

MASTERYS BC

100 - 120 kVA

Installations- und bedienungsanleitung (DE)

Installation and operating manual (EN)

Manual de instalación y uso (ES)

Paigaldus- ja kasutusjuhend (ET)

Asennus- ja käyttöohje (FI)

Manuel d'installation et d'utilisation (FR)

Manuale di installazione e uso (IT)

Installatie- en bedieningshandleiding (NL)

Dokumentacja Techniczno-Ruchowa (PL)

Manual de instalação e funcionamento (PT)

Manual de instalare și utilizare (RO)

Руководство по установке и эксплуатации (RU)

Navodila za priključitev in uporabo (SL)

Installations- och användarhandbok (SV)

Kurulum ve kullanım kılavuzu (TR)

安装及操作手册 (ZH)



CERTIFICATE AND CONDITIONS OF WARRANTY

This SOCOMEC continuous power system is guaranteed against any manufacturing or material defects.

The warranty is valid for 12 (twelve) months from the commission date, provided activation is carried out by SOCOMEC personnel or personnel from a support centre authorised by SOCOMEC, and no more than 15 (fifteen) months from being shipped from SOCOMEC.

The warranty is valid throughout national territory. If the UPS is exported abroad, the warranty will only cover the parts used to repair faults.

The warranty is valid ex-works and covers labour and parts used to repair the faults.

The warranty shall not apply in the following cases:

- Failure due to unforeseen circumstances or force majeure (lightning, floods, etc.);
- Failure due to negligence or improper use (use outside limits: temperature, humidity, ventilation, electric power supply, applied load, batteries);
- Insufficient or inappropriate maintenance;
- When maintenance, repairs or modifications have not been carried out by SOCOMEC personnel, or personnel from a support centre authorised by SOCOMEC.
- If the battery has not been recharged in accordance with the terms indicated on the packaging and in the manual, in the event of long periods of storage or UPS inactivity.

SOCOMEC may, at its own discretion, opt for the repair of the product or the replacement of faulty or defective parts with new parts, or with used parts of equivalent quality to new parts with regard to function and performance.

Defective or faulty parts replaced free of charge must be made available to SOCOMEC, which becomes the sole owner.

Replacement or repair of parts, or any modifications to the product during the warranty period, will not extend the duration of the warranty.

SOCOMEC will not be responsible for damages under any circumstances (including, without limitations, damage for loss of earnings, interruption of activity, loss of information or other financial losses) arising from the use of the product.

These conditions are subject to Italian law. Any disputes fall under the jurisdiction of the Court of Vicenza.

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1. SAFETY STANDARDS

1.1. IMPORTANT

- This document provides important instructions for the safe use, movement and connection of the MASTERYS BC uninterruptible power system (UPS).
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- This document is not a specification. SOCOMEC reserves the right to make any changes to information without prior notice.
- The unit must only be installed and activated by qualified technical personnel who have been authorised by SOCOMEC.



The UPS MUST be handled carefully by at least two people.

- The unit must remain in a vertical position at all times.
- Connect the PE ground conductor first before making any other connection.



UPS mains power supplies (rectifier and bypass) must be protected from voltage transients with devices that are suited to the installation; the mains voltage transients must be limited to 2.5 kV. These devices must be sized to consider all the installation parameters (geographical position, whether or not there is a lightning rod, whether or not there are other suppressors in the electrical installation, etc.).

- Do not expose the UPS to rain or liquids in general. Do not insert foreign bodies.



The installer is responsible for implementing the backfeed protection with the use of AC input line isolation devices external to the UPS (see section 2.6.1).

Before working on this circuit

- Isolate the Uninterruptible Power System (UPS)
- Then check for Hazardous Voltage between all terminals including the protective earth

Risk of Voltage Backfeed



- For the purpose of warning electrical technicians against backfeed situations not caused by the UPS, which may arise when a particular load fault is present while the UPS is operating in stored energy mode, or while unbalanced loads are supplied through a particular power distribution system e.g. an impedance grounded IT system, the installer must attach the labels provided to all primary power isolators installed remotely from the UPS area and on external access points, if present, between the said isolators and the UPS.

In particular the label must be attached to the external AC input line isolation service (backfeed insulation).

- The UPS may be powered from an IT distribution system with a neutral conductor.
- Keep this manual in a convenient place for future consultation.
- If the unit fails it must only be repaired by authorised technicians who have been specially trained for this purpose.
- This equipment complies with European Community directives for industrial equipment and bears the approval mark **CE**
- The UPS requires three-phase plus neutral input connections (3P+N).
- The UPS can be powered by an IT distribution system with a neutral conductor.



The connecting bars are made of aluminium!
Use only aluminium cables or cables with tin-plated eyelets for the connections.

- Do not connect the output neutral to ground. The UPS does not modify the neutral setup of the system; the use of an isolation transformer is required should it be necessary to modify the neutral setup downstream of the UPS.
- At the end of the UPS system's lifetime it should only be entrusted to specialist disposal companies, which are required to dismantle and dispose of its constituent components in accordance with existing national legislation.
- Before connecting the external battery cabinet check it is fully compatible with the UPS model.
- The use of external battery cabinets not supplied by the manufacturer is not recommended.
- Switch off and isolate the UPS and wait for 5 minutes before removing protection panels to carry out work on parts under dangerous voltage.
- There is a risk of explosion if batteries are replaced with others of the wrong type.
- Batteries are considered toxic waste. If replaced, the used batteries must only be entrusted to specialist disposal companies. Batteries must not be disposed of with other industrial or domestic waste, as stipulated by local legislation.



It is very dangerous to touch any part of the batteries as there is no insulation between the batteries and the mains power source.

The product you have chosen is designed for commercial and industrial use only. If used for particular critical applications such as life support systems, medical applications, commercial transportation, nuclear facilities or any other application or systems where product failure is likely to cause substantial harm to people or property, products may have to be adapted. For such use please contact SOCOMEC beforehand to check if these products meet the required levels of safety, performance, reliability, and comply with applicable laws, regulations and specifications.



WARNING!

This is a product for commercial and industrial application in the second environment - installation restrictions or additional measures may be needed to prevent disturbances.

1.2. DESCRIPTION OF SYMBOLS ON LABELS ATTACHED TO THE UNIT

All precautions and warnings on labels and plates inside and outside the equipment should be observed.



DANGER! HIGH VOLTAGE (BLACK/YELLOW)



GROUND TERMINAL



READ THE USER MANUAL BEFORE USING THE UNIT

2. UNPACKING AND INSTALLATION OF THE UNIT

The packaging guarantees the stability of the UPS during shipping and physical transfer. Carry the packaged unit as close as possible to the installation site.



When moving the unit on even slightly sloping surfaces, use the blocking equipment and braking devices to ensure the unit does not fall over.

2.1. SHIPPING AND MOVING

- The UPS must remain in a vertical position during all shipping and moving operations.
- Ensure the floor is strong enough to support the weight of the UPS and battery cabinet if used.



Avoid moving the unit by putting pressure on the front door.



The UPS **MUST** be handled carefully by at least two people.



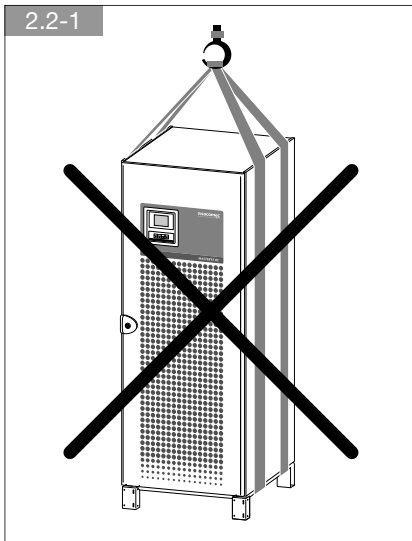
CAUTION IF DAMAGED

If packaging is crushed, ripped or open such that the inner contents are revealed, the equipment should be kept in an isolated area and inspected by a qualified person. If the packaging cannot be shipped the contents should be collected promptly, kept apart, and the sender or recipient should be contacted.



All packaging must be recycled in compliance with existing legislation in the country where the system is installed.

2.2. MOVING FROM ABOVE



IMPORTANT!

When being moved the cabinets must be kept in an upright position.



WARNING!

NEVER USE HARNESES!

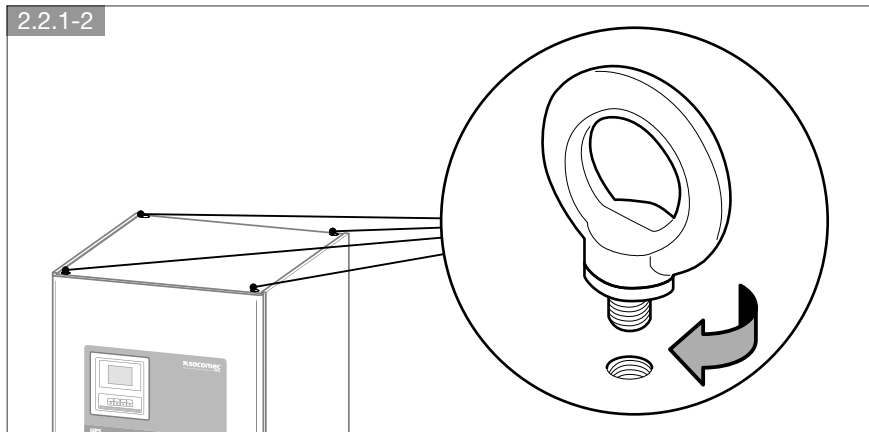
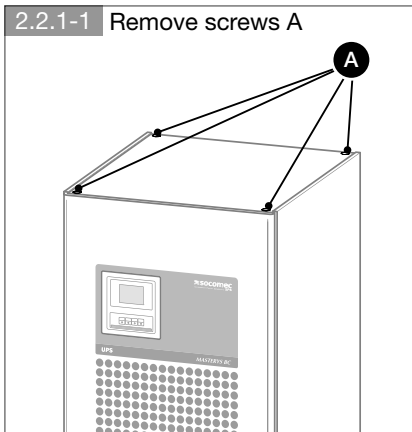
2.2.1. Moving with belts

- Length of belts: ≥ 150 cm
- Lifting eyebolts (supplied on request): internal $\varnothing 30$ mm, thread M12.

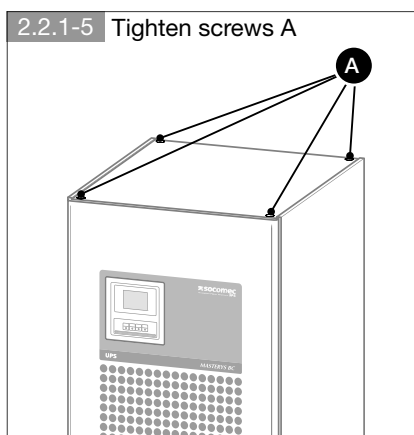
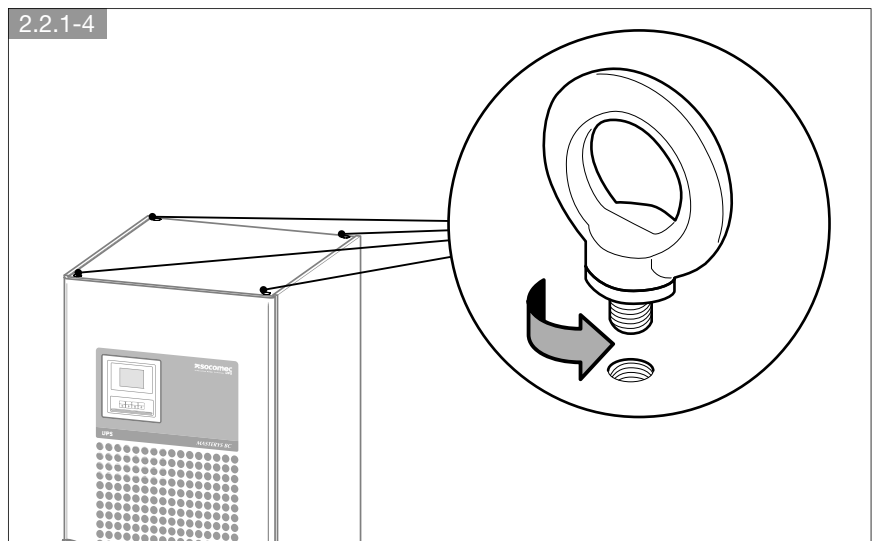
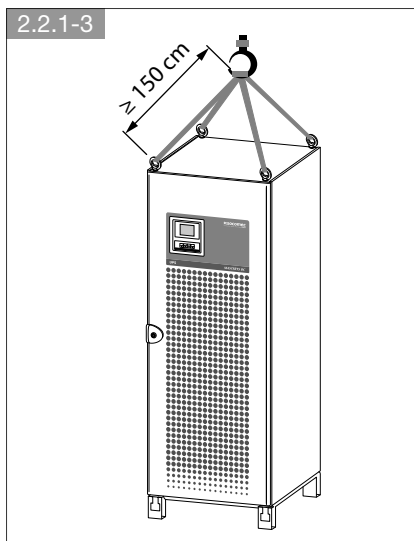


WARNING!

LIFT AND HANDLE THE CABINETS WITH THE UTMOST CARE AND WITHOUT JERKING!

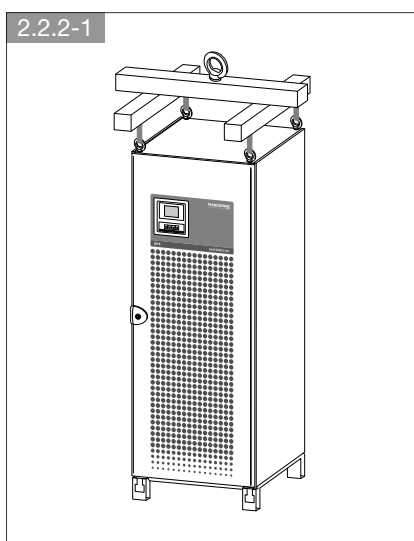


2. UNPACKING AND INSTALLATION OF THE UNIT



2.2.2. Moving with lifting truss

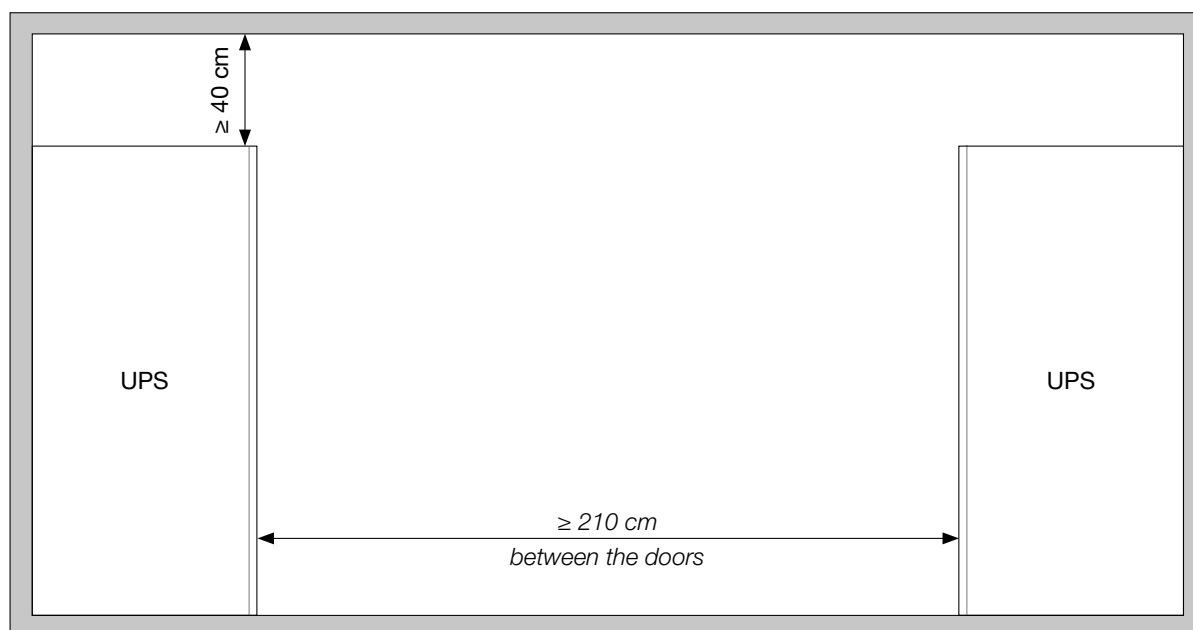
If the height of the ceiling does not allow the use of belts the UPS can be moved using lifting trusses.



2.3. ENVIRONMENTAL REQUIREMENTS

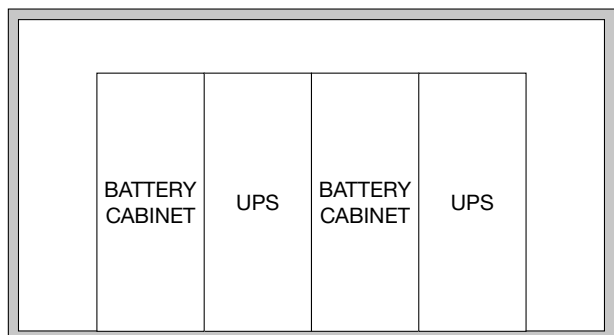
- The UPS is not designed for outdoor use.
- Do not expose the UPS to direct sunlight or sources of excessive heat.
- The recommended operating temperature, humidity and altitude values are listed in the technical specifications table (see chapter 10). Cooling systems may be required to maintain these values.
- The UPS must be installed in an environment with no obstructions and which is dry, clean and dust-free.
- Avoid dusty environments or areas where there is dust from conductive or corrosive materials (e.g. metal dust or chemical solutions).
- The UPS can be installed against a wall; the distance will depend on the cables present. The upper part of the UPS must be positioned at least 40 cm away from the ceiling (figure 2.3-1).
- The UPS switches are accessed from the front; however, a space of at least 1.5 metres should be left at the front of the UPS for maintenance purposes (figure 2.3-1).
- For UPSs set up front-wise, leave a minimum space of 210 cm between the two cabinets so as to allow a passageway when both doors are open (in accordance with standard IEC 60364 - see figure 2.3-1).

