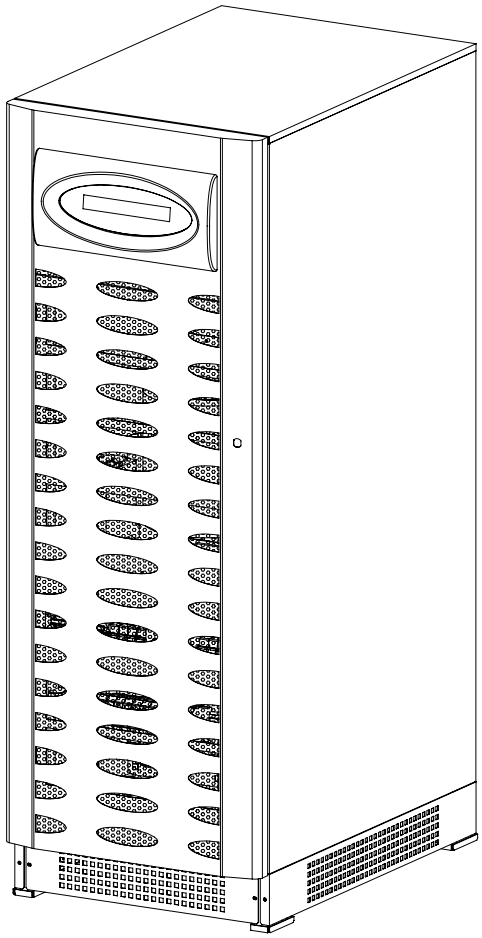
THE SCIENCE OF CONTINUITY

Sentry Multistandard

ST40 - ST60 - ST80



Manuale d'uso / User's manual

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USER'S MANUAL

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USER'S MANUAL

Thank you for choosing our products.

The manufacturer specialises in the development and production of uninterruptible power supplies (UPS). This series of high quality UPS units have been carefully designed and built to offer the best capabilities.

THIS MANUAL CONTAINS INSTRUCTIONS ON THE USE, INSTALLATION AND DEBUGGING OF THE UPS. READ THE MANUAL CAREFULLY BEFORE PROCEEDING TO THE INSTALLATION, WHICH SHOULD BE CARRIED OUT BY TRAINED PERSONNEL.
THE MANUAL CONTAINS INFORMATION ON THE USE OF THE EQUIPMENT AND MUST THEREFORE BE KEPT CAREFULLY AND *CONSULTED BEFORE OPERATING THE UPS*.

SAFETY PRECAUTIONS AND REGULATIONS

This section of the manual describes safety precautions that should be followed scrupulously.

a) THE UPS MUST NEVER BE USED WITHOUT AN EARTH CONNECTION.
The first operation is to connect the earth connector to the terminal marked PE (yellow/green).

b) THE UPS MUST NEVER BE USED WITHOUT A NEUTRAL CONNECTION.
No neutral connection could damage the UPS.

c) Do not connect the output neutral to the input neutral or to earth, as this could cause system malfunction.

d) The UPS generates DANGEROUS internal electrical voltages, even with the input and/or battery switches open. All installation and maintenance operations must be carried out exclusively by qualified personnel.

e) In dangerous conditions, open all the isolating switches located behind the front panel or remove the EPO connector to cut off the power supply to the loads.

f) DO NOT OPEN batteries fuseholders when the load is powered by the UPS and the mains is absent.

g) Do not turn on the UPS if a liquid is seen to be leaking.

h) Make sure that water or other liquids and/or foreign objects do not enter the UPS unit.

i) Always use the same type of fuses when they need to be replaced.

ELECTROMAGNETIC COMPATIBILITY

The UPS have the CE mark and, if used in accordance with the procedures described in this manual, comply with the EN50091-2: UPS – EMC requirement, EMC 89/336, 92/31 and 93/68 ECC directives.

The UPS have been designed for professional use in industrial or commercial environments. Shielded cables must be used for connections to the REMOTE and RS232 connectors.

ATTENTION: This is a product for restricted sales distribution to informed partners. Installation restrictions or additional measures may be needed to prevent disturbances.

