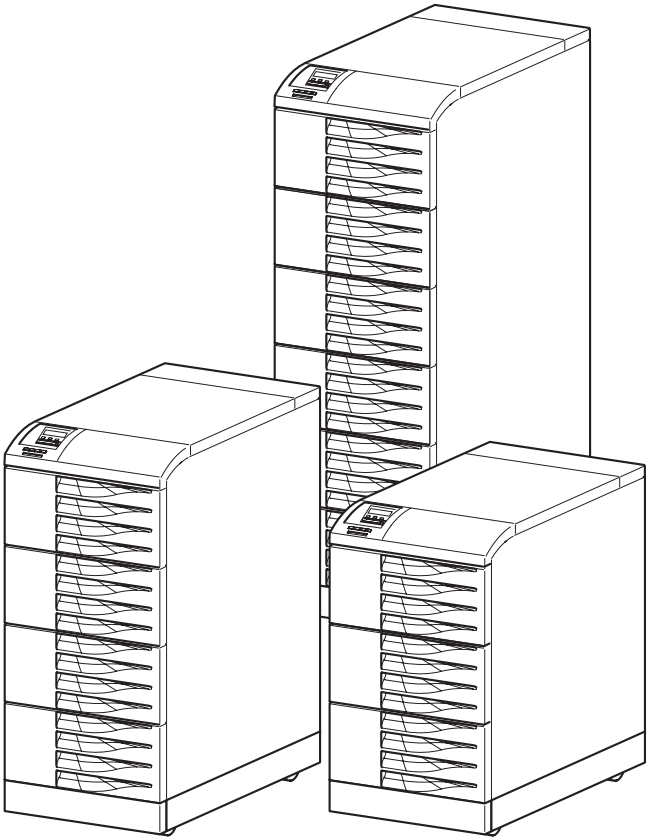
INSTALLATION AND OPERATING MANUAL

MASTERYS MC

from 10 to 80 kVA



socomec
Innovative Power Solutions UPS

ENGLISH

ENGLISH

1 CERTIFICATE AND CONDITIONS OF WARRANTY

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

The period of validity of the warranty is 12 (twelve) months from the date of activation, if said activation is carried out by SOCOMEC UPS personnel or personnel from a support centre authorised by SOCOMEC UPS, and not however more than 15 (fifteen) months from the date of shipment by SOCOMEC UPS.

The warranty is recognized within Italian territory. If the UPS is exported out of Italian territory, the warranty shall be limited to the cover of the parts used to repair the fault.

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

The warranty shall not apply in the following cases:

- Failures due to fortuitous circumstances or force majeure (lightning, floods, etc.);
- Failures due to negligence or improper use (use out of tolerance: temperature, humidity, ventilation, electric power supply, applied load, batteries);
- Insufficient or inadequate maintenance;
- Attempted maintenance, repairs or modifications not carried out by SOCOMEC UPS personnel or personnel from a support centre authorised by SOCOMEC UPS.
- If the battery has not been recharged in accordance with the terms indicated on the packaging and in the manual, in cases of extended storage or UPS inactivity.

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

Defective or faulty parts replaced free of charge are to be put at the disposal of SOCOMEC UPS who becomes the sole owner.

Replacements or repairs of parts and any modifications to the product during the warranty period cannot extend the duration of the warranty.

In no case will SOCOMEC UPS be responsible for damages (including, without limitations, damage for loss of earnings, interruption of activity, loss of information or other economic losses) deriving from the use of the product.

The present conditions are subject to Italian law. Any dispute falls under the province of the Court of Vicenza.

2.1 IMPORTANT.

- This document provides important instructions for the safe use, movement and connection of the MASTERYS™ uninterruptible power system (UPS).
- The unit must be installed and activated only by qualified technical personnel and authorised by SOCOMEC UPS.

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

- The unit must remain in a vertical position in all circumstances.
- Connect the PE ground conductor first before you make any other connection.
- Do not expose the UPS to rain or liquids in general. Do not introduce external bodies.
- If the UPS is not equipped with automatic sectioning against back feed or if the switch is external to the UPS, affix a label bearing the following words on all the external switches of the UPS power supply:

ISOLATE THE UPS BEFORE
OPERATING ON THIS CIRCUIT

- Keep this manual handy for future consultation.
- If the unit fails, it must be repaired only by authorised technicians that have been specially trained for this purpose.
- This equipment conforms to the European Community directives for professional 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 arrangements of the system; the use of an isolation transformer is required should it be necessary to modify the neutral arrangements downstream of the UPS.
- Before connecting any external battery cabinet, ensure that it is fully compatible with the model of UPS it is to be used with.
- The use of external battery cabinets not supplied by the manufacturers is not recommended.
- Switch off and isolate the UPS and then wait for 5 minutes before removing the protection panels in order to carry out work on parts under dangerous voltage.
- Danger of explosion if the batteries are replaced with others of the wrong type.
- Replaced 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 isolation between the batteries and the mains power source.

The product you have chosen is designed for commercial and industrial use only.
In order to be 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 harms to person or property, the products may have to be adapted.
For such uses we would advise you to contact SOCOMEC UPS beforehand to confirm the ability of these products to meet the requested level of safety, performance, reliability and compliance with applicable laws, regulations and specifications.

2.2 DESCRIPTION OF THE SYMBOLS USED ON THE LABELS APPLIED TO THE UNIT.
Si ricorda di osservare tutte le avvertenze e le indicazioni riportate sulle etichette e targhette applicate all'interno e all'esterno dell'apparecchiatura.

DANGER! HIGH VOLTAGE (BLACK/YELLOW)

GROUND TERMINAL

READ THE USER MANUAL BEFORE USING THE UNIT

3 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 breaking devices to ensure that the unit does not fall over.

3.1 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 that the floor is strong enough to support the weight of the UPS and of the battery cabinet, if used.

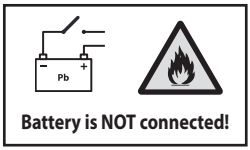
Avoid pressing on the front panels when moving the unit.

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

CAUTION IF DAMAGED.

BATTERIES, NON SPILLABLE.

Packages, crushed, punctured, or torn such that contents are revealed **must** be set aside in an isolated area and inspected by a qualified person. If the package is deemed to be not shippable, the contents **must** be promptly collected, segregated, and either the consignor or consignee contacted.

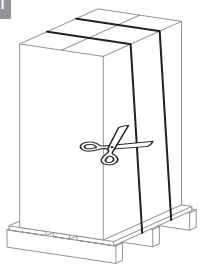


All packaging material must be recycled in compliance with the laws in force in the country where the system is installed.

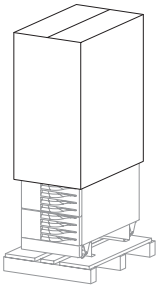
3.2 UNPACKING PROCEDURE.

3.2.1 Models "S" (h 800 mm) and models "M" (h 1.000 mm).

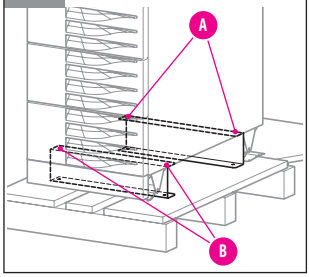
3.2.1-1



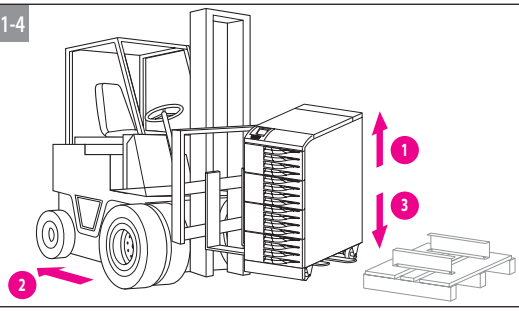
3.2.1-2



3.2.1-3 Remove screws **A** and screws **B**.

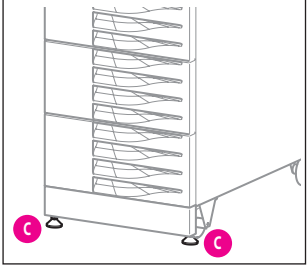


3.2.1-4



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

3.2.1-5 Secure the UPS with feet **C**.

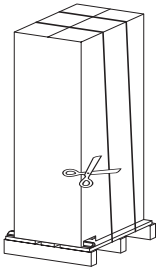


Secure the UPS with feet D only when it is in position with cables connected.

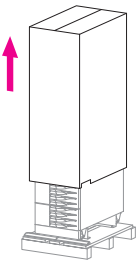
ENGLISH

3.2.2 Models "T" (h 1.400 mm).

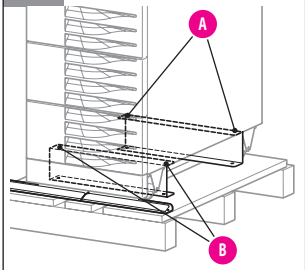
3.2.2-1



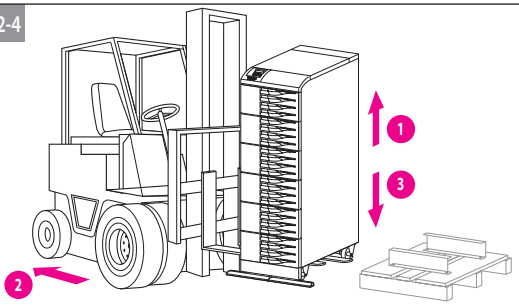
3.2.2-2



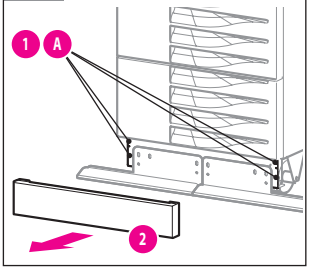
3.2.2-3 Remove screws **A** and screws **B**.



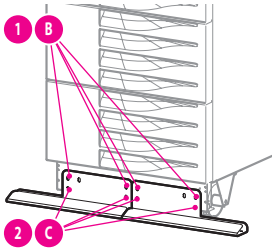
3.2.2-4



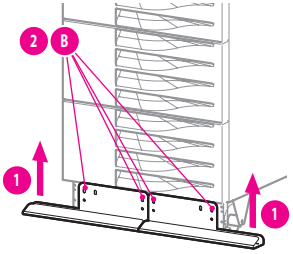
3.2.2-5 Remove screws **A**.



3.2.2-6 Loosen screws **B**.
Remove screws **C**.

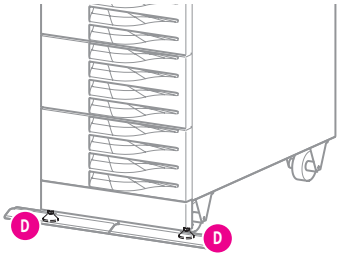


3.2.2-7 Tighten screws **B**.



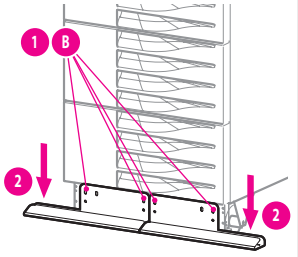
The UPS can be moved.
Place the UPS in the installation area.

3.2.2-8 Secure the UPS with feet **D**.

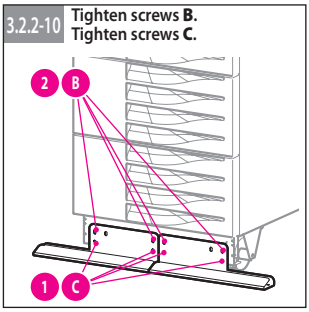


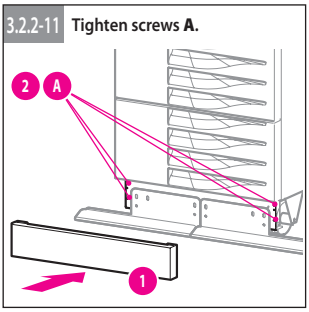
Secure the UPS with feet **D** only when it is in position with the cable connected.

3.2.2-9 Loosen screws **B**.



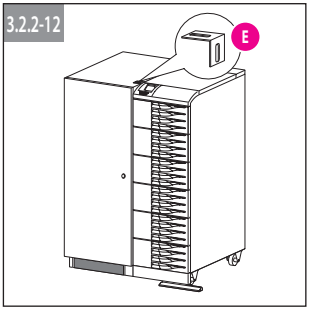
socomec Innovative Power Solutions UPS

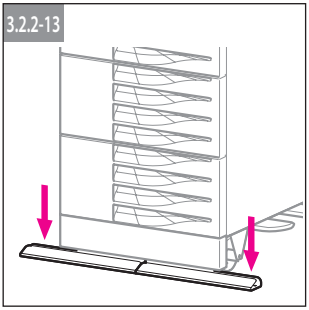




For UPS 15-40kVA height 1.400mm without internal battery:

- **with battery cabinet fitted alongside:** remove leveller **E** from the cabinet. Fasten the UPS to the cabinet using the bracket **E** supplied (figure 3.2.2-12).
- **without battery cabinet fitted alongside:** secure the UPS to the floor (figure 3.2.2-13).



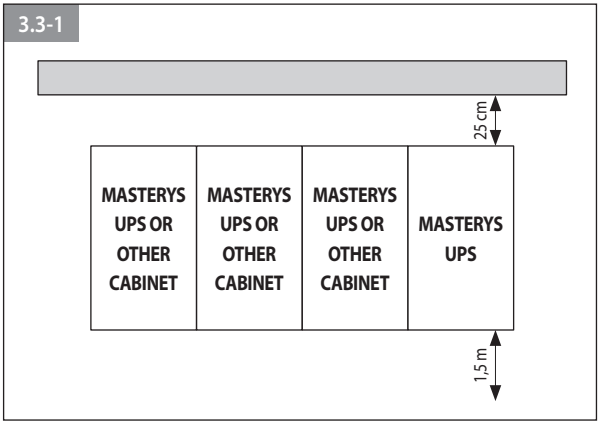


ENGLISH

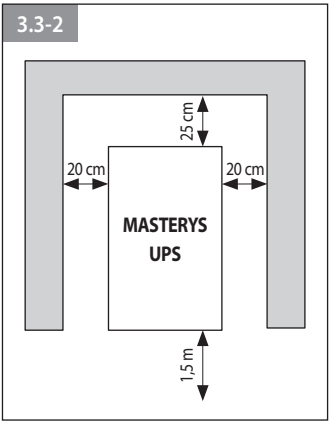
3.3 ENVIRONMENTAL REQUISITES.

- The recommended operating temperature, humidity and altitude values are listed in the technical specifications table (see chapter 11). 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 to sources of excessive heat.
- A space of at least 25 cm must be left at the back for adequate ventilation (see figure 3.3-1).
- 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 recommended to ensure that the cable connections are sufficiently long and flexible so that the unit can be extracted during maintenance (see figure 3.3-2).
- If it is not possible to leave sufficient space at the front, adequate access must be ensured from both sides.