2.3-1

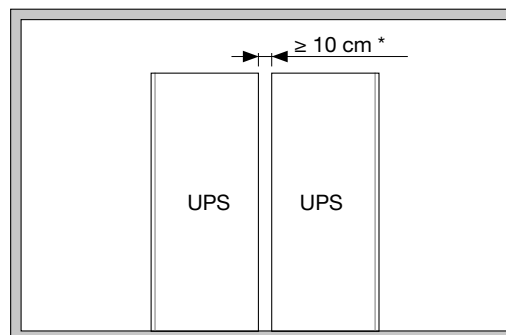


- Several cabinets can be installed adjacent to each other (figure 2.3-2).
- Two MASTERYS BC 100-120 systems can be installed back to back (figure 2.3-3).
- Observe the direction of ventilation flows (figure 2.3-4) and heat dispersion flows (figure 2.3-5). See chapter 10 for the technical specifications relating to required ventilation values.

2.3-2



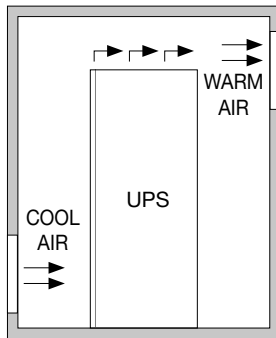
2.3-3



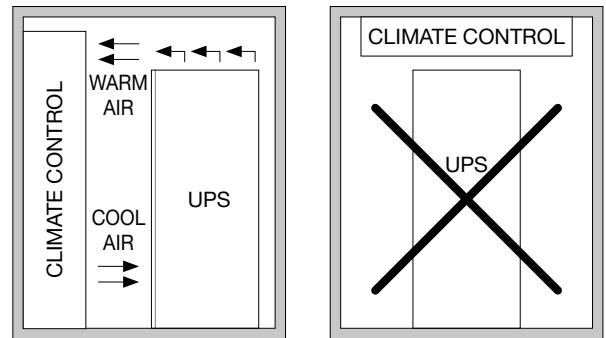
* between the backs

2. UNPACKING AND INSTALLATION OF THE UNIT

2.3-4 Ventilation



2.3-5 Climate control



2.3.1. Installation on raised flooring

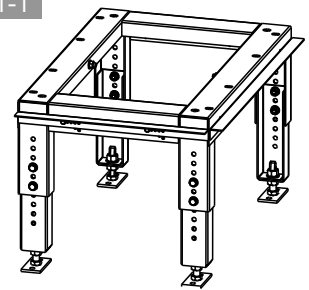
If the UPS is to be installed on raised flooring the SOCOMEC adjustable frame (figure 2.3.1-1) must be used to support the weight of the unit (figure 2.3.1-2).



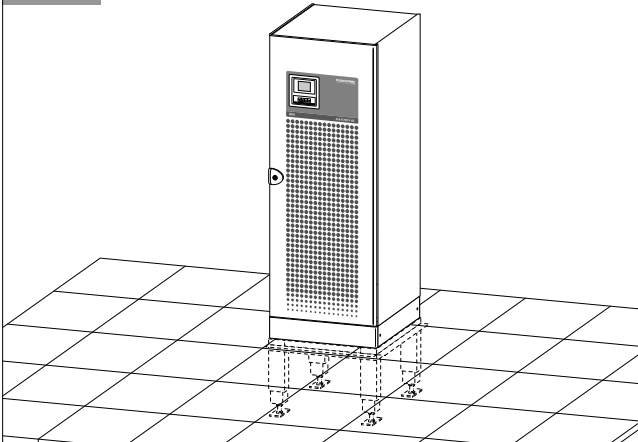
Refer to the relevant installation manual provided in the packaging for information on frame assembly operations.

Allow for small openings in the floor panels to ensure air flow at the front (figure 2.3.1-3).

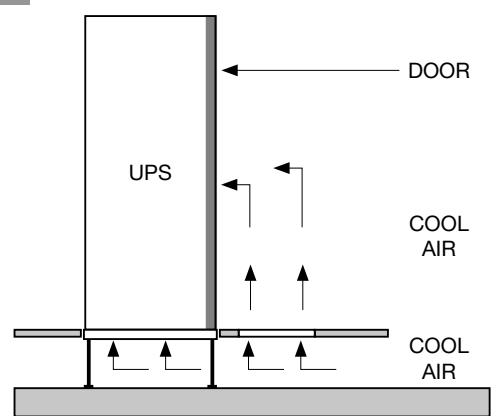
2.3.1-1



2.3.1-2

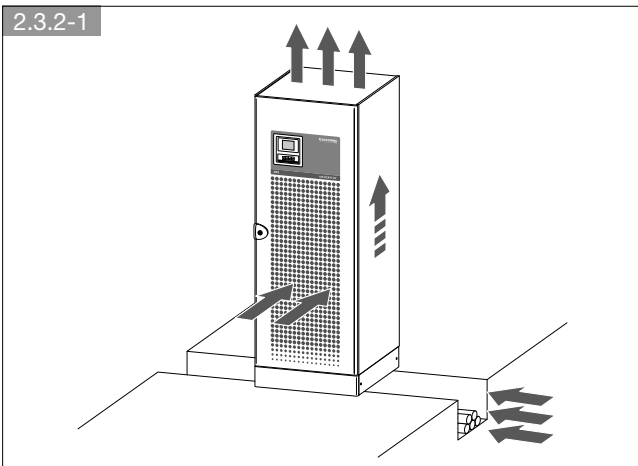


2.3.1-3



2.3.2. Installation over a gap

2.3.2-1



2.4. GENERAL RULES FOR CABLE INSTALLATION ON TRAYS



WARNING!

The cables must be installed on trays when indicated in the following diagrams. The trays must be positioned near the UPS.



WARNING!

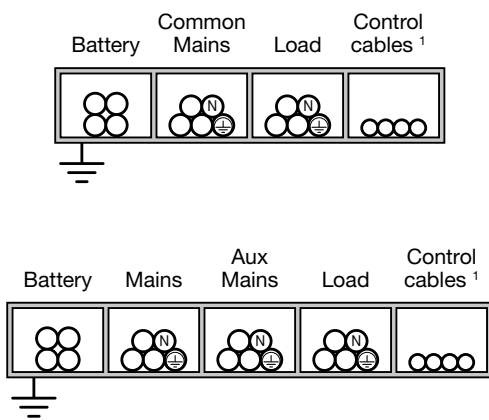
All metal and suspended ducts or those in raised flooring **MUST** be connected to earth and to the various cabinets.



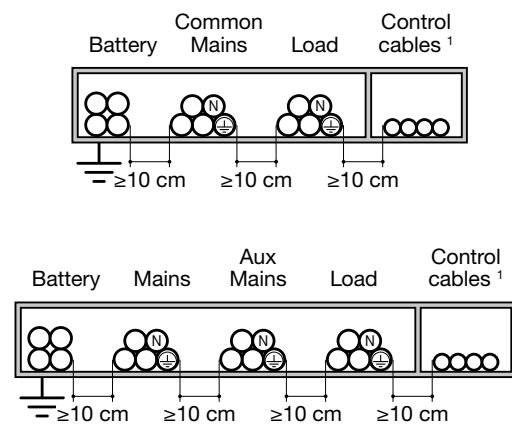
WARNING!

Power cables and control cables **MUST NEVER** be installed in the same duct.

2.4-1 Correct installation



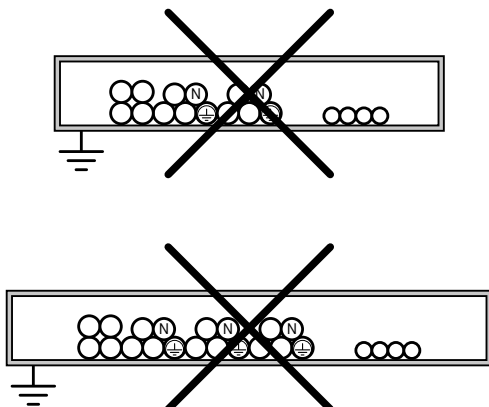
2.4-2 Permitted installation



WARNING!

Risk of electromagnetic interference between battery cables and output cables.

2.4-3 Wrong installation



WARNING!

Do not expose power cables to other equipment sensitive to the electromagnetic field.

1. Control cables: connections between the cabinets and each unit, alarm signals, remote mimic panel, connection to the BMS (Building Management System), emergency stop, connection to generator.

2.5. ELECTRICAL REQUIREMENTS

The installation and system must comply with national plant regulations. The electrical distribution panel must have a protection and sectioning system installed for the input mains and the auxiliary mains. If a differential switch is installed on the mains power switch (optional), it must be inserted upstream from the distribution panel.

The table below shows the size of the input protection devices recommended for correct installation.

Size of the input protection devices									
Magneto-thermal input ⁽¹⁾		Magneto-thermal Aux Mains ⁽¹⁾		Differential input ⁽⁴⁾	Input/Output cable core size		Battery cable core size		Magneto-thermal battery ⁽³⁾⁽⁶⁾
(A)		(A)		(A)	(mm ²)		(mm ²)		(A)
single	parallel ⁽²⁾	single	parallel ⁽²⁾	selective type	Min	Max	Min	Max ⁽⁵⁾	
250	250	250	250	0,5	70	150	70	120	250

(1). Recommended magneto thermal switch: four poles with intervention threshold $\geq 10 I_n$ (curve C). It is necessary to use a D curve selective breaker if an optional external transformer is used.

(2). In installations with two UPSs operating in a redundant or power parallel configuration.

(3). Quadrapole protection on external battery cabinet.

(4). Caution! Use type B four-pole selective (S) circuit breakers. Load leakage currents are added to those generated by the UPS and during transitory phases (power failure and power return) short current peaks may occur. If loads with high leakage current are present, adjust the differential protection. It is advisable in all cases to carry out a preliminary check on the earth current leakage with the UPS installed and operational with the definitive load, so as to prevent the sudden activation of the above switches.

(5). Determined by the size of the terminals.

(6). Recommended magneto thermal switch: four poles with intervention threshold = $3 I_n$ suited for DC applications.



The UPS is designed for transitory overvoltages in category II installations. If the UPS is part of the building's electric circuit or if it is likely to be subject to transitory overvoltages in category III installations, further external protection must be provided, either on the UPS or in the AC power supply network connected to the UPS. Additionally, the 'surge arrestor' option, specially designed to protect against residual overvoltages in category III installations, can be installed in the external manual bypass cabinet. If used, the distance between the UPS and the centralised 4 kV SPD protection device type 1 must be $U_p \leq 4 \text{ kV}$ is $\geq 15 \text{ m}$.



GENSET must support load variations from 0 to 100%.



In the event of three-phase distorting loads connected in output, the current on the neutral conductor may have a value that is 1.5 - 2 times the phase value (also for the input bypass). In this case, size the neutral cables and the input/output protection adequately.



WARNING!

This is a product for commercial and industrial application in an industrial environment - installation restrictions or additional measures may be needed to prevent interference.

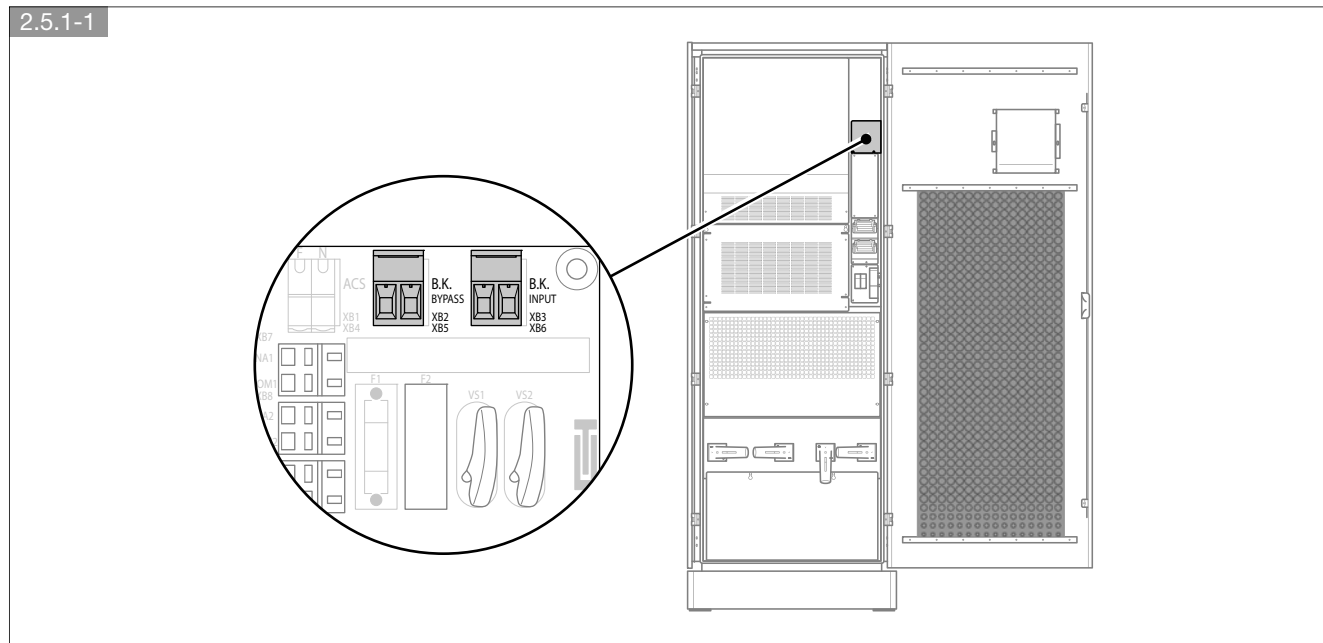


IMPORTANT!

Protective earthing conductor (PE) must have sufficient current-carrying capacity.

The PE cable core size must be chosen according to the PROTECTIVE CURRENT RATING of the earth circuit which depends on the provision and location of protective overcurrent devices. We suggest 70 mm² using the protective devices in the above table.

2.5.1. Backfeed protection



The UPS is set up for the installation of external protection devices against the backfeed of dangerous voltages, on both the input power supply line (MAINS SUPPLY) and on the auxiliary backup mains power supply line (AUX MAINS SUPPLY); these devices are controlled by means of the card shown in figure 2.5.1-1.

In the event that the equipment does not have a voltage protection device, warning labels must be attached to all mains power disconnectors installed away from the UPS area, in order to remind support personnel that the circuit is connected to a UPS (see also paragraph 1.1 of this manual and paragraph 4.5.3 of standard EN62040-1 2009-05). The label is supplied with the equipment.

If under certain irregular conditions, or due to the installation upstream (e.g. undetected and protected earth fault, or high leakage in a phase, or with IT systems) there is a hazardous potential on neutral, a suitable isolating switch must be provided on the neutral as well, or else there must be a detection, signalling and protection system (see the table in section 2.5 Electrical requirements).

Connections, refer to paragraph 2.6.5.

2.6. INSTALLATION PROCEDURES AND INSTRUCTIONS



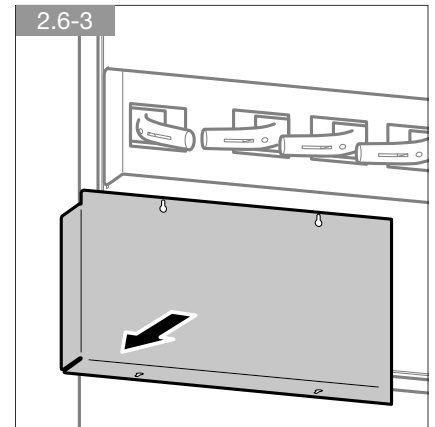
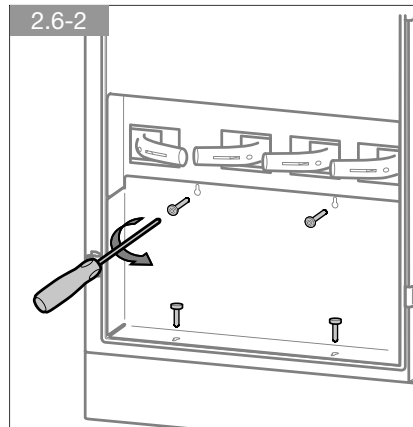
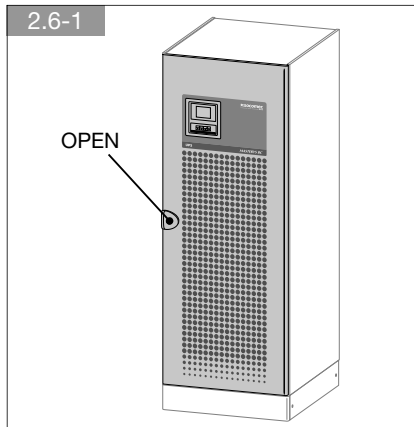
WARNING!

Before carrying out work on the terminal board or on UPS internal parts, ensure the UPS is switched off, remove the power supply, open the external battery cabinet disconnectors, isolate the system and wait 5 minutes.