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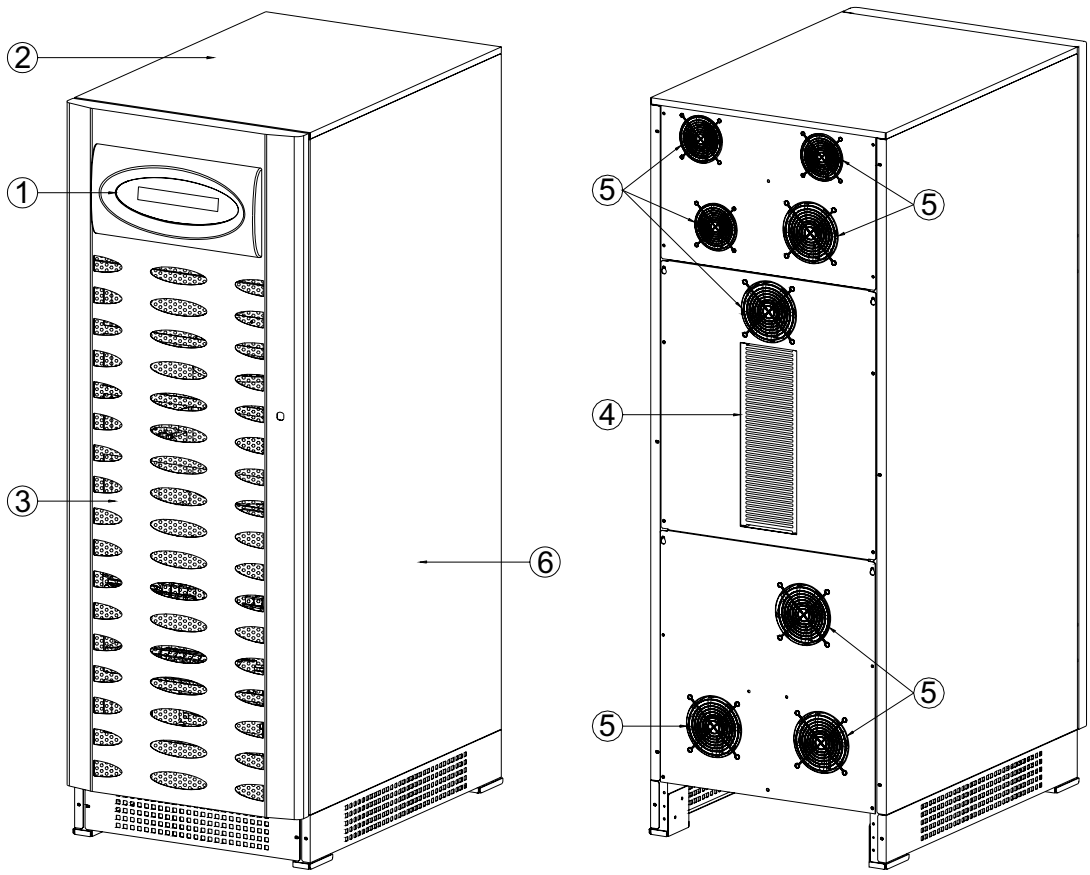
LAYOUT



1. Display panel
2. Upper panel
3. Front panel
4. Dissipater
5. Fan grids
6. Side panel

STORAGE

The premises used for storage must comply with the following characteristics:

Temperature:	0°÷40°C (32°÷104°F)
Degree of relative humidity	95% max

NOTES FOR INSTALLATION

UPS MODELS		40000	60000	80000
Rated power	[kVA]	40	60	80
Operating temperature	[°C]	0 ÷ 40		
Max. relative humidity		95 % (non-condensing)		
Max. installation altitude		1000 m at rated power (-1% power for every 100m above 1000m) max 4000m		
Dimensions (w x d x h)	[mm]	500 x 740 x 1400		
Weight	[Kg]	180	200	220
Power dissipated with nominal load and back up battery	[kW] [Kcal] [B.T.U.]*	2,8 2400 9600	4,2 3600 14200	4,8 4100 16300
Fan range at installation premises for heat dissipation	[mc/h]**	1450	2200	2500
Current dispersed to earth	[mA]	< 200 mA		
Protection level		IP20		
Cable input		From bottom / on rear		

* 3,97 B.T.U. = 1 kcal

** The following formula can be used to calculate the fan range: Q [mc/h]= 3,1* P_{diss}[Kcal]/(t_a-t_e) [°C]
P_{diss} is the dissipated power (expressed in Kcal) at the installation premises by all the installed equipment.
ta= environmental temperature, te=external temperature. To account for leaks, increase the value obtained by 10%.

PRELIMINARY OPERATIONS

The following items come with the UPS:
- warranty
- user manual
- CD-ROM with the UPS management software
- 3 battery input fuses (for the correct position see: APPENDICES, “INPUT/OUTPUT PANEL”, 2)

INSTALLATION PREMISES

The following points should be observed when choosing the place of installation:

- avoid dusty environments,
- ensure that the floor is level and able to take the weight of the UPS and the battery cabinet
- avoid sites that are too narrow as this may impede normal maintenance operations
- the ambient relative humidity must not exceed 95%, non-condensing
- ensure that the ambient temperature, with the UPS operating, remains between 0 and 40°C

  The UPS can operate with an ambient temperature of between 0 and 40°C. The recommended operating temperature for the UPS and the batteries is between 20 and 25°C. If the operational lifetime of the batteries is on average 4 years at a temperature of 20°C, raising the temperature to 30°C will halve the lifetime.
- avoid positioning in sites exposed to direct sunlight or hot air

