

MASTERYS BC

15 - 40 kVA

Installations- und bedienungsanleitung (DE)

Installation and operating manual (EN)

Manual de instalación y uso (ES)

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)

安裝及操作手冊 (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 the information provided without prior notice.
- The unit must only be installed and activated by qualified technical personnel who have been authorised by SOCOMEC.



The UPS MUST only be moved by two people at least.
They MUST take position at the sides of the UPS with respect to the direction of movement.


- The unit must remain in a vertical position at all times.
- Connect the PE ground conductor first before making any other connection.
- 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 2.4.1).


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).

- 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 
- The UPS requires three-phase plus neutral input connections (3P+N).
- 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.
- Before connecting any external battery cabinets, ensure they are fully compatible with the UPS model used.
- 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 the protection panels in order to carry out work on parts under dangerous voltage.
- Risk of explosion if the batteries are replaced with others of the wrong type.
- Used batteries must be disposed of at authorised waste disposal centres.



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



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



WARNING!
This 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.

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 earthed. If inadvertently earthed, remove source from earth. Contact with any part of an earthed battery can result in electric shock. The likelihood of shock can be reduced if earthing is removed during installation and maintenance (applicable to equipment and remote battery supplies with no earthed supply circuit).

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, the products may have to be adapted.

For such use please contact SOCOMEC beforehand to check if these products meet the required level of safety, performance, reliability and comply with applicable laws, regulations and specifications.

1.2. DESCRIPTION OF SYMBOLS USED 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 that 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.
- The unit has wheels that can be used to move it for short distances.
- Ensure the floor is strong enough to support the weight of the UPS and battery cabinet, if used.



Avoid pressing on the front panels when moving the unit.

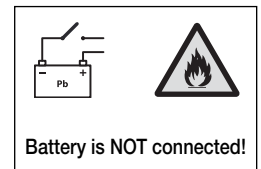


The UPS **MUST** only be moved by two people at least. They **MUST** take position at the sides of the UPS with respect to the direction of movement.



CAUTION IF DAMAGED NON-SPILLABLE BATTERIES

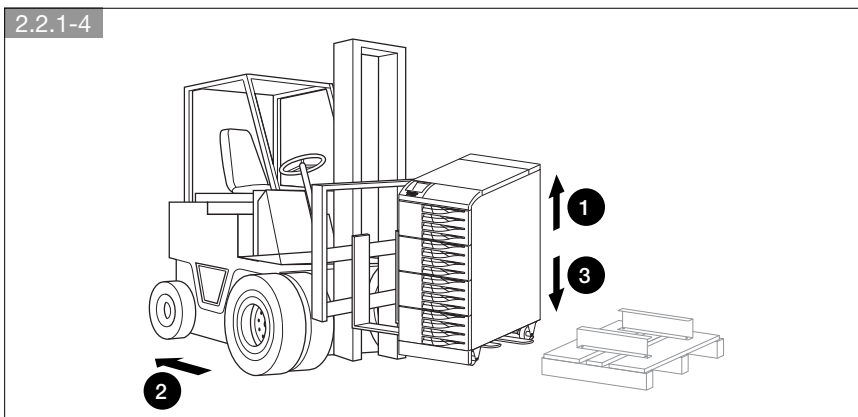
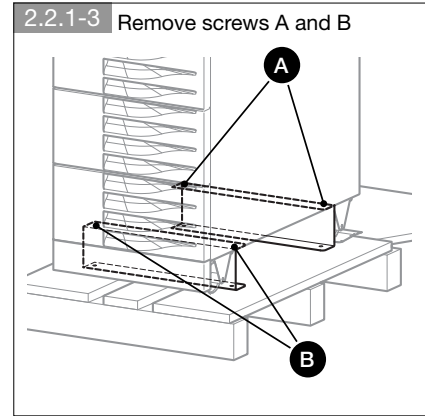
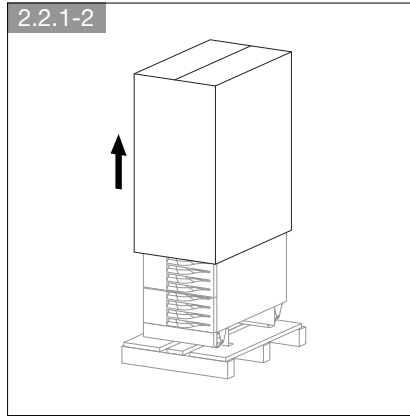
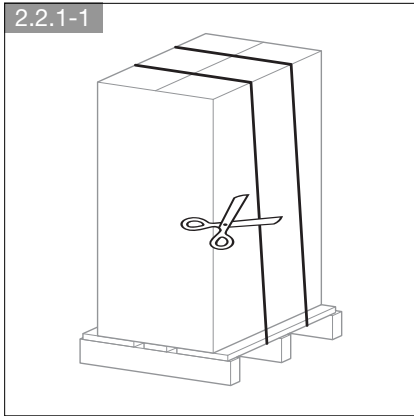
If packaging is crushed, ripped or open such that the inner contents are revealed, the equipment should be kept in an isolated area and inspected by a qualified person. If the packaging cannot be shipped the contents should be collected promptly, kept apart, and the sender or recipient should be contacted.



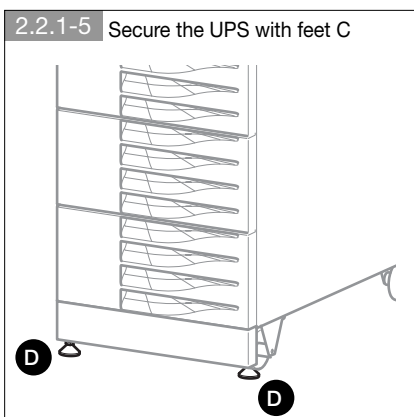
All packaging must be recycled in compliance with existing legislation in the country where the system is installed.

2.2. UNPACKING PROCEDURE

2.2.1. S Models (h 800 mm) and M Models (h 1000 mm)



The UPS can be moved.
Place the UPS in the installation area.

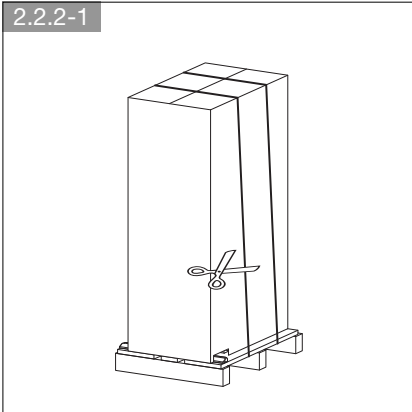


Secure the UPS with feet D only when it is in position with cables connected.

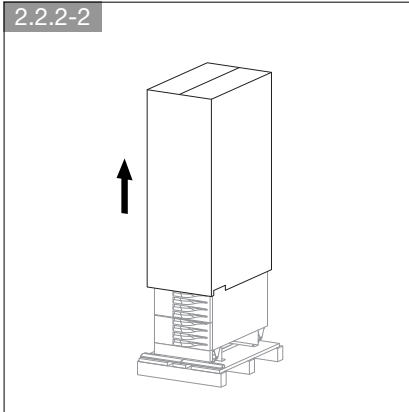
2. UNPACKING AND INSTALLATION OF THE UNIT

2.2.2. T Models (h 1400 mm)

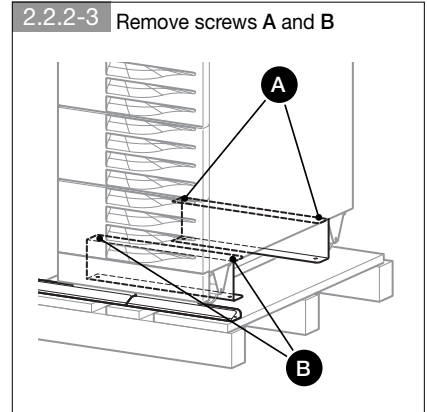
2.2.2-1



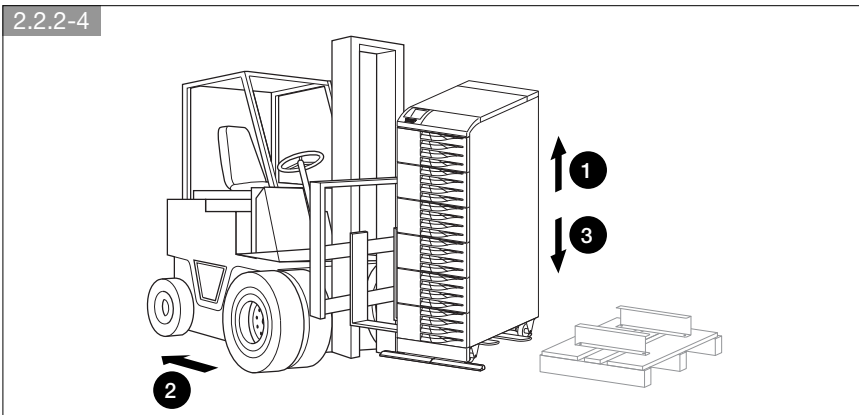
2.2.2-2



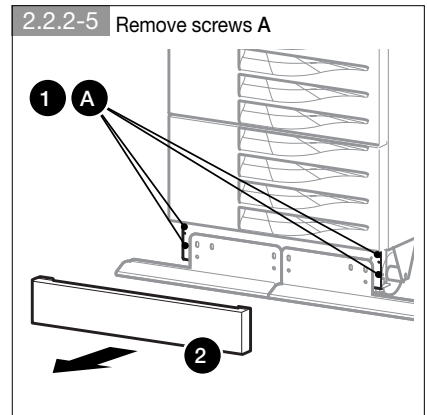
2.2.2-3 Remove screws A and B



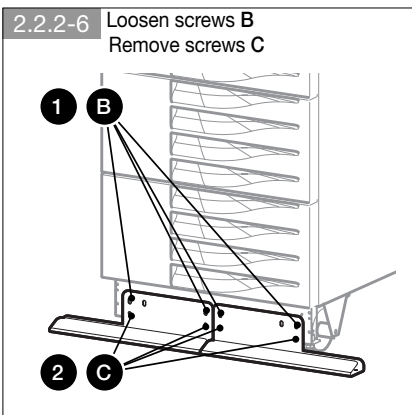
2.2.2-4



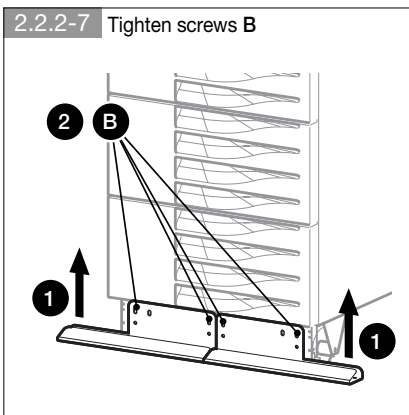
2.2.2-5 Remove screws A




2.2.2-6 Loosen screws B
Remove screws C

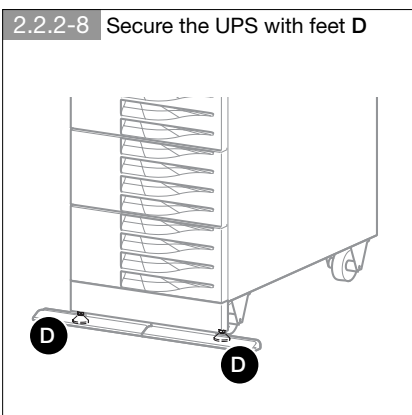


2.2.2-7 Tighten screws B



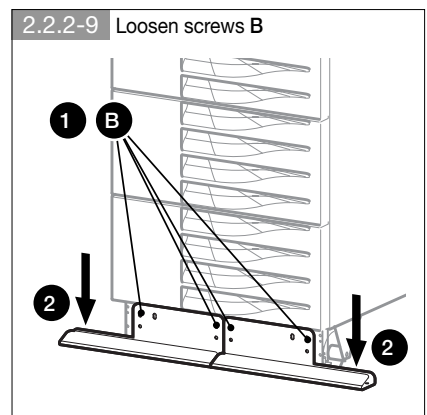
 The UPS can be moved.
Place the UPS in the installation area.

2.2.2-8 Secure the UPS with feet D



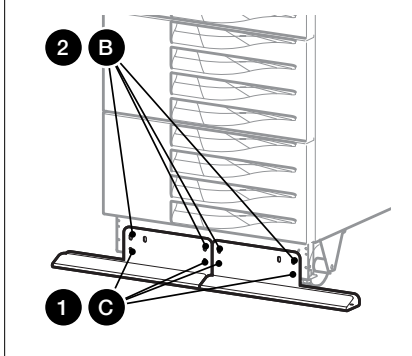
 Secure the UPS with feet D only when it is in position with the cable connected.