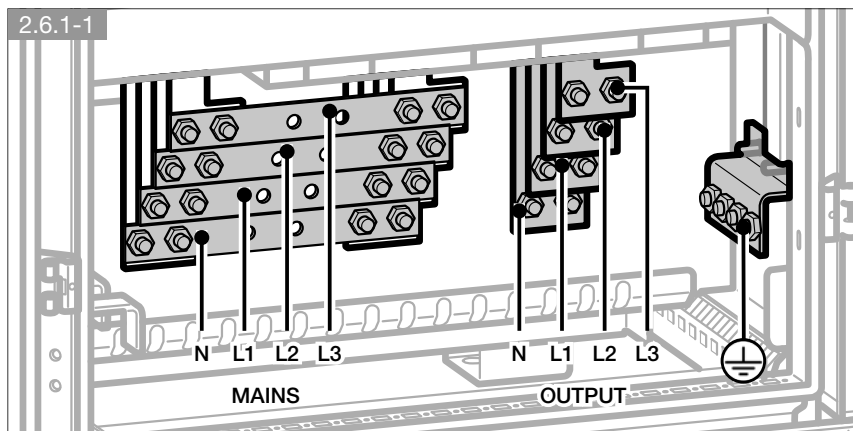


The connecting bars are made of aluminium!

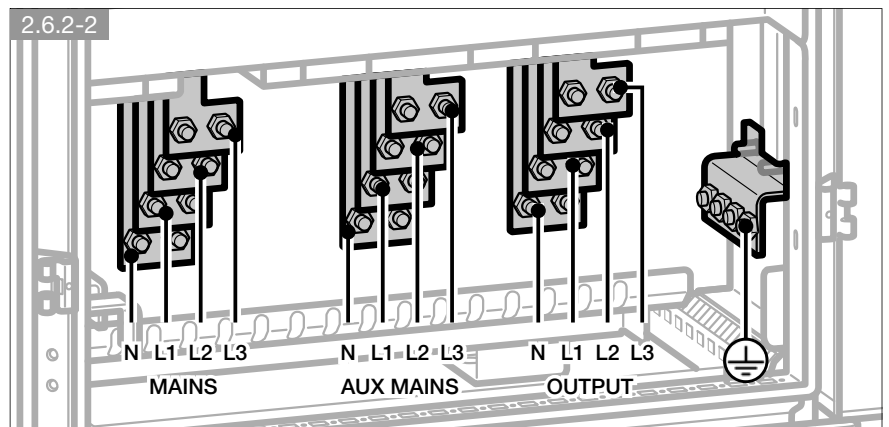
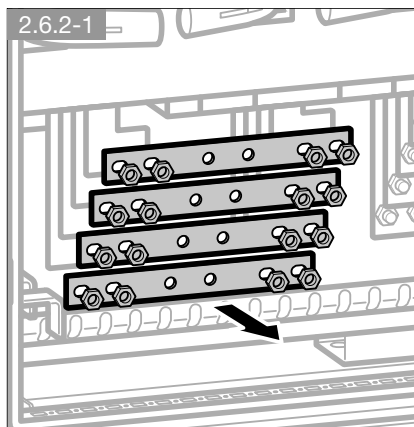
Use only aluminium cables or cables with tin-plated eyelets for the connections.



2.6.1. Connections if the MAINS and AUX MAINS are connected IN COMMON



2.6.2. Connections if the MAINS and AUX MAINS are connected SEPARATELY



2.6.3. EXTERNAL BATTERY CABINET connection



WARNING!

Before carrying out any operations, ensure that:

- the battery fuses located inside the battery cabinet are open;
- the UPS is not live and all mains or battery switches are open;
- the switches upstream of the UPS are open.



Use double insulated cables or the cables supplied with the unit to connect the UPS to the Battery cabinet.



Cabling errors with inversion of battery polarity may cause permanent damage to the equipment.

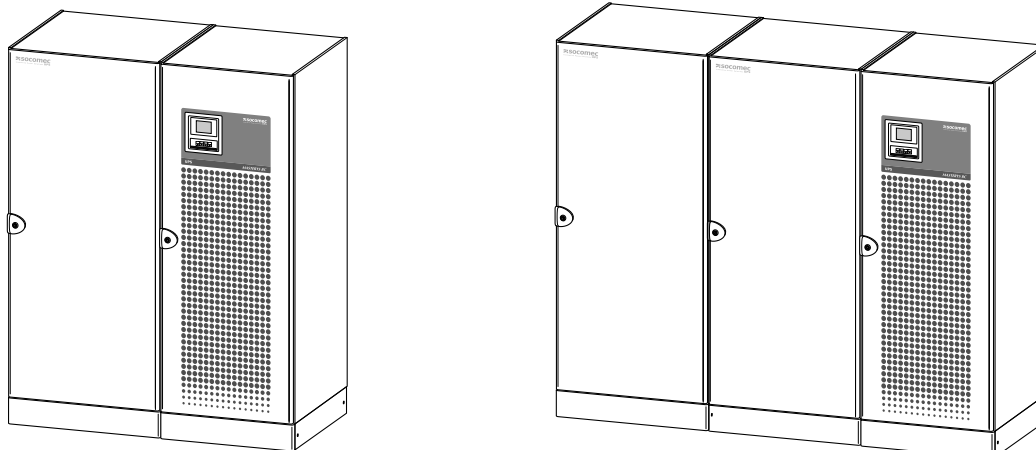


If using cabinets not supplied by the UPS manufacturer, it is the installer's responsibility to check the electrical compatibility and presence of appropriate protection devices between the UPS and the battery cabinet (fuses and switches of sufficient capacity to protect the cables from the UPS to the battery cabinet). As soon as the UPS is switched on (before closing the battery switches) the battery parameters must be verified accordingly (voltage, capacity, number of elements, etc.) on the mimic panel menu. See 5.3.6 paragraph for battery settings configuration.

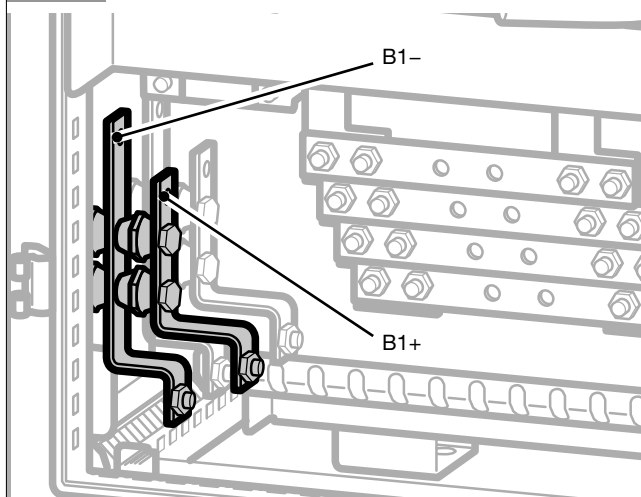


In the case of external batteries, the minimum number of elements permitted is 20 per branch for 120 kVA and 19 per branch for 100 kVA.

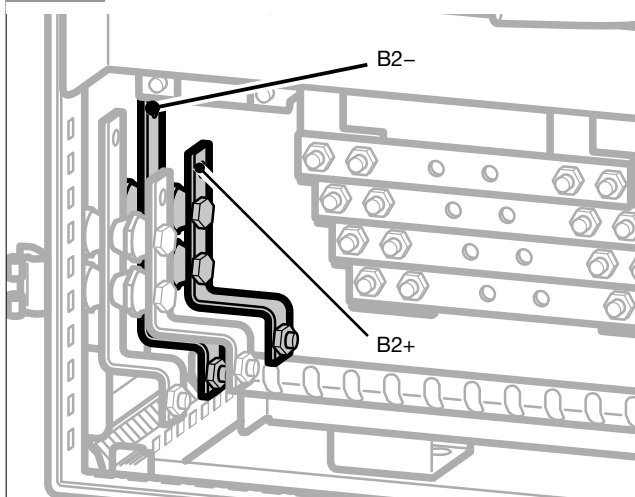
2.6.3-1



2.6.3-2 BATTERY STRING No. 1



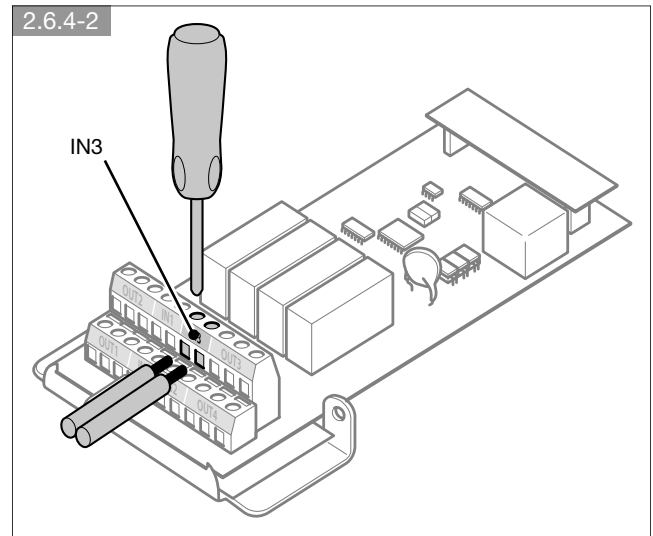
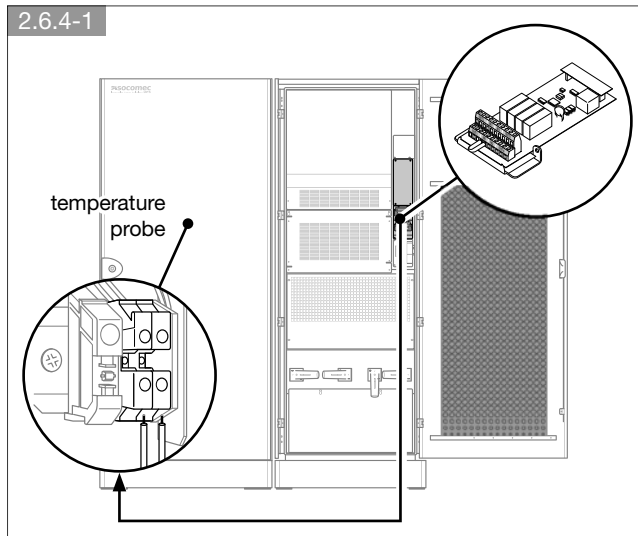
2.6.3-3 BATTERY STRING No. 2



2.6.4. Connecting THE BATTERY CABINET TEMPERATURE PROBE

• SOCOMEC battery cabinets:

- The SOCOMEC battery cabinet comes with a temperature probe which must be connected to the card supplied with the UPS (figure 2.6.4-1).
- Connect the temperature probe as shown in figure 2.6.4-2 without cabling distance limits and without the need to observe polarity.
- In the event of a single UPS with several battery cabinets use a single temperature sensor.
- In the event of parallel UPSs connect the battery cabinet temperature sensors to the cards installed in the related UPSs.



• Other manufacturers battery cabinets:

- Use the specific kit available as an option.
- Fix the probe in the battery room or inside the battery cabinet.
- Connect the temperature probe as shown in figure 2.6.4-2 without cabling distance limits and without the need to observe polarity, by using a 2x1 mm² double insulation cable.
- In the event of a single UPS with several battery cabinets, use a single temperature sensor.
- In the event of parallel UPSs, connect the battery cabinet temperature sensors to the cards installed in the related UPSs.

Note: If you do not intend to use the battery cabinet temperature sensor, go to the MAIN MENU > SLOT OPTIONS > BATTERY TEMPERATURE PROBE menu, and set the parameter Battery Temperat. Probe as Not Present.



WARNING!

If the Battery Temperat. Probe parameter is set to Not Present, the battery charger will not correct the recharge voltage as a function of the temperature.

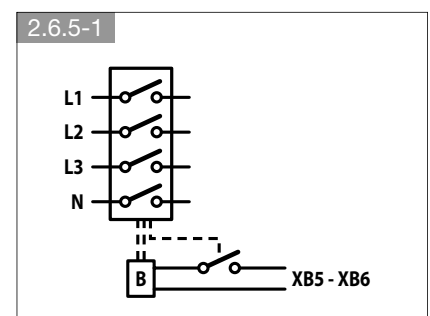
2.6.5. Connecting THE EXTERNAL BACKFEED PROTECTION



To guarantee maximum protection use a 220-240 V release coil with integrated travel limit contact to pilot the input protection systems (see section 2.5 Electrical requirements).

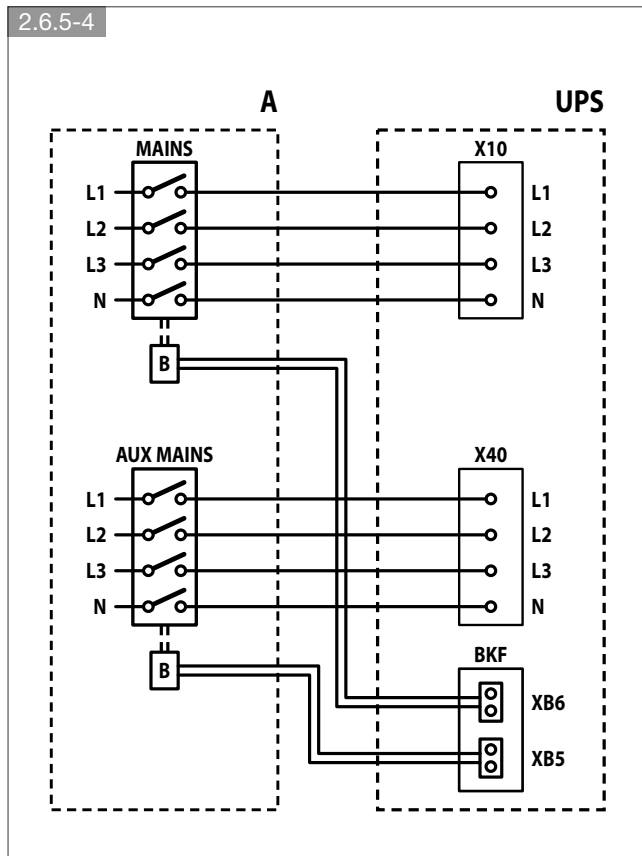
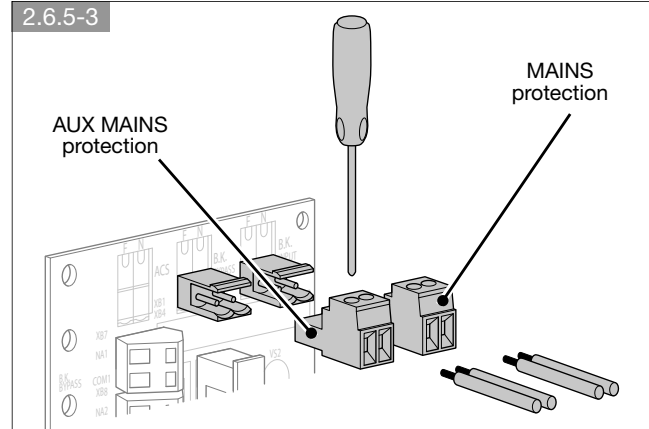
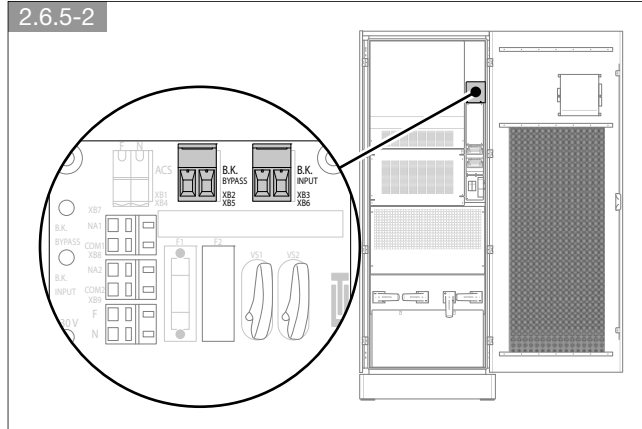
If a trip coil without an integrated end-of-travel contact is used, add an early auxiliary contact as shown in figure 2.6.5-1.

Electrical contact data: 2 A 250 Vac



2. UNPACKING AND INSTALLATION OF THE UNIT

• Separate Mains



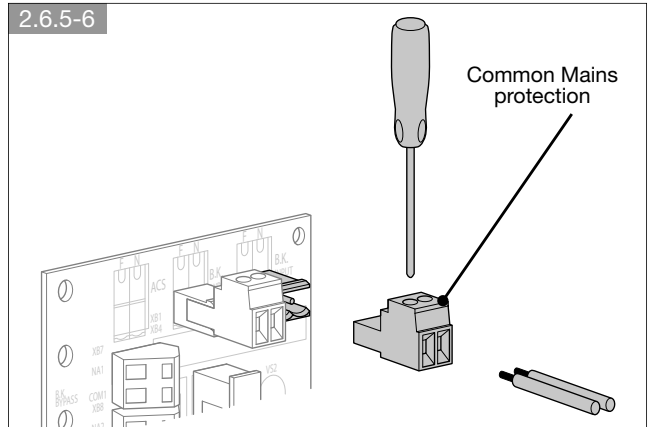
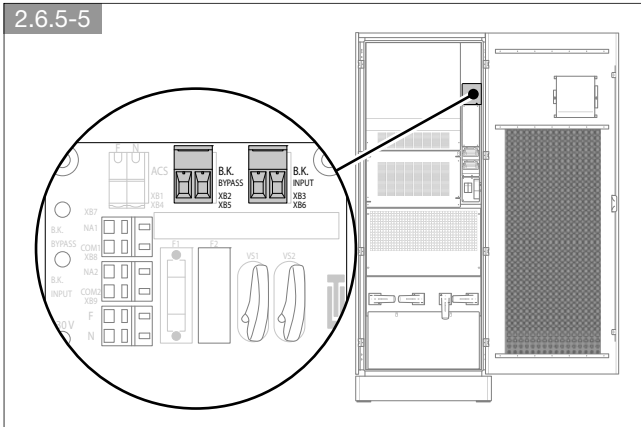
Activating UPS protection on the mimic panel: access the **MAIN MENU > SETTINGS > UPS SETTINGS > BACKFEED** and set the parameter **Backfeed Type** to **Separate Mains**.