To keep the temperature of the installation premises within the range indicated above, a system has to be provided to remove the dissipated heat (the value of the kcal/kW/B.T.U. dissipated by the UPS is indicated in the table shown below). The following methods can be used:

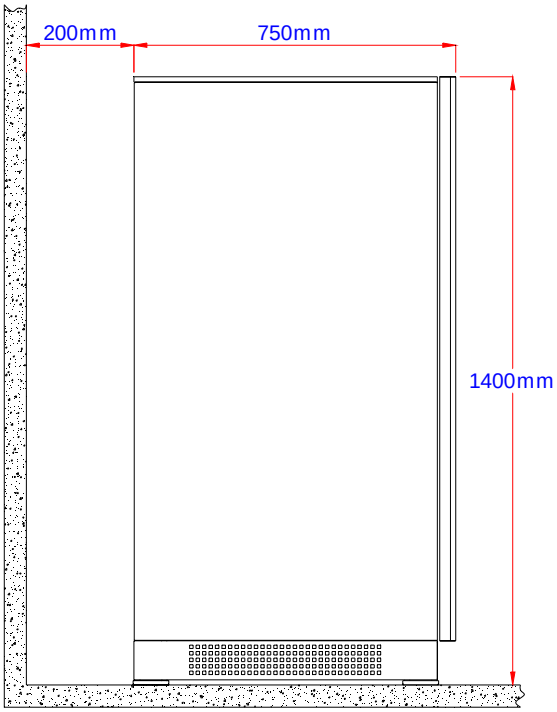
- *natural ventilation*
- *forced ventilation,* recommended if the external temperature is lower (e.g. 20°C) than the UPS operating temperature (e.g. 25°C);
- *air-conditioning system,* recommended if the external temperature is higher (e.g. 30°C) than the temperature set for UPS operation (e.g. 25°C).

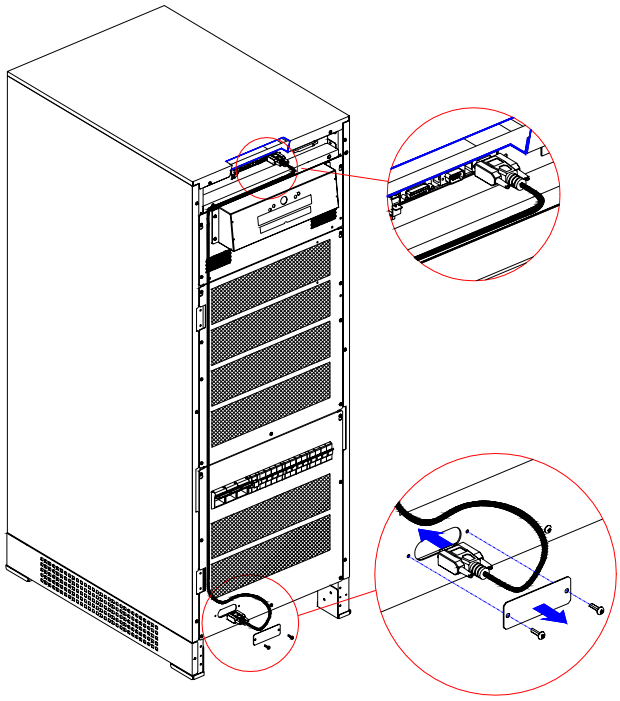
POSITIONING

The following should be taken into account when choosing a position for the UPS:

- a space of at least one metre must be kept clear in front of the equipment for start-up/shutdown operations and any maintenance operations that may be required
- the back of the UPS must be placed at least 20 cm from the wall, for the correct flow of the air blown by the fans
- no objects are to be placed on the top

The INPUT/OUTPUT AC, DC cables input can be from the bottom or from the rear.





ELECTRICAL INSTALLATION SETTINGS

PROTECTIONS

Inside the UPS

The sizes of the switches and fuses on the UPS input and output lines are shown below (see the block diagram section for the abbreviations). Fuses must be replaced with fuses of the same capacity and with the same characteristics as in the table.

	Disconnecting switches and internal protections						
Type of UPS	Non-automatic switches		Fuses				
[kVA]	UPS input	UPS/maintenance output	Rectifier input fuse	Battery fuse	Output fuse	Input current [A]	Output current [A]
	SWIN	SWOUT/SWMB		FBAT		max*	Nominal
40	63A(4P)	63A(4P)	80A gR(19x56)	80A gG(22x58)	80A gR(19x56)	61	58
60	100A(4P)	100A(4P)	125A gR(19x56)	100A gG(22x58)	125A gR(19x56)	91	87
80	125A(3P)+160A (1P)	125A(3P)+160A (1P)	160A gR(19x56)	125A gG(22x58)	160A gR(19x56)	122	116

** The maximum input current refers to a nominal load with minimum nominal input voltage (380V). At higher input voltages, the current may increase by 10%*

External protection devices

As can be seen above, the uninterruptible power supply is provided with protection devices for both faults at the output as well as internal faults.