2.2.2-9 Loosen screws B

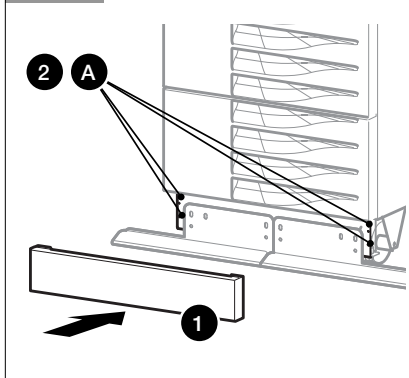


2. UNPACKING AND INSTALLATION OF THE UNIT

2.2.2-10 Tighten screws B
Tighten screws C



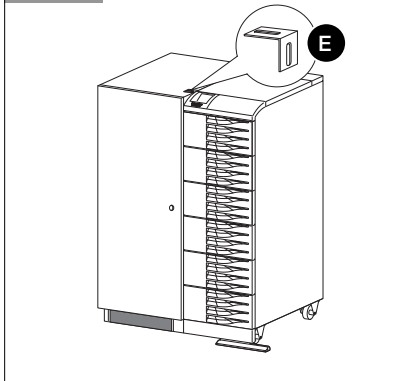
2.2.2-11 Tighten screws A



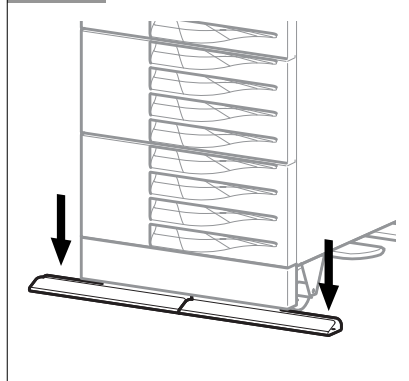
For UPS 15-40kVA height 1400mm without internal battery:

- with battery cabinet fitted alongside: remove leveller E from the cabinet. Fasten the UPS to the cabinet using the bracket E supplied (figure 2.2.2-12).
- without battery cabinet fitted alongside: secure the UPS to the floor (figure 2.2.2-13).

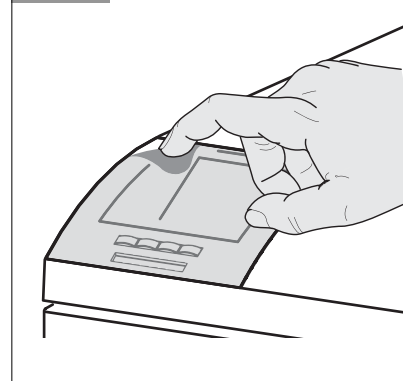
2.2.2-12



2.2.2-13

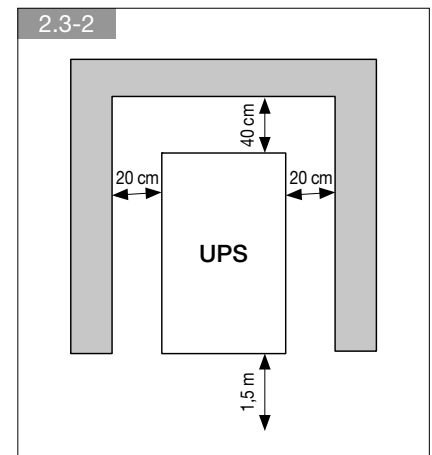
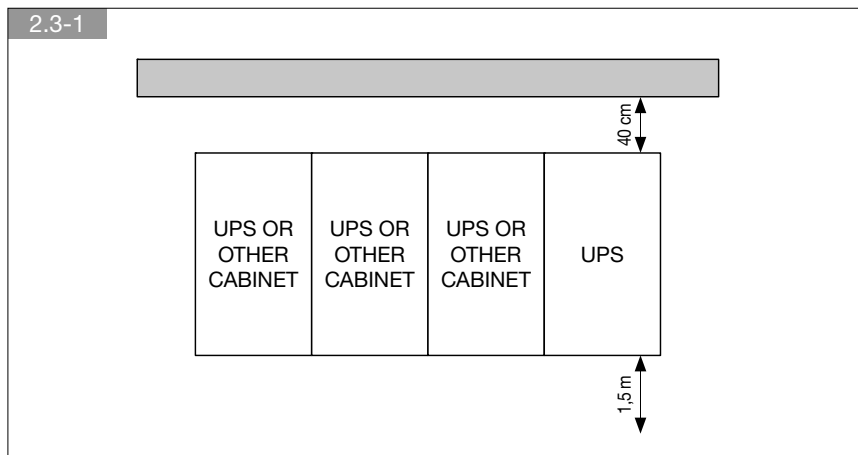


2.2.2-14 Remove the label



2.3. ENVIRONMENTAL REQUIREMENTS

- 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.
- Avoid dusty environments or areas where there is dust from conductive or corrosive materials (e.g. metal dust or chemical solutions).
- The UPS is not designed for outdoor use.
- Do not expose the UPS to direct sunlight or sources of excessive heat.
- A space of at least 40 cm must be left at the back for adequate ventilation (see 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. It is also advisable to ensure that the cable connections are sufficiently long and flexible so that the unit can be extracted during maintenance (see figure 2.3-2).
- If it is not possible to leave sufficient space at the front, adequate access must be ensured from both sides.



2.4. 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										
UPS	Magneto-thermal input ¹		Magneto-thermal Aux Mains ¹		Differential input ⁵	Input/Output cable core size		Battery cable core size		Battery protection ⁴
(kVA)	(A)		(A)		(A)	(mm ²)		(mm ²)		(A)
	single	parallel ²	single	parallel ²	selective type ⁵	Min	Max ³	Min	Max ³	
15 3/1	32	40	100	125	0.5	6	35	6	35	50 Gr
	100 <i>if common input mains</i>	125 <i>if common input mains</i>				25 <i>aux mains and output</i>				
20 3/1	40	63	125	160	0.5	10	35	10	35	63 Gr
	125 <i>if common input mains</i>	160 <i>if common input mains</i>				35 <i>aux mains and output</i>				
15 3/3	32	40	32	40	0.5	6	35	6	35	50 Gr
20 3/3	40	63	40	63	0.5	10	35	10	35	63 Gr
30 3/3	63	80	63	80	0.5	16	35	16	35	100 Gr
40 3/3	80	100	80	100	0.5	25	35	25	35	125 Gr

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 systems with two or more UPSs operating in a redundant or power parallel configuration.

³ Determined by the size of the terminals.

⁴ Protection on the external battery cabinet (preferably 2 bipolar protection devices or one quadripolar).

⁵ Caution! Use type B 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.



The UPS is designed for transitory overvoltages in category II installations. If the UPS is part of the building's electric circuit or 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 arrester' 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 $U_p \leq 4\text{kV}$ or $\geq 15\text{m}$.



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.

2.4.1. Backfeed protection

If the UPS does not have an automatic protection device against current backfeed, the operator/installer must add a warning label to all the mains power disconnecting switches installed at a distance from the UPS area. This serves to remind technicians of the fact that the circuit is connected to a UPS (see the SAFETY section in paragraph 1 of this manual and paragraph 4.7.3. of the EN62040-1 2009-05 standard).

The label is supplied with the system.

The backfeed protection device may be built into the system (only on specific request), or an electromechanical switch may be installed externally in the input of the UPS.

- If the UPS incorporates this protection, proceed with the connections as described in paragraph 2.5 of this manual.
- To install the external backfeed protection it is necessary to use the BKF card and an external electromechanical switch that should be installed . For further information on the connection and the type of remote switch, please read paragraph 9.7 of this manual.



WARNING

The neutral is not disconnected as, even in the event of a single fault on the UPS, it never has high potential when the mains and/or auxiliary power supplies are disconnected upstream. This is to prevent transformation of the power source to the UPS every time there is a power failure.

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.



NOTE

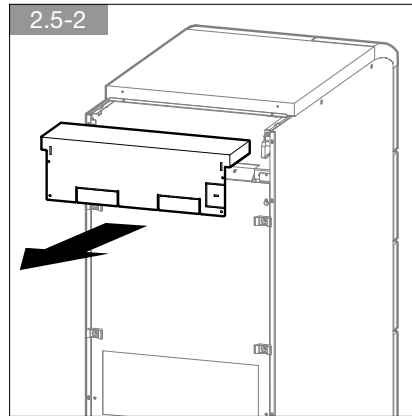
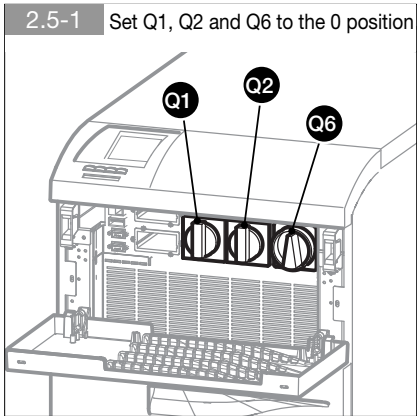
For equipment with separate Emergency Mains, the neutral of the Emergency Mains line must be electrically common with the neutral of the main input feed line.

2.5. INSTALLATION PROCEDURES AND INSTRUCTIONS



WARNING!

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

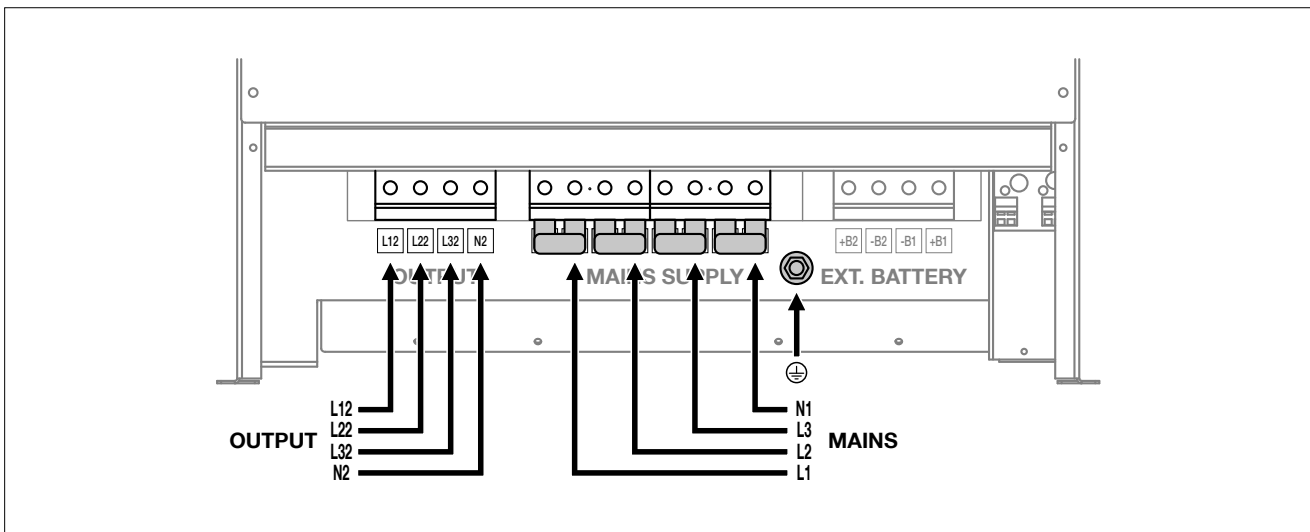


Cable specifications:

