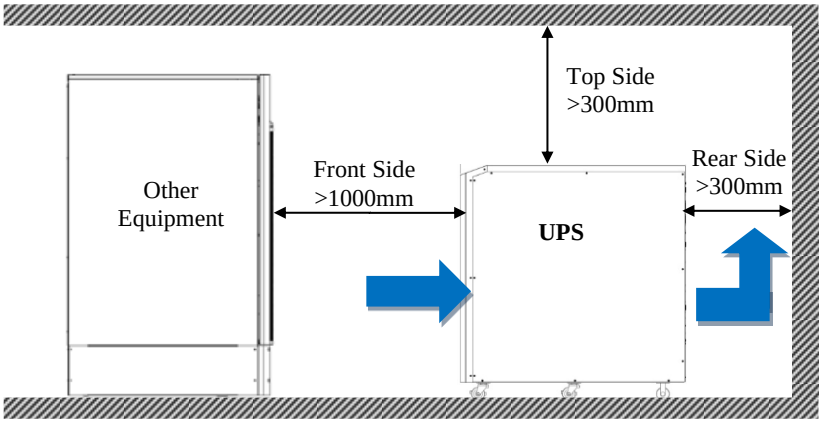
The Keor Compact UPS has six wheels at the bottom of the cabinet. Before installations and while it is still empty, it can be moved by hand by at least two people.
For any lifting, use a forklift or a transpallet with an adequate carrying capacity, placing the forks in the specific spaces of the base 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

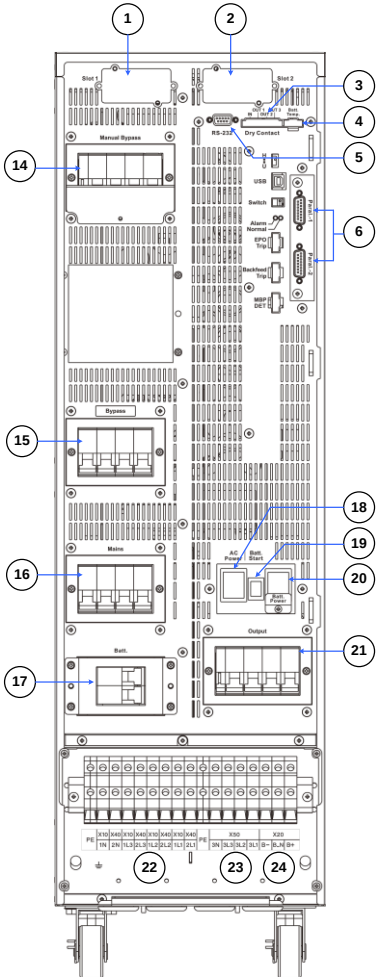
DANGER

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

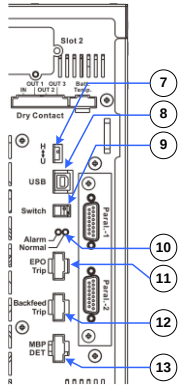
- The UPS has a high leakage current. The earthing connection must be connected before cabling the UPS input. The switchgear must have a safe connection with the earthing and an adequate protection as required by the installation standards.
- The UPS must only be installed in a fixed way with a thermal-magnetic 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



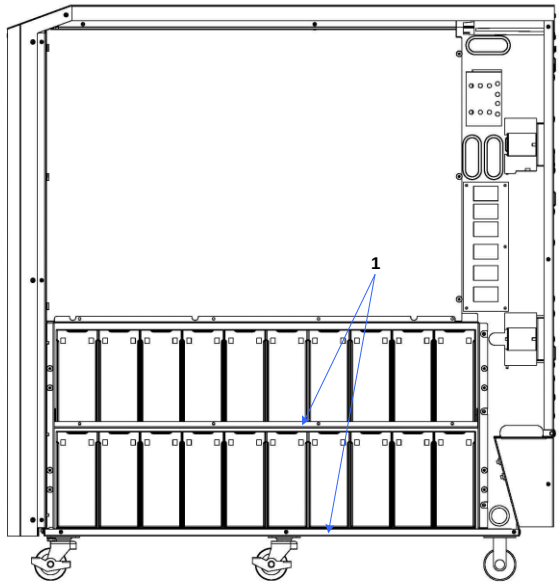
1. Communication Slot 1
2. Communication Slot2
3. Dry Contacts
4. External Battery Temperature Connector
5. RS-232 Port for Setting Software
6. Parallel Communication Ports (Option)



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

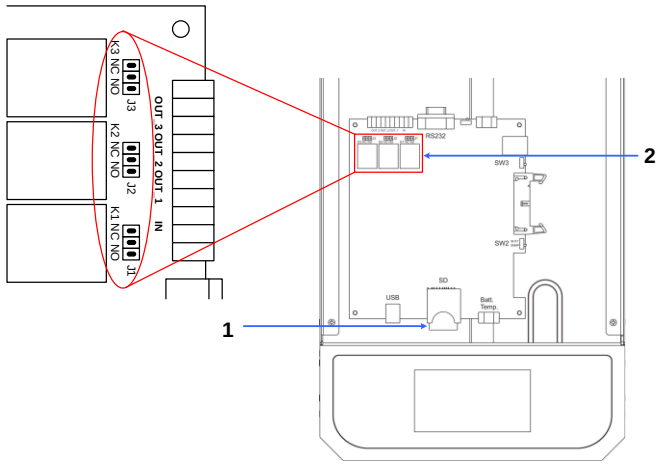
14. Manual Bypass Breaker
15. Bypass Input Breaker
16. Mains Input Breaker
17. Battery Breaker
18. AC Working Power
19. Batt. Start
20. Batt. Working Power
21. Output Breaker
22. X10/X40: Mains/Bypass Input Connections Terminal (1N, 2N, 1L3, 2L3, 1L2, 2L2, 1L1, 2L1)
23. X50: Output Connection Terminals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

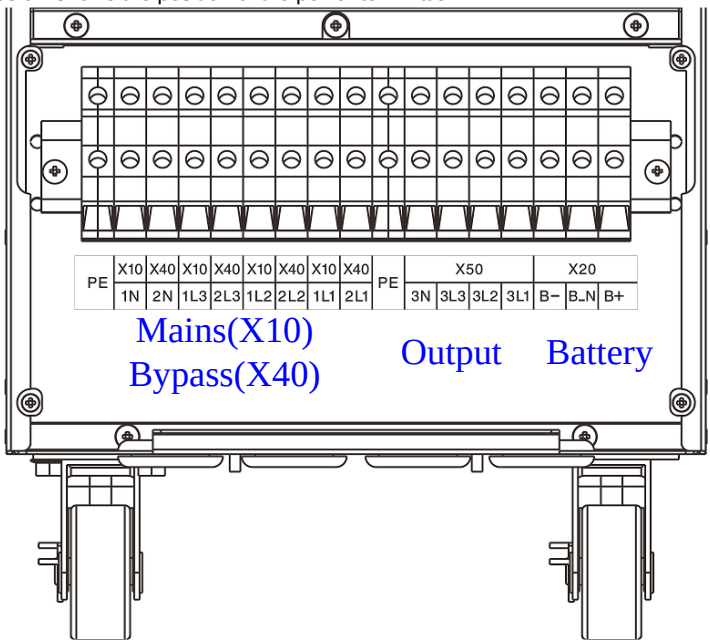
WARNING

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.

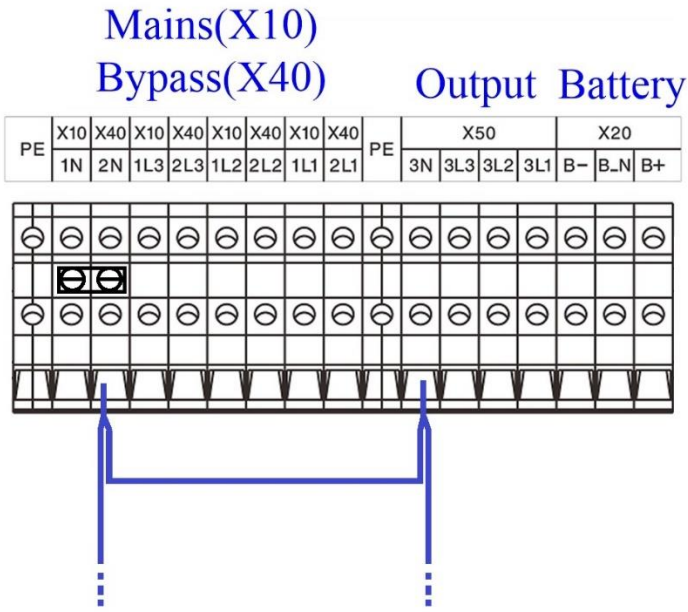
INDICATION

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.

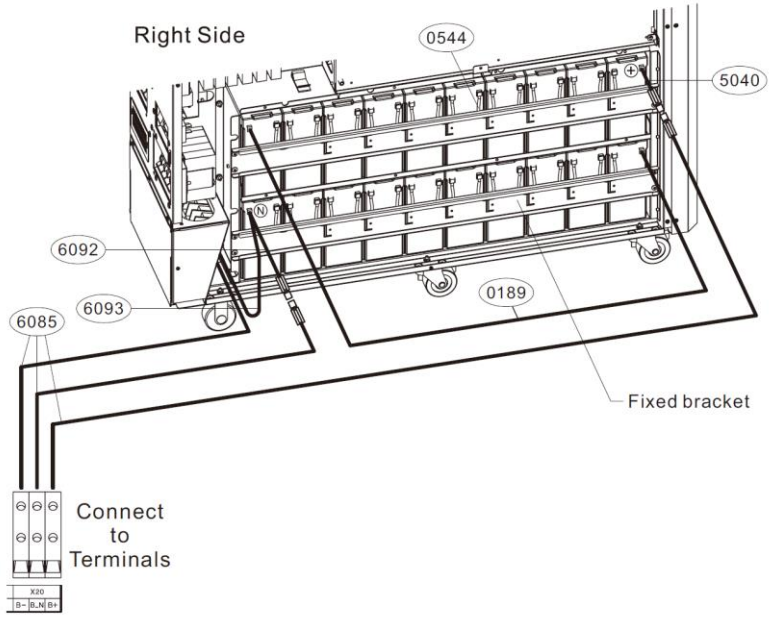
The minimum cross-sectional area of the earthing conductor must be chosen according to the following criteria:

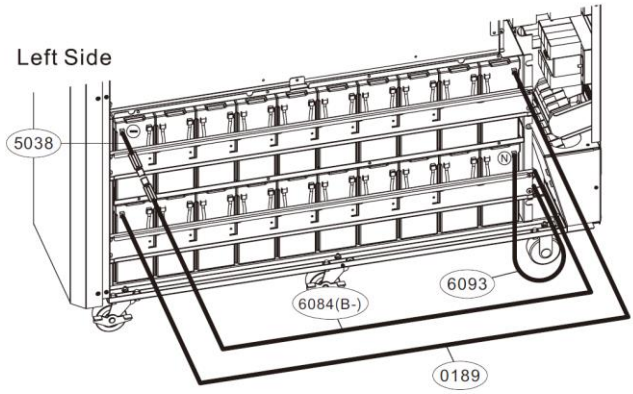
- if the cross-sectional area S of the phase conductors is $S \leq 16\ mm^2$, the minimum cross-sectional area of the earthing conductor must be the same as the phase conductors;
- if the cross-sectional area S of the phase conductors is $16\ mm^2 < S \leq 35\ mm^2$, the minimum cross-sectional area of the earthing conductor must be16 mm^2;
- if the cross-sectional area S of the phase conductors is $S > 35\ mm^2$, the minimum cross-sectional area of the earthing conductor must be $S/2\ mm^2$.

4.3.3 Internal battery installation

4.3.3.1 Keor Compact 20 kVA

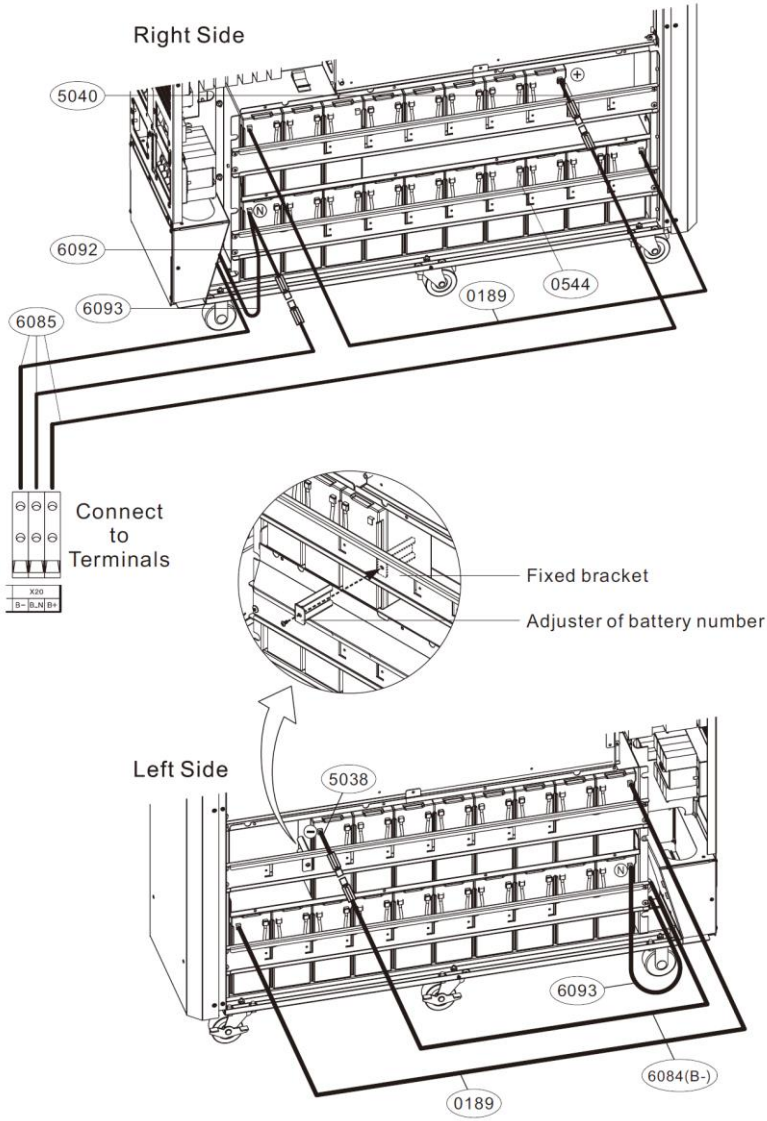
40 PCS





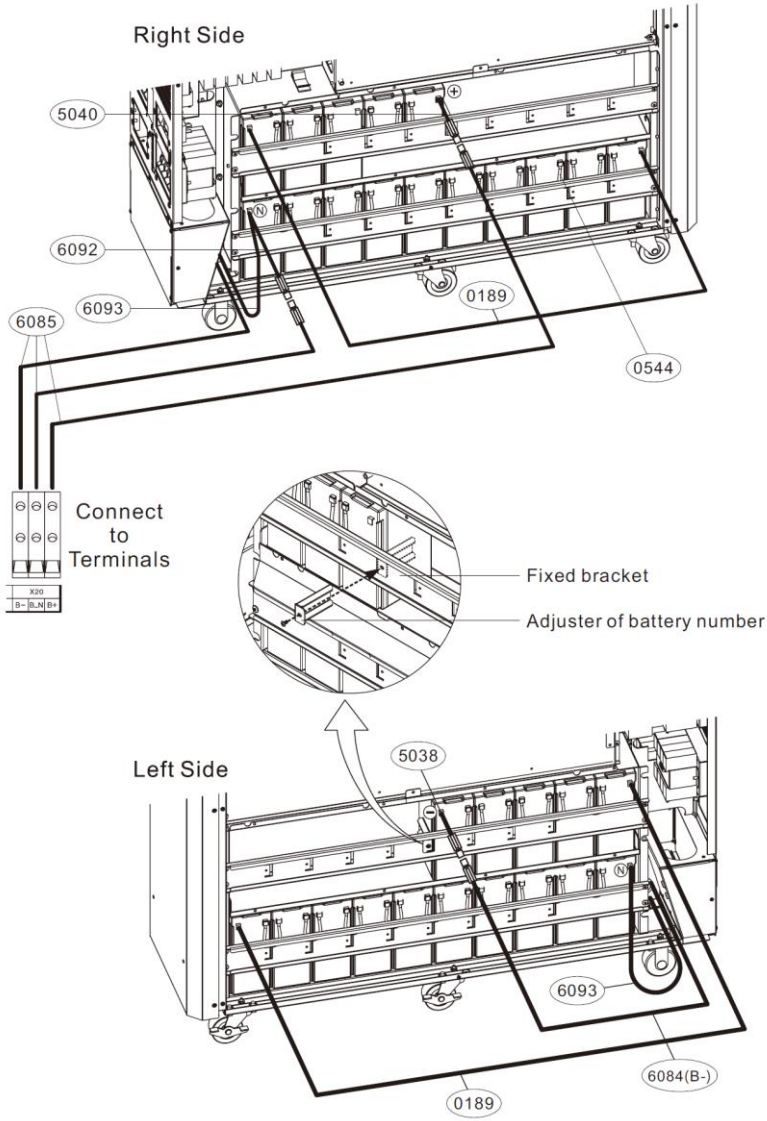
4.3.3.2 Keor Compact 15 kVA

36 PCS



4.3.3.3 Keor Compact 10 kVA

30 PCS



4.3.4 Terminals configuration

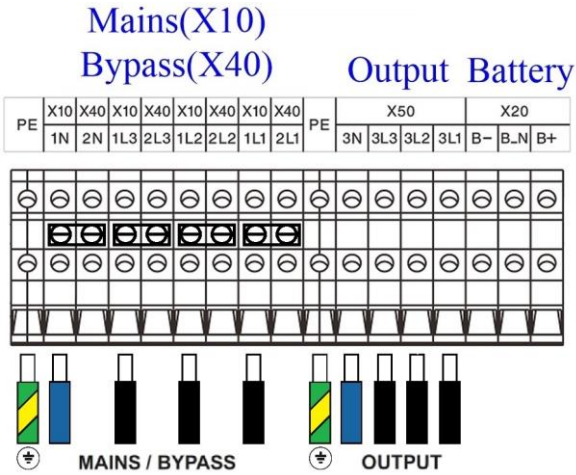
The electrical configuration must be done on the distribution terminal strip.

WARNING

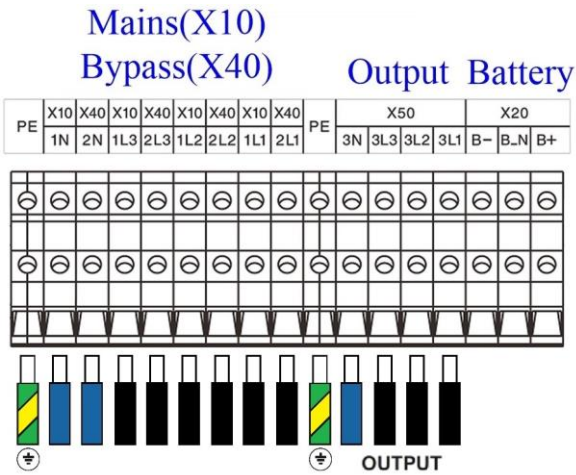
Always check that the connection jumper screws are tightened properly.

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”).

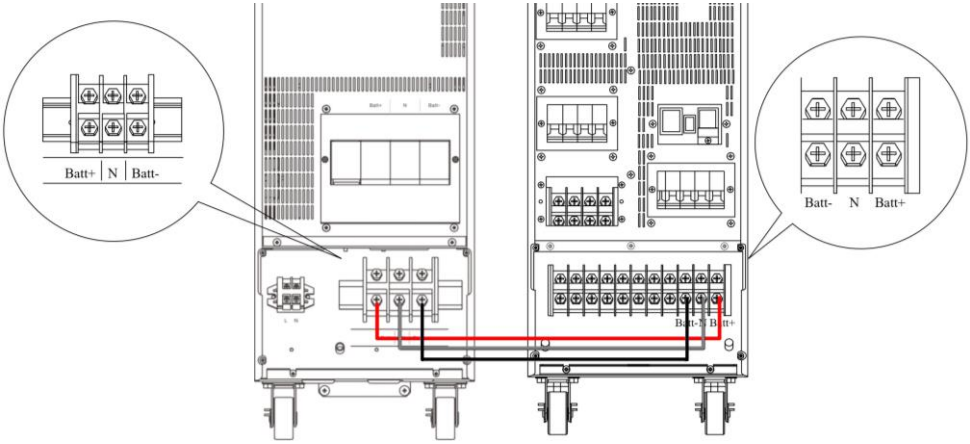
WARNING

The neutral output cable must always be connected.

