

DELPHYS BC

from 160 to 300 kVA

Operating manual 



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1. WARRANTY CERTIFICATE

The warranty terms and conditions are stipulated in the offer, by default the following clauses apply.

The SOCOMEC UPS warranty is strictly limited to the product(s) and does not extend to equipment which may be integrated with this/these product(s), nor the performance of such equipment.

The manufacturer guarantees its products to be free from manufacturing faults and defects in design, material or workmanship, subject to the limits set forth below.

The manufacturer reserves the right to modify the delivery with a view to fulfilling these guarantees or to replace defective parts. The manufacturer's warranty does not apply in the following cases:

- fault or defect in the design of parts added or supplied by the customer
- fault due to unforeseen circumstances or force majeure
- replacement or repair resulting from normal wear and tear of the modules or machinery
- damage caused by negligence, lack of proper maintenance or misuse of the products
- repair, modification, adjustment or replacement of parts undertaken by unqualified third parties or personnel without the express consent of SOCOMEC UPS.

The warranty period is twelve months commencing from the date of delivery of the product.

The repair, replacement or modification of the parts during the warranty period does not imply or justify any extension of the warranty beyond the original period.

In order to establish a valid warranty claim, the purchaser must notify the manufacturer in writing immediately after the discovery of any apparent material defects and provide any and all supporting evidence of the defects at the latest within eight days before the date of expiry of the warranty.

Defective parts which have been returned and replaced free of charge shall become the property of SOCOMEC UPS.

The warranty is void if the purchaser has undertaken modifications or repairs on the devices on his or her own initiative and without the express consent of the manufacturer.

The manufacturer's responsibility is strictly limited to the obligations defined in this warranty (repair and replacement) excluding any other right to claim compensation or indemnity.

Any import tax, duty, fee or charge of any nature whatsoever imposed by European regulations or those of an importing country or of a transit country shall be paid by the purchaser.

2. FOREWORD

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

This equipment is fitted with up to date technology. Rectifier and inverter subsets are provided with power semi-conductors (IGBT) including a digital micro-controller.

Our equipment complies with standard IEC EN 62040-2 and 62040-1.



“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:



This equipment conforms to AS standards and bears the approval mark:



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.

3. GENERAL

3. 1. SCOPE

This document provides required information for operating DELPHYS BC 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

3. 2. PURPOSE AND UPS COMPOSITION

UPS 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.

UPS provide three-phase sinusoidal output. The UPS is composed of:

- 1 fully controlled three-phase rectifier of DBC type (Double Bridge Converter),
- 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 DC/DC converter for recharging the batteries,
- 1 control panel made up of a mimic panel, an 8-line display and an intuitive user interface.

3. 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.
-



the residual voltage of the capacitors may still cause heavy electrical arcs after 5 minutes.

HAZARD INDICATION



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.

3. 4. 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 500Vdc).

4. MODES OF OPERATION

4. 1. ON LINE OPERATIONS

ON LINE operation consists of double conversion operation in conjunction with mains absorption with very low distortion and a power factor at 1.

This enables UPS to supply a voltage that is fully stabilised in frequency and amplitude, regardless of any interference in the mains power supply.

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

- **“Normal” mode.**

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

The inverter is constantly synchronised with the auxiliary mains to enable load transfer (due to an overcurrent 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, 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 out of tolerances due to a major overload or a fault on the inverter.
- when the internal temperature exceeds the maximum value allowed.

- **“Battery” mode.**

In the event of a mains failure (micro interruptions or extended black-outs), 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 remaining back-up time adapted permanently according to the battery capacity and the load rate.

4. 2. OPERATION WITH MANUAL MAINTENANCE BYPASS

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

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

4. 3. OPERATION WITH EXTERNAL MANUAL MAINTENANCE BYPASS (OPTIONAL)

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

The Q4 disconnecter must be connected to the auxiliary mains input and the mains input must be isolated on the panel. If the manual maintenance bypass is activated (with the appropriate procedure), the load is powered directly from the auxiliary mains, while UPS is in fact excluded from the power supply and can be switched off.

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

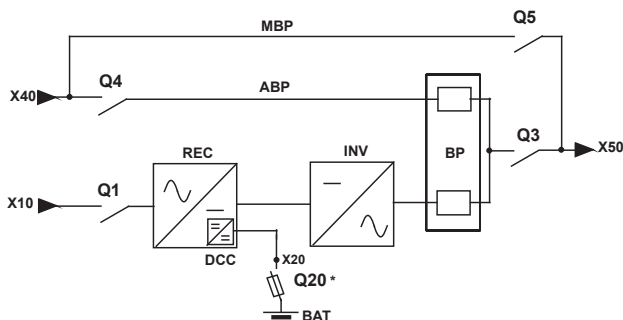
4. 4. OPERATION IN G.E. CONFIGURATION.

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.

4. 5. SPECIFIC MODE SINGLE UNITS WITH BYPASS

4. 5.1. Standard Basic Schemes

SEPARATED RECTIFIER AND BYPASS INPUTS



X40 = rectifier input

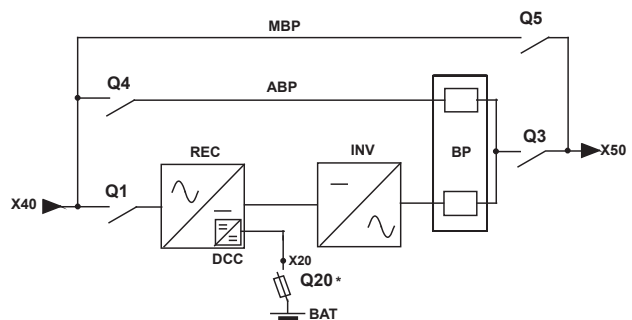
X10 = bypass input

X50 = to the load

ABP = automatic bypass

MBP = maintenance bypass

COMMON RECTIFIER AND BYPASS INPUT



BP = bypass facility

REC = rectifier

INV = inverter

DCC = battery charger converter

* other protection upon request.

NOTE: in any case, see the technical details of the drawing on the inner side of the UPS door.