- strip length: 18 mm
- tightening torque: 2.5 - 4.5 Nm

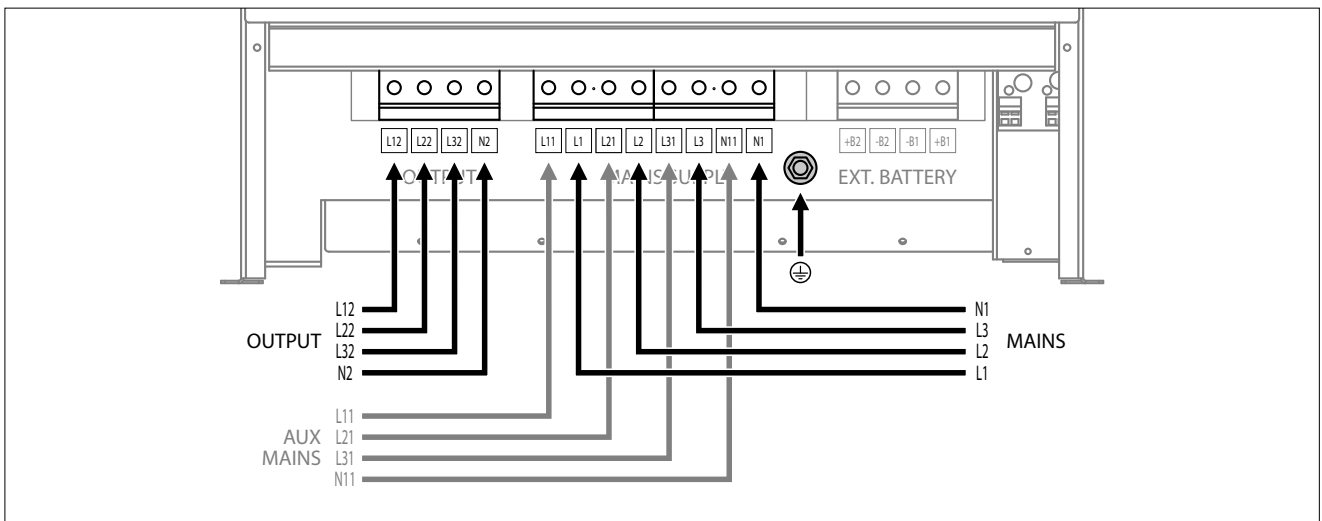
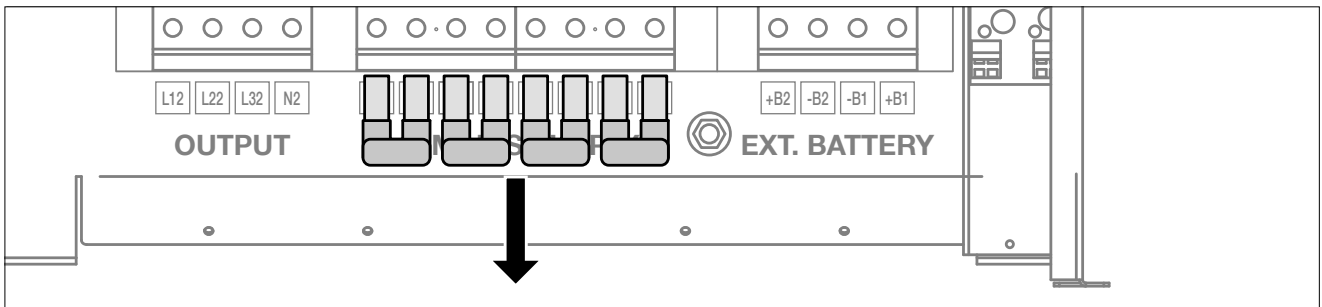
3/3

Connections if
THE MAINS AND AUX MAINS ARE CONNECTED IN COMMON

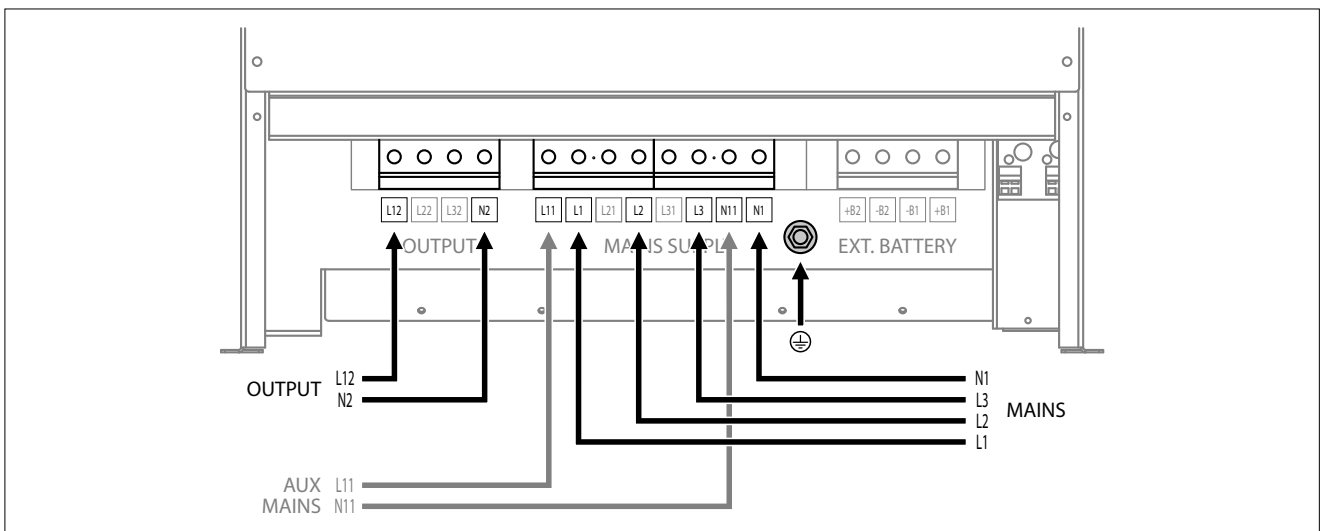


2. UNPACKING AND INSTALLATION OF THE UNIT


3/3 Connections if THE MAINS AND AUX MAINS ARE CONNECTED SEPARATELY

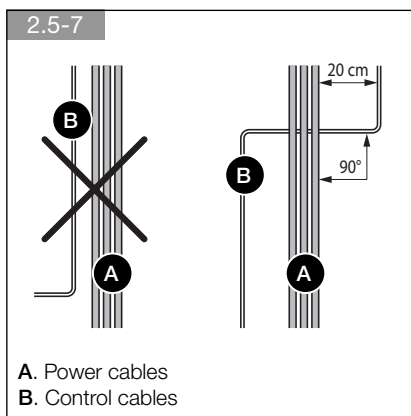
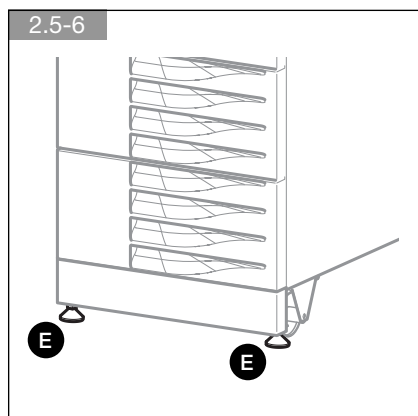
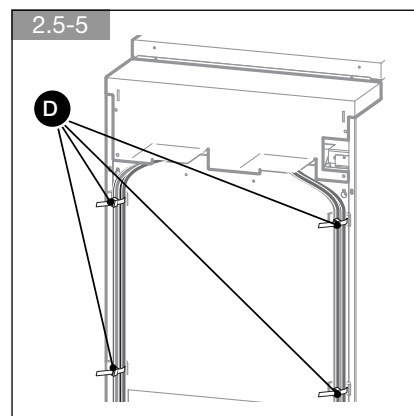
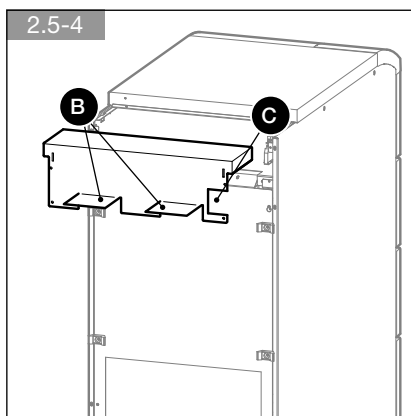
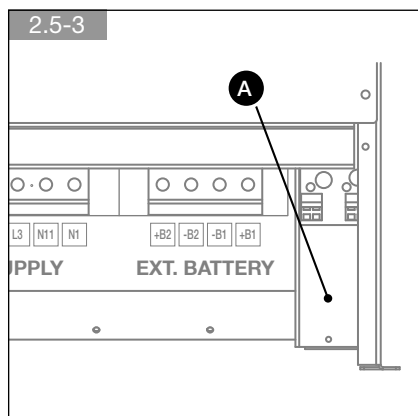


3/1 Connections if THE MAINS AND AUX MAINS ARE CONNECTED SEPARATELY



2. UNPACKING AND INSTALLATION OF THE UNIT

- 2.5-3** Guide any control cables from the front (RS232, signalling relay contacts, etc.) into the appropriate side cable run **A**.
- 2.5-4** Remove the pre-cut element **C** and bend elements **B** to feed through the cables, secure the terminal board cover with the four screws.
- 2.5-5** Secure the cables to the couplings **D** located on the rack ensuring that the air vents are not obstructed in any way.
- 2.5-6**  Once cabling has been carried out, secure the UPS with the fixing feet **E**
- 2.5-7** If the system is installed on a raised floor (such as in a data processing room):
- leave a space of at least 20 cm between the power and the control cables;
 - avoid parallel channelling over long distances; choose cables crossing at 90° instead.



2.6. GENERATOR CONNECTION

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

2.7. EXTERNAL ESD CONNECTION

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

2.8. 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 2.4 for details about protection devices.
- 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.

2.9. UPS PARALLEL CONFIGURATION

2.9.1. General

Parallel connection enhances UPS system reliability, performance and power.

All models can be installed in parallel configuration provided they have the special parallel kit that can be installed in the factory or later by specialist personnel.

UPS modules for parallel operation are identical to standard UPS modules, as a result safety, shipping and installation recommendations in 'Safety' and 'Unpacking and installation of the unit' chapters.



For 3/1 versions only two units in parallel are allowed.

2.9.2. Installation

UPS units operating in parallel are interconnected using control cables **B** (fig. 2.9-1) and are configured differently depending on the position they are assigned.

For this reason the units have a position label **C** (Fig. 2.10-1):

- The LEFT label means that the unit must be positioned to the left.
- The RIGHT label means that the unit must be positioned to the right.
- The INTERNAL label (used only on systems with three) means this unit must be positioned between the two other cabinets.

The control cables supplied allow a maximum distance of about 3 metres between the UPS units. This gives enough room for an external battery cabinet to be inserted beside each UPS.

2.9.3. Power connections

- The power supply to each unit must be protected as indicated in the table in paragraph 'Electrical requirements'.
- The cross section and length of the input and output cables must be identical for all units.
- The 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.
- The cables from the UPS module to switch **F** must be of the same length (max. 15 metres) with multi-core cables.
- If a differential switch is installed on the mains power switch (optional), it must be inserted upstream from the distribution panel (detail **H**), it **must be a selective type and the trigger value must be 0.5 A multiplied by the number of UPSs connected in parallel.**

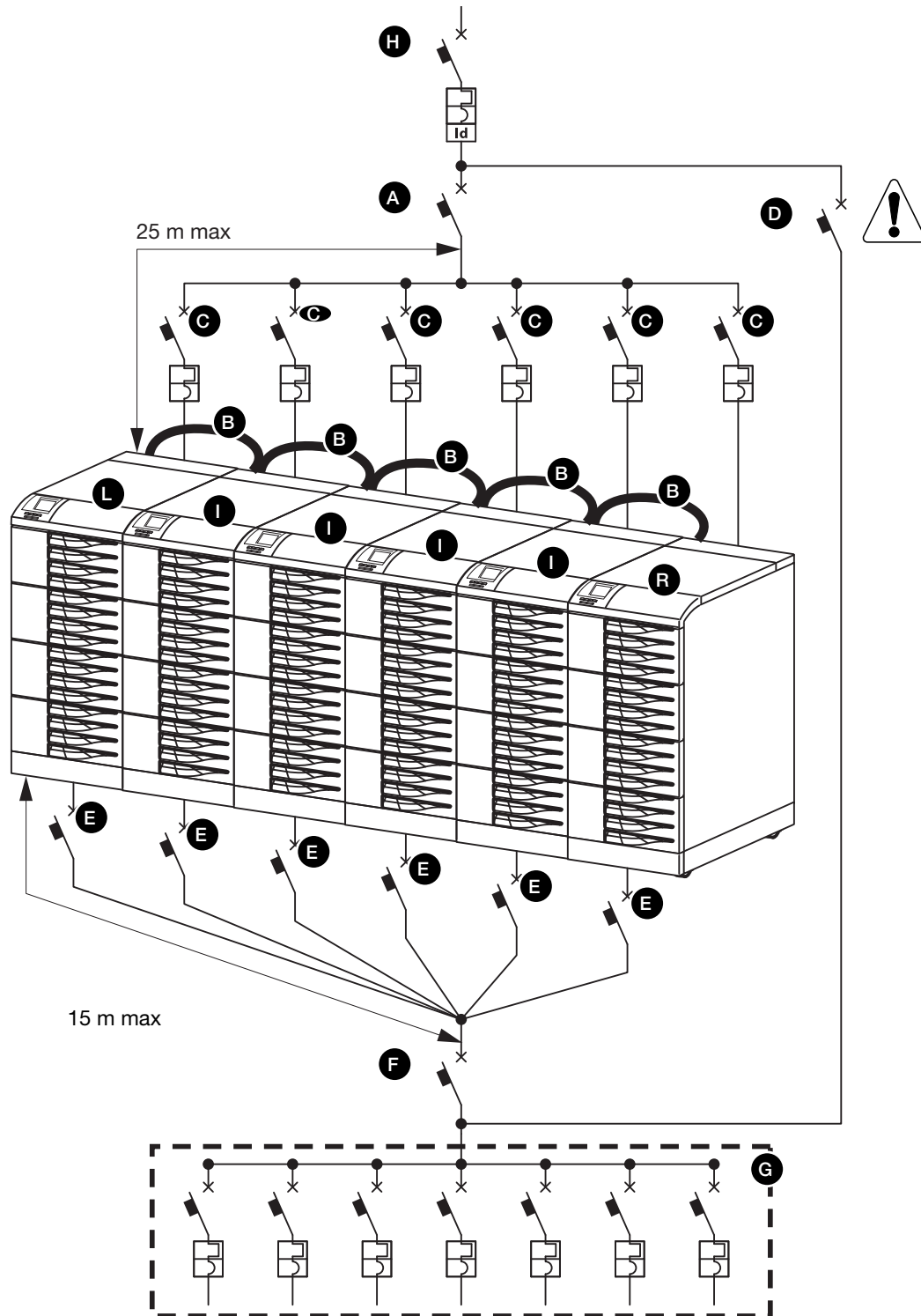


Only activate switch D after carrying out the procedure for switching onto the maintenance bypass.



