MASTERYS BC

60-80 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 şi 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

TÜV SÜD
Production monitored
Safety tested

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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.

SUMMARY

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).
- SOCOMEC retains the full and exclusive ownership rights over this document. Only a personal right to use the document for the application indicated by SOCOMEC is granted to the recipient of the document. The reproduction, modification, distribution of this document either partially or wholly, and in any way, is strictly prohibited except upon Socomec's express prior written consent.
- This document is not a specification. SOCOMEC reserves the right to make any changes to 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 CE
- 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 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.

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 to meet the required level 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 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.

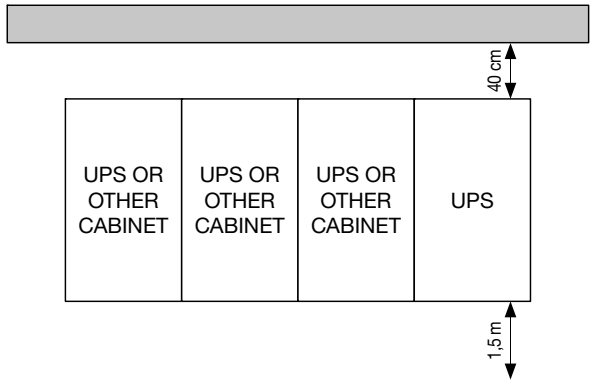
CAUTION IF DAMAGED
NON-SPILLABLE BATTERIES
If packaging is crushed, ripped or open such that the inner contents are revealed, the equipment should be kept in an isolated area and inspected by a qualified person. If the packaging cannot be shipped the contents should be collected promptly, kept apart, 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.

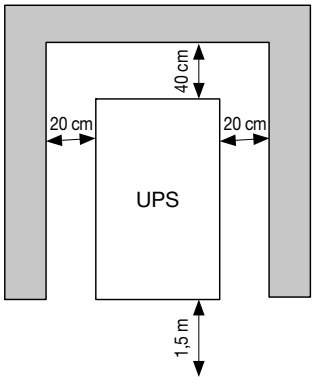
2.2. ENVIRONMENTAL REQUIREMENTS

- 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 2.2-1).
- 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 2.2-2).
- If it is not possible to leave sufficient space at the front, adequate access must be ensured from both sides.

2.2-1



2.2-2



2.3. 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)	
60 3/3	125	160	125	160	0.5	35	50	50	95	200 aR
80 3/3	160	200	160	200	0.5	50	50	70	95	200 aR

1. *Magneto-thermal switch recommended: four poles with intervention threshold ≥10 In (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 selective type differentials. 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.*
6. *Use 2500 aR for a battery cabinet with capacity exceeding 90 A.*

This unit has been designed for connection to an ordinary AC power supply, i.e. with transient voltage in overvoltage II category. Should it be necessary to connect the UPS to a higher overvoltage category (e.g. at the beginning of the installation, or to primary distribution circuits), or should the UPS risk being exposed to higher transient overvoltages, adequate external protection devices must be installed.

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.

2.3.1. 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 as close as possible to the UPS. 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.
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 that could lead to UPS failure.

NOTE

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

2.4. INSTALLATION PROCEDURES AND INSTRUCTIONS

The procedure below should be followed closely for correct installation:

2.4-1 Set switches **Q2/Q4, Q3, Q5** to position **0**, open the switches of any external battery cabinets.

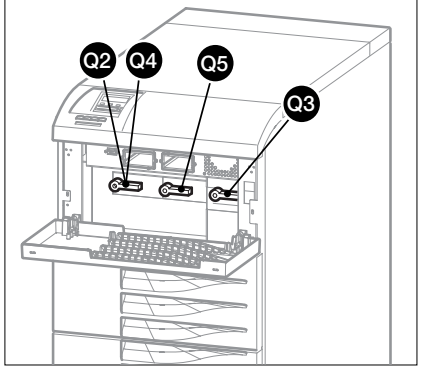
Switch off the UPS, remove the power, open the switches of any external battery cabinets, isolate the system and wait for 5 minutes before working on the terminal board or any internal UPS parts.

2.4-2 Open the terminal board protection panel at the back of the UPS by removing the four fastening screws **A**.

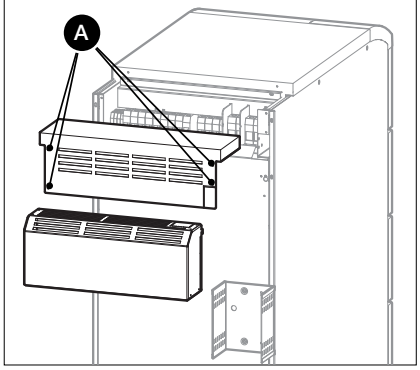
The terminal board shown is the most complete version including all options. On basic models or models with internal batteries the terminal board has fewer terminals. Refer to the names of each terminal to identify it during connection. After connection secure the cables with bands C (figure 2.4-3) to couplings B as shown in the figure 2.4-6.

2.4-3 Connect the ground lead to the terminal with the corresponding symbol. Connect the input cables to the terminals labelled MAINS SUPPLY **L1, L2, L3, N** (observing the phase cycle direction).

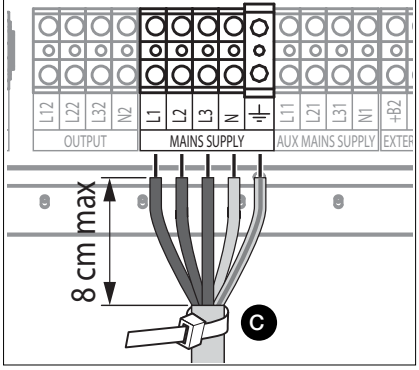
2.4-1



2.4-2



2.4-3



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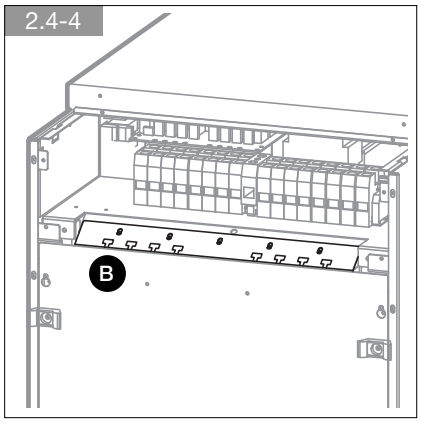
2.4-5 Connect the cables of the separate auxiliary power supply (if present) to the terminals labelled AUX MAINS SUPPLY **L11, L21, L31, N1** (observing the phase cycle direction).

2.4-6 Connect the output cables to the terminals labelled OUTPUT **L12, L22, L32, N2**.