4.3.8 Battery cables installation for external battery cabinets

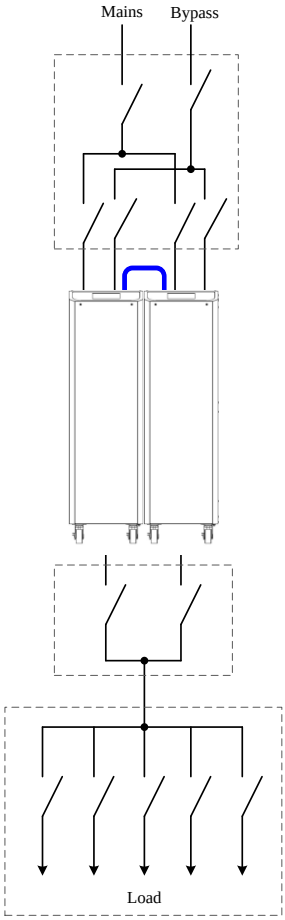
If there are external battery cabinets, follow the instructions in the installation manual of the external battery cabinets and perform the installation according to the following steps:

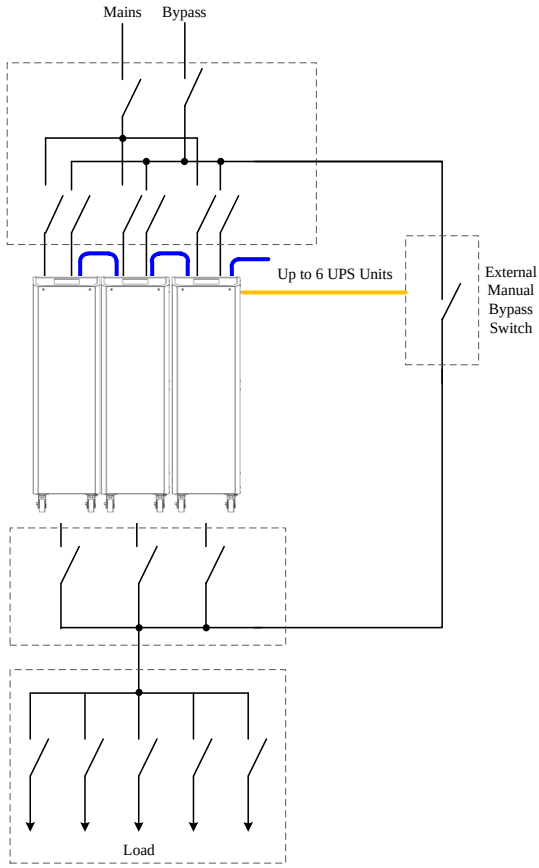
- Make sure all battery breakers are open;
- check that the cables for connecting the UPS are insulated upstream and that there is no voltage;
- check that the grounding cable of the low voltage cabinet is correctly connected (see paragraph 4.2.3);
- connect the positive cables of the battery cabinets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

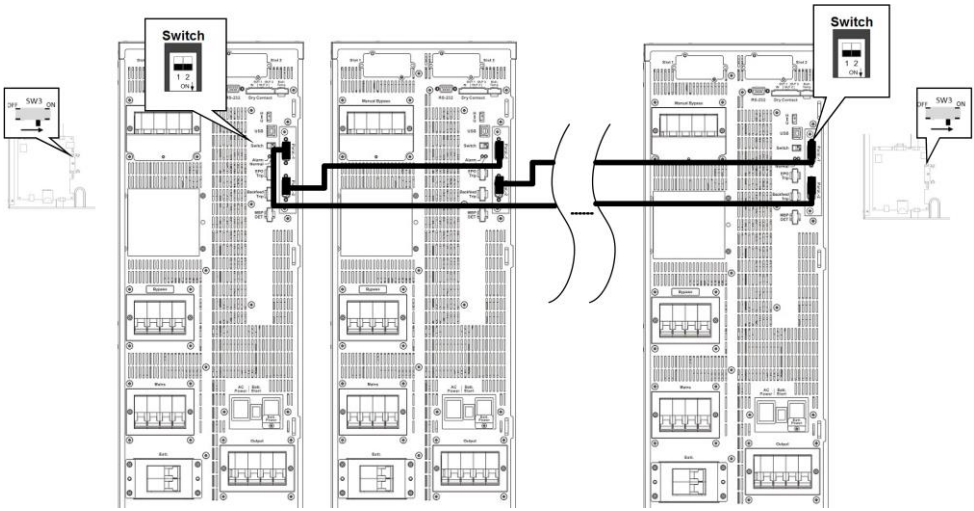
The UPS can be operated in parallel to extend the capacity and to enhance the system reliability. Up to 6 UPS units can be operated in parallel.



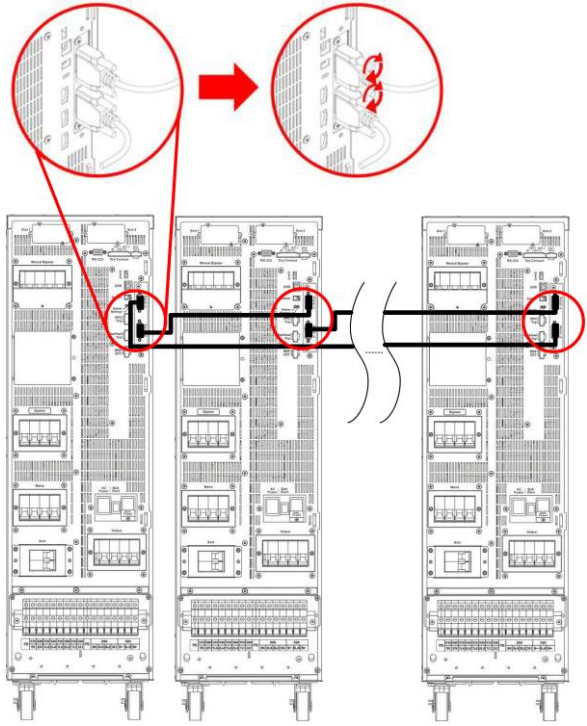


Ensure this for a correct parallel connection:

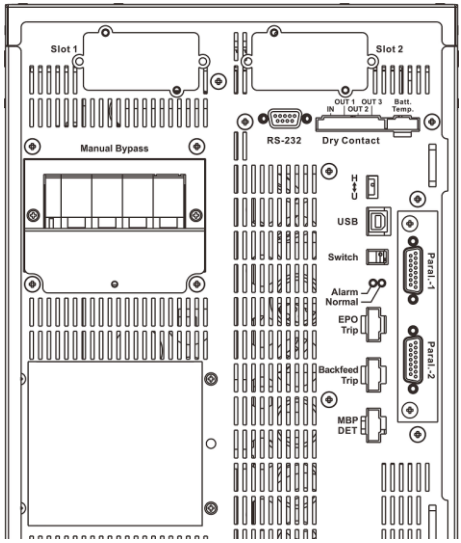
- each UPS must be equipped with the parallel card;
- the size and length of the input and output cables must be identical for all UPS units;
- the phase rotation must be the same for each UPS unit;
- it is recommended to use an external bypass cabinet to facilitate maintenance and system testing for 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.

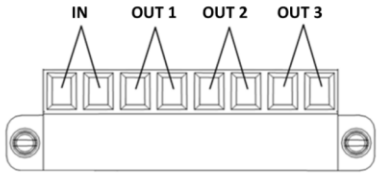


4.5 Communication devices



- Dry Contacts

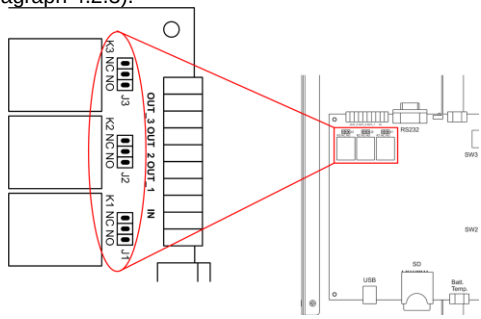
The UPS provides 3 output dry contacts and1 input contact.



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.

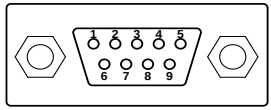
- Communication Slot2

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 Indictors

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.

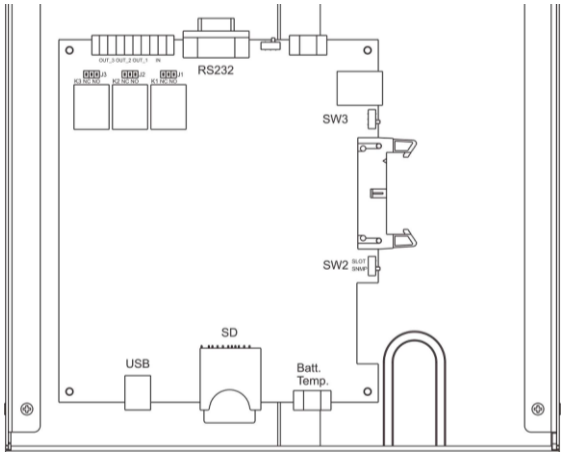
There are two switches visible in the Internal Top View:

- 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

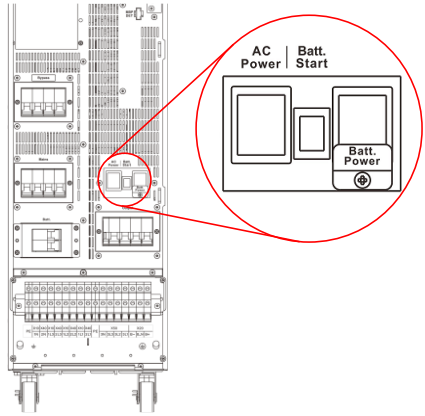
All the configurations and start-up operations must be carried out exclusively by a SKILLED TECHNICIAN (paragraph 2.2.1).

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 disconnector is open (OFF position).
3. Check that the bypass input disconnector is open (OFF position).
4. Check that the output disconnector is open (OFF position).
5. Check that the battery disconnectors of the external battery cabinets are open.
6. Check that 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).

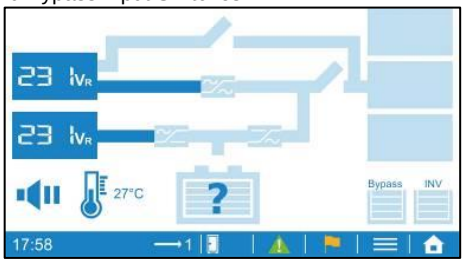
5.2.1 Start-up in normal mode

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 ±8V.

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

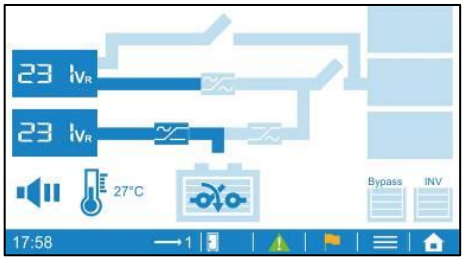
2- Close the UPS Mains Input and Bypass Input Switches.



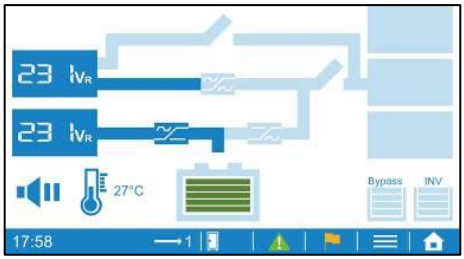
3- Check that the parameters in the configuration setting of the UPS correspond to the UPS installation (see paragraph 5.4.3)

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

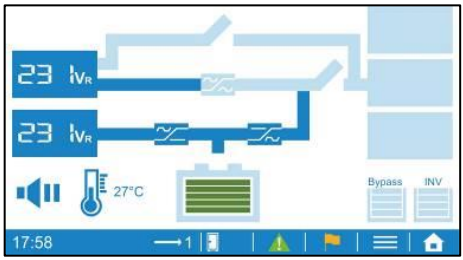
5- Return to the Mimic Display and wait for the start of the rectifier.



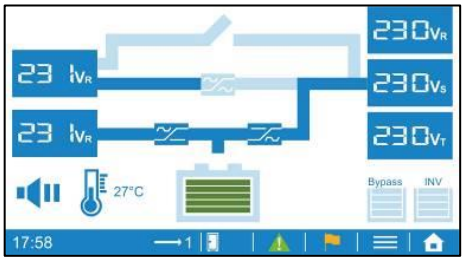
6- Close the battery breakers only after the rectifier has been turned on.



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 ±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.

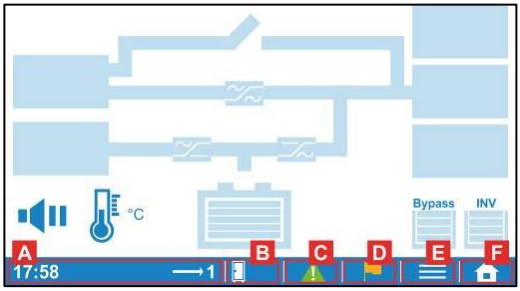
1- Turn ON the ***AC Power*** switch at the back of the UPS.
2- Turn ON the Output and Mains/Bypass Input switches.
3- Select Home → Command → Operation → Load on Bypass on the LCD panel.
4- Turn OFF the maintenance breaker.
5- Select Home → Command → Operation → Normal Mode on the LCD panel.
6- Return 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

Single unit

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

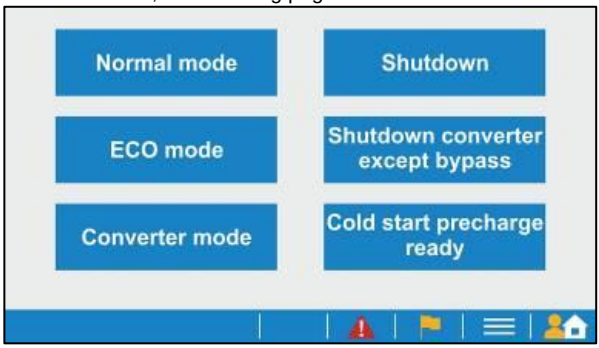
[E] Enters the Sub-Menu, if available in that specific page

[F] Opens the Menu page (Home)

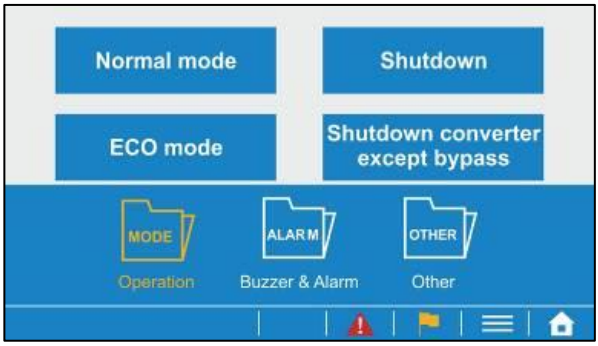
5.4.2 Menu pages

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]	*Operation*	• Normal mode • ECO mode • Converter mode • Shutdown • Load on bypass • Cold start precharge ready
	Buzzer & Alarm	• Enable/disable buzzer • Clear latched alarms and silence buzzer
	Other	• Force Charger ON • Recover backfeed protection signal • Clear UPS Maintenance Alarm
	Battery Test	• Battery Test • Turn OFF the Battery Test
Monitor	*Identification*	Display UPS information
	Real Time Information	Display real time measurements of input, output, bypass and battery
	Maintenance Code	Display the maintenance code for technician to check the status of the UPS
	Version	Display the control MCU software and firmware version
Configuration	*Alarm*	Set alarm latch function • General alarm • Mains alarm • Bypass alarm • Over temperature • Battery low • Inverter overload • Bypass overload • EPO activated
	Mains	Select the measurements on mimic display

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

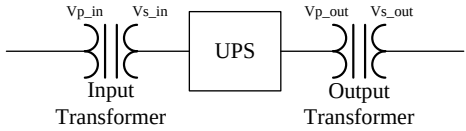
The *Parameters* page is a sub-section of the *Setting* menu.
Locate the *Setting* icon on the home page and tap on it to open the relevant section; the following page will appear.

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.

Parameters	***Content***	***Range***	***Default***
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

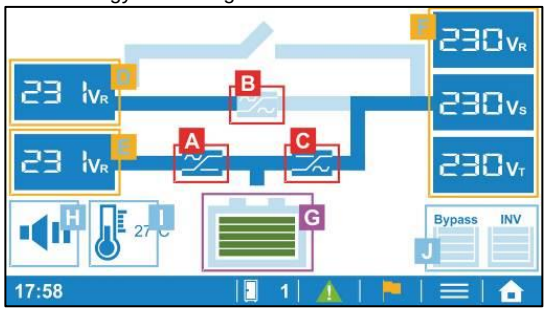
	Output transformer ratio [2]	0.00 ÷ 10.00	0
Other	Unit number	1 ÷ 6	1
	Number of units in parallel system	1 ÷ 6	1
	Set EPO logic	NO/NC	NO

(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 = Vp_in/Vs_in; Output transformer ratio = Vs_out/Vp_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.

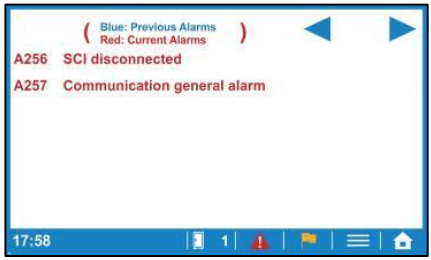
Contact the LEGRAND Technical Support Service in case of problems.

WARNING

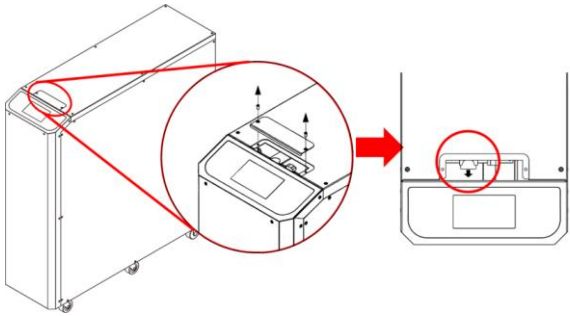
The periodical checks involve operations inside the UPS in presence of dangerous voltages. Only maintenance personnel trained by LEGRAND are authorized to intervene.

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.

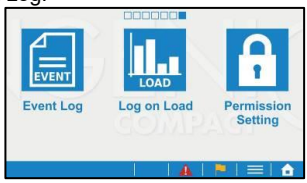


It is recommended to export the event log and the UPS information from LCD panel to the SD card.



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

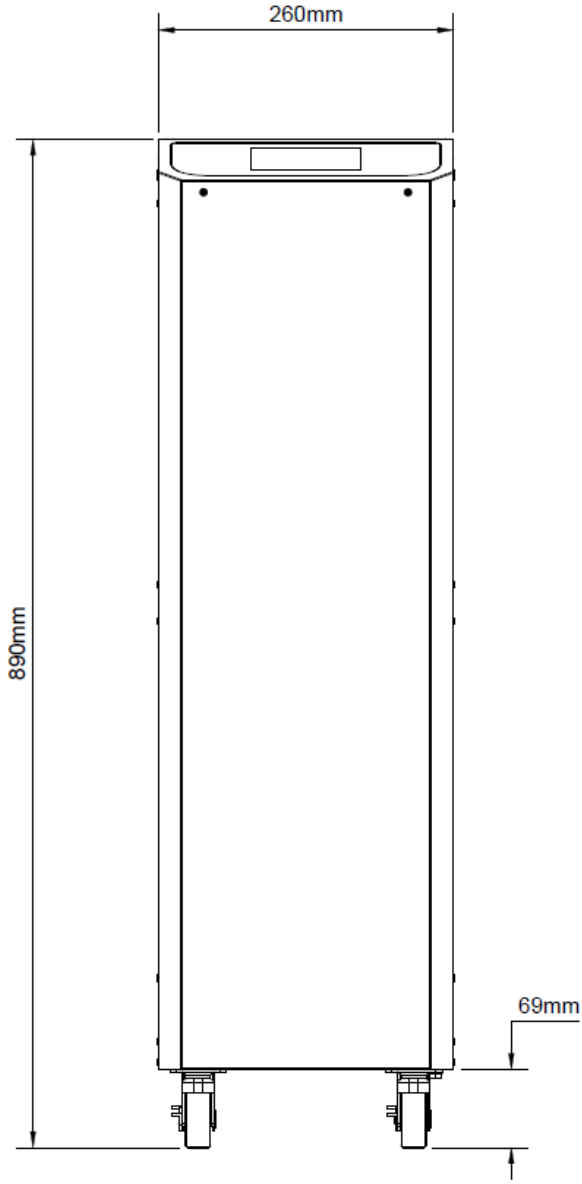
The dismantling of the UPS must occur after the dismantling of the various parts it consists of.
For the dismantling operations, it is necessary to wear the Personal Protective Equipment mentioned in paragraph 2.3.
Sub-divide the components separating the metal from the plastic, from the copper and so 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.

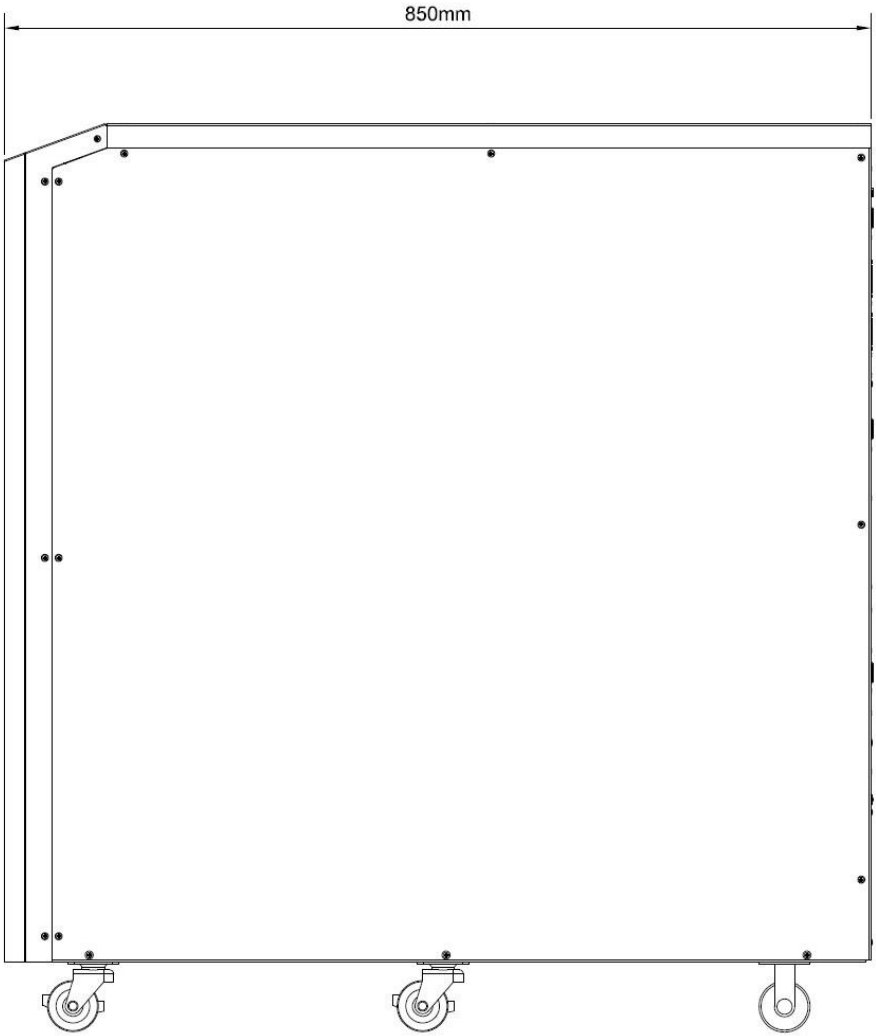
8.3 Electronic component dismantling

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




850mm

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 ± 20% at full load 400 - 40% ~ -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 ± 1% (with static load) (3F+N+PE)		
Output frequency (Hz)	50 / 60		
Range of the output frequency	± 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 ± 10% (adjustable ± 5% ~ ± 15%) (3F+N+PE)		
Bypass frequency (Hz)	50 / 60		
Range of the bypass frequency	± 1 / ± 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 *(optional)* RS-485 MODBUS Card *(optional)* Programmable Dry Contact Card *(optional)*		
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 Icp=10kA
15 kVA	I_N=25 A curve C Icp=10kA
20 kVA	I_N=40 A curve C Icp=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 (IΔn)
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

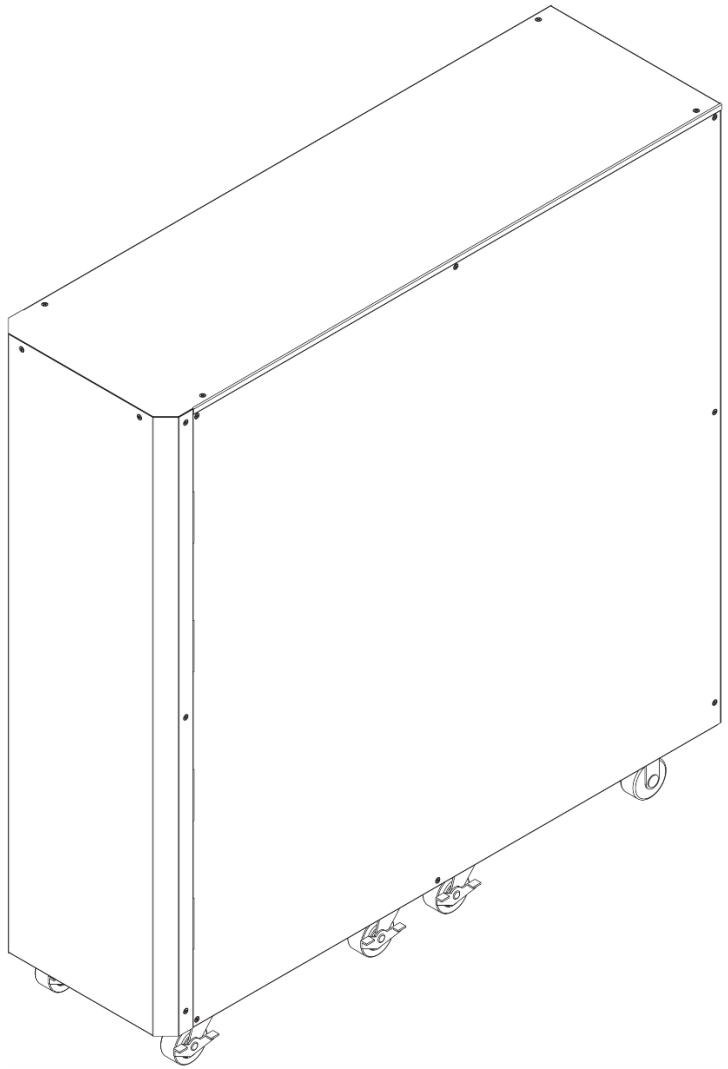
POWER	FUSES
10 kVA	Bussmann FWP-32A14F or Bussmann FWP-32A22F
15 kVA	Bussmann FWP-50A14F or Bussmann FWP-50A22F
20 kVA	

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

Installer stamp

EXTERNAL BATTERY CABINET
KEOR COMPACT

Installation Manual



LE12678AA – 20/12

Table of Contents

1. Introduction

1.1 Overview

Congratulations on your LEGRAND external battery cabinet purchase.
Legrand offers a complete range of battery cabinets for the whole Three-Phase UPS portfolio in Legrand UPS catalogue, from 10kVA up to 800kVA power range.
The external battery cabinets family is designed for standard VRLA batteries of capacity range from 24Ah to 105Ah (C10).