3.3-1



3.3-2



3.4 ELECTRICAL REQUISITES.

The installation and the 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 show the size of the input protection devices recommended for correct installation.

Size of the input protection devices

UPS (kVA)	Magneto-thermal input[1] (A)		Magneto-thermal Aux Mains[1] (A)		Differential input[5] (A)	Input/Output cable core size (mm²)		Battery cable core size (mm²)		Battery protection[4] (A)
	single	parallel[2]	single	parallel[2]	selective type[5]	Min	Max[3]	Min	Max[3]	
10 3/1	32 100 if common input mains	40 125 if common input mains	100	125	0,5	6 16 aux mains and output	35	6	35	32 Gg
15 3/1	32 100 if common input mains	40 125 if common input mains	100	125	0,5	6 25 aux mains and output	35	6	25	50 Gg
20 3/1	40 125 if common input mains	63 160 if common input mains	125	160	0,5	10 35 aux mains and output	35	10	25	63 Gg
10 3/3	32	40	32	40	0,5	6	25	6	35	32 Gg
15 3/3	32	40	32	40	0,5	6	25	6	25	50 Gg
20 3/3	40	63	40	63	0,5	10	25	10	25	63 Gg
30 3/3	63	80	63	80	0,5	16	35	16	35	100 Gg
40 3/3	80	100	80	100	0,5	25	35	25	35	125 Gg
60 3/3	125	160	125	160	0,5	35	50	50	95	200 Gg
80 3/3	160	200	160	200	0,5	50	50	70	95	250 Gg

[1] D curve magneto-thermal switch recommended.

[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.

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 protections must be installed.

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.

3.4.1 Back-feed protection.

If the UPS does not have an automatic protection device against current back-feed, 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 CAUTION section in paragraph 2 of this manual and paragraph 4.5.3. of the EN62040-1-1 2003-11 standard.
The label is supplied with the system.
The back-feed 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 3.5 of this manual.
- To install the external back-feed 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 10.9 of this manual.

ATTENTION.
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.

3.5 INSTALLATION PROCEDURES AND INSTRUCTIONS.

The procedure below should be strictly followed for correct installation:

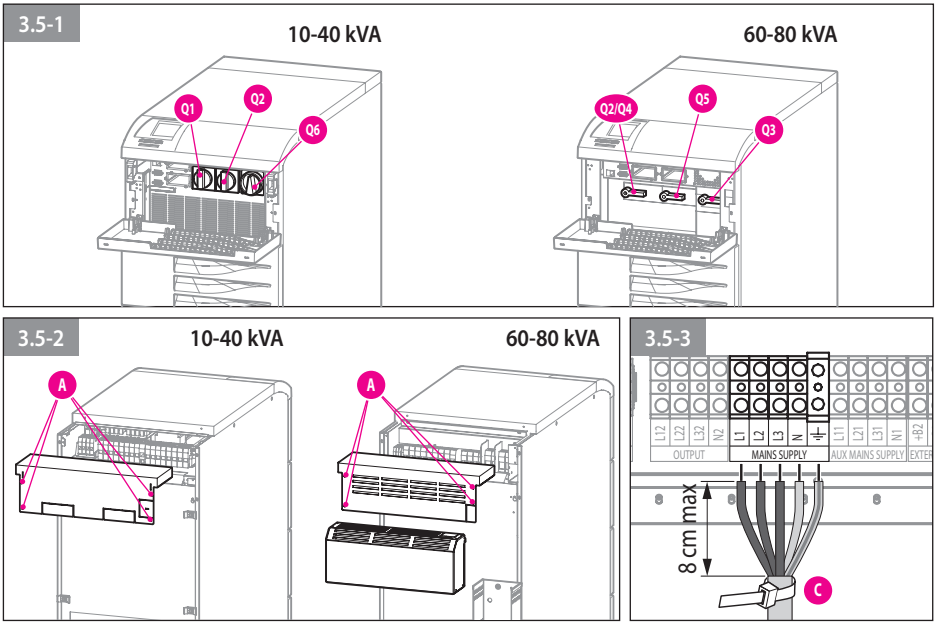
3.5-1
- 10-40 kVA: set switches **Q1**, **Q2**, **Q6** to position 0, open the switches of any external battery cabinets.
- 60-80 kVA: set switches **Q2/Q4**, **Q3**, **Q5** to position 0, open the switches of any external battery cabinets.

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.

3.5-2 Open the terminal boards 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. In the basic models or in the versions 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 3.5-3) to couplings B as shown in the figure 3.5-6.

3.5-3 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).



ENGLISH

ENGLISH

3.5-5 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).
In the event of a UPS with 10-20 kVA single-phase output, **it is essential** to connect the auxiliary mains to the relative dedicated terminal board. If there is no separate mains for the bypass, it is advisable to obtain one from the primary mains in one of the two ways set out below:

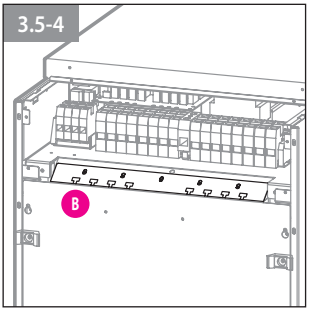
- with distribution external to the UPS (figure 3.5-6).
- with a bridge connection (figure 3.5-7).

3.5-8 Connect the output cables to the terminals labelled "OUTPUT" **L12**, **L22**, **L32**, **N2**.

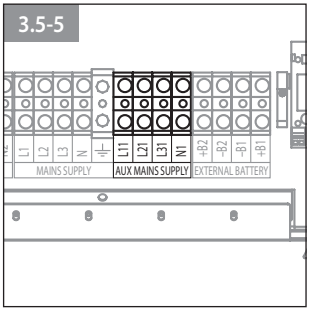
3.5-9 Connect the external battery cables (if present) to the terminals labelled "EXTERNAL BATTERY" **+B2**, **-B2**, **-B1**, **+B1** (refer to paragraph 3.10); connect the Power Share cables to the terminals labelled "POWER SHARE" **L15**, **L25**, **L35**, **N5** (the option is available).

3.5-10 Divert any control cables from the front (RS232, signalling relay contacts, etc.) into the appropriate side cable run A.

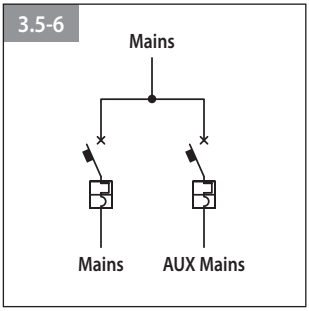
3.5-4



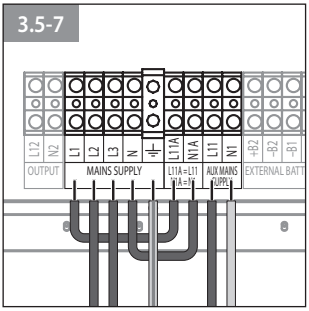
3.5-5



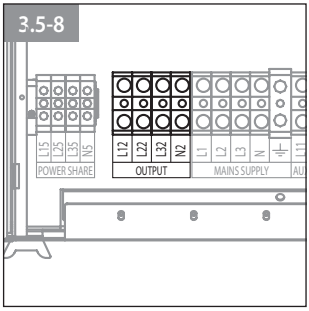
3.5-6



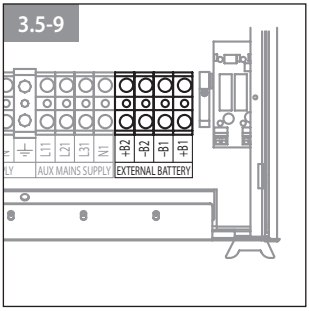
3.5-7



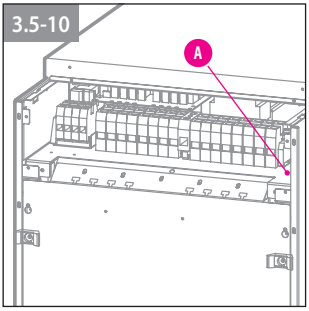
3.5-8



3.5-9



3.5-10



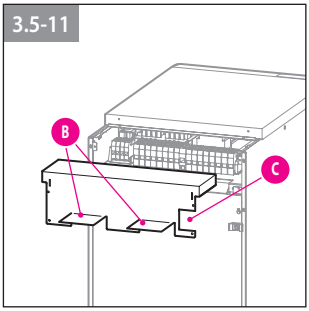
socomec Innovative Power Solutions UPS

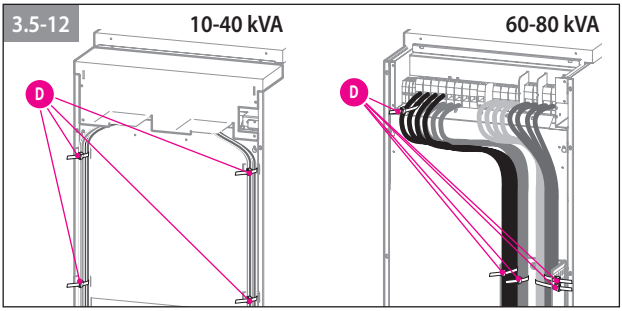
3.5-11 Remove the pre-cut detail **C** and bend details **B** to pass the cables.

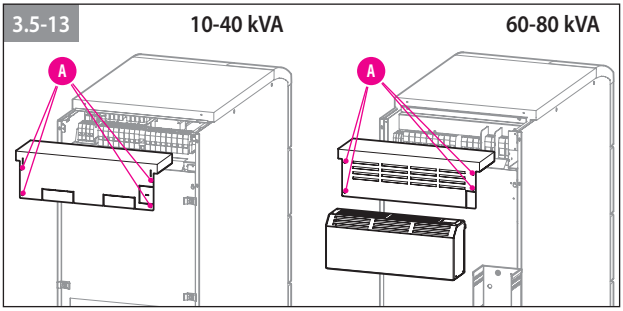
Secure the cables to the couplings D located on the rack as shown in picture 3.5-12, ensuring that the air vents are not obstructed in any way.

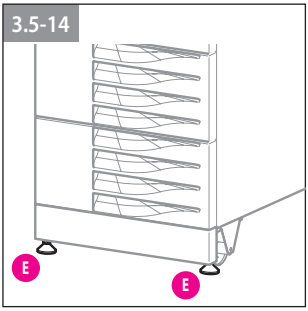
3.5-13 Once the cabling has been completed, secure the terminal board cover with the four screws **A**.

Once the cabling has been carried out, secure the UPS with the fixing feet E as shown in figure 3.5-14.





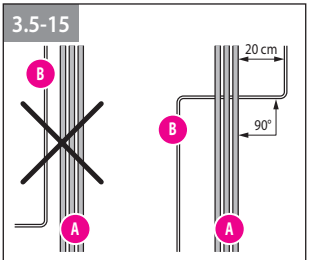




3.5-15 NOTE.

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.



3.6 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 PCB configured in standard or power safe mode (see paragraph 10.1). This automatically extends the voltage and frequency value range when power is supplied by the generator set.

3.7 EXTERNAL E.S.D. CONNECTION.

A remote emergency shutdown system (E.S.D.) can be installed by means of the optional ADC PCB; see paragraph 10.1. Connect a normally closed zero-potential contact to terminals **IN1+** and **IN1-** of the ADC PCB.

3.8 ISOLATION TRANSFORMER.

The MASTERYS™ IP model of the MASTERYS™ range is fitted with an internal isolation transformer.
If an external isolation transformer cabinet is required, the following instructions should be followed:

- Refer to chapters 2 and 3 of this manual for indications on moving and installing the cabinet.
- See paragraph 3.4 for details about protections.
- 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 single UPS unit connected in parallel configuration.

For details of the connections, refer to the transformer terminal board diagram.

3.9 UPS PARALLEL CONFIGURATION.

3.9.1 General.

Parallel connection enhances UPS system reliability, performance and power.
All MASTERYS™ models can be installed in parallel configuration provided they have the special parallel kit that can be installed in 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 2 and 3 also apply.

3.9.2 Installation.

UPS units operating in parallel are interconnected using control cables **B** (fig. 3.9.3-1) and are configured differently depending on the position they are assigned.
For this reason the units have a position label **C** (Fig. 3.9.4-1):

- 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 UPS) means that 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.

3.9.3 Power connections.

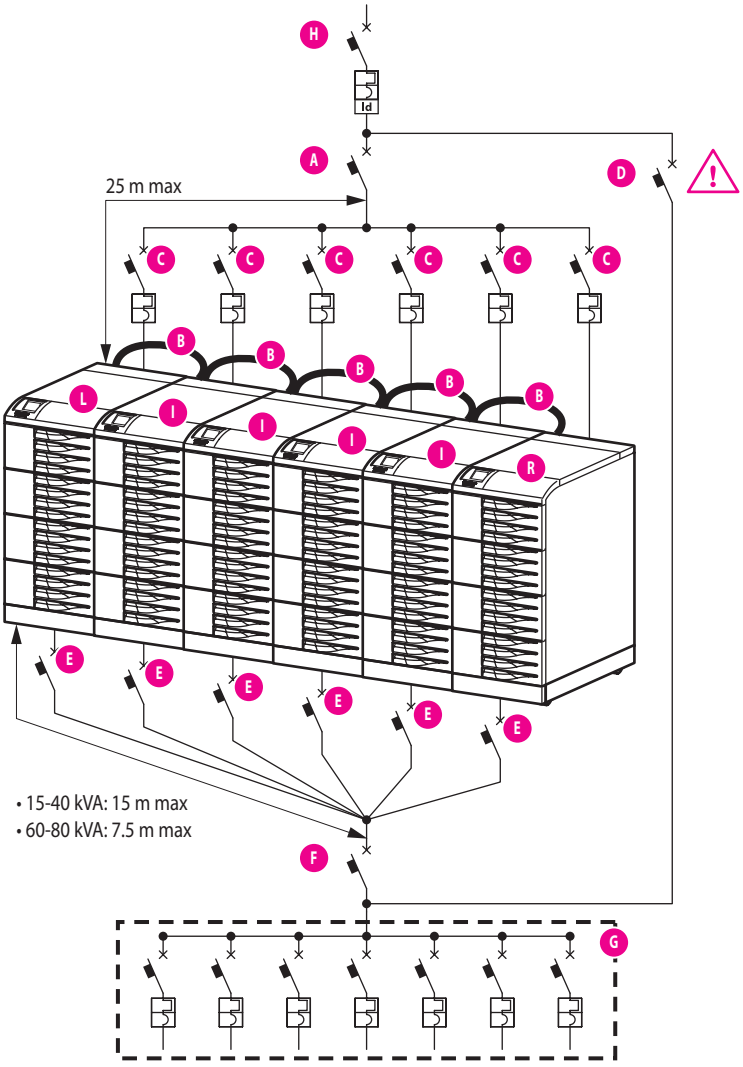
- The power supply to each unit must be protected as indicated in the table in paragraph 3.4.
- The cross section and length of the input and output cables must be identical for all the units.
- The phase rotation must be the same for each unit connected in parallel and also on any external manual bypass 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 meters (Fig. 3.9.3-1).
- The cables from the UPS module to circuit breaker **F** must be of the same length (max. 15 metres for 10-40 kVA and max. 7.5 metres for 60-80 kVA 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. 3.9.3-1, detail **H**), it must be a selective type and the trigger value **must be 0.5 A by the number of UPS connected in parallel**.