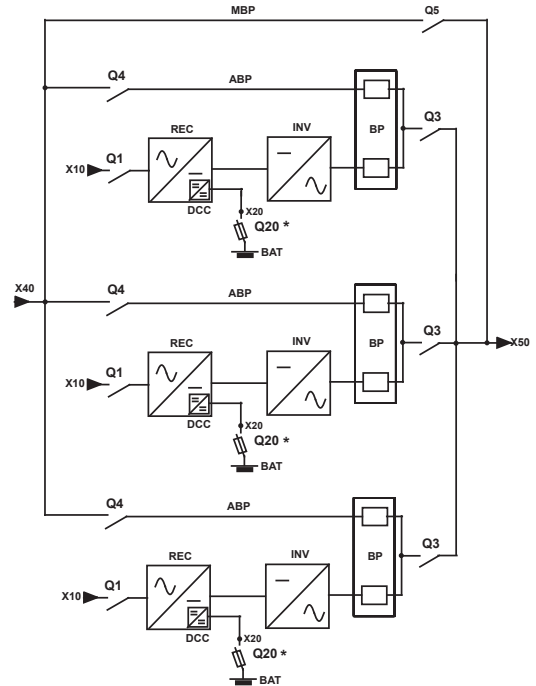
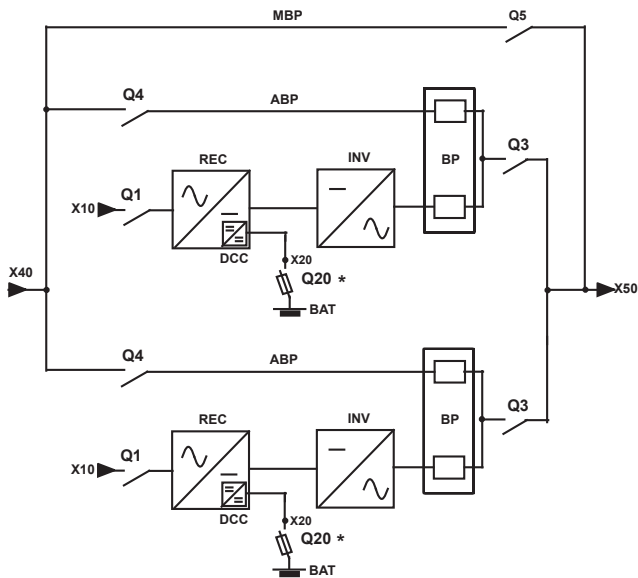
4. 6. SPECIFIC MODE MODULAR SYSTEMS

4. 6.1. Standard Basic Schemes

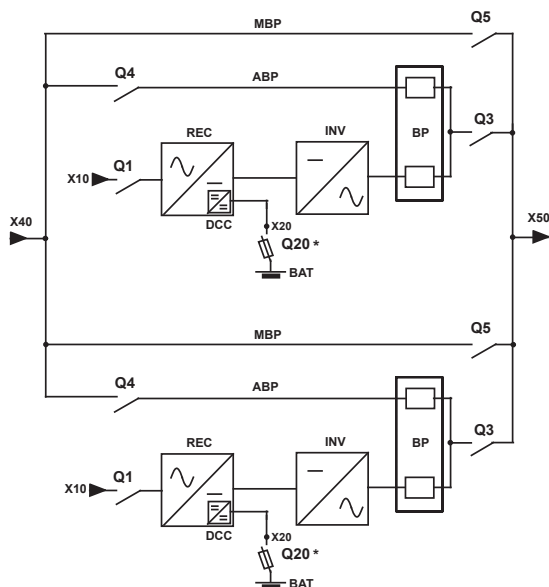
TWO NON REDUNDANT UPS UNITS

THREE UPS UNITS OR MORE

NOTE: in such 2 configurations, the system is fitted with an EXTERNAL maintenance bypass.



TWO REDUNDANT UPS UNITS



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

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

* other protection upon request.

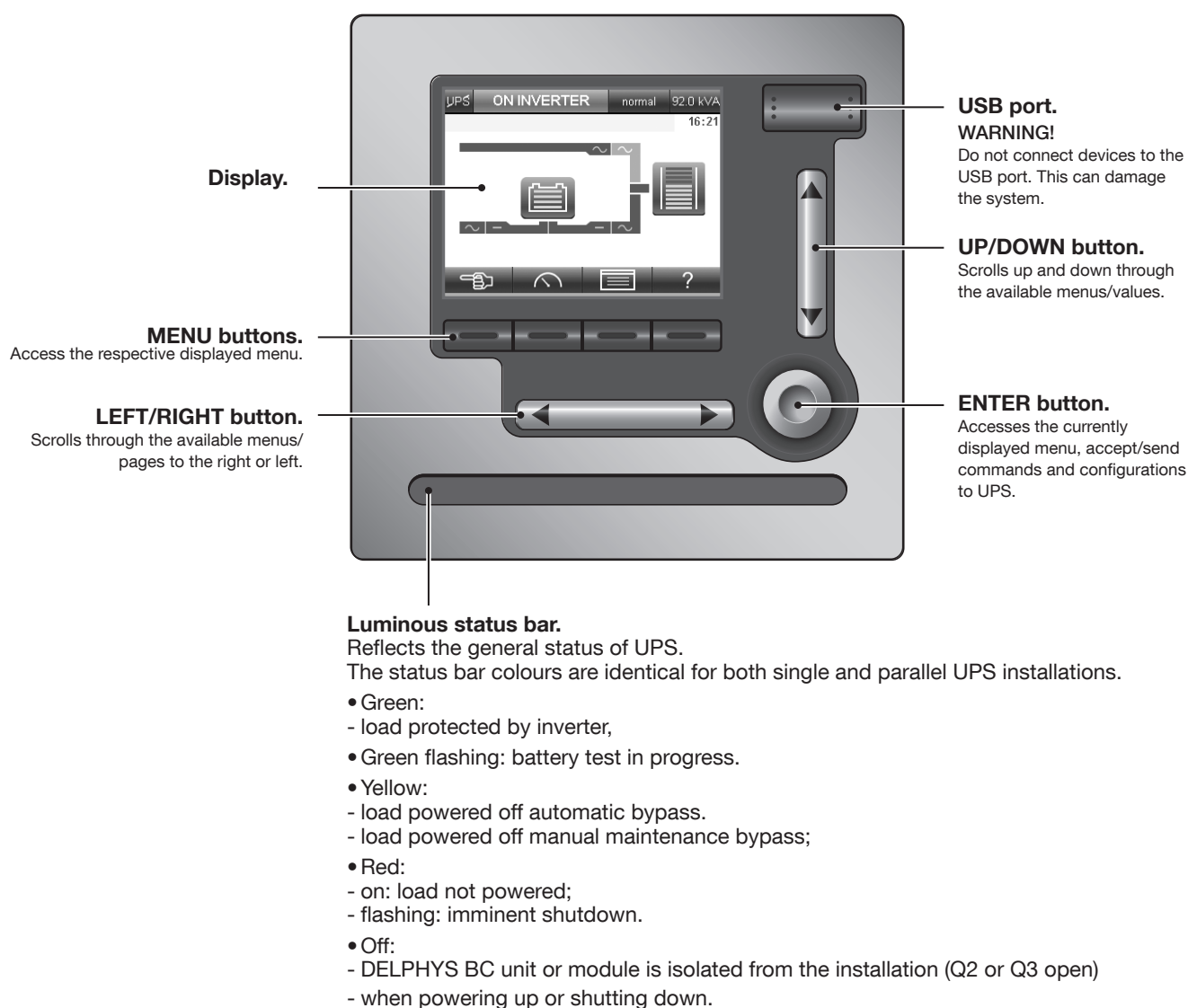
NOTE: in any case, see the technical details of the drawing on the inner side of the UPS door.