Only activate switch E after turning off the UPS.

2.9-1 Recommended parallel configuration



Key

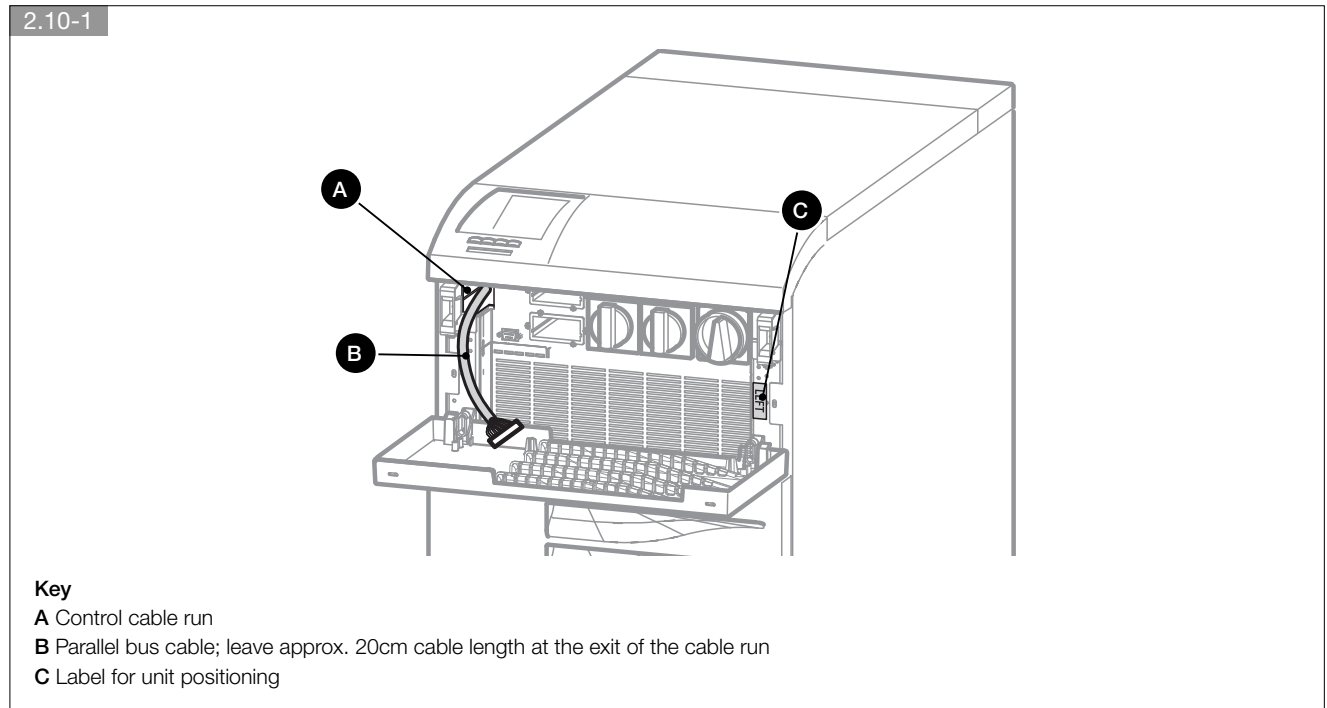
- | | | |
|---|---|--|
| A System input switch | D Ext. bypass switch | H Main differential magneto-thermal switch |
| B Parallel bus cable | E Output switch (connect the micro switch to the relative parallel board) | I Internal UPS |
| C Single UPS magneto-thermal switch (if a separate auxiliary power source is used, add a magneto-thermal switch for each UPS) | F System shutdown switch | L Left UPS |
| | G Distribution | R Right UPS |

2.10. CONTROL CONNECTIONS

In order for units connected in a parallel configuration to operate correctly, control cables are required to exchange data between the various UPS units making up the parallel system, for management of correct load sharing and synchronisation logic.

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.

Parallel configuration must only be activated by SOCOMEC qualified personnel; in each case arrange the control cables in the relevant cable run as shown in figure 2.9.4-1, leaving the connector(s) unconnected (in the central UPS one incoming and one outgoing control cable must be used).



2.11. EXTERNAL BATTERY CABINET CONNECTION



If the UPS has internal batteries connecting external battery cabinets is prohibited.

Position the battery cabinet next to the UPS.



Before carrying out any operations ensure that:

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

- Remove the terminal board protection.
- Connect the ground cable.
- Connect the cables between the UPS terminals and the battery cabinet terminals, strictly observing the polarity of each individual string and the cross-sections indicated in table 2.4.



Use double insulated cables or the cables supplied with the unit to connect the UPS to the battery cabinet. The length L of battery cable must not be more than 8 metres long (if $L > 8$ m, please contact the support service).

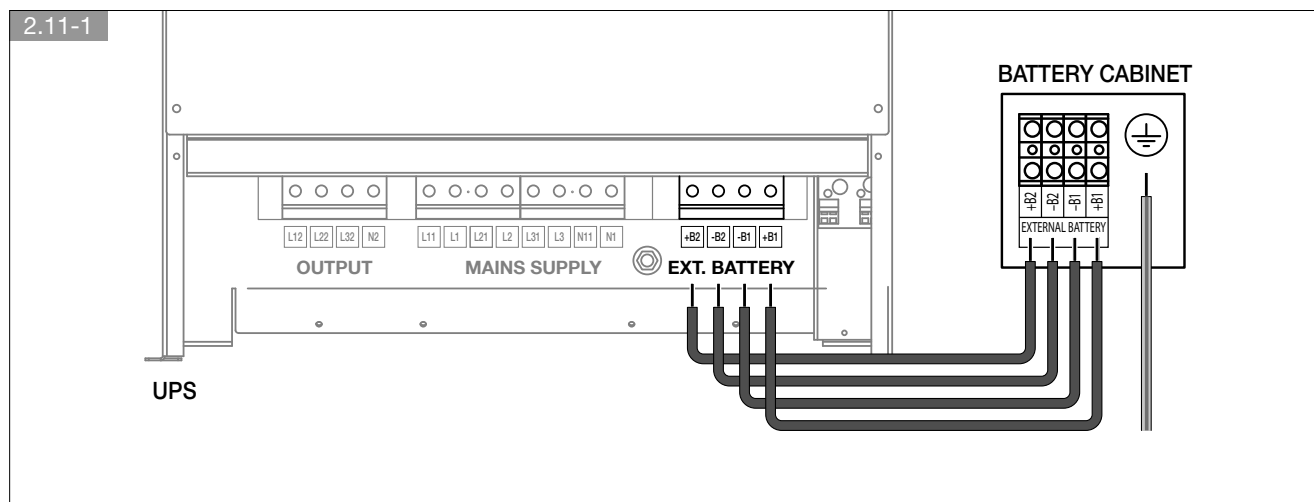


Cabling errors with inversion of battery polarity may cause permanent damage to the equipment.

- Replace the terminal board's protection.



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. If the values indicated on the battery cabinet data plate are different from those shown on the mimic panel use the SERVICE > CONFIGURATIONS menu to correct the settings.



3. MODES OF OPERATION

3.1. ON LINE OPERATION

A special feature of the MASTERYS BC series is the ON LINE double conversion feature in conjunction with low distortion mains power absorption. With ON LINE mode the UPS is able to 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.

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

- **Normal mode**

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

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 the 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 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. The Expert Battery System keeps the user constantly informed on battery status and the back-up time available.

3.2. OPERATION IN HIGH EFFICIENCY MODE

The UPS allows the selection of a programmable 'economy' operating mode that can increase overall efficiency by up to 98% for energy saving purposes. With this mode of operation, specific daily or weekly time intervals can be selected and programmed to power the applications directly from the auxiliary mains. 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 like the ON LINE mode. Thus the use of this mode should be carefully evaluated according to the level of protection required by the application.

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

3.3. OPERATION WITH MANUAL MAINTENANCE BYPASS

If the maintenance bypass is activated using the appropriate procedure the load is powered directly from the maintenance bypass, while the UPS is separated 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.

3.4. OPERATION WITH EXTERNAL MANUAL BYPASS

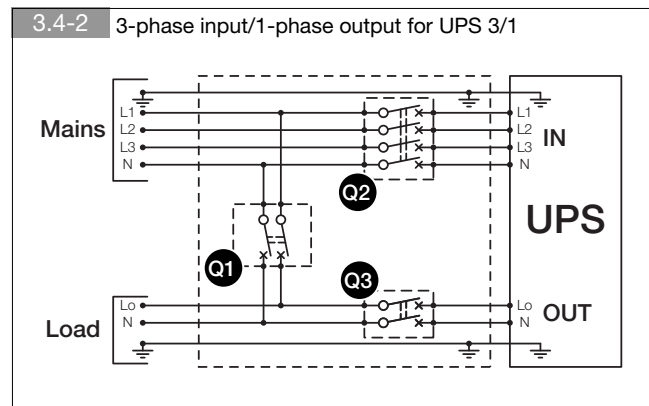
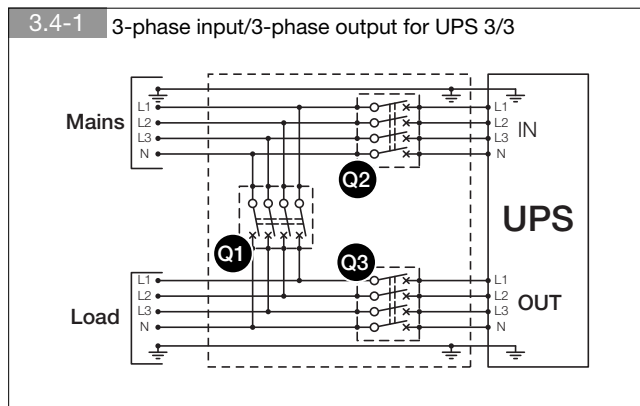
The external maintenance bypass may be placed on the general distribution panel when the UPS is installed, or by installing the bypass panel that is supplied on request.

If the UPS has an input for the auxiliary power supply the **Q2** switch must be connected to this input and the main power supply input must be disconnected on the control panel.

If the maintenance bypass is activated with the appropriate procedure the load is powered directly from the maintenance bypass, while the UPS is separated 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.