Protection of the power supply line depends on which of the two modes the UPS is operating in:

- In "NORMAL MODE", the maximum input current from the main line through the rectifier is that indicated in the table. A disconnecting switch is present at the rectifier input as indicated in the SWIN column of the table
- In STANDBY-ON MODE, the input line is connected directly to the output without any protection

UPS output, short circuit and selectivity

The nominal current (In), output by the UPS is that indicated in the table under "nominal output current".

Short Circuit

In the event of a fault on the load or a short circuit, the UPS will automatically limit the value and the length of the current supplied (short circuit current). These values also depend on the operating status of the system at the time of the fault:

- UPS in NORMAL MODE
  the load is immediately switched over to the bypass line for the protections (see the paragraph entitled "BYPASS LINE CHARACTERISTICS").
- UPS in BATTERY MODE
  the UPS protects itself by supplying an output current of about twice the nominal value for 0.5s, and then shuts down.

Selectivity

In NORMAL MODE, selectivity is achieved with the output fuse at max. capacity, as in the table below. If selectivity is required in battery mode, the value of the fuse to be provided is also indicated:

MODELS [kVA]	**40**		**60**		**80**	
Max. capacity of output fuse [A]	gG	aM	gG	aM	gG	aM
1) selectivity in battery mode	16	8	20	10	32	16
2) selectivity in normal mode	40	20	63	36	80	40

Differential

In the standard version, without the separation transformer in input, the neutral from the mains power supply is connected to the neutral of the UPS output and the neutral arrangements of the installation are not modified:

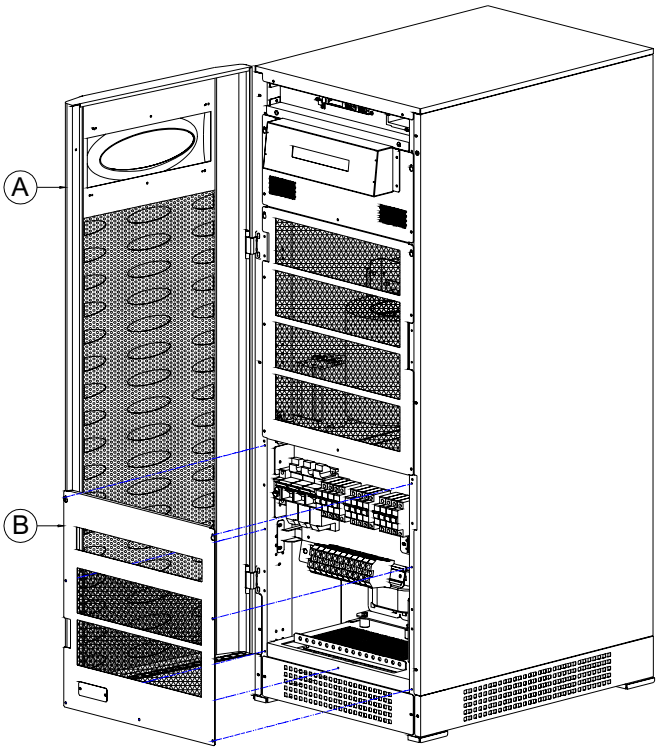
THE INPUT NEUTRAL IS CONNECTED TO THE OUTPUT NEUTRAL

THE ELECTRICAL SYSTEMS UPSTREAM AND DOWNSTREAM OF THE UPS ARE IDENTICAL

When operating with mains power, a differential switch inserted at the input intervenes so that the output circuit is not isolated from the input circuit.

Further differential switches can always be inserted at the output, coordinated, where possible, with those present at input. The differential switch located upstream must have the following characteristics:

differential current not lower than 100mA (to avoid delayed interventions)
type B or type A
delay greater than or equal to 0.1s



OPERATIONS TO BE CARRIED OUT BEFORE OPENING THE UPS

The following operations are to be carried out with the UPS disconnected from the mains, with all the switches on the equipment open (control lever turned downwards).