Only activate circuit breaker D after carrying out the procedure for switching onto the maintenance bypass, paragraph 7.1.4 for the 10-40 kVA range or 7.2.4 for the 60-80 kVA range.

Only activate circuit breaker E after turn off the UPS.

ENGLISH

3.9.3-1 RECOMMENDED PARALLEL CONFIGURATION.



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 Output switch
F System shutdown switch
G Distribution
H Main differential magneto-thermal switch
I Internal UPS "INTERNAL"
L Left UPS "LEFT"
R Right UPS "RIGHT"

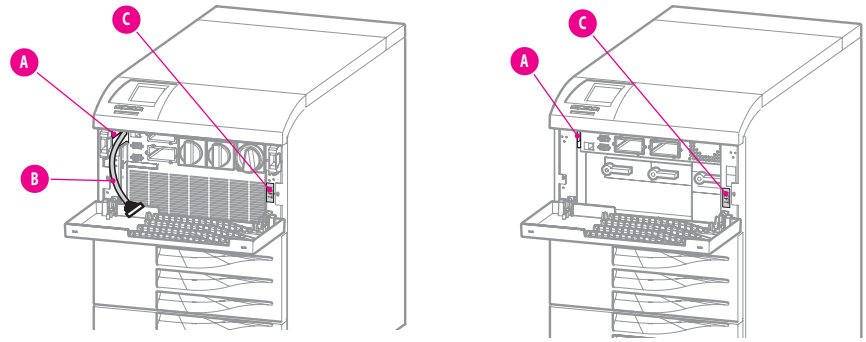
3.9.4 Control connections.

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 case of standard parallel setting or are attached to the parallel kit in case of later upgrading of the system.

Parallel configuration must only be activated by SOCOMEC UPS qualified personnel; in each case arrange the running of the control cables in the relative cable run as shown in figure 3.9.4-1, leaving the connector(s) unconnected (in the central UPS one incoming and one outgoing control cable must be used).

3.9.4-1



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

3.10 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 operation, 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 boards protection.
- Connect the ground cable (figure 3.10-1).
- Connect the cables between the UPS terminals and the battery cabinet terminals, strictly observing the polarity of each individual string (figure 3.10-1) and the cross-sections indicated in table 3.4.

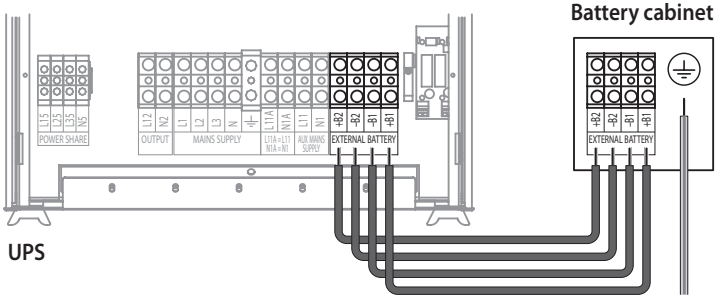
Use double insulated cables or the cables supplied with the unit to connect the UPS to the Battery cabinet. The lenght L of battery cable must not be more than 8 metres long for 10-40 kVA range (if L > 8 m, please contact the support service).

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

- Replace the terminal board's protection.

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

3.10-1



4.1 ON LINE OPERATIONS.

A special feature of the MASTERYS™ 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:

- **"Normale" 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 case 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 onto the auxiliary mains via the automatic bypass. Normal operation, which is from inverter, returns automatically a few seconds after the overload disappears.
- when the voltage generated by the inverter goes is out of tolerances due to a major overload or a fault on the inverter.
- wWhen the internal temperature exceeds the maximum value allowed.

- **"Battery" mode**.
  In the event of a mains failure (micro interruptions or extended black-outs), the UPS continues to power the load using the energy stored in the battery. The Expert Battery System keeps the user constantly informed on the battery status and on the back-up time available. The disconnection of non mission critical applications during battery discharge can be programmed (after a certain laps of time) by using the Power Share option, so that the battery resources can be reserved for the most critical applications.

4.2 OPERATION IN HIGH EFFICIENCY MODE.

The UPS has a selectable and 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 outage, 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.

- **Eco-Mode Operation:** 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.
- **Always On operating mode:** the innovative Always On mode combines very high efficiency and the active filtering of the harmonics re-injected onto the upstream mains by the distorting load. In normal conditions the load is powered directly from the auxiliary mains via the automatic bypass, while the inverter contributes to compensate the re-injected harmonics..

ENGLISH

4.3 OPERATION WITH MANUAL MAINTENANCE BYPASS.

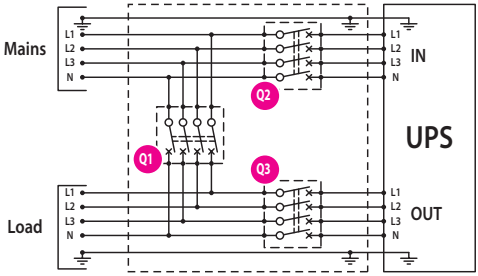
If the maintenance bypass is activated using the appropriate procedure, the load is powered directly from the maintenance bypass, while the UPS is separated from the power supply and can be switched off.
This operating mode can be selected for maintenance to be carried out on the system so that the necessary actions can be performed by service personnel without having to disconnect the power supply to the load.

4.4 OPERATION WITH EXTERNAL MANUAL BYPASS (optional).

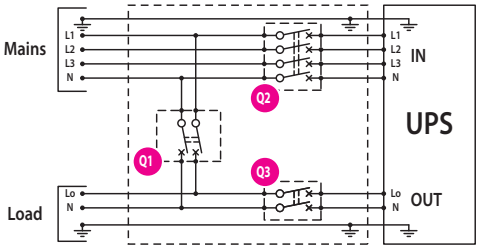
The external maintenance bypass may be placed on the general distribution panel when the UPS is installed, or by installing the bypass panel that is supplied on request. By-pass panel connection diagram.
If the UPS has an input for the auxiliary power supply, the **Q2 switch must** be connected to this 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.

4.4-1 3-phase input/3-phase output for UPS 3/3.



4.4-2 3-phase input/1-phase output for UPS 3/1.



Q1 Bypass switch.
Q2 Mains power switch.
Q3 Output switch.

4.5 OPERATION IN GE CONFIGURATION.

MASTERYS™ can be operated in conjunction with a generator (GE).
With a generator, the frequency and voltage ranges of the auxiliary mains can be increased to accept the instability of the GE and at the same time to avoid operation from the battery or risks of out-of-synchronisation switching onto the bypass.
The use of the GSS interface, described in the options section, also increases the amount of diagnostic information exchanged between the continuous power system and the generator.

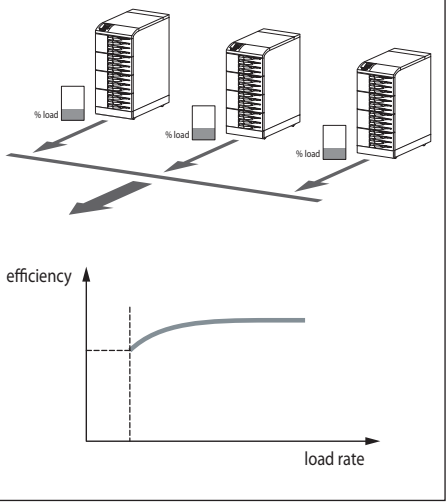
4.6 "ENERGY SAVER" MODE.

This mode ensures that the UPS system always operates at the highest load efficiency (40-70% of the nominal power).

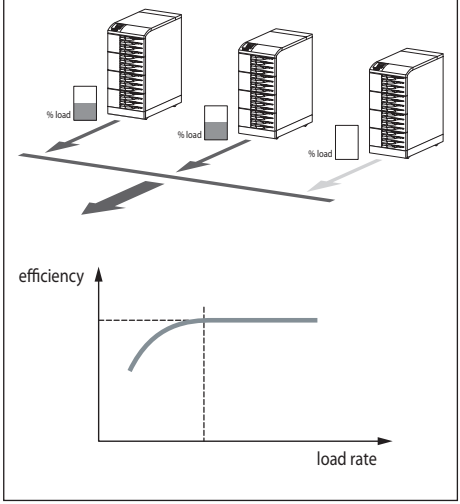
This mode can only be activated on UPS connected in parallel and operating in normal mode.

In cases of low load, the system shuts down any unnecessary UPS units, thus increasing the load on the remaining units.
This leads to higher system efficiency, as the UPS in stand-by are not using any power, while the active units with a high load are operating at maximum productivity.
When the load increases, the units in stand-by are immediately reactivated to guarantee continuous power supply.
Monitoring the hours of operation means that the hours are distributed on all the UPS, alternating the units that are shut down from time to time. This prolongs the life of the units and reduces the risk of failure.

4.6-1 **Load sharing.**



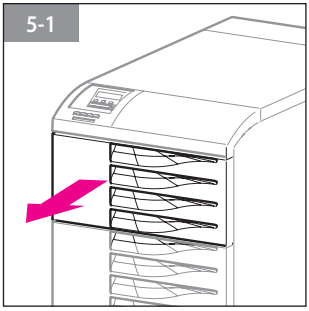
4.6-2 **Load sharing + Energy Saver.**



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

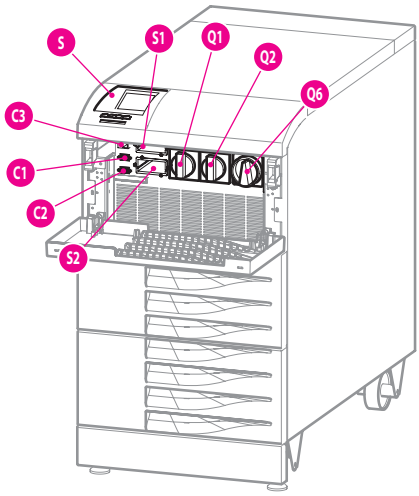
Access to the control area is from the front by opening the upper door using the red handle as shown in figure 5-1. The control area also contains the communication interface connectors and the slots for the optional signalling cards. Please refer to the relevant chapter for more details on the connection and use of the related communication interfaces/cards.

5-1



5.1 IDENTIFYING THE SWITCHES AND INTERFACES FOR THE 10-40 kVA RANGE.

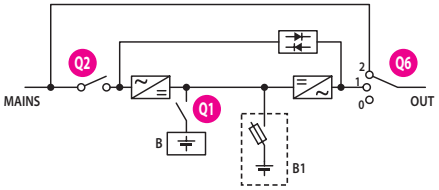
5.1-1



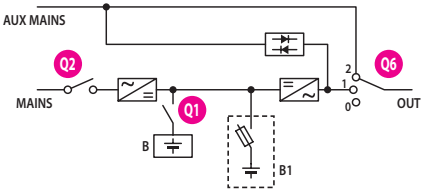
Legend.

- **B** Internal batteries
- **B1** External batteries
- **C1** Serial connector RS232/485
- **C2** serial connector RS232 for Modem (3/3 only)
- **C3** LAN connector RJ45 for Ethernet (3/3 only)
- **S** Mimic panel
- **S1** Options slot 1
- **S2** Options slot 2
- **Q1** Battery switch (for internal batteries)
- **Q2** Input circuit breaker
- **Q6** Output disconnecting switch (E.S.D.)

Configuration with common mains.



Configuration with separate mains.



5.2 FUNCTIONS OF THE SWITCHES FOR THE 10-40 kVA RANGE.

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 operation of the UPS for a continuous power supply to the load;
- **Position 2 "MANUAL BY-PASS"**: This position should only be selected for ordinary or extraordinary 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 condition. It is used for the emergency shutdown of the system (internal E.S.D.).

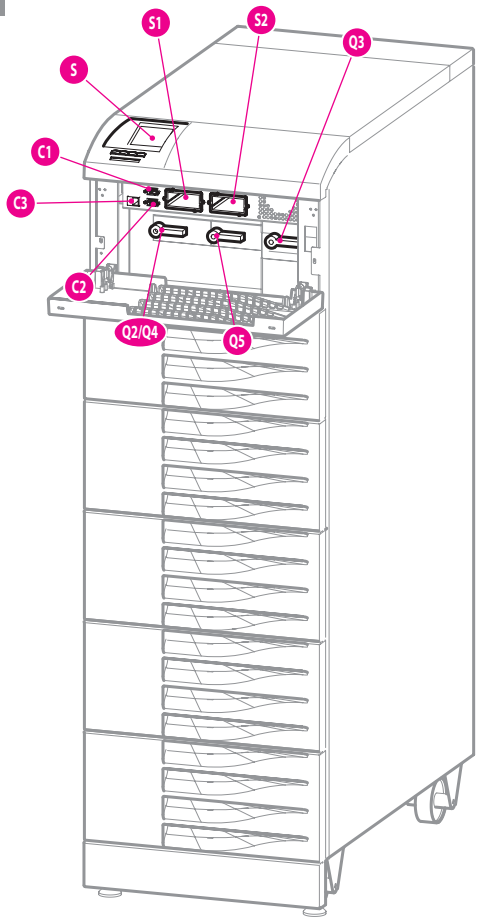
Battery switch Q1 (UPS batteries).

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

ENGLISH

5.3 IDENTIFYING THE SWITCHES AND INTERFACES FOR THE 60-80 kVA RANGE.

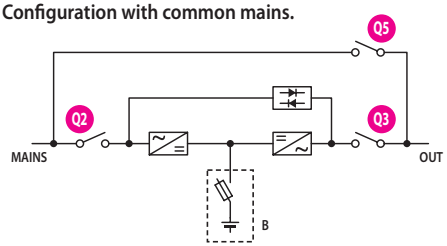
5.3-1



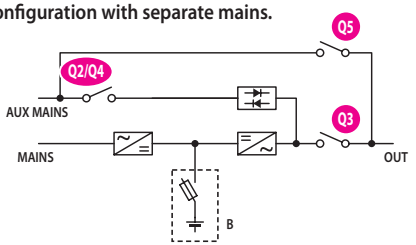
Legend.

- **B** External batteries
- **C1** Serial connector RS232/485
- **C2** Serial connector RS232 for Modem
- **C3** LAN connector RJ45 for Ethernet
- **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.



5.4 FUNCTIONS OF THE SWITCHES 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 the 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 BY-PASS" **Q3 open (0)** and **Q5 closed (1)**: This position should only be selected for ordinary or extraordinary 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 paragraph 7.2.4.

