DELPHYS

MP / MP elite mimic control panel

Operating manual GB

socomec
Innovative Power Solutions UPS

Certificate of Warranty

The warranty conditions are stipulated in the sales contract, if not the following points shall apply.

The manufacturer exclusively guarantees his own products against any defect in construction or operation arising from faulty design, materials or workmanship according to the conditions set down below.

The manufacturer, at his discretion, is entitled to adapt his product in order to comply with the warranty or replace the faulty parts. The manufacturer's warranty does not apply in the following cases:

- Defects arising either from designs or parts imposed or supplied by the Purchaser.
- Failure due to fortuitous circumstances or force majeure.
- Replacements or repairs resulting from normal wear of units and machinery,
- Damage or injuries caused by negligence, lack of inspection or maintenance, or improper use of the products.

The period of validity of the warranty may never exceed 12 months after delivery.

Replacements, repairs or modifications of parts during the warranty period cannot extend the duration of the warranty.

For these stipulations to be valid, the Purchaser must, within a maximum of 8 days beyond which the warranty lapses, expressly inform the Manufacturer of the faulty design, or the material or manufacturing defect, stating in detail the grounds for his complaint.

Defective parts replaced free of charge by the Manufacturer are to be put at his disposal, so that he may become the sole owner.

The warranty legally ceases if the Purchaser has, of his own initiative, undertaken modifications or repairs on the Manufacturer's products without the written consent of the latter.

The Manufacturer's liability is limited to the obligations as defined herein (repair or replacement), all other items of damage being formally excluded.

The Purchaser is liable for taxes or duties of any kind in compliance with either the European regulations, or those of the country of import or transit.

FOREWORD

We thank you for the trust you have in our Uninterruptible Power Systems.

This equipment is fitted with up to date technology with power semiconductors (IGBT) and a digital micro-controller.

Our equipment complies with standard IEC EN 62040-2 and 62040-1-2.
CAUTION: “This is a product for restricted sales distribution to informed partners. Installation restrictions or additional measures may be needed to prevent disturbances”.

SAFETY REQUIREMENTS

Using conditions:

Do read carefully these operation instructions before using the UPS and comply with the safety notes mentioned.

Whatever the repairs, they must be made only by authorised staff, who have been suitably trained. It is recommended that the ambient temperature and humidity of the UPS environment are maintained below the values specified by the manufacturer.

This equipment meets the requirements of the European directives applied to this product. As a consequence it is labelled as follows:

CE

REGULATIONS CONCERNED WITH ENVIRONMENTAL ISSUES

Recycling of electrical products and equipment
Provision is made in European countries to break up and recycle materials making up the system. The various components must be disposed of in accordance with the legal provisions in force in the country where the system is installed.

Battery wastes
Used batteries are considered as toxic wastes. It is therefore essential to entrust them solely and exclusively to firms specialised in their recycling. They can not be treated with other industrial or household wastes, as set out in local regulations in force.

CONTENTS

ABBREVIATIONS:
- UPS: Uninterruptible Power Systems
- LCD: Liquid Crystal Display
- SC: Static switch.
- CIM: Commissioning, Inspection and Maintenance Department.

CHAPTER 1: GENERAL

1.1 SCOPE

This document provides required information for operating **DELPHYS MP** and **DELPHYS MP *elite*** systems. It describes the facilities offered on the control panels:

- Scrolling through the menus displayed
- Load transfer onto the automatic and/or maintenance bypass
- System start up or shutdown

The operating instructions refer to the most frequently used configurations, i.e.:

- Single UPS's with bypass
- Modular systems
- Central bypass systems

1.2 PURPOSE AND UPS COMPOSITION

DELPHYS MP and DELPHYS MP *elite* provide:
- very low distortion and high power factor to the upstream power supply,
- voltage and frequency stability as well as continuity of supply to downstream loads –whatever the outages or disturbances on the upstream power supply-.

The system is fitted with double conversion VFI-SS-111 technology.

When the input power supply is present, the UPS acts as a stabilizer. In the event of a utility outage, it acts as a source of electrical power. In such case, the required power is supplied by the battery, which is kept charged when the mains is present.

DELPHYS MP and DELPHYS MP *elite* provide three-phase sinusoidal output. The UPS is composed of:

- 1 fully controlled three-phase rectifier with 6 thyristors or IGBT (DELPHYS MP *elite*),
- 1 three-phase inverter of S.V.M. type (Space Vector Modulation),
- 1 static bypass to transfer the load automatically and without interruption to the bypass supply.
- 1 maintenance bypass, which allows a seamless load transfer to the mains during maintenance operations,
- 1 battery,
- 1 control panel made up of a mimic panel, an 8-line display and an intuitive user interface.

1.3 SAFETY

CAUTION	The equipment can only be switched on or used if the following conditions are fulfilled: - electrical connections comply with the regulation in force (earth bonding, appropriate protections and cross-section of cables) **- all means to comply with the protection index of the system are in place, such as side panels, doors, glands, shields or whatever....**

ADVICE	**- Carefully follow the instructions described in this manual.** **- All operations must only be carried out by personnel who are suitably trained and with authorized access to restricted areas.**

CAUTION	**Do not forget that even when the load is stopped the unit is live**: - because of the mains voltage, the rectifier and the bypass. - because of the voltage generated by the battery and by the rectifier. - because of the load voltage when the maintenance bypass Q5 is closed and the bypass mains is present.

DANGER	**Any operation inside the cabinets is to be completed:** - **once the UPS is stopped and no longer live** - **after 5 minutes, the time for the capacitors upstream of the rectifier and inverter to discharge.** **CAUTION: the residual voltage of the capacitors may still cause heavy electrical arcs after 5 minutes.**

Caution

	While the UPS is operating, this label indicates that the parts are live and therefore the risk of electrical hazard. **All operations behind protection panels must only be carried out by personnel who are suitably trained.**

1.4 LAYOUT OF DELPHYS MP AND DELPHYS MP ELITE SYSTEMS

DELPHYS MP

DELPHYS MP elite

1.5 POWER SUPPLY INPUTS

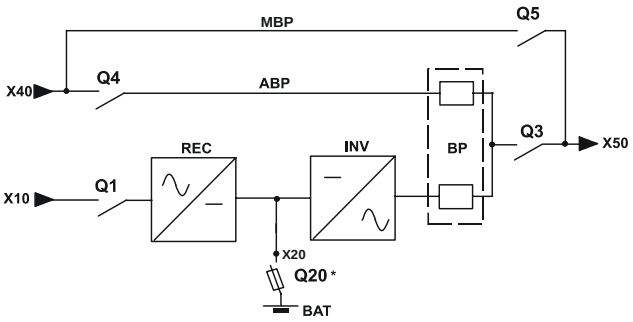
Three power supply inputs are needed to operate the system:

- voltage on input 1 for the supply to the rectifier,
- voltage on input 2 for the supply to the automatic bypass (depending on the system, inputs 1 and 2 can be common),
- the DC voltage for the battery (about 450Vdc).

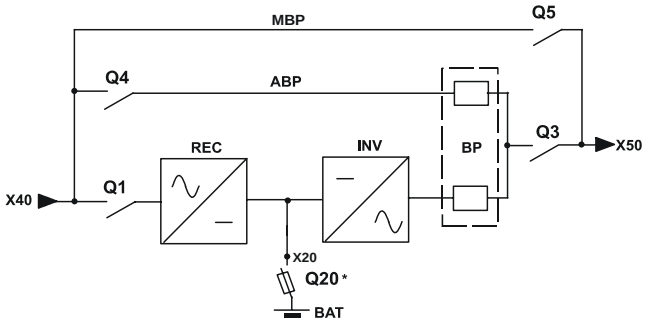
CHAPTER 2: SINGLE UNITS WITH BYPASS

2.1 STANDARD BASIC SCHEMES

SEPARATED RECTIFIER AND BYPASS INPUTS



COMMON RECTIFIER AND BYPASS INPUT



X10 = rectifier input
X40 = bypass input
X50 = to the load
ABP = automatic bypass
MBP = maintenance bypass

BP = bypass facility
REC = rectifier
INV = inverter
* other protection upon request.

NOTE: in any case, see the technical details of the drawing.

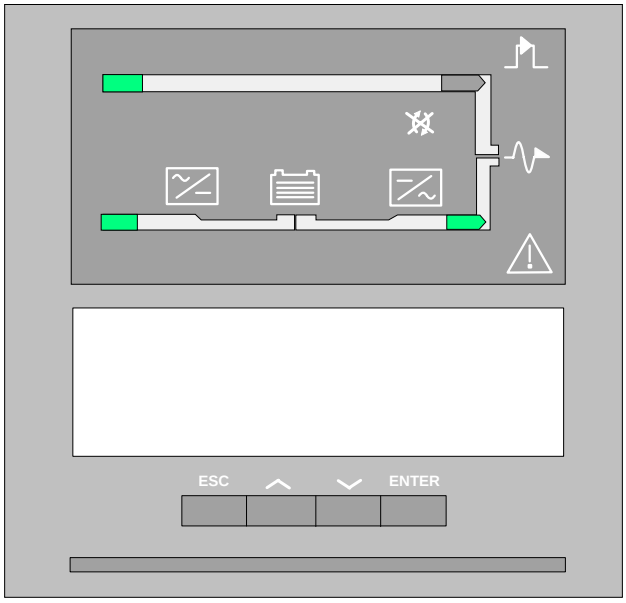
2.2 LAYOUT OF SWITCHES

Description of switches:
Q4: automatic bypass switch
Q3: output switch
Q5: maintenance bypass switch

Note:
Q20: battery protection is located in the battery cabinet or battery enclosure.