Follow the instructions below to open the UPS:

- Ç Open the door (A)
- Ç Remove the switch cover panel (B)

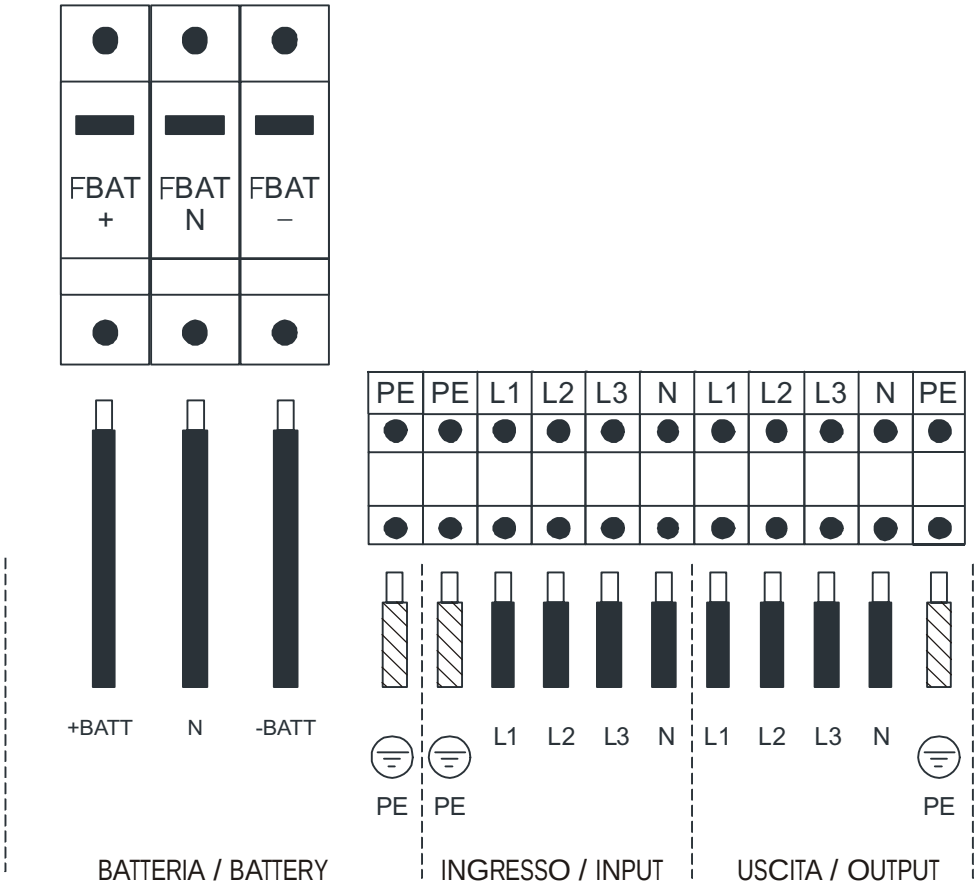
THE FIRST CONNECTION TO BE MADE IS THE PROTECTION CONDUCTOR THAT MUST BE INSERTED IN THE TERMINAL LABELLED PE.
THE UPS **MUST** OPERATE WITH THE EARTH POINT CONNECTED.

MAINS, LOAD AND BATTERY CONNECTIONS

N.B: *THE INPUT NEUTRAL MUST ALWAYS BE CONNECTED*

Refer to the following table for the size of the input and output cables (the value in brackets is the maximum cable cross-section that can be connected to the terminal).

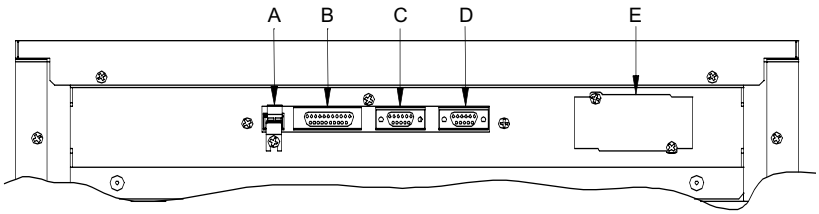
	Section. [mmq]					
	INPUT		OUTPUT			BATTERY
kVA	L1/L2/L3	N	PE	L1/L2/L3	N	+BATT / -BATT / N
40	25 (50)	25 (50)	16 (50)	25 (50)	25 (50)	25 (50)
60	35 (50)	35 (50)	16 (50)	35 (50)	35 (50)	35 (50)
80	50 (70)	50 (70)	16 (50)	50 (70)	50 (70)	50 (50)



CONNECTORS FOR COMMANDS AND REMOTE SIGNALS

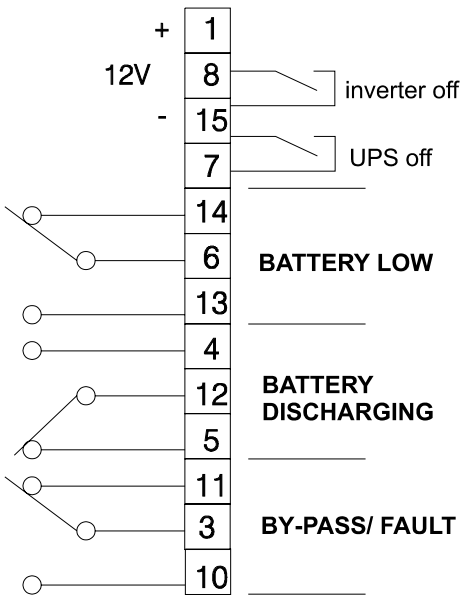
With the UPS door open, the following connectors are located at the front of the unit:

A - EPO connector, emergency shutdown command
B - female DB15 labelled REMOTE
C - female DB9 labelled RS232-2
D - male DB9 labelled RS232-1
E - SNMP connector (optional)



EPO connector (emergency shutdown command)

Opening the jumper located on the connector interrupts the voltage at the UPS output.
The UPS is supplied ex-works with the E.P.O. terminals short-circuited. If a hazardous situation should occur, this input can be used to shut down the UPS from a remote location simply by pressing a button.
By removing the power supply alone, for example by opening the switch on the power supply panel, the UPS will keep the load powered using the energy stored in the batteries.



Female DB15 labelled "Remote"

This connector has:
12Vdc 80mA(max) power supply, pin 1 and 15
3 voltage-free change-over contacts for alarms
2 remote commands for INVERTER shutdown and UPS shutdown.
The connector has the following pin configuration (see figure at side):
BATTERY LOW = END DISCHARGE PREALARM
BATTERY DISCHARGING = BATTERY IN DISCHARGE
BYPASS / FAULT = BYPASS / FAULT
The position of these contacts is with no alarm present (NORMAL MODE)
The contacts can withstand a max. current of 0.5A at 42V.
REMOTE COMMANDS
2 commands are available:

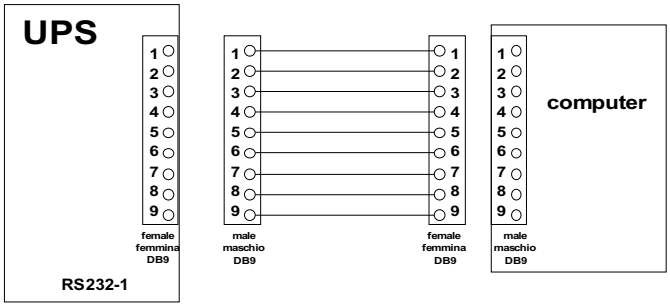
- BYPASS with STOP INVERTER – connecting pin 8 to pin 15 (for at least 2 seconds)
- UPS BLOCK - connecting pin 7 to pin 15 (for at least 2 seconds)

BYPASS with STOP INVERTER (**COMMAND NOT STORED**)
If the INVERTER OFF command is received during NORMAL MODE, the UPS switches the load onto the BYPASS line (load not protected from mains failure). If the STOP INVERTER command is received while in EMERGENCY mode, the UPS shuts down (load not powered). When the mains power supply is restored, the UPS without jumper will restart in NORMAL MODE.

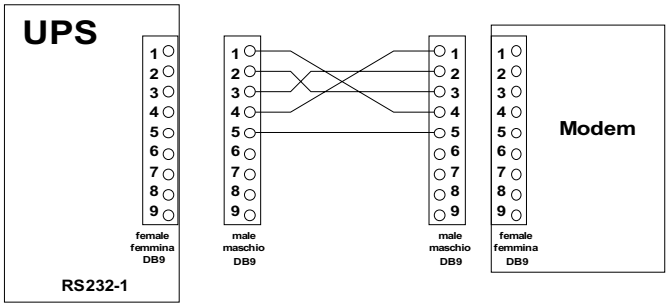
TOTAL BLOCK (**COMMAND STORED**)
If the TOTAL BLOCK command is received, the UPS removes the output voltage, **and the load is no longer powered**. The INVERTER OFF command must be sent to restart the UPS.

RS232

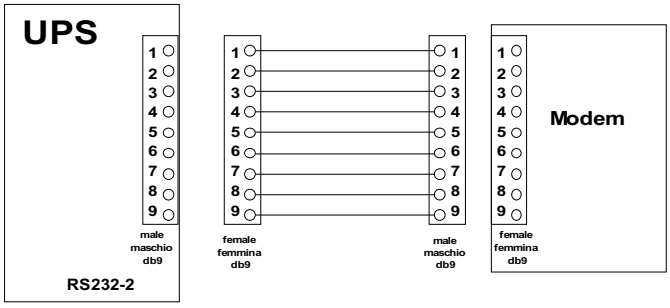
2 DB9 connectors are available for RS232 connection.
The default transmission protocol of the UPS is as follows - 9600 baud, - no parity, - 8 bit, - 1 stop bit.
The transmission speed can be changed, from 1200 to 9600 baud, by means of the PERSONALIZING menu on the panel. Recommended transmission speed values depend on the transmission distance:
9600 baud 50m, 4800 baud 100m, 2400 baud 200m, 1200 baud 300m.
Use a shielded cable (AWG22÷28) for connection and connect the shield only to the connector on the computer/modem side. See the diagrams below for the connections.