- 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 condition.
  It is used for the emergency shutdown of the system (internal E.S.D.).

ENGLISH

ENGLISH

6.1 ADVANCED MIMIC PANEL.

The LCD mimic panel (figure 6.1-1) located on the upper part of the UPS provides all the information on operating status, electrical measurements, and access to controls and configuration parameters.

The information is grouped into four sections:

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

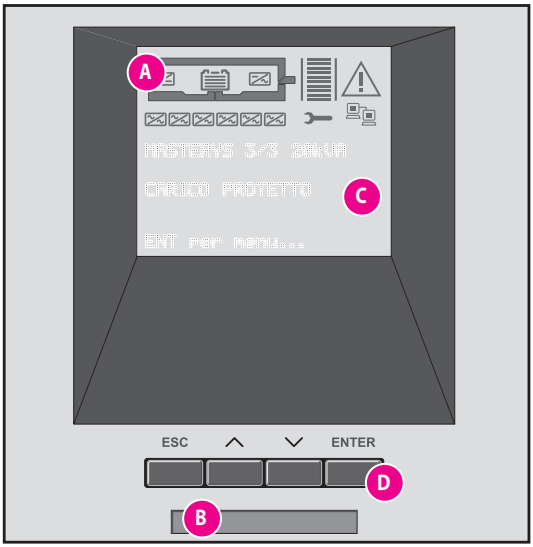
B. multicoloured luminous bar that identifies the condition of the power supply to the load;

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:

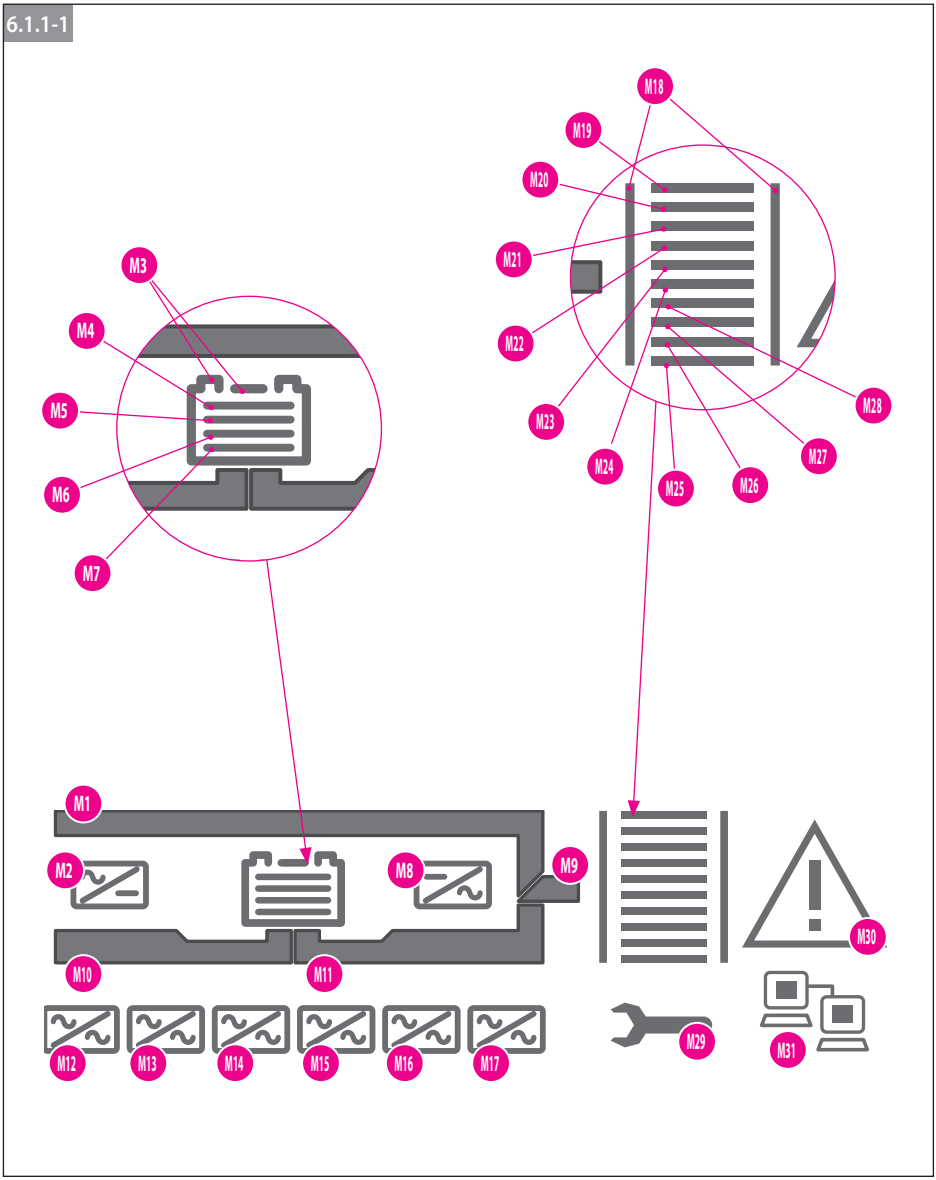
- **ESC**: exit from the current menu/parameter/action;
- **UP** ∧ : scrolls the available menus/values upwards. It increases the value each time it is pressed when changing a parameter;
- **DOWN** ∨ : scrolls the available menus/values downwards. It decreases the value each time it is pressed when changing a parameter;
- **ENTER**: enters the menu displayed on the screen to confirm the choice/changes made .

6.1-1



6.1.1 Meaning of ideograms.

6.1.1-1



6.2.1. **Meaning of ideograms**, see page 32

ENGLISH

Meaning of ideograms

Code	Description	Condition
M1	Load on bypass, in Eco-mode or Maintenance bypass closed Automatic bypass alarm	Steady Flashing
M2	Input rectifier active. Input rectifier general alarm.	Steady Flashing
M3	Battery OK. Battery alarm.	Steady Flashing
M4-M7	Remaining battery capacity. Battery recharging.	Steps of 25% Sequence M7 M4
M8	Inverter on Inverter general alarm.	Steady Flashing
M9	Output voltage present.	Steady
M10	Input mains OK. Input mains alarm.	Steady Flashing
M11	Inverter on.	Steady
M12	Module 1 present. Module 1 general alarm.	Steady Flashing
M13	Module 2 present. Module 2 general alarm.	Steady Flashing
M14	Module 3 present. Module 3 general alarm.	Steady Flashing
M15	Module 4 present. Module 4 general alarm.	Steady Flashing
M16	Module 5 present. Module 5 general alarm.	Steady Flashing
M17	Module 6 present. Module 6 general alarm.	Steady Flashing
M18	Load present. Overload.	Steady Flashing
M19-M28	Output load indicator.	Steps of 10%
M29	Periodic maintenance alarm/warning.	Flashing
M30	Activation code alarm. General alarm.	Steady Flashing
M31	LAN connection ready (Cable Connected).	Steady

6.1.2 Meaning of the luminous bar.

The luminous bar (figure 6.1-1) provides an immediate indication of the condition of the power supply to the load :

- Red: power supply not present or shutdown imminent (flashing).
- Yellow: power supply present but unstable or temporary.
- Green: power supply safe and stable.

Meaning of the luminous bar

Colour	Conditions 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	UPS in stand-by or Ups on manual by-pass Alarm indicating request for ordinary maintenance according to conditions of use (type of load, temperature), after over 25.000 – 30.000 hours of operation (M29 flashing and alarm A44)
YELLOW	Warning for preventive maintenance according to conditions of use (type of load, temperature), after over 10.000 - 12.000 hours of operation (M29 flashing)
YELLOW	Load on battery or battery discharging if M11 is on steady and M10 is off
YELLOW	On automatic bypass if M1 is on steady
YELLOW	First maintenance period expired (10,000 hours of operation) UPS in maintenance mode
GREEN flashing	Battery test in progress
GREEN	Load powered from inverter or in high efficiency mod

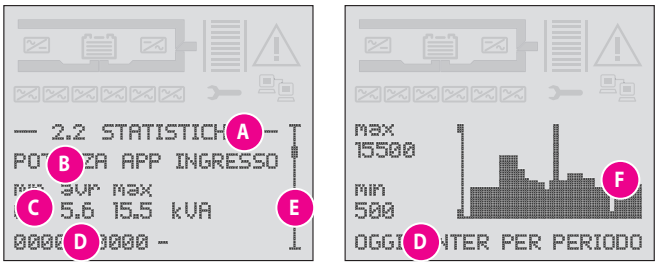
6.1.3 Mimic panel menu.

The paragraph below describes the menus available on the mimic panel and their functions.
The displays are organised into menus and submenus as shown in the figure 6.1.3-1:

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

When the UPS is connected in parallel, the mimic panel shows the system information as if it were a single UPS. Select the UPS number to display information on the individual units.

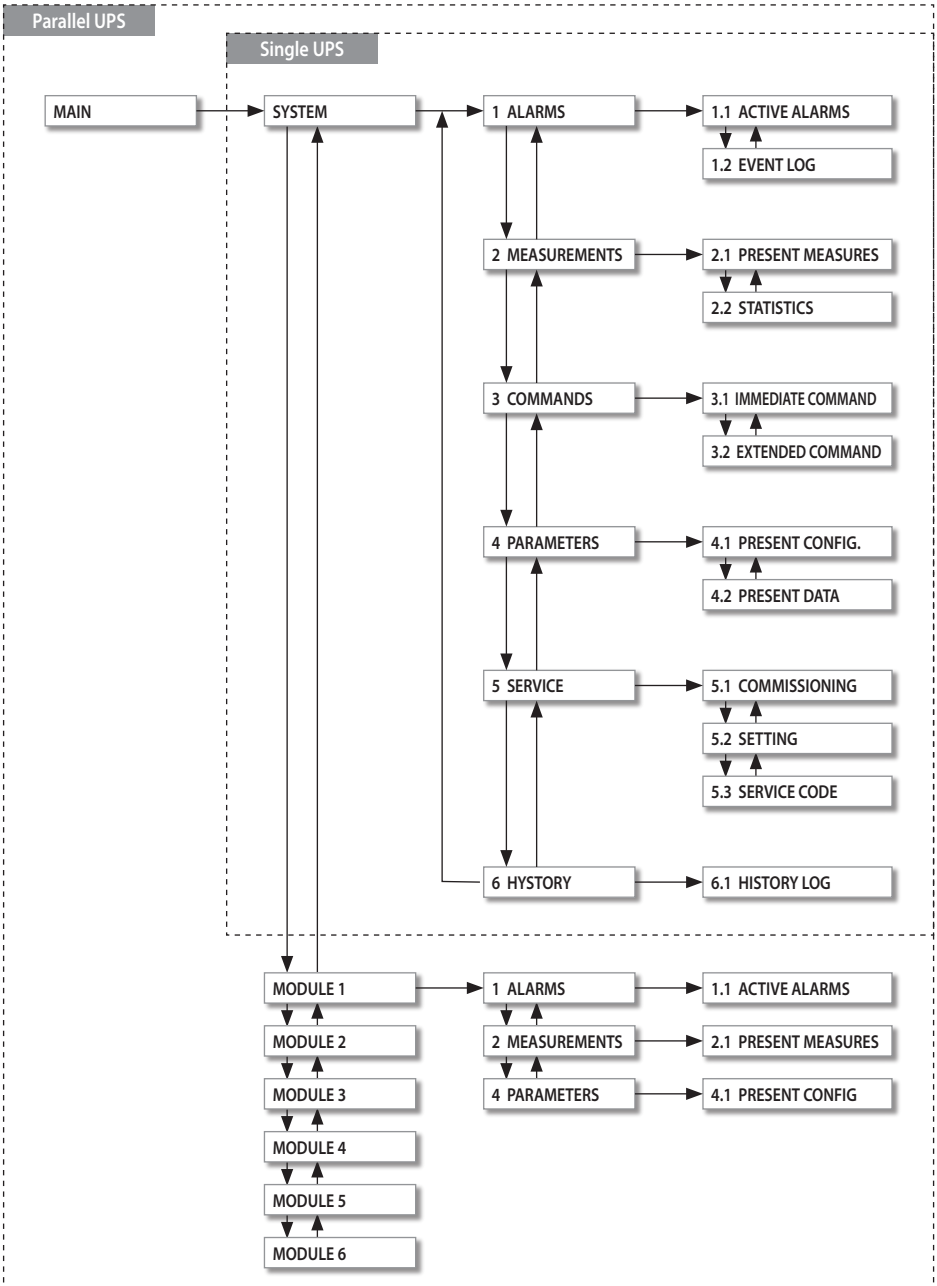
6.1.3-1



Legend.

A Current menu
B Active sub menu
C Additional values or information
D Scrolling contextual help line
E Scroll bar
F Statistical graphics display

ENGLISH


Parallel UPS
Single UPS
MAIN
SYSTEM
1 ALARMS
1.1 ACTIVE ALARMS
1.2 EVENT LOG
2 MEASUREMENTS
2.1 PRESENT MEASURES
2.2 STATISTICS
3 COMMANDS
3.1 IMMEDIATE COMMAND
3.2 EXTENDED COMMAND
4 PARAMETERS
4.1 PRESENT CONFIG.
4.2 PRESENT DATA
5 SERVICE
5.1 COMMISSIONING
5.2 SETTING
5.3 SERVICE CODE
6 HYSTORY
6.1 HISTORY LOG
MODULE 1
MODULE 2
MODULE 3
MODULE 4
MODULE 5
MODULE 6
1 ALARMS
1.1 ACTIVE ALARMS
2 MEASUREMENTS
2.1 PRESENT MEASURES
4 PARAMETERS
4.1 PRESENT CONFIG

6.1.3.1 "Alarms" menu.