5. MIMIC PANEL

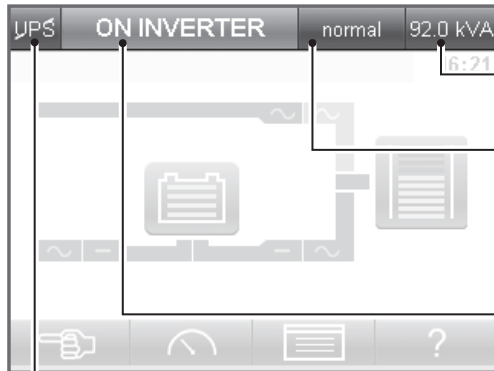
5. 1. GRAPHIC MIMIC PANEL

The graphic mimic panel on DELPHYS BC door displays information regarding operating status, electrical measurements, access to control functions and configuration parameters. It includes a colour graphic display and a luminous status bar, and provides access to:

- mimic panel;
- measurements, statuses and commands for the subassemblies;
- programming battery tests and UPS operating modes;
- assisted startup and switching to manual maintenance bypass procedures;
- event and battery discharge log;
- UPS and battery discharge duration statistics;
- configuration menu;
- list of states and alarms.



5. 2. MIMIC PANEL GENERAL OVERVIEW



Mimic panel reference.

UPPER BAR (always displayed).

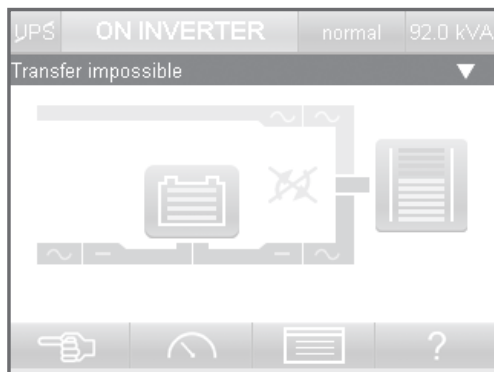
Total output load (kVA).

Operating modes:

Normal, Isolated, Service, Standby.

Unit status:

- Messages displayed: LOAD OFF, ON INVERTER, IMMINENT STOP, ON BATTERY, BATTERY TEST, ON MAINTENANCE BYPASS, ON AUTO BYPASS, UPS STARTING..., UPS STOP..., UNIT AVAILABLE.
- Priority of colours (from highest to lowest):
 - red: load off, imminent stop.
 - grey: when powering up or shutting down.
 - yellow: load powered of bypass or maintenance bypass in Battery Mode.
 - green: load powered of inverter.

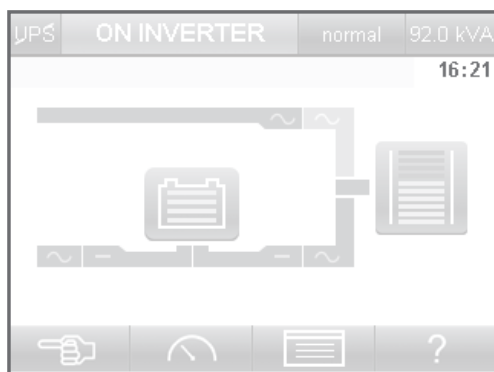


ALARMS AREA.

Present when an alarm is active.

Press button DOWN to display the list of alarms.

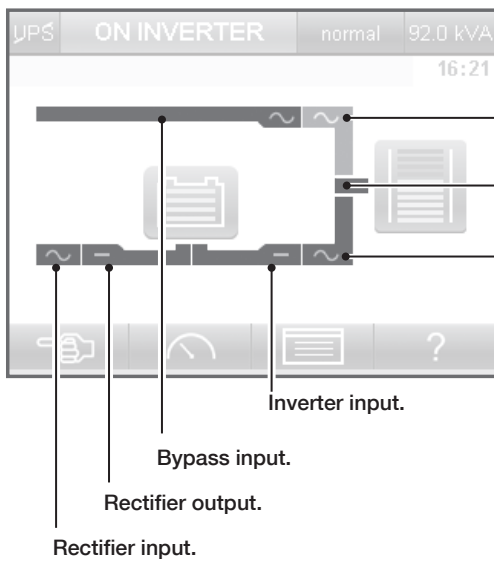
See "Troubleshooting".



CLOCK.

Hours and minutes.

The symbol ":" flashes once a second to indicate that the software is running.



FLOW DIAGRAM ANIMATION. (eg UPS single unit)

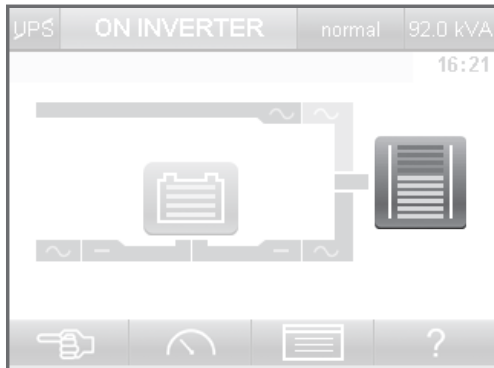
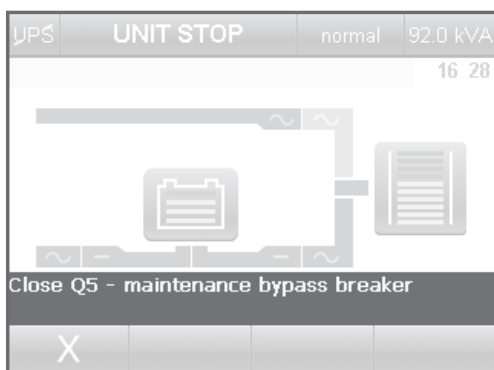
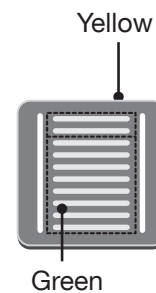
Colour of the bar:

- blue: active/mains present.
- grey: mains not present.

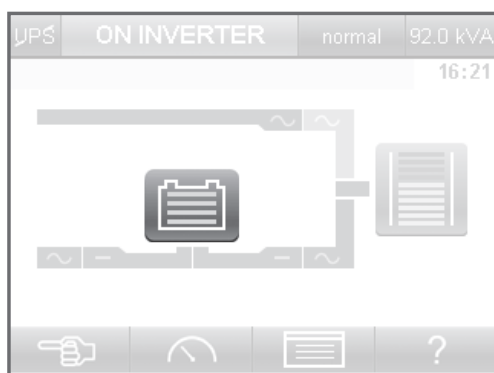
Priority of colours of the symbols “~” and “-”

(from highest to lowest):

- yellow: ON or voltage present and pre-alarm active.
- green: ON or voltage present and no alarm active.

**LOAD LEVEL.****Overload****MESSAGES AREA.**

Present during automatic start or manual maintenance bypass procedure.



BATTERY STATUS (unit only)

Battery charging.

Colour of bars: green; level reached: light on.



Battery discharging.

Colour of bars: yellow.



Battery charged.

Colour of bars: green.



Battery alarm.