Bypass panel connection diagram



Key

Q1 Bypass switch

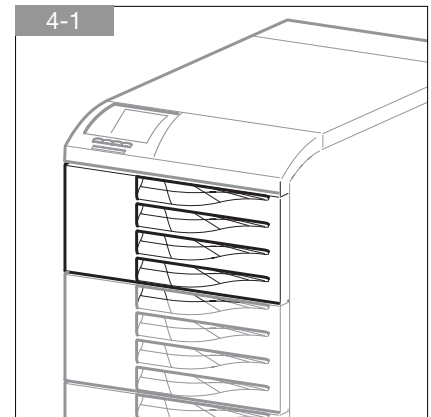
Q2 Mains power switch

Q3 Output switch

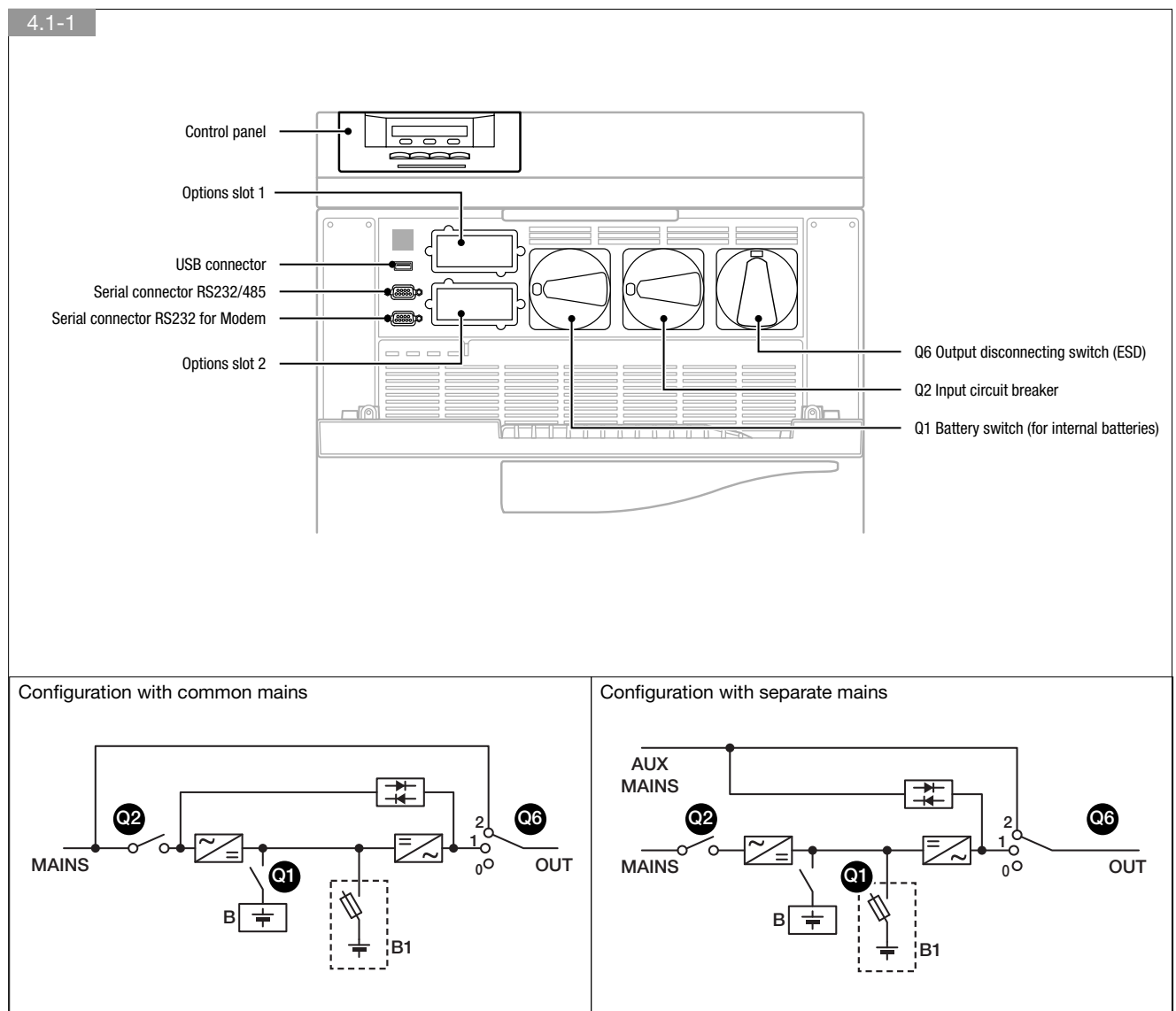
4. ACCESS TO CONTROLS

This chapter identifies the electromechanical switches, described below, used for start-up, shutdown and maintenance bypass procedures.

Access to the control area is from the front by opening the upper door using the red handle as shown in figure 4-1. The control area also contains the communication interface connectors and the slots for the optional signalling cards. Please refer to the relevant chapter for more details on the connection and use of the relevant communication interfaces/cards.



4.1. IDENTIFYING SWITCHES AND INTERFACES



4.2. SWITCH FUNCTIONS

Input switch Q2

The input switch provides the primary power supply to the UPS.

In normal operating conditions it should be in position **1 ON**.

The position **0 OFF** will cause the batteries to discharge.

In a configuration with separate mains the switch only interrupts the rectifier power supply.

Output disconnecting switch Q6

The disconnecting switch **Q6** has three positions with the following functions:

- **Position 1 UPS:** this is the position for normal UPS operation for a continuous power supply to the load;
- **Position 2 MANUAL BYPASS:** This position should only be selected for standard or special maintenance operations (manual bypass); the load is connected directly to the mains power supply. It may be used in the event of a UPS failure to power applications from the auxiliary mains while awaiting the intervention of technical personnel;
- **Position 0 OFF:** This completely isolates the UPS output by removing the voltage from the applications in any operating conditions. It is used for the emergency shutdown of the system (internal ESD).

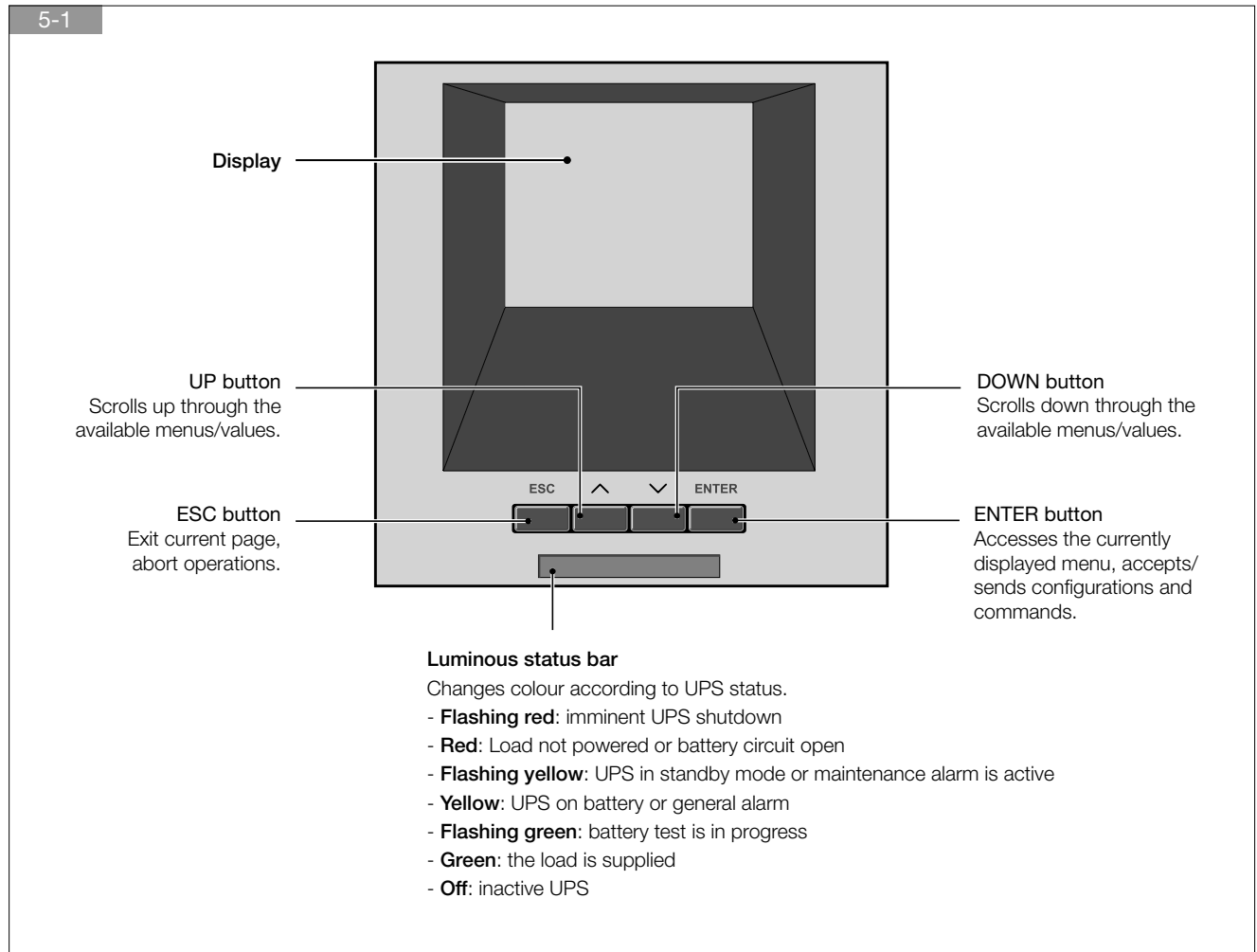
Battery switch Q1 (UPS batteries)

When closed, this switch connects the UPS batteries to the DC/DC converter stage to power the inverter in the event of a mains failure. The normal operating position is **1** (closed).

5. CONTROL PANEL

The HMI (Human Machine Interface) 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:

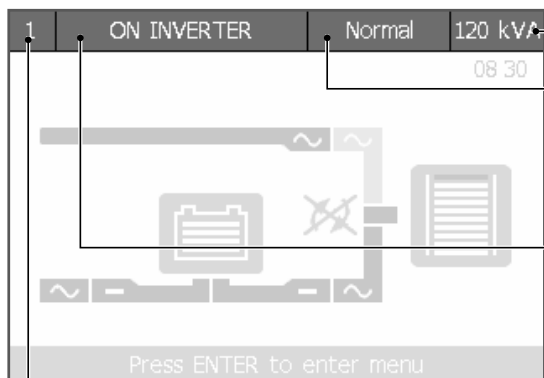
- mimic panel;
- measurements and alarms;
- changing UPS operating modes and programming battery tests;
- assisted startup and switching on maintenance bypass procedures;
- settings menu;
- list of events and statistics.



6. MENU

6.1. DISPLAY OVERVIEW

6.1-1 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**.

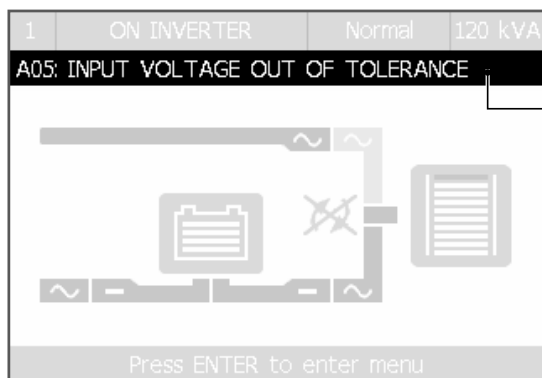
Unit status:

- 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

6.1-2 Alarms area

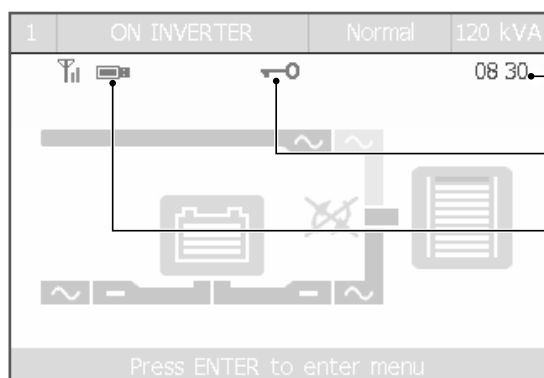


Alarms area

Present when an alarm is active.

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

6.1-3 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:

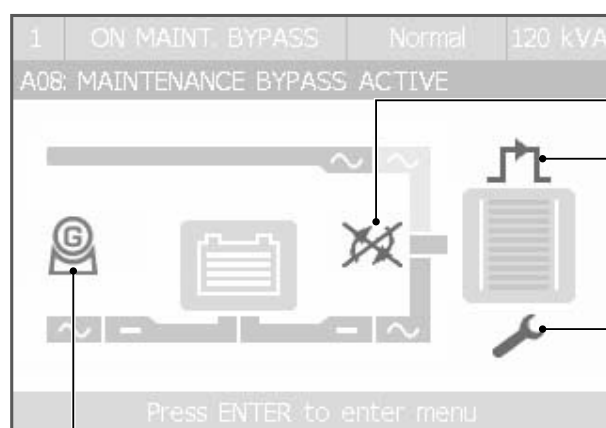
ESC → UP → DOWN → ENTER

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.