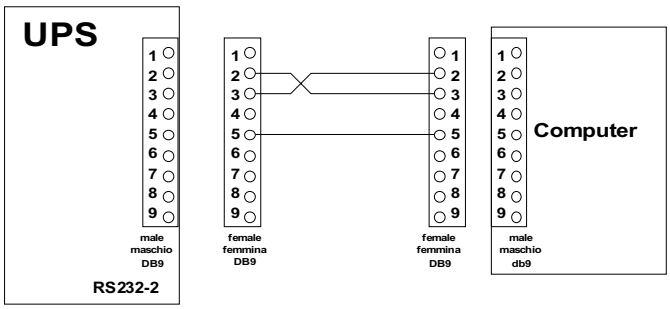


Female DB9 "RS 232-1"
This is to be used to connect the UPS to a computer using a standard cable.



Male DB9 "RS 232-2"
To be used to connect the UPS to a modem using a standard cable.





SNMP connector (optional)

Housing for an electronic board that gives the UPS access to an SNMP (Simple Network Management Protocol) network, with the possibility of transmitting data and receiving commands from a control station located anywhere in the world.

CHECKING CONNECTIONS

Once the INPUT/OUTPUT cables have been connected and the battery has been connected to the UPS terminals, before replacing the switch cover panel check that:

- ⊄# the input and output protection conductor (yellow/green earth cable) is connected correctly
- ⊄# all the input/output terminals have been tightened

SWITCHING ON

Once all the operations described above have been carried out, the UPS can be switched on.

ü ***Powering up with mains power (no cold start feature)***

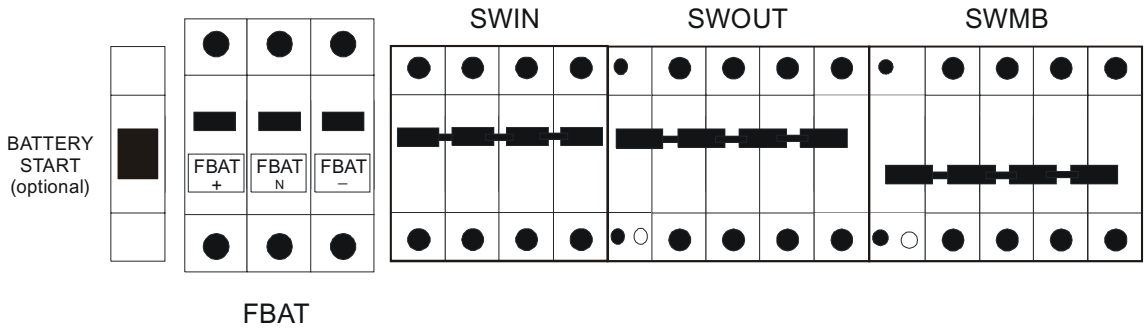
Perform the following operations in the given order:

- check that all the fuse holders in the battery cabinet have the fuse inserted and in a closed position

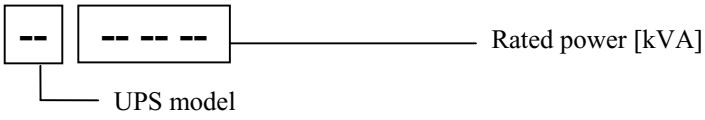
- close the following switches and fuse holders on the UPS:

FBAT	battery fuses
SWIN	isolating input switch
SWOUT	isolating output switch

N.B.: the SWMB isolating switch (rightmost) must be left open (lever downwards) in NORMAL mode. The SWMB switch is closed only to power the load directly from the mains, excluding the UPS, e.g. for maintenance operations (see the OPERATING MODES chapter).



Once these operations have been carried out, the hum of the fans will be heard immediately and the buzzer will sound for about one minute (if it does not, check the buzzer status on the second row of the display panel - 5=OFF is disabled, 5=ON is enabled. Press key 5 to change the status). Press button 1 twice, select the language and then press button 8 to return to the NORMAL menu, the message NORMAL OPERATION will be displayed.
Manually run the battery test: press button 3 on the display panel and then button 2 (BATTERY TEST). Once the test has finished and the UPS has started up correctly, the green LED labelled IN (INPUT) and the green LED labelled OUT (OUTPUT) should be lit on the indicator and control panel. The message NORMAL MODE should be displayed on the first row of the panel, while the model of the UPS will be displayed in the left-hand corner of the second row, followed by two figures indicating the nominal power expressed in [kVA].



ü ***Power up from batteries [optional] (start up both from mains or from batteries)***

Perform the following operations in the given order:

Check that all the fuse holders in the battery cabinet have the fuse inserted and are in the closed position.