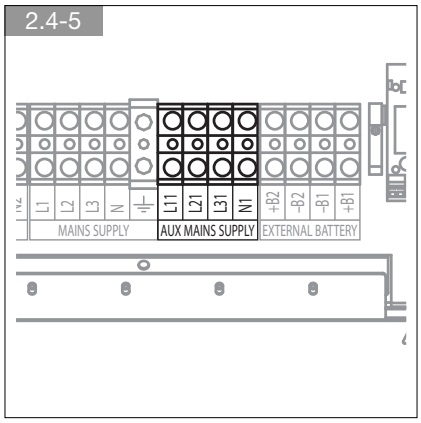
2.4-7 Connect the external battery cables (if present) to the terminals labelled EXTERNAL BATTERY **+B2, -B2, -B1, +B1** (refer to paragraph 2.9).

2.4-8 Guide any control cables from the front (RS232, signalling relay contacts, etc.) into the appropriate side cable run **A**.

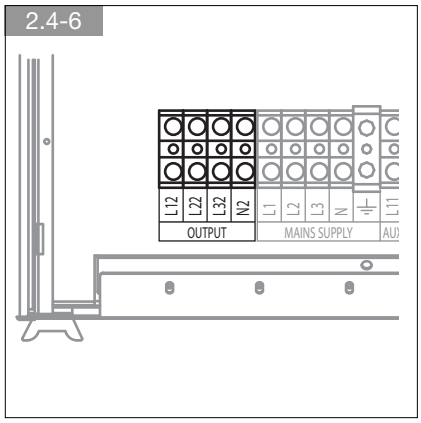
2.4-4



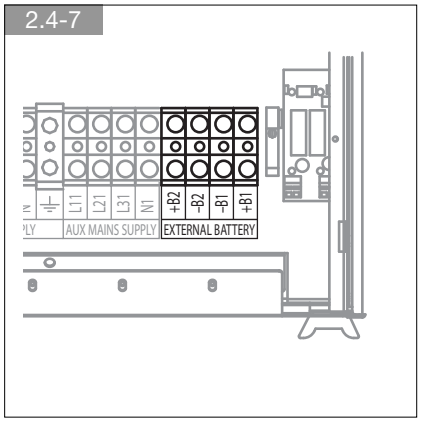
2.4-5



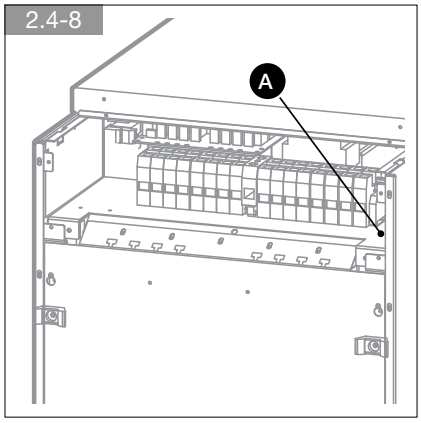
2.4-6



2.4-7



2.4-8



2.4-9 Remove the pre-cut element **C** and curved elements **B** to feed the cables through.

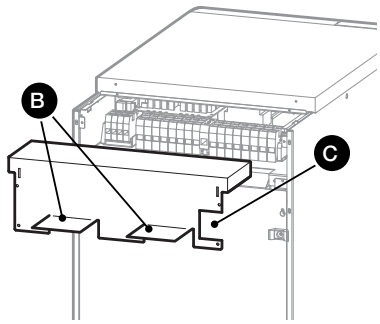
Secure the cables to the couplings D located on the rack as shown in picture 2.4-10, ensuring the air vents are not obstructed in any way.

2.4-11 Once cabling has been completed secure the terminal board cover with the four screws **A**.

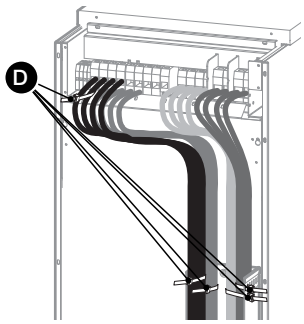
Once cabling has been carried out secure the UPS with the fixing feet E as shown in figure 2.4-12.

2.4-13 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.

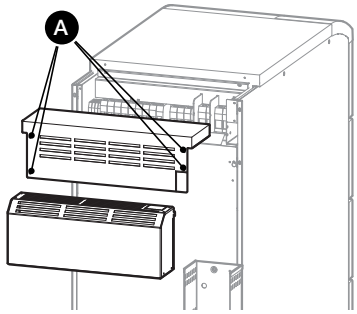
2.4-9



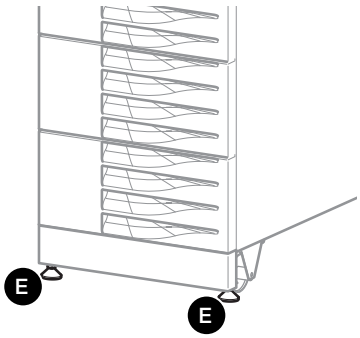
2.4-10



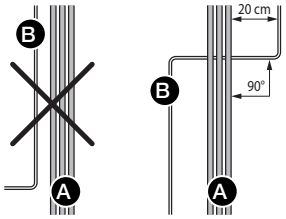
2.4-11



2.4-12



2.4-13



A. power cables
B. control cables

2.5. 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 (see paragraph 7.2). This automatically extends the voltage and frequency value range when power is supplied by the generator set.

2.6. EXTERNAL ESD CONNECTION

A remote emergency shutdown system (ESD) can be installed by means of the optional ADC PCB; see paragraph 7.2. Connect a normally closed zero-potential contact to terminals **IN1+** and **IN1-** of the ADC PCB.

2.7. UPS PARALLEL CONFIGURATION

2.7.1. General

Parallel connection enhances UPS system reliability, performance and power.

All MASTERYS BC 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 chapters 1 and 2 also apply.

2.7.2. Installation

UPS units operating in parallel are interconnected using control cables **B** (fig. 2.7.3-1) and are configured differently depending on the position they are assigned.

For this reason the units have a position label **C** (Fig. 2.8-1):

- 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 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.