Q1: rectifier input switch (optional)

2.3 MIMIC CONTROL PANEL



The control panel is composed of:

- 1 mimic panel
- 1 eight-line LCD display (with up to 40 characters)
- 1 four-key intuitive user interface:
  - 1 validation key (ENTER)
  - 1 ESC key
  - 2 scrolling keys (UP/DOWN)
- 1 luminous status bar

2.3.1 Contrast setting

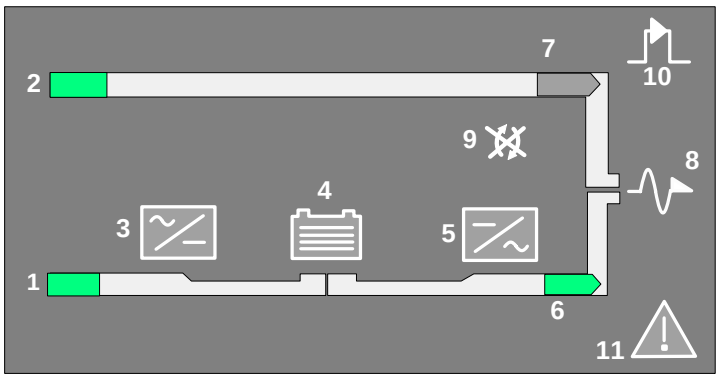
The display contrast is set by the factory. It is automatically adjusted according to the temperature of the technical plant. No setting is required.

2.3.2 Luminous status bar

The status bar provides immediate indication about the operating conditions of the system. The following information can be displayed.

Green bar:	- the load is supplied via the inverter - the load is supplied via the bypass path if in Eco-mode
Yellow bar:	the load is supplied via the automatic / maintenance bypass
Yellow blinking bar:	maintenance mode or maintenance alarm active
Red bar:	the load is not supplied
Red blinking bar:	the imminent shutdown alarm is given

2.4 MEANING OF THE PICTOGRAMS



Rectifier and battery charger

Battery

Inverter

Output to the loads

Transfer impossible

Maintenance bypass

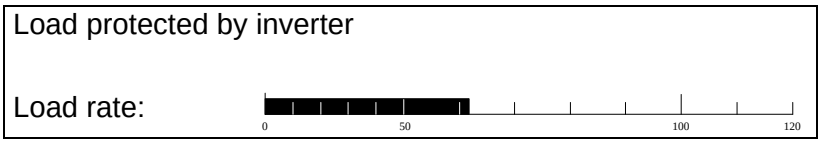
General alarm

2.4.1 Mimic panel description

SYMBOLS	GREEN	YELLOW	RED	BLINKING
1 RECTIFIER INPUT	Within tolerances	Without tolerances		
2 BYPASS INPUT	Within tolerances	Without tolerances		
3 RECTIFIER	ON	Operating and alarm ON		
4 BATTERY	Charged	discharging		Green: charging Yellow: battery alarm
5 INVERTER	ON	Operating and alarm ON		
6 LOAD ON INVERTER	OK	INV switch ON		
7 LOAD ON MAINS	If Eco Mode active	BYP switch ON		
8 LOAD OUTPUT	supplied		OFF	Red: imminent stop
9 TRANSFER		Impossible		
10 MAINTENANCE BYPASS		ON		Yellow: maint. Byp alarm
11 GENERAL ALARM		Alarm ON		Yellow: communication error

2.5 MENU STRUCTURE

From the permanently displayed screen:



Press "**ENTER**" to reach the various menus,
Select the menu with the UP ^ or DOWN v key,
Press "**ENTER**" to reach the various sub-menus,
Select the sub-menu with the UP ^ or DOWN v key,
Validate with the "**ENTER**" key.

LIST OF MENUS		LIST OF SUB-MENUS
MEASUREMENTS	"*ENTER*" ▸	UPS SYSTEM OUTPUT UPS SYSTEM OUTPUT POWER BYPASS. – INVERTER MAINS RECTIFIER - BATTERY
UPS COMMANDS	"*ENTER*" ▸	AUTOMATIC START UP LOAD TO MAINS / LOAD TO INVERTER TRANSFER TO MAINTENANCE BYPASS
OPERATING MODE	"*ENTER*" ▸	ECO MODE PROGRAMMING TRANSFER TO NORMAL MODE
EVENT LOG	"*ENTER*" ▸	SYSTEM
BATTERY	"*ENTER*" ▸	BATTERY TEST INFORMATION BATTERY TEST PROGRAMMING BATTERY MEASUREMENTS BATTERY MANUAL TEST
UPS GENERAL DATA	"*ENTER*" ▸	DIAGNOSTIC CODES REFERENCES
STATUS	"*ENTER*" ▸	UPS SYSTEM STATUS AUXILIARY INPUTS
SUBSET COMMAND	"*ENTER*" ▸	RECTIFIER ON / OFF INVERTER ON / OFF LOAD ON MAINS / LOAD ON INVERTER SHUTDOWN UPS OUTPUT
CLOCK	"*ENTER*" ▸	PROGRAMMING
CONFIGURATION	"*ENTER*" ▸	LANGUAGE BUZZER ACCESS CODE LOCAL / REMOTE
JBUS LINK	"*ENTER*" ▸	PROGRAMMING

Note	Controls are only displayed when available.

2.6 OPERATING A SINGLE UPS

The « UPS COMMANDS » menu is designed for the operation of the UPS.

Note: controls are only displayed when available.

2.6.1 Starting up the UPS

Prior to any operation, please refer to the basic scheme of the system.

Conditions to be completed:
- The system is live,
- wait for the control panels to light up.

Comply with the following chronology procedure:
The UPS is started from the "UPS COMMANDS" menu and the "AUTOMATIC START UP" sub-menu through an interactive procedure. Just follow the instructions displayed and validate with the "ENTER" key.

Display for the automatic start up control:

```
UPS COMMANDS: AUTOMATIC START UP

CONFIRM THE START UP WITH UPS

SYSTEM OUTPUT SWITCHING ON

cancel                          validate
 ESC                              ENTER
```

2.6.2 Load transfer from inverter to mains

The load transfer is achieved from the "UPS COMMANDS" menu and the "LOAD TO MAINS" submenu, which enables the seamless switching from the inverter source to the non protected bypass source. Validate with the "ENTER" key.

Display for the LOAD TO MAINS control:

```
SUBSET COMMAND: LOAD TO MAINS

CONFIRM TRANSFER

TO AUTOMATIC BYPASS

cancel                          validate
'ESC'                            'ENTER'
```

2.6.3 Load transfer from mains to inverter

The load transfer is achieved from the "UPS COMMANDS" menu and the "LOAD TO INVERTER" sub-menu, which enables the seamless switching of the load from the bypass source to the protected inverter source. Validate with the "ENTER" key

Display for the LOAD TO INVERTER control:

```
UPS COMMAND: LOAD TO INVERTER

CONFIRM TRANSFER TO INVERTER



Cancel                          validate
'ESC'                            'ENTER'
```

2.6.4 UPS shutdown with transfer to the maintenance bypass

The Maintenance bypass is for ensuring supply to the load, while the system is stopped for servicing reasons, for instance.

The transfer is achieved from the "UPS COMMANDS" menu and the "TRANSFER TO MAINTENANCE BYP" sub-menu. This is achieved through an interactive procedure. Just follow the instructions displayed and validate with the "ENTER" key.

Display for the "TRANSFER TO MAINTENANCE BYP" control:

```
UPS COMMANDS: TRANSFER TO M. BYPASS

CONFIRM TRANSFER

TO MAINTENANCE BYPASS

cancel                          validate
 ESC                              ENTER
```

2.7 OPERATING MODE

Note: the operating mode is displayed only if the configuration is available. Seek advice to the CIM department.

The UPS can either operate in normal or Eco mode. The mode can be selected manually or programmed to be made automatically.

Mode normal: the load is supplied by the inverter. Should a problem occur on the rectifier-inverter path, the load is automatically transferred to the bypass input.