6.1-4 Additional Icons



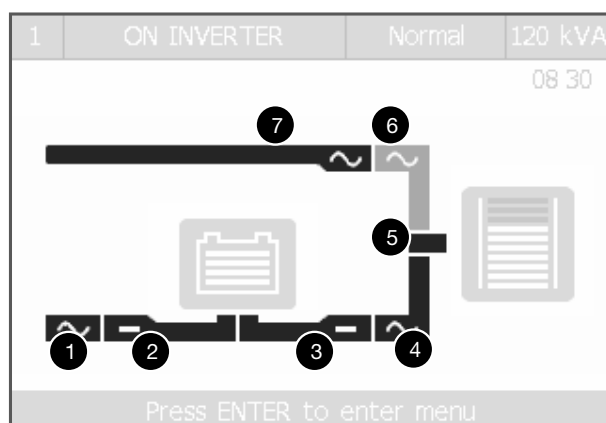
Bypass mode (or Eco Mode) not possible

On Maintenance Bypass

Commissioning Code not insert or Scheduled Inspection warning: machine inspection required. Call SOCOMEC support service

Operating on GenSet

6.1-5 Mimic panel



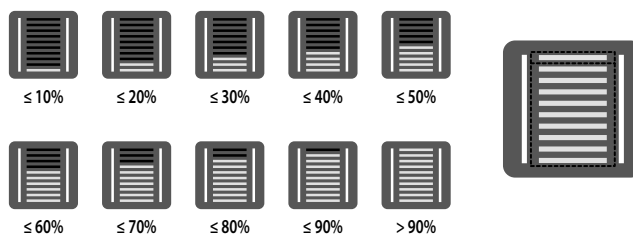
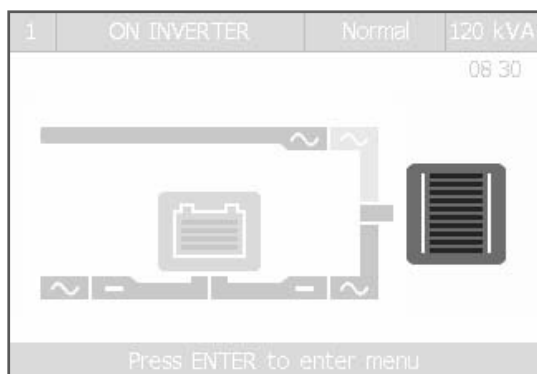
Bars

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.

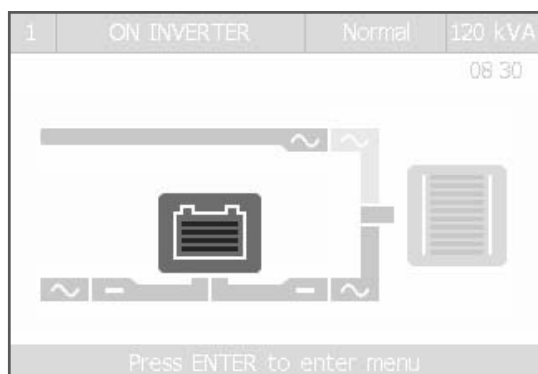
Bar colour identifies energy flow:

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

6.1-6 Load level



6.1-7 Battery status (unit only)



Battery charging

The level reached is continuous, other levels flashing



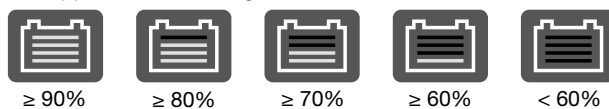
Battery discharging

The level reached is continuous white, others level flashing.



Battery charged

The upper level is flashing white.



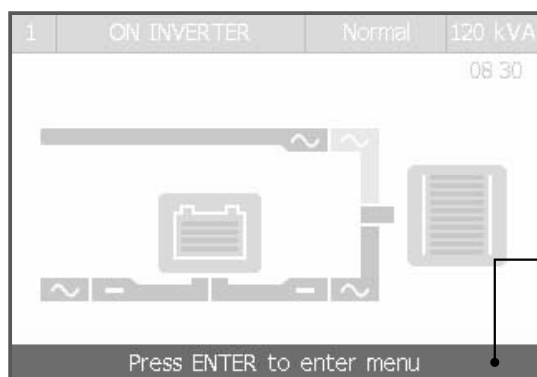
Battery discharged



Battery open



6.1-8 Message area

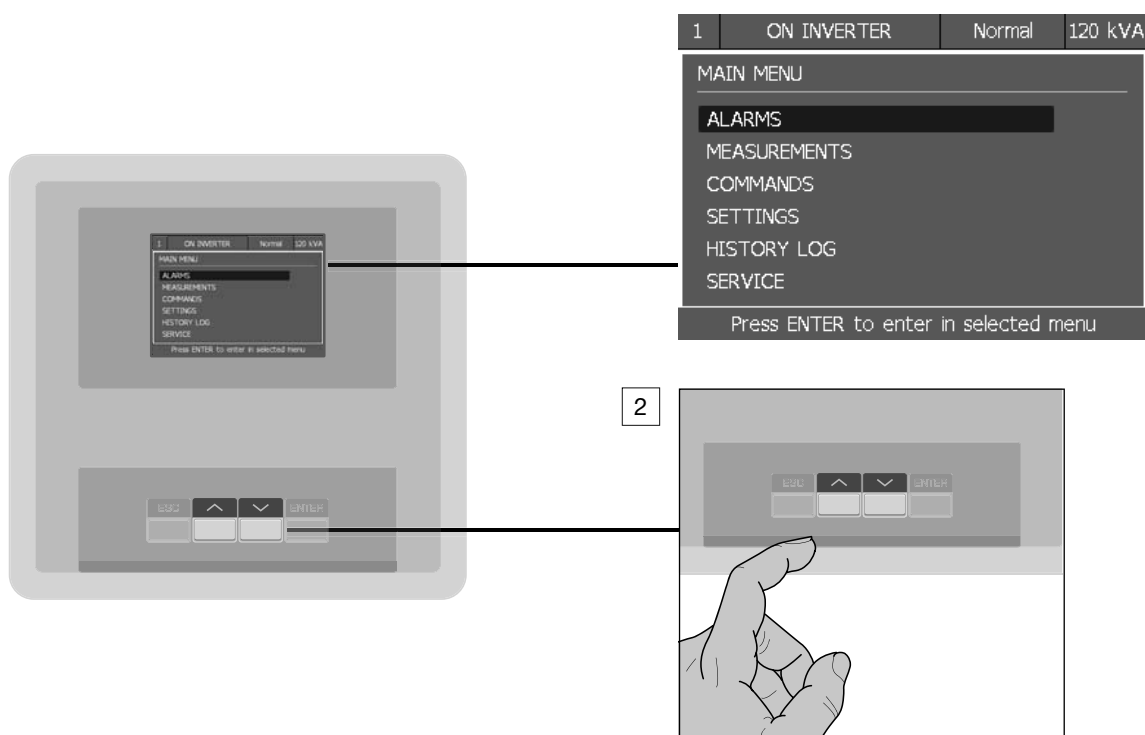
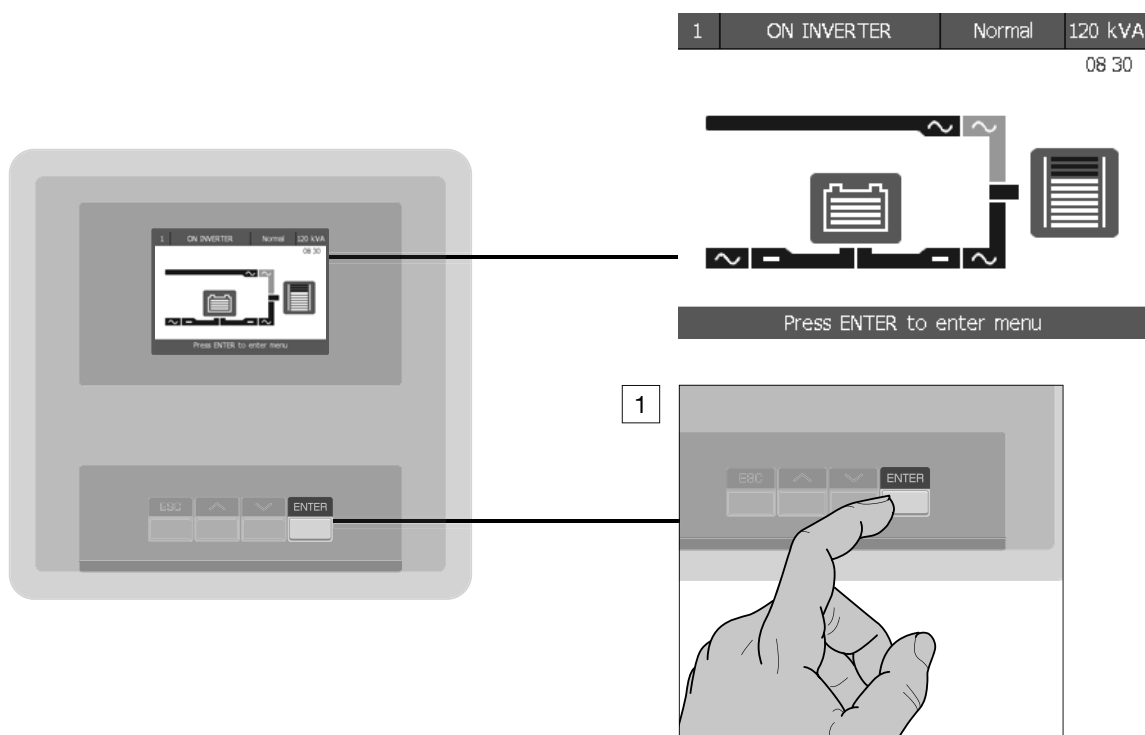


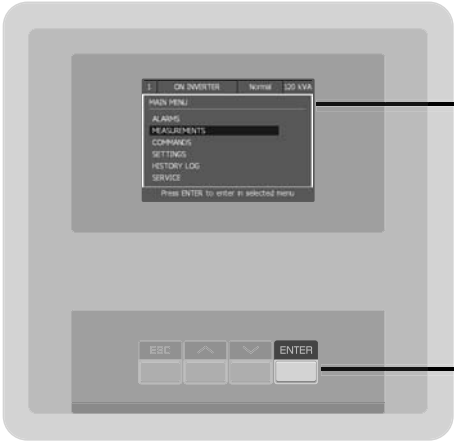
Message area

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

6.2. MENU NAVIGATION

From the mimic panel page, press the **ENTER** key to access the **MAIN MENU**. 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.





1

ON INVERTER

Normal

120 kVA

MAIN MENU

ALARMS

MEASUREMENTS

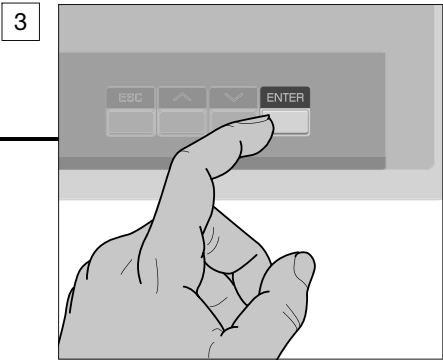
COMMANDS

SETTINGS

HISTORY LOG

SERVICE

Press ENTER to enter in selected menu



1

ON INVERTER

Normal

120 kVA

MEASUREMENTS

OUTPUT MEASURES

BATTERIES MEASURES

INPUT MEASURES

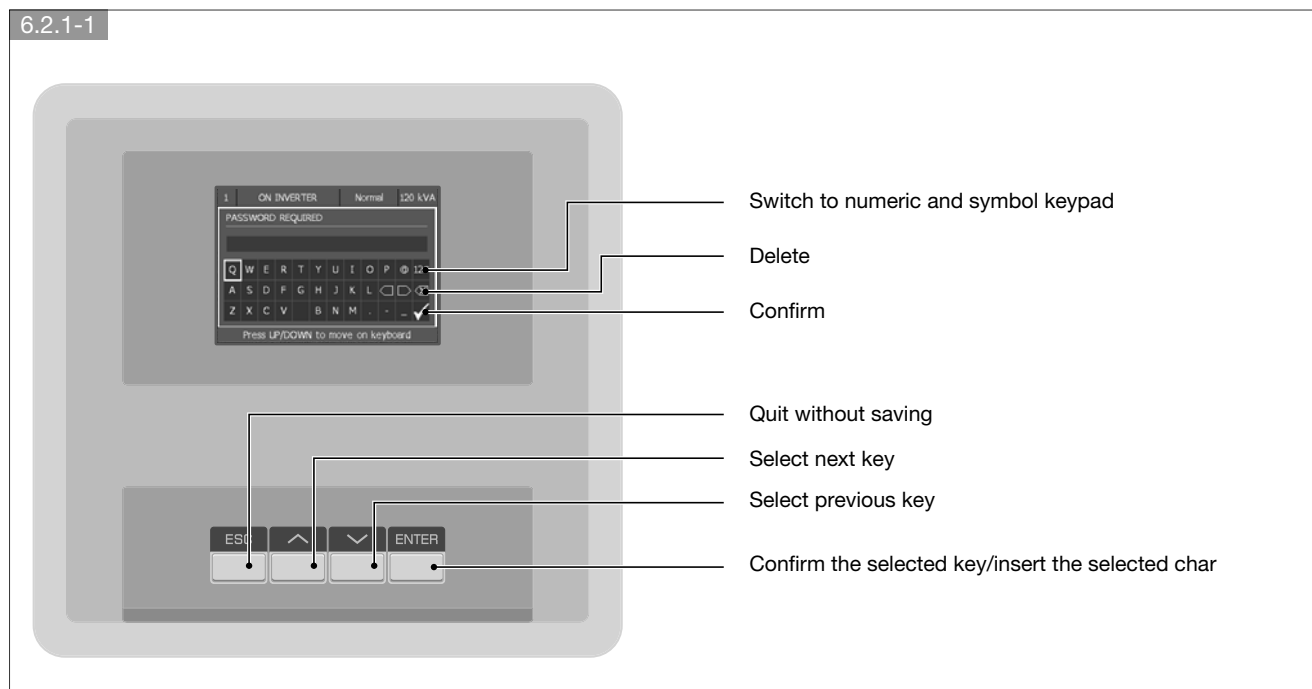
BYPASS MEASURES

Press ENTER to enter in selected menu

6.2.1. 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.