The battery cabinets, with 5 different mechanical dimensions, can contain various combinations of batteries, up to maximum 63 blocks, connected in series and parallel, with positive, negative and middle point poles and with a maximum DC voltage of 800 V.

Legrand battery cabinets are available in:

- empty versions, without switches and protection but with the predisposition of protection provided by the user;
- versions equipped with fuse holder switches and relevant protection fuses, sized accordingly with the power capability of installed batteries;

In the versions equipped with fuse holder is provided, as standard, an auxiliary contact to monitor the status (open or closed) of the fuse holder switch.

Electric safety is guaranteed also with the opened door thanks to a polycarbonate panel, which segregate batteries, and dedicated plastic cover on the poles of the fuse holder switches.
The proper ventilation is guaranteed with natural air circulation thanks to the ventilation holes, present on the cabinet sides and on the rear panels.

This publication, simply defined “installation manual” herein, contains all the information for the installation of the battery cabinet, also referred to as “equipment” in this manual.

1.2 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 equipment, also called EBC (External Battery Cabinet) in the rest of the manual.

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.

1.3 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.

1.4 Where and how to keep the manual

This manual must be kept in a safe, dry place and must always be available for consultation.
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.

1.5 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 hiip://www.ups .legrand.com

1.6 Manufacturer's liability and guarantee

The skilled technician and the operator shall scrupulously comply with the precautions and installation instructions indicated in the manual. In particular 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 battery cabling made by personnel not fully qualified according to national standards to work on equipment presenting electrical hazards;
- assembly and battery 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 by the use of battery types and protections not specified in the manual;
- accidents caused by a wrong assembly of the safety protections or due to the lack of application of the safety labels specified in this manual.

The transfer of the equipment to others also requires the handing over of 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.

1.6.1 Guarantee terms
The guarantee terms may vary depending on the country where the EBC 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 EBC has not been brought into service by a properly trained skilled technician (see paragraph 2.2.1).

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

1.6.2 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.

1.7 Copyright

2. Safety regulations

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 figure that will carry out the installation, start up and ordinary maintenance is called "Skilled Technician".
This definition refers to people 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 section 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).

WARNING
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 figure 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:
1. technical education, which enables them to operate according to safety standards in relation to the dangers linked to the presence of electric current;
2. 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 restoring it to working order after it shuts down;
- adoption of the necessary provisions for maintaining the quality performance of the UPS;
- cleaning the equipment;
- working with people responsible for ordinary maintenance activities (skilled technicians).

2.3 Personal Protective Equipment

DANGER

The EBC 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 at all times. Additional requirements may be needed according to national safety standards.

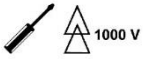

Anti-accident and non-sparking shoes with rubber sole and reinforced toe


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
indicates that smoking is not allowed.

2.5 Signs on the equipment

Displayed on the EBC 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. Signs in different languages are provided along with the cabinet in order to replace the default ones in English. 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 EBC works with dangerous voltages. SKILLED TECHNICIANS shall perform the installation and ordinary maintenance operations. No part of the EBC 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 EBC 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.

WARNING

A battery can present a risk of electrical shock and high short circuit current. 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.

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.

CAUTION

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

WARNING

To reduce the risk of fire or electric shock, the EBC must work in closed, clean environments with controlled temperature and humidity. It must be kept away from inflammable liquids and corrosive substances.

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.
- The connection of the equipment (and of any accessory devices) must always be perfectly grounded to discharge short-circuit currents and electrostatic voltages. The input voltage must correspond with the value shown on the rating plate. Current adapters must not be used under any circumstances. Pay attention to polarity when connecting.
- Any intervention on the equipment must be done only after it has been disconnected from the power supply network by means of a switch disconnector 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. Installation

DANGER

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

3.1 Safety regulations

CAUTION

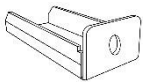
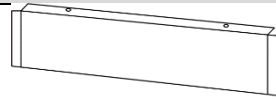
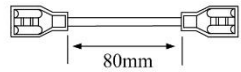
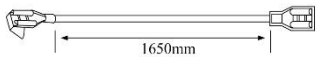
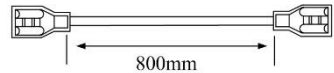
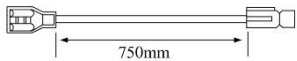
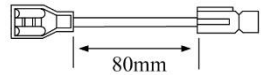
Before carrying out any installation operation you must read and apply the following:

1. Consult chapter 2 of the manual containing mandatory safety regulations and wear the Personal Protective Equipment mentioned in paragraph 2.3.
2. Turn off the UPS and disconnect it from the power supply before the EBC installation.
3. The connection to the earth ground is essential for safety and proper installation and operation. Before carrying out any other installation operation, connect the earthing wiring.
4. Do not carry out the installation if there is water or humidity around.

3.2 Inspecting and unpacking

Carefully inspect the outer packaging for evidence of damage during transit.
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.

Battery Fixed Support：10pcs	Screw (M3 x 6mm)：10pcs	Mylar Film：30pcs
		
Nylon Rivet：60pcs	Fuse：3pcs	Cable#0544：78pcs
		
Cable#6398：3pcs		Cable#0189：8pcs
		
Cable#5075：3pcs		Cable#5038：3pcs Cable#5040：3pcs
		

Follow the instructions in chapter 5 when storing the EBC.

WARNING

Move the EBC very carefully, lifting it as little as possible and avoiding dangerous swings or falls.
The EBC and the batteries are heavy. The cabinet may tip and cause serious injury. For any lifting, use a forklift or a transpallet with an adequate carrying capacity, placing the forks in the wooden base and making sure they come out the other side by at least twenty centimetres.
The equipment must always be handled by trained and instructed personnel equipped with the Personal Protective Equipment illustrated in chapter 2.

3.3 Battery cabinet installation site

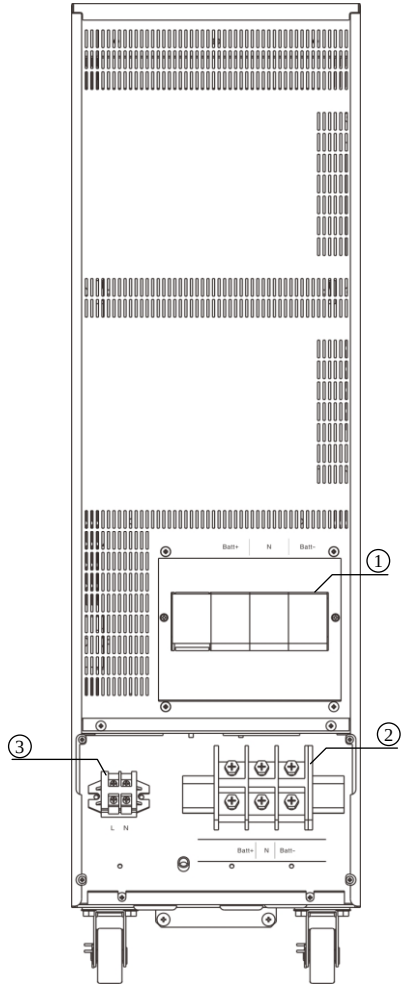
The UPS system installation, including the EBC, must meet the following guidelines:
- The support surface must be scaled in for the carrying capacity necessary to support the equipment.
- Dust or corrosive/explosive gasses must be absent.
- The site must be free of vibration and there should be enough lighting.
- The system must be installed in a temperature and humidity controlled indoor. The ambient temperature range is 0-40°C (32-104°F) with a maximum relative humidity of 95%, non-condensing. However, the recommended operating range is 20-25°C (68-77°F) to ensure nominal battery lifetime.

INDICATION

Operating temperatures above the recommended range will result in decreased battery life and performance, and will reduce or void the battery warranty.

- The rear and side space must be enough to guarantee an adequate circulation of air for cooling.
- The cooling flow of air must be guaranteed.
- The external battery cabinet must be accessible on all sides for assistance or periodic servicing.

3.4 Rear view



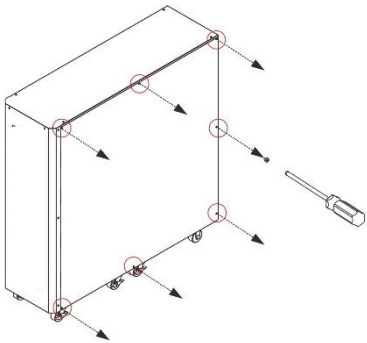
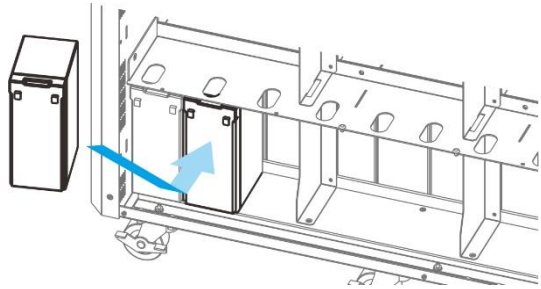
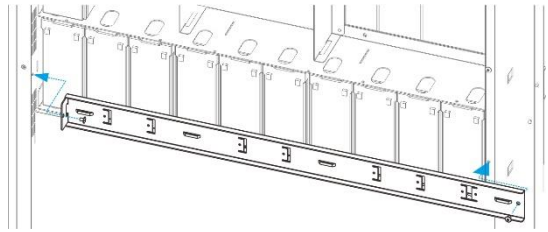
1. Fuse holder
2. To UPS Battery Terminals

3.5 Battery assembly on the empty battery cabinet 3 110 94

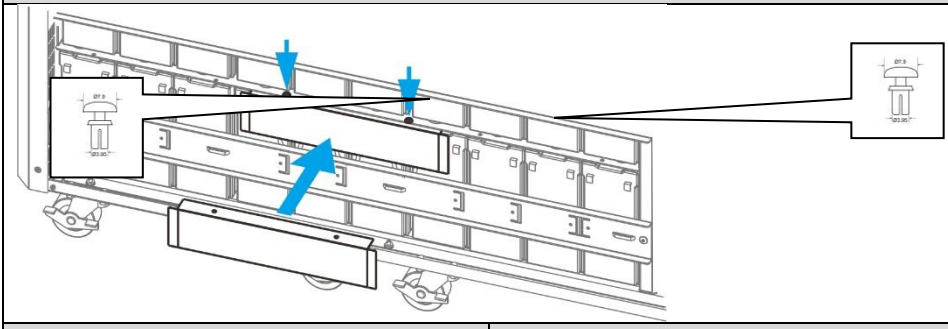
WARNING
Do not move the EBC after the installation of the batteries

INDICATION
It is mandatory to properly fill out the product label after the installation of the batteries

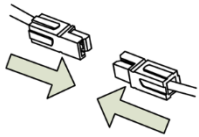
STEP 1：Remove the right/left side panel.
STEP 2：To install battery in the battery bank
STEP 3：Install the battery guardrail.
STEP 4：Using nylon rivet to fix mylar film.
STEP 5：Connect Anderson terminal.
STEP 6：Install the fuse into the fuse holder.
STEP 7：Measure the voltage of terminal block to ensure the battery connections are correctly.
STEP 8：Install the right/left side panel.

STEP 1	STEP 2
	
	STEP 3
	

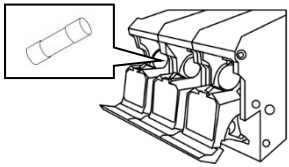
STEP 4



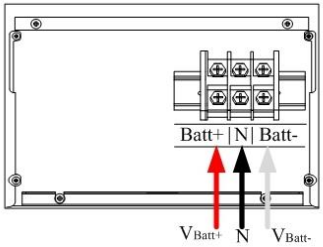
STEP 5



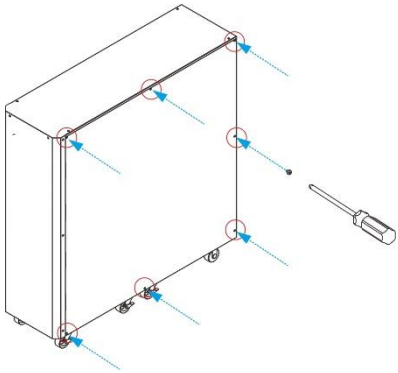
STEP 6



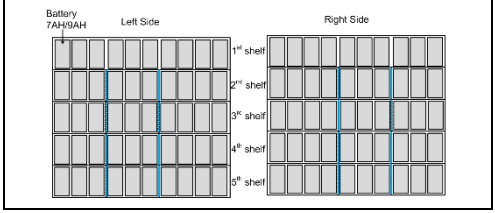
STEP 7



STEP 8

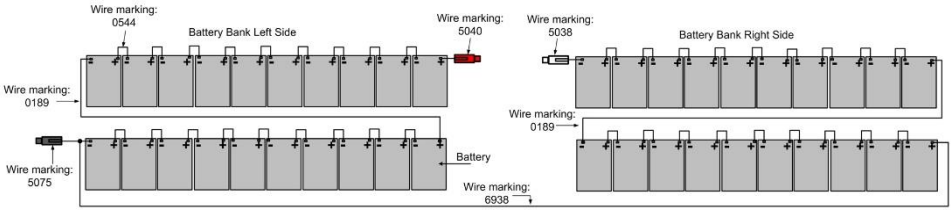


The battery cabinet has 5 shelves. For 7Ah/9Ah, 10 batteries can be placed in one shelf.

7AH/9AH configuration


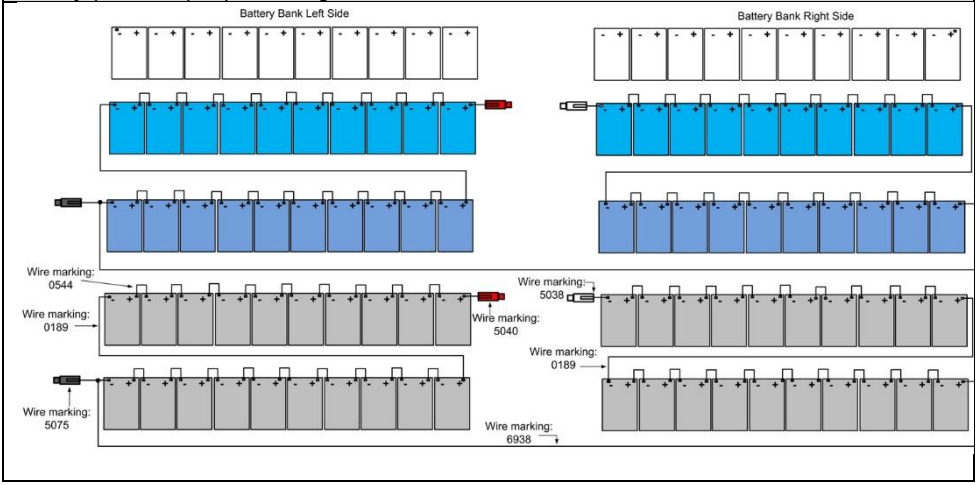
The internal wiring diagram, as below:

Cable#	Description
5040	Positive battery cable
5038	Negative battery cable
5075	Neutral battery cable
0189	Battery connection cable
0544	Battery connection cable
6398	Neutral battery connection cable

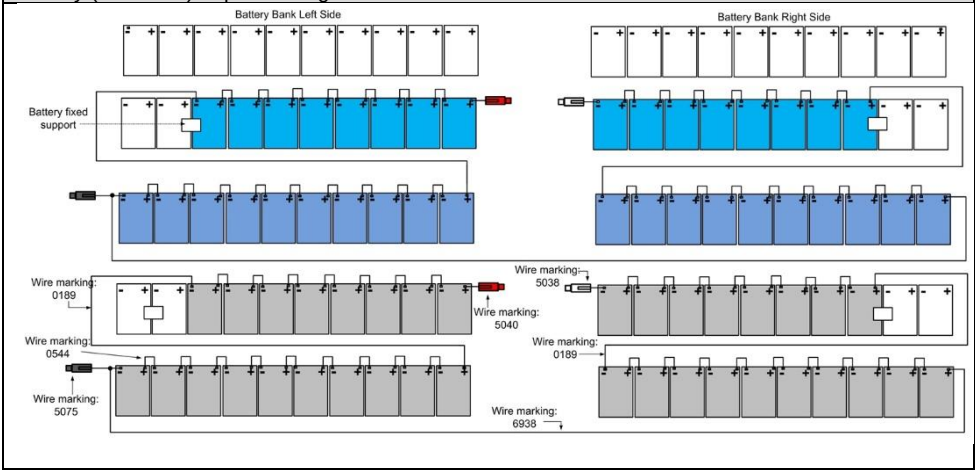


Battery (7AH/9AH) internal wiring diagram

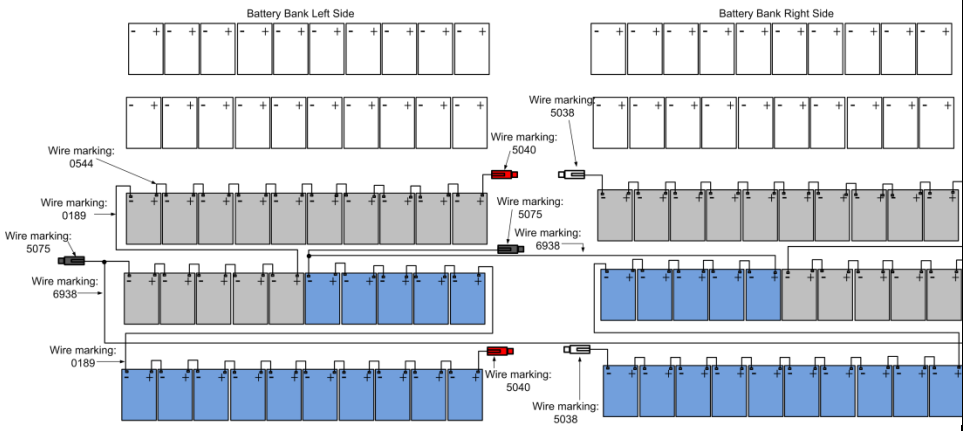
Battery (7AH/9AH) 40pcs*2strings



Battery (7AH/9AH) 36pcs*2strings

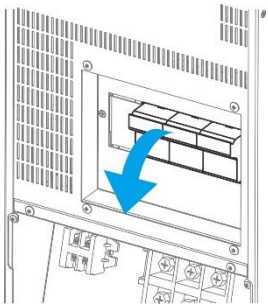
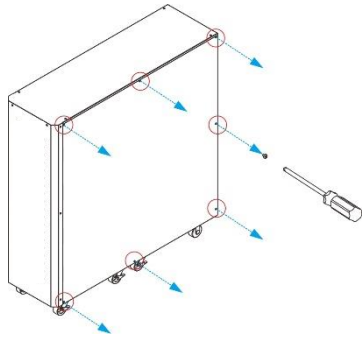
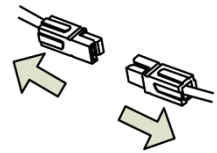
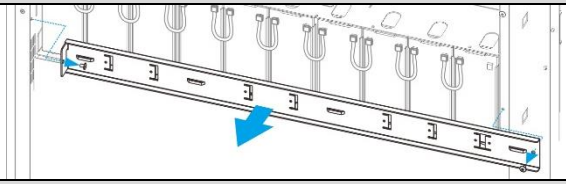
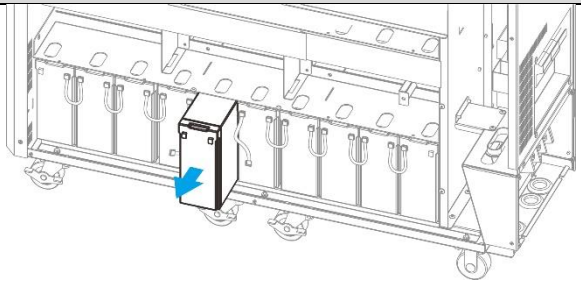


Battery (7AH/9AH) 30pcs*2strings



3.6 Battery replacement

STEP 1：Disconnect the fuse holder.
STEP 2：Remove the right/left side panel.
STEP 3：Disconnect Anderson terminal.
STEP 4：Remove the battery guardrail.
STEP 5：Disconnect battery cable and take the battery out of the battery bank.