Key

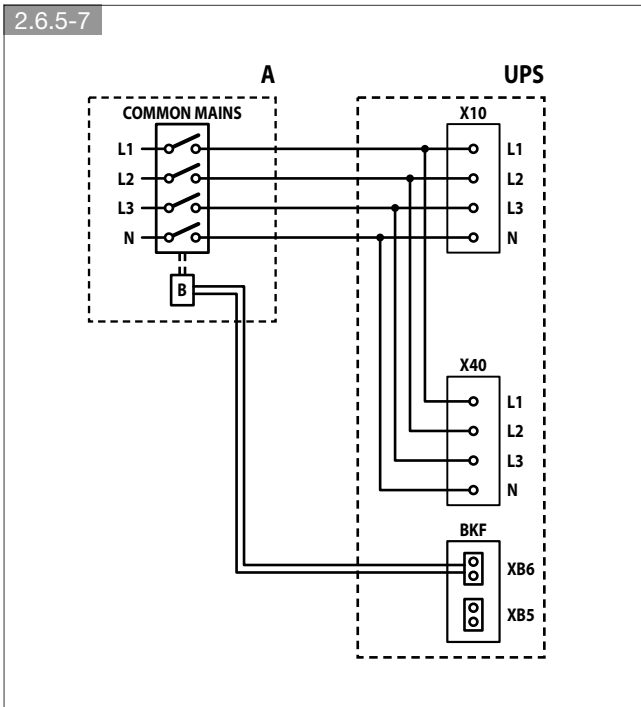
A	Distribution panel
B	Trip coil
X10	Mains terminal board
X40	Aux Mains terminal board
MAINS	Mains switch
AUX MAINS	Aux Mains switch
XB5	Aux Mains BKF connector
XB6	Mains BKF connector

2. UNPACKING AND INSTALLATION OF THE UNIT

- **Common Mains**



Activating UPS protection on the mimic panel: access the **MAIN MENU > SETTINGS > UPS SETTINGS > BACKFEED** and set the parameter **Backfeed Type** to **Common Mains**.



Key

A

B Trip coil

X10 Mains terminal board

X40 Aux Mains terminal board

COMMON MAINS Mains switch

XB5 Aux Mains BKF connector

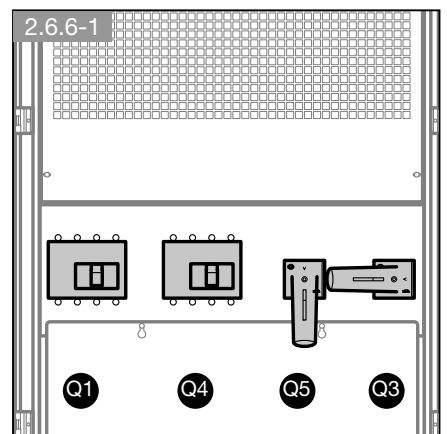
XB6 Mains BKF connector

2.6.6. INTERNAL BACKFEED PROTECTION

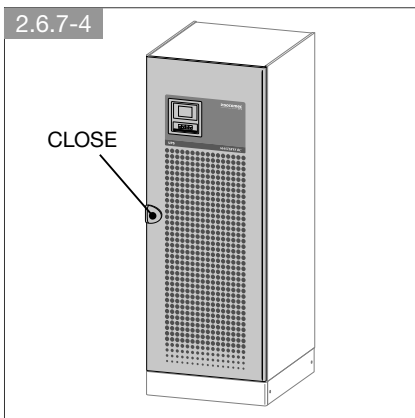
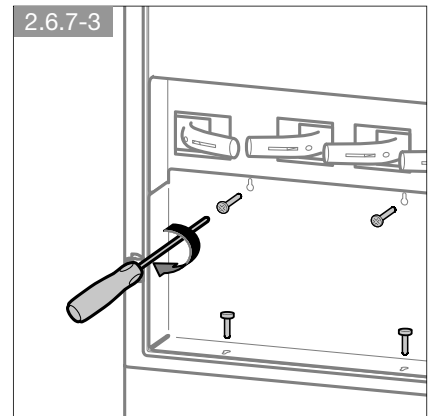
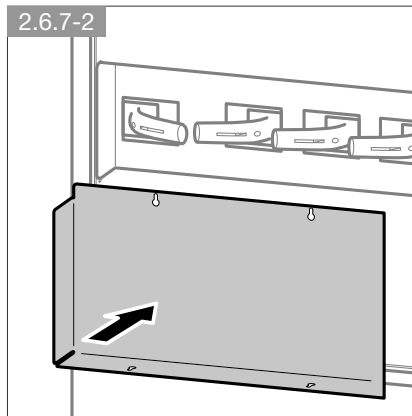
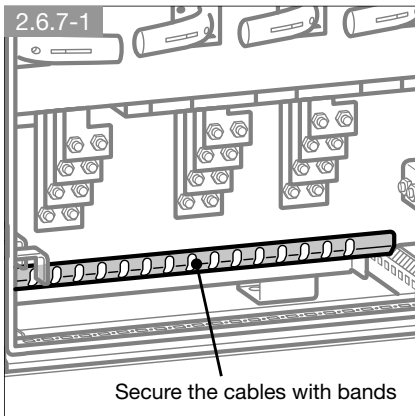


If the UPS has internal backfeed protection:

- there is no need for external backfeed protection;
- connect the UPS as indicated in paragraph 4.4;
- the switches should be set as shown in figure 2.6.6-1.



2.6.7. Completion of the installation



2.7. GENERATOR CONNECTION

If the installation requires the use of a generator (GE), connect the 'generator ready' unpowered contact to connector **IN 2** of the ADC card configured in STANDARD configuration (see paragraph 7.2). This allows the tolerance of the voltage and frequency values to be increased when power is supplied by the GE.

2.8. EXTERNAL ESD CONNECTION

An emergency remote shutdown system (ESD) can be installed using the ADC card (see paragraph 7.2). Connect a normally closed, unpowered contact to terminals **IN1+** and **IN1-** of the ADC card.

2.9. ISOLATION TRANSFORMER

If an external isolation transformer cabinet is required, the following instructions should be followed:

- Refer to chapters 1 and 2 of this manual for indications on moving and installing the cabinet.
- See paragraph 2.5 for details about protection.
- The protection cable marked with the ground symbol is connected directly to the distribution panel.
- The transformer can either be connected to the UPS input or output.



The UPS must not operate without the neutral connection to the input.

The transformer cannot be connected to the output on individual UPS units connected in parallel configuration.

For connection details refer to the transformer terminal board diagram.

2.10. UPS PARALLEL CONFIGURATION

- Parallel connection enhances UPS system reliability, performance and power.
- Operating UPSs are connected to each other by a signal cable **B** (Fig. 2.10.1-1) which provides a maximum distance between UPSs of approx. 3 metres and enables the external battery cabinet to be inserted next to each UPS. They are configured differently depending on the position they are assigned; for this reason the units have a position label:
 - the LEFT label means the unit must be positioned to the left.
 - the RIGHT label means the unit must be positioned to the right.
- The power supply of each UPS must be equipped with a protection device as shown in the table in paragraph 2.5.
- **The cross section and length of the input and output cables must be identical for all units.**
- Phase rotation must be the same for each unit connected in parallel and also on any external manual bypass line.
- Cables of the same length and cross section must be used for the connection between the general power switch **A**, the switches **C** and the respective UPS units. The length of the cables from **A** to each UPS module must not exceed 25 metres (Fig. 2.10.1-1).
- The cables from the UPS module to switch D must be of the same length (max. 20 m with multi-core cables).
- If a differential switch is installed on the mains power switch, it must be inserted upstream from the distribution panel; it must be a selective type and the trigger value **must be 0.5 A multiplied by the number of UPSs connected in parallel.**



Only activate switch D after turning off the UPS.

- In order for units connected in a parallel configuration to operate correctly, control cables are required to exchange data between both UPS units making up the parallel system. The cables in question are supplied with the UPS in the case of a standard parallel setup or are attached to the parallel kit in the case of a later system upgrade.

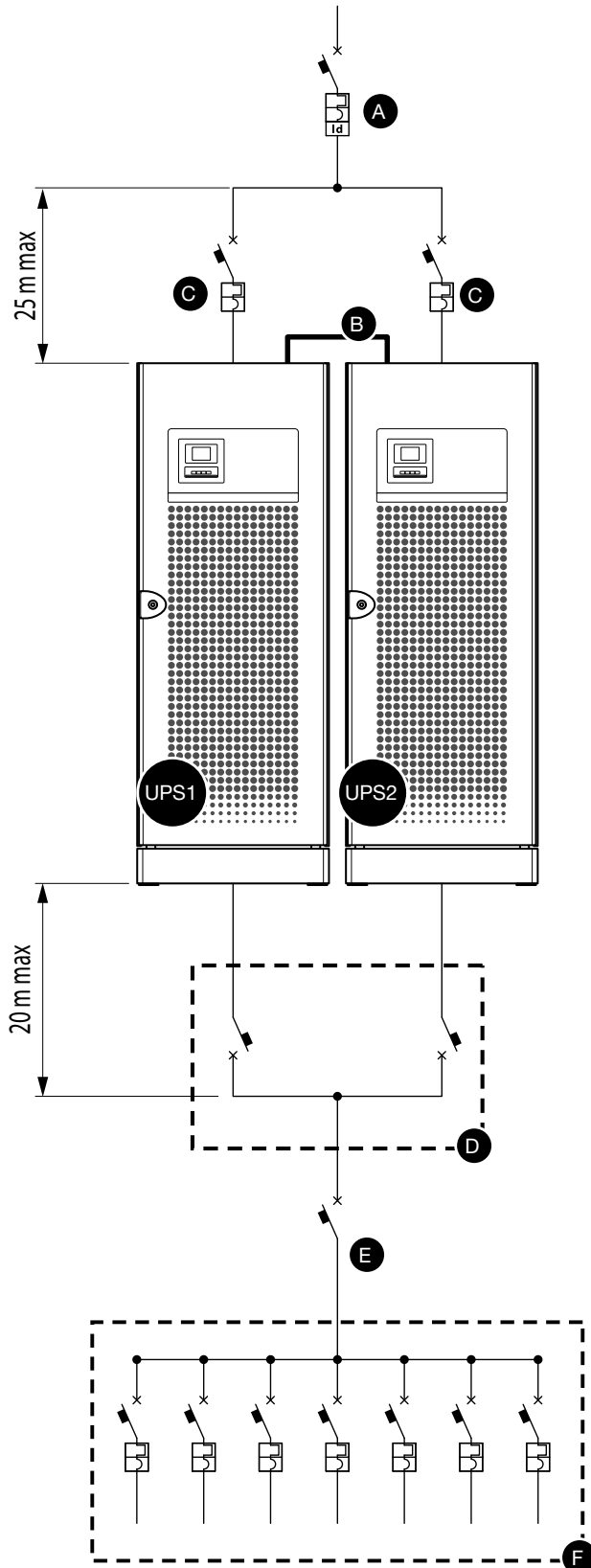


WARNING!

Parallel configuration must only be activated by SOCAMEC qualified personnel.

2.10.1. Recommended 1+1 parallel configuration

2.10.1-1 Recommended parallel configuration



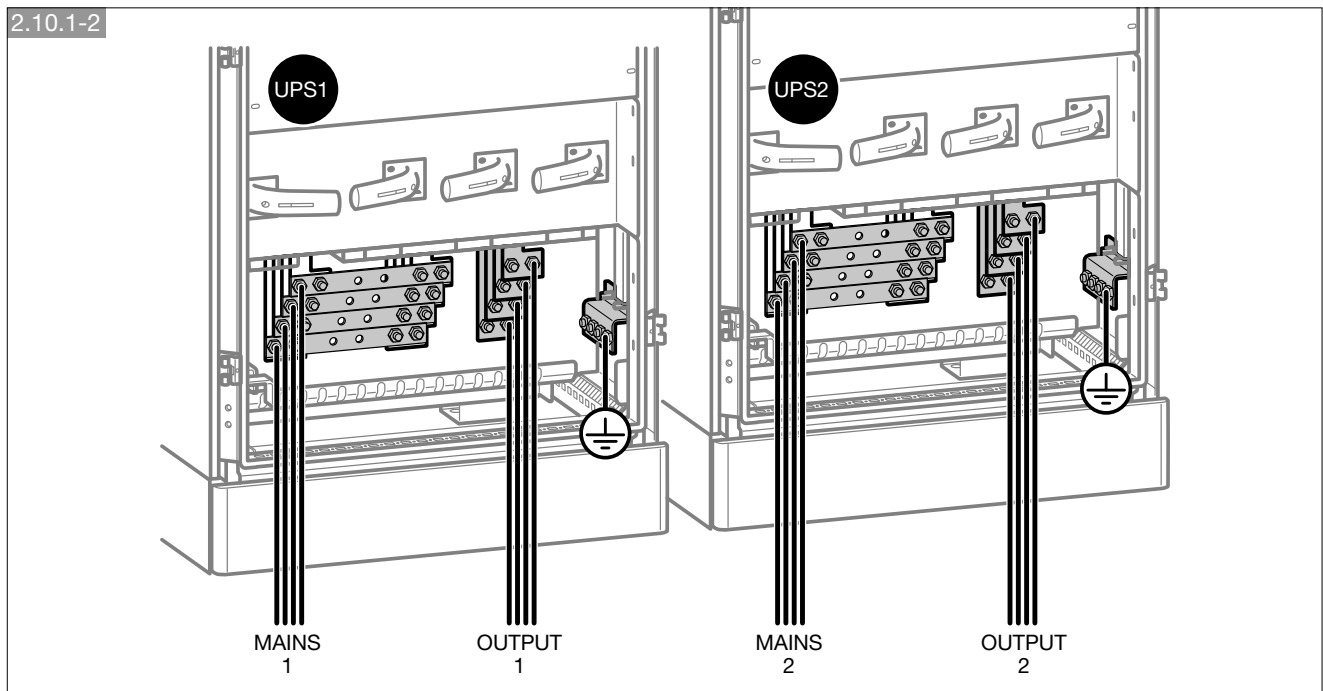
Key

- A Selective general differential magneto thermal switch
- B Parallel bus cable
- C Single UPS magneto-thermal switch (if a separate auxiliary power source is used add a magneto-thermal switch for each UPS)
- D⁽¹⁾ Additional disconnectors on the distribution panel
- E⁽¹⁾ System shutdown switch
- F Distribution

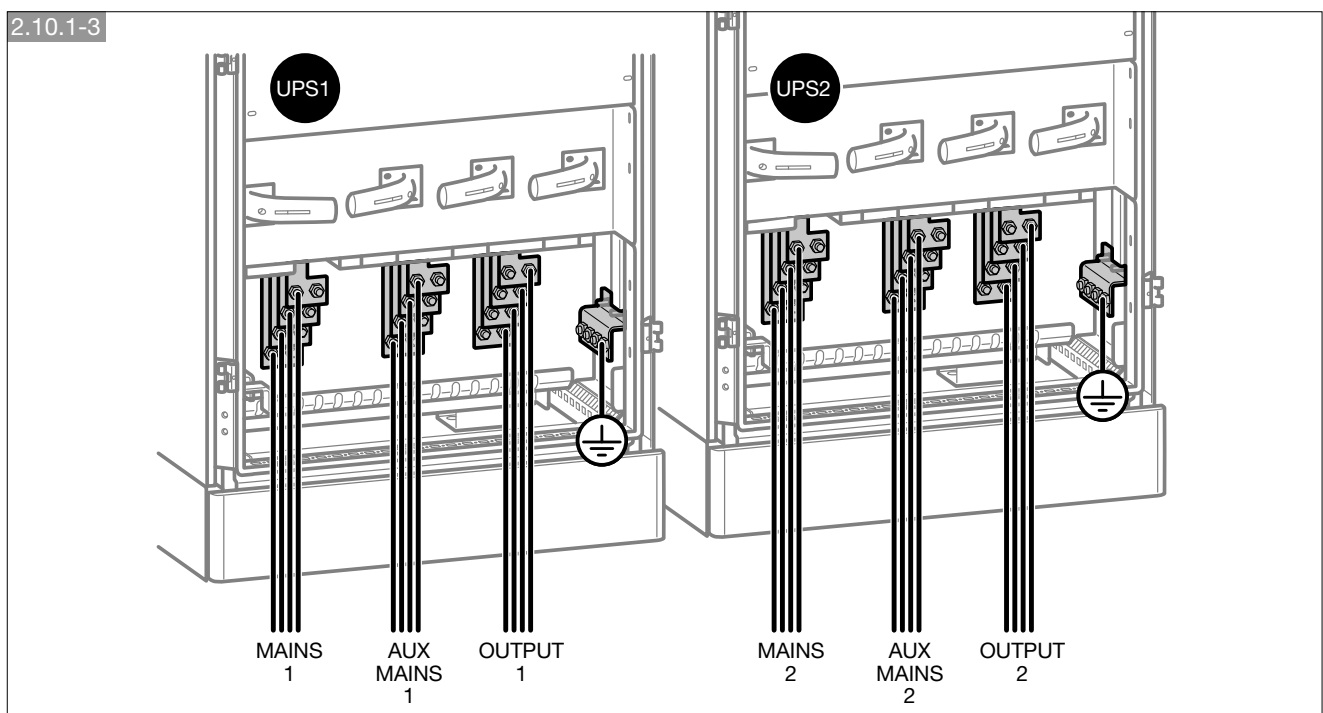
(1). To avoid unwanted tripping, do not use the magneto-thermal switch.