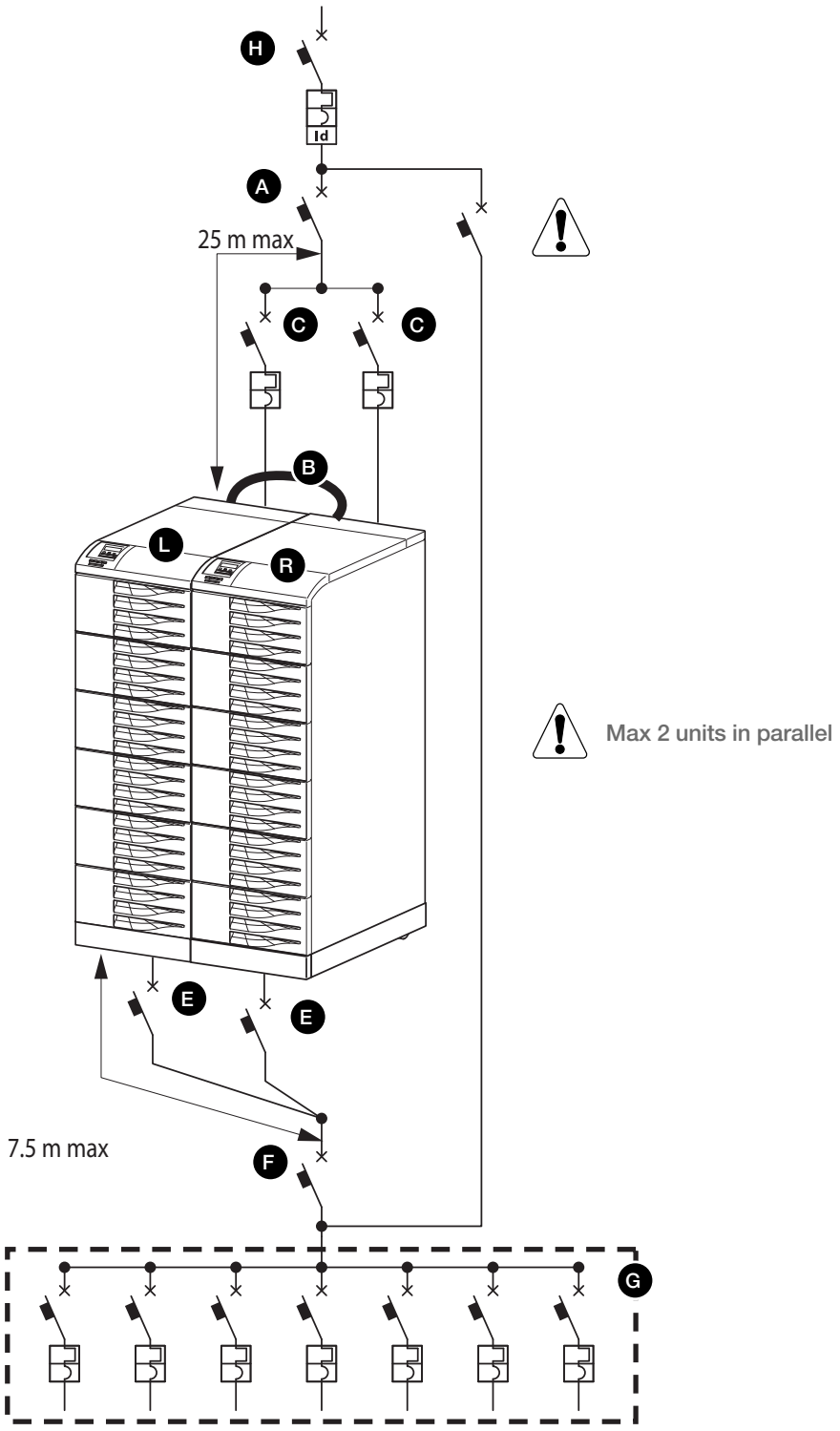
2.7.3. Power connections

- The power supply to each unit must be protected as indicated in the table in paragraph 2.3.
- The cross section and length of the input and output cables must be identical for all the 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 (Fig. 2.7.3-1).
- The cables from the UPS module to switch **F** must be of the same length (max. 7.5 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 (see fig. 2.7.3-1, 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.

2.7.3-1 Recommended parallel configuration



Key

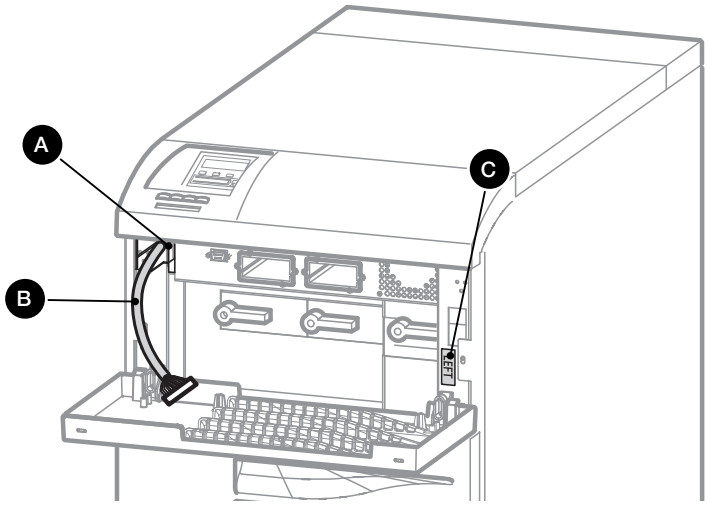
- **A** System input switch
- **B** Parallel bus cable
- **C** Single UPS magneto-thermal switch (if a separate auxiliary power source is used, add a magneto-thermal switch for each UPS)
- **D** Ext. bypass magneto-thermal switch
- **E**(1) Output switch (connect signal status to the parallel board)
- **F**(1) System shutdown switch
- **G** Distribution
- **H** Main differential magneto-thermal switch

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

2.8. 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 standard parallel setups 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 2.8-1, leaving the connector(s) unconnected (in the central UPS one incoming and one outgoing control cable must be used).

2.8-1



Key
A Control cable run
B Parallel bus cable; leave approx. 20cm cable length at the exit of the cable run
C Label for unit positioning

2.9. EXTERNAL BATTERY CABINET CONNECTION

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 (figure 2.9-1).
- Connect the cables between the UPS terminals and the battery cabinet terminals, strictly observing the polarity of each individual string (figure 2.9-1) and the cross-sections indicated in table 2.3.

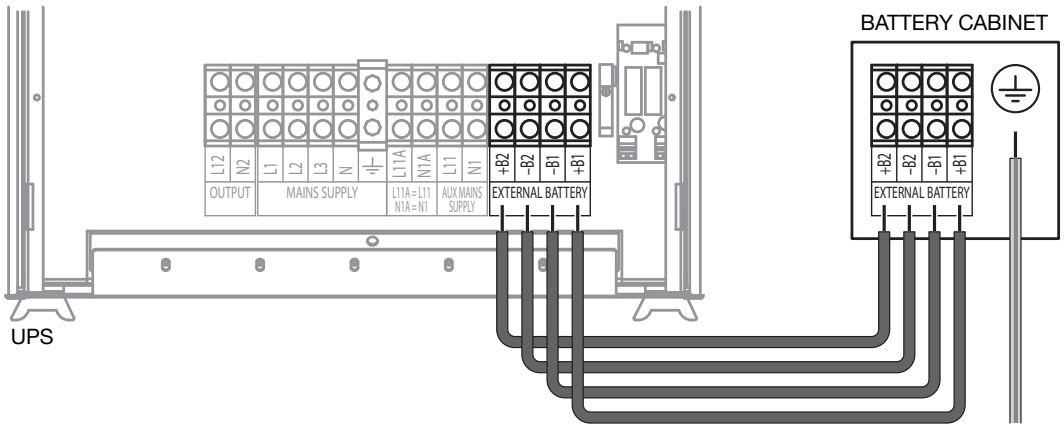
Use double insulated cables or the cables supplied with the unit to connect the UPS to the battery cabinet.