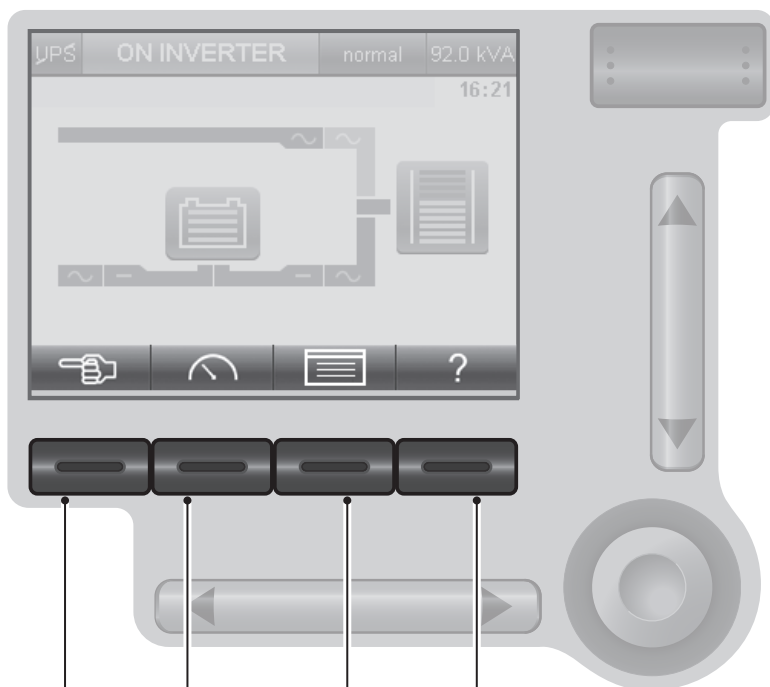
Battery general alarm
(symbol turns to yellow)



Battery circuit
open



Battery low or
end of autonomy.

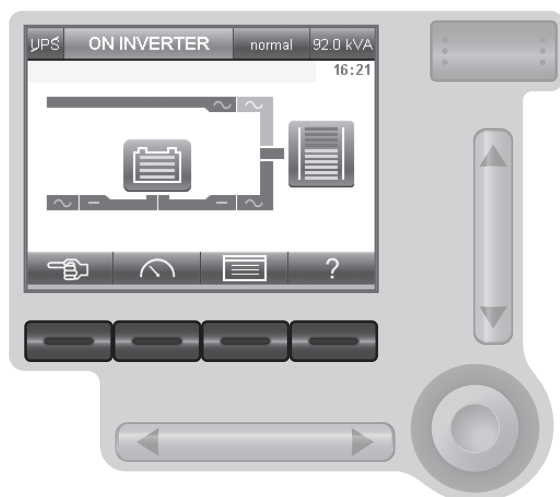


MENU ICONS.

Menu CONTROL. Menu MEASUREMENTS. Menu MONITORING. Help.

5. 3. PRINCIPLE OF NAVIGATION MENU

5. 3.1. Overview



1 Select one of the four menus



2 Scroll through list (up/down) and pages (left/right)



3 Access selected menu

Legend of symbols

	Controls		Log file
	Measurements		Status
	Monitoring		Confirm settings
	Help		Cancel
	Home page (mimic panel)		Next value
	Previous page		Previous value
	Reset alarms		Confirm procedure or send command

5. 3.2. CONTROL menu



The menu is used to send some immediate commands to activate UPS or various operating modes.

Note.

- Access control menu can be protected by password.
- If a control is not available, the related menu will not be displayed.

5. 3.3. MEASURES menu



This menu is used to display all the measurements relating to the input rectifier / bypass, user output and to the battery.

5. 3.4. MONITORING menu



This menu is used for monitoring, to change user's configuration parameters, enabling communication options and to display service information.

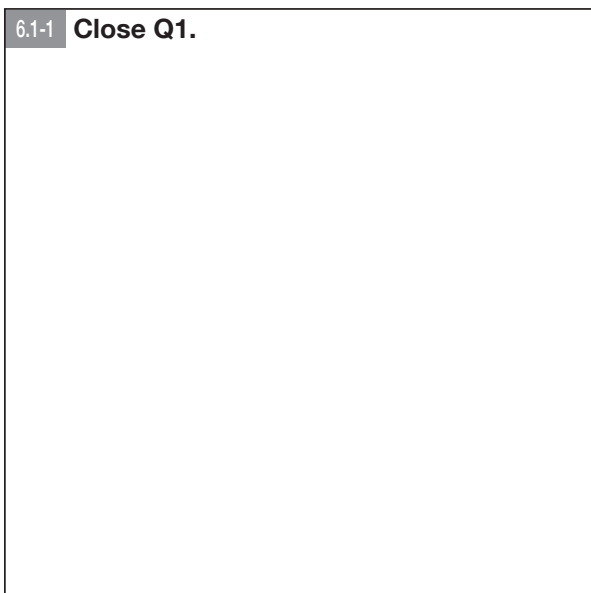
Note.

- The remote access configuration can be protected by password.

6. SINGLE UNIT OPERATING

6. 1. AUTOMATIC STARTING PROCEDURE

6.1-1 Close Q1.