This is used to display all the 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 description	Meaning
A00	GENERAL ALARM	
A01	BATTERY ALARM	Battery circuit failure or faulty operation.
A02	OUTPUT OVERLOAD	Power required in output over the limits.
A06	AUXILIARY MAINS OUT OF TOLERANCE	The voltage or frequency limits accepted by the bypass have been exceeded.
A07	OVER TEMPERATURE	Temperature excessive or ventilation problems.
A08	MAINTENANCE BYPASS ACTIVE	Q6 in position 2 (10-40 kVA), Q5 in position 1 (60-80 kVA).
A17	IMPROPER CONDITION OF USE	Improper conditions of use verified (load, mains, and temperature).
A18	BLOCKING INVERTER FOR OVERLOAD	Inverter shutdown due to overload.
A20	WRONG CONFIGURATION	Error in the configuration parameters (e.g. different parameters between several UPSs in parallel).
A22	INPUT MAINS OUT OF TOLERANCE	The voltage or frequency limits accepted by the rectifier have been exceeded.
A23	RECTIFIER GENERAL ALARM	Rectifier fault.
A25	INVERTER GENERAL ALARM	Inverter fault.
A26	BATTERY CHARGER GENERAL ALARM	Battery charger fault.
A29	BYPASS GENERAL ALARM	Bypass fault.
A30	STOP FOR OVERLOAD	The duration of the overload has inhibited the bypass.
A32	MODULE 1 GENERAL ALARM	Module 1 failure.
A33	MODULE 2 GENERAL ALARM	Module 2 failure.
A34	MODULE 3 GENERAL ALARM	Module 3 failure.
A35	MODULE 4 GENERAL ALARM	Module 4 failure.
A36	MODULE 5 GENERAL ALARM	Module 5 failure.
A37	MODULE 6 GENERAL ALARM	Module 6 failure.
A38	EXTERNAL ALARM 1	Signalling from ADC input.
A39	EXTERNAL ALARM 2	Signalling from ADC input.
A40	EXTERNAL ALARM 3	Signalling from ADC input.
A41	EXTERNAL ALARM 4	Signalling from ADC input.
A42	E-SERVICE GENERAL ALARM	Alarm that generates automatic sending of a signal to the support centre (if the service has been activated).
A43	REDUNDANCY LOST	The power required by the load no longer allows the preset redundancy N+x to be maintained (for UPSs in parallel only).
A44	PERIODIC SERVICE CHECK-UP	Warning for periodic check by support service.
A49	BATTERY DISCHARGED	The energy available in the battery has been used up.
A51	OPTION BOARD GENERAL ALARM	Fault related to the optional PCBs in the slots.
A56	GENERATOR SET GENERAL ALARM	Minor alarm on generator set.
A57	GENERATOR SET FAULT	Major alarm on generator set.
A58	ESD ACTIVATED	The remote emergency shutdown command has been activated.
A59	BATTERY CIRCUIT OPEN	The battery switch is open.
A60	FAN FAILURE	Fans faulty or blocked.
A61	PHASE ROTATION FAULT	Wrong phase cycle direction.

6.1.3.2 "Measurements" menu.

This menu is used to display all the measurements relating to the UPS input, output and to 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 STAR VOLTAGE	___ V	___ V	___ V	
OUTPUT PH-PH VOLTAGE	___ V	___ V	___ V	
OUTPUT LOAD	__ %	__ %	__ %	
OUTPUT ACTIVE POWER	___ kW			
OUT APPARENT POWER	__._ kVA	__._ kVA	__._ kVA	
OUTPUT CURRENT	__._ A	__._ A	__._ A	
OUTPUT FREQUENCY	__._ Hz			
AUXILIARY VOLTAGE	___ V	___ V	___ V	
AUXILIARY FREQUENCY	__._ Hz			
INPUT STAR VOLTAGE	___ V	___ V	___ V	
INPUT PH-PH VOLTAGE	___ V	___ V	___ V	
INPUT FREQUENCY	__._ Hz			
INPUT APPARENT POWER	__._ kVA	__._ kVA	__._ kVA	
BATTERY VOLTAGE	B1___ V	B2___ V		
CAPACITY	__ %			CHARGING
BACKUP	T___MIN			DISCHARGING
INTERNAL TEMPERATURE	__ °C			

"Statistical measurements" menu.

Once a (programmable) reference period has been defined, the system reports measurements that are made available in digital or graphical format.
The values that are represented graphically can be used to analyse the situation over the last 24 hours. This information, together with the programmed interval information, provides an enhanced evaluation on the operating mode of the equipment in order to verify whether certain critical operating situations are repetitive or only casual.

STATISTICAL MEASUREMENTS menu

Measurement	Value	Option	Option
INPUT APPARENT POWER	MIN. AVERAGE MAX.	ENTER displays weekly graphics	ENTER displays 24 hr graphics
BACKUP TIME LESS THAN 2 MINUTES	NUMBER OF EVENTS		
BACKUP TIME BETWEEN 2 AND 5 MINUTES	NUMBER OF EVENTS		
BACKUP TIME MORE THAN 5 MINUTES	NUMBER OF EVENTS		
OUTPUT LOAD	MIN. AVERAGE MAX.	ENTER displays weekly graphics	ENTER displays 24 hr graphics
OVERLOAD TIME LESS THAN 5 SECONDS	NUMBER OF EVENTS		
OVERLOAD TIME MORE THAN 5 SECONDS	NUMBER OF EVENTS		
REDUNDANCY LOST	NUMBER OF EVENTS		
INTERNAL TEMPERATURE	MIN. AVERAGE MAX.	ENTER displays weekly graphics	ENTER displays 24 hr graphics
WORKING TIME ON GEN SET	NUMBER OF HOURS		

6.1.3.3 "Commands" menu.

This is used to send some immediate commands to activate the UPS or various operating modes. It can also be used to send extended commands to define some UPS settings.

To activate the commands select the command with **UP** ∧ or **DOWN** ∨, press **ENTER**, select **YES** or **NO** to execute and press **ENTER** to confirm.

"High efficiency" mode.

As explained in chapter 4, there are two kinds of "High efficiency mode": **ALWAYS ON MODE** and **ECO MODE**. Use the service menu to switch from one mode to the other.

"Extended commands".

They can only be displayed if the extended commands item in the configurations menu has been activated.

IMMEDIATE COMMANDS menu	
Command	**Description**
START PROCEDURE	UPS start-up command.
STOP PROCEDURE	UPS shutdown command.
HIGH EFFICIENCY MODE	Activates Eco mode / always on mode.
NORMAL MODE	Activates normal double conversion operation.
ALARM RESET	Resets all the alarms.
LEDS TEST	Performs the test on the mimic panel LEDs.

EXTENDED COMMAND menu	
Command	**Description**
MANUAL BATTERY TEST	Activates the battery test.
BATTERY COMMISSION	Activates battery commissioning (use only if necessary for the type of battery).
SET LAN DEFAULT VALUE	Resets all the values of the LAN.
JBUS TUNNELING ENABLE JBUS TUNNELLING DISABLE	Enables the connection of advanced software (BMS or Uni vision) via the LAN network.
DHCP ENABLE DHCP DISABLE	Enables the automatic allocation of the IP address by the network server.
FORCE MODEM DIAL OUT	Forces sending of an immediate test modem call.
ENERGY SAVER ENABLE ENERGY SAVER DISABLE	Enables energy save mode on a parallel system.
DISABLE CHECK-UP	Deactivates the periodic maintenance message (visible only if alarm A44 is present).

6.1.3.4 "Parameters" menu.

Displays only the configuration parameters set for the UPS.
The messages in this menu are identified by an asterisk in the configurations service menu.
The parameters can only be changed by entering the service / configurations menu.

CURRENT DATA menu	
Message	**Description**
SINOTTICO SN. 0000000000 FW. X.XX CKS. XXXX	Identifie the size, the phases configuation input and output and the serial number of the UPS.
LAN SINOTTICO MAC ADDRESS XX . XX . XX . XX . XX . XX FW X.XX	Identifie the mac addres of LAN PCB.
SCHEDA DIGITALE UP RV 000 CKS: 0000 DSP RV 000 CKS: 0000	Identifie the micro prosessor software version. Identifie the mac addres of LAN PCB.

6.1.3.5 "Service" menu.

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

"Activation code" menu.

During activation of the equipment a warranty activation code, made up of four characters, is requested to complete the start-up procedure.
The activation code is provided directly by the reference Support Centre upon communication of the serial

MANUFACTURER WARRANTY
VALIDATION
PLEASE INSERT THE CODE

number of the equipment which is displayed in the next message by pressing **ENTER**.
Inserting the code does not limit the availability of the equipment's functionality.

SEE INSTALLATION MANUAL
FOR PROCEDURE
SN: 0000000000

When contact is made with the Support Centre for the activation code, detailed information can be obtained on the UPS functions available and on the periodic preventive 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 **UP** ∧ and **DOWN** ∨ 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 code.

VEDI MANUALE PER LA PROCEDURA
CODICE = - - - - **

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

"Configurations" menu.

This is used to change the configuration parameters.

Press **ENTER**. Access is via the password **MAST** which is keyed in by using the **UP** ∧ and **DOWN** ∨ keys and **ENTER** to go on to the next letter.

Note.

Column A shows whether the parameter is visible in the **PARAMETERS "CONFIGURATIONS"** menu.

CONFIGURATIONS menu

A	Parameter	Description	Allowed values
	LANGUAGE SELECTION	Selects the required language	ENG, FRA, ITA
•	NUMBER OF MODULES	Only appears in case of parallel systems. Indicates the number of UPSs in the system.	1-6
•	REDUNDANCY LEVEL	Only appears in case of parallel systems. Indicates the number of redundant UPSs.	FROM 0 TO THE NUMBER OF MODULES LESS ONE
•	OUTPUT VOLTAGE	Sets the required output voltage value.	208/220/230/240
•	OUTPUT FREQUENCY	Sets the required output frequency value.	50/60
•	CONVERTER	Sets whether 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
•	AUTO ON	Sets whether the UPS has to restart automatically after shutdown due to minimum battery level.	YES/NO
•	HIGH EFFICIENCY MODE	Selects eco or always on mode	ECONOMY/ALWAYS ON
	BATTERY AVAILABLE	Indicates whether the batteries are present	YES/NO
•	BATTERY TYPE	Selects the type of batteries used	SEALED, OPEN VENT, NI-CD
•	BATTERY RECHARGE	Selects the type of recharge required	AUTO, MAINTENANCE, 2 LEVELS, INTERMITTENT
•	BATTERY CAPACITY	Sets the battery capacity in Ah.	6,50 ÷ (1.000 x number of UPS)
•	BATTERY ELEMENTS	Indicates the number of elements in series in a branch.	10-40 kVA: 108÷144 (180÷228 for NiCd) 60-80 kVA: 120÷132 (198÷200 for NiCd)
	BATTERY VOLTAGE PRE-MINIMUM	Indicates the voltage value at which battery pre-alarm signalling is activated.	1,65÷1,95 (0,85÷1,25 for NiCd)
	BATTERY VOLTAGE MINIMUM	Indicates the voltage value at which the UPS switches off due to battery minimum voltage.	1,60÷1,90 (0,80÷1,20 for NiCd)
•	BATTERY RECHARGE FLOATING VOLTAGE	Indicates the maintenance voltage value per cell.	2,10÷2,50 (1,25÷1,55 for NiCd)
•	BATTERY RECHARGE CURRENT LIMIT	Indcates the recharge current limit as a percentage of C10.	1÷25
•	BATTERY RECHARGE LEVEL TWO VOLTAGE ❷	Indicates the second level recharge voltage value.	2,20÷2,50 (1,25÷1,70 for NiCd)
•	BATTERY RECHARGE FLOATING ▶ RECHARGE ❶	Indicates the current threshold in % of C10 to pass from maintenance voltage to recharge voltage.	1÷20%
•	BATTERY RECHARGE RECHARGE ▶ FLOATING	Indicates the current threshold in % of C10 to pass from recharge voltage to maintenance voltage (<❶!).	1÷20%
•	BATTERY RECHARGE FORMING VOLTAGE	Indicates the battery commissioning voltage value (>❷!).	2,20÷2,70 (1,25÷1,70 for NiCd)

ENGLISH

ENGLISH

CONFIGURATIONS menu

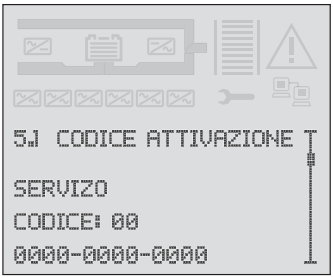
A	Parameter	Description	Allowed values
•	BATTERY RECHARGE FORMING CURRENT	Indicates the battery commissioning current value.	10÷20% (1-20% for NiCd)
•	BATTERY RECHARGE EQUALISATION VOLTAGE	Sets the equalisation voltage value.	2,20÷2,50
•	BATTERY RECHARGE TEMP COMPENSATION	Sets the recharge voltage compensation value according to the battery temperature (not present with external battery cabinets.	YES/NO
•	BACKFEED TYPE	Sets the type of backfeed protection.	DISABLE 1. BYPASS 2. BYPASS-INPUT ALONE 3. BYPASS-INPUT COMMON
•	BATTERY TEST TEST EVERY XX DAYS	Sets the frequency rate of the battery test in days (zero = do not perform the test).	0÷180
•	POWER SHARE PLUG1 TYPE	Selects the configuraton of power share required (see paragraph 10.5).	STANDARD EMERGENCY LIGHTING REMAINING TIME RESIDUAL CAPACITY
•	POWER SHARE PLUG1 VALUE	Sets the required intervention value (minutes for remaining time and Ah for capacity) (optional).	
•	POWER SHARE PLUG2 TYPE	As plug1 type (optional).	
•	POWER SHARE PLUG2 VALUE	As plug1 value (optional).	
•	POWER SHARE PLUG3 TYPE	As plug1 type (optional).	
•	POWER SHARE PLUG3 VALUE	As plug1 value (optional).	
•	SERIAL LINK BAUD RATE	Inserts the serial communication parameters.	1200/2400//4800/9600
•	SERIAL LINK PARITY	Inserts the serial communication parameters.	odd/even/none
•	SERIAL LINK BIT NUMBER	Inserts the serial communication parameters.	8-9
•	SERIAL LINK STOP BITS	Inserts the serial communication parameters.	0-1
•	LAN IP STATICO XXX . XXX . XXX .XXX	Sets the static IP address of the LAN	255.255.255.255
•	SERIAL LINK JBUS SLAVE NUMBER	Sets the mimic panel jbus node	1/15
	DATE AND TIME	Sets the date and time	DD/MM/YY HH:MM
•	EXTENDED COMMAND	Enables/Disables the mimic panel extended commands	YES/NO
•	REMOTE COMMAND	Enables/disables the remote controls	YES/NO
	BUZZER	Enables/Disables the buzzer	YES/NO
	LCD CONTRAST	Sets the LCD display contrast	0/100
•	STATISTICS PERIOD	Indicates the time in weeks for the calculation of statistics	1/10
	SYNOPTIC CAN NODE	Indicates the can bus node for the mimic panel	1/6
•	GSS TIME DELAY	Sets the generator start up delay time (visible only when the GSS PCB is installed)	1-60 MINUTES
GSS BATT. CAPACITY MINIMUM		Sets the minimum battery capacity to start up the generator (visible only when the GSS PCB is installed)	20-80%
E-SERVICE TYPE		Select e-service operating mode	NONE, MODEM, SMS
E-SERVICE TELEPHONE NUMBER		Insert the phone number to call for e-service messages	MAX 20 CHARACTERS
OUTPUT TRANSFORMER TYPE		Set the output trasformer type if present	SETTABLE ONLY BY AFTER SALE SERVICES
OUTPUT TRANSFORMER VOLTAGE		Set the output trasformer voltage	SETTABLE ONLY BY AFTER SALE SERVICES

CONFIGURATIONS menu		
A Parameter	Description	Allowed values
INPUT TRANSFORMER PRESENT	Enable/Disable the input voltage measure with transformer	SETTABLE ONLY BY AFTER SALE SERVICES
AUX TRANSFORMER VOLTAGE	Set the auxiliary voltage measure with transformer	SETTABLE ONLY BY AFTER SALE SERVICES
INPUT TRANSFORMER VOLTAGE	Set the input voltage measure with transformer	SETTABLE ONLY BY AFTER SALE SERVICES

"Service code" menu.