STEP 1	STEP 2	STEP 3
		
STEP 4		
		
STEP 5		
		

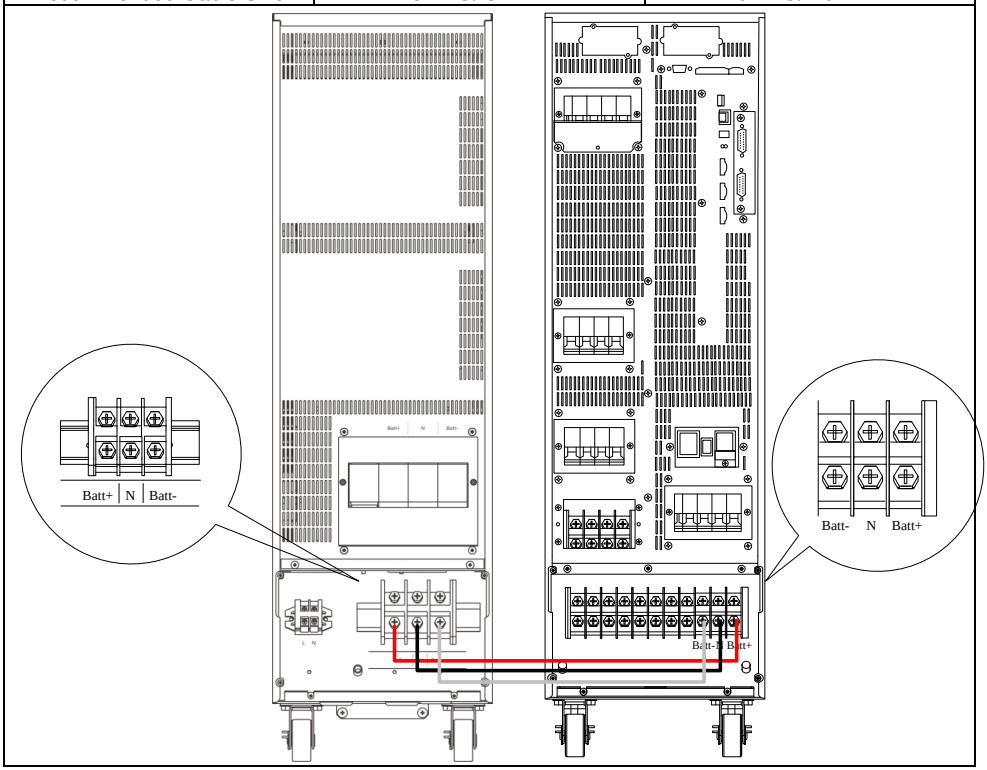
3.6 Wiring of UPS and BATTERY CABINET

The electrical hook-up of the EBC to the UPS 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 made based on local installation standards.

ATTENTION

The choice of cable type and their cross sections depending on the rated current and their installations must be made as indicated by the installation standards in force and it is a responsibility of the skilled technician.
Check the UPS installation manual to verify the battery current.

UPS Capacity	10KVA	20KVA
Recommended Cable Size	8AWG/ 8 mm^2	6AWG/ 16 mm^2



4. 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.

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

4.1 Installation
The operator is not authorized to install and connect electrically the EBC to the UPS. These operations are the sole preserve of a skilled technician (paragraph 2.2.1) who must follow the instructions addressed to him in this manual.

4.2 Preventive maintenance
The EBC does not contain parts for preventive maintenance by the operator.
The operator must periodically perform:
- a general external cleaning;
- a check to the area surrounding the UPS system to ensure that there is free access to the units.

4.3 Periodical checks
The correct functioning of the EBC must be guaranteed by periodical maintenance inspections. These are essential to safeguard the reliability of the battery cabinet.
These inspections should be made to determine if components, wiring, and connections exhibit evidence of overheating.

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

4.4 Battery maintenance
Contact a skilled technician for battery maintenance.
If necessary, contact the LEGRAND Technical Support Service.

5. 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 EBC must be open.

5.1 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

The batteries must never be stored if the batteries are partially or totally discharged.
LEGRAND is not liable for any damage or bad functioning caused to the UPS by wrong warehousing of the batteries.

6. 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.

6.1 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.

6.2 Cabinet dismantling

The dismantling of the cabinet 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.

6.3 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.

7. Technical data

	3 110 94 Keor Compact Battery Cabinet Empty	3 110 95 Keor Compact Battery Cabinet 10 kVA	3 110 96 Keor Compact Battery Cabinet 15 kVA	3 110 97 Keor Compact Battery Cabinet 20 kVA
Voltage Rating (V)	-	±180	±216	±240
Battery type	-	VRLA 12V	VRLA 12V	VRLA 12V
Battery Capacity (Ah)	-	9	9	9
Number of batteries installed	-	60	72	80
Dimensions WxHxD (mm)	260x890x850			
Weight (kg)	49.5	193.5	222.3	241.5
Operating temperature (°C)	0 ÷ +40 (+20 ÷ +25 recommended for longer battery life)			
Relative humidity during operation	20% ÷ 95% non-condensing			
Ingress Protection Marking	IP 20			

REFERENCE DIRECTIVES AND STANDARDS

Safety	2014/35/EU Directive EN 62040-1
EMC	2014/30/EU Directive EN 62040-2

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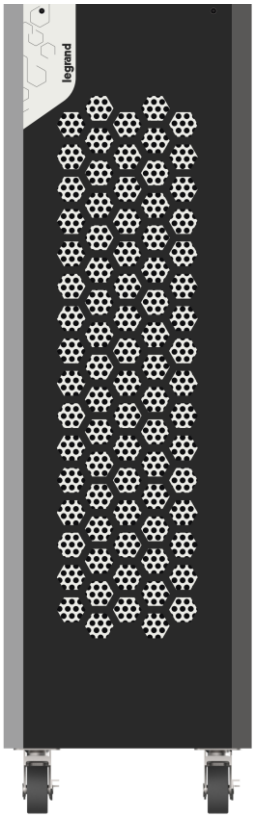
KEOR COMPACT
3 111 06 DRY CONTACT CARD

Installation Manual



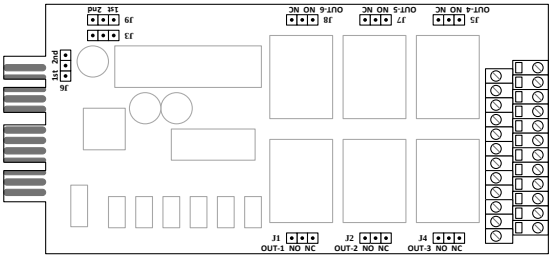


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Table of Contents

1. Introduction

The main purpose of this dry contact card is to send the information about the abnormal events happen in UPS to the other apparatus so that this equipment can understand the current situation and act accordingly. This card provides six output relays and six input contacts. The UPS can install up to 2 dry contact cards. All output and input contacts are programmable, and user can define the definition for each contact using setting tool.
The prevalent requirements of output information include: Mains input fault alarm, Bypass fault alarm, Battery weak alarm, Output overload alarm so on and so forth.
The prevalent requirement of input information includes: Single shutdown, System shutdown, Single start, System start, Transfer to bypass in single operation, Transfer to bypass in parallel operation, EPO (Emergency shutdown).

The purpose of this manual is to provide indications for installing and using safely the LEGRAND dry contact card 3 109 69.
It is essential that this manual is read through, but it is not a substitute for the expertise of the technical personnel who must have had adequate preliminary training.
The dry contact card has been built for the applications specified in this manual. For no reason whatsoever it is allowed a use for purposes other than those for which it has been designed, nor in ways different to those explained in the manual.

This manual must be kept in a safe, dry place and always be available for consultation. We suggest making a copy and filing it.
The manual is to be considered an integral part of the dry contact card and therefore must be kept for the card's useful life cycle.
The original text of this publication is in English and is the only reference for solving any interpretation disputes related to the translation into other languages.

1.1 Guarantee terms

The guarantee conditions may vary depending on the country where the dry contact card is sold. Check with your local LEGRAND sale representative for validity and duration.
In order to use the guarantee supplied by the Manufacturer the user must scrupulously comply with the precautions indicated in the manual .
The Manufacturer declines all liabilities, direct and indirect, resulting from:

- disregard for the instructions by the specialized technician and a use of the card different from the one stated in the manual;
- use by personnel who have not read and understood properly the contents of the manual;
- a use failing to conform to the specific laws existing in the country of installation;
- changes made to the equipment, operating logic or tampering;
- repairs unauthorized by the Technical Service Assistance of LEGRAND;
- damages caused by willful misconduct, gross negligence, exceptional events, fire or infiltration of liquids.

2. Safety provisions

ATTENTION
It is necessary to read these safety provisions before doing any operation.

DANGER
This product should be installed in compliance with installation rules, preferably by a qualified electrician. Incorrect installation and use can lead to risk of electric shock or fire.
Before carrying out the installation, read the instructions and take account of the product's specific mounting location.
Do not open up, dismantle, alter or modify the device except where specifically required to do so by the instructions. All Legrand products must be opened and repaired exclusively by personnel trained and approved by Legrand. Any unauthorized opening or repair completely cancels all liabilities and the rights to replacement and guarantees.
Use only Legrand brand accessories.

DANGER
The dry contact card must be installed only with the UPS UNPLUGGED FROM THE MAINS.

ATTENTION
The dry contact card 3 110 99 can only be used in the expansion slot of the UPS KEOR COMPACT manufactured by LEGRAND.

ATTENTION
It is required to connect the dry contacts of the card by strictly following the instructions provided in this manual. The UPS and the card may be damaged if the installation and operating procedures are not followed.

ATTENTION
Inspect the dry contact card immediately after opening the packaging. If it appears damaged, do not install it inside the UPS but immediately contact the Technical Service Assistance of LEGRAND.

In case of problems with the card, you should read this manual before contacting the Technical Service Assistance of LEGRAND.
If the problem persists, contact the Technical Service Assistance of LEGRAND that will provide all the instructions on how to proceed.

3. Installation Procedure

3.1 Component List

The dry contact card package includes below items:

- Dry-contact card × 1
- M3 Screw × 2

3.2 Electrical Specification

- Output Relay：250VAC / 2A, 30VDC / 2A
- Input Contact：When the contact is closed, a current of 10mA max circulates.

3.3 Dry Contact Card Hardware Setting

Before installing this card to UPS, please check below jumpers setting as Figure 1 and Table 1 show.

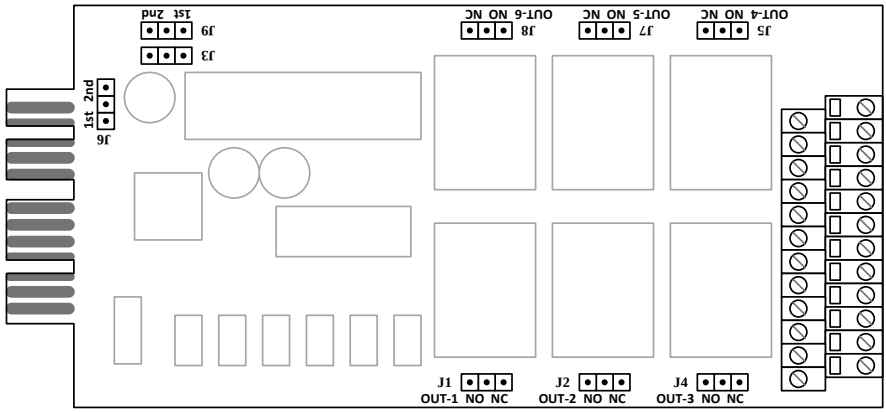


Figure 1. Layout of dry-contact card

Table 1

Jumper	Function Descriptions	Setting
J3 J6 J9	These three jumpers to select the communication slot of UPS which one this dry-contact card will be installed.	Slot 1: **1st 2nd** Slot 2: **1st 2nd** ※
J1	Out Relay#1 NO/NC setting	NO (Normal Open) **NO NC** NC (Normal Closed) **NO NC**
J2	Out Relay#2 NO/NC setting	
J4	Out Relay#3 NO/NC setting	
J5	Out Relay#4 NO/NC setting	
J7	Out Relay#5 NO/NC setting	
J8	Out Relay#6 NO/NC setting	

※ Check the TACI4xx PCB board SW2 is on the Slot sides Figure 2 shows

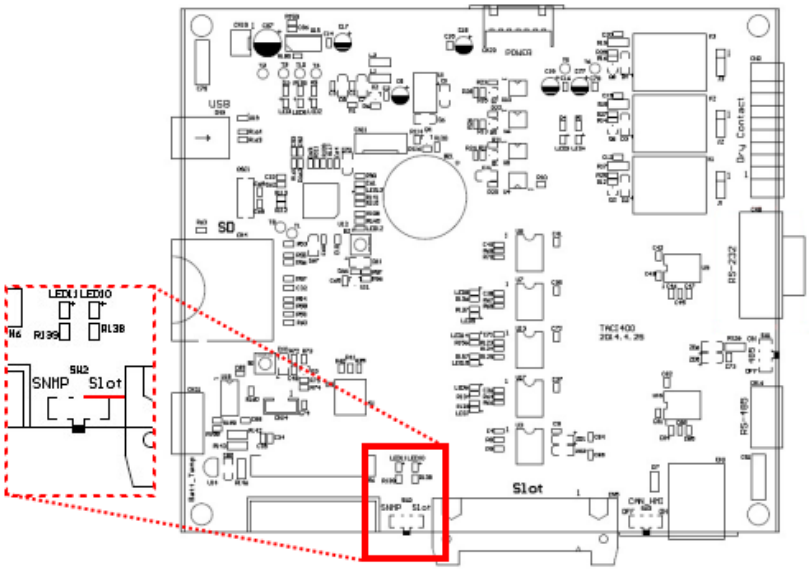
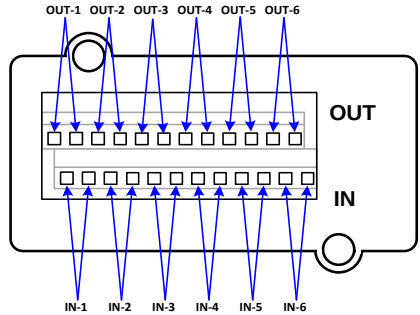


Figure 2. TACI4XX PCB board SW2

If you insert Dry Contact Card into the Slot2 · you must select Slot side on the SW2.

3.4 Pin Assignment of Output/Input Contacts

This card provides six output relays and six input contacts. The pin assignment as Figure 3 shows.



OUT-1	Output Relay 1
OUT-2	Output Relay 2
OUT-3	Output Relay 3
OUT-4	Output Relay 4
OUT-5	Output Relay 5
OUT-6	Output Relay 6
IN-1	Input Contact 1
IN-2	Input Contact 2
IN-3	Input Contact 3
IN-4	Input Contact 4
IN-5	Input Contact 5
IN-6	Input Contact 6

Figure 3

3.5 Hardware Installation Procedure

Please refer to section 1.3 to set all jumpers of the dry contact card before install to UPS.

Plug in the dry contact card to the《Slot1》or《Slot2》and then screw in the screws after the card is firmly locked in to complete the installation procedure, as Figure 4 shows.

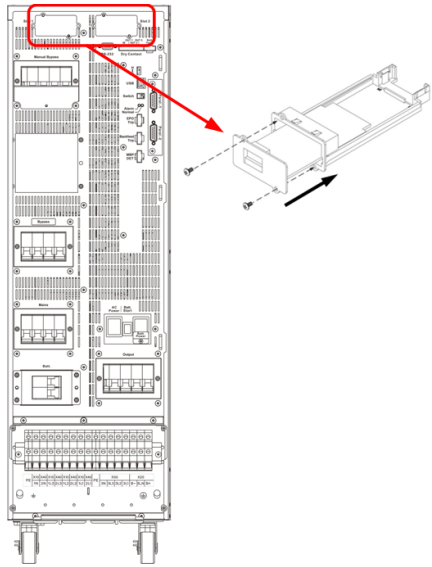


Figure 4

3.6 Communication Setting Procedure

- Please configure the setting of this card via the LCD control panel and the setup procedure as shows in Figure 5.
- The programmable parameters as shows in table below.

Item	Setting
ID	1
Stop Bit	1
Parity Check	None
Baud Rate	57600

- In parallel system, please click  to select the machine ID which installs the dry contact card before you change the setting.

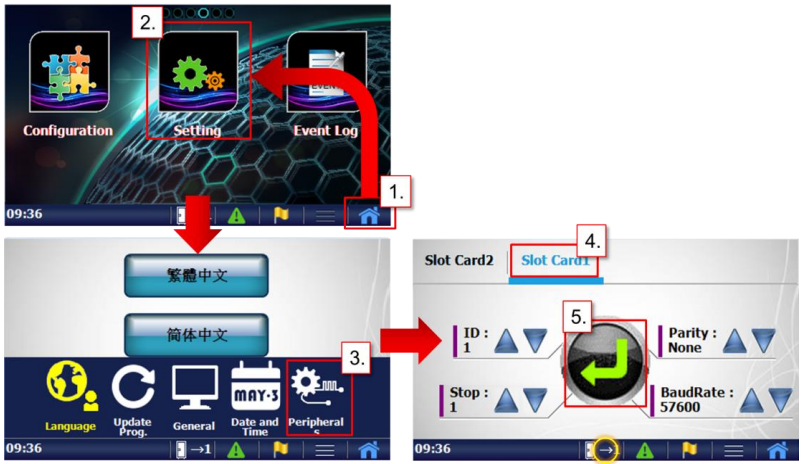
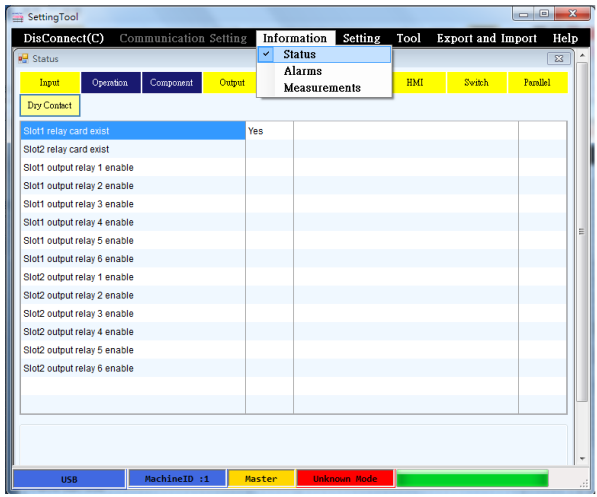


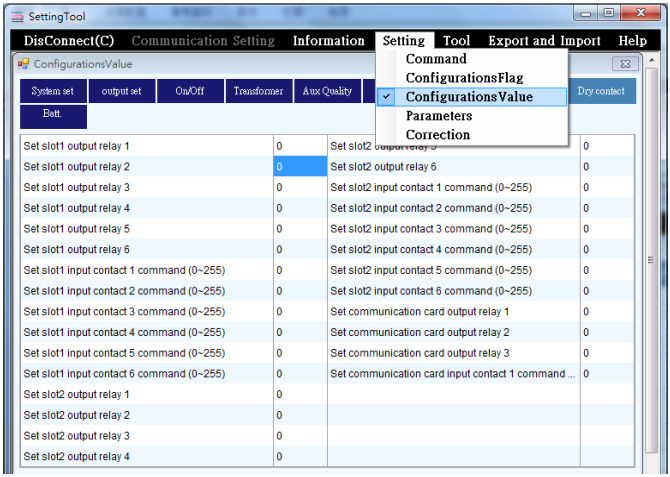
Figure 5

- Please use the setting tool software to confirm the configuration of the dry contact card.
- Go to 『Information』-> 『Status』-> 『Dry Contact』 page to identify whether the dry contact card is properly set. If the card is installed correctly, “Yes” will be appeared.

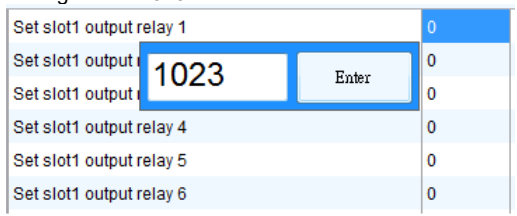


3.7 Configure Output/Input Contacts

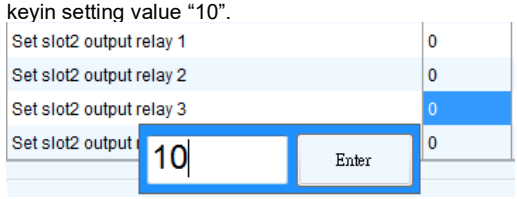
- Please use the setting tool software to configure the output/Input contacts.
- Go to 『Setting』-> 『Configurations Value』-> 『Dry Contact』 page to change the definition for each contact.



- Configure Output Relay
  - The status and alarm events can be set.
  - The status code list show as Table 2.
  - The alarm code list show as Table 3.
  - Example 1: Set Status S23 “Load on Bypass” to slot1 output relay1. Please keyin setting value “1023”.



  - Example 2: Set alarm A10 “Over Temperature” to slot2 output relay3. Please keyin setting value “10”.



- Configure Input Contact
  - The available command code list show as Table 4.

- Example: Set command C05 “Shutdown” to slot1 input contact 2. Please keyin setting value “5”.