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

- Replace the terminal board protection.

If using cabinets not supplied by the UPS manufacturers, it is the installer's responsibility to check electrical compatibility and the 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.

2.9-1



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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 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 (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.

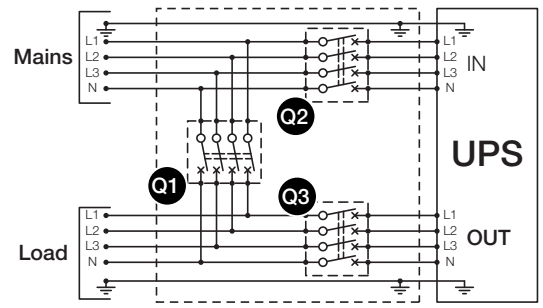
If the UPS has an input for the auxiliary power supply the **Q2** switch must be connected to this input and the main power supply input must be disconnected on the control panel.

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.

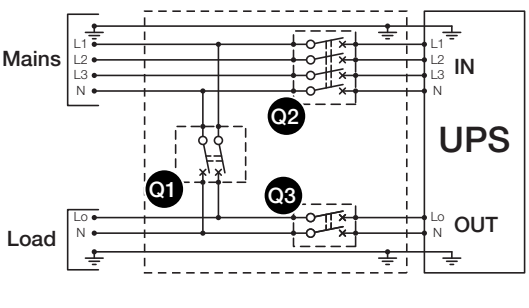
This operating mode can be selected for maintenance to be carried out on the system so that the necessary actions can be performed by service personnel without having to disconnect the power supply to the load.

Bypass panel connection diagram

3.4-1 3-phase input/3-phase output for UPS 3/3



3.4-2 3-phase input/1-phase output for UPS 3/1



Key

Q1 Bypass switch

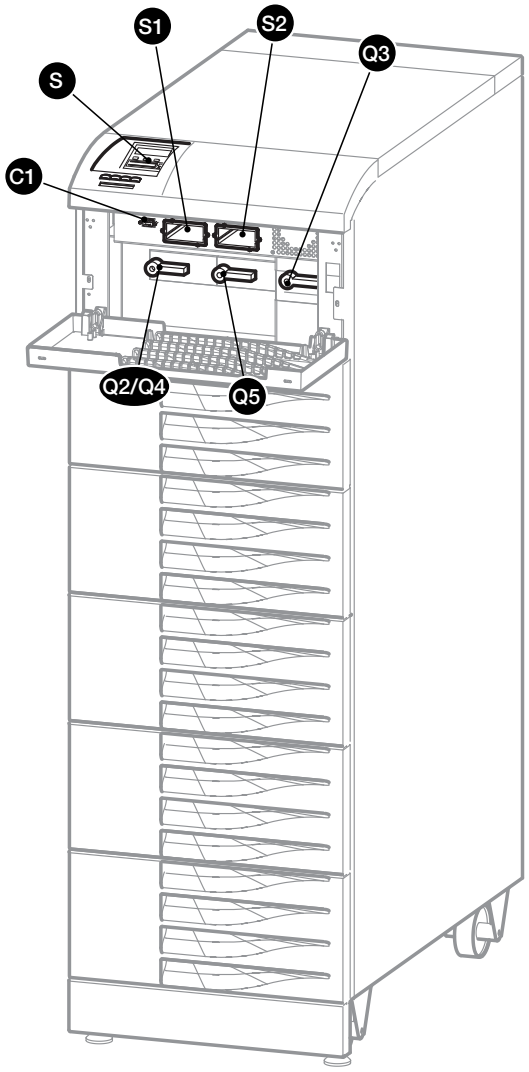
Q2 Mains power switch

Q3 Output switch

4. ACCESS TO CONTROLS

4.1. IDENTIFYING SWITCHES AND INTERFACES

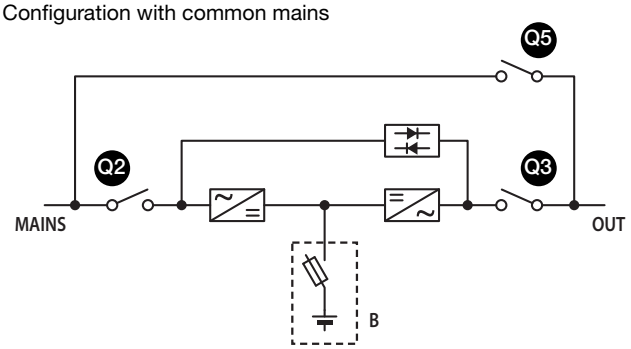
4.1-1



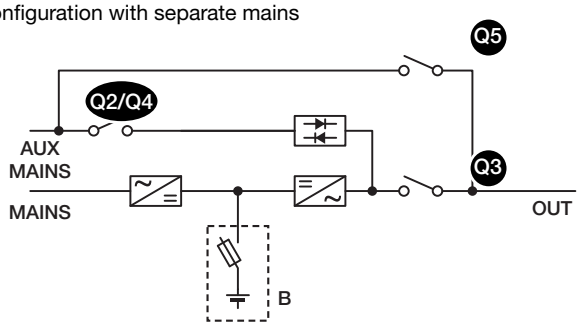
Key

C1 Serial connector RS232/485
S Mimic panel
S1 Options slot 1
S2 Options slot 2
Q2 Input switch
Q3 Output inverter switch
Q4 Auxiliary mains Input switch
Q5 Output maintenance bypass switch

Configuration with common mains



Configuration with separate mains



ENGLISH

4.2. SWITCH FUNCTIONS FOR THE 60-80 kVA RANGE

With common mains input:

• Input switch Q2:

- The input switch provides the primary power supply to the UPS.
- In normal operating conditions this should be in position **1 ON**.
- The position **0 OFF** will cause the batteries to discharge.

With separate mains inputs:

• Input switch Q4:

- The switch provides the power supply to the automatic bypass line.
- In normal operating conditions this should be in position **1 ON**.

WARNING!
in this configuration the mains power supply to the rectifier cannot be isolated inside the UPS, only via external protection devices.