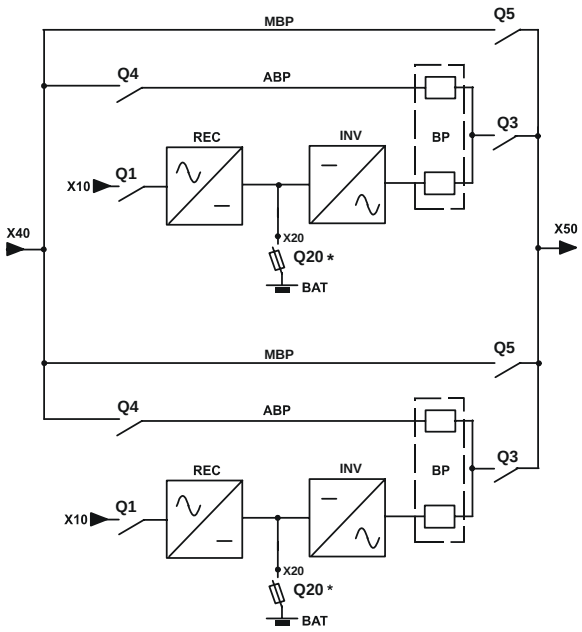
Eco mode: the load is supplied by the bypass input. Should a problem occur on the bypass path, the load is automatically transferred to the inverter.

CHAPTER 3: MODULAR SYSTEMS

3.1 BASIC SCHEMES

Modular systems can include up to six UPS units.

3.1.1 Modular systems with two redundant UPS units



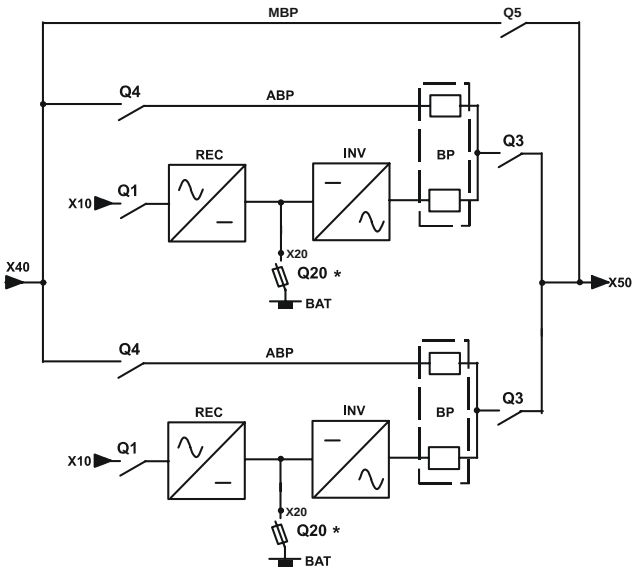
X10: rectifier input
X40: bypass input
X50: to the load
X20: battery connection
REC: rectifier
INV: inverter
BAT: battery
BP: bypass facility
ABP: automatic bypass
MBP: maintenance bypass

*** other protection upon request.**

NOTE: in such a configuration each UPS unit has its own maintenance bypass.

NOTE: in any case, see the technical details of the drawing.

3.1.2 Modular systems with two non redundant UPS units



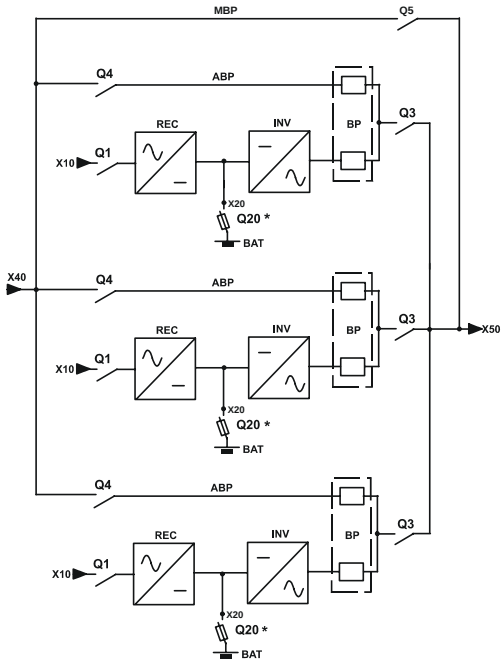
X10: rectifier input
X40: bypass input
X50: to the load
X20: battery connection
REC: rectifier
INV: inverter
BAT: battery
BP: bypass facility
ABP: automatic bypass
MBP: maintenance bypass

*** other protection upon request.**

NOTE: in such a configuration, the system is fitted with an EXTERNAL maintenance bypass.

NOTE: in any case, see the technical details of the diagram.

3.1.3 Modular systems with three UPS units or more



X10: rectifier input
X40: bypass input
X50: to the load
X20: battery connection
REC: Rectifier
INV: Inverter
BAT: battery
BP: bypass facility
ABP: automatic bypass
MBP: maintenance bypass

*** other protection upon request.**

NOTE: in such a configuration, the system is fitted with an EXTERNAL maintenance bypass.

NOTE: in any case, see the technical details of the diagram.

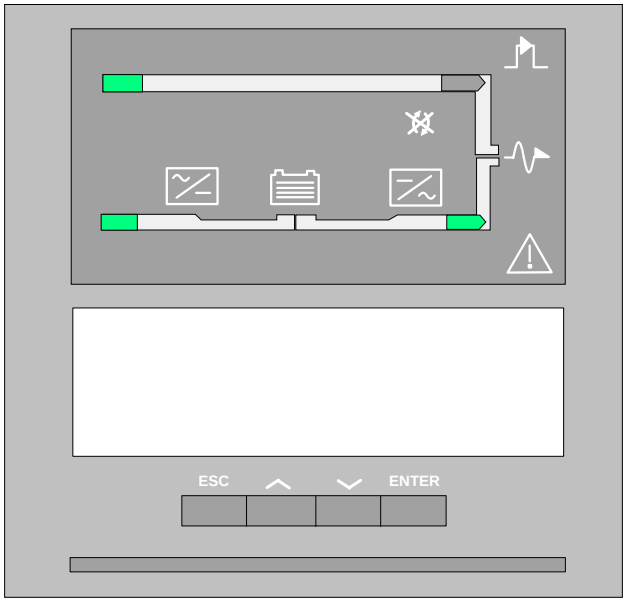
3.2 LAYOUT OF SWITCHES

Description of switches:
Q4: automatic bypass switch
Q3: output switch
Q5: maintenance bypass switch

Note:
Q20: battery protection is located in the battery cabinet or battery enclosure.

Q1: rectifier input switch (optional)

3.3 CONTROL PANEL



The control panel is composed of:

- 1 mimic panel
- 1 eight-line LCD display (with up to 40 characters)
- 1 four-key intuitive user interface:
  - 1 validation key (ENTER)
  - 1 ESC key
  - 2 scrolling keys (UP/DOWN)
- 1 luminous status bar

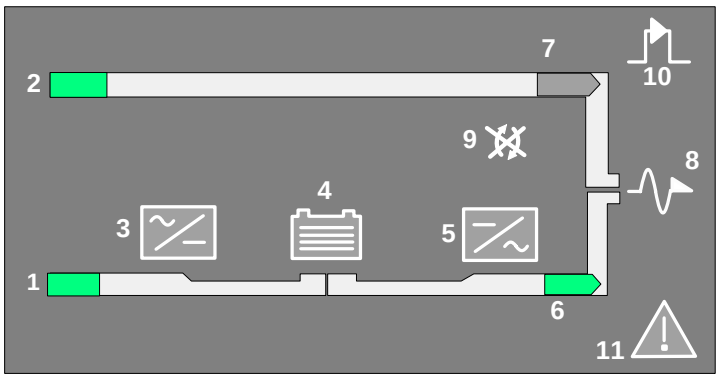
3.3.1 Contrast setting

The display contrast is set by the factory. It is automatically adjusted according to the temperature of the technical plant. No setting is required.

3.3.2 Description of the luminous status bar

Green bar:	the load is supplied via the inverter the load is supplied via the bypass path if the Eco-mode is activated
Yellow bar:	the load is supplied via the automatic / maintenance bypass
Yellow blinking bar:	maintenance mode or maintenance alarm
Red bar:	load OFF
Red blinking bar:	the imminent shutdown alarm is given
OFF:	UPS unit isolated or not available.

3.4 MEANING OF THE PICTOGRAMS



Rectifier and battery charger

Battery

Inverter

Output to the loads

Transfer impossible

Maintenance bypass

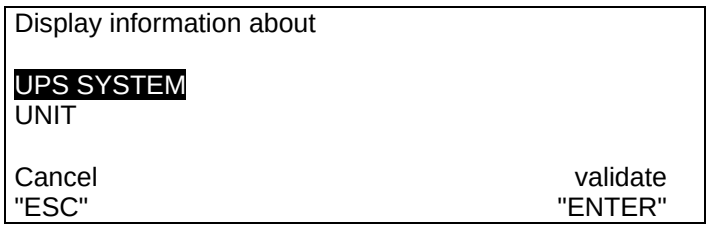
General alarm

3.4.1 Mimic panel description

SYMBOLS	GREEN	YELLOW	RED	BLINKING
1 RECTIFIER INPUT	Within tolerances	Without tolerances		
2 BYPASS INPUT	Within tolerances	Without tolerances		
3 RECTIFIER	ON	Operating and alarm ON		
4 BATTERY	Charged	discharging		Green: charging Yellow: battery alarm
5 INVERTER	ON	Operating and alarm ON		
6 LOAD ON INVERTER	OK	Eco-Mode ON		
7 LOAD ON MAINS	If Eco Mode ON	BYP switch ON		
8 LOAD OUTPUT	supplied		Not supplied	Red: imminent stop
9 TRANSFER		Impossible		
10 MAINTENANCE BYPASS		ON		Yellow: Maint. Byp alarm
11 GENERAL ALARM		Alarm ON		Yellow: communication error

3.5 STRUCTURE OF THE SYSTEM RELATED MENU

It is intended for operating the whole system, i.e. all the UPS units.