This displays the service code to be sent to the support service to make an accurate and rapid diagnostic of the problem. In the event of a fault, select the menu **SERVICE** > **SERVICE CODE** and inform the support centre of the code displayed.

6.1.3.5-1

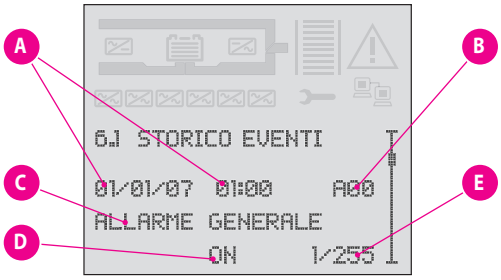


6.1.3.6 "Event Log" menu.

Shows a list of UPS events in chronological order.

It allows the user to analyse UPS operation with regard to variations in the power supply, load or the environment.

6.1.3.6-1



Legend.

A Shows date and time of event.
B Shows the event code.
C Describes the event.
D ON/OFF status of event.
E Progressive number of event.

6.2 MIMIC PANEL CONCENTRATOR.

In systems with 2 or more UPS units connected in parallel, advanced mimic panels can provide an overall view of the system and a detailed view of the UPSs in a single point.
During the installation phase, one of the UPSs and the relative mimic panel is defined as the concentrator. It is then possible to manage and install in one step all the options required for external communication.

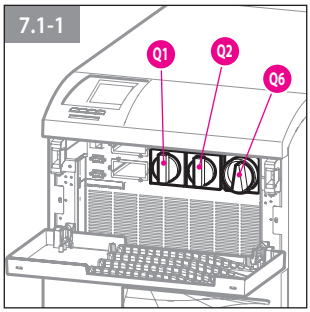
6.2.1 Keyboard blocking procedure.

Is possible to block/unblock the keyboard using the buttons in following sequence: **ENTER**, **UP** ∧, **DOWN** ∨, **ESC** (pressed for over 3 seconds). The sequence must be done in no more than 15 seconds.

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.

7.1 OPERATING PROCEDURES FOR THE 10-40 kVA RANGE.



7.1.1 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.

7.1.2 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 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).

7.1.3 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.

7.1.4 Switching onto manual bypass.

Switching onto the manual bypass creates a direct connection between the UPS input and output, completely excluding the equipment control part.

This operation is performed in the event of ordinary 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 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.

7.1.5 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 EFFICIENCY MODE** command from the **COMMANDS** > **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.

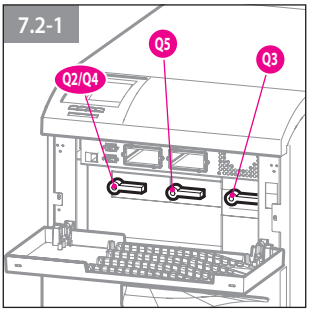
- From the mimic panel set the **NORMAL OPERATION** command from the **COMMANDS** > **IMMEDIATE COMMANDS** menu.

7.1.6 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 by means of 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.

7.2 OPERATING PROCEDURES FOR THE 60-80 kVA RANGE.



7.2.1 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.

7.2.2 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).

7.2.3 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.

7.2.4 Switching onto manul bypass.

Switching onto the manual bypass creates a direct connection between the UPS input and output, completely excluding the equipment control part.

This operation is performed in the event of ordinary 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.

7.2.5 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.

7.2.6 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.

8.1 MULTILEVEL COMMUNICATION.

MASTERYS™ is able to manage a variety of serial, contact and Ethernet communication channels simultaneously.

The various PCBs and signalling accessories are inserted in the two standard communication slots. This gives MASTERYS™ immediate interfacing and integration flexibility as soon as the unit is installed with no need for trained personnel.

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

5 communication levels

	Slot 1	Slot 2	RS 232/485	RS 232	RJ45 10BT
ADC card	●	●			
GSS card	●	●			
NetVision card	●[2]	●[2]			
UniVision pro			●		●[4]
Remote Panel			●		
BMS			●[1]	●[1]	●[4]
Modem				●[3]	
LAN (ethernet)					●

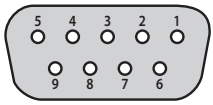
[1] Building Management System.

[2] Ethernet adapter with Web/SNMP 10/100Mb functions (E-service via Web required).

[3] For T-service via telephone network.

[4] By jbus tunnelling on TCP/IP.

8.1-1



Legend 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

Legend pin Modem C2

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

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 PCBs installed in the slots.

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

ENGLISH

ENGLISH

8.2 STANDARD LAN WEB PAGE.

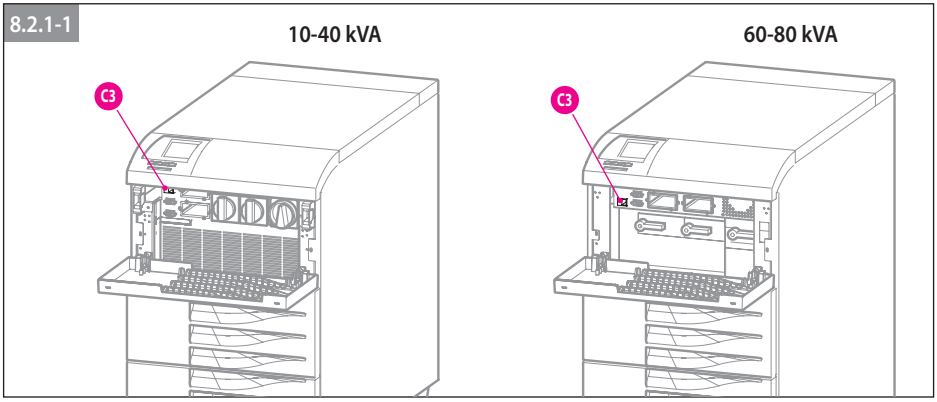
By connecting the UPS to a standard LAN network, the operating status of the UPS can be monitored from any PC connected to the network through an html page.

8.2.1 Activation.

Comply with the following operations to activate the monitoring system:

- Connect the UPS to the LAN network (connector **C3** in Fig. 8.2.1-1).

8.2.1-1



A. If the BOOT DHCP protocol is enabled in the local network: verify the IP address shown in the **PARAMETERS** > **PRESENT CONFIG** > **LOCAL AREA NETWORK IP** menu on the UPS mimic panel (go to point C).

B. If the BOOT DHCP protocol is not enabled in the local network:
Foreword: the following is applicable only if the user is in possession of the administrator rights, otherwise the procedure indicated below is only valid if using a stand-alone PC (i.e. not in a network of computers with administrator privileges) and a network twisted cable.

Deactivate DHCP mode in the **COMMAND**> **EXT.COMMAND**> **DHCP DISABLE** menu on the UPS mimic panel.

Read the IP address given in the **PARAMETERS** > **PRESENT CONFIG** > **LOCAL AREA NETWORK IP** menu on the UPS mimic panel (by default 192.168.7.19).

From a PC connected to the network add the address read by means of the following command: Route add 192.168.7.19 210.67.192.147 (assuming 210.67.192.147 to be the IP address of the PC being used).

C. Open an internet browser and key in the address http://XXX.XXX.XXX.XXX and press send (where xxx.xxx.xxx.xxxx is the IP address read on the mimic panel).

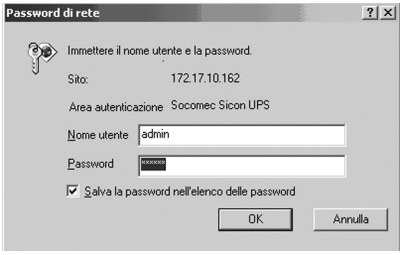
D. A login and a password will be requested (fig. 8.2.1-2), the default parameters are:

- login: admin
- password: public

Insert data and click OK.

The main web supervisor page will be displayed and the functions are described in the following paragraph.

8.2.1-2

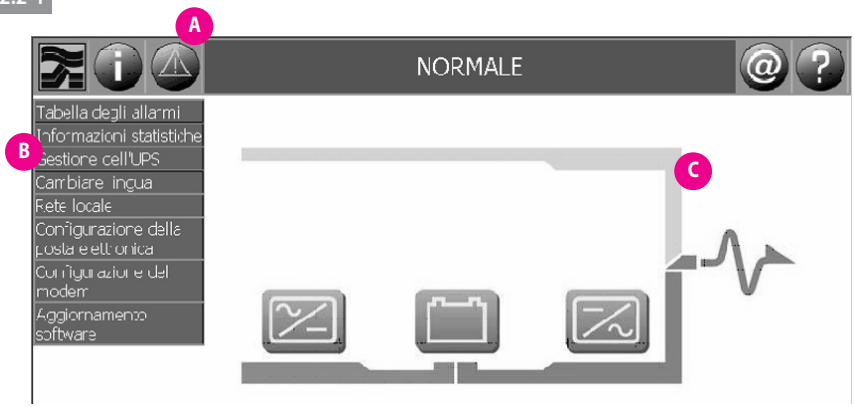


8.2.2 Description of the functions available.

The main web page shows the general status of the UPS.

This page like all the "sub-pages" are dynamic i.e. the data, images or type of messages shown vary in accordance with the UPS status and configuration.

8.2.2-1



Legend.
A Navigation bar.
B Menu bar.
C system information area.

ENGLISH

8.2.2.1 Navigation bar.

Consult the on-line guide for details about the various icons.
The graphics interface shows a number of icons, each of which is associated to a specific function:

Connection to the **www.socomec.com** web site. Regularly check the news that the SOCOMEC group publishes on the site so as to take full advantage of the MASTERYS™ unit.

UPS information: Serial number, type, power, etc.

Alarm present: shows the alarms table (this icon appears when the UPS detects an anomaly).

Generator operating mode (this icon appears when the UPS is powered by the generator).

Technical support department e-mail address. This connection opens the e-mail program and automatically fills in the addressee and subject lines.

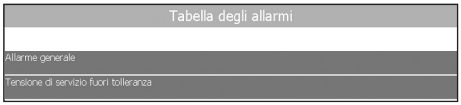
Information on the network interface: a help page in html is loaded.

8.2.2.2 Menu bar.

The menu bar displays links to html pages that provide detailed information on the unit and describe how to configure special options.

8.2.2.3 List of alarms.

Shows the list of alarms present in table form.

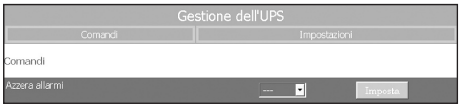


8.2.2.4 Statistics.

The counter folder shows the number of events that have occurred over a given period of time

The average minimum and maximum values of a measurement can be seen by clicking on the measurement folder.
A sampling time from one to 10 weeks can be set by clicking on the period folder.

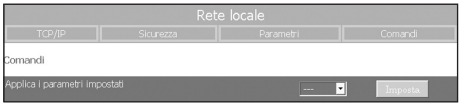
8.2.2.5 UPS management.
The commands folder shows the commands that can be sent to the UPS.
The setting folder shows the parameter settings on the UPS.



8.2.2.6 Change language.
Click on the relative flag to choose a different language. If the desired language is not listed, see if it is downloadable from the **www.socomec.com** web site.
Refer to the chapter on software updating for instructions on how to install a new language.

8.2.2.7 Local network.
Enable the user to modify the network communication parameters.

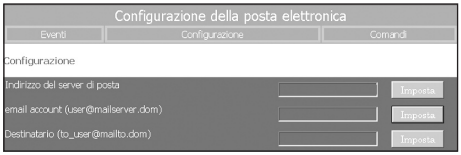
- **Dynamic IP address**: if enabled, the IP address is automatically assigned by the network server
- **Static IP address**: the IP address is used if the dynamic IP address is disabled.
- **Network mask**: this is used if the dynamic IP address is disabled.
- **Gateway**: the gateway address used to send TCP/IP data out of the local network.

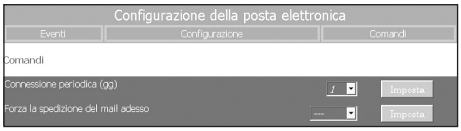


- **Password**: allows the user to change the password to access the html. To authorise access only to users that have a password. Insert the new password and write it down in case of need.
- **JBUS TCP/IP Port**: used to accept a JBUS frame through LAN tunnelling
- **Client JBUS IP address to be authorised**: if a specific IP address is inserted in this box, then only that address/user will be able to access the html pages. If the address 0.0.0.0 is used, all the PCs on the network will be able to access the supervisor (one client at a time). If the address 255.255.255.255 is inserted, access will be denied to all users.
- **Software updating**: if on, allows the supervisor to be updated.
- **Page refresh (sec)**: the page refresh rate can be set.
- **Installation**: text string used to describe the UPS installation site, which is useful if there are more than one unit connected (this value is inserted in SMS messages or e-mails).
- **NTP Server**: indicates the IP address of the time server to automatically update the date and time on the system.
- **GMT Correction (minutes)**: indicates local time and the offset in minutes with respect to the zero meridian of Greenwich
- **Apply the parameter settings**: restarts the monitoring system with the new settings.

8.2.2.8 Configuring e-mail.

This menu lets the user configure parameters for sending e-mails.

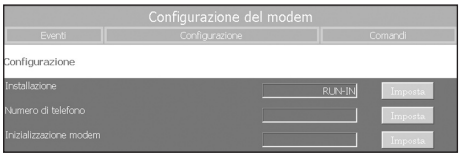




- **Event that will send an e-mail**: as required, the e-mail may be deactivated or activated to send a message in the event of serious alarms or for all alarm conditions.
- **E-mail server address**: insert the IP address (xxx.xxx.xxx.xxx) of the SMTP e-mail server from which you wish to send messages
- **E-mail account**: insert the UPS e-mail (we recommend that an e-mail address be created for the UPS as if it were a normal e-mail user)
- **Addressee**: insert the e-mail address to which the alarm messages will be sent.
- **Periodic connection**: set the frequency at which an e-mail is to be sent to verify the connection.
- **Force an e-mail to be sent now**: by selecting "execute" a test e-mail will be sent.