• Output switches Q3 and Q5:

- These are used to manage UPS output.
  Q3 connects the UPS output to the inverter (continuous power supply). **Q5** connects the output directly to the auxiliary mains input (manual bypass).
- Positions **Q3 closed (1)** and **Q5 open (0)**: this is the position for normal operation of the UPS for a continuous power supply to the load.
- Position MANUAL BYPASS **Q3 open (0)** and **Q5 closed (1)**: this position should only be selected for standard or special maintenance operations (manual bypass); the load is connected directly to the auxiliary mains.
  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.
  Refer to the relevant procedure described below on how to activate the bypass; see chapter 6.
- Positions OFF **Q3 open (0)** and **Q5 closed (0)**: 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).

5. MIMIC PANEL

5.1. BASIC MIMIC PANEL

The LCD mimic panel (figure 5.1-1) located on the upper part of the UPS provides all the information on operating status, electrical measurements, access to controls and configuration parameters.

The information is grouped into four sections:

A. LEDs that identify the subsets and the energy flow;

B. Multicoloured light bar that identifies the condition of the power supply to the load;

C. Alphanumeric information that uses a menu layout to provide details on any alarms that may occur and on the measurements, controls and parameters.

D. Use of the buttons:

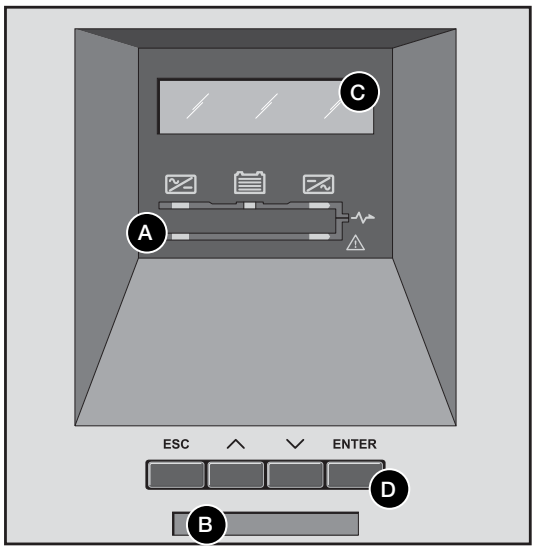
· **ESC**: exits from the current menu/parameter/action;

· ∧ : scrolls the available menus/values upwards. It increases the value each time it is pressed when changing a parameter;

· ∨ : scrolls the available menus/values downwards. It decreases the value each time it is pressed when changing a parameter;

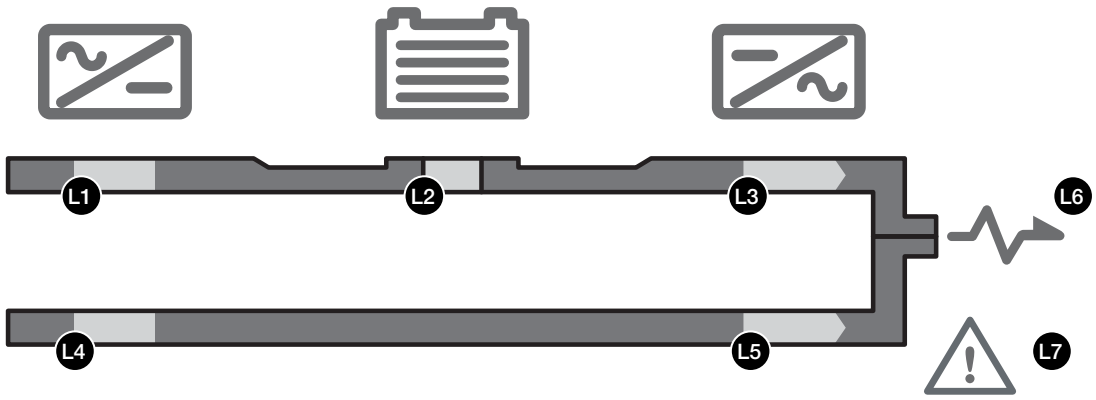
· **ENTER**: enters the menu displayed on the screen to confirm the choice/changes made.

5.1-1



5.1.1. Meaning of LEDs

5.1.1-1



Meaning of LEDs							
LED	L1	L2	L3	L4	L5	L6	L7
COLOUR	GREEN	YELLOW	GREEN	GREEN	YELLOW	GREEN	RED
ON	Rectifier and Battery charger on	Operation from battery-battery test	Inverter on	Auxiliary input mains present and Ok	Output on automatic bypass mode	Output powered	Activation code alarm-Maintenance
FLASHING	Rectifier alarm	Battery section alarm	Inverter failure or fault	Auxiliary input mains out of tolerance	General bypass alarm	Bypass general alarm Inverter failure or fault	General alarm
OFF	No input mains present	Battery charged	Inverter off or power supply from automatic bypass	Auxiliary input mains not present	Power supply from inverter	Load not powered	No alarms

5.1.2. Meaning of light bar status

The light bar **B** (figure 5.1-1) provides immediate indication of the condition of the power supply to the load:

- Red: power supply not present or shutdown imminent.
- Yellow: power supply present but unstable or temporary.
- Green: power supply stable and regular.

Meaning of light bar status	
Colour	**Condition displayed**
RED flashing	Imminent shutdown alarm (the load will be disconnected in a few minutes)
RED	Load not powered or battery circuit open
YELLOW flashing	Alarm requesting standard maintenance after over 25,000-30,000 hours of operation according to conditions of use (type of load, temperature), (L7 flashing and alarm A44) UPS on standby
YELLOW	Load on battery or battery discharging if LED 2 is on continuously
YELLOW	On automatic bypass if LED 5 is on continuously
YELLOW	End of first maintenance period (10,000 hours) UPS in maintenance mode
GREEN flashing	Battery Test in progress
GREEN	Load powered by the inverter or in high efficiency mode

5.1.3. Display menu

This paragraph describes the menus available on the mimic panel and their functions.
The displays are organised into menus and submenus as shown in the diagram:

- to access a menu press the **ENTER** key.
- To return to the higher level press **ESC** key.
- Use the ∧ and ∨ keys to scroll the information available at a particular level.

FIRST LEVEL	SECOND LEVEL	THIRD LEVEL
MAIN	ALARMS	
	MEASUREMENTS	
	COMMANDS	IMMEDIATE COMMANDS
		EXTENDED COMMANDS
	PARAMETERS	UPS CURRENT DATA
	SERVICE	UPS SETTING
		CIM ALARMS CODE
		WARRANTY CODE

5.1.4. Alarms menu

This menu displays all alarms that are active at the time of access. The alarms menu is activated automatically when an alarm condition occurs.