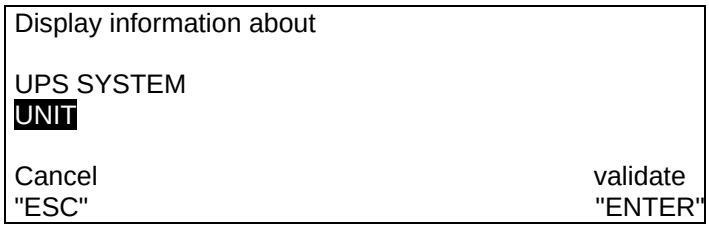
Press "**ENTER**" to reach the various menus,
Select the menu with the UP ^ or DOWN v key,
Press "**ENTER**" to reach the various sub-menus,
Select the sub-menu with the UP ^ or DOWN v key,
Validate with the "**ENTER**" key.

LIST OF MENUS		LIST OF SUB-MENUS
MEASUREMENTS	"*ENTER*" ▸	UPS SYSTEM OUTPUT UPS SYSTEM OUTPUT POWER SYSTEM BYPASS SUPPLY
UPS COMMANDS	"*ENTER*" ▸	UPS AUTOMATIC STARTUP LOAD TO MAINS / LOAD TO INVERTER TRANSFER TO MAINTENANCE BYPASS
OPERATING MODE	"*ENTER*" ▸	ECO MODE PROGRAMMING TRANSFER TO NORMAL MODE
EVENT LOG	"*ENTER*" ▸	UPS
STATUS	"*ENTER*" ▸	UPS SYSTEM STATUS
CLOCK	"*ENTER*" ▸	PROGRAMMING
CONFIGURATION	"*ENTER*" ▸	LANGUAGE BUZZER ACCESS CODE LOCAL / REMOTE
JBUS LINK (if available)	"*ENTER*" ▸	PROGRAMMING

Note	Controls are only displayed when available.

3.6 STRUCTURE OF THE UNIT RELATED MENUS (UNIT)

It is only for operating the related unit.



Press "**ENTER**" to reach the various menus,
Select the menu with the UP ^ or DOWN v key,
Press "**ENTER**" to reach the various sub-menus,
Select the sub-menu with the UP ^ or DOWN v key,
Validate with the "**ENTER**" key.

LIST OF MENUS		LIST OF SUB-MENUS
MEASUREMENTS	"*ENTER*" ▸	UPS UNIT OUTPUT UPS UNIT OUTPUT POWER INVERTER - BYPASS MAINS RECTIFIER - BATTERY
UNIT COMMANDS	"*ENTER*" ▸	UNIT AUTOMATIC START UP UNIT COUPLING / UNCOUPLING
EVENT LOG	"*ENTER*" ▸	UNIT
BATTERY	"*ENTER*" ▸	BATTERY TEST INFORMATION BATTERY TEST PROGRAMMING BATTERY MEASUREMENTS BATTERY MANUAL TEST
UNIT DATA	"*ENTER*" ▸	DIAGNOSTIC CODES REFERENCES
STATUS	"*ENTER*" ▸	UPS UNIT STATUS AUXILIARY INPUTS
SUBSET COMMANDS	"*ENTER*" ▸	RECTIFIER ON / OFF INVERTER ON / OFF LOAD TO MAINS / LOAD TO INVERTER UNIT COUPLING / UNCOUPLING

Note	Controls are only displayed when available.

3.7 OPERATING THE MODULAR SYSTEM

Each unit has it's own control panel. The menu structure is divided into two distinctive parts (Please, refer to sections 3.5 and 3.6)

- the first one is for operating the system
- the second one is intended for operating the unit.

Note: controls are only displayed when available.

3.7.1 Starting up the modular system

Prior to any operation, please refer to the basic scheme of the system.

Conditions to be completed:

- the system is live on the input of each UPS unit,
- the battery circuit of each UPS unit is open.
- wait for all the control panels to light up,

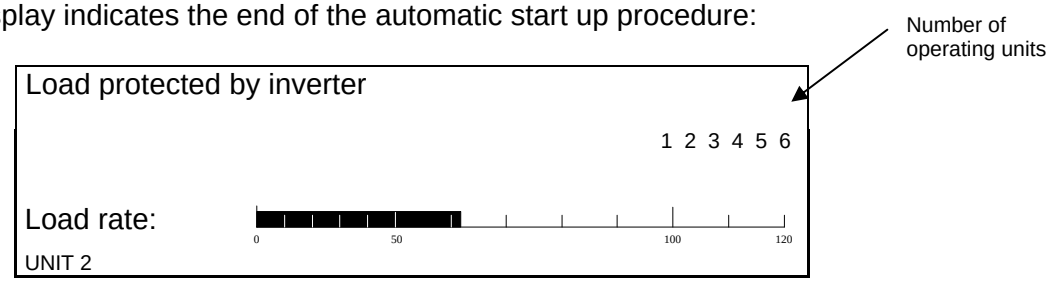
In the control panel of one of the units, select:

- menu "UPS SYSTEM",
- menu " UPS COMMANDS"
- and submenu "AUTOMATIC STARTUP".

The startup of all the units is run through an interactive procedure. Just follow the instructions displayed and validate with the "ENTER" key. Pressing the ESC key cancels the action.

At the end of this stage, the load is protected by the UPS units.

The display indicates the end of the automatic start up procedure:



3.7.2 Load transfer from inverter to mains

In the control panel of one of the units, select:
- menu "UPS SYSTEM",
- menu "UPS COMMANDS"
- and submenu "LOAD TO MAINS".

Display for the "LOAD TO MAINS" control

```
UPS COMMANDS: LOAD TO MAINS

CONFIRM TRANSFER TO

AUTOMATIC BYPASS

cancel                          validate
'ESC'                            'ENTER'
```

Validate pressing the ENTER key.

3.7.3 Load transfer from mains to inverter

In the control panel of one of the units, select:
- menu "UPS SYSTEM",
- menu "UPS COMMANDS"
- and submenu "LOAD TO INVERTER".

Display for the "LOAD TO INVERTER" control

```
UPS COMMANDS: LOAD TO INVERTER

CONFIRM TRANSFER TO INVERTER



Cancel                          validate
'ESC'                            'ENTER'
```

Validate pressing the ENTER key.

3.7.4 Switching to maintenance bypass - shutdown of the system

Purpose:
The Maintenance bypass is for ensuring supply to the load, while the system is stopped for servicing, for instance.

Comply with the following procedure:
In the control panel of one of the units, select:
- menu "UPS SYSTEM",
- menu "UPS COMMANDS"
- menu "TRANSFER TO MAINTENANCE BYPASS".

The command is run through an interactive procedure. Just follow the instructions displayed and validate with the "ENTER" key.

Display for "TRANSFER TO MAINTENANCE BYP"

```
UPS commands: to MAINTENANCE BYPASS

CONFIRM LOAD TRANSFER

TO MAINTENANCE BYPASS

cancel                        validate
 ESC                            ENTER
```

NOTE: when the process is completed, all the UPS units are stopped.

CAUTION	**Do not forget that even when the loads are stopped the units are live**: - because of the utility voltage to the rectifier and the bypass. - because of the residual voltage of the capacitors. - because of the load voltage when the maintenance bypass Q5 is closed and the bypass supply is present.

3.7.5 System with two redundant units

In a system with two redundant units, only one maintenance bypass can be closed.

3.7.6 System with two non redundant units or more than two parallel units

In such a system, the maintenance bypass is common to the whole system.

3.7.7 Uncoupling of a unit

CAUTION	Unit uncoupling can only be achieved if the system is redundant, meaning that it can supply all the energy required to the load with one unit disconnected.

The uncoupling of a unit is to be made from its control panel by selecting:
- the menu "UPS UNIT"
- the menu "UNIT COMMANDS"
- and the submenu "UNIT UNCOUPLING".

At this point, the UPS unit is uncoupled but still operating. Open switch Q3 in the appropriate unit to isolate it from the system.

Note: At this point, the UPS unit can be autonomously operated.

3.7.8 Shutdown of a unit

(The unit has been previously uncoupled - See section 3.7.7)

Shutdown the unit in the following chronology order:
- select the menu "SUBSET COMMAND"
- select the submenu "INVERTER OFF",
- select the submenu "RECTIFIER OFF"

At this point:
- open battery protection Q20,
- open switch Q4
- open switch Q1 (if provided).