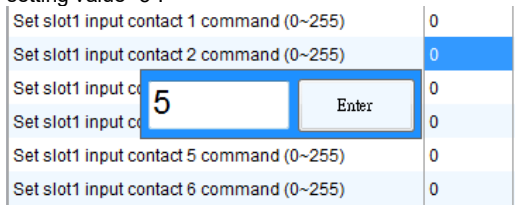


Table 2. Status Code List

Code	Description	Setting Value
S00	Rectifier Input Present OK	1000
S01	Bypass Input Present OK	1001
S05	UPS in Normal Mode	1005
S07	UPS in ECO Mode	1007
S08	UPS in Converter Mode	1008
S14	Rectifier on	1014
S15	Inverter on	1015
S16	Battery Discharger on	1016
S17	Battery Charger on	1017
S21	Load off	1021
S22	Load on Inverter	1022
S23	Load on Bypass	1023
S24	Load on Manual bypass	1024
S33	Unitary Operation	1033
S34	Parallel Operation	1034
S35	Redundancy Operation	1035
S40	Vbatt. Ok	1040
S41	Vbatt. Low	1041
S42	Vbatt. Min	1042
S48	Battery Charging Compensation	1048
S50	Battery Precharge Kit Available	1050
S51	Permission for Close Battery Switch	1051
S52	Cold Start Ready	1052
S61	Buzzer Enable	1061
S63	Automatic Restart Enable	1063
S67	Manual Bypass Switch Closed	1067
S69	Output Switch Closed	1069
S71	Bypass SCR Activated	1071
S72	Battery Switch Closed	1072
S77	Output Contactor Closed	1077
S84	Unit is Master	1084
S85	Unit is Slave	1085
S106	System Load off	1106
S107	System Load on Inverter	1107
S108	System Load on Bypass	1108

Table 3. Alarm Code List

Code	Description	Setting Value
A01	General Alarm	01
A02	Inverter General Alarm	02
A03	Mains General Alarm	03
A04	Discharger General Alarm	04
A05	Charger General Alarm	05
A06	Bypass General Alarm	06
A10	Over Temp.	10
A14	Interior over Temp.	14
A15	Battery Room over Temp.	15
A16	Converter Stop Due To UPS Overheat	16
A25	Inverter Fault	25
A26	Rectifier Fault	26
A27	Discharger Fault	27
A28	Charger Fault	28
A29	Bypass SCR Fault	29
A30	Fan out of Order	30
A31	Temp. Sensor Disconnected	31
A46	Mains Input out of Tolerance	46
A47	Mains Input Disconnected or Fuse Open	47
A48	Mains Input Phase Rotation Error	48
A49	Mains Input 3 Phase Current Unbalance	49
A50	Mains Input Voltage Low	50
A58	Inverter Output Voltage out of Tolerance	58
A59	Output contactor broken or output fuse open	59
A60	Inverter Output DC Offset too High	60
A61	Output Short Circuit	61
A69	Bypass Short Circuit	69
A70	Bypass Preventive Alarm	70
A71	Bypass Critical Alarm	71
A72	Bypass Phase Rotation Error	72
A73	Bypass Phase Error	73
A74	Backfeed Protection Active	74
A76	Lock on Bypass	76
A78	Bypass out of THD Tolerance	78
A82	Battery Disconnected or Fuse Open	82
A83	Vbatt. Min	83
A84	Vbatt. Low	84
A85	Battery over Voltage	85
A86	Charger over Current	86
A90	Inverter Overload	90
A91	Bypass Overload	91
A92	UPS Overload Shutdown	92
A94	System Occurred Unpredictable Interrupt Output	94
A95	Rectifier Rating down to 50%	95
A96	Transfer Impossible	96
A97	Output Switch Open	97
A100	Manual Bypass Aalarm	100
A101	Battery Near End of Life	101

A102	UPS Maintenance Alarm	102
A129	Sync. of Start or Load Transfer Error	129
A132	EPO(emergency power off) active	132
A133	External Alarm 1 Active	133
A134	External Alarm 2 Active	134
A135	External Alarm 3 Active	135
A136	External Alarm 4 Active	136
A137	External Alarm 5 Active	137
A138	External Alarm 6 Active	138
A139	External Alarm 7 Active	139
A140	External Alarm 8 Active	140
A141	External Alarm 9 Active	141
A142	External Alarm 10 Active	142
A143	External Alarm 11 Active	143
A144	External Alarm 12 Active	144

Table 4. Command Code List

Code	Description	Setting Value
C00	Normal Mode	0
C02	ECO Mode	2
C03	Converter Mode	3
C05	Shutdown	5
C06	Load on Bypass	6
C11	Buzzer Disable	11
C12	Buzzer Enable	12
C14	Clear Latch Alarm and Buzzer	14
C200	System Normal Mode on	200
C202	System ECO Mode on	202
C203	System CVCF Mode on	203
C205	System Shutdown	205
C206	System Shut down Converter Except Bypass	206
C256	External Alarm 1 Active	256
C257	External Alarm 2 Active	257
C258	External Alarm 3 Active	258
C259	External Alarm 4 Active	259
C260	External Alarm 5 Active	260
C261	External Alarm 6 Active	261
C262	External Alarm 7 Active	262
C263	External Alarm 8 Active	263
C264	External Alarm 9 Active	264
C265	External Alarm 10 Active	265
C266	External Alarm 11 Active	266
C267	External Alarm 12 Active	267

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3 110 99
RS-485 MODBUS CARD

Installation Manual

Introduction

The purpose of this manual is to introduce the installation instructions of RS-485 MODBUS card of the KEOR COMPACT UPS.

This card is design according to the JBUS/MODBUS RTU protocol; it can provide the related information, such as status, alarm, measurement, command, etc. to other apparatus like large-scale monitor software, Internet communication, etc.

If the UPS system is operating in parallel, only one of UPS need to install this card, this configuration would allow this specific card to be able to perceive all the information in the parallel system.

Note: Please, refer to the JBUS/MODBUS protocol manual for communication protocol.

The RS-485 MODBUS card package includes below items,

- RS-485 MODBUS Card × 1
- M3 Screw × 2

Hardware Installation Procedure

- Plug in the RS-485 card to the《Slot1》and then screw in the screws after the RS-485 card is firmly locked in to complete the installation procedure, as Figure 1 shows.

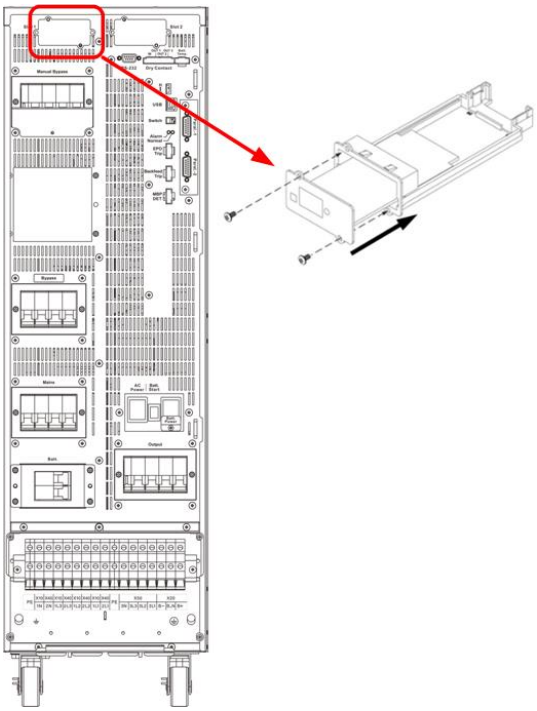

Figure 1

- The pin assignment of this card is shown in Figure 2.

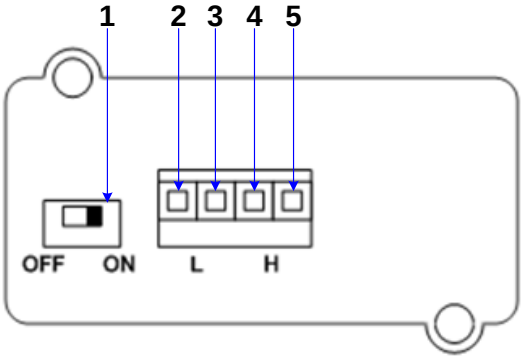

Figure 2

1	Termination Resistor Switch
2	L (-)
3	L (-)
4	H (+)
5	H (+)

- A 120 ohms termination resistor is built in and selectable by a switch. This resistor is needed at both end of the line and must be switched or not depending on the location in the Modbus network topology.
- Switch to “ON” position for connect the termination resistor.

Software Configuration

- Please, configure the setting of this card via the LCD control panel and the setup procedure as shows in Figure 3.

Figure 3

- In parallel system, please click  to select the machine ID which install RS-485 card before you change the setting.
- The programmable parameters are shown in the table below.

Item	Range	Default
ID	1~255	1
Stop Bit	1 , 2	1
Parity Check	Even, Odd, None	None
Baud Rate	9600, 19200, 38400, 57600	9600

Safety and guarantee terms

- This card must be installed only with the UPS turned OFF and UNPLUGGED FROM THE MAINS.
- The Manufacturer declines all liabilities, direct and indirect, resulting from:
  - disregard for the instructions by the skilled technician and a use of the card different from the one stated in the manual;
  - use by personnel who have not read and understood the contents of the manual;
  - a use not conforming to the specific laws existing in the country of installation;
  - changes made to the equipment, operating logic or tampering;
  - repairs unauthorized by the Technical Service Assistance of LEGRAND;
  - damages caused by willful misconduct, gross negligence, exceptional events, fire or infiltration of liquids.

KEOR COMPACT

JBUS / MODBUS Protocol

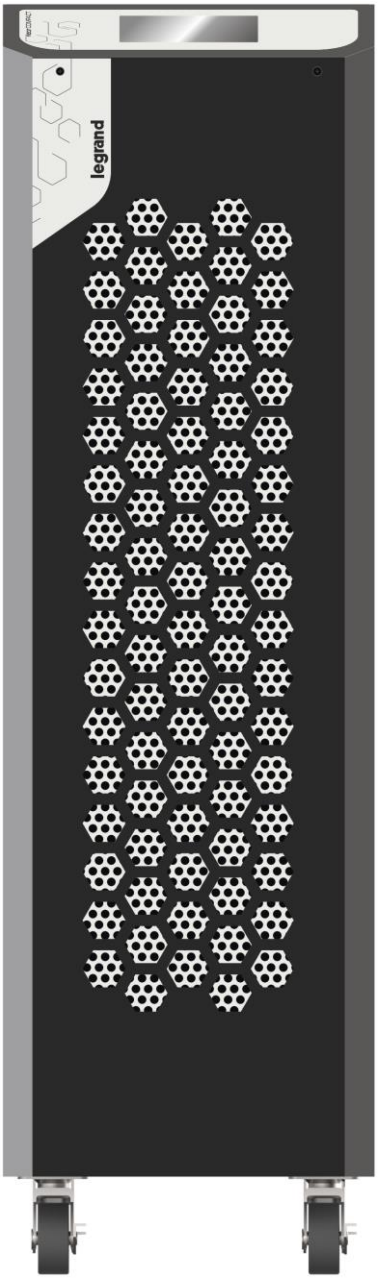

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Table of Contents

1. Introduction

This document describes the KEOR COMPACT Series UPS protocol, adopted to communicate with all communication products, like Supervisor, Network communication, etc...

This protocol will be implemented in the KEOR COMPACT Series UPS equipment, in order to use the same driver for all products.

1.1 Communication Layers

APPLICATIONS
REMOTE MONITOR TERMINAL CENTRAL COMPUTER
DATA TABLE
FIXED
ADDRESS SPECIFICATION
PUBLIC DATA JBUS/MODBUS in RTU mode
MODBUS TRANSPORT PROTOCOL
HARDWARE
RS485

2. JBUS General Purpose

JBUS/MODBUS is a Master/Slave protocol, in which Master could be one of the 255 slaves. The master sent a request to a slaver; the slaver sent the data or an ACK to the Master.

2.1 General Message Format

SLAVE NUMBER (1 byte)	Specified the destination node
FUNCTION CODE (1 byte)	Specified a READ or WRITE data command
DATA FIELD	Information to read or write data (Address, value, number of data...)
CONTROL WORD (CRC16) (2 bytes, 1 word)	Algorithm calculation of each data

- The JBUS/MODBUS protocol includes various functions that are intended for collecting information in different ways. As follows:

  Function (03h) for reading registers.

  Function (06h) for 1 word writing registers.

  Remark: 1 Address = 16 bits or 1 Word (LSB and MSB)

2.2 JBUS/MODBUS protocol

2.2.1 Function description

✓ Function 0x03

Master request: 8 bytes

Slave Number	Function READ	Address High	Address Low	0	Nb of word to read	CRC Low	CRC High
1	0x03	0xE0	0x00	0	10		

Ex. Request to slave number1, the data (10 words) beginning at 0xE000 (Address)

Slave Message:

Slave Number	Function READ	Nb of byte	First data hi byte	First data low byte	Next data	CRC Low	CRC High
1	0x03	20	0x20	0x02	……		

Example: the first data is (0x20 * 256) + 0x02=0x2002

✓ FUNCTION 0x06

This function is used to send a command to the slave.

Slave Number	Function WRITE	Address High	Address Low	data to write high byte	data to write low byte	CRC Low	CRC High
1	0x06	0xE0	0x10	0x30	0x03		

Slave message:

Slave Number	Function WRITE	Address High	Address Low	data to write high byte	data to write low byte	CRC Low	CRC High
1	0x06	0xE0	0x10	0x30	0x03		

The slave sends the same message if not error occurred.

2.3 Data decoding

➢ Status and alarms Information

The information are coding in bit. This means that 1 word defines 16 information.

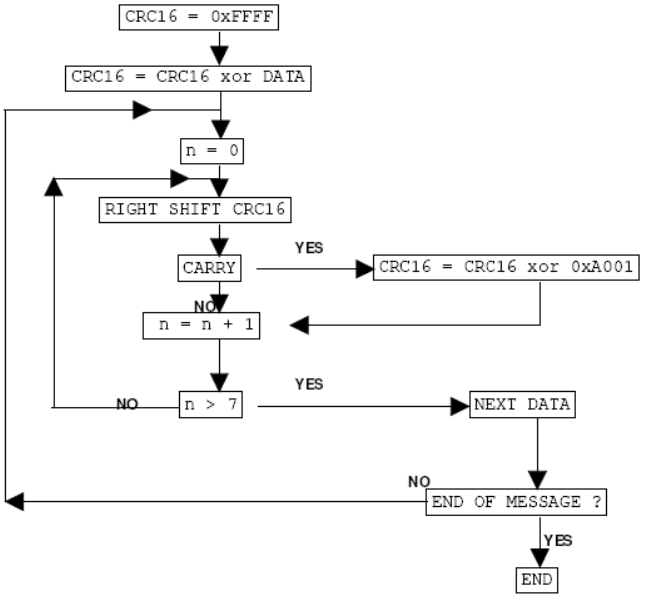
➢ Measurements data

1 word defines a measurement. Some values are numeric decimal signed or unsigned (0 to 65535 or from -32767 to 32767).

2.4 Acknowledgement of end of data package

A time-out equal to a value of 10* time of transmission of a character, points out that the data package is finished (the CRC has been sent).

2.4.1 CRC 16 CALCULATION



2.4.2 Example of CRC calculation

```
unsigned int CALCUL_CRC(unsigned int *Msg)
{
    unsigned int Crc;
    int lenght,i,n;
    Crc = 0xFFFF;
    lenght = Msg[0];
    for ( i = 1 ; i <= lenght    ; i++ )
    {
        Crc ^=    Msg[i];
        for ( n = 1 ; n <= 8 ; n++)
        {
                /* if CRC is even */
                if ((Crc % 2) == 0)
                /* to right decrement */
                        Crc >>=    1;
                else
                {
                        Crc >>=    1;
                        Crc ^= 0xA001;
                }
        }
    }
    return( Crc );
}
```

3. Definition of the JBUS/MODBUS protocol

3.1 General data structure

JBUS/MODBUS-table

Index	Table	JBUS/MODBUS Function
1	Status	03h READ
2	Alarms	03h READ

3	Measurement	03h READ
4	Control	06h WRITE
5	Configurations	03h READ

➢ Incoming data structure

Example of 4 words							
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
MSB0	LSB0	MSB0	LSB0	MSB0	LSB0	MSB0	LSB0
Bit15 Bit0		Bit15 Bit0		Bit15 Bit0		Bit15 Bit0	
WORD0		WORD1		WORD2		WORD3	
Status15 Status0		Status31 Status16		Status47 Status32		Status63 Status48	
Alarm15 Alarm0		Alarm31 Alarm16		Alarm47 Alarm32		Alarm63 Alarm48	
M00		M01		M02		M03	

4. JBUS interface in Unit system configuratio

4.1 General data area

Index	Table	Start addresses	Table length in words	JBUS/MODBUS Function
1	UPS Status	0xn000	8	03h READ
2	UPS Alarms	0xn010	10	03h READ
3	UPS Measurement	0xn030	97	03h READ
4	UPS Control	0xn0D0	1	06h WRITE
5	UPS Configurations	0xn1EC	2	03h READ

Remark: n = (number of unit ID + 1).

Remark: The UPS Information table should be read word by word or per group, without exceed the length of the table.

4.2 UPS Status data area

STATUS : Address from 0xn000, 10 WORDS			
Code	**Description**	**BIT**	**Address**
S00	Rectifier Input Present OK	0	0xn000
S01	Bypass Input Present OK	1	0xn000
S02	RESERVED	2	0xn000
S03	RESERVED	3	0xn000
S04	RESERVED	4	0xn000
S05	UPS in Normal Mode	5	0xn000
S06	RESERVED	6	0xn000

S07	UPS in ECO Mode	7	0xn000
S08	UPS in Converter Mode	8	0xn000
S09	RESERVED	9	0xn000
S10	RESERVED	10	0xn000
S11	RESERVED	11	0xn000
S12	RESERVED	12	0xn000
S13	RESERVED	13	0xn000
S14	Rectifier on	14	0xn000
S15	Inverter on	15	0xn000
S16	Battery Discharger on	0	0xn001
S17	Battery Charger on	1	0xn001
S18	RESERVED	2	0xn001
S19	RESERVED	3	0xn001
S20	RESERVED	4	0xn001
S21	Load off	5	0xn001
S22	Load on Inverter	6	0xn001
S23	Load on Bypass	7	0xn001
S24	Load on Manual bypass	8	0xn001
S25	Permission for ECO mode aux supply	9	0xn001
S26	RESERVED	10	0xn001
S27	RESERVED	11	0xn001
S28	RESERVED	12	0xn001
S29	RESERVED	13	0xn001
S30	Inverter Sync. With Bypass	14	0xn001
S31	RESERVED	15	0xn001
S32	RESERVED	0	0xn002
S33	Unitary Operation	1	0xn002
S34	Parallel Operation	2	0xn002
S35	Redundancy Operation	3	0xn002
S36	RESERVED	4	0xn002
S37	RESERVED	5	0xn002
S38	RESERVED	6	0xn002
S39	RESERVED	7	0xn002
S40	Vbatt. Ok	8	0xn002
S41	Vbatt. Low	9	0xn002
S42	Vbatt. Min	10	0xn002
S43	ESS Discharging	11	0xn002
S44	ESS Schedule Set	12	0xn002

S45	ESS Waiting for Process	13	0xn002
S46	ESS can be Executed	14	0xn002
S47	ESS Battery Energy Storage Limited	15	0xn002
S48	Battery Charging Compensation	0	0xn003
S49	RESERVED	1	0xn003
S50	Battery Precharge Kit Available	2	0xn003
S51	Permission for Close Battery Switch	3	0xn003
S52	Cold Start Ready	4	0xn003
S53	RESERVED	5	0xn003
S54	RESERVED	6	0xn003
S55	RESERVED	7	0xn003
S56	RESERVED	8	0xn003
S57	RESERVED	9	0xn003
S58	RESERVED	10	0xn003
S59	RESERVED	11	0xn003
S60	Shutdown Active	12	0xn003
S61	Buzzer Enable	13	0xn003
S62	Remote Control Enable	14	0xn003
S63	Automatic Restart Enable	15	0xn003
S64	RESERVED	0	0xn004
S65	RESERVED	1	0xn004
S66	RESERVED	2	0xn004
S67	Manual Bypass Switch Closed	3	0xn004
S68	RESERVED	4	0xn004
S69	Output Switch Closed	5	0xn004
S70	RESERVED	6	0xn004
S71	Bypass SCR Activated	7	0xn004
S72	Battery Switch Closed	8	0xn004
S73	RESERVED	9	0xn004
S74	RESERVED	10	0xn004
S75	RESERVED	11	0xn004
S76	Input Contactor Closed	12	0xn004
S77	Output Contactor Closed	13	0xn004
S78	Cold Start contactor Closed	14	0xn004
S79	Rectifier Precharge Relay Closed	15	0xn004
S80	Cold Start Precharge Relay Closed	0	0xn005
S81	RESERVED	1	0xn005
S82	RESERVED	2	0xn005

S83	RESERVED	3	0xn005
S84	Unit is Master	4	0xn005
S85	Unit is Slave	5	0xn005
S86	RESERVED	6	0xn005
S87	RESERVED	7	0xn005
S88	RESERVED	8	0xn005
S89	RESERVED	9	0xn005
S90	RESERVED	10	0xn005
S91	RESERVED	11	0xn005
S92	RESERVED	12	0xn005
S93	RESERVED	13	0xn005
S94	RESERVED	14	0xn005
S95	RESERVED	15	0xn005
S96	RESERVED	0	0xn006
S97	RESERVED	1	0xn006
S98	RESERVED	2	0xn006
S99	RESERVED	3	0xn006
S100	RESERVED	4	0xn006
S101	RESERVED	5	0xn006
S102	RESERVED	6	0xn006
S103	RESERVED	7	0xn006
S104	RESERVED	8	0xn006
S105	RESERVED	9	0xn006
S106	RESERVED	10	0xn006
S107	RESERVED	11	0xn006
S108	RESERVED	12	0xn006
S109	RESERVED	13	0xn006
S110	Slot1 Relay Card Present(1)	14	0xn006
S111	Slot2 Relay Card Present(1)	15	0xn006
S112	Slot1 Output Relay 1 Activated(1)	0	0xn007
S113	Slot1 Output Relay 2 Activated (1)	1	0xn007
S114	Slot1 Output Relay 3 Activated (1)	2	0xn007
S115	Slot1 Output Relay 4 Activated (1)	3	0xn007
S116	Slot1 Output Relay 5 Activated (1)	4	0xn007
S117	Slot1 Output Relay 6 Activated (1)	5	0xn007
S118	Slot2 Output Relay 1 Activated(1)	6	0xn007
S119	Slot2 Output Relay 2 Activated (1)	7	0xn007
S120	Slot2 Output Relay 3 Activated (1)	8	0xn007

S121	Slot2 Output Relay 4 Activated (1)	9	0xn007
S122	Slot2 Output Relay 5 Activated (1)	10	0xn007
S123	Slot2 Output Relay 6 Activated (1)	11	0xn007
S124	RESERVED	12	0xn007
S125	RESERVED	13	0xn007
S126	RESERVED	14	0xn007
S127	RESERVED	15	0xn007
S128	RESERVED	0	0xn008
S129	RESERVED	1	0xn008
S130	RESERVED	2	0xn008
S131	RESERVED	3	0xn008
S132	RESERVED	4	0xn008
S133	RESERVED	5	0xn008
S134	RESERVED	6	0xn008
S135	RESERVED	7	0xn008
S136	RESERVED	8	0xn008
S137	RESERVED	9	0xn008
S138	RESERVED	10	0xn008
S139	RESERVED	11	0xn008
S140	RESERVED	12	0xn008
S141	RESERVED	13	0xn008
S142	RESERVED	14	0xn008
S143	RESERVED	15	0xn008
S144	Schedule Battery Test Process Permitted	0	0xn009
S145	Manual Battery Test Process Permitted	1	0xn009
S146	After Battery Test, Battery is Aging	2	0xn009
S147	After Battery Test, Battery Pass	3	0xn009
S148	Battery Test Fail	4	0xn009
S149	Battery Test in Progress	5	0xn009
S150	Battery Test Condition Incompatible	6	0xn009
S151	Waiting for The Battery Test Process	7	0xn009
S152	Manual Battery Test Time is Limited in 2 Minutes	8	0xn009
S153	RESERVED	9	0xn009
S154	RESERVED	10	0xn009
S155	RESERVED	11	0xn009
S156	Energy Saver Enable	12	0xn009

S157	Energy Saver On	13	0xn009
S158	Energy Saver is Operating	14	0xn009
S159	Unit is Standing by	15	0xn009

Note. Status with “RESERVED” are not usable in KEOR COMPACT Series protocol.