2. UNPACKING AND INSTALLATION OF THE UNIT

1+1 Parallel configuration - Common Mains



1+1 Parallel configuration - Separate Mains



2.11. SPECIAL PARALLEL CONFIGURATION FEATURES

2.11.1. Intelligent communication module (ICM)

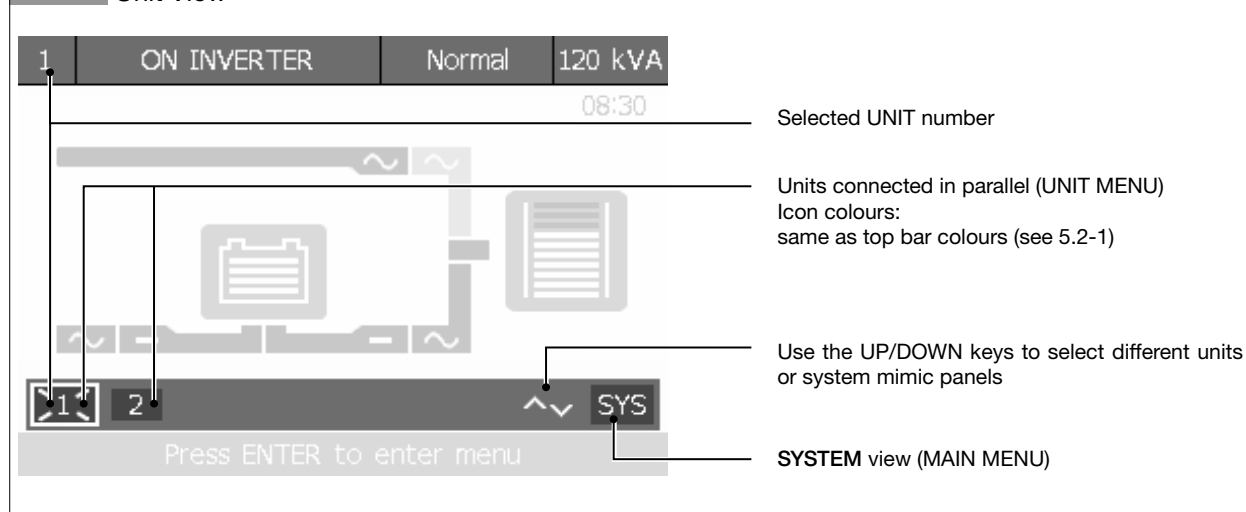
The Intelligent Communication Module (ICM) allows the hierarchical supervision both of each unit and the whole system from all displays. The advantage of using the ICM is that the options and the external communication accessories for system monitoring and diagnostics (i.e. Net Vision, ADC board, etc.) can only be installed on one UPS.

In the UPS parallel configuration an additional navigation bar is displayed on the mimic panel page, where all connected units appear.

To enter the **MAIN MENU** select the SYS icon and press **ENTER**.

To enter the **UNIT MENU** select one of the numbered icons and press **ENTER**.

2.11.1-1 Unit View



The  symbol (number surrounded by four lines) indicates the Unit number of the UPS upon which the display is assembled (the display is assembled on UPS #1 in this example). The **BATTERY SETTINGS** menu and the **Automatic Stop Procedure** are only available on this **UNIT MENU**.

2.11.2. Sequential start (configurable by Socomec service personnel only)

In a parallel configuration a sequential start can be set on all the units. It allows a reduction of the power impact on the mains or GenSet when the UPS system resumes from battery mode. The delay restart time (from 0 to 65 seconds) can only be set via AS-SIST. The delay restart rectifier (T_delay_start_rect) has to be the same for each module according to the following specification:

T_delay_start_rect = 5000 ms for each module

Sequential start		
	Module 1	Module 2
Delay time	1 x 5 s = 5 s	2 x 5 s = 10 s

3. MODES OF OPERATION

3.1. ONLINE OPERATION

A special feature of the MASTERYS BC series is the ON LINE double conversion in conjunction with low distortion mains power absorption. In Normal Mode (on inverter) the UPS can supply a voltage that is fully stabilised in frequency and amplitude, regardless of any interference in the mains power supply, within the most stringent classification of UPS regulations.

ONLINE operation provides three operating modes according to mains and load conditions:

- **Inverter mode**

This is the most frequent operating condition: energy is drawn from the primary mains power supply and converted and used by the inverter to generate the output voltage to power the connected loads.

The inverter is constantly synchronised in frequency with the auxiliary mains to enable load transfer (due to an overload or inverter shutdown) without any break in the power supply to the load.

The battery charger supplies the energy required to maintain or recharge the battery.

- **Bypass mode**

In the event of inverter failure the load is automatically transferred onto the auxiliary mains without any interruption in the power supply. This procedure may occur in the following situations:

- in the event of a temporary overload, the inverter continues to power the load. If the condition persists, the UPS output is switched on to the auxiliary mains via automatic bypass. Normal operation, which is from the inverter, returns automatically a few seconds after the overload disappears.
- when the voltage generated by the inverter goes outside the limits due to a major overload or a fault on the inverter.
- when the internal temperature exceeds the maximum value allowed.

- **Battery mode**

In the event of a mains failure (micro interruptions or extended power cuts), the UPS continues to power the load using the energy stored in the battery.

3.2. OPERATION IN HIGH EFFICIENCY MODE

The UPS allows the selection of a programmable economy operating mode (**Eco Mode**) that can increase overall efficiency by up to 99% for energy saving purposes. If the power supply fails the UPS will automatically switch onto the inverter and continue to supply power to the load by drawing energy from the battery.

This mode does not provide perfect stability in frequency and voltage as the **Normal mode** does. Therefore the use of this mode should be carefully evaluated according to the level of protection required by the application.

With the optional board Net Vision (see chapter 7.7) specific daily or weekly time intervals can be selected and programmed to power applications directly from the auxiliary mains.

Eco Mode operation provides very high efficiency, since the application is powered directly from the auxiliary mains via the automatic bypass under normal operating conditions.

To activate **Eco Mode** go to **MAIN MENU > COMMANDS > ECO MODE** and select **Activate Eco Mode**. To disable **Eco Mode**, select **Return to Normal Mode**.

3.3. OPERATION IN CONVERTER MODE

In converter mode the UPS can supply a fully stabilised sinusoidal output voltage with a different frequency from the input power line (50Hz or 60Hz is available as output frequency value).



IMPORTANT!

Only set this mode on UPS units with the auxiliary mains (AUX MAINS) disconnected!
Do not set this mode on UPS units with common mains lines as it could damage the load!

3.4. OPERATION WITH EXTERNAL MANUAL BYPASS (optional)

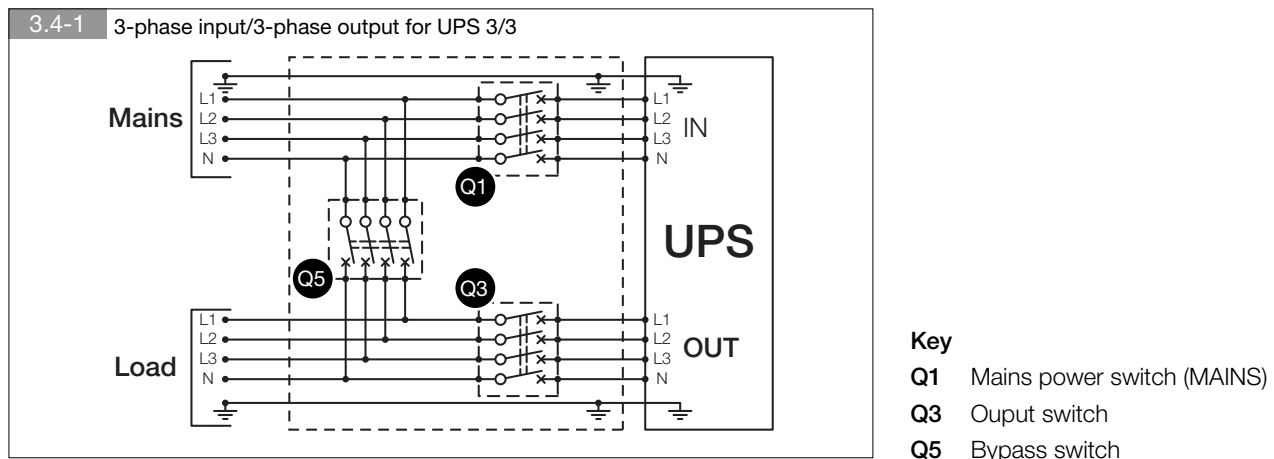
The external maintenance bypass may be placed on the general distribution panel when the UPS is installed, or by installing the bypass panel that is supplied on request.

The **Q1** switch must be connected to the auxiliary mains input and the mains input must be isolated on the panel.

If the manual bypass is activated (with the appropriate procedure), the load is powered directly from the auxiliary mains, while the UPS is in fact excluded from the power supply and can be switched off.

This operating mode is useful when maintenance needs to be carried out on the UPS since service personnel can work on the installation without having to cut off the power supply to the load.

Bypass panel connection diagram



3.5. OPERATION WITH INTERNAL MAINTENANCE BYPASS

If the internal maintenance bypass is activated using the appropriate procedure the load is powered directly from the maintenance bypass, while the UPS is separate from the power supply and can be switched off.

This operating mode can be selected for maintenance to be carried out on the system, so that the necessary actions can be performed by service personnel without having to disconnect the power supply to the load.

3.6. OPERATION WITH MOTOR GENERATOR (GENSET)

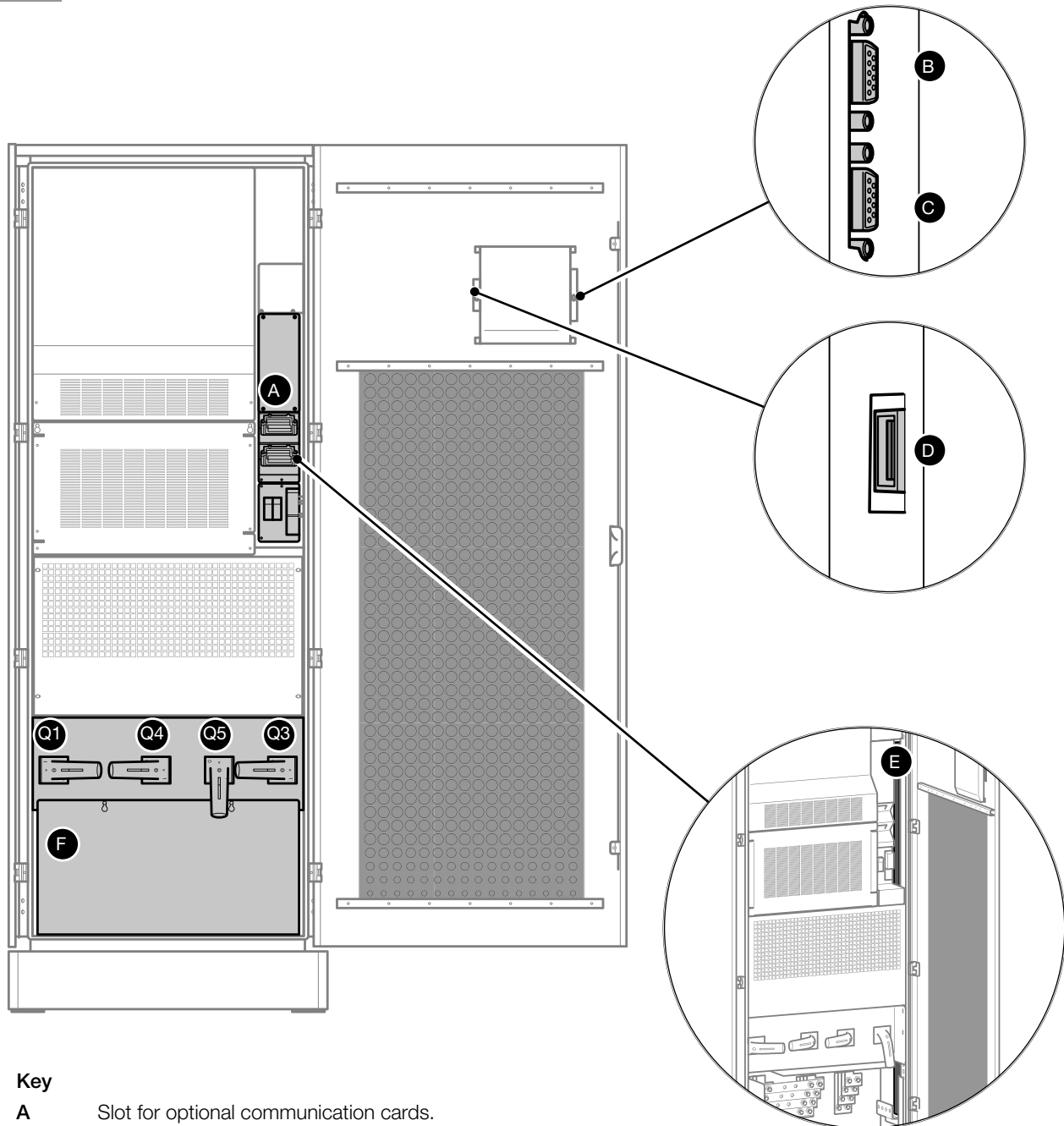
MASTERY'S BC can be operated in conjunction with a generator (GENSET) over the ADC interface (see chapter 8.1).

With a generator, the frequency and voltage ranges of the auxiliary mains can be increased to accept the instability of the GE and to also avoid operation from the battery or risks of out-of-synchronisation switching on to the bypass.

4. ACCESS TO CONTROLS

4.1. IDENTIFYING SWITCHING AND CONNECTION POINTS

4.1-1



Key

- A Slot for optional communication cards.
- B Serial RS232/485 connector.
- C Serial RS232 connector.
- D USB connector.
- E Cable trunking for control cables.
- F Power connections.
- Q1 Input switch (MAINS).
- Q3 Output switch.
- Q4 Auxiliary mains Input switch (AUX MAINS).
- Q5 Output maintenance bypass switch.

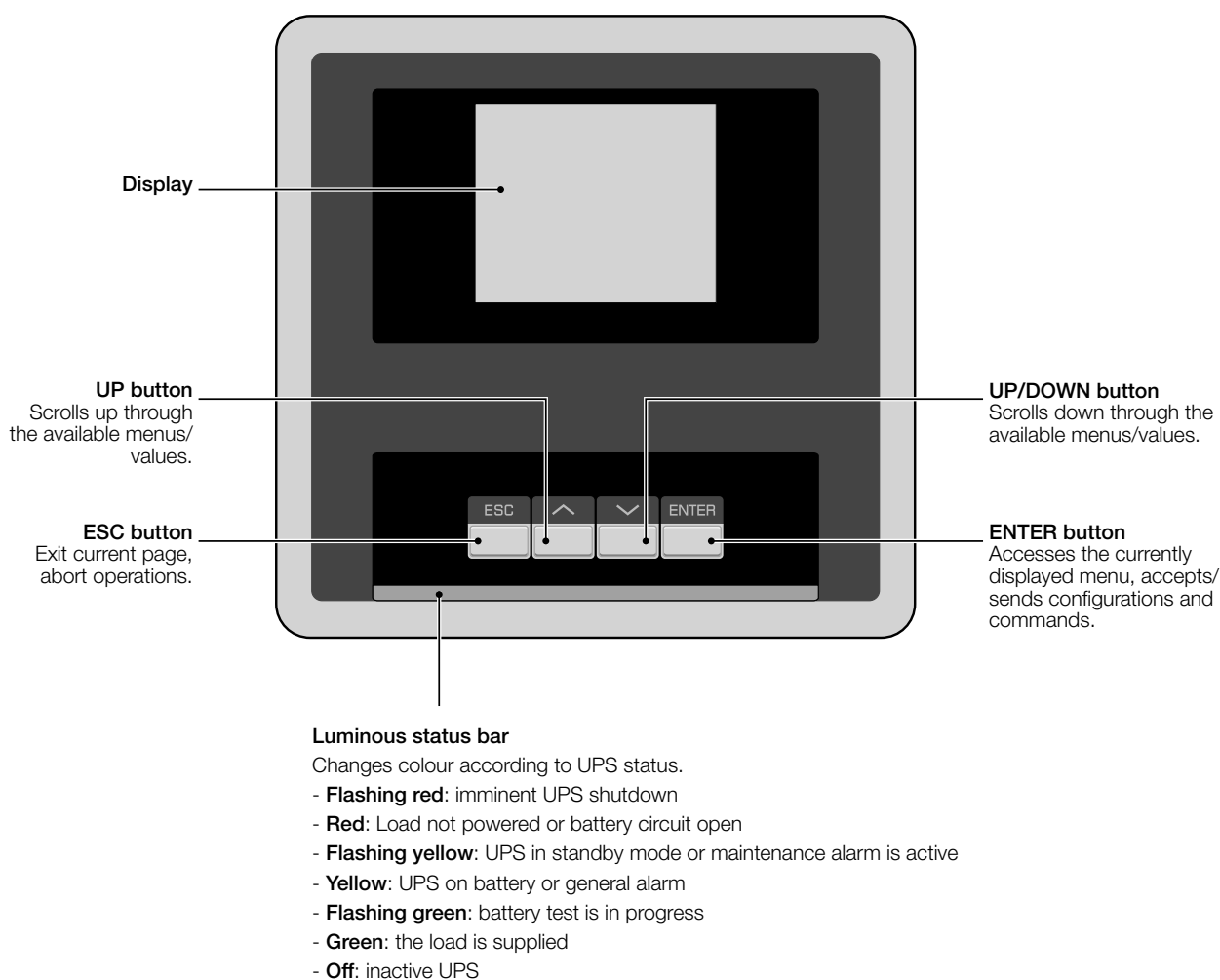
5. HUMAN MACHINE INTERFACE

5.1. INTRODUCTION

The HMI (Human Machine Interface) on the UPS door displays information regarding operating status, electrical measurements, access to control functions and configuration parameters. It includes graphic display and a luminous status bar, and provides access to:

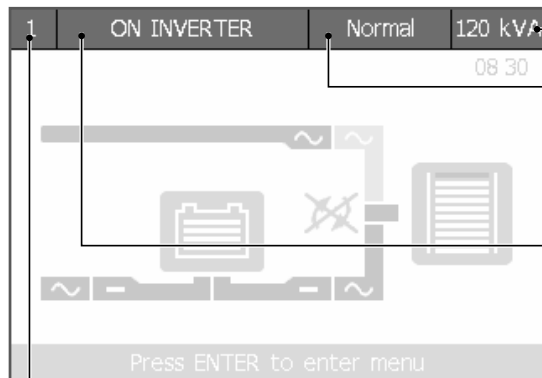
- mimic panel;
- measurements and alarms;
- changing UPS operating modes and programming battery tests;
- assisted startup and switching on maintenance bypass procedures;
- settings menu;
- list of events and statistics.