CAUTION	**Do not forget that even when the load is stopped the unit is live**: - because of the mains voltage to the rectifier and the bypass. - because of the residual voltage of the capacitors. - because of the load voltage coming from the common busbar (downstream of Q3).

3.7.9 Unit switching on or coupling to the common busbar

Conditions to be completed:

- the system is live upstream of the UPS unit
- wait for the control panel to light up.

In the control panel of the appropriate unit, successively select:

- the menu "UPS UNIT"
- the menu "UNIT COMMANDS"
- and the submenu "AUTOMATIC STARTUP".

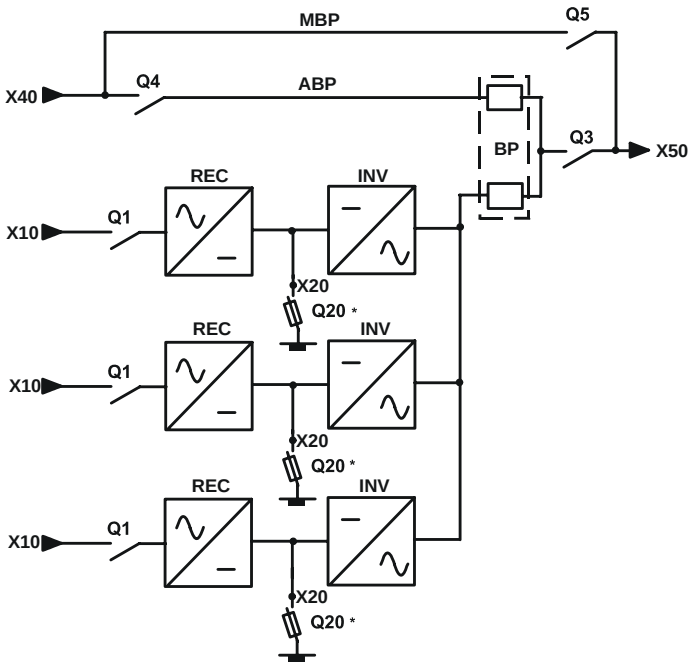
The automatic startup is run through an interactive procedure. Just follow the instructions displayed and validate with the "ENTER" key.

Note: at the end of the start up sequence, the unit is coupled to the common busbar and Q3 is closed.

CHAPTER 4: CENTRAL BYPASS SYSTEMS

4.1 STANDARD BASIC SCHEME

Central bypass systems can include up to six modules in parallel.



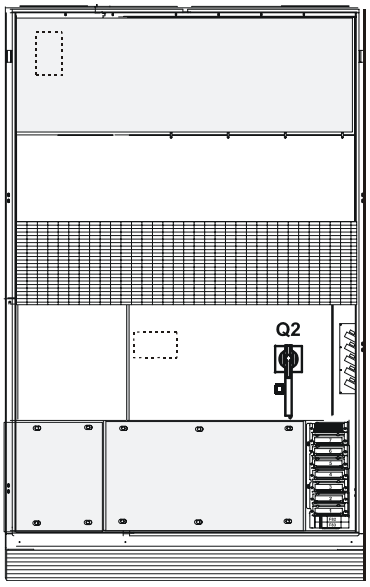
X10: rectifier input
X40: bypass input
X50: to the load
REC: rectifier
INV: inverter
BAT: battery
BP: bypass facility
ABP: automatic bypass
MBP: maintenance bypass

*** other protection upon request**

NOTE: in any case, see the technical details of the drawing.

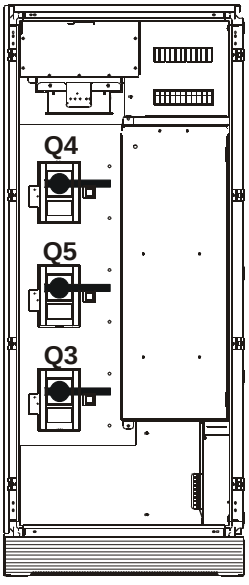
4.2 LAYOUT OF SWITCHES

UPS UNIT



Q2: Unit output switch
Q20: Battery protection in the battery enclosure or cabinet
Q1: Input rectifier switch (optional)

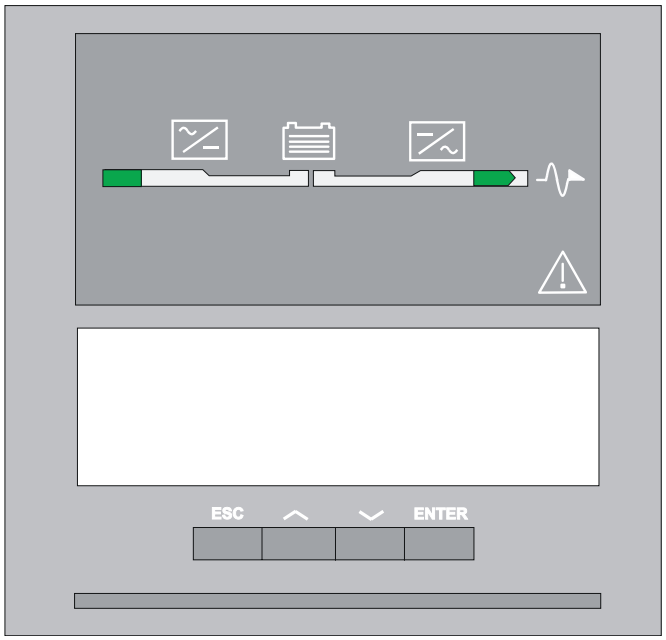
BYPASS CABINET



Q4: Input automatic bypass switch
Q3: Output switch to the load
Q5: Maintenance bypass switch

4.3 CONTROL PANELS

CONTROL PANEL OF THE MODULE

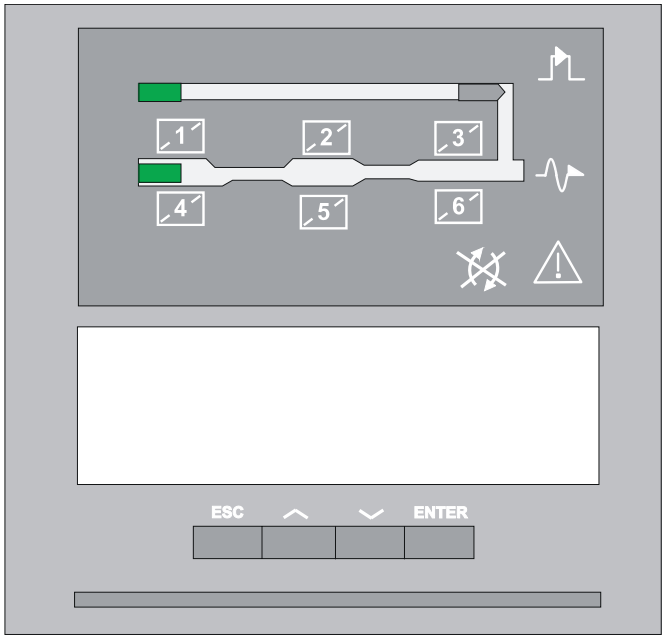


Each control panel is composed of:

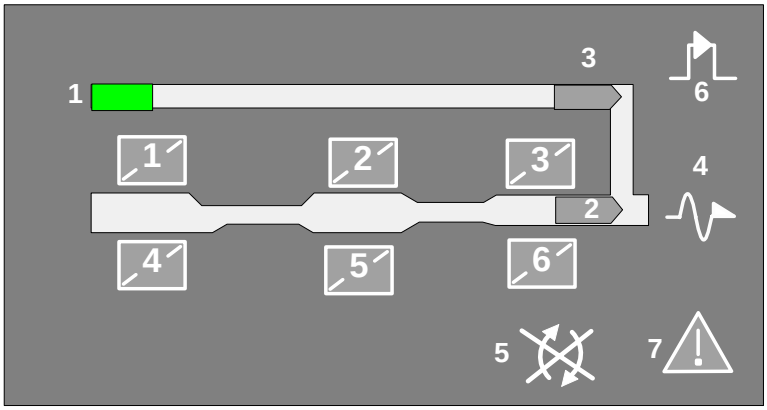
- 1 mimic panel
- 1 eight-line LCD display (with up to 40 characters)
- 1 four-key intuitive user interface:
  - 1 validation key (ENTER)
  - 1 ESC key
  - 2 scrolling keys (UP/DOWN)
- 1 luminous status bar.

The display contrast is set by the factory. It is automatically adjusted according to the temperature of the technical plant. No setting is required.