(1) Optional function for Relay Card.

4.3 UPS Alarms data area

ALARMS : Address from 0xn010, 10 WORDS			
Code	**Description**	**BIT**	**Address**
A00	RESERVED	0	0xn010
A01	General Alarm	1	0xn010
A02	Inverter General Alarm	2	0xn010
A03	Mains General Alarm	3	0xn010
A04	Discharger General Alarm	4	0xn010
A05	Charger General Alarm	5	0xn010
A06	Bypass General Alarm	6	0xn010
A07	RESERVED	7	0xn010
A08	RESERVED	8	0xn010
A09	RESERVED	9	0xn010
A10	Over Temp.	10	0xn010
A11	RESERVED	11	0xn010
A12	RESERVED	12	0xn010
A13	RESERVED	13	0xn010
A14	Interior over Temp.	14	0xn010
A15	Battery Room over Temp.	15	0xn010
A16	Converter Stop Due To UPS Overheat	0	0xn011
A17	RESERVED	1	0xn011
A18	RESERVED	2	0xn011
A19	RESERVED	3	0xn011
A20	RESERVED	4	0xn011
A21	RESERVED	5	0xn011
A22	RESERVED	6	0xn011
A23	RESERVED	7	0xn011
A24	RESERVED	8	0xn011
A25	Inverter Fault	9	0xn011
A26	Rectifier Fault	10	0xn011
A27	Discharger Fault	11	0xn011
A28	Charger Fault	12	0xn011

A29	Bypass SCR Fault	13	0xn011
A30	Fan out of Order	14	0xn011
A31	Temp. Sensor Disconnected	15	0xn011
A32	RESERVED	0	0xn012
A33	RESERVED	1	0xn012
A34	RESERVED	2	0xn012
A35	RESERVED	3	0xn012
A36	RESERVED	4	0xn012
A37	RESERVED	5	0xn012
A38	RESERVED	6	0xn012
A39	RESERVED	7	0xn012
A40	RESERVED	8	0xn012
A41	RESERVED	9	0xn012
A42	RESERVED	10	0xn012
A43	RESERVED	11	0xn012
A44	RESERVED	12	0xn012
A45	RESERVED	13	0xn012
A46	Mains Input out of Tolerance	14	0xn012
A47	Mains Input Disconnected or Fuse Open	15	0xn012
A48	Mains Input Phase Rotation Error	0	0xn013
A49	Mains Input 3 Phase Current Unbalance	1	0xn013
A50	Mains Input Voltage Low	2	0xn013
A51	RESERVED	3	0xn013
A52	RESERVED	4	0xn013
A53	RESERVED	5	0xn013
A54	RESERVED	6	0xn013
A55	RESERVED	7	0xn013
A56	RESERVED	8	0xn013
A57	RESERVED	9	0xn013
A58	Inverter Output Voltage out of Tolerance	10	0xn013
A59	Output Contactor Broken or Output Fuse Open	11	0xn013
A60	Inverter Output DC Offset too High	12	0xn013
A61	Output Short Circuit	13	0xn013
A62	RESERVED	14	0xn013
A63	RESERVED	15	0xn013
A64	RESERVED	0	0xn014
A65	RESERVED	1	0xn014

A66	RESERVED	2	0xn014
A67	RESERVED	3	0xn014
A68	RESERVED	4	0xn014
A69	Bypass Short Circuit	5	0xn014
A70	Bypass Preventive Alarm	6	0xn014
A71	Bypass Critical Alarm	7	0xn014
A72	Bypass Phase Rotation Error	8	0xn014
A73	Bypass Phase Error	9	0xn014
A74	Backfeed Protection Active	10	0xn014
A75	RESERVED	11	0xn014
A76	Lock on Bypass	12	0xn014
A77	RESERVED	13	0xn014
A78	Bypass out of THD Tolerance	14	0xn014
A79	RESERVED	15	0xn014
A80	RESERVED	0	0xn015
A81	RESERVED	1	0xn015
A82	Battery Disconnected or Fuse Open	2	0xn015
A83	Vbatt. Min	3	0xn015
A84	Vbatt. Low	4	0xn015
A85	Battery over Voltage	5	0xn015
A86	Charger over Current	6	0xn015
A87	ESS interrupted due to abnormal conditions	7	0xn015
A88	ESS interrupted due to low battery setting voltage	8	0xn015
A89	RESERVED	9	0xn015
A90	Inverter Overload	10	0xn015
A91	Bypass Overload	11	0xn015
A92	UPS Overload Shutdown	12	0xn015
A93	RESERVED	13	0xn015
A94	System Occurred Unpredictable Interrupt Output	14	0xn015
A95	Rectifier Rating down to 50%	15	0xn015
A96	Transfer Impossible	0	0xn016
A97	Output Switch Open	1	0xn016
A98	RESERVED	2	0xn016
A99	RESERVED	3	0xn016
A100	Manual Bypass Aalarm	4	0xn016

A101	Battery Near End of Life	5	0xn016
A102	UPS Maintenance Alarm	6	0xn016
A103	Internal Clock Alarm	7	0xn016
A104	RESERVED	8	0xn016
A105	RESERVED	9	0xn016
A106	RESERVED	10	0xn016
A107	RESERVED	11	0xn016
A108	RESERVED	12	0xn016
A109	RESERVED	13	0xn016
A110	RESERVED	14	0xn016
A111	RESERVED	15	0xn016
A112	RESERVED	0	0xn017
A113	RESERVED	1	0xn017
A114	RESERVED	2	0xn017
A115	RESERVED	3	0xn017
A116	RESERVED	4	0xn017
A117	RESERVED	5	0xn017
A118	RESERVED	6	0xn017
A119	RESERVED	7	0xn017
A120	RESERVED	8	0xn017
A121	RESERVED	9	0xn017
A122	RESERVED	10	0xn017
A123	RESERVED	11	0xn017
A124	RESERVED	12	0xn017
A125	RESERVED	13	0xn017
A126	RESERVED	14	0xn017
A127	RESERVED	15	0xn017
A128	RESERVED	0	0xn018
A129	RESERVED	1	0xn018
A130	RESERVED	2	0xn018
A131	RESERVED	3	0xn018
A132	EPO(emergency power off) active	4	0xn018
A133	External Alarm 1 Activated(1)	5	0xn018
A134	External Alarm 2 Activated (1)	6	0xn018
A135	External Alarm 3 Activated (1)	7	0xn018
A136	External Alarm 4 Activated (1)	8	0xn018
A137	External Alarm 5 Activated (1)	9	0xn018
A138	External Alarm 6 Activated (1)	10	0xn018

A139	External Alarm 7 Activated (1)	11	0xn018
A140	External Alarm 8 Activated (1)	12	0xn018
A141	External Alarm 9 Activated (1)	13	0xn018
A142	External Alarm 10 Activated (1)	14	0xn018
A143	External Alarm 11 Activated (1)	15	0xn018
A144	External Alarm 12 Activated (1)	0	0xn019
A145	RESERVED	1	0xn019
A146	RESERVED	2	0xn019
A147	RESERVED	3	0xn019
A148	RESERVED	4	0xn019
A149	RESERVED	5	0xn019
A150	RESERVED	6	0xn019
A151	RESERVED	7	0xn019
A152	RESERVED	8	0xn019
A153	RESERVED	9	0xn019
A154	RESERVED	10	0xn019
A155	RESERVED	11	0xn019
A156	RESERVED	12	0xn019
A157	RESERVED	13	0xn019
A158	RESERVED	14	0xn019
A159	RESERVED	15	0xn019

Note. Status with “RESERVED” are not usable in KEOR COMPACT Series protocol.

(1) Optional function for Relay Card.

4.4 UPS Measurement area

Information : Address from 0xn030, 121 WORDS

Code	Description	Unit	Address	Data Format
M00	Input voltage R(1)	V*10	0xn030	###.#
M01	Input voltage S(1)	V*10	0xn031	###.#
M02	Input voltage T(1)	V*10	0xn032	###.#
M03	Input R-S Voltage(1)	V*10	0xn033	###.#
M04	Input S-T Voltage(1)	V*10	0xn034	###.#
M05	Input T-R Voltage(1)	V*10	0xn035	###.#
M06	Input frequency	Hz*10	0xn036	##.#
M07	Input current R(1)	A*10	0xn037	###.#
M08	Input current S(1)	A*10	0xn038	###.#
M09	Input current T(1)	A*10	0xn039	###.#
M10	Output voltage R(2)	V*10	0xn03A	###.#

M11	Output voltage S(2)	V*10	0xn03B	###.#
M12	Output voltage T(2)	V*10	0xn03C	###.#
M13	Output R-S Voltage(2)	V*10	0xn03D	###.#
M14	Output S-T Voltage(2)	V*10	0xn03E	###.#
M15	Output T-R Voltage(2)	V*10	0xn03F	###.#
M16	Output frequency	Hz*10	0xn040	##.#
M17	Output current R(2)	A*10	0xn041	##.#
M18	Output current S(2)	A*10	0xn042	##.#
M19	Output current T(2)	A*10	0xn043	##.#
M20	Output active power phase R	kW*10	0xn044	##.#
M21	Output active power phase S	kW*10	0xn045	##.#
M22	Output active power phase T	kW*10	0xn046	##.#
M23	Output active power total	kW*10	0xn047	##.#
M24	Output apparent power phase R	kVA*10	0xn048	##.#
M25	Output apparent power phase S	kVA*10	0xn049	##.#
M26	Output apparent power phase T	kVA*10	0xn04A	##.#
M27	Output apparent power total	kVA*10	0xn04B	##.#
M28	Output power factor R	*100	0xn04C	#.##
M29	Output power factor S	*100	0xn04D	#.##
M30	Output power factor T	*100	0xn04E	#.##
M31	Input Bypass voltage R(1)	V*10	0xn04F	###.#
M32	Input Bypass voltage S(1)	V*10	0xn050	###.#
M33	Input Bypass voltage T(1)	V*10	0xn051	###.#
M34	Bypass R-S Voltage(1)	V*10	0xn052	###.#
M35	Bypass S-T Voltage(1)	V*10	0xn053	###.#
M36	Bypass T-R Voltage(1)	V*10	0xn054	###.#
M37	Input Bypass frequency	Hz*10	0xn055	##.#
M38	Load rate R	%	0xn056	###
M39	Load rate S	%	0xn057	###
M40	Load rate T	%	0xn058	###
M41	RESERVED			
M42	RESERVED			
M43	RESERVED			
M44	RESERVED			
M45	RESERVED			
M46	RESERVED			
M47	RESERVED			
M48	RESERVED			

M49	RESERVED			
M50~M54	RESERVED			
M55	Inverter overload counter		0xn068	#####
M56	Bypass overload counter		0xn069	#####
M57	RESERVED			
M58	RESERVED			
M59	RESERVED			
M60	RESERVED			
M61	RESERVED			
M62	RESERVED			
M63	RESERVED			
M64	Battery remaining capacity	%*10	0xn070	##.#
M65	RESERVED			
M66	Remaining run time	Min*1	0xn072	###
M67	Positive total battery voltage	V*100	0xn073	###.##
M68	Negative total battery voltage	V*100	0xn074	###.##
M69	Positive battery voltage per cell	V*100	0xn075	#.##
M70	Negative battery voltage per cell	V*100	0xn076	#.##
M71	Charging watt	kW*100	0xn077	###.##
M72	Discharging watt	kW*100	0xn078	###.##
M73	Positive battery charger current	A*100	0xn079	###.##
M74	Negative battery charger current	A*100	0xn07A	###.##
M75	Positive battery discharger current	A*100	0xn07B	###.##
M76	Negative battery discharger current	A*100	0xn07C	###.##
M77	RESERVED			
M78	RESERVED			
M79	RESERVED			
M80	Rectifier T1 temperature	℃*10(3)	0xn080	##.#
M81	RESERVED	℃*10(3)	0xn081	##.#
M82	Rectifier T2 temperature	℃*10(3)	0xn082	##.#
M83	Inverter T1 temperature	℃*10(3)	0xn083	##.#
M84	RESERVED	℃*10(3)	0xn084	##.#
M85	Inverter T2 temperature	℃*10(3)	0xn085	##.#
M86	Bypass temperature	℃*10(3)	0xn086	##.#
M87	RESERVED	℃*10(3)	0xn087	##.#
M88	RESERVED	℃*10(3)	0xn088	##.#
M89	DC converter 1 temperature	℃*10(3)	0xn089	##.#
M90	DC converter 2 temperature	℃*10(3)	0xn08A	##.#

M91	Inner system temperature	℃*10(3)	0xn08B	##.#
M92	Battery chamber temperature	℃*10(3)	0xn08C	##.#
M93	Input Bypass current R(1)	A*10	0xn08D	###.#
M94	Input Bypass current S(1)	A*10	0xn08E	###.#
M95	Input Bypass current T(1)	A*10	0xn08F	###.#
M96	RESERVED			
M97	RESERVED			
M98	RESERVED			
M99	RESERVED			
M100	RESERVED			
M101~M119	RESERVED			
M120	Rectifier input active power	kW*10	0xn0A8	###.#

Note. Status with “RESERVED” are not usable in KEOR COMPACT Series protocol.

(1) This Information needs to be transferred if “Input transformer” is existing.

- Displayed Mains Voltage = (Input Voltage * Input transformer ratio).
- Displayed Mains Current = (Input current / Input transformer ratio).
- Displayed Bypass Voltage = (Input Bypass Voltage * Input transformer ratio).
- Displayed Bypass Current = (Input Bypass current / Input transformer ratio).

Note. “Input transformer ratio (T44)” settings please refers to chapter 4.6.

(2) This Information needs to be transferred if “Output transformer” is existing.

- Displayed Output Voltage = (Output Voltage * Output transformer ratio).
- Displayed Output Current = (Output current / Output transformer ratio).

Note. “Output transformer ratio (T45)” settings please refers to chapter 4.6

(3) Displayed with a minus sign.

4.5 UPS Control area

Following code must be written into 0xn0D0 vector index address. The commands are coded by a decimal value. Different value defined different command in word type.

Commands: Address: 0xn0D0, 1word.		
Code	**Description**	**Remarks**
C00	Normal Mode	
C02	ECO Mode	
C03	Converter Mode	
C05	Shutdown	**Immediate load off!!**
C06	Load on Bypass	
C11	Buzzer Disable	
C12	Buzzer Enable	
C14	Clear Latch Alarm and Buzzer	

C256	External Alarm 1 Active(1)
C257	External Alarm 2 Active(1)
C258	External Alarm 3 Active(1)
C259	External Alarm 4 Active(1)
C260	External Alarm 5 Active(1)
C261	External Alarm 6 Active(1)
C262	External Alarm 7 Active(1)
C263	External Alarm 8 Active(1)
C264	External Alarm 9 Active(1)
C265	External Alarm 10 active(1)
C266	External Alarm 11 Active(1)
C267	External Alarm 12 Active(1)

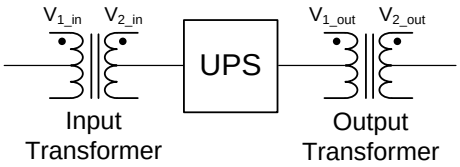
(1) Optional function for Relay Card.

4.6 UPS Configurations area

Information : Address from 0xn1EC, 2 WORDS

Code	Description	Unit	Address	Remarks
T44	Input transformer ratio parameter	N*100	0xn1EC	0 : No Transformer. 0~1 : Transformer ratio(1)
T45	Output transformer ratio parameter	N*100	0xn1ED	0 : No Transformer. 0~1 : Transformer ratio(1)

(1) Transformer ratios can be calculated as following:



Input transformer ratio = V_{1_in}/V_{2_in} = T44

Output transformer ratio = V_{2_out}/V_{1_out} = T45

5. JBUS interface in parallel system configuration

There is only one JBUS/MODBUS serial link interface for a parallel system configuration. One serial interface is used for the whole installation. The access data to the UPS unit is managed by the table addressing.

5.1 General data area

Table	Start address	Table length in words	JBUS/MODBUS function	Remark
SYS Status	0x1000	10	3 READ	
SYS Alarm	0x1010	10	3 READ	
SYS Measurement	0x1030	78	3 READ	See SYS part
SYS Command	0x10D0	1	6 WRITE	
SYS Configurations	0x111C	2	3 READ	
Status unit1	0x2000	8	3 READ	
Alarm unit1	0x2010	16	3 READ	
Measurement unit1	0x2030	97	3 READ	See unit part
Command unit1	0x20D0	1	6 WRITE	
Configurations unit1	0x21EC	2	3 READ	
Status unit2	0x3000	8	3 READ	
Alarm unit2	0x3010	16	3 READ	
Measurement unit2	0x3030	97	3 READ	See unit part
Command unit2	0x30D0	1	6 WRITE	
Configurations unit2	0x31EC	2	3 READ	
Status unit3	0x4000	8	3 READ	
Alarm unit3	0x4010	16	3 READ	
Measurement unit3	0x4030	97	3 READ	See unit part
Command unit3	0x40D0	1	6 WRITE	
Configurations unit3	0x41EC	2	3 READ	
Status unit4	0x5000	8	3 READ	
Alarm unit4	0x5010	16	3 READ	
Measurement unit4	0x5030	97	3 READ	See unit part
Command unit4	0x50D0	1	6 WRITE	
Configurations unit4	0x51EC	2	3 READ	
Status unit5	0x6000	8	3 READ	
Alarm unit5	0x6010	16	3 READ	
Measurement unit5	0x6030	97	3 READ	See unit part
Command unit5	0x60D0	1	6 WRITE	
Configurations unit5	0x61EC	2	3 READ	

Status unit6	0x7000	8	3 READ	See unit part
Alarm unit6	0x7010	16	3 READ	
Measurement unit6	0x7030	97	3 READ	
Command unit6	0x70D0	1	6 WRITE	
Configurations unit6	0x71EC	2	3 READ	

5.2 SYS Status data area

STATUS : Address from 0x1000, 10 WORDS			
Code	**Description**	**BIT**	**Address**
S00	Rectifier Input Present OK	0	0x1000
S01	Bypass Input Present OK	1	0x1000
S02	Common Input	2	0x1000
S03	RESERVED	3	0x1000
S04	RESERVED	4	0x1000
S05	UPS in Normal Mode	5	0x1000
S06	RESERVED	6	0x1000
S07	UPS in ECO Mode	7	0x1000
S08	UPS in Converter Mode	8	0x1000
S09	RESERVED	9	0x1000
S10	RESERVED	10	0x1000
S11	RESERVED	11	0x1000
S12	RESERVED	12	0x1000
S13	RESERVED	13	0x1000
S14	Rectifier on	14	0x1000
S15	Inverter on	15	0x1000
S16	Battery Discharger on(1)	0	0x1001
S17	Battery Charger on(1)	1	0x1001
S18	RESERVED	2	0x1001
S19	RESERVED	3	0x1001
S20	RESERVED	4	0x1001
S21	Load off	5	0x1001
S22	Load on Inverter	6	0x1001
S23	Load on Bypass	7	0x1001
S24	Load on Manual Bypass	8	0x1001
S25	Permission for ECO Mode Bypass Supply	9	0x1001
S26	RESERVED	10	0x1001
S27	RESERVED	11	0x1001
S28	RESERVED	12	0x1001

S29	RESERVED	13	0x1001
S30	RESERVED	14	0x1001
S31	RESERVED	15	0x1001
S32	RESERVED	0	0x1002
S33	RESERVED	1	0x1002
S34	RESERVED	2	0x1002
S35	Redundancy operation	3	0x1002
S36	RESERVED	4	0x1002
S37	RESERVED	5	0x1002
S38	RESERVED	6	0x1002
S39	System is Common Battery	7	0x1002
S40	Vbatt. Ok(1)	8	0x1002
S41	Vbatt. Low(1)	9	0x1002
S42	Vbatt. Min(1)	10	0x1002
S43	ESS Discharging(1)	11	0x1002
S44	RESERVED	12	0x1002
S45	ESS Waiting for Process(1)	13	0x1002
S46	RESERVED	14	0x1002
S47	RESERVED	15	0x1002
S48	RESERVED	0	0x1003
S49	RESERVED	1	0x1003
S50	RESERVED	2	0x1003
S51	Permission for Close the Battery Switch(1)	3	0x1003
S52	RESERVED	4	0x1003
S53	RESERVED	5	0x1003
S54	RESERVED	6	0x1003
S55	RESERVED	7	0x1003
S56	RESERVED	8	0x1003
S57	RESERVED	9	0x1003
S58	RESERVED	10	0x1003
S59	RESERVED	11	0x1003
S60	RESERVED	12	0x1003
S61	Any one of Unit's buzzer is active	13	0x1003
S62	Remote Control Enabled	14	0x1003
S63	RESERVED	15	0x1003
S64	RESERVED	0	0x1004
S65	RESERVED	1	0x1004
S66	RESERVED	2	0x1004