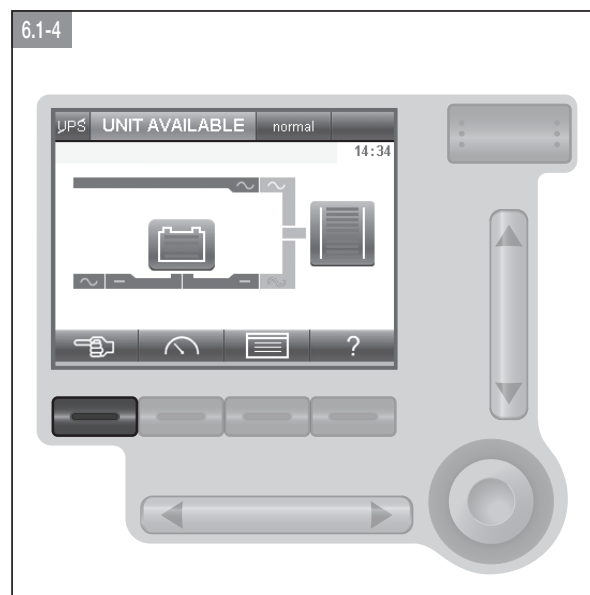
6.1-2

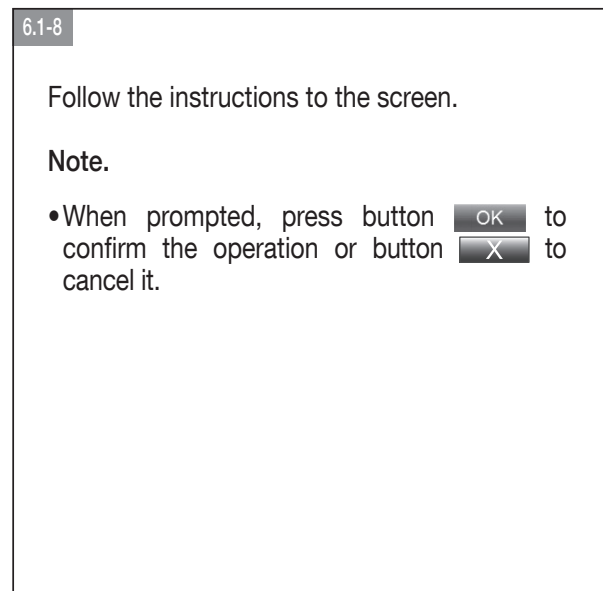
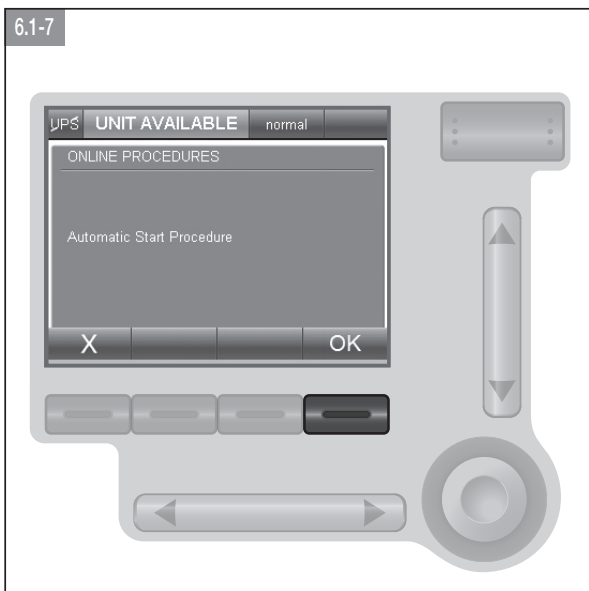
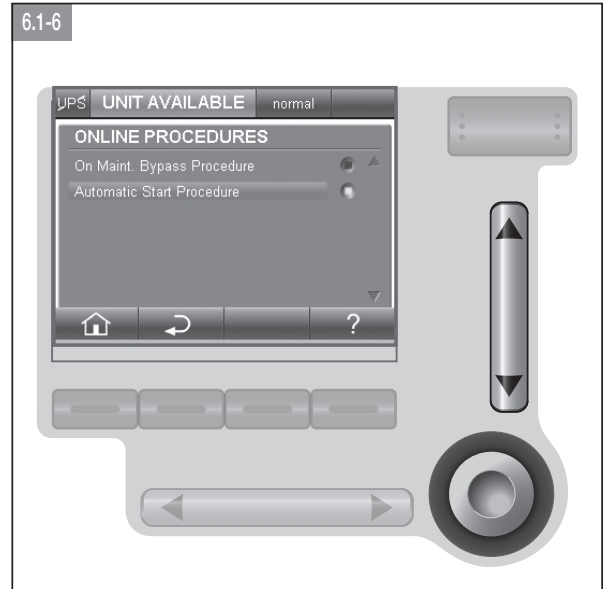


6.1-3

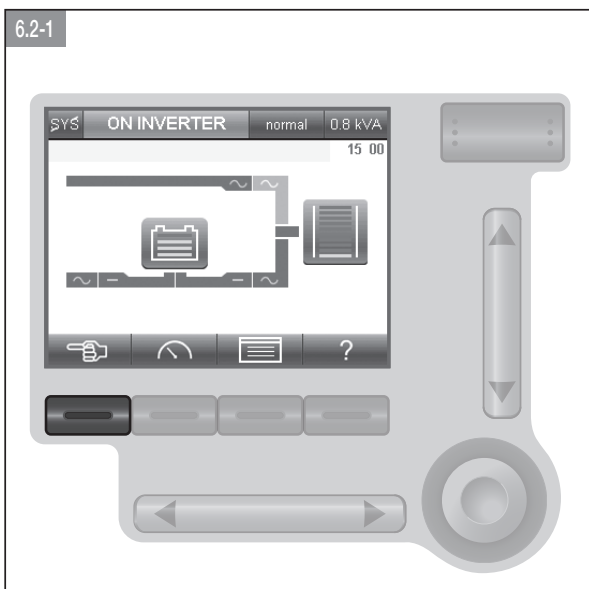


6.1-4





6. 2. TRANSFER TO MAINTENANCE BYPASS



6.2-3



6.2-4



6.2-5

Follow the instructions to the screen.

Notes.

- When prompted, press button **OK** to confirm the operation or button **X** to cancel it.

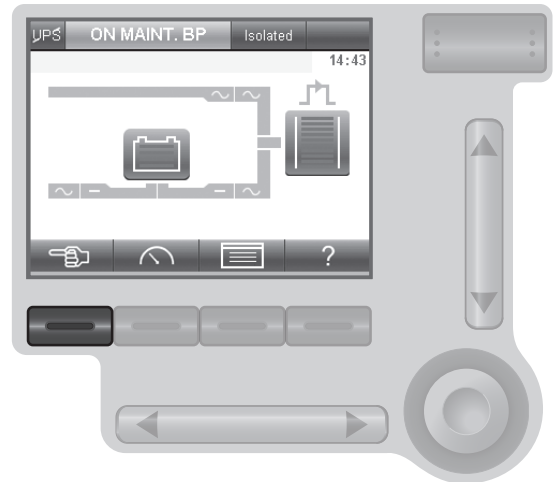
6.2-6 Open Q1.

6.2-7 Wait a few seconds for shutdown.

6. 3. UPS STARTING

6.3-1 Close Q1 and Q4.

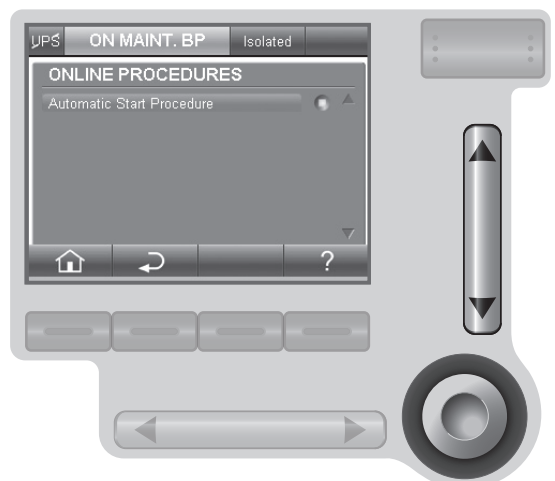
6.3-2



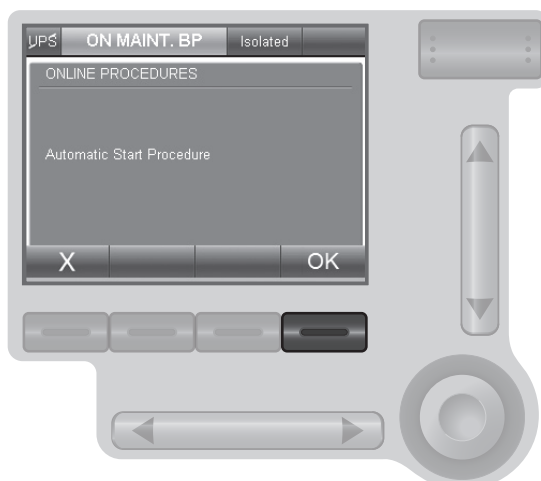
6.3-3



6.3-4



6.3-5



6.3-6

Follow the instructions to the screen.