CONTROL PANEL OF THE BYPASS CABINET



4.4 MIMIC PANEL OF THE CENTRAL BYPASS CABINET




modules 1 to 6


General output to the loads


Transfer impossible


Maintenance bypass


General alarm

4.4.1 Mimic panel description

SYMBOLS	GREEN	YELLOW	RED	BLINKING
MODULES 1 to 6	Connected	Connected and alarm active		
1. BYPASS INPUT	Within tolerances	Without tolerances		
2. LOAD ON INVERTER	OK	Eco-mode active		
3. LOAD ON MAINS	If ECO MODE active	BYP switch ON		
4. OUTPUT TO THE LOAD	supplied		Load not supplied	Red: imminent shutdown of the system
5. LOAD TRANSFER		impossible		
6. MAINTENANCE BYP		ON		Yellow: Maint. byp alarm
7. GENERAL ALARM		At least one alarm ON		Yellow: communication error

4.4.2 Description of the luminous status bar on the central bypass cabinet

Green bar: - the loads are protected by the inverters
- the loads are supplied via the bypass input if in Eco-mode
- the system operates in the "Energy Saver" mode
(i.e. the number modules ON depends on the energy required)

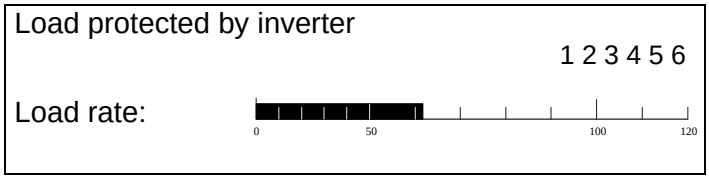
Yellow bar: - the loads are supplied via the bypass input
- the loads are supplied via the maintenance bypass

Yellow blinking bar: - maintenance mode or maintenance alarm active

Red bar: - the loads are not supplied

Red blinking bar: - the imminent shutdown alarm is given and the loads will shortly be disconnected.

4.4.3 Structure of the menus on the central bypass cabinet

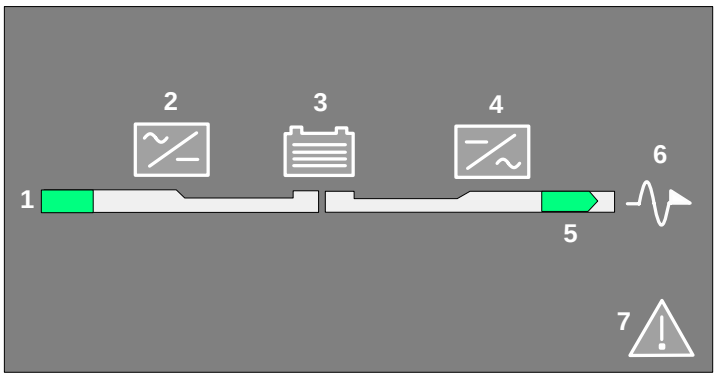


Press "**ENTER**" to reach the various menus,
Select the menu with the UP ^ or DOWN v key,
Press "**ENTER**" to reach the various sub-menus,
Select the sub-menu with the UP ^ or DOWN v key,
Validate with the "**ENTER**" key.

LIST OF MENUS		LIST OF SUB-MENUS
MEASUREMENTS	"*ENTER*" ▸	UPS SYSTEM GENERAL OUTPUT UPS SYSTEM OUTPUT POWER INVERTER / BYPASS MAINS
UPS COMMANDS	"*ENTER*" ▸	UPS AUTOMATIC START UP LOAD TO MAINS / LOAD TO INVERTER TRANSFER TO MAINTENANCE BYPASS
EVENT LOG	"*ENTER*" ▸	UPS UNIT
BYPASS DATA	"*ENTER*" ▸	DIAGNOSTIC CODES REFERENCES
STATUS	"*ENTER*" ▸	UPS SYSTEM STATUS
SUBSET COMMAND	"*ENTER*" ▸	LOAD TO MAINS / LOAD TO INVERTER SHUTDOWN UPS OUTPUT
CLOCK	"*ENTER*" ▸	PROGRAMMING
CONFIGURATION	"*ENTER*" ▸	LANGUAGE BUZZER ACCESS CODE LOCAL / REMOTE
JBUS LINK	"*ENTER*" ▸	PROGRAMMING

Note	Controls are only displayed when available.

4.5 MIMIC PANEL OF A MODULE



Rectifier and battery charger

Battery

Inverter

Module output to the common busbar

General alarm

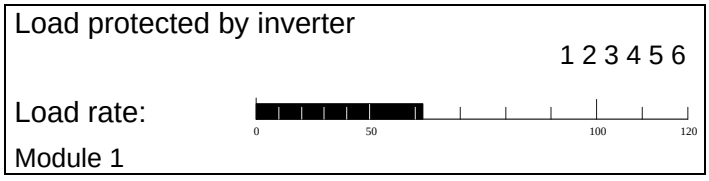
4.5.1 Mimic panel description

SYMBOLS	GREEN	YELLOW	RED	BLINKING
1. RECTIFIER INPUT	Within tolerances	Without tolerances		
2. RECTIFIER	ON	Alarm ON		
3. BATTERY	Charged	discharging		Green: charging Yellow: battery alarm
4. INVERTER	ON	Alarm ON		
5. OUTPUT SWITCH	Closed	Closed and Eco-Mode ON		
6. OUTPUT TO THE COMMON BUSBAR	Module connected		Module not connected	Red: imminent stop
7. GENERAL ALARM		General alarm ON		Communication error

4.5.2 Description of the luminous status bar on a module

Green bar:	the module is connected to the common busbar
Yellow bar:	the load is supplied via the automatic or the maintenance bypass
Yellow blinking bar:	maintenance mode or maintenance alarm active
Red bar:	the load is not supplied
Red blinking bar:	the imminent shutdown alarm is given for the module
OFF	Module isolated

4.5.3 Structure of the Unit menus



Press "**ENTER**" to reach the various menus,
Select the menu with the UP ^ or DOWN v key,
Press "**ENTER**" to reach the various sub-menus,
Select the sub-menu with the UP ^ or DOWN v key,
Validate with the "**ENTER**" key.

LIST OF MENUS		LIST OF SUB-MENUS
MEASUREMENTS	"*ENTER*" ▸	UPS UNIT OUTPUT UPS UNIT OUTPUT POWER INVERTER – BYPASS MAINS RECTIFIER - BATTERY
UNIT COMMANDS	"*ENTER*" ▸	UNIT AUTOMATIC START UP UNIT COUPLING/UNCOUPLING
EVENT LOG	"*ENTER*" ▸	UNIT
BATTERY	"*ENTER*" ▸	BATTERY TEST INFORMATION BATTERY TEST PROGRAMMING BATTERY MEASUREMENTS BATTERY MANUAL TEST
UPS GENERAL DATA	"*ENTER*" ▸	DIAGNOSTIC CODES UPS REFERENCES
STATUS	"*ENTER*" ▸	UPS UNIT STATUS AUXILIARY INPUTS
SUBSET COMMANDS	"*ENTER*" ▸	RECTIFIER ON / OFF INVERTER ON / OFF LOAD TO MAINS / LOAD TO INVERTER UNIT COUPLING / UNCOUPLING

Note	Controls are only displayed when available.

4.6 OPERATING THE CENTRAL BYPASS SYSTEM

4.6.1 Using

The central bypass cabinet has a control panel intended for the operation of the system, while the one on the modules is only dedicated to the operation of the relevant module.

4.6.2 Preliminary conditions

- Q4, Q5 and Q3 in the central bypass cabinet are open,
- Q1 (if provided), Q2 and Q20 of each module are open.

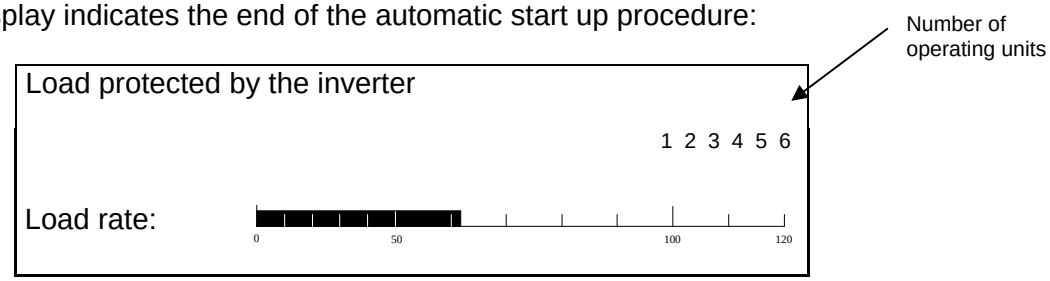
4.6.3 Starting up the system

Prior to any operation, please refer to the basic scheme of the system.

Conditions to be completed:
- the input of the system is live
- wait for all the control panels to light up.

In the central bypass cabinet:
The UPS is started from the menu "UPS COMMANDS /AUTOMATIC START UP" through an interactive procedure. Just follow the instructions displayed and validate with the "ENTER" key. The action can be interrupted by pressing the "ESC" key.

The display indicates the end of the automatic start up procedure:



4.6.4 Load transfer from inverter to mains

In the central bypass cabinet:
The seamless transfer command from inverter to mains can be achieved from the menu "UPS COMMANDS" and the submenu "LOAD TO MAINS". Validate with the "ENTER" key.

Display for the "LOAD TO MAINS" control

```
UPS COMMANDS: LOAD TO MAINS

CONFIRM TRANSFER TO AUTOMATIC BYP



cancel                          validate
'ESC'                            'ENTER'
```

4.6.5 Load transfer from mains to inverter

In the central bypass cabinet:
The seamless load transfer from mains to inverter can be achieved in the menu "UPS COMMANDS" and the submenu "LOAD TO INVERTER". Validate with the "ENTER" key.