5.1-1 3-phase input/3-phase output for UPS 3/3



5.2. MIMIC PANEL OVERVIEW

5.2-1 Status bar (always displayed)



Unit panel reference

UPS Rated Power (kVA)

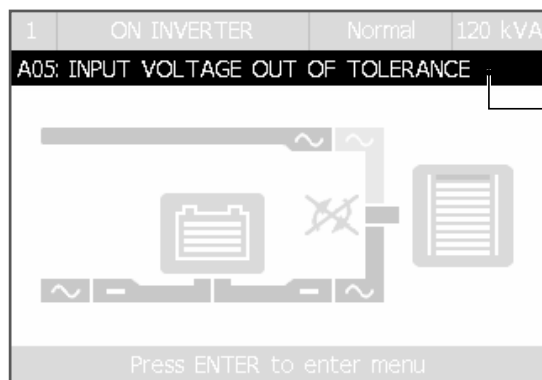
Operating modes:

Normal (Normal mode), **Eco** (Eco mode), **En. Saver** (Energy Saver mode – parallel configurations only), **Standby** (Standby program mode), **Service**.

Unit status:

- Displayed messages: ON MAINT. BYPASS, IMMINENT STOP, ON BATTERY, BATTERY TEST, ON INVERTER, ON AUTO BYPASS, UNIT AVAILABLE, UPS ON STANDBY, LOAD OFF.
- **Flashing**: imminent UPS shutdown
- **Black**: Load not powered or battery circuit open

5.2-2 Alarms area

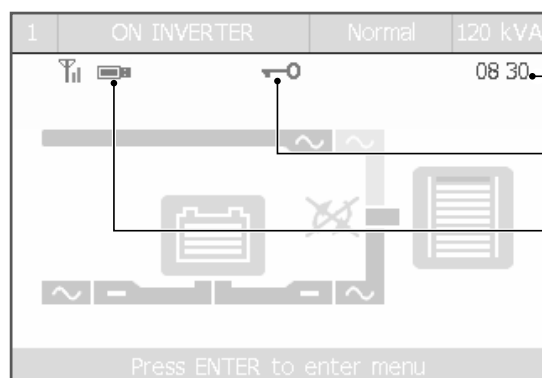


Alarms area

Present when an alarm is active.

Enter ALARMS menu to display the complete alarms list (see chapter 9).

5.2-3 Status icons



Foreword: Status icons and Time are only visible if there are no pending alarms, as the alarm bar overwrites the icons when active.

Time:

UPS current time (hours and minutes, with ':' flashing).

Key icon:

Displayed if the keypad has been locked.

USB icon:

Displayed if a USB memory stick is inserted. It must be formatted with FAT32 file system.

Keypad locking

The keypad can be locked by pressing the buttons in the following sequence:

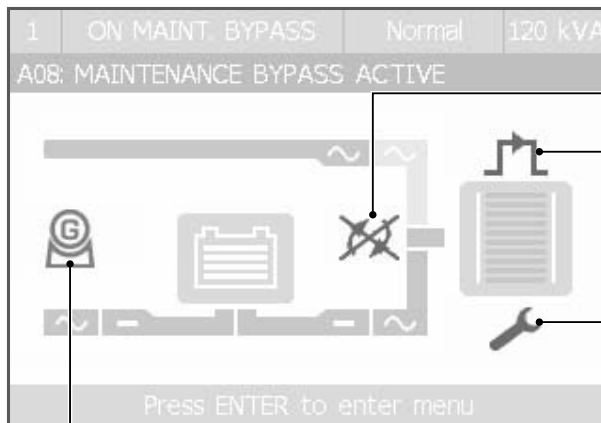
ESC → UP → DOWN → ENTER

To unlock the keypad, the buttons must be pressed in the reverse sequence:

ENTER → DOWN → UP → ESC

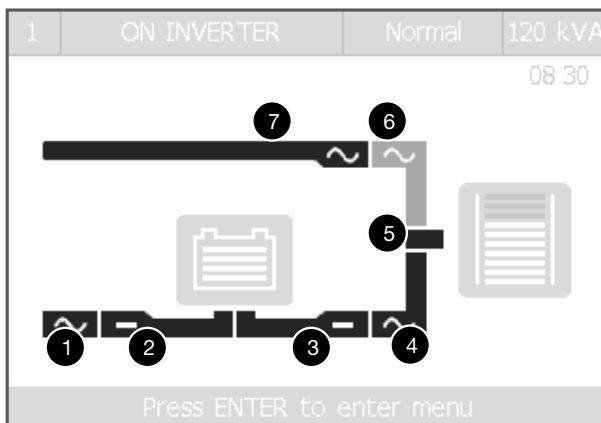
These sequences work only on Mimic Panel page.

5.2-4 Additional Icons



Operating on GenSet

5.2-5 Mimic panel



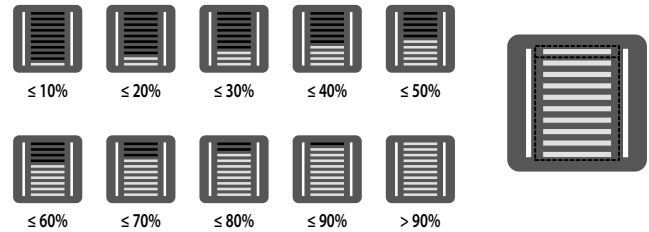
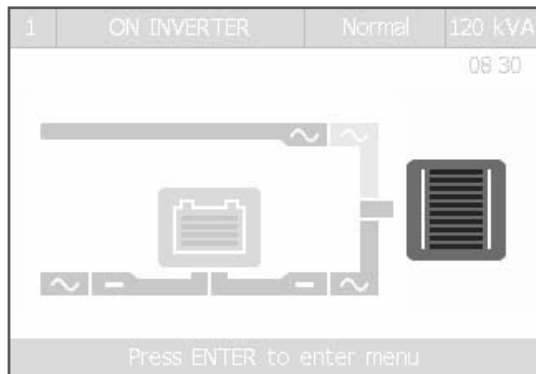
Bars

1. Rectifier input.
2. Rectifier output.
3. Inverter Input or Battery Output.
4. Inverter Output.
5. Unit output.
6. Output from static switch
7. Bypass input.

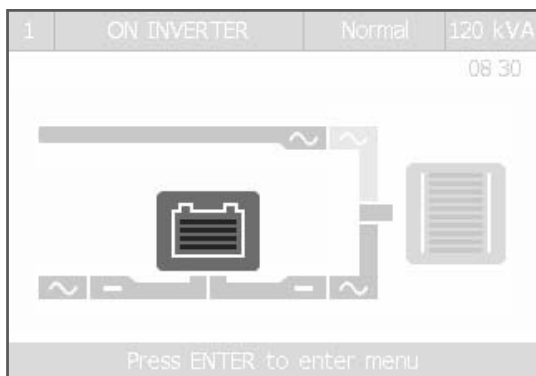
Bar colour identifies energy flow:

- dark grey: active/mains present
- light grey: mains not present

5.2-6 Load level



5.2-7 Battery status (unit only)



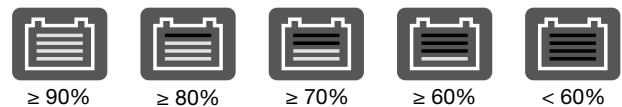
Battery charging
The level reached is continuous, other levels flashing



Battery discharging
The level reached is continuous white, others level flashing.



Battery charged
The upper level is flashing white.



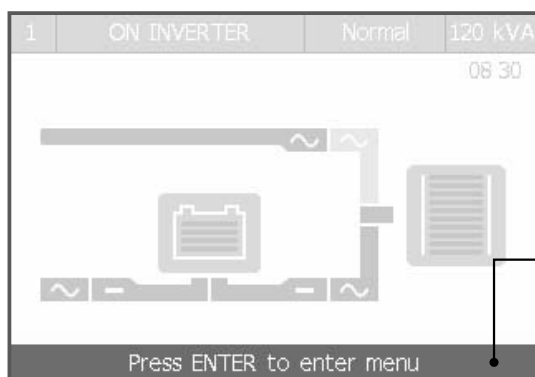
Battery discharged



Battery open



5.2-8 Message area

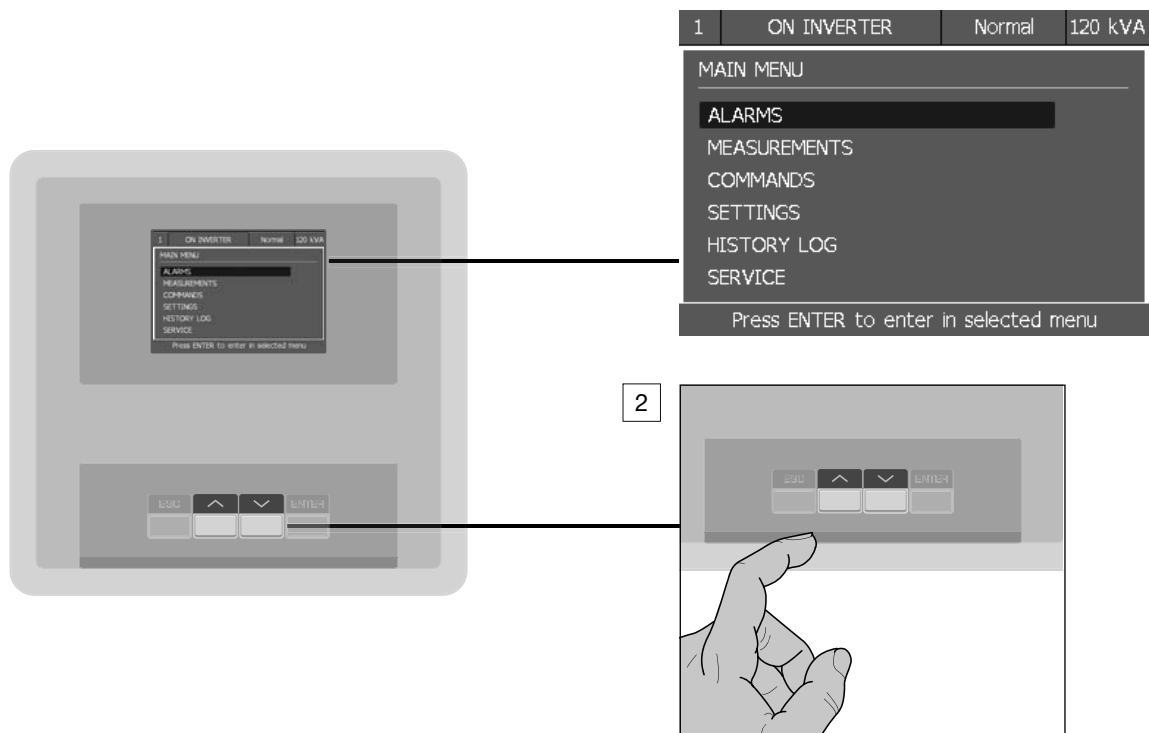
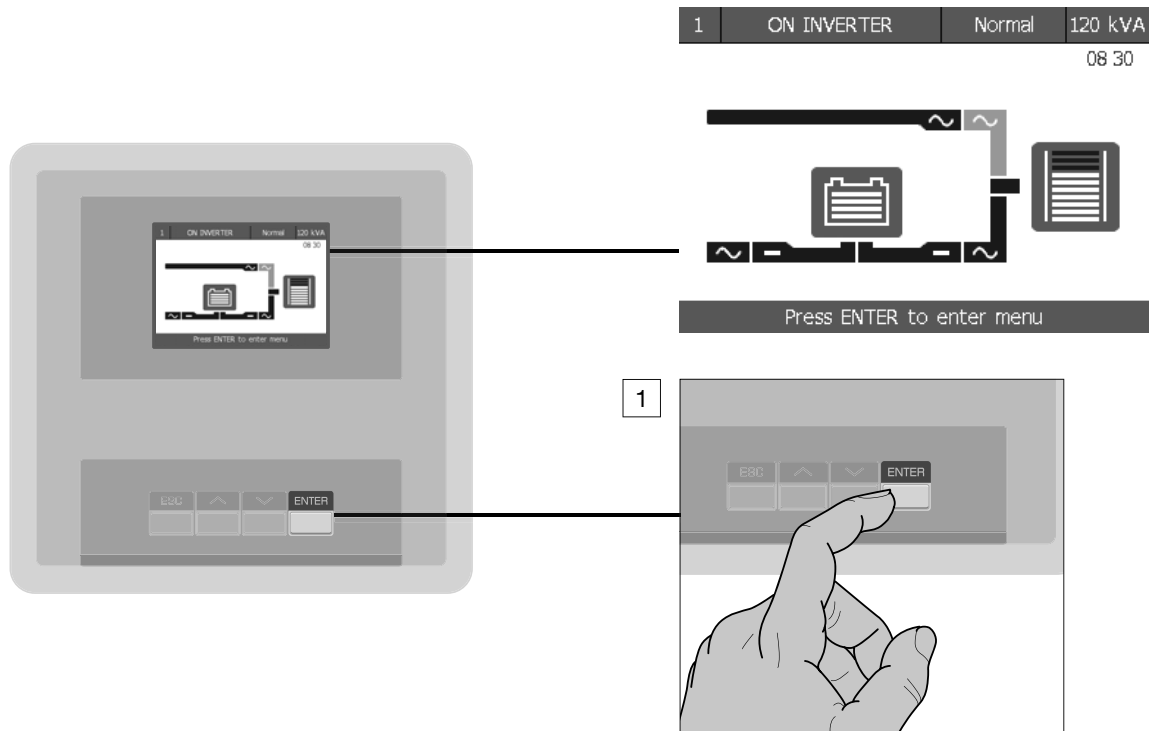


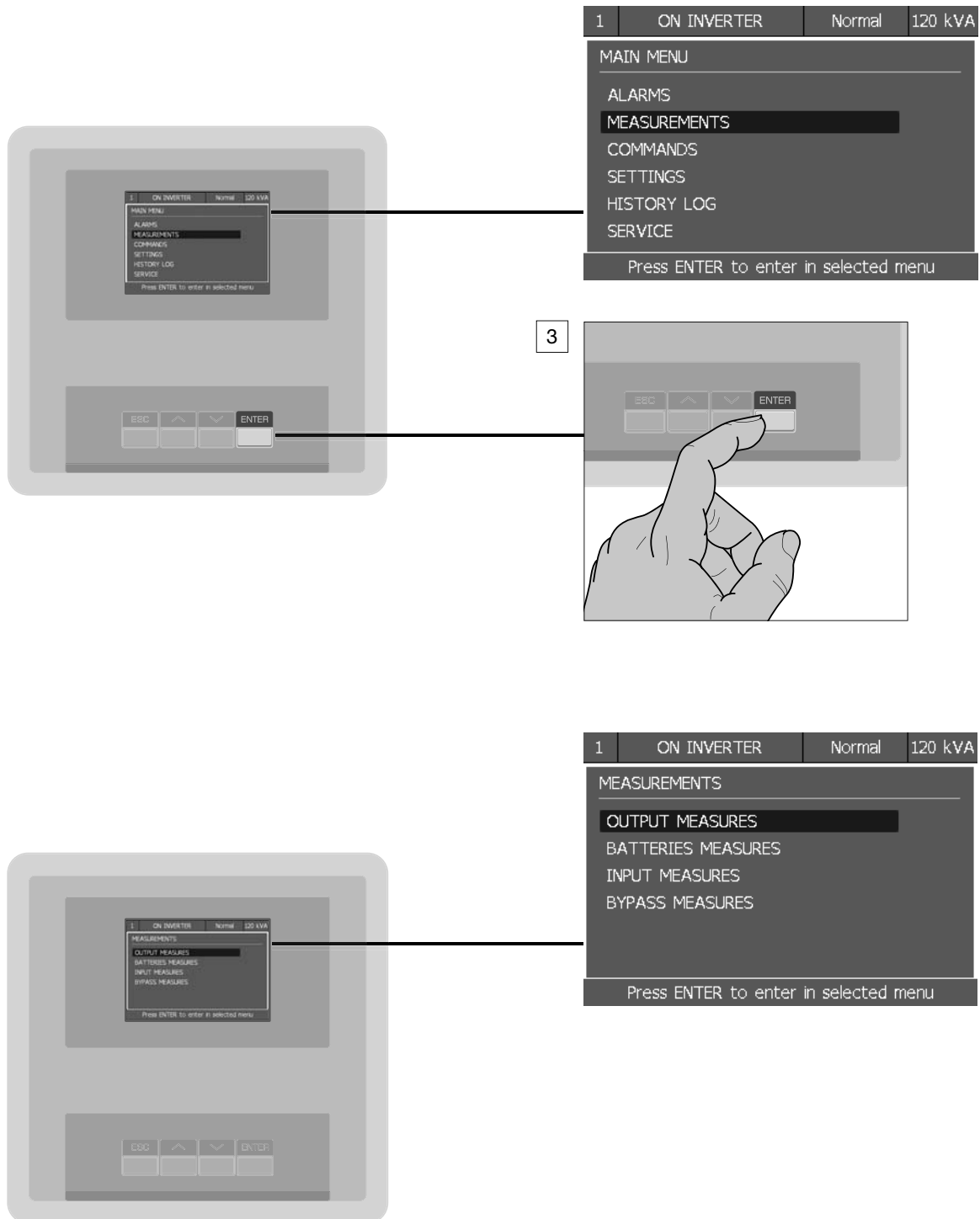
Message area

Always present, displays a help message to guide the user through the display functions.