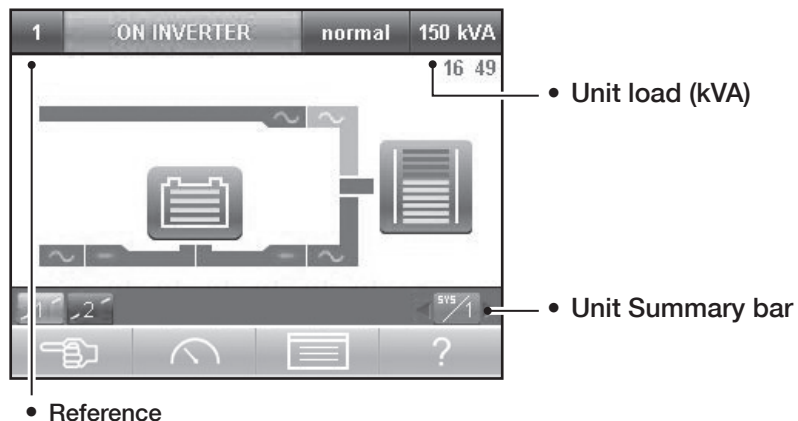
Notes.

- When prompted, press button **OK** to confirm the operation or button **X** to cancel it.

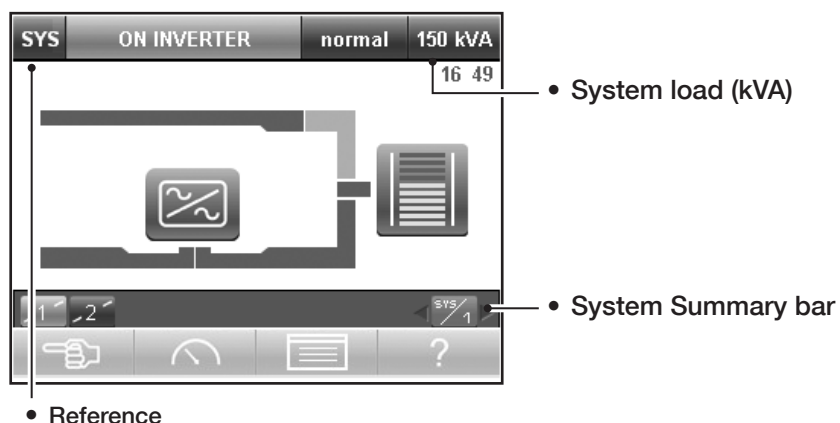
7. MODULAR OPERATING

7. 1. SYNOPTIC

7. 1.1. Unit



7. 1.2. System



7. 2. AUTOMATIC STARTING PROCEDURE

7. 2.1. Unit automatic starting

Each unit can be started independently

7. 2.2. System Automatic starting

Run the control of automatic starting from CONTROL SYSTEM menu

This command performs an automatic start of all units. Actions are to be performed on each of them

7. 3. TRANSFER TO MAINTENANCE BYPASS

Run the control of Transfer to Maintenance Bypass from CONTROL SYSTEM menu

This command performs an automatic start of all units. Actions are to be performed on each of them

8. MULTILEVEL COMMUNICATION

DELPHYS BC can manage various serial, contact and Ethernet communication channels at the same time. The 2 communication slots available allow the use of signalling accessories and cards.

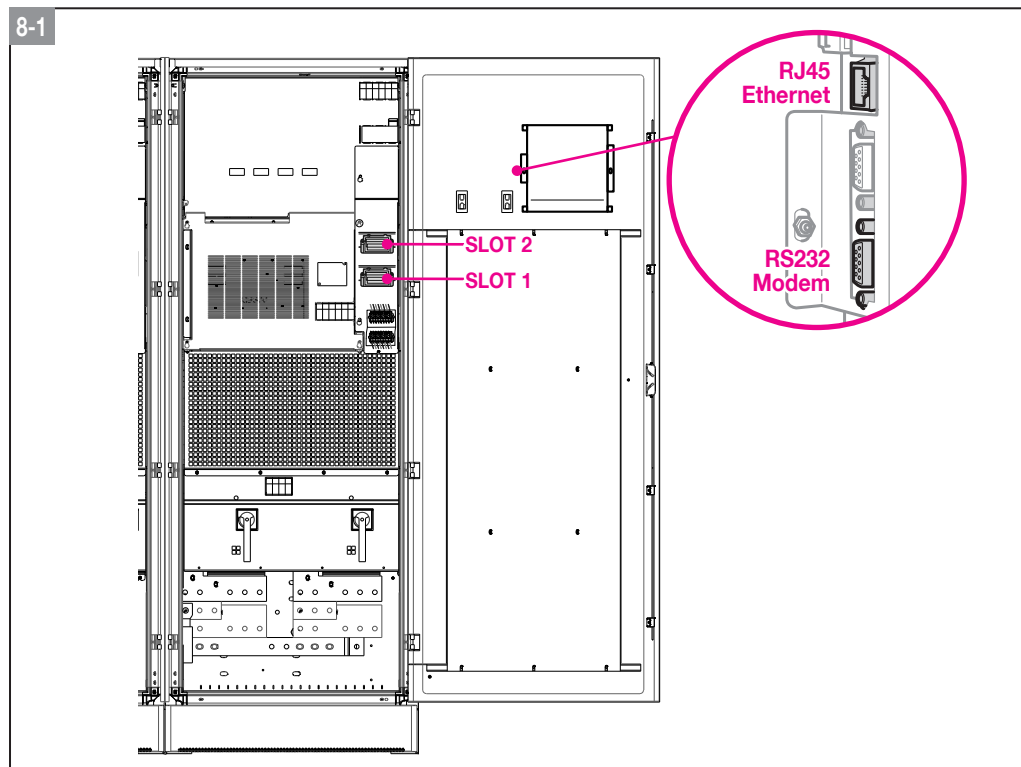
Each communication channel is independent; simultaneous connections can thus be made to have various levels of remote signalling and monitoring (see the § 9 "options" for a detailed evaluation of the functionality of the cards that can be installed in the slots).

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

Communication levels

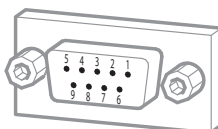
	SLOT 1	SLOT 2
ADC card	•	•
Serial port*		COM2
BHC		•
NetVision		•
Modbus TCP		•

* It is possible to use one isolated serial PCB only.