Display for the "LOAD TO MAINS" control

```
UPS COMMANDS: LOAD TO INVERTER

CONFIRM TRANSFER TO INVERTER



Cancel                          validate
'ESC'                            'ENTER'
```

4.6.6 UPS shutdown with switching to the maintenance bypass

In the central bypass cabinet:
The transfer to maintenance bypass should be carried out by selecting the menu "UPS COMMANDS" and the submenu "TRANSFER TO MAINTENANCE BYPASS". This control is run through an interactive procedure. Just follow the instructions displayed and validate with the "ENTER" key.

In each module:
- follow the instructions given on the control panel.
- successively shutdown the rectifiers (open Q1 if provided).

Note: at this stage the load is supplied by the maintenance bypass (no protection) and the modules are stopped.

4.6.7 Operating a module of the system

	Module uncoupling can only be achieved if the system is redundant, meaning that it can supply all the energy required to the load with one module disconnected.

4.6.7.1 Uncoupling of a module

The uncoupling of a module is to be made from its control panel by selecting:
- the menu "UNIT COMMANDS"
- the submenu "UNIT UNCOUPLING" ("cancel" is being displayed)
- press key ﹀ to reach the module uncoupling option
- press key ENTER to confirm the request
- open switch Q2

4.6.7.2 Shutdown of a module

In the control panel of the appropriate module, select:
- the menu "SUBSET COMMAND"
- the submenu "INVERTER OFF" and confirm with the ENTER key
- the submenu "RECTIFIER OFF" and confirm with the ENTER key
- open Q1 (if provided) and Q20 (battery protection),

Note 1: operations are identical for all modules.
Note 2: in case of a redundant system, the command is inhibited if the module uncoupling causes the loss of redundancy; the corresponding alarm is displayed on the central bypass cabinet.

CAUTION	**Do not forget that even when the load is stopped the module is live:** - **because of the input voltage upstream of Q1,** - **because of the load voltage coming from the common busbar downstream of Q2,** - **because of the continuous voltage generated by the capacitors. The safety level is only reached after 5 minutes.**

4.6.8 Starting and coupling a module

The startup of the modules is run through an interactive procedure.

In the control panel of the module:
- select the menu "UNIT COMMANDS"
- select the submenu " UNIT AUTOMATIC STARTUP"
- confirm with the ENTER key
- comply with the instructions displayed i.e.:
- close Q1 (if provided) to supply the rectifier
- validate startup with the battery before closing Q20
- close Q2.

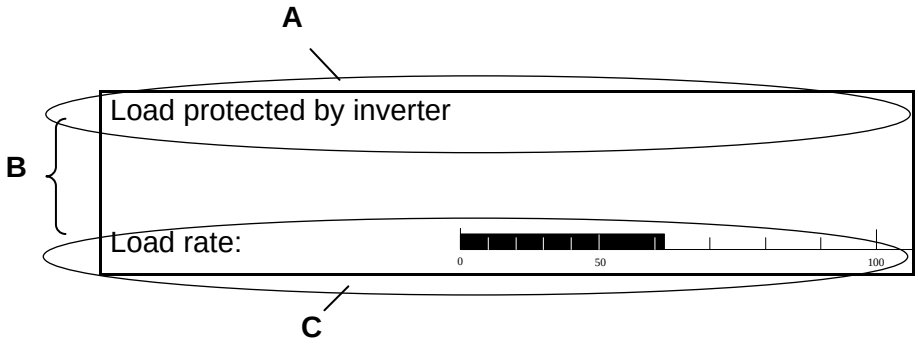
Note 1: operations are identical for all modules.
At this point, the module is connected to the common busbar.

CHAPTER 5: DESCRIPTION OF THE MENUS

5.1 LCD DISPLAY

Various screens can be displayed:

- the permanent display by default



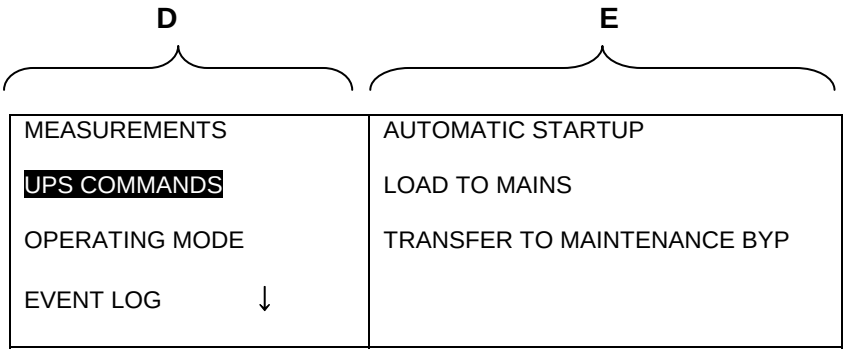
A. The load supply source is displayed, i.e.:
   - LOAD PROTECTED BY INVERTER,
   - LOAD SUPPLIED BY AUTOMATIC BYPASS,
   - LOAD SUPPLIED BY MAINTENANCE BYPASS,
   - OPERATING ON BATTERY,
   - LOAD OFF,

B. The actual alarms are displayed as long as they have not been reset by the operator (or auto-reset).

C. The load rate is displayed as long as less than 4 alarms are not activated.

Note: if the  icon is displayed, some maintenance has to be planned.

- The menu screen



D. The menus available are displayed.
E. The submenu related to the selected menu is highlighted on the display.

Note: the remaining displays are described in the corresponding paragraphs.

5.2 COMMENTS CONCERNING THE MENUS

5.2.1 Menu measurements

This menu displays the following system measurements:
- general measurements of the UPS
- output power of the UPS,
- inverter and bypass measurements,
- rectifier measurements.

5.2.2 Menu UPS commands

The UPS commands menu enables (Please refer to the sections related to the menu structure):
- the automatic start up (interactive procedure)
- the transfer from the inverter to the mains (and vice-versa),
- the transfer to the maintenance bypass (interactive procedure),

Note: in the event of a modular system, the UPS COMMANDS menu is common to all the modules connected. The control can be performed on whatever module.

5.2.3 Menu Event log

Principle:
The UPS has a memory enabling the record and date all alarms, status or commands that could arise during operation. This memory is saved utilising a separate supply.

The log can record up to 500 items according to the FIFO principle (First In - First out). When the log is filled up, the latest information recorded overwrites the earliest one.
Use:
To improve the user-friendliness, the latest records of the relevant date are displayed over six lines. Press key ^ or v to respectively scroll up to previous line or scroll down to next line. The "ENTER" key provides access to the previous days.

EVENT LOG			
05/12/2005			
15:19:45	Unit overload	yes	
15:19:30	Load protected by inverter	yes	
15:19:20	Load on automatic bypass	yes	
15:19:05	Inverter ON	yes	
15:15:35	Battery charging	yes	
15:15:28	Charger ON	yes	↓

↓ indicates other messages are stored. Press key v to have access to the previous information.

5.2.4 Battery

The battery test is for controlling the battery capacity to supply energy. The battery test can either be made manually or automatically.

5.2.4.1 Battery test information

This menu provides information to show:
- the result of the latest battery test (OK, failed or aborted),
- date and time of the latest battery test,
- date and time of the next battery test. If the test is not scheduled, "----" is displayed instead of the date.

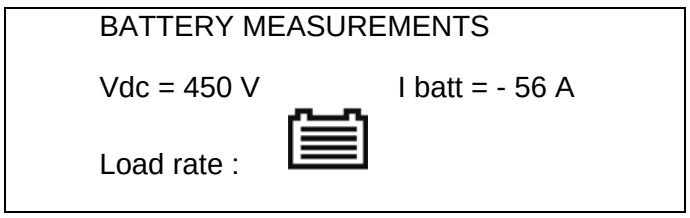
5.2.4.2 Test programming

The battery test can be made automatic from the control panel by setting the frequency, the day of the week and the time.

```
BATTERY: BATTERY TEST PROGRAMMING

BATTERY TEST:   inactive

PROGRAMMED ON:  Friday  at 20:00

EVERY:          8   weeks
```

5.2.4.3 Battery measurements

The following measurements can be displayed:
- Battery voltage,
- Battery current (minus sign in front of the value means the battery is discharging)
- Battery temperature,
- Load rate.



5.2.5 UPS system data

5.2.5.1 Diagnostic codes

All basic information can be displayed in a single screen thanks to hexadecimal codes.

UPS SYSTEM DATA: DIAGNOSTIC CODES

User	Status	Alarms
Adv Rect	120000456087	000000000
Adv Byp	000657003300	000007650
Adv Inv	000765876000	006549800
Adv Hmi	076431789700	054687900
Adv Com	000006757400	000007650

In case of UPS failure, the customer can transmit these codes to the CIM DEPARTMENT for complete diagnostic.