5.3. MENU NAVIGATION

From the mimic panel page, press the **ENTER** key to access the **MAIN MEN**. Use the **UP/DOWN** key to scroll menu items, **ENTER** to confirm a choice, **ESC** to exit the current page or to abort an operation.

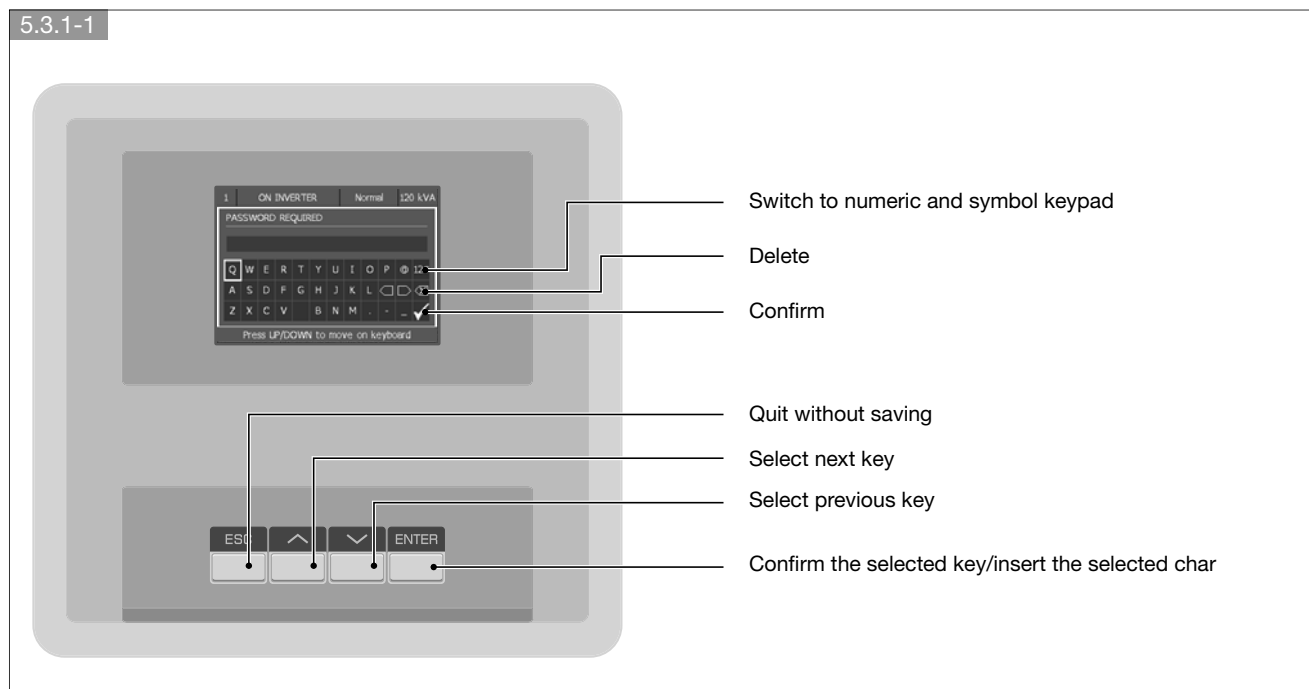




5.3.1. Entering passwords

Some operations and settings require a password in order to be performed. If this is the case a padlock is displayed at the top right of the page. After inserting a valid password the padlock opens and the operation can be performed.

When a password is required a virtual keyboard is displayed. The default password is MAST.



5.3.2. ALARMS menu

This menu displays all pending UPS alarms. Use the **ALARMS RESET** command in the **COMMANDS** menu to reset alarms. If there is more than one page press **UP/DOWN** to scroll pages.

5.3.3. MEASUREMENTS menu

This menu displays all UPS measurements relating to the input stage, output stage, batteries and auxiliary mains (bypass). If there is more than one page press **UP/DOWN** to scroll pages.

5.3.4. COMMANDS menu

This menu contains the commands that can be sent to the UPS. Some of them are password protected. If a command is not available a command failure message appears.

5.3.5. SETTINGS menu

This menu contains all the machine settings. There are the following sub-menus:

- **PREFERENCES:** user preferences such as language, date and time, display brightness, buzzer;
- **UPS SETTINGS:** critical machine settings for output, batteries and transformer.



Wrong configuration in **UPS SETTINGS** could damage the load or the batteries.

- **CONNECTIVITY:** configurations of communication options;
- **SLOT OPTIONS:** configurations of available optional boards, which can be fitted to the front slots.

System critical parameters are password protected and should be modified by specialist personnel only.

5.3.6. BATTERY SETTINGS MENU

This is the menu for battery configuration. The list can be scrolled down to see the full list of battery settings. If batteries are not available only the first element of the list is shown. When one of the battery settings is edited all settings below in the list have to be checked and confirmed. The battery settings are saved only when the last battery setting is confirmed.

To change battery configurations enter the menu: **MAIN MENU > SETTINGS > UPS SETTINGS > BATTERIES**.

In the case of UPSs connected in parallel enter the menu: **UNIT MENU > BATTERY SETTINGS**.



These parameters for battery settings are critical: number of cells, capacity, charge current.
Risk of damage for load or batteries.

5.3.7. HISTORY LOG menu

EVENT LIST menu: it shows the list of UPS alarms and events that have occurred. The last 150 events can be displayed. Press **UP/DOWN** to scroll the list.

STATISTICS menu: the system reports some measurements (output load, input apparent power, internal temperature) in graphical format. These values can be used to analyse the situation over the last 14 days or in shorter periods (last 24 hours, last hour or last minute). Enter the required menu and press **UP/DOWN** to scroll through different periods. The last page shows the minimum, maximum and average values of the selected measurement. This information provides an enhanced evaluation of the operating mode of the equipment in order to verify whether certain critical operating situations are recurrent or only occasional.

COUNTERS menu: provides the number of events (occurred in the last 14 days) of switches on battery, overloads and the number of working hours on genset.

5.3.8. SERVICE menu

This menu is reserved for support service personnel and holds the UPS identification data, the utilities for the SW upgrade, and the utilities for the download of reports to an USB key.

5.3.9. COMMISSIONING CODE

To complete equipment activation a warranty activation code is requested. To insert the **Commissioning Code** go to **MAIN MENU > SERVICE > COMMISSIONING CODE**.

If the **Commissioning Code** is not inserted an alarm symbol is shown on the mimic panel (.

The **Commissioning Code** is provided directly by the reference Support Centre upon communication of the serial number. When contact is made with the Support Centre for the **Commissioning Code**, detailed information can be obtained on the UPS functions available and on regular preventive maintenance programmes.

5.3.10. BATTERY SETTINGS MENU

This is the menu for battery configuration. The list can be scrolled down to see the full list of battery settings. If batteries are not available only the first element of the list is shown. When one of the battery settings is edited all settings below in the list have to be checked and confirmed. The battery settings are saved only when the last battery setting is confirmed.

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In the case of UPSs connected in parallel enter the menu: **UNIT MENU > BATTERY SETTINGS**.



These parameters for battery settings are critical: number of cells, capacity, charge current.
Risk of damage for load or batteries.

5.3.11. REPORT ON USB

Reports containing UPS information can be downloaded onto a standard USB memory stick. The USB device must be formatted with FAT32 file system.

There are two commands to download USB reports:

- **User Report:** this is a .txt file translated in the language set on the display. It contains information regarding the UPS, statistics, counters and the history log.
- **Service Reports:** there are three files that can help troubleshooting for after sales service.

Step 1

Insert the USB stick into the UPS USB port placed on the inside of the UPS door.

Step 2

A menu appears with the USB services. Choose **REPORT ON USB**. Alternatively enter the menu: **MAIN MENU > SERVICE > REPORT ON USB**. When on a parallel system the SYS unit has to be selected beforehand on the mimic panel page.

Step 3

Select the required report, press **ENTER** and follow the instructions displayed.

Step 4

Remove the USB stick when completed.

Step 5

The reports are saved in the folder **\SOCOMECS\REPORTS**.

5.3.12. TREE MIMIC PANEL MENU

FIRST LEVEL	SECOND LEVEL	THIRD LEVEL
ALARMS		
MEASUREMENTS	OUTPUT MEASURES	
	BATTERIES MEASURES	
	INPUT MEASURES	
	BYPASS MEASURES	
COMMANDS	UPS PROCEDURES	
	ECO MODE	
	ALARMS RESET	
	BATTERY TEST	
	LED BAR TEST	
	RESTART DISPLAY	
	PERIODIC CHECK UP	
SETTINGS	PREFERENCES	LANGUAGE DATE AND TIME BUZZER DISPLAY PASSWORDS REMOTE COMMANDS
	UPS SETTINGS	OUTPUT BATTERIES TRANSFORMER BACKFEED
	CONNECTIVITY	RS232/485 PORT RS232/MODEM PORT RS232 SLOT OPTIONS
	SLOT OPTIONS	NET VISION ADVANC DRY CONTACTS (ADC) BATTERY TEMPERATURE PROBE
HISTORY LOG	EVENT LIST	
SERVICE	UPS REFERENCE	
	FIRMWARE VERSION	
	COMMISSIONING CODE	
	SERVICE CODE	
	UPGRADE FIRMWARE	UPGRADE HMI FIRMWARE UPGRADE LANGUAGES
	REPORT ON USB	

6. OPERATING PROCEDURES

UPS procedures can be activated from the menu **COMMANDS > UPS PROCEDURES**. Select the procedure to be activated and press **ENTER**.

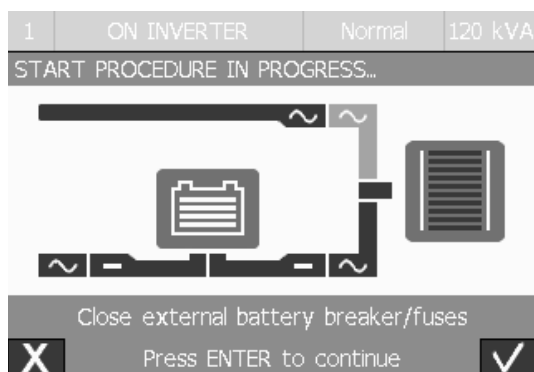
If the conditions to start the selected procedure are not fulfilled an error message is shown.

When the selected procedure starts the mimic panel is shown on the display. Follow the instructions that are given on the bottom help bar. Some instructions require confirmation with the **ENTER** button. Some procedures cannot be aborted.

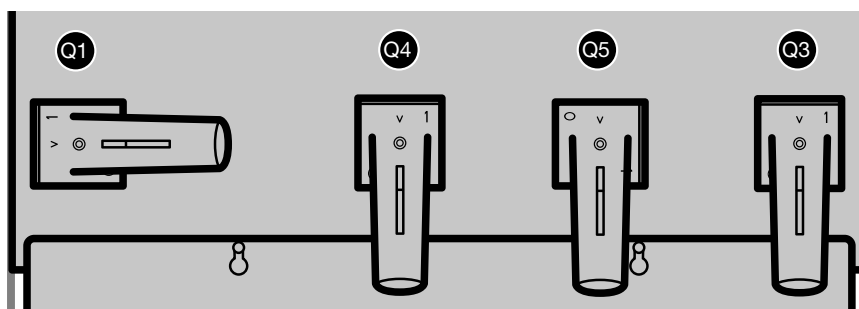


WARNING!

With the stop procedure the load will be disconnected.



6-1 Breaker position



6.1. SWITCHING ON

- Connect the mains and auxiliary mains to the UPS.
- Put switch **Q1** into position **1** (mains ON).
- Wait for the display to switch on.
- Enter **MAIN MENU > COMMANDS > UPS PROCEDURES**.
- Select **Automatic Start Procedure** and press **ENTER**.
- Carry out the operations indicated on the display.



In the case of UPSs connected in parallel choose the Automatic Start Procedure available in MAIN MENU (SYSTEM) in order to switch on the whole system. The automatic start procedure is also available in each UNIT MENU and only concerns the unit from which the command has been activated it does not affect the behaviour of the other units.

6.2. SWITCHING ONTO MAINTENANCE BYPASS

Switching onto maintenance bypass creates a direct connection between the UPS input and output, completely excluding the equipment control element. This operation is performed in the event of standard maintenance on the equipment, so as not to remove the power supply from the load, or in the event of a serious failure while waiting for the equipment to be repaired.

- Enter menu **MAIN MENU > COMMANDS > UPS PROCEDURES**
- Select **On Maint. Bypass Procedure** and press **ENTER**
- Carry out the operations indicated on the display.



If there is an external manual bypass, carry out the procedure described above before activating this switch.



In the case of UPSs connected in parallel the maintenance bypass procedure is available in MAIN MENU (SYSTEM) and affects the whole system.

6.3. SWITCHING ON FROM MAINTENANCE BYPASS

- Put switch **Q1** into position **1** (mains ON).
- Wait for the display to switch on.
- Enter menu **MAIN MENU > COMMANDS > UPS PROCEDURES**.
- Select **Automatic Start Procedure** and press **ENTER**.
- Carry out the operations indicated on the display.



If there is an external manual bypass not monitored from the UPS, or a parallel system, put the switch to position OFF to avoid overlap of mains and inverter.

6.4. EXTENDED OUT OF SERVICE

If the UPS is deactivated for some time the batteries must be recharged regularly. They should be recharged every three months.

- Connect the mains and auxiliary mains to the UPS.
- Put switch **Q1** into position **1** (mains ON).
- Wait for the display to switch on.
- Close the external battery breaker/fuses.
- Put or keep switches **Q3** (output) and **Q5** (maintenance bypass) in position **0**.
- The battery must be charged for at least ten hours.
- Once ten hours have elapsed open the external battery breaker/fuses.
- Put switch **Q1** into position **0** (mains OFF).

6.5. EMERGENCY SHUTDOWN

Should it be necessary to interrupt the continuous power provided by the UPS quickly (emergency shutdown) this can be done by putting switch **Q3** to position **0**.



The UPS output can only be electrically disconnected by means of Q3.

If the UPS is operating from the maintenance bypass (Q5 in position 1) with the mains present, the emergency shutdown does not interrupt the power supply to the load. In emergency conditions all power supplies upstream of the UPS must be disconnected.

6.6. UPS GENERAL POWER OFF

Using a button/switch connected to the ADC (Advanced Dry Contacts) card it is possible to interrupt the continuous power provided by the UPS (see chapter 8).

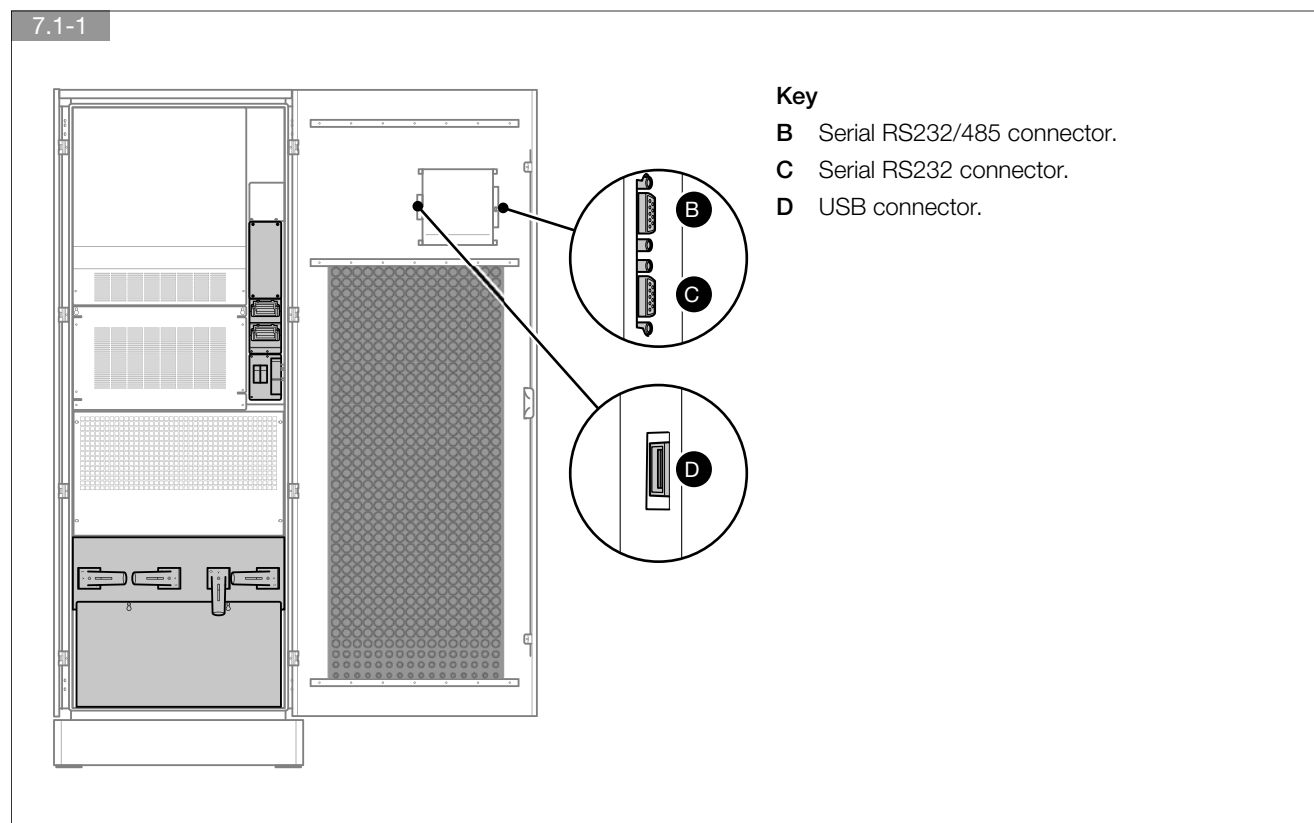
7. CONNECTIVITY AND COMMUNICATION OPTIONS

7.1. MULTILEVEL COMMUNICATION

MASTERYS BC can manage different communication channels simultaneously. It is equipped with standard communication ports and two slots to host additional optional boards.