8. 1. SERIAL CONNECTION PCB

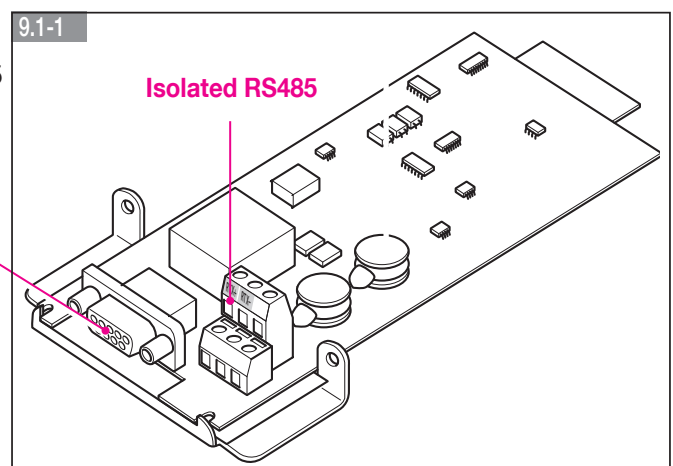
A serial RS232 connector DB9 and an isolated RS485 connector are available on the card (RTX+ and RTX-).



RS232 DB9

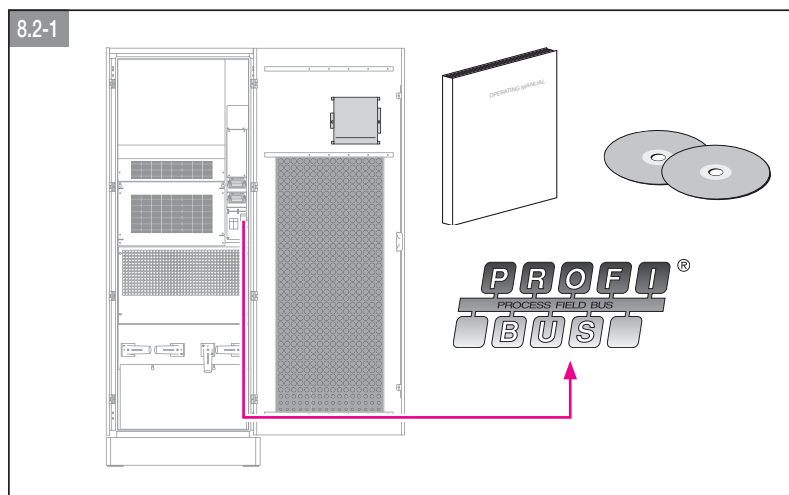
Legend pin RS232 DB9

1 Reserved	4 Reserved	7 Reserved
2 RX for RS232	5 GND for RS232	8 Reserved
3 TX for RS232	6 Reserved	9 Reserved



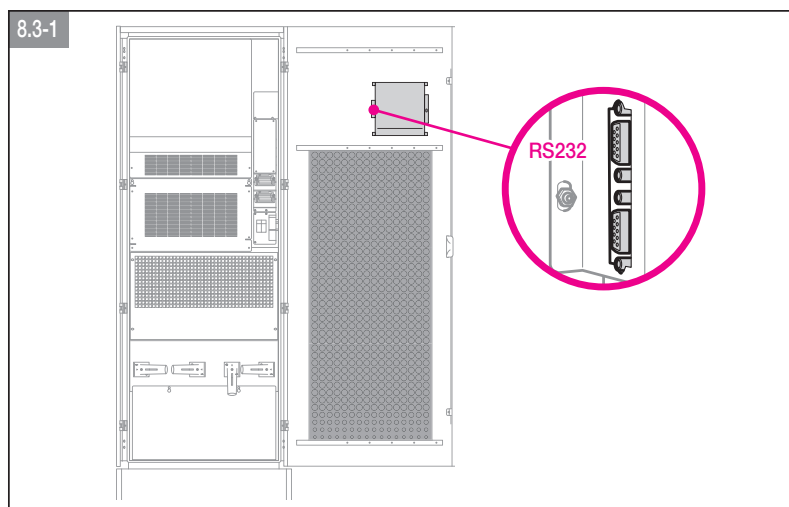
8. 2. PROFIBUS

On request, UPS can be provided with a Profibus protocol converter, installation software, configuration software and user manuals.



8. 3. GSM MODEM

Enables sending of SMS messages regarding the equipment's operating status.



9. TROUBLESHOOTING

9. 1. DELPHYS BC UNIT ALARMS

- **Unit imminent stop.**

- **Unit Overload.**

The load power draw is greater than DELPHYS BC's nominal output.

Check the load on the display and disconnect loads not requiring UPS service or distribute the total load over the three phases.



Overloading results in the load not being powered by UPS for a limited period of time. For further details, see the technical specifications.

- **Transfer blocked.**

Switching from UPS unit bypass to inverter may be inhibited by an inverter failure. Reset the alarm and contact Socomec UPS After-sales Service.

- **Transfer impossible.**

Switching from UPS unit inverter to bypass is prevented by problems on the auxiliary mains supply: mains supply out of tolerance, not synchronised,... Ensure that Q4 is closed, that the auxiliary mains supply is available and that the values are within range.

- **Insufficient resources.**

UPS unit is in overload, with auxiliary mains supply and inverter inhibited. The power supply to the load will be interrupted if the load is not brought back within range or the auxiliary mains supply fails. Check the load on the display and disconnect loads not requiring UPS service or distribute the total load over the three phases.

- **Inverter stopped by overload.**

This alarm is generated when the inverter has reached the maximum permitted overload time. Check UPS's load and reset the alarms.

- **Unit stopped by overload.**

This alarm is generated when both the inverter and the bypass have reached the maximum permitted overload time. Reduce UPS's load and reset the alarms.

- **Fan alarm.**

Ventilation system failure. Contact After-sales Service.

- **Charger alarm.**

This alarm is generated in case of a battery charger fault. Check for other alarms and contact After-sales Service if necessary.

- **Operating on battery.**

This alarm is generated when UPS unit is operating on battery power. The input power supply has failed or is insufficient (voltage/frequency out of tolerance). Check for the "rectifier input supply fault" alarm. If there is no power failure, check whether upstream protections have tripped and whether Q1 is open.

- **Battery general alarm.**

General battery alarm due to: battery test failed, maximum battery voltage, battery circuit breaker open, battery charger failure. Check for other alarms and inspect the batteries.

- **Battery room alarm.**

This alarm is generated when the battery room temperature, measured with an external sensor, is higher than the permitted maximum. Check the displayed temperature, and check the battery room ventilation/conditioning system.

- **Batteries discharged.**

This alarm is generated when the batteries' charge is low and UPS is about to switch off. Check for other alarms.

- **Battery circuit open.**

Battery circuit breaker open.

- **Bypass preventive alarm.**

This alarm is generated when the bypass has reached the maximum permitted overload time or in case of problems when switching from inverter to bypass. Check for other alarms. In case of overload, check UPS's load and reset the alarms.

- **Bypass preventive alarm.**

Incorrect configuration parameters. Contact After-sales Service.

- **Ambient T° maximum.**

The machine room temperature is above the recommended maximum. Check UPS room temperature and ventilation/conditioning system. If there is a fan alarm, contact After-sales Service.

- **Preventive maintenance alarm.**

UPS must be checked periodically by After-sales Service to ensure maximum efficiency and performance. If the alarm displays, UPS must be inspected by a qualified technician.