ALARMS menu		
Code	**Mimic panel message**	**Description**
A00	GENERAL ALARM	At least one alarm is present
A01	BATTERY ALARM	Battery circuit failure or faulty operation
A02	OUT OVERLOAD	Power required in output over the limits
A06	VAUX OUT OF TOL	The voltage or frequency limits accepted by the bypass have been exceeded
A07	OVER TEMPERATURE	Temperature excessive or ventilation problems
A08	MAINTEN. BYPASS	Active bypass procedure
A17	IMPROPER USE	Improper conditions of use verified (load, mains, temperature)
A18	OVERLOAD OFF INV	Inverter shutdown due to overload
A20	WRONG CONFIG.	Error in the configuration parameters (e.g. different between several UPS units in parallel)
A22	MAINS OUT OF TOL	The voltage or frequency limits accepted by the rectifier have been exceeded
A23	RECTIFIER ALARM	Rectifier fault
A25	INVERTER ALARM	Inverter fault
A26	BATT CHARGER ALM	Battery charger fault
A29	BYPASS ALARM	Bypass fault
A30	OVERLOAD STOP	The duration of the overload has inhibited the bypass
A38	EXTERNAL ALARM1	Signalling from ADC input
A39	EXTERNAL ALARM2	Signalling from ADC input
A40	EXTERNAL ALARM3	Signalling from ADC input
A41	EXTERNAL ALARM4	Signalling from ADC input
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.
A43	REDOUNDANCY LOST	The power required by the load no longer allows the preset redundancy N+x (signalling for UPS units in parallel) to be maintained
A44	SERVICE CHECK	Notification that the routine service check is overdue
A49	BATT. DISCHARGED	The energy available in the battery has been depleted
A51	OPT. BOARD ALM	Fault in the optional cards in the slots
A58	ESD ACTIVATED	The remote emergency shutdown command has been activated
A59	BATT.CIRC. OPEN	The battery switch is open
A60	FAN FAILURE	Fans faulty or blocked
A61	PHASE ROT. FAULT	Wrong phase cycle direction

5.1.5. Measurements menu

This menu is used to display all measurements relating to UPS input, output, and the battery. For models with single phase input or output, the voltage and current displays are adjusted automatically.

MEASUREMENTS menu				
Type of measurements	**Value**	**Value**	**Value**	**Note**
OUTPUT VOLTAGE	___ V	___ V	___ V	Output voltage
OUTPUT LOAD	__ %	__ %	__ %	Output load percentage
OUT ACTIVE PWR	__._ kW			Output active power
OUTPUT FREQNCY	__._ Hz			Output frequency
AUX VOLTAGE	___ V	___ V	___ V	Auxiliary mains voltage
AUX FREQUENCY	__._ Hz			Auxiliary mains frequency
INPUT VOLTAGE	___ V	___ V	___ V	Input mains voltage
INPUT FREQUENCY	__._ Hz			Input mains frequency
BATTERY VOLTAGE	B+___ V	B+___ V		Battery voltage
CAPACITY	__ %			Battery capacity percentage during charging
BACKUP INFO	T___MIN			Backup time during battery discharge
INTERNAL TEMP.	__ °C			Internal temperature

5.1.6. Commands menu

This is used to send immediate commands for start-up/shutdown/reset alarms to the UPS and to select the operating mode. Commands can also be sent for diagnostic purposes by means of the extended commands menu (if enabled in the configurations menu). The command is activated by selecting it with the ∧ and ∨ keys, press **ENTER**, confirm **YES** or **NO**, then press **ENTER**.

IMMEDIATE COMMANDS menu	
Command	**Description**
START PROCEDURE	UPS start-up command
STOP PROCEDURE	UPS shutdown command
HIGH EFF. MODE	High efficiency mode: activates the energy saving feature
NORMAL MODE	Activates normal double conversion operation
ALARMS RESET	Resets all the alarms
LEDS TEST	Performs test on mimic panel LEDs

EXTENDED COMMANDS menu	
Command	**Description**
BATTERY TEST	Activates the battery test to check battery efficiency
BATT.COMMISSION	Activates forming charging for the battery
CHECK-UP DISAB.	Disables the regular maintenance message

5.1.7. Parameters menu

Displays the UPS parameters set.

UPS CURRENT DATA menu	
Message	**Description**
MASTERYS 3/3 30 KVA SN. 0000000000	Displays the size, input and output phase configuration and UPS serial number
UC FW. REVISION RV 000 CKS: 0000	Identifies the microprocessor software release
DSP FW. REVISION RV 000 CKS: 0000	Identifies DSP software release

5.1.8. Service menu

This is used to change the configuration parameters, insert the warranty activation code and display the service code.

5.1.9. UPS SETTINGS menu

This is used to change the configuration parameters. Access is via the password **MAST** which is keyed in by using the ∧ and ∨ keys and **ENTER** to go on to the next letter.

UPS SETTINGS menu		
Parameter	**Description**	**Allowed values**
SET LANGUAGE	Sets the required language	English, Français, Italiano, Deutsch, Español
SET OUTPUT VOLTAGE	Sets the required output voltage value	208/220/230/240 V
SET OUTPUT FREQUENCY	Sets the required output frequency value	50/60 Hz
SET MODE CONVERTER	Sets whether or not the UPS has to operate as a frequency converter **WARNING! Set only on UPS with mains power (MAINS) and auxiliary mains (AUX MAINS) separated and with the auxiliary mains (AUX MAINS) disconnected! Do not set on UPS with common mains lines as it could damage the load!**	YES/NO
SET MODE AUTORESTART	Sets whether or not the UPS has to restart automatically after shutdown due to minimum battery	YES/NO
SET BATTERY AVAILABLE	Set if battery is present	YES/NO
if YES:		
- SET BATTERY TYPE	Selects the type of batteries used	Sealed
- SET BATTERY CAPACITY	Sets the battery capacity in Ah	9.5 – 1000 Ah
- SET CHARGER TYPE	Selects the type of recharge required	Auto, Float, int.
- SET BATTERY ELEMENTS	Set the number of battery elements	120-132
- SET BATT_TEST PERIOD	Sets the frequency rate of the battery test in days	0, 30, 60, 90, 120,150,180 (zero do not perform the test) in days
SET BACKFEED	Sets the type of backfeed protection	Disable, 2.ByPass-Input alone, 3.ByPass-Input common
SERIAL LINK	Inserts the serial communication parameters: - Serial Link Baud Rate - Serial Link Parity - Serial Link Bit Number - Serial Link Stop Bits When the data is confirmed, the serial connection automatically changes the configuration without having to switch off the UPS.	 1200/2400/4800/9600/14.4 odd/even/none 8-9 0-1
JBUS SETTING SLAVE NR.	Sets the mimic panel jbus node When the data is confirmed, the serial connection automatically changes the configuration without having to switch off the UPS.	1/32
DATE SETUP	Sets the date	DD/MM/YY
TIME SETUP	Sets the time	HH:MM
SYN EXT CMDS ENABLED	Enables/Disables the mimic panel extended commands	YES/NO
REMOTE CMDS ENABLED	Enables the transmission of commands from external systems	YES/NO
SET BUZZER ENABLED	Enables/Disables the buzzer	YES/NO

CIM Alarms Code menu

This displays the service code to be sent to the support service to make an accurate and rapid diagnosis of the possible failure.