This gives MASTERYS BC immediate interfacing and integration flexibility as soon as the unit is installed, with no need for trained personnel.

The table below lists the possible connections between the UPS and the external devices.

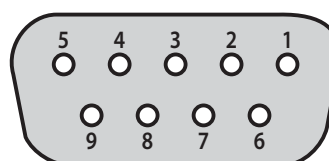


As each channel is independent, simultaneous connections can be made to satisfy the different levels of signalling and remote monitoring.



For UPS systems connected in parallel: all options listed in this chapter must only be installed on the UPS systems in the parallel setup configured as ICM (see chapter 2.11.1). For further information about parallel systems please refer to the relevant chapter.

7.1-2



B

RS232/485 pinout

- 1 Not connected
- 2 RX for RS232
- 3 TX for RS232
- 4 Data + for RS485
- 5 GND
- 6 Data - for RS485
- 7 Reserved
- 8 Not connected
- 9 +12 V

C

RS232 pinout

- 1 Reserved
- 2 RX for RS232
- 3 TX for RS232
- 4 Reserved
- 5 GND
- 6 Not connected
- 7 RTS
- 8 CTS
- 9 +12 V

7.2. ADC CARD

To be installed in one of the two slots available, these cards can be used to manage up to four normally closed or normally open outputs, and up to three digital inputs in configurable mode. If more than one ADC card is used simultaneously, the dip switch configurations must be different. Secure the card with the appropriate screws.

This card can be configured to control up to four outputs that can be set as normally closed or normally open and up to three digital inputs. The card is inserted in one of two slots provided. Up to four operating modes can be selected using the two DIP switches 1 or 2.

• Electrical data

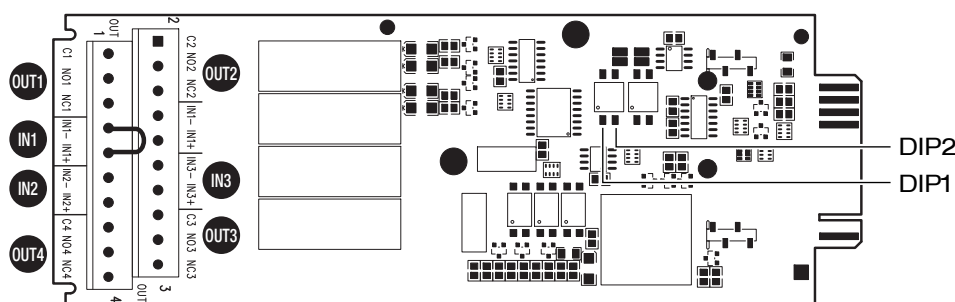
- Permitted Nominal current and voltage of NO or NC contacts: 2 A 250 Vac depending on the terminal used.
- Inputs are activated on loop closing.

• Connection of the generator

If your system uses a generator connect the 'generator set ready' no-potential contact to connector IN 2 on the optional ADC card configured in standard or power safe mode. This automatically extends the voltage and frequency value range when power is supplied by the generator set.

• External ESD connection

A remote emergency shutdown system (ESD) can be installed by means of the optional ADC card. Connect a normally closed zero-potential contact to terminals IN1+ and IN1- of the ADC card.



The filter level indicates the activation delay: 1 immediate activation (1 second minimum communication time), 2 10 s delay, 3 30 s delay.

STANDARD configuration (default) DIP1: OFF - DIP2: OFF		
IN/OUT	Description	Filter level
OUT 1	General alarm	2
OUT 2	Battery discharging	3
OUT 3	Battery low or imminent stop	2
OUT 4	UPS on bypass	2
IN 1 ⁽¹⁾	ESD	1
IN 2	Supply from GenSet	1
IN 3 ⁽²⁾	Insulation controller	2

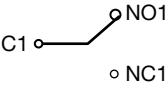
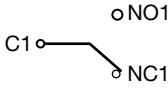
POWER SAFE configuration DIP1: ON - DIP2: OFF		
IN/OUT	Description	Filter level
OUT 1	General Alarm	2
OUT 2	Power safe plug 1	2
OUT 3	Power safe plug 2	2
OUT 4	Power safe plug 3	2
IN 1 ⁽¹⁾	ESD	1
IN 2	Supply from GenSet	1
IN 3 ⁽²⁾	Management of energy consumption	1

SAFETY configuration DIP1: OFF - DIP2: ON		
IN/OUT	Description	Filter level
OUT 1	General Alarm	2
OUT 2	ESD activation	1
OUT 3	Battery low or imminent stop	2
OUT 4	ESD activation	1
IN 1 ⁽¹⁾	ESD	1
IN 2	External alarm A39	2
IN 3 ⁽²⁾	External alarm A40	2

ENVIRONMENTAL configuration DIP1: ON - DIP2: ON		
IN/OUT	Description	Filter level
OUT 1	General Alarm	2
OUT 2	Overheating	2
OUT 3	Overload / Loss of redundancy	2
OUT 4	External alarm In2	2
IN 1 ⁽¹⁾	ESD	1
IN 2	External alarm A39	2
IN 3 ⁽²⁾	External alarm A40	2

(1) If the external ESD button is not used always insert a jumper to short circuit input IN 1.

(2) The IN3 input on the ADC card with temperature sensor is for the external battery temperature sensor.

Description of signals	
Message on the mimic panel	Description
General Alarm	'General Alarm' contact output No alarm  'General Alarm' active 
Battery Low or Imminent stop	Battery low voltage and imminent shutdown contact output
Supply from GenSet	Generator ready signal input
Power safe plug 1	Non privileged load 1 command output activated by overload or loss of redundancy
Power safe plug 2	Non privileged load 1 command output activated by battery discharging
Power safe plug 3	Non privileged load 1 command output activated by low battery
Management of energy consumption	Input for the battery to help providing energy in the event of peak consumption
ESD activation	Shutdown for ESD contact output
Overheating	Internal overheating contact output
Overload/Loss of redundancy	Overload / loss of redundancy contact output



Intervention of the ESD input switches off the UPS output.

To restore the UPS to operation:

- Close the ESD contact on 'In 1' on the ADC board.
- Send the Alarms Reset command.
- Run the Automatic Start Procedure

7.3. ADC CARD WITH TEMPERATURE SENSOR

This card's inputs/outputs have the same functions as the ADC card, with the exception of the third input (IN3).



CAUTION!

Two ADC cards with temperature sensor cannot be connected simultaneously.

7.4. REMOTE MIMIC PANEL

This device monitors and interacts with the UPS through a serial link RS 485 (maximum distance of 175 m) 25 m cable supplied as standard and 50 m cable available as an option (D in fig. 9-1).

7.5. NET VISION LAN/WEB INTERFACE

NET VISION is a communication and management interface designed for business networks. The UPS behaves exactly like a networked peripheral, it can be managed remotely and allows the shutdown of network workstations.

NET VISION allows a direct interface between the UPS and LAN network avoiding dependence on the server and support SMTP, SNMP, DMCP and many other protocols. It interacts via the Web browser.

7.6. PROFIBUS INTERFACE

The externally mounted PROFIBUS adapter allows UPS models to be connected to a Profibus network.

7.7. MODBUS-TCP INTERFACE

With the slot-mounted MODBUS-TCP adapter the UPS can be monitored from remote stations using this same network protocol for functionality.

7.8. ISOLATED SERIAL PORT RS232 (DB9 CONNECTION) AND RS485 CARD

To be installed on the UPS slot.

A serial RS232 DB9 connector and an isolated RS485 connector are available on the card.

7.9. SOFTWARE OPTIONS

A large number of SW solutions can be adopted on MASTERYS BC thanks to its advanced communication facilities. These solutions have been specially designed for the efficient management of power protection devices.

Visit **www.socomec.com** and click on **DOWNLOAD** then **SOFTWARE** to find the communication software which is suitable for your requirements.

8. TROUBLESHOOTING

The alarm messages displayed enable immediate diagnosis.

Alarms are divided into two categories:

- Alarms relating to external UPS circuits: input mains, output mains, temperature and environment.
- Alarms relating to internal UPS circuits: in this case corrective action will be carried out by the After Sales Department.

The USB report makes it possible to have full information on what occurred. Refer to 5.3.11 to download it.

Note: the service code number in the HMI menu service and give it to the after sales service to help with diagnosis and troubleshooting.

8.1. SYSTEM ALARMS

A02: UPS OVERLOAD

The power required by the loads is higher than the power available.

Check the load is well balanced on the three phases by checking the measurements on the display. If required disconnect any loads that do not need uninterruptible power.



Important!

The accepted overload time limit is defined in the technical specifications. When this time limit is exceeded the loads will no longer be powered by the inverter.

A06: AUXILIARY MAINS OUT OF TOLERANCE

The auxiliary mains exceeds acceptable tolerance values. Possible causes are:

- No voltage or frequency present or voltage and frequency outside acceptable values (see the technical specifications).
- The frequency is subjected to continuous variations (typical with power supplied from an incorrectly sized GE).

A07: INSIDE OVER TEMPERATURE

The UPS internal temperature is higher than 50 °C (please refer to the MEASUREMENTS menu on the HMI).

Check the ventilation or air conditioning system in the UPS room.

A08: MAINTENANCE BYPASS ACTIVE

The output disconnection switch Q5 is in position 1 (maintenance bypass).

The load is therefore powered directly by the mains power supply.

A17: IMPROPER USE

This alarm does not indicate a UPS malfunction or failure, but incorrect use/sizing of the system. It is activated in the event of:

- Operation for long periods at high temperatures (battery deterioration)
- High number of overloads (wrong sizing)
- Continuous battery discharging (mains not stable)
- High number of switches onto the bypass (high impulsive loads)

A22: INPUT MAINS OUT OF TOLERANCE

The input mains is not present or not sufficient (voltage and/or frequency values incorrect with reference to the technical data. If there is no input mains outage check if any protection upstream of the UPS has tripped.

Check that the voltage applied and frequency values comply with the values set on the HMI.

A38, A39, A40, A41: EXTERNAL ALARM 1, 2, 3, 4

One of the ADC PCB inputs has been activated. Check the status of the devices connected to this PCB.

A56, A57: GENERATOR SET GENERAL ALARM / GENERATOR SET FAULT

The generator has issued an alarm. Check the GE directly.

A61: PHASE DETECTION FAULT

The phase cycle sequence is incorrect. In this case invert two phases of the input mains. For a UPS with separate auxiliary mains exchange the two phases of the auxiliary mains only.

8.2. UPS ALARMS

A01: BATTERY ALARM

Failure or problem on the battery circuit. Check the battery switch is closed.

A18: BLOCKING INVERTER FOR OVERLOAD

Reduce the load rate applied to the UPS and reset the alarms.

A20: WRONG CONFIGURATION

Error in the configuration parameters. Please contact the support service.

A30: UPS STOPPED FOR OVERLOAD

Reduce the load rate applied to the UPS and reset the alarms.

A42: REMOTE SERVICE ALARM

This alarm indicates that a critical anomaly has occurred on the UPS. Where a maintenance contract with the Remote Monitoring option is in place, the procedure for analysing the UPS via remote connection will be automatically activated by your service centre provider.

A44: PERIODIC SERVICE CHECK-UP

The equipment must undergo regular inspections by the support service in order to ensure optimum performance and efficiency. If the Scheduled Inspection signal appears (🔧) on the mimic panel the equipment should be inspected by a suitably trained technician.

A51: OPTION BOARD GENERAL ALARM

Check if the optional cards are correctly inserted in the slots.

A59: BATTERY CIRCUIT OPEN

Battery switch open.

A60: FAN FAILURE

Fault in the ventilation system. Check that the air inlet at the front and the air outlet at the back of the UPS are not obstructed.

8.3. PREVENTIVE MAINTENANCE

We recommend regular specialist maintenance (annually) for the MASTERYS BC, to achieve optimum operating efficiency and avoid equipment downtime.

It is strongly advisable to comply with any requests for preventive maintenance automatically displayed with an alert message (🔧).

All operations on equipment must only be carried out by SOCOMEC personnel or authorised support personnel.

Maintenance consists of accurate functional checks on electronic and mechanical parts with replacement of parts subject to wear if necessary (typically batteries, fans and capacitors).

8.3.1. Batteries

The condition of the external batteries is fundamental to UPS operation.

Thanks to the **Expert Battery System**, battery condition information is processed in real time and recharging and discharging procedures are selected automatically in order to optimise battery lifetime expectancy and offer maximum performance.

Furthermore, during the operating lifetime of the battery, MASTERYS BC stores statistics on battery conditions of use for analysis.

Since the expected lifetime of batteries is very much dependent on operating conditions (number of charging and discharging cycles, load rate, temperature), a regular inspection by authorised personnel is recommended.



When replacing the batteries use the same type and configuration by placing them in the appropriate containers so as to avoid the risk of acid leakage.

Used batteries must be disposed of at authorised recycling and disposal centres.

Do not open the plastic cover of the batteries as they contain harmful substances.

8.3.2. Fans

The lifetime of fans used to cool the power parts is dependent on usage and environmental conditions (temperature, dust). Preventive replacement by an authorised technician is recommended within four years (in normal operating conditions).



Fans must be replaced by SOCOMEC technicians when required.

8.3.3. Capacitors

The equipment houses electrolytic capacitors (used in the rectifier and inverter section) and filtering capacitors (used in the output section), whose lifetime is dependent on usage and environmental conditions.

The average expected lifetime of these components is shown below:

- Electrolytic capacitors: 5 years;
- Filtering capacitors: 7 years.

The actual condition of components is verified during preventive maintenance.

9. ELECTRICAL OPTIONS

9.1. INSULATION CONTROLLER

This device continually checks transformer insulation, displaying an alarm message on the mimic panel.

9.2. EXTERNAL MAINTENANCE BYPASS

This device will electrically exclude and isolate the UPS (e.g. for maintenance operations) without interrupting the power supplied to the load.

9.3. ACS PCB

Synchronises UPS output with an external power source (another UPS, even of a different brand, generator or transformer).

10. TECHNICAL SPECIFICATIONS

Models			100	120
Electrical specifications - Input				
Mains voltage		Vin	3Ph+N 400 V -15% +20% (up to -40% @ 50% of nominal load)	
Input frequency		Hz	50-60 ±10%	
Input power factor			0.99	
THDI			< 3%	
Electrical specifications - External battery				
Battery voltage range		V bat	from +/- 180 ³ up to +/- 302 ⁴	from +/- 190 ³ up to +/- 302 ⁴
Electrical specifications - Output				
Output voltage		V	3Ph+N 380/400/415 V ±1% ¹	
Frequency		Hz	50-60 Hz ±0,2%	
Automatic bypass			400 V ±15% (selectable from 10% to 20% if generator is used)	
Nominal power		kW	90	108
Overload (@ 25 °C; Vin > 380; Vbat > 240) ²	• 10 minutes • 1 minute	kW	112,5 135	135 162
Crest factor			≥ 2.7	
Voltage distortion			< 1% with linear load; < 4% with non-linear load	
Environment				
Operating temperature		°C	0÷35 (15÷25 recommended)	
Storage temperature		°C	-5÷45	
Relative humidity		%	up to 95%	
Max. altitude		m	1000	
Acoustic noise		dBA	< 65	
Required cooling capacity		m³/h	2000	
Dissipated power max		W	5299	7136
Dissipated power max		BTU/h	18,091	24,362
Standards				
Safety			EN 62040-1/A1, EN 60950-1	
Type and performance			EN 62040-3 (VFI-SS-111)	
EMC			EN 62040-2 (Category C3)	
Product certification			CE - TÜV-SÜD	
Protection level			IP20; IP21 on request	
Mechanical characteristics with standard batteries				
Dimensions (LxPxH)		mm	700 x 830 x 1925	
Weight		kg	400	

1. 360 V with $P_{out} = 90\% P_n$.

2. Initial Condition $P_{out} \leq 80\% P_n$

3. @ Battery Fully Discharged. Call SOCOMEC support service.

4. @ Battery Fully Charged. Call SOCOMEC support service.

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