5.2.5.2 UPS references

This menu displays the following module information:
- module number,
- serial number,
- power in kVA.

5.2.6 Status menu

5.2.6.1 List of status

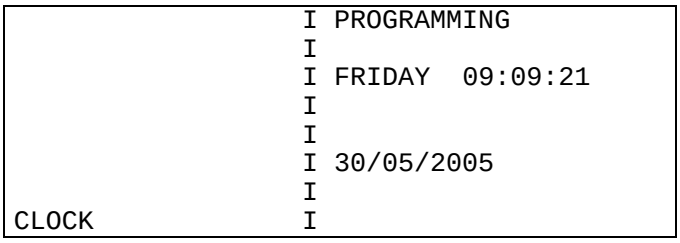
The activation or de-activation of each state is confirmed by YES or NO.
By means of the up and down keys, you can scroll the list.
Symbol ^ is not displayed at the beginning of the list and v is not displayed at the end.

List of STATUS

Wording
Rectifier ON
Rectifier input supply out of tolerances
Charger ON
Boost charge
Commissioning charge
Synchronisation reference on bypass input
Synchronisation reference on ACS
Battery charging
Battery charged
Battery test aborted
Battery test running
Inverter ON
ACS functioning forced
Output on inverter
Output on automatic bypass
Output not supplied
Output on maintenance bypass
In eco mode
Transfer to eco mode
Bypass input supply out of tolerances
Bypass input absent
Inverter switch ON
Bypass switch ON
Unit available
Unit isolated
Q2 closed
Q3 closed
Maintenance bypass Q5 closed
General maintenance bypass closed
Q21 …..Q22 closed
ESD activated
Input supplied by EmSet (emergency set)
Maintenance mode active
Load protected by inverter
Load on automatic bypass
Load OFF
Load on maintenance bypass
Automatic start in progress
Transfer to maintenance bypass
Energy saver activated (parallel system with central bypass)
Unit in standby mode
Automatic start forced
Energy saver deactivated (parallel system with central bypass)
Local/remote control
Auxiliary inputs 1 to 12

5.2.7 Clock

The UPS is fitted with a clock that enables the time and date of every event to be known.
The clock can only be set from the control panel.

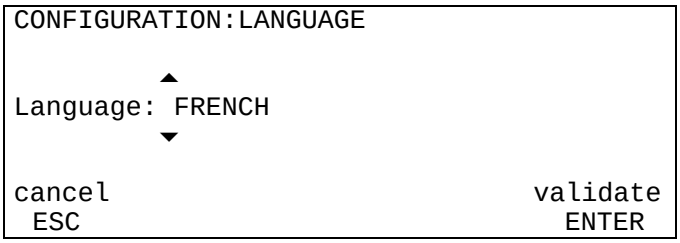


The "ENTER" key is for selecting the field to be modified.
The "ESC" key is for returning to the previous field.
The scrolling keys ^ or v is for changing the parameters of the selected field.

5.2.8 Configuration

5.2.8.1 Language

Two languages are available on the control panel.

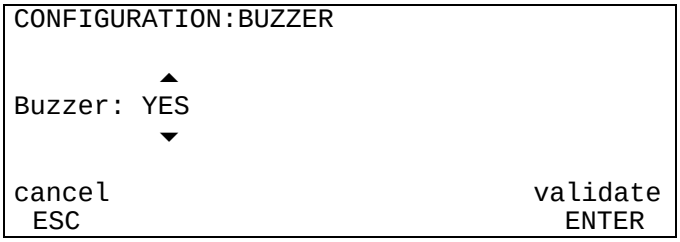


The scrolling keys ^ or v enable the user to select the appropriate language.

Note: other languages can be downloaded by the Servicing Department.

5.2.8.2 Buzzer

The buzzer can be activated or de-activated when the alarm appears by means of the scrolling keys ^ or v. The buzzer is activated by default.



5.2.8.3 Access code

The access code enables to lock the access to the following menus:
- UPS COMMANDS,
- OPERATING MODE,
- BATTERY / BATT TEST PROGRAMMING,
- SUBSET COMMAND,
- CLOCK,
- CONFIGURATION,
- JBUS LINK.

```
CONFIGURATION: ACCESS CODE


Type new access code:??????
```

This code can only be set from the control panel. It can contain up to 6 characters from "A" to "Z" and "0" to "9".
Keys ^ or v enable to select the character.
The "ENTER" key is for entering the character selected.
The "ESC" key enables to return to the previous field.

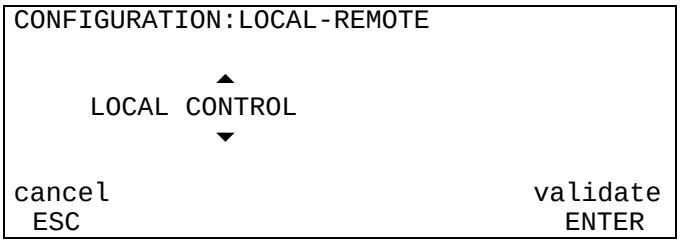
For coding with less than 6 characters, the ENTER key needs to be pressed up to the sixth character, and once more for validation.

```
CONFIGURATION: ACCESS CODE

CONFIRM NEW

ACCESS CODE: ??????

cancel                          validate
 ESC                              ENTER
```

Note: the access code is only activated when the display is in standby, i.e. after 4 minutes without action on any key.

5.2.8.4 Local / Remote

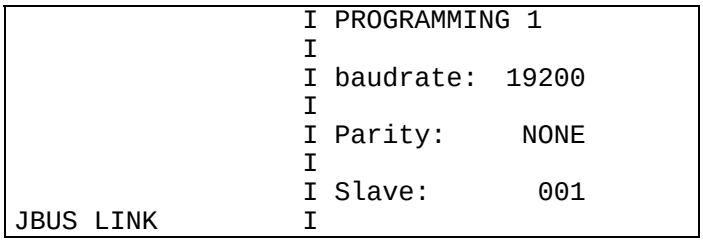
The UPS can be connected to a remote equipment. By default the control panel has the master function while the remote control has the slave function (all controls are inhibited). Through this menu, controls can be sent from the remote equipment.



5.2.9 JBUS link

Note: the JBUS link menu is only displayed if the setting is available on the UPS.

Configuration parameters are:
- the baudrate (1200 to 19200),
- the parity (none, even, odd),
- the slave number (001 to 255).



If a second JBUS link is available, the corresponding screen is automatically displayed after completing the setting of the first JBUS link.

5.2.10 List of alarms

5.2.10.1 Display of activated alarms

When an alarm is activated, the description is displayed and an audible signal is given.

5.2.10.2 Resetting an alarm

The alarms can be reset by means of the "ENTER" key. Thus, the audible alarm is silenced, but its description remains displayed as long as the alarm is activated. If several alarms are displayed, each of them needs to be silenced individually.

5.2.10.3 List of alarms for single units and modular systems

Wording
Rectifier critical alarm
Rectifier preventive alarm
Charger general alarm
Battery alarm
Battery room alarm
Battery test failed
Battery circuit open
Operating on battery
Battery autonomy end
Battery discharged
Inverter critical alarm
Inverter preventive alarm
Bypass critical alarm
Bypass preventive alarm
Manual/automatic transfer disabled
Automatic transfer disabled
Maintenance bypass alarm
Backfeed protection open
Unit imminent stop
Unit overload
Insufficient resources
Synchronisation reference ACS absent
Control preventive alarm
Control alarm
Internal temperature alarm
Loss of redundancy
Unit general alarm
Load imminent stop
Servicing preventive alert
UPS overload alarm
Control panel alarm

5.3 OVERLOAD MONITORING

Principle:

The UPS overload monitoring is based on reference levels (the higher the load rate, shorter the overload capacity). There are two distinct reference levels:
- the first one corresponds to the overload capacity of the bypass input,
- the second one corresponds to the overload capacity of the inverter.

While operating from the inverter, the load is automatically transferred to the automatic bypass when the overload capacity reaches 50% and the bypass input is present.

Signalling and automatic actions:

The UPS OVERLOAD alarm is activated if:
- the load rate exceeds 103% ("LOAD ON INVERTER"),
- the load rate exceeds 105% ("LOAD ON MAINS").

The alarm disappears if the load rate drops below 100%

Typical unit overload < 30°C

Overload rate	Inverter and byp locked	Automatic bypass	Total overload time inverter + automatic byp
110%	60 minutes	60 minutes	30 min + 60 min
125%	10 minutes	10 minutes	5 min + 10 min
150%	1 minute	1 minute	30 sec + 1 min

NOTE: Should an extended overload occur, the static switch warms up, which results in the disconnection of the load after some time.
If the load is supplied by the bypass input following an automatic transfer, no return to the inverter is possible as long as the UPS is overloaded and the UPS OVERLOAD alarm has not been reset.

5.4 REMAINING BACK UP TIME

The remaining back up time is displayed on the control panel when the UPS operates from the battery. The calculation is obtained from the battery capacity and the Ampères per hour (Ah) consumed by the load.
Text displayed can be set by Commissioning, Inspection and Maintenance Department.