S67	Manual Bypass Switch Closed	3	0x1004
S68	RESERVED	4	0x1004
S69	Output Switch Closed	5	0x1004
S70	RESERVED	6	0x1004
S71	Bypass SCR Activated	7	0x1004
S72	Battery Switch Closed	8	0x1004
S73	RESERVED	9	0x1004
S74	RESERVED	10	0x1004
S75	RESERVED	11	0x1004
S76	RESERVED	12	0x1004
S77	Output Contactor Closed	13	0x1004
S78	RESERVED	14	0x1004
S79	RESERVED	15	0x1004
S80	RESERVED	0	0x1005
S81	RESERVED	1	0x1005
S82	RESERVED	2	0x1005
S83	RESERVED	3	0x1005
S84	RESERVED	4	0x1005
S85	RESERVED	5	0x1005
S86	Unit 1 present	6	0x1005
S87	Unit 2 present	7	0x1005
S88	Unit 3 present	8	0x1005
S89	Unit 4 present	9	0x1005
S90	Unit 5 present	10	0x1005
S91	Unit 6 present	11	0x1005
S92	RESERVED	12	0x1005
S93	RESERVED	13	0x1005
S94	RESERVED	14	0x1005
S95	RESERVED	15	0x1005
S96	RESERVED	0	0x1006
S97	RESERVED	1	0x1006
S98	RESERVED	2	0x1006
S99	RESERVED	3	0x1006
S100	Unit 1 Operating	4	0x1006
S101	Unit 2 Operating	5	0x1006
S102	Unit 3 Operating	6	0x1006
S103	Unit 4 Operating	7	0x1006
S104	Unit 5 Operating	8	0x1006

S105	Unit 6 Operating	9	0x1006
S106	RESERVED	10	0x1006
S107	RESERVED	11	0x1006
S108	Comm. Board 1 Present	12	0x1006
S109	Comm. Board 2 Present	13	0x1006
S110	Comm. Board 3 Present	14	0x1006
S111	Comm. Board 4 Present	15	0x1006
S112	Comm. Board 5 Present	0	0x1007
S113	Comm. Board 6 Present	1	0x1007
S114	RESERVED	2	0x1007
S115	RESERVED	3	0x1007
S116	RESERVED	4	0x1007
S117	RESERVED	5	0x1007
S118	RESERVED	6	0x1007
S119	RESERVED	7	0x1007
S120	RESERVED	8	0x1007
S121	RESERVED	9	0x1007
S122	RESERVED	10	0x1007
S123	RESERVED	11	0x1007
S124	Schedule Condition Not Met	12	0x1007
S125	RESERVED	13	0x1007
S126	RESERVED	14	0x1007
S127	RESERVED	15	0x1007
S128	RESERVED	0	0x1008
S129	RESERVED	1	0x1008
S130	RESERVED	2	0x1008
S131	RESERVED	3	0x1008
S132	RESERVED	4	0x1008
S133	RESERVED	5	0x1008
S134	RESERVED	6	0x1008
S135	RESERVED	7	0x1008
S136	RESERVED	8	0x1008
S137	RESERVED	9	0x1008
S138	RESERVED	10	0x1008
S139	RESERVED	11	0x1008
S140	RESERVED	12	0x1008
S141	RESERVED	13	0x1008
S142	RESERVED	14	0x1008

S143	RESERVED	15	0x1008
S144	Schedule Battery Test Process Permitted(1)	0	0x1009
S145	Manual Battery Test Process Permitted(1)	1	0x1009
S146	After Battery Test, Battery is Aging(1)	2	0x1009
S147	After Battery Test, Battery Pass(1)	3	0x1009
S148	Battery Test Fail(1)	4	0x1009
S149	Battery Test in Progress(1)	5	0x1009
S150	Battery Test Condition Incompatible(1)	6	0x1009
S151	Waiting for The Battery Test Process	7	0x1009
S152	Manual Battery Test Time is Limited in 2 Minutes	8	0x1009
S153	RESERVED	9	0x1009
S154	RESERVED	10	0x1009
S155	RESERVED	11	0x1009
S156	Energy Saver Enable	12	0x1009
S157	Energy Saver On	13	0x1009
S158	Energy Saver is Operating	14	0x1009
S159	Any Unit has Standing by	15	0x1009

Note. Status with “RESERVED” are not usable in KEOR COMPACT Series protocol.

(1) Optional function for Common Battery.

5.3 SYS Alarm data area

Alarms : Address from 0x1010, 16 WORDS			
Code	**Description**	**BIT**	**Address**
A00	RESERVED	0	0x1010
A01	Any Unit has General Alarm	1	0x1010
A02	Any Unit has Inverter General Alarm	2	0x1010
A03	Any Unit has Mains General Alarm	3	0x1010
A04	Any Unit has Discharger General Alarm	4	0x1010
A05	Any Unit has Charger General Alarm	5	0x1010
A06	Any Unit has Bypass General Alarm	6	0x1010
A07	RESERVED	7	0x1010
A08	RESERVED	8	0x1010
A09	RESERVED	9	0x1010
A10	Any Unit has Over Temp.	10	0x1010
A11	RESERVED	11	0x1010
A12	RESERVED	12	0x1010
A13	RESERVED	13	0x1010

A14	RESERVED	14	0x1010
A15	RESERVED	15	0x1010
A16	Unit 1 General Alarm	0	0x1011
A17	Unit 2 General Alarm	1	0x1011
A18	Unit 3 General Alarm	2	0x1011
A19	Unit 4 General Alarm	3	0x1011
A20	Unit 5 General Alarm	4	0x1011
A21	Unit 6 General Alarm	5	0x1011
A22	RESERVED	6	0x1011
A23	RESERVED	7	0x1011
A24	RESERVED	8	0x1011
A25	Any Unit has Inverter Fault	9	0x1011
A26	Any Unit has Rectifier Fault	10	0x1011
A27	RESERVED	11	0x1011
A28	RESERVED	12	0x1011
A29	Any Unit has Bypass SCR Fault	13	0x1011
A30	RESERVED	14	0x1011
A31	RESERVED	15	0x1011
A32	RESERVED	0	0x1012
A33	RESERVED	1	0x1012
A34	RESERVED	2	0x1012
A35	RESERVED	3	0x1012
A36	RESERVED	4	0x1012
A37	RESERVED	5	0x1012
A38	RESERVED	6	0x1012
A39	RESERVED	7	0x1012
A40	RESERVED	8	0x1012
A41	RESERVED	9	0x1012
A42	RESERVED	10	0x1012
A43	RESERVED	11	0x1012
A44	RESERVED	12	0x1012
A45	RESERVED	13	0x1012
A46	RESERVED	14	0x1012
A47	RESERVED	15	0x1012
A48	RESERVED	0	0x1013
A49	RESERVED	1	0x1013
A50	RESERVED	2	0x1013
A51	RESERVED	3	0x1013

A52	RESERVED	4	0x1013
A53	RESERVED	5	0x1013
A54	RESERVED	6	0x1013
A55	RESERVED	7	0x1013
A56	RESERVED	8	0x1013
A57	RESERVED	9	0x1013
A58	RESERVED	10	0x1013
A59	RESERVED	11	0x1013
A60	RESERVED	12	0x1013
A61	RESERVED	13	0x1013
A62	RESERVED	14	0x1013
A63	RESERVED	15	0x1013
A64	RESERVED	0	0x1014
A65	RESERVED	1	0x1014
A66	RESERVED	2	0x1014
A67	RESERVED	3	0x1014
A68	RESERVED	4	0x1014
A69	RESERVED	5	0x1014
A70	RESERVED	6	0x1014
A71	RESERVED	7	0x1014
A72	RESERVED	8	0x1014
A73	RESERVED	9	0x1014
A74	RESERVED	10	0x1014
A75	RESERVED	11	0x1014
A76	RESERVED	12	0x1014
A77	RESERVED	13	0x1014
A78	RESERVED	14	0x1014
A79	RESERVED	15	0x1014
A80	RESERVED	0	0x1015
A81	RESERVED	1	0x1015
A82	RESERVED	2	0x1015
A83	Vbatt. Min(1)	3	0x1015
A84	Vbatt. Low(1)	4	0x1015
A85	RESERVED	5	0x1015
A86	RESERVED	6	0x1015
A87	ESS interrupted due to abnormal conditions	7	0x1015
A88	RESERVED	8	0x1015
A89	RESERVED	9	0x1015

A90	Inverter Overload	10	0x1015
A91	Bypass Overload	11	0x1015
A92	UPS Overload Ohutdown	12	0x1015
A93	RESERVED	13	0x1015
A94	System Occurred Unpredictable Interrupt Output	14	0x1015
A95	Rectifier rating down to 50%	15	0x1015
A96	RESERVED	0	0x1016
A97	Output Switch Open	1	0x1016
A98	RESERVED	2	0x1016
A99	RESERVED	3	0x1016
A100	Manual Bypass Alarm	4	0x1016
A101	Battery Near End of Life	5	0x1016
A102	Any Unit has UPS Maintenance Alarm	6	0x1016
A103	RESERVED	7	0x1016
A104	RESERVED	8	0x1016
A105	RESERVED	9	0x1016
A106	RESERVED	10	0x1016
A107	RESERVED	11	0x1016
A108	RESERVED	12	0x1016
A109	RESERVED	13	0x1016
A110	RESERVED	14	0x1016
A111	RESERVED	15	0x1016
A112	RESERVED	0	0x1017
A113	RESERVED	1	0x1017
A114	RESERVED	2	0x1017
A115	RESERVED	3	0x1017
A116	RESERVED	4	0x1017
A117	Parallel Error - Parameter Setting	5	0x1017
A118	Parallel Error - System ID Conflict	6	0x1017
A119	Parallel Error - Communication Error	7	0x1017
A120	RESERVED	8	0x1017
A121	RESERVED	9	0x1017
A122	Parallel Error - Redundancy Loss	10	0x1017
A123	Parallel Error - Sync. Ring Disconnected	11	0x1017
A124	RESERVED	12	0x1017
A125	RESERVED	13	0x1017
A126	Parallel Error - Sync. Signal Failed	14	0x1017
A127	Parallel Error - System Number Setting	15	0x1017

A128	RESERVED	0	0x1017
A129	Parallel Error - Sync. of Start or Load Transfer Error	1	0x1018
A130	RESERVED	2	0x1018
A131	RESERVED	3	0x1018
A132	EPO Activated	4	0x1018
A133	RESERVED	5	0x1018
A134	RESERVED	6	0x1018
A135	Comm. Board 1 Disconnected with Unit1	7	0x1018
A136	Comm. Board 2 Disconnected with Unit1	8	0x1018
A137	Comm. Board 3 Disconnected with Unit1	9	0x1018
A138	Comm. Board 4 Disconnected with Unit1	10	0x1018
A139	Comm. Board 5 Disconnected with Unit1	11	0x1018
A140	Comm. Board 6 Disconnected with Unit1	12	0x1018
A141	Comm. Board 1 CAN Error	13	0x1018
A142	Comm. Board 2 CAN Error	14	0x1018
A143	Comm. Board 3 CAN Error	15	0x1018
A144	Comm. Board 4 CAN Error	0	0x1019
A145	Comm. Board 5 CAN Error	1	0x1019
A146	Comm. Board 6 CAN Error	2	0x1019
A147	Comm. Board 1 General Alarm	3	0x1019
A148	Comm. Board 2 General Alarm	4	0x1019
A149	Comm. Board 3 General Alarm	5	0x1019
A150	Comm. Board 4 General Alarm	6	0x1019
A151	Comm. Board 5 General Alarm	7	0x1019
A152	Comm. Board 6 General Alarm	8	0x1019
A153	RESERVED	9	0x1019
A154	RESERVED	10	0x1019
A155	RESERVED	11	0x1019
A156	RESERVED	12	0x1019
A157	RESERVED	13	0x1019
A158	RESERVED	14	0x1019
A159	RESERVED	15	0x1019
A160~A239	RESERVED		
A240	RESERVED	0	0x101F
A241	RESERVED	1	0x101F
A242	RESERVED	2	0x101F

A243	RESERVED	3	0x101F
A244	RESERVED	4	0x101F
A245	RESERVED	5	0x101F
A246	RESERVED	6	0x101F
A247	RESERVED	7	0x101F
A248	RESERVED	8	0x101F
A249	RESERVED	9	0x101F
A250~A255	RESERVED	10	0x101F
A251	RESERVED	11	0x101F
A252	RESERVED	12	0x101F
A253	RESERVED	13	0x101F
A254	RESERVED	14	0x101F
A255	RESERVED	15	0x101F

Note. Status with “RESERVED” are not usable in KEOR COMPACT Series protocol.

(1) Optional function for Common Battery.

5.4 SYS Measurement data area

Information : Address from 0x1020, 121 WORDS

Code	Description	Unit	Address	Data Format
M00	Input voltage R(1)(3)	V*10	0x1020	###.#
M01	Input voltage S(1)(3)	V*10	0x1021	###.#
M02	Input voltage T(1)(3)	V*10	0x1022	###.#
M03	Input R-S Voltage(1)(3)	V*10	0x1023	###.#
M04	Input S-T Voltage(1)(3)	V*10	0x1024	###.#
M05	Input T-R Voltage(1)(3)	V*10	0x1025	###.#
M06	Input frequency	Hz*10	0x1026	##.#
M07	Input current R(1)(3)	A*10	0x1027	###.#
M08	Input current S(1)(3)	A*10	0x1028	###.#
M09	Input current T(1)(3)	A*10	0x1029	###.#
M10	Output voltage R(2)	V*10	0x102A	###.#
M11	Output voltage S(2)	V*10	0x102B	###.#
M12	Output voltage T(2)	V*10	0x102C	###.#
M13	Output R-S Voltage(2)	V*10	0x102D	###.#
M14	Output S-T Voltage(2)	V*10	0x102E	###.#
M15	Output T-R Voltage(2)	V*10	0x102F	###.#
M16	Output frequency	Hz*10	0x1030	##.#
M17	Output current R(2)	A*10	0x1031	##.#

M18	Output current S(2)	A*10	0x1032	##.#
M19	Output current T(2)	A*10	0x1033	##.#
M20	Output active power phase R	kW*10	0x1034	##.#
M21	Output active power phase S	kW*10	0x1035	##.#
M22	Output active power phase T	kW*10	0x1036	##.#
M23	Output active power total	kW*10	0x1037	##.#
M24	Output apparent power phase R	kVA*10	0x1038	##.#
M25	Output apparent power phase S	kVA*10	0x1039	##.#
M26	Output apparent power phase T	kVA*10	0x103A	##.#
M27	Output apparent power total	kVA*10	0x103B	##.#
M28	Output power factor R	*100	0x103C	#.##
M29	Output power factor S	*100	0x103D	#.##
M30	Output power factor T	*100	0x103E	#.##
M31	Input Bypass voltage R(1)	V*10	0x103F	###.#
M32	Input Bypass voltage S(1)	V*10	0x1040	###.#
M33	Input Bypass voltage T(1)	V*10	0x1041	###.#
M34	Bypass R-S Voltage(1)	V*10	0x1042	###.#
M35	Bypass S-T Voltage(1)	V*10	0x1043	###.#
M36	Bypass T-R Voltage(1)	V*10	0x1044	###.#
M37	Input Bypass frequency	Hz*10	0x1045	##.#
M38	Load rate R	%	0x1046	###
M39	Load rate S	%	0x1047	###
M40	Load rate T	%	0x1048	###
M41	RESERVED			
M42	RESERVED			
M43	RESERVED			
M44	RESERVED			
M45	RESERVED			
M46	RESERVED			
M47	RESERVED			
M48	RESERVED			
M49	RESERVED			
M50	RESERVED			
M51	RESERVED			
M52	RESERVED			
M53	RESERVED			
M54	RESERVED			
M55	RESERVED			

M56	RESERVED			
M57	RESERVED			
M58	RESERVED			
M59	RESERVED			
M60	RESERVED			
M61	RESERVED			
M62	RESERVED			
M63	RESERVED			
M64	Battery remaining capacity(4)	%*10	0x1060	##.#
M65	RESERVED			
M66	Remaining run time(4)	min	0x1062	###
M67	Positive total battery voltage(4)	V*100	0x1063	###.##
M68	Negative total battery voltage(4)	V*100	0x1064	###.##
M69	Positive battery voltage per cell(4)	V*100	0x1065	#.##
M70	Negative battery voltage per cell(4)	V*100	0x1066	#.##
M71	Charging watt(4)	kW*100	0x1067	###.##
M72	Discharging watt(4)	kW*100	0x1068	###.##
M73	Positive battery charger current(4)	A*100	0x1069	###.##
M74	Negative battery charger current(4)	A*100	0x106A	###.##
M75	Positive battery discharger current(4)	A*100	0x106B	###.##
M76	Negative battery discharger current(4)	A*100	0x106C	###.##
M77	RESERVED			
M78	RESERVED			
M79	RESERVED			
M80	RESERVED			
M81	RESERVED			
M82	RESERVED			
M83	RESERVED			
M84	RESERVED			
M85	RESERVED			
M86	RESERVED			
M87	RESERVED			
M88	RESERVED			
M89	RESERVED			
M90	RESERVED			
M91	RESERVED			

M92	RESERVED			
M93	Input Bypass current R(1)	A*10	0x107D	###.#
M94	Input Bypass current S(1)	A*10	0x107E	###.#
M95	Input Bypass current T(1)	A*10	0x107F	###.#
M96	RESERVED			
M97	RESERVED			
M98	RESERVED			
M99	RESERVED			
M100	RESERVED			
M101	RESERVED			
M102	RESERVED			
M103~M119	RESERVED			
M120	Rectifier input active power	kW*10	0x1098	###.#

Note. Status with “RESERVED” are not usable in KEOR COMPACT Series protocol.

(1) This Information needs to be transferred if “Input transformer” is existing.

- Displayed Mains Voltage = (Input Voltage * Input transformer ratio).
- Displayed Mains Current = (Input current / Input transformer ratio).
- Displayed Bypass Voltage = (Input Bypass Voltage * Input transformer ratio).
- Displayed Bypass Current = (Input Bypass current / Input transformer ratio).

Note. “Input transformer ratio (T60)” settings please refers to chapter 5.6.

(2) This Information needs to be transferred if “Output transformer” is existing.

- Displayed Output Voltage = (Output Voltage * Output transformer ratio).
- Displayed Output Current = (Output current / Output transformer ratio).

Note. “Output transformer ratio (T61)” settings please refers to chapter 5.6.

(3) Optional function for Common input.

(4) Optional function for Common Battery.

5.5 SYS Control area

Following code must be written into 0x10D0 vector index address. The commands are coded by a decimal value. Different value defined different command in word type.

Commands: Address: 0x10D0, 1word.		
Code	**Description**	**Remarks**
C200	System Normal Mode	
C202	System ECO Mode	
C203	System Converter Mode	
C205	System Shutdown	**Immediate load off!!**
C206	System Load on Bypass	
C214	System Buzzer Disable	

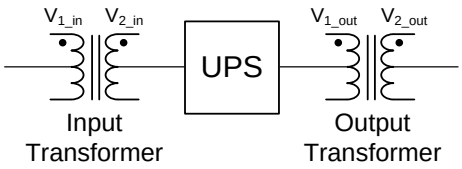
C215	System Buzzer Enable
C216	System Clear Latch Alarm and Buzzer

5.6 SYS Configurations area

Information : Address from 0x111C, 2 WORDS

Code	Description	Unit	Address	Remarks
T60	Input transformer ratio parameter	N*100	0x111C	0 : No Transformer. 0~1 : Transformer ratio(1)
T61	Output transformer ratio parameter	N*100	0x111D	0 : No Transformer. 0~1 : Transformer ratio(1)

(1) Transformer ratios can be calculated as following:



Input transformer ratio = V_{1_in}/V_{2_in} = T60

Output transformer ratio = V_{2_out}/V_{1_out} = T61

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Installer stamp

3 110 98
PARALLEL KIT

Installation Manual

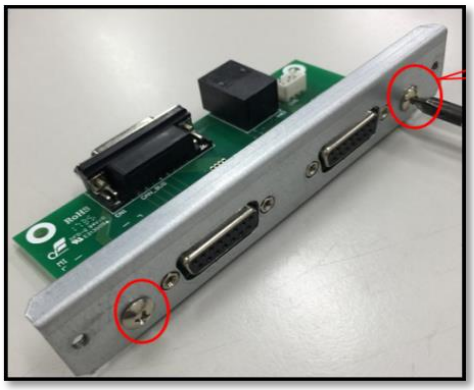
Content of the kit

Items	Description	Picture	Q'ty
1	Bracket		1
2	PCB TAEE3xx		1
3	Cable A 40cm		1
4	Cable B 70cm		1
5	Cable C 20cm		1
6	Cable D 150cm Parallel Communication Cable		1
7	Screw		4

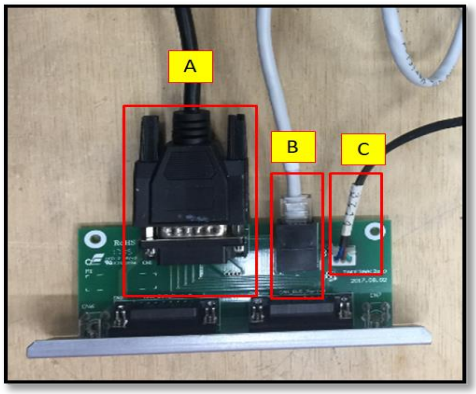
3 110 98
PARALLEL KIT
Installation Manual

Installation Procedure

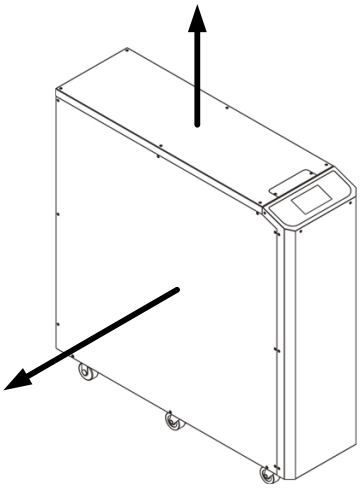
Step 1—Use 2 screws to fix the Bracket on PCB TAEE3xx



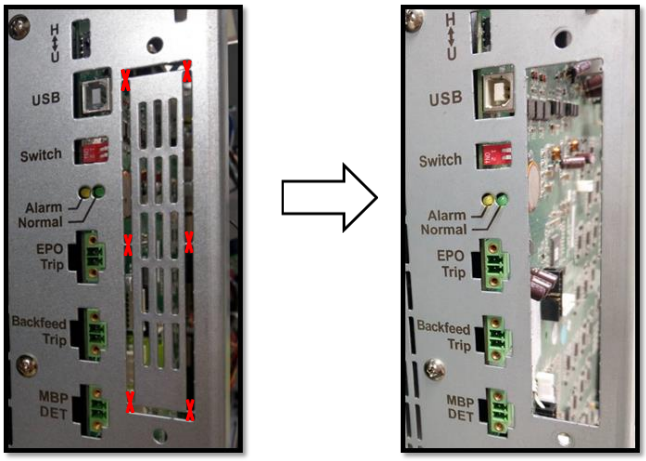
Step 2—Connect Cable A, B & C to PCB TAEE3xx



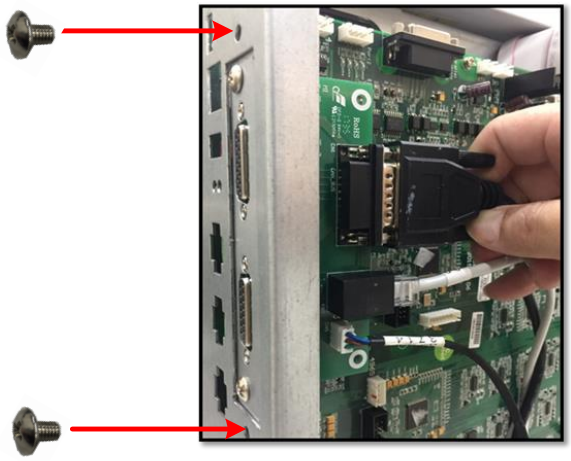
Step 3—Remove the top and left side cover of UPS.