In the event of a fault, select the menu **SERVICE > CIM ALARMS CODE** and inform the support centre of the code displayed.

ALARMS CODE 1/2 1) 0000 2) 0000

ALARMS CODE 2/2 3) 0000 4) 0000

Warranty Code menu

During equipment commissioning, a warranty activation code, comprising four characters, is required to complete the start-up procedure.

5.3 WARRANTY CODE COMMISSIONING

The activation code is provided directly by the reference Support Centre upon communication of the equipment serial number which is displayed in the next message by pressing **ENTER**.

WARRANTY CODE SN: 0000000000

Inserting the code does not limit the availability of equipment functionality.

When the Support Centre is contacted for the activation code, detailed information can be obtained on the UPS functions available and regular routine maintenance programmes.

Once the code is obtained, enter it by pressing **ENTER** to activate the entry (two asterisks will appear). Select the first character with the ∧ and ∨ keys and confirm with **ENTER** to accept the character. Then move on to the next character. Pressing the **ENTER** key after selecting the fourth character activates the code.

WARRANTY CODE CODE - - - -

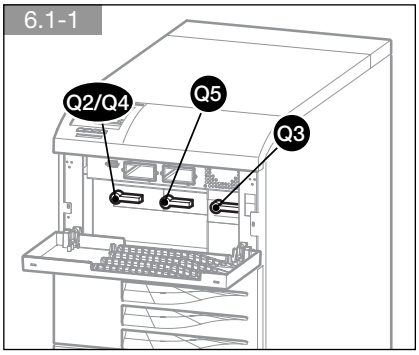
An error message is displayed if the code is incorrect. Check that the code displayed corresponds to the code provided by the Support Centre and repeat the procedure.

6. OPERATING PROCEDURES

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

For UPSs in parallel:
Carry out the procedures on all the UPSs before going on to the next operation.
Each procedure should be carried out on all the UPSs within 30 seconds.
The mimic panel operations are carried out on the concentrator.

6.1.1. Start-up in normal mode



- Set the external battery switches to position **1** (battery circuit closed).
- Apply voltage to the UPS.
- Set switch **Q4/Q2** to position **1**.
- Wait for the mimic panel to start up.
- Activate the start procedure from the commands menu on the mimic panel.
- Set switch **Q3** to position **1** (inverter in output ON).
- The load is now powered by the UPS.

6.1.2. 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 shutdown software).
- Set switch **Q3** to position **0** (inverter in output OFF).
- Set the battery switches to position **0** (battery circuit open).
- Set switch **Q4/Q2** to position **0** (input mains OFF).

6.1.3. Extended out of service

In the event of an extended period of UPS inactivity the batteries must be recharged regularly. Recharging should be carried out every three months.

- Put the external battery switches to position **1** (battery circuit closed).
- Apply voltage to the UPS.
- Set switch **Q4/Q2** to position **1** (input mains ON).
- Set or keep switches **Q3** and **Q5** to position **0** (inverter in output OFF and bypass OFF).
- The battery must be charged for at least ten hours.
- After ten hours:
- Set the battery switches to position **0** (battery circuit open).
- Set switch **Q4/Q2** to position **0** (input mains OFF).
- The UPS can be switched off.

6.1.4. Switching onto manual bypass

Switching onto the 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 EFFICIENCY MODE** command from the **COMMANDS > 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 switch **Q5** to position **1** (bypass on load) and then put switch **Q3** to position **0** (inverter in output OFF).
- Set the battery switches to position **0** (battery circuit open).
- Open the switch **Q4/Q2**.
- In the event of a separate input mains disconnect the UPS primary input mains.

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

6.1.5. Return to normal mode

- Set switch **Q4/Q2** to position **1** (input mains ON).
- Set 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 EFFICIENCY MODE** command from the **COMMANDS > IMMEDIATE COMMANDS** menu.
- Set switch **Q3** to position **1** (inverter in output ON).
- Check that alarm A06 is not present (if the alarm is present resolve the problem before continuing).
- Set switch **Q5** to position **0**.

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

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

6.1.6. Emergency shutdown

Should it be necessary to interrupt the continuous power supply provided by the UPS quickly (emergency shutdown), this can be done by putting switch **Q3** to position **0** 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 Q3.
If the UPS is operating from the manual bypass (Q5 in position 1) with mains present, the emergency shutdown does not interrupt the power supply to the load. In emergency conditions all the power supplies upstream of the UPS must be disconnected.

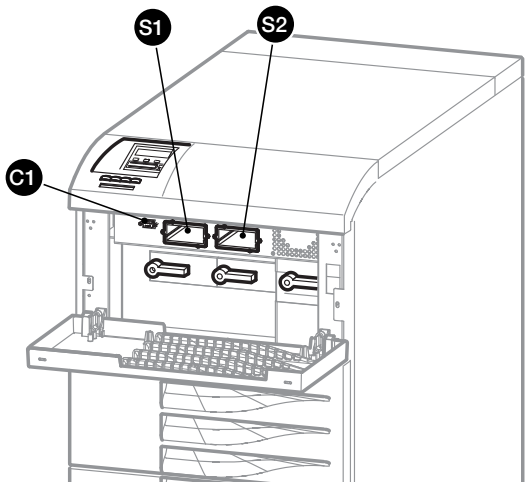
7. CONNECTIVITY AND COMMUNICATION OPTIONS

7.1. MULTI-LEVEL 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.

7.1-1



Key

C1 Serial connector RS232/485

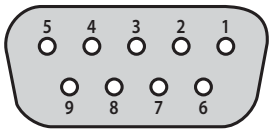
S1 Options slot 1

S2 Options slot 2

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

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

7.1-2



Key for pin RS232/485 C1

1 Not connected
2 RX for RS232
3 TX for RS232
4 Data +
5 GND for RS232
6 Data –
7 Reserved
8 Not connected
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

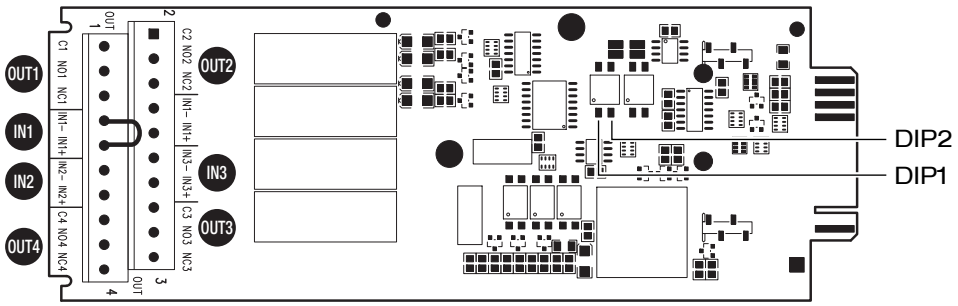
- Permitted Nominal current and voltage of NO or NC contacts: 2 A 250 Vac depending on the terminal used.
- Inputs are activated on loop closing.