6.2.2. 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.

6.2.3. 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.

6.2.4. 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.

6.2.5. 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.

6.2.6. 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.

6.2.7. 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.

6.2.8. 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.

6.2.9. 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.

6.2.10. 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.

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.

6.2.11. 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**.

6.3. 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	

7. OPERATING PROCEDURES

This chapter defines the operating procedures to be followed to activate and manage the UPS.



For UPS units in parallel.
Carry out the procedures on all UPS units before going on to the next operation.
Each procedure should be carried out on all UPS units within 30 seconds.

7.1. START-UP IN NORMAL MODE

- Set switch **Q1** and/or the external batteries switches to position **1** (battery circuit closed).
- Apply voltage to the UPS.
- Set switch **Q2** to position **1** (input mains ON).
- Wait for the mimic panel to start up.
- Activate the **START PROCEDURE** from the **COMMANDS** menu on the mimic panel.
- Set disconnecting switch **Q6** to position **1** (continuous output).
- The load is now powered and protected by the UPS.

7.2. SHUTDOWN

Shutdown interrupts the power supply to the load and stops the UPS and the battery charger.

- Activate the **STOP PROCEDURE** from the **COMMANDS** menu on the mimic panel, wait approx. 2 minutes for shutdown (the controlled shutdown of any servers is managed via the shutdown software).
- Set disconnecting switch **Q6** to position **0** (inverter in output OFF).
- Set switch **Q1** and/or battery switches to position **0** (battery circuit open).
- Set switch **Q2** to position **0** (input mains OFF).

7.3. EXTENDED OUT OF SERVICE

In the event of an extended period of UPS inactivity, the batteries must be recharged every three months.

- Set switch **Q1** and/or the external battery switches to position **1** (battery circuit closed).
- Apply voltage to the UPS.
- Set switch **Q2** to position **1** (input mains ON).
- Set or keep disconnecting switch **Q6** to position **0** (inverter in output OFF).
- The battery must be charged for at least ten hours.
- After ten hours:
- Set switch **Q1** and/or battery switches to position **0** (battery circuit open).
- Set switch **Q2** to position **0** (input mains OFF).
- The UPS can be switched off.

7.4. SWITCHING ONTO MANUAL BYPASS

Switching onto manual 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.

- From the mimic panel set the **HIGH EFF. MODE** command from the **IMMEDIATE COMMANDS** menu.
- Wait for the command to be executed (bypass line on the M1 display on). If this does not take place, suspend the operation (the auxiliary mains is not suitable for the load).
- Set disconnecting switch **Q6** to position **2**.
- Set switch **Q1** and/or battery switches to position **0** (battery circuit open).
- Open the switch **Q2**.



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

7.5. RETURN TO NORMAL MODE

- Set switch **Q2** to position **1** (input mains ON).
- Set switch **Q1** and/or the external battery switches to position **1** (battery circuit closed).
- Activate the start procedure from the commands menu on the mimic panel.
- From the mimic panel set the **HIGH EFF. MODE** command from the **IMMEDIATE COMMANDS** menu.
- Check that alarm A06 is not present (if the alarm is present, resolve the problem before continuing).
- Set disconnecting switch **Q6** to position **1** (inverter in output ON).



If there is an external manual bypass, put the switch to position OFF.

- From the mimic panel set the **NORMAL MODE** command from the **IMMEDIATE COMMANDS** menu.

7.6. EMERGENCY SHUTDOWN (ESD)

Should it be necessary to interrupt the continuous power supply provided by the UPS quickly (emergency shutdown), this can be done by putting disconnecting switch **Q6** to position **0** (zero) or, where applicable, by activating the emergency button/switch connected to the ADC PCB.



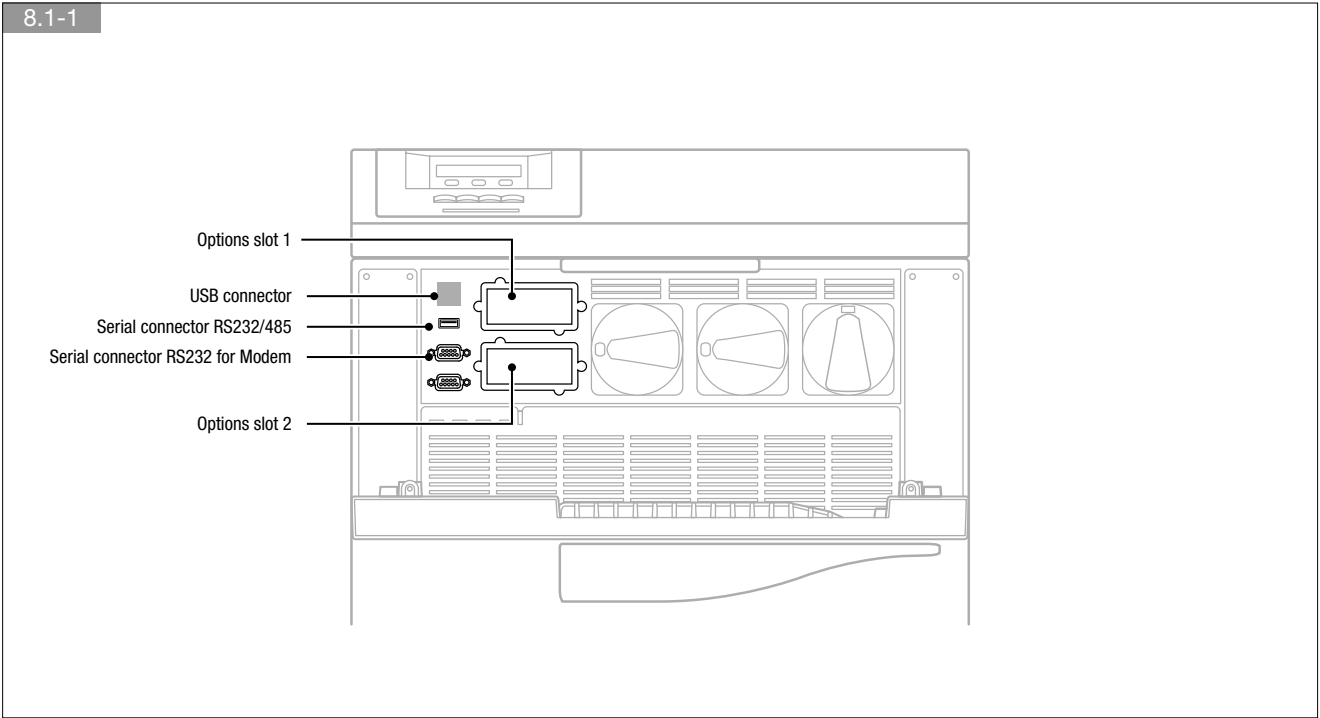
The UPS output can only be electrically disconnected by means of Q6.

If the UPS is operating from the manual bypass with mains present, shutdown using the emergency button does not interrupt the power supply to the load. In emergency conditions all the power supply sources upstream of the UPS must be disconnected.

8. CONNECTIVITY AND COMMUNICATION OPTIONS

8.1. MULTILEVEL COMMUNICATION

MASTERYS BC can manage a variety of serial, contact and Ethernet communication channels simultaneously. The various cards and signalling accessories are inserted in the two standard communication slots. This gives MASTERYS BC immediate interfacing and integration flexibility as soon as the unit is installed with no need for trained personnel.



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

See the operating procedures paragraph to access the detailed functions of the cards installed in the slots.

8.1-2

The diagram shows a 9-pin D-sub connector with pins numbered 1 through 9. Pins 1, 2, 3, 4, 5, 6, 7, 8, and 9 are arranged in two rows: 5, 4, 3, 2, 1 on top and 9, 8, 7, 6 on the bottom.

C	D
RS232/485 pinout	RS232 for Modem pinout
1 Not connected	1 Reserved
2 RX for RS232	2 RX for RS232
3 TX for RS232	3 TX for RS232
4 Data + for RS485	4 Reserved
5 GND	5 GND
6 Data – for RS485	6 Not connected
7 Reserved	7 RTS
8 Not connected	8 CTS
9 +12 V	9 +12 V

8.2. 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

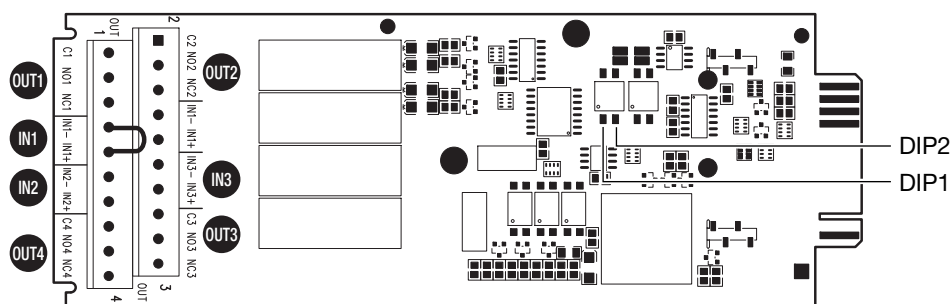
- Permitted Nominal current and voltage of NO or NC contacts: 2 A 250 Vac depending on the terminal used.
- Inputs are activated on loop closing.

• 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

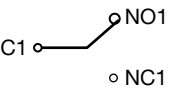
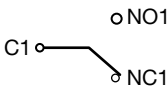
POWER SAFE configuration DIP1: ON - DIP2: OFF		
IN/OUT	Description	Filter level
OUT 1	General Alarm	2
OUT 2	Power safe plug 1	2
OUT 3	Power safe plug 2	2
OUT 4	Power safe plug 3	2
IN 1 ⁽¹⁾	ESD	1
IN 2	Supply from GenSet	1
IN 3 ⁽²⁾	Management of energy consumption	1

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	<p>'General Alarm' contact output</p> <p>No alarm</p>  <p>'General Alarm' active</p> 
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

8.3. 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.

8.4. 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.

8.5. NET VISION LAN/WEB INTERFACE

NET VISION is a communication and management interface to be installed in the UPS slot 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.



Please note that two Net Vision cards cannot be connected simultaneously.

8.6. PROFIBUS INTERFACE

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

8.7. 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.

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

To be installed in the UPS slot.

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

9. TROUBLESHOOTING

The alarm messages displayed enable immediate diagnosis.

Alarms are divided into two categories:

- alarms related to the UPS external circuits, (input mains, output mains, temperature and environment).
- alarms related to the UPS internal circuits. In this case, corrective actions will be carried out by the After Sales Department.

9.1. SYSTEM ALARMS

• A02: OUT OVERLOAD

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

Check that the load is well balanced on the three phases by checking the measurements on the display. If necessary 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: VAUX OUT OF TOL

The auxiliary mains supply exceeds the 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 subject to continuous variations (typical with power supplied from an incorrectly sized GE).