Step 4—Cut off the metal sheet on the rear panel of UPS.

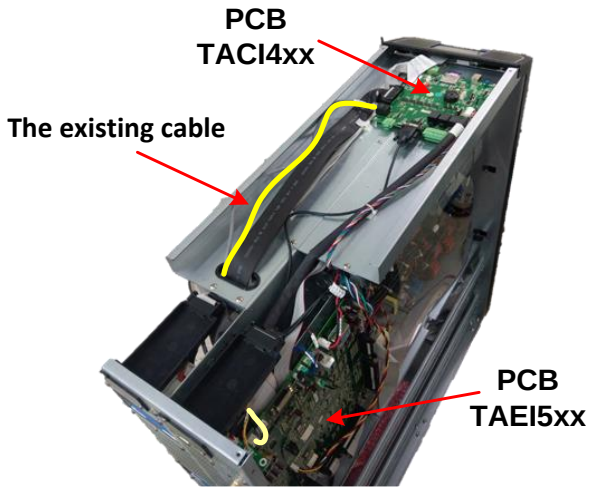


Step 5—Install the PCB TAEE3xx with the Bracket to the rear panel of UPS. Fix it with 2 screws.



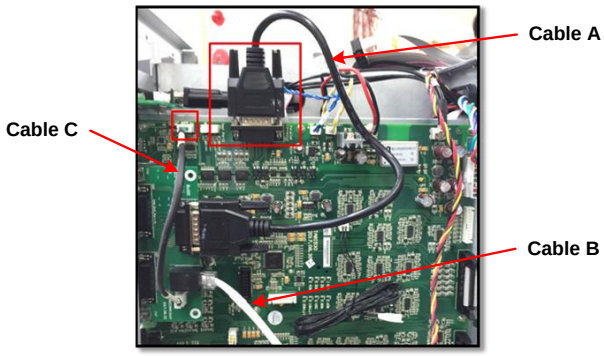
3 110 98
PARALLEL KIT
Installation Manual

Step 6—Take out the existing cable between TAEI5xx CN16 and TACI4xx CN1.

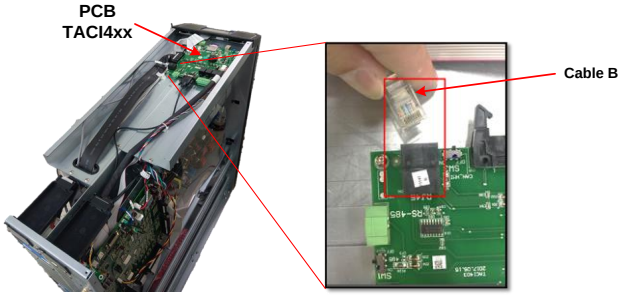


Step 7—Connect Cable A to TAEI5xx CN7

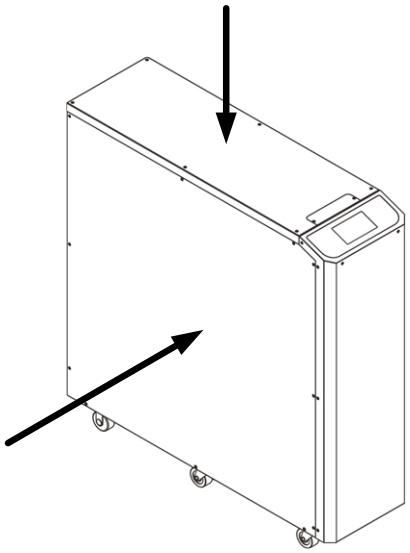
Step 8—Connect Cable C to TAEI5xx CN16



Step 9—Connect Cable B to TACI4xx CN1



Step 10—Install the top and left side cover of UPS.



Safety and guarantee terms

- The kit must be installed only with the UPS turned OFF and UNPLUGGED FROM THE MAINS.
- The Manufacturer declines all liabilities, direct and indirect, resulting from:
  - disregard for the instructions by the skilled technician and a use of the card different from the one stated in the manual;
  - use by personnel who have not read and understood the contents of the manual;
  - a use not conforming to the specific laws existing in the country of installation;
  - changes made to the equipment, operating logic or tampering;
  - repairs unauthorized by the Technical Service Assistance of LEGRAND;
  - damages caused by willful misconduct, gross negligence, exceptional events, fire or infiltration of liquids.

Keor Compact

THREE-PHASE UPS

10 - 15 - 20 kVA

GLOBAL SPECIALIST IN ELECTRICAL
AND DIGITAL BUILDING INFRASTRUCTURES

legrand®

SUSTAINABILITY

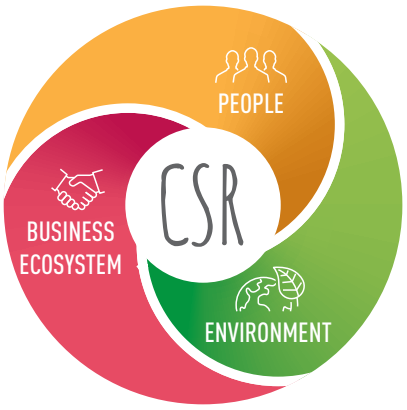
Corporate Social Responsibility

Green management and sustainable supply chain: these concepts are part of Legrand's Corporate Social Responsibility, which is the company's commitment to drawing up a strategy and implementing it with practical actions aimed at socially responsible behaviour towards everything around it, such as people, things and environment.
CSR involves the management of human resources, the organization and division of labour and the management of natural resources. CSR aims to assess the impact that the company's actions and decisions have internally, but also externally, on the stakeholders and the environment.

BUSINESS ECOSYSTEM
or how Legrand interacts ethically with the whole ecosystem of its activities.

PEOPLE
or how Legrand engages with all of its employees and stakeholders.

ENVIRONMENT
or how Legrand intends to limit the Group's environmental impact.



Circular economy

We are committed to creating a system that involves all stakeholders to share values, objectives and actions in order to control and reduce the environmental impact of all our economic and production processes, reduce waste and environmental impact and transform what would once have been defined as «waste» into new resources. Controlling these aspects has an impact on the entire life cycle of the product, starting from the design of new concepts and new specifications for the materials the UPS is made of; this is possible through responsible design and procurement processes (so-called «green procurement»), with a strong focus on research and the use of innovative materials from the circular economy and alternative raw materials. When a product ends its life, all these materials can become high value-added resources that can be used in other production cycles.

Digitalization

New information technologies allow us to reduce the use of several paper documents in favor of the digital format: in this way the information is always and everywhere accessible from a PC or smartphone and at the same time we can avoid the felling of many trees.
Digitization also becomes an important driver of the circular economy, since it allows the use of tools for performance data analysis and preventive diagnostics, both useful for optimizing the life cycle and durability of the product.

Efficiency

Our R&D team is constantly working on the development of increasingly efficient UPSs that allow high and incremental performance with minimum energy dissipation; with regard to CO_2 emissions, we are implementing processes and products that represent an improvement in the percentage of carbon footprint compared to the past.
But efficiency is not only synonymous with high performance.
For us, efficiency also means ecodesign: this implies that the UPS is designed to be easily repaired, maintained and it's easy to separate its components.
This means increasing the durability of our UPSs and the possibility of reusing and recycling them at the end of their life.

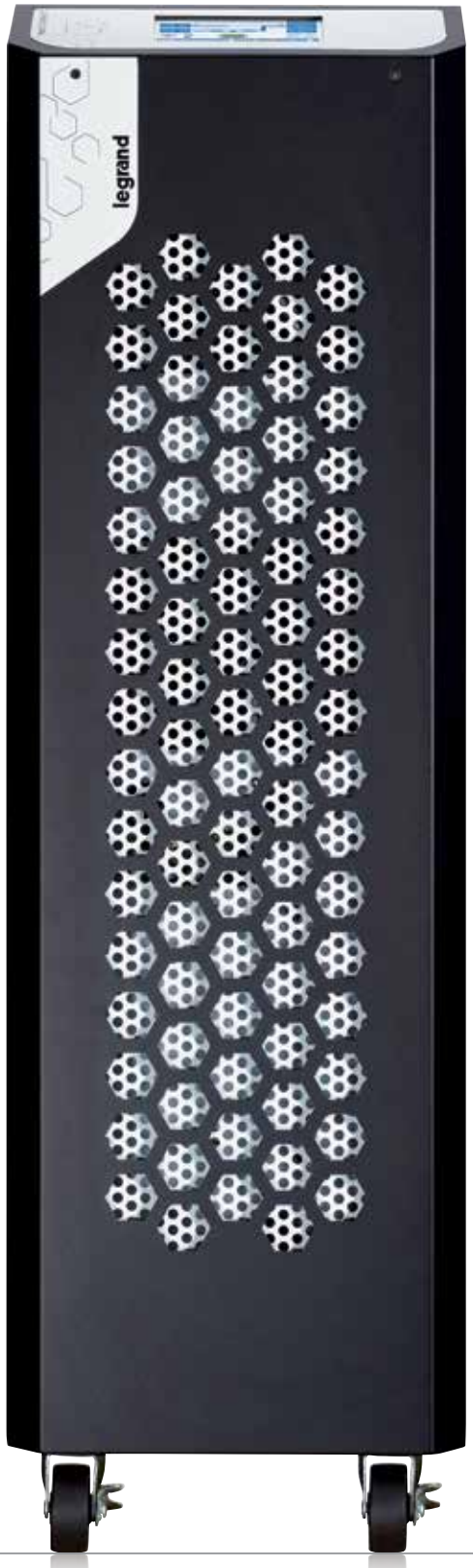
L'EPD/PEP

For each product family we draw up an EPD (Environmental Product Declaration) or PEP (Profil Environnemental Produit) in line with ISO 14025: it is a declaration that is a sort of environmental photograph of the product.
The EPD is drawn up according to the concept of Life Cycle Assessment: it examines the environmental impact of a product throughout its life cycle, from the development of product specifications to the choice of materials to be used and the end-of-life destination of the product itself.

Keor Compact

THREE-PHASE UPS

Keor Compact is a three phase online double conversion and transformerless UPS. Ideal for all typical low-power three-phase applications such as offices, commercial and tertiary, **Keor Compact** is characterized by small size and ease of use.
The range is available in 3 different power ratings: 10-15-20 kVA.



Easy Installation

With only 0.22 m² footprint for both UPS and its battery cabinet, wheels, small dimensions, easy connection and start up, **Keor Compact** is perfect for comfortable installation even in small technical room.

Reduces the floor space and simplifies the installation.

Equipped with wheels that make it easy to move.

User friendly

This UPS can be easily controlled and managed thanks to its Colour Touch Screen with intuitive graphics and navigation windows.

Keor Compact

Redundancy & high availability

Parallel connection for redundant configurations makes the **Keor Compact** able to guarantee high levels of availability for critical applications.

Easy autonomy selection

Keor Compact gives typical standard autonomy with internal batteries.
Just connecting external battery cabinets, longer autonomy can be easily obtained.

Embedded backfeed

Keor Compact is equipped, as standard, with internal Backfeed protection, so no need to implement external protection in upstream panel.

Communication features

- Standard RS232
- ModBus
- Programmable dry contacts
- EPO & GenSet and Remote Monitoring Panel
- USB Converter (optional)
- Internal SNMP solutions (optional)

Keor Compact 10-15-20 kVA

Conventional UPS - Online three-phase double conversion VFI

3 111 00

Characteristics

- Power factor correction PFC (input PF>0.99)
- User friendly touch screen display 4.3”
- Wide input voltage range and frequency
- Dual input
- Cold start
- Embedded backfeed protection
- Smart communication ports and SNMP management capability
- Parallel operation up to 6 units
- Built-in battery for standard autonomy
- Extended back up time with battery cabinet
- Overload & short circuit protection
- Powerful built-in charger
- RS232, GenSet, dry contacts,
- Compact size, light weight & low noise
- Smallest footprint: 0.22m^2
- Wheels for easy movement

Item	UPS Keor Compact			
	Nominal power (kVA)	Active power (kW)	Dimensions H x W x D (mm)	Net weight (kg)
3 111 00	10	9	260 x 850 x 890	74
3 111 01	10	9	260 x 850 x 890	149
3 111 02	15	13.5	260 x 850 x 890	76
3 111 03	15	13.5	260 x 850 x 890	166
3 111 04	20	18	260 x 850 x 890	76
3 111 05	20	18	260 x 850 x 890	176

Accessories

	Description	Dimensions W x D x H (mm)
3 110 94	Keor Compact battery cabinet empty	260 x 850 x 890
3 110 95	Keor Compact battery cabinet 10 kVA	260 x 850 x 890
3 110 96	Keor Compact battery cabinet 15 kVA	260 x 850 x 890
3 110 97	Keor Compact battery cabinet 20 kVA	260 x 850 x 890
3 110 98	Parallel kit	
3 110 99	RS-485 MODBUS card	
3 111 06	Dry contact card	
3 110 86	Battery temperature probe	

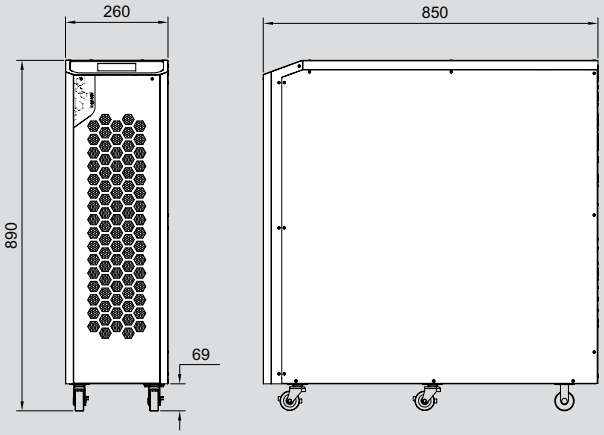
Autonomy Table

	Power (kVA)	Autonomy (min)	No. Battery Cabinets*
311101	10	11	0
311101 + 1 x 311095	10	50	1
311101 + 2 x 311095	10	87	2
311101 + 3 x 311095	10	126	3
311103	15	7	0
311103 + 1 x 311096	15	40	1
311103 + 2 x 311096	15	67	2
311103 + 3 x 311096	15	99	3
311105	20	6	0
311105 + 1 x 311097	20	28	1
311105 + 2 x 311097	20	57	2
311105 + 3 x 311097	20	81	3

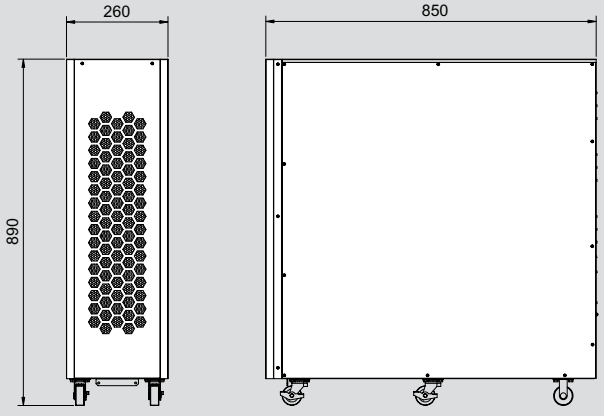
*** 0 = No Battery Cabinets**

Dimensions (mm)

Keor Compact 10 - 15 - 20 kVA



Battery Cabinet



Keor Compact 10-15-20 kVA

Conventional UPS - Online three-phase double conversion VFI

Characteristics

General specifications	Keor Compact 10	Keor Compact 15	Keor Compact 20
Nominal Power (kVA)	10	15	20
Active Power (kW)	9	13.5	18
Technology	On-line double conversion VFI-SS-111		
Waveform	Sinusoidal		
UPS architecture	Stand Alone or Distributed Parallel up to 6 units		
Efficiency	up to 95%		
Efficiency in ECO mode	up to 98.5%		
Input			
Input Voltage	400V (3Ph+N+PE)		
Input Voltage Range (Ph-Ph)	±20% @100% load, -40/+20% @50% load		
Input Frequency	40-70 Hz		
THD of input current	< 3% at full load		
Dual Input	Yes		
Compatibility with Diesel Generators	Yes		
Input power factor	> 0.99		
Output			
Output Voltage	380, 400, 415V (3Ph+N+PE)		
Output voltage tolerance	± 1% (Static load)		
Output frequency (nominal)	50 /60 Hz (Adjustable from front panel)		
Output frequency tolerance	± 1 Hz / ± 3 Hz adjustable synch Mains for Bypass; ± 0.01% Free Run		
Crest Factor	3:1		
THD of output voltage	< 2% with linear load, < 5% with distorted load		
Output power factor	0.9		
Overload Capability	60 min at 110%, 10 min at 125%; 1 min at 150%		
By-pass	Builtin Automatic and Mainteinance Bypass		
Batteries			
Cold Start	Yes		
Battery type	VRLA		
Internal batteries	Yes		
Communication and management			
Control Panel Display	Colour Touch Screen 4.3"		
Communication ports	RS232, Genset, 4 programmable relay contacts, RS485 (optional), net interface slot		
BackFeed protection	Embedded		
Audible alarm	Acoustic alarms and warnings		
Emergency Power Off (EPO)	Yes		
Remote Management	Availble		
Physical characteristics			
Ventilation	Forced with FANs from front to rear		
Max Heat Disipation (100% load W, battery in recharge)	600	900	1300
Color	RAL 9017 (Black-cabinet) RAL9003 (White-control panel)		
Dimensions W x D x H (mm)	260 x 850 x 890		
Weight without Batteries (kg)	74	76	76
Weight with Batteries (kg)	149	166	176
Environmental conditions			
Operating temperature (°C)	0 - 40°C (Recommended temperature for longer Battery Life: 20-25°C)		
Relative humidity range (%)	20-95% (Non-Condensing)		
Protection degree	IP20		
Acoustic Noise at 1m (dBA)	< 52		
Conformity and sustainability			
Reference product standards	IEC/EN 62040-1, IEC/EN 62040-2, IEC/EN 62040-3		
Estimated content of circular economy derived materials	**≃ 39%**		
Recyclability rate calculated using the method described in technical report IEC/TR 62635*	**≃ 71%**		

***This value is based on data collected from a technological channel operating on an industrial basis. It does not pre-validate the effective use of this channel for end-of-life of this product.**

CUSTOMER SERVICES

Reliable

Directly present in more than 70 countries and servicing its products in more than 150 countries worldwide, a team of qualified engineers is available to support your UPS system to ensure power quality and availability to the most critical loads.

Excellent

Legrand's competitive edge lies in its ability to provide high value-added UPS systems and services for both end users and business partners.
For Legrand, creating value means coming up with solutions for lower energy consumption, but also integrating product design into the overall development process. With around 200 000 catalogue items, the Group also provides all products required for electrical and digital building installations, particularly as integrated systems, finding solutions to fit everyone's needs.

Tailor-made

Legrand offers a complete range of specific solutions and services to meet customer requirements:
- Technical pre-sales support at the project design stage
- Factory acceptance test
- Supervision of installation, testing and commissioning, site acceptance test
- Operator training
- Site audit
- Warranty extension
- Annual maintenance contract
- Fast intervention on emergency call

SUPPORT

SITE INSPECTION, INSTALLATION SUPERVISION.
We perform a comprehensive check of the UPS environment to ensure safety and fault-free operation.
Our technical experts give manufacturer's recommendations to the site engineer or electrical contractors, and supervise the UPS installation before load power-up.

SITE TEST, COMMISSIONING.
Our Service Engineers conduct rigorous site tests and full setting-up of the UPS system before going live. They also perform site acceptance tests according to your requirements.
Commissioning operations for all UPS are carried out by qualified engineers to guarantee seamless start-up.
After the final handing over of the UPS system, a Test and Commissioning report is delivered to you.

TRAINING

We offer on-site training to ensure your equipment's safe and efficient operation.
Troubleshooting courses are also available in our plants for intensive hands-on practice on UPS training equipment.

MAINTENANCE

PREVENTIVE MAINTENANCE
Electronic equipment and power systems, such as UPS, contain life-limited components and parts that must be replaced according to the manufacturer's specifications.
To ensure optimal performance and to protect your critical application from potential downtime, it is crucial to perform preventive maintenance operations on a regular basis and replace parts when needed. Our Service Contracts include cleaning, IR thermography, measurements, functional tests, event log and power quality analysis, battery health check, hardware and software upgrades, and technical reports.
A Preventive Maintenance Plan is one of the most cost-effective actions that can preserve your initial investment and ensure your business continuity.

CORRECTIVE MAINTENANCE, EMERGENCY CALL
In the event of an Emergency Call, our worldwide service network, with engineers and spare-parts stocks strategically located as close as possible to your site, guarantees a fast intervention time with 24/7/365 assistance.
After connecting his laptop to your UPS, very powerful diagnostic software helps our engineer to identify the fault, thus ensuring short MTTR (Mean Time To Repair).
Corrective actions are performed such as part replacement, adjustments and upgrades to return the UPS system back to normal operation.

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