8.2.2.9 Modem configuration.

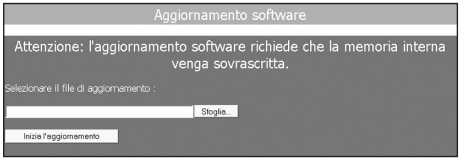
This menu lets the user configure the parameters of a modem



- **Rings before reply**: sets the number of rings before the reply is activated.
- **Outgoing call:** sets the type of outgoing call: SMS or E- service (to activate e-service a contract to the support centre is required).
- **Reason for callout**: set the reasons for the call (all alarms or for serious faults).
- **Installation**: text string used to describe the UPS installation site, which is useful if there are more than one unit connected (this value is inserted in SMS messages or e-mails).
- **Telephone number**: insert the number to be called.
- **Modem initialisation**: initial string to be sent to the modem (for special configurations or certain types of modem).
- **Connection period**: set the number of days between two calls even if no faults occur.
- **Force an outgoing call**: by selecting "execute" a test connection is immediately carried out.

8.2.2.10 Software updating.

This html page is used to update automatically the monitoring software, which could be useful to add new languages or the SNMP function.

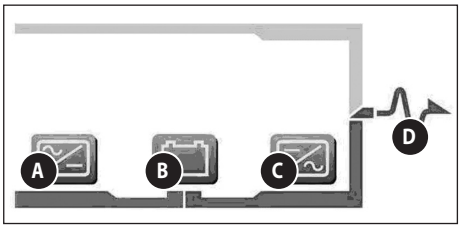


Once the file has been acquired (by requesting it from the support service) select it with the browse button.

Click on the "start update" button; once the update has been completed, reload the html page.

8.2.2.11 System Information Area.

This area of the screen page shows the measurements and the UPS operating mode.



- **Click on icon A** to display the input measurements.
- **Click on icon B** to display the battery measurements.
- **Click on icon C or D** to display the output measurements

ENGLISH

8.3 ACCESSORIES AND SW OPTIONS.

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

UNI VISION PRO is the solution for managing a UPS connected to the local server via RS232 interface or via LAN network. It is normally used at departmental level to automatically shutdown the systems and ensure secure control of the UPS that in turn protect servers and workstations.
The main functions are:

- Graphic monitoring of the UPS via web browser
- Local shutdown of a server connected via serial interface
- Remote shutdown via proxy agent and optional Java shutdown clients
- Notification of anomalies via e-mail to a maximum of 8 addresse.

NET VISION is a solution for managing UPS units connected directly to the local network. It is normally used on medium/large, complex networks and in multi-server environments where the IT manager centrally controls all the network resources. The physical position of the UPS is not significant.
The main functions are:

- 10/100Mb Ethernet connection (RJ45)
- Graphic monitoring of the UPS via web browser
- Remote shutdown of up to 40 computers
- Notification of anomalies via e-mail to a maximum of 8 addresses
- UPS management using SNMP protocol
- Diagnostics via Internet offered by e-Service.

Java & .NET shutdown Client (JNC) is an optional Java application to be installed on a server for the automatic shutdown of the computers on the network before the UPS stops due critical operating conditions (imminent battery failure, overload, etc.). It is supplied as an option and can be associated to the UNI VISION PRO or NET VISION communication solutions.
The main features/functions are:

- Use of the TCP/IP standard network protocol
- Graphics interface for easy configuration
- Minimum use of CPU resources
- Personalisation of shutdown parameters and script
- Continuous monitoring of the efficiency of the connection to the UPS.

T.SERVICE

T.SERVICE This is a cutting edge supervision service ensuring 24 x 7 service. It ensures effective prevention and constant monitoring of the system.
Communication between the UPS and the local technical support centre is via Internet with the help of NetVision (via the mail-server on the same network).
Any emergency situation is managed and resolved extremely quickly and remotely by the Support Centre, with immediate intervention on site if needed.
The auto-diagnostic system analyses UPS operating conditions, identifies faults and monitors environmental conditions such as temperature, overload, etc, avoiding the risk of equipment stoppages. In the event of a failure, the system immediately sends a diagnostic report via e-mail or modem to the support centre.

The alarm messages displayed enable an 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, the corrective actions will be carried out by the After Sales Department.

9.1 SYSTEM ALARMS.

- **A02: output 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 needed, disconnect any loads that do not need uninterruptible power.
  Important!
  The accepted overload time limit is defined in the technical specifications. When this time limit is exceeded, the loads will no longer be powered by the inverter.

- **A06: auxiliary mains out of tolerance**.
  The auxiliary mains exceeds the acceptable tolerance values. Possible causes are:
  - No voltage or frequency present or voltage and frequency out of acceptable values (see the technical specifications).
  - The frequency is subject to continuous variations (typical with power supplied from an incorrectly sized GE).

- **A07: temperature over the limits.**
  The technical plant temperature is higher than the maximum value recommended.
  Check the ventilation or air conditioning system in the UPS room.

- **A08: maintenance bypass activated.**
  For 10 to 40 kVA UPS models, the output disconnecting switch Q6 is in position 2 (maintenance bypass).
  For 60 and 80 kVA UPS models, the Q5 maintenance bypass switch Q5 is closed.
  The load is therefore powered directly by mains power supply. See Chapter 7.1.4 or 7.2.4 for more information.

- **A17: improper conditions of 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: input mains out of tolerance.**
  The input mains is not present or not sufficient (voltage and/or frequency values incorrect with reference to the technical data); if there is no input mains outage, check if no protections upstream of the UPS have tripped.
  Check that 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 PCB inputs has been activated; check the situation of the devices connected to this PCB.
- **A56, A57: generator general alarm.**
  The generator has sent an alarm; check directly on the GE.
- **A61: wrong phase cycle direction.**
  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 that the battery switch is closed.
- **A18: inverter blocked due to overload.**
  Reduce the load rate applied to the UPS and reset the alarms.
- **A20: wrong configuration.**
  Error in the configuration parameters; please contact the support service.
- **A30: block due to overload.**
  Reduce the load rate applied to the UPS and reset the alarms.
- **A42: T.Service general alarm.**
  The MASTERYS™ products can be remotely serviced. This alarm indicates that a procedure for analysing the UPS failure has been activated by the support centre (if an e-service contract has been concluded).
- **A44: programmed control.**
  The equipment has to undergo periodic checks by the support service in order to ensure optimum performance and efficiency. If the "Programmed Control" signal appears on the mimic panel, the equipment should be inspected by an adequately trained technician.
- **A59: battery circuit open.**
  Battery switch open.
- **A60: fan failure.**
  Fault in the ventilation system; check that the air inlet at the front and the air outlet at the back of the UPS are not obstructed.

ENGLISH

9.3 PREVENTIVE MAINTENANCE.

We would like to inform you that specialised periodic maintenance (with yearly frequency) is recommended for the MASTERYS™, in order to offer optimum operating efficiency and avoid downtime of the equipment.
It is strongly recommended to give due consideration to any requests for preventive maintenance automatically displayed with alarm message M29 (refer to paragraph 6.2.3.1).
All operations on the equipment must be only carried out by SOCOMEC UPS personnel or by 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 state of the battery is fundamental to UPS operation.
Thanks to the **Expert Battery System**, the information relating to the state and the conditions of use of the battery are processed in real time and the 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™ stores statistics on the conditions of use of the battery for analysis.
Since the expected life of the batteries is very much dependent on operating conditions (number of charging and discharging cycles, load rate, temperature), a periodic check by authorised personnel is recommended.

When replacing the batteries, use the same type and configuration by placing them in the appropriate containers so as to avoid the risk of acid leakage.
The replaced 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 life of the fans used to cool the power parts is dependent on the using and environmental conditions (temperature, dust).
Preventive replacement by an authorised technician is recommended within four years (in normal operating conditions).

When needed, fans should be replaced as per specifications by SOCOMEC UPS.

9.3.3 Capacitors.

The equipment houses electrolytic capacitors (used in the rectifier and inverter section) and filtering capacitors (used in the output section), whose life is dependent on using and environmental conditions.
The average expected life of these components is shown below:

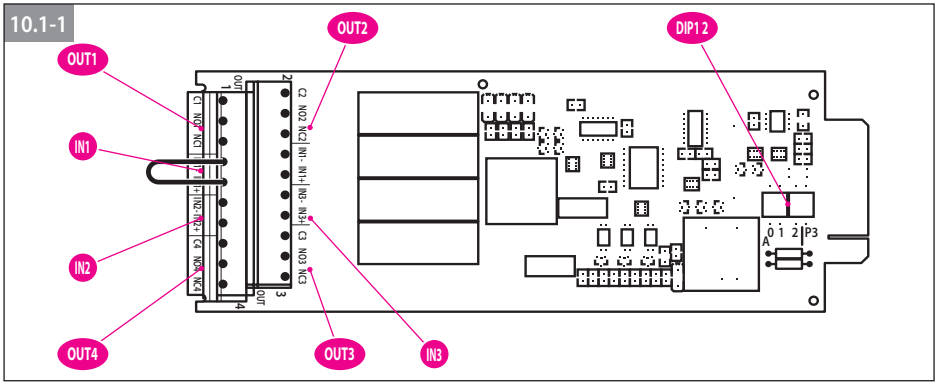
- Electrolytic capacitors: 5 years;
- Filtering capacitors: 7 years.

In any case the effective state of the components is verified during preventive maintenance.

ENGLISH

10.1 ADC CARD.

This card can be configured to control up to four outputs that are normally closed or normally open and up to three digital inputs. A maximum of two cards can be installed on each unit. The card must be inserted in slot S1 or S2 (10-40 kVA: see paragraph 5.1; 60-80 kVA: see aragraph 5.3).



Up to four operating modes can be selected using the two DIP switches 1 or 2.

- The filter level indicates:

  1 immediate activation (1 seconds minimum communication time) - **2** 10 s delay - **3** 30 s delay.

Mode 1 - STANDARD configuration

Position dip1	Position dip2	IN/OUT	Description	Filter level
OFF	OFF	Out 1	General Alarm	2
OFF	OFF	Out 2	Battery discharging	3
OFF	OFF	Out 3	Battery low or imminent stop	2
OFF	OFF	Out 4	UPS on by-pass	2
OFF	OFF	In 1*	E.S.D.	1
OFF	OFF	In 2	Supply from GenSet	1
OFF	OFF	In 3	Isolation controller	2

Mode 2 - POWER SAFE configuration

Position dip1	Position dip2	IN/OUT	Description	Filter level
ON	OFF	Out 1	General Alarm	2
ON	OFF	Out 2	Power safe plug 1	2
ON	OFF	Out 3	Power safe plug 2	2
ON	OFF	Out 4	Power safe plug 3	2
ON	OFF	In 1*	E.S.D.	1
ON	OFF	In 2	Supply from GenSet	1
ON	OFF	In 3	Management of energy consuption	1

Mode 3 - SAFETY configuration

Position dip1	Position dip2	IN/OUT	Description	Filter level
OFF	ON	Out 1	General Alarm	2
OFF	ON	Out 2	E.S.D. activation	1
OFF	ON	Out 3	Battery low or imminent stop	2
OFF	ON	Out 4	E.S.D. activation	1
OFF	ON	In 1*	E.S.D.	1
OFF	ON	In 2	External alarm A39	2
OFF	ON	In 3	External alarm A40	2

Mode 4 - ENVIRONMENTAL configuration

Position dip1	Position dip2	IN/OUT	Description	Filter level
ON	ON	Out 1	General Alarm	2
ON	ON	Out 2	Over-heating	2
ON	ON	Out 3	Overload / Loss of redundancy	2
ON	ON	Out 4	External alarm In2	2
ON	ON	In 1*	E.S.D.	1
ON	ON	In 2	External alarm A39	2
ON	ON	In 3	External alarm A40	2

*if the external E.S.D. button is not used, always insert a jumper to short circuit input IN 1 (Figure 10.1-1).

ENGLISH

Description of signals	
Message on the mimic panel	**Description**
General Alarm	General alarm contact output: • No Alarm: - NO contact: closed - NC contact: open • Alarm: - NO contact: open - NC contact: closed
Battery discharging	Battery discharging contact output
Battery Low or Imminent stop	Battery low voltage and imminent shutdown contact output
UPS on bypass	UPS on bypass contact output
E.S.D.	Contact input for emergency shutdown device
Supply from GenSet.	Generator ready signal input
Isolation controller	Isolation leakage controller 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 battery low
Management of energy consumption	Input for the battery to help providing energy in the event of peak consumption
E.S.D. activation	Shutdown for E.S.D. contact output
Over-heating	Internal over-heating contact output
Overload/Loss of redundancy	Overload / loss of redundancy contact output

Intervention of the E.S.D. input switches off the UPS output.
To restore the UPS to operation:
- **Close the E.S.D. contact on "In 1" on the ADC board.**
- **Give the reset alarms" command.**
- **Run the start procedure**

10.1.1 ADC card installation.

- Set the operating mode by means of the **DIP switches 1 and 2**
- If the external ESD contact is not used, check that there is a jumper between pins **IN1+** and **IN1-**. If there is no jumper, the UPS cannot be started when the card is inserted in the slot.
- Connect the signal cables to the card terminals
- Insert the card in a free slot
- Secure the card with the appropriate screws.

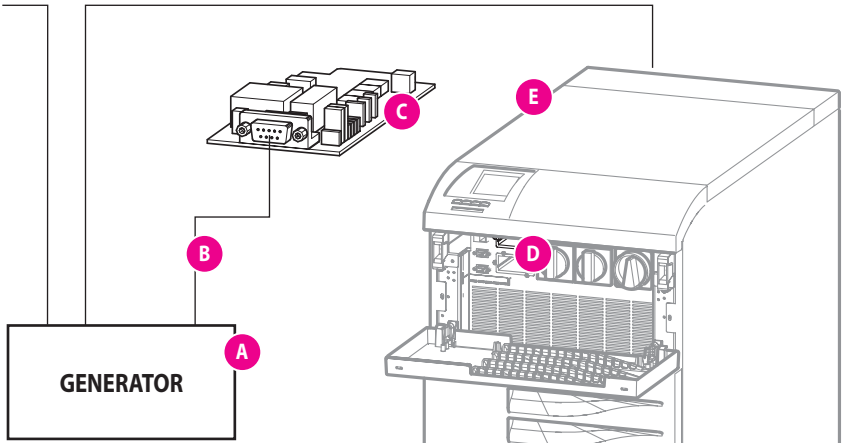
10.1.2 Electrical data.

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

10.2 KIT GSS (GLOBAL SUPPLY SYSTEM).

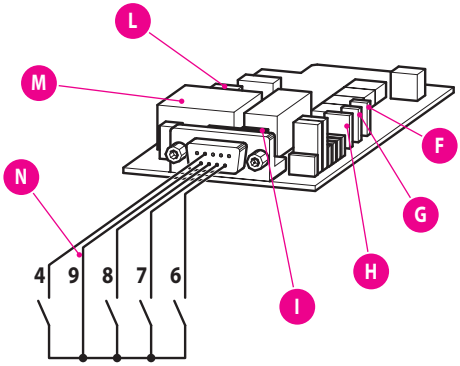
This kit optimises generator sizing and control when connected to the UPS input. Follow the wiring layout shown in figure 10.2-1.

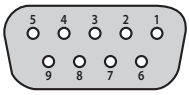
10.2-1



Legend.