- **Improper condition of use.**

This alarm is not generated by a failure or fault, but by incorrect use or sizing of DELPHYS BC system. The alarm may be tripped by:

- Operation for an extended period of time at high temperatures (degradation of the batteries);
- large number of overloads (incorrect sizing);
- continuous battery draining (unstable mains voltage);
- large number of circuit breakers on the bypass (high peak loads).

9. 2. DELPHYS BC PARALLELS SYSTEM ALARMS

- **UPS imminent stop.**

- **UPS Overload.**

The load power draw is greater than the system's nominal output.

Check the load on the display and disconnect loads not requiring UPS service or distribute the total load over the three phases.



Overloading results in the load not being powered by UPS for a limited period of time. For further details, see the technical specifications.

- **UPS transfer blocked.**

Switching from system bypass to inverter may be inhibited by an inverter failure. Reset the alarm and contact Aftersales Service.

- **UPS transfer impossible.**

Switching from system inverter to bypass is prevented by problems on the auxiliary mains supply: mains supply out of tolerance, not synchronised, etc. Ensure that Q4 is closed, that the auxiliary mains supply is available and that the values are within range.

- **UPS Insufficient resource.**

The system is in overload, with auxiliary mains supply and inverter inhibited. The power supply to the load will be interrupted if the load is not brought back within range or the auxiliary mains supply fails. Check the load on the display and disconnect loads not requiring UPS service or distribute the total load over the three phases

- **UPS redundancy loss.**

In case of a parallel redundant system, loss of redundancy is due to possible problems with one of the units. Check values and alarms status of all units, and make sure that none of the operating units is overloaded.

- **UPS general alarm.**

This alarm is generated if at least one alarm is present on at least one unit. Check the other active alarms for details.

- **Unit 1...6 general alarm.**

These alarms are generated if at least one alarm is present on unit 1 to 6 respectively. Check the other active alarms for details.

- **Manual maintenance bypass alarm.**

This alarm is generated if circuit breakers Q5 (bypass) and Q3 (output) are closed at the same time. Check the position of the circuit breakers.

- **Rotation phase fault.**

The phase cycle of the auxiliary mains is incorrect. Swap two input phases or two phases of the auxiliary mains supply (only for UPS with separate auxiliary mains supply).

- **Input supply absence.**

The input power supply or auxiliary mains supply has failed or is insufficient (voltage/frequency out of tolerance). Check for “rectifier input power fault” and “bypass power supply out of tolerance” to identify the failure.

Check that the voltage and frequency values are in range (see technical specifications).

If there is no input mains supply failure, check whether Upstream protections have tripped or whether circuit breaker Q1 (input power supply) is open.

If there is no auxiliary mains supply failure, check whether Upstream protections have tripped or whether circuit breaker Q4 (auxiliary mains supply) is open.

- **Unit general alarm.**

This alarm is generated if at least one alarm is present on the unit. Check the other active alarms for details.

- **Genset alarm.**

The genset has sent an alarm; check the genset.

- **Option board alarm.**

This alarm is generated if one of the optional boards is no longer communicating with UPS controller. Check that the board is correctly mounted and reset the alarms.

- **Customer input alarm.**

An ADC board input has been activated; check the devices connected to the board.

9. 3. PREVENTIVE MAINTENANCE



All operations on the equipment must be carried out solely by SOCOMECS UPS personnel or by authorised service personnel.

Maintenance requires accurate functionality checks of the various electronic and mechanical parts and, if necessary, the replacement of parts subject to wear and tear (batteries, fans and condensers). It is recommended to carry out periodic specialised maintenance (annually), in order to keep the equipment at the maximum level of efficiency and to avoid the installation being out of service with possible damage/risks. Moreover, attention should be paid to any requests for preventive maintenance that the equipment may automatically display with alarm/warning message.

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, DELPHYS BC™ 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 5 years (in normal operating conditions).



When needed, fans must be replaced as per specifications by SOCOMECS 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:

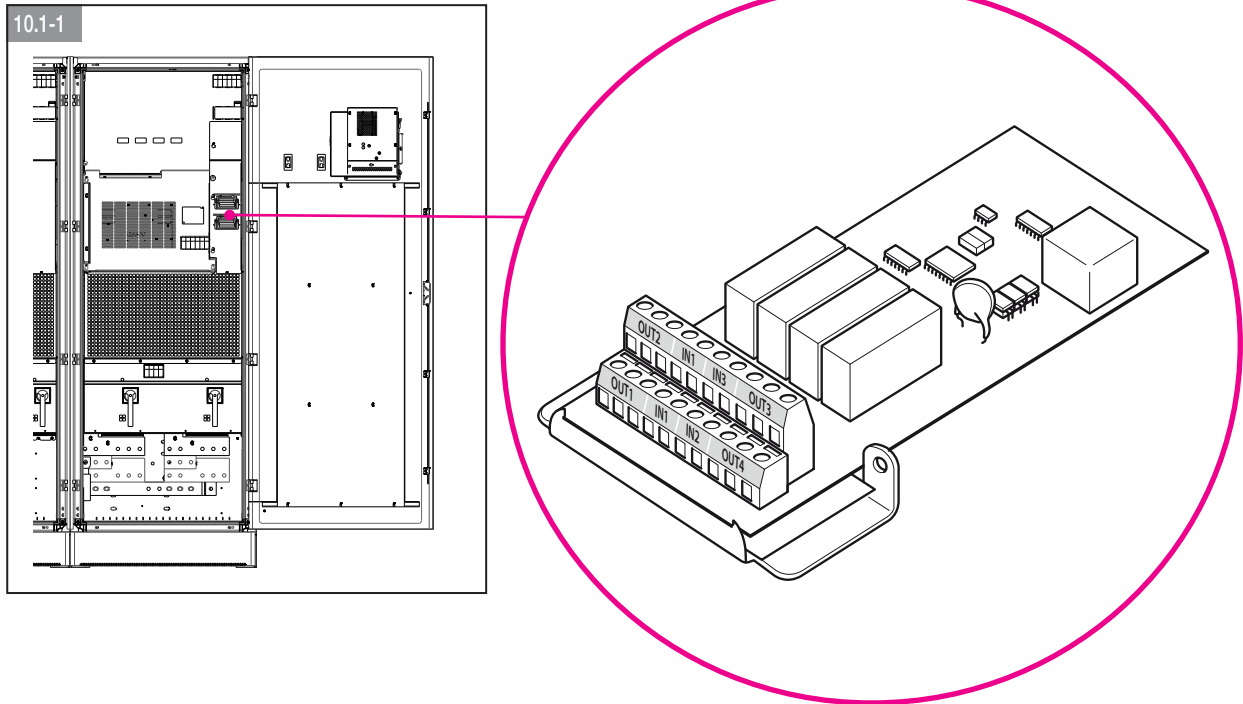
- Electrolytic capacitors: 5 years;
- Filtering capacitors: 7 years.

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

10. OPTIONS

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.



10. 2. ISOLATION CONTROLLER

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

10. 3. EXTERNAL MANUAL MAINTENANCE BYPASS

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

10. 4. ACS PCB

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

10. 5. TEMPERATURE SENSOR

This allows control of the temperature in the battery room or inside the battery cabinet.

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