• 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

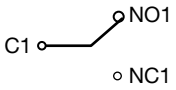
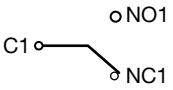
POWER SAFE configuration DIP1: ON - DIP2: OFF		
IN/OUT	Description	Filter level
OUT 1	General Alarm	2
OUT 2	Power safe plug 1	2
OUT 3	Power safe plug 2	2
OUT 4	Power safe plug 3	2
IN 1(1)	ESD	1
IN 2	Supply from GenSet	1
IN 3(2)	Management of energy consuption	1

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 outpu
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. 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.

7.4. 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.

7.5. PROFIBUS INTERFACE

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

7.6. 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 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.

8.1. 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 Q3 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.

8.2. 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.

8.3. 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 chapter 5).

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).

8.3.1. 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.

8.3.2. 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.

8.3.3. 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 life of these components is shown below:

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

Component status is however 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 (see paragraph 3.4).

9.3. ACS PCB

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

9.4. SEPARATE AUXILIARY POWER SUPPLY

This allows the use of an auxiliary energy source other than the primary mains power supply in the event of outage.

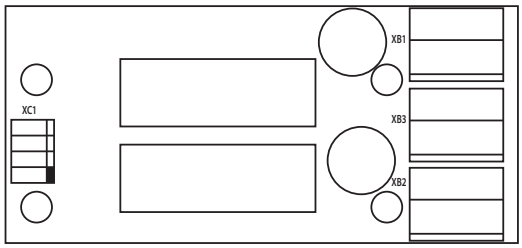
9.5. EXTERNAL BACKFEED PROTECTION

External devices can be installed to protect against the backfeed of dangerous currents, both on the **MAINS SUPPLY** and on the **AUX MAINS SUPPLY**. These devices are controlled by the **BKF PCB** shown in figure 9.5-1.

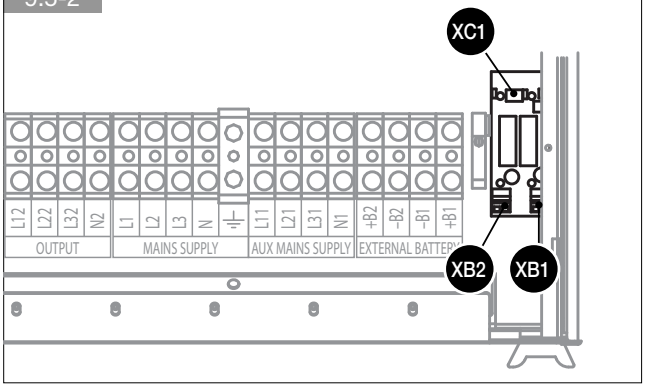
The **BKF PCB** is installed in the position shown in figure 9.5-2.

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

9.5-1



9.5-2



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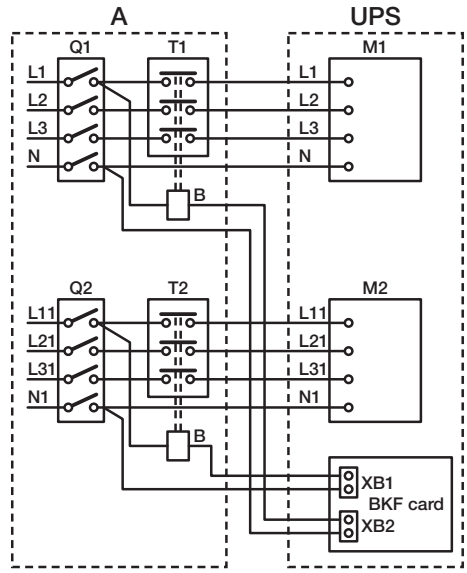
9.6. PROTECTION ON MAINS SUPPLY AND ON AUXILIARY MAINS SUPPLY

Activating UPS protection on the mimic panel: access the **SERVICE** menu on the mimic panel (see the **SERVICE** menu section) and set the **SET BACKFEED** parameter to **2.BYPASS-INPUT Alone**.

Cable and trunk schematic

9.6-1 UPS 3/3 with separate auxiliary supply



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

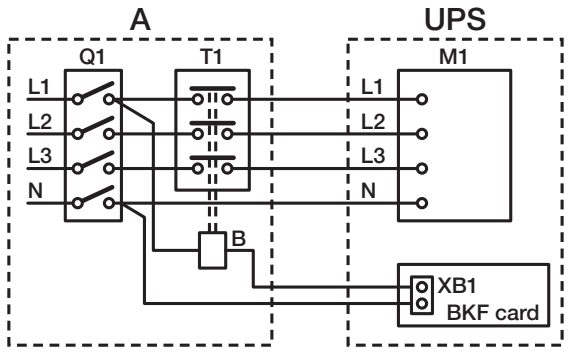
[1]Remote switches - rated current		
Model	**T1**	**T2**
60 3/3	125 A AC1	125 A AC1
80 3/3	140 A AC1	140 A AC1

9.7. PROTECTION ON A UPS WITHOUT AUXILIARY MAINS SUPPLY

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

Cable and trunk schematic

9.7-1 UPS 3/3 without separate auxiliary supply



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 switch[1]
XB1	Connector on BKF PCB

[1]Remote switches - rated current	
Model	**T1**
60 3/3	125 A AC1
80 3/3	140 A AC1

WARNING
The neutral connections on the UPS input or output are identical. Consequently there is no risk of high potential when the input power supply is absent.
However, depending on the type of system connected to the output or in some failure conditions (earth leakage, significant phase dispersion or in the case of non-insulated neutral systems), high potential can be detected. It would therefore be necessary to install either adequate neutral switching or a protection system.

10. TECHNICAL SPECIFICATIONS

Models			60	80
Input/Output phases			3/3	3/3
Electrical specifications - Input				
Mains voltage		Vin	3Ph+N 400 V -10% +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 from ±198[3] up to ±360[4]	
Electrical specifications - Output				
Output voltage (three phase + neutral)		V	400 V three phase (selectable 360/380/400/415 V) ±1% [1]	
Frequency		Hz	50-60 Hz ±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	54	72
Overload (@ 25 °C; Vin > 380; Vbat > 216) [2]	• 10 minutes • 1 minute	kW	67,5 81	90 108
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	< 62	< 62
Required cooling capacity		m^3/h	1330	1330
Dissipated power max		W	5341	7121
Dissipated power max		BTU/h	18,234	24,312
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	444 x 795 x 1400	444 x 795 x 1400
Weight		kg	200 [1]	210 [1]

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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