• A07: OVER TEMPERATURE

The technical plant temperature is higher than the maximum value recommended.

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

• A08: MAINTEN. BYPASS

The output disconnecting switch Q6 is in position 2 (maintenance bypass). The load is therefore powered directly by mains power supply.

• A17: IMPROPER USE

This alarm does not indicate a malfunction or failure of the UPS, but an 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: MAINS OUT OF TOL

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 that no protection devices upstream of the UPS have tripped.

Check the voltage applied and frequency values are in compliance with the values set on the mimic panel.

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

One of the ADC card inputs has been activated; check the status of the devices connected to this card.

• A61: PHASE ROT. 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.

9.2. UPS ALARMS

- **A01: BATTERY ALARM**

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

- **A18: OVERLOAD OFF INV**

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

- **A20: WRONG CONFIG.**

Error in the configuration parameters; contact the support service.

- **A30: OVERLOAD STOP**

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: SERVICE CHECK**

The equipment has to undergo regular checks 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.

- **A59: BATT.CIRC. OPEN**

Battery switch open.

- **A60: FAN FAILURE**

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

9.3. PREVENTIVE MAINTENANCE

Please note that specialist regular maintenance (annually) is recommended for the MASTERYS BC to provide optimum operating efficiency and avoid equipment downtime.

It is strongly advisable to give due consideration to any instructions to perform preventive maintenance displayed automatically with alarm message M29 (refer to paragraph 6.2.3.1).

All operations on the 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).

9.3.1. Batteries

The condition of the battery is fundamental to UPS operation.

Thanks to the Expert Battery System, the information relating to the battery status and conditions of use are processed in real time and recharging and discharging procedures are selected automatically in order to optimise battery life expectancy and offer maximum performance.

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

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



When replacing the batteries use the same type and configuration by placing them in appropriate containers 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.

9.3.2. Fans

The lifetime of the 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).



When necessary fans should be replaced as per specifications by SOCOMEC.

9.3.3. Capacitors

The equipment houses electrolytic capacitors (used in the rectifier and inverter section) and filtering capacitors (used in the output section), the lifetime of which 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.

Component status is however verified during preventive maintenance.

10. ELECTRICAL OPTIONS

10.1. INSULATION CONTROLLER

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

10.2. 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.

10.3. EXTERNAL MAINTENANCE BYPASS WITH BACKFEED PROTECTION

This device will electrically exclude and isolate the UPS (e.g. for maintenance operations) without interrupting the power supplied to the load. 3-pole contactors are used for backfeed protection.

Note: an additional option is available to bring the manual bypass signal back to the UPS.

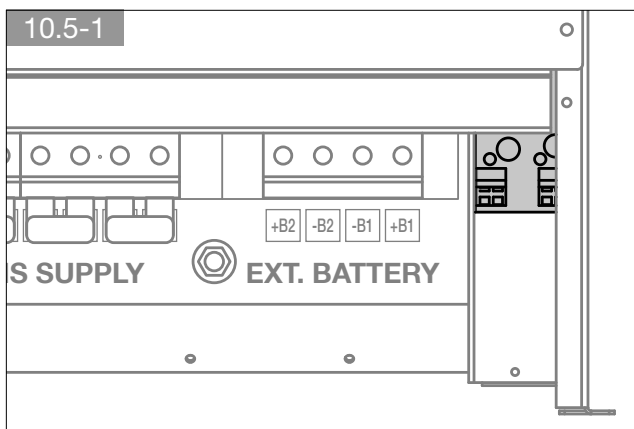
10.4. ACS PCB

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

10.5. EXTERNAL BACKFEED PROTECTION

External devices can be installed to protect against the back-feed of dangerous currents, both on the **MAINS SUPPLY** and on the **AUX MAINS SUPPLY**. These devices are controlled by the **BKF PCB** installed in the position shown in figure 10.5-1.

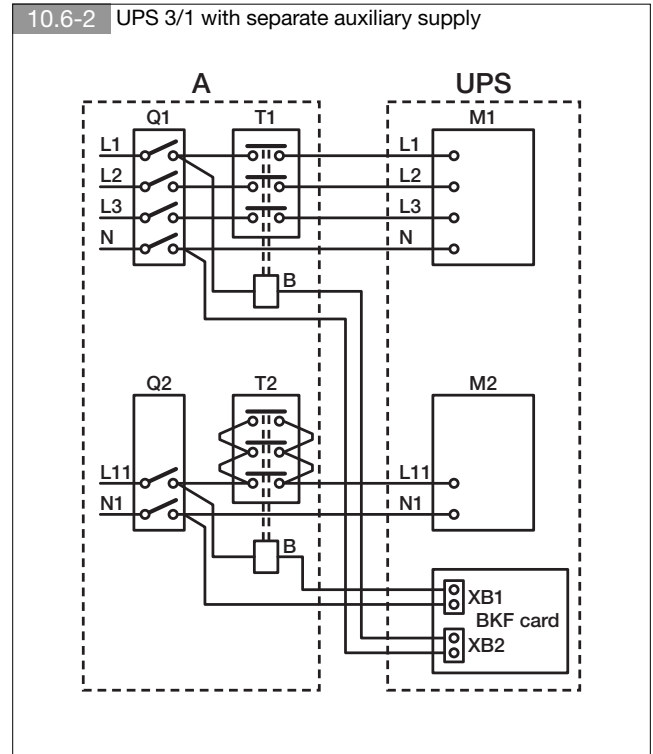
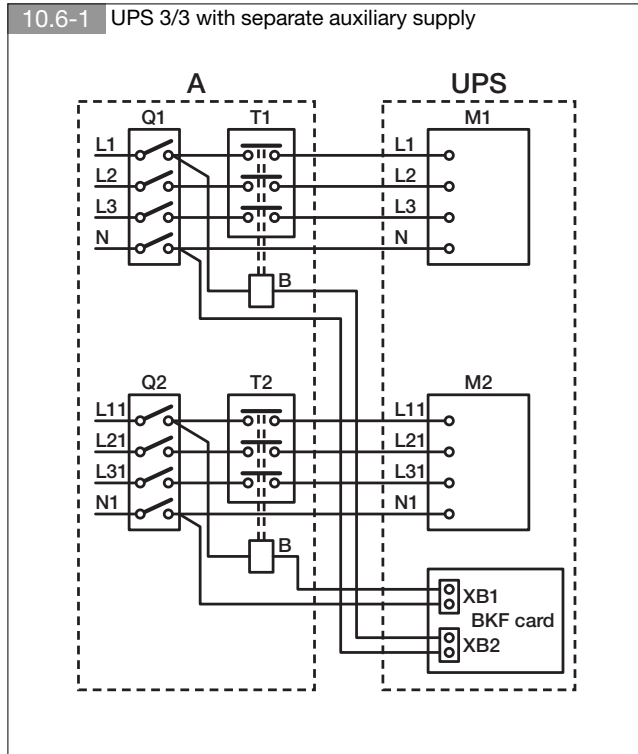
Refer to the following paragraphs for details on electrical connections and on activating the chosen protection.



10.6. PROTECTION ON THE SEPARATE AUXILIARY MAINS

Activating UPS protection on the mimic panel: access the **UPS SETTING** menu on the mimic panel (see the **UPS SETTING** menu under the **SERVICE** menu section of the manual) and set the **SET BACKFEED** parameter to **1.BYPASS**.

Cable and trunk schematic



Key

A	Distribution panel
B	Remote coil switch
L1-L2-L3-N	Input power source
L11-L21-L31-N1	Backup power source
M1	Input power terminal board
M2	Backup power terminal board
T1	Remote switch ¹
T2	Remote switch ¹
Q1	Input power switch
Q2	Backup power switch
XB1	Connector on BKF PCB
XB2	Connector on BKF PCB

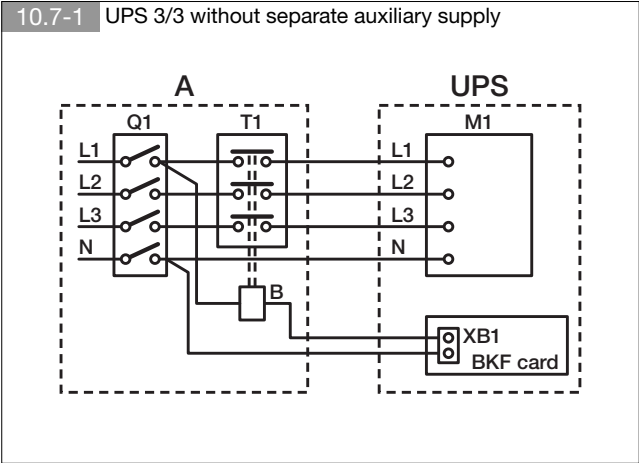
¹Remote switches - rated current

Model	T1	T2
15 3/1	32 A AC1	45 A AC1
15 3/3	32 A AC1	90 A AC1
20 3/1	45 A AC1	60 A AC1
20 3/3	45 A AC1	45 A AC1
30 3/3	60 A AC1	60 A AC1
40 3/3	90 A AC1	90 A AC1

10.7. PROTECTION ON A UPS WITHOUT AUXILIARY MAINS SUPPLY

Activating UPS protection on the mimic panel: access the **UPS SETTING** menu on the mimic panel (see the **UPS SETTING** menu under the **SERVICE** menu section of the manual) and set the **SET BACKFEED** parameter to **3.BYPASS-INPUT Common**.

Cable and trunk schematic



Remote switches - rated current	
Model	T1
15 3/1	32 A AC1
15 3/3	32 A AC1
20 3/1	45 A AC1
20 3/3	45 A AC1
30 3/3	60 A AC1
40 3/3	90 A AC1

Key

- A Distribution panel
- B Remote coil switch
- L1-L2-L3-N Input power source
- M1 Input power terminal board
- Q1 Input power switch
- T1 Remote switch¹
- XB1 Connector on BKF PCB

Note: The neutral is not disconnected as, even in the event of a single fault on the UPS, it never has high potential when the mains and/or auxiliary power supplies are disconnected upstream. This is to prevent transformation of the power source to the UPS every time there is a power failure.

Should the Neutral potential be very high due to certain error conditions or due to installations downstream (e.g. ground fault not detected and protected, high dispersion of a phase, or the IT system), it will be necessary to install either devices that disconnect the Neutral or alternatively a system that detects, signals and protects against high neutral/ground potential which could lead to UPS failure.

11. TECHNICAL SPECIFICATIONS

Models			15	20	30	40
Input/Output phases			3/1 and 3/3	3/1 and 3/3	3/3	3/3
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 (three phase)			
THDI			< 3%			
Electrical specifications - External battery						
Battery voltage range		V bat	from +/-175 ³ up to +/-360 ⁴ Vdc			
Electrical specifications - Output						
Output voltage (three phase + neutral)		V	230 single phase (selectable: 208/220/230/240 V) ±1% ¹ 400 three phase (selectable 360/380/400/415 V) ±1% ¹			
Frequency		Hz	50-60 ±2% (from 1% to 8% if generator is used)			
Automatic bypass			nominal output voltage ±15% (from 10% to 20% selectable if generator is used)			
Nominal power		kW	13,5	18	27	36
Overload (@ 25 °C; Vin > 380; Vbat > 216) ²	• 10 minutes • 1 minute	kW	16,875 20,25	22,5 27	33,75 40,5	45 54
Crest factor			≥ 2.7			
Voltage distortion			1% with linear load			
Environment						
Operating temperature		°C	0÷35 (15÷25 recommended for longer battery life)			
Storage temperature		°C	-5÷45			
Relative humidity		%	0÷95 condensation-free			
Max. altitude		m	1.000 without derating; 3.000 max			
Acoustic noise		dBA	< 52	< 52	< 55	< 55
Required cooling capacity		m³/h	280	280	465	465
Dissipated power max		W	883	1211	1706	2142
Dissipated power max		BTU/h	3016	4135	5823	7250
Standards						
Safety			EN 62040-1/A1, EN 60950-1			
Type and performance			EN 62040-3 (VFI-SS-111)			
EMC			EN 62040-2 (Category C2)			
Product certification			CE - TÜV-SÜD			
Protection level			IP20, IP21 on request			
Mechanical characteristics with standard batteries						
Models	T	Dimensions	mm	444 x 795 x 1400		
		Weight	kg	390÷540		
	M	Dimensions	mm	444 x 795 x 1000		
		Weight	kg	230÷315		
	S	Dimensions	mm	444 x 795 x 800		
		Weight	kg	190÷200		

1. 360 V with Pout = 90% Pn.

2. Initial Condition Pout ≤ 80% Pn

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

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

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