A Generator
B Connection cable
C GSS PCB
D Free slot for the PCB
E UPS MASTERYS™
F XJ5 jumper
G XJ4 jumper
H XJ3 jumper
I XJ2 jumper
L Jumper for buzzer
M Buzzer
N External contacts





Legend pin DB9 serial connector

1 Common relay
2 Contact relay
3 Not connected
4 Input 1(powered by generator)
5 Not connected
6 Input 2 (GE working conditions OK)
7 Input 3 (GE failure)
8 Input 4 (GE preventive alarm)
9 Common inputs

Functions available on the GSS card:

- **4 external inputs** to monitor the generator set. The contact at each input must be voltage-free and activate the signal when closed to the common input:
  - **pin 4 "Input 1"**: this contact must be closed when the generator set is used to power the UPS.
  - **pin 6 "Input 2"**: this contact must be closed when the generator set is operating normally.
  - **pin 7 "Input 3"**: this contact must be closed when an alarm condition occurs on the generator set that does not impede its operation (e.g. low fuel, etc.)
  - **pin 8 "Input 4"**: this contact must be closed when an alarm condition occurs on the generator set that impedes its operation (engine failure, no oil, etc.)
  - **pin 9 "Common input"**: the common point for the contacts of the single relays listed above.
- **1 dry-contact relay for "Notification signal from UPS to the generator set ("generator call")**: this is used to activate the generator set start up sequence when a power failure lasts longer that the time set in the UPS configuration and/or battery discharge reaches the minimum safety level. The contact can be configured as normally open or closed using the XJ2 jumper. Maximum current and voltage is 500 mA at 60 Vac.
- **"Simple" operation.**
  The generator set performs an auto-start up due to the power failure. The signal sent by the generator set (dry contact activated when the UPS is powered by the generator set) must be connected between inputs 1 and 2 (short circuit) and the common inputs. Inputs 3 (GE alarm) and 4 (GE failure) which respectively generate alarms A56 or A57 on the UPS, are to be considered options. The dry contact (generator call signal) is not used in "Simple" operation.
- **"Advanced" operation.**
  The generator set is activated according to the parameters set by the user on the UPS depending on how long the power failure lasts or when the remaining battery backup time is reached. Until these conditions occur, the generator set will remain blocked by the "generator call" contact. Subsequently, a change of status on the same contact will start up the generator set that will send the "Generator running signal (input 2) and then "powered by GE" (input 1). The alarms on Input 3 (GE alarm) or 4 (GE failure) are used by the UPS to generate the A56 or A57 alarms. When alarm A57 occurs, the generator set is disabled using the "generator call" signal.

  Note.
  In both operating states, an electric and/or electromechanical locking mechanism must be used to prevent the simultaneous supply of voltage to the UPS by the generator set and by the main supply.

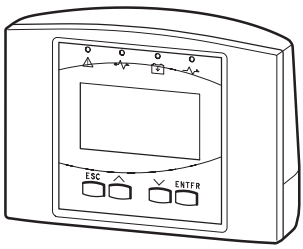
10.3 ISOLATION CONTROLLER.

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

10.4 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 standard; 50 m cable available as an option). Connect the RS485 cable supplied onto port C1 of the unit (see figure 5.1-1). Refer to the relevant user manual for instructions on how to use the device.

10.3-1



10.5 POWER SHARE.

10.5.1 General information.

The POWER SHARE function can be used to programme the supply of energy to the loads connected to the POWER SHARE terminal board via the mimic panel or the NET-VISION option (Network Integrator).
The loads powered from this plug may have a lower priority than the privileged applications connected to the main plug and may be excluded in critical situations.

10.5.2 Operating modes.

- **"Standard".**
  In standard configuration, the load connected to the POWER SHARE plug is disconnected if one of the following conditions is verified:
- Mains failure >10 seconds and load rate > 85%.
- Mains failure >30 seconds and "battery low" condition
- In the presence of mains with overload > 15 seconds

- "**Residual capacity"**
  In the Residual capacity configuration, the load connected to the POWER SHARE plug is disconnected if one of the following conditions is verified:
- One of the standard conditions.
- The residual battery capacity is lower than the value set on the mimic panel.

- "**Remaining back-up time"**
  In the remaining back-up time configuration, the load connected to the POWER SHARE plug is disconnected if one of the following conditions is verified:
- One of the standard conditions is verified.
- The residual battery back-up time is lower than the value set on the mimic panel.

- **"Emergency lighting".**
  In an emergency lighting configuration, the load connected to the POWER SHARE plug operates with inverse logic, i.e. it is connected if the following condition is verified: the mains is not present.

The time taken to activate the power share plug is, according to the EN50171 standard, considered an average activation (delay comprised between 0.5 and 15 seconds) .

ENGLISH

- **Time after failure.**
  With the NET-VISION option only, the shutdown of the load connected can be programmed in accordance with the back-up time of the UPS. On return of the nominal mains parameters, the plug operating conditions are restored.

If the UPS is out of service, the power share plug nevertheless powers the load connected to it by operating in permanent configuration.

THE LOAD CONNECTED TO THE POWER SHARE PLUG IS ALWAYS POWERED, REGARDLESS OF THE CONFIGURATION SELECTED.

Maximum current that can be drawn from the power share terminals: 16 A 250 Vac Ac3 3-phase.

10.6 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.

10.7 ACS PCB.

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

10.8 SEPARATE AUXILIARY POWER SUPPLY.

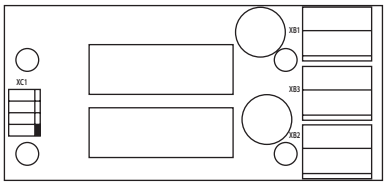
This allows the use of an auxiliary energy source other than the primary mains power supply in the event of outage.

10.9 EXTERNAL BACK-FEED PROTECTION.

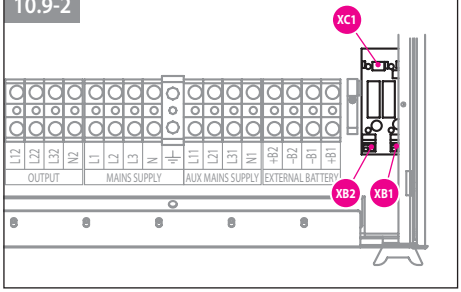
External devices can be installed to protect against the backfeed of dangerous currents, both on the MAINS SUPPLY and on the AUX MAINS SUPPLY. These devices are controlled by the BKF PCB shown in figure 10.9.1.
The BKF PCB is installed in the position shown in figure 10.9.2.

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

10.9-1



10.9-2

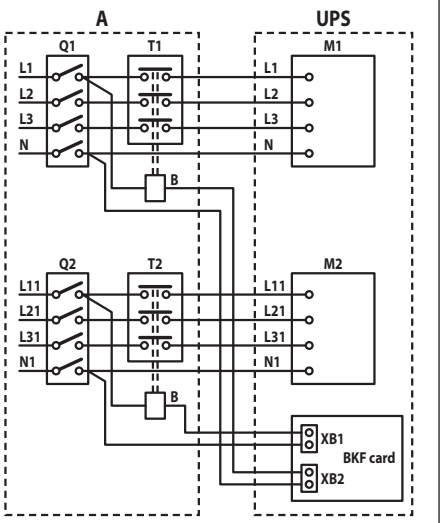


10.9.1 Protection on Mains Supply and on Auxiliary Mains Supply.

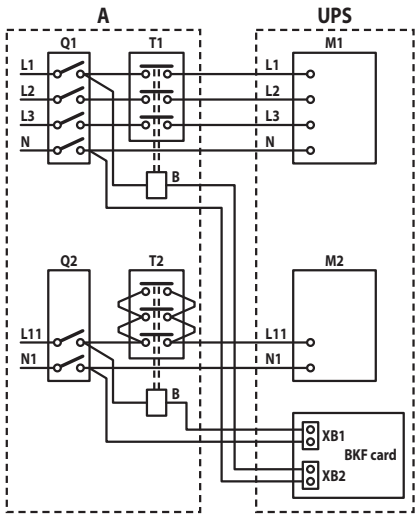
Activating UPS protection on the mimic panel: access the **Configuration** menu on the mimic panel (see the **Configuration** Menu section in the manual) and set the **BACKFEED TYPE** parameter to **2.BYPASS-INPUT Alone**.

Diagram of principle.

10.9.1-1 UPS 3/3 with separate auxiliary supply.



10.9.1-2 UPS 3/1 with separate auxiliary supply.



Legend.

A	Distribution panel
B	Coil remote 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
10 3/1	32 A AC1	45 A AC1
15 3/1	32 A AC1	45 A AC1
20 3/1	45 A AC1	60 A AC1
10 3/3	32 A AC1	32 A AC1
15 3/3	32 A AC1	32 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
60 3/3	125 A AC1	125 A AC1
80 3/3	140 A AC1	140 A AC1

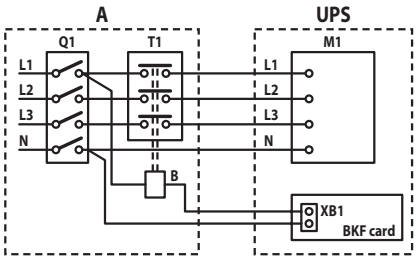
ENGLISH

10.9.2 Protection on an UPS without auxilary mains supply.

Activating UPS protection on the mimic panel: access the **Configuration** menu on the mimic panel (see the **Configuration** Menu section in the manual) and set the **BACKFEED TYPE** parameter to **3.BYPASS-INPUT Common**.

Diagram of principle.

10.9.2-1 UPS 3/3 without separate auxiliary supply.



Legend.

A	Distribution panel
B	Coil remote switch
L1-L2-L3-N	Input power source
M1	Input power terminal board
M2	Backup power terminal board
T1	Remote switch[1]
Q1	Input power switch
XB1	Connector on BKF PCB

[1]Remote switches - rated current

Model	T1	T2
10 3/1	32 A AC1	45 A AC1
15 3/1	32 A AC1	45 A AC1
20 3/1	45 A AC1	60 A AC1
10 3/3	32 A AC1	32 A AC1
15 3/3	32 A AC1	32 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
60 3/3	125 A AC1	125 A AC1
80 3/3	140 A AC1	140 A AC1

Attention.

The neutral on the input or the output of the UPS 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 in the output or in some failure conditions (earth leakage, significant phase dispersion or in case of non-isolated neutral system), high potential can be detected. It will therefore be necessary to install either adequate neutral switching or protection system.

Models

	10	15	20	30	40	60	80
Input/Output phases	3/1 and 3/3	3/1 and 3/3	3/3	3/3	3/3	3/3	3/3

Standards

	10	15	20	30	40	60	80
Safety	(EN) IEC 62040-1-1, (EN) IEC 60950-1-1*						
Type and performance	(EN) IEC 62040-3 (VFI-SS-111)						
EMC	IEC 62040-2, EN 50091-2						
Product certification	CE						
Protection level	IP20 (compliant with 60529), IP21 on request						

*TÜV tested

Environment

	10	15	20	30	40	60	80
Operating temperature	0÷40 °C (15÷25 °C recommended for longer battery life)						
Storage temperature	-5÷45 °C						
Relative humidity	0÷95% condensation-free						
Max. altitude	1.000 m (3.300 ft) without derating; 3.000 m (10.000 ft) max						
Acoustic noise (dB)	< 55	< 55	< 55	< 55	< 62	< 62	< 62
Required cooling capacity (m^3/h)	546	546	546	546	1.092	1.330	1.330
Dissipated power max (W)	1.187	1.187	1.738	2.549	3.165	4.500	6.000
Dissipated power (BTU/h)	4.051	4.051	5.933	8.700	10.800	15.360	20.478

Electrical specifications - Input

	10	15	20	30	40	60	80
Mains voltage (three phase + neutral)	400 V ±20% (up to -35% @70% of nominal load)						
Input frequency	50/60 Hz ±10%						
Input power factor	0,99						
THDI	< 3%						

Electrical specifications - Output

	10	15	20	30	40	60	80
Output voltage (three phase + neutral)	230 V single phase (selectable: 220/240 V) ±1% 400 V three phase (selectable 360*/380/415 V) ±1%						
Frequency	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)	8	12	16	24	32	48	64
Overload on mains power supply	125% 10 minutes 150% 1 minute						
Crest factor	3:1						
Voltage distortion	1% with linear load						

*@ 208 V Pout = 90% Pnom

ENGLISH

Mechanical characteristics with standard batteries

Model	Input/Output	kVA	Dimensions (LxPxH mm)	Weight (kg)
MAS2MC110S+C1	3/1	10	444x795x800	190
MAS2MC110M+D1	3/1	10	444x795x1.000	230
MAS2MC110M+C2	3/1	10	444x795x1.000	295
MAS2MC110T+C3	3/1	10	444x795x1.400	410
MAS2MC110T+C4	3/1	10	444x795x1.400	515
MAS2MC115S+C1	3/1	15	444x795x800	195
MAS2MC115M+D1	3/1	15	444x795x1.000	235
MAS2MC115M+C2	3/1	15	444x795x1.000	300
MAS2MC115T+C3	3/1	15	444x795x1.400	415
MAS2MC115T+C4	3/1	15	444x795x1.400	520
MAS2MC120M+D1	3/1	20	444x795x1.000	240
MAS2MC120M+C2	3/1	20	444x795x1.000	310
MAS2MC120T+D2	3/1	20	444x795x1.400	390
MAS2MC120T+D3	3/1	20	444x795x1.400	520
MAS2MC310S+C1	3/3	10	444x795x800	190
MAS2MC310M+D1	3/3	10	444x795x1.000	230
MAS2MC310M+C2	3/3	10	444x795x1.000	295
MAS2MC310T+C3	3/3	10	444x795x1.400	410
MAS2MC310T+C4	3/3	10	444x795x1.400	515
MAS2MC315S+C1	3/3	15	444x795x800	195
MAS2MC315M+D1	3/3	15	444x795x1.000	235
MAS2MC315M+C2	3/3	15	444x795x1.000	300
MAS2MC315T+C3	3/3	15	444x795x1.400	415
MAS2MC315T+C4	3/3	15	444x795x1.400	520
MAS2MC320M+D1	3/3	20	444x795x1.000	240
MAS2MC320M+C2	3/3	20	444x795x1.000	310
MAS2MC320T+D2	3/3	20	444x795x1.400	390
MAS2MC320T+D3	3/3	20	444x795x1.400	520
MAS2MC330M+C2	3/3	30	444x795x1.000	315
MAS2MC330T+C3	3/3	30	444x795x1.400	435
MAS2MC330T+C4	3/3	30	444x795x1.400	540
MAS2MC340T+D2	3/3	40	444x795x1.400	415
MAS2MC360T-00	3/3	60	444x795x1.400	200[1]
MAS2MC380T-00	3/3	80	444x795x1.400	210[1]

[1] Without batteries.

Dimensions