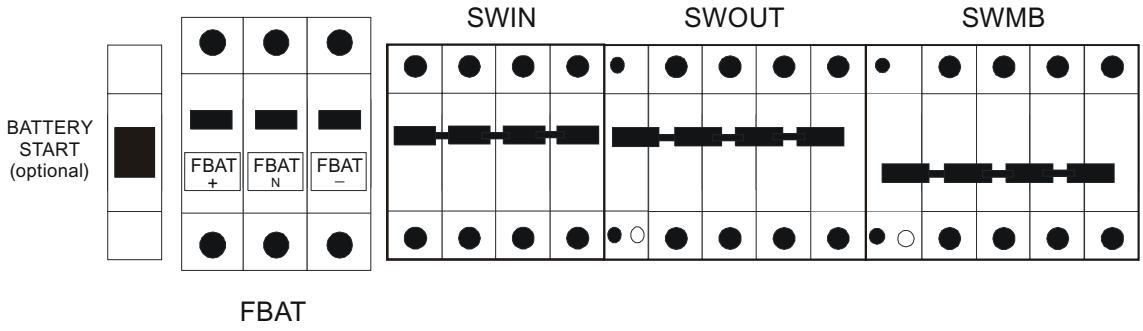
- close the following switches and fuse holders on the UPS:

  FBAT battery fuses
  SWIN isolating input switch

- press the BATTERY POWER UP button until the significant messages appear on the display

- close the SWOUT isolating output switch

N.B.: the SWMB isolating switch (rightmost) must be left open (lever downwards) in NORMAL mode. The SWMB switch is closed only to power the load directly from the mains, excluding the UPS, e.g. for maintenance operations (see the OPERATING MODES chapter).



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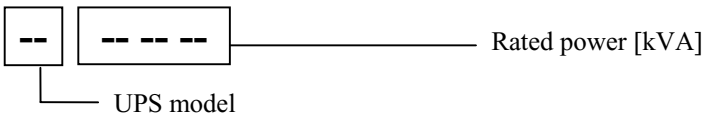


FUNCTIONAL TEST

When the start-up operations have been completed and after at least four hours (charge the batteries) with the UPS in NORMAL mode, the mains failure simulation can be effected by opening the switch located at the UPS input. The buzzer will sound while the OUT (green) and BATT (yellow) LEDs on the indicator and control panel will remain on. Check that the load connected to the UPS is powered. If it is, without mains power, the load is supplied by the energy previously accumulated in the batteries. After a few minutes, normal operating conditions may be restored by closing the input switch. The CONTROL PANEL will be displayed again with the GREEN IN and OUT LEDs on. The batteries will be recharged automatically.

SETTINGS / PERSONALIZING

The UPS operating mode (see section “OPERATING MODES”) can be changed by entering the access code “436215” on the CONTROL PANEL (press key 3 “CONTROLS” and then key 5 “PERSONALIZING on the NORMAL menu). The following factory default electrical parameters can be changed in the same way:

- value of the NOMINAL OUTPUT VOLTAGE
- acceptable frequency and voltage range on the BYPASS line
- acceptable frequency and voltage range on the BYPASS line in STANDBY-ON mode
- battery capacity, end of discharge prealarm
- switching over to the bypass line due to output power lower than the set value (AUTO-OFF in power)
- programmed daily shutdown (AUTO-OFF time)
- transmission parameters of the RS232-1, RS232-2 ports
- the UPS ID number

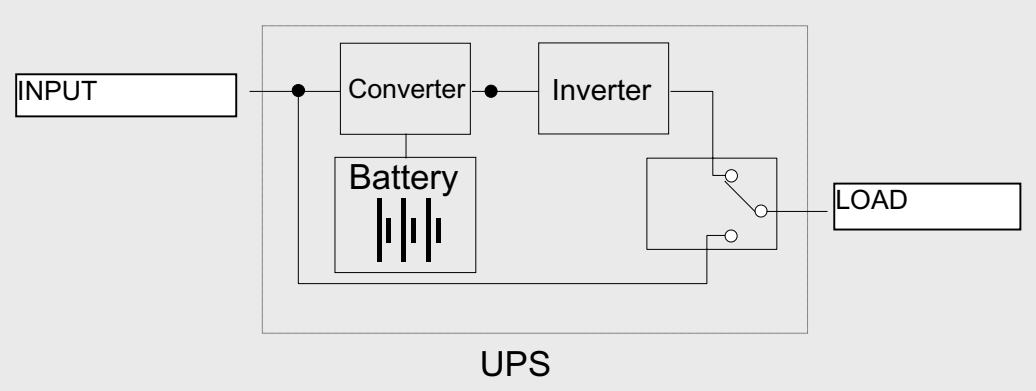
The procedure to be followed and the modification ranges are set out in the section “key menu 3, 5, ”436215”……”.

SHUTDOWN

Carry out the following operations to shut down the UPS: open isolating switches SWIN, SWOUT
open fuse holders FBATT

The load is no longer powered and after a few seconds the indicator panel will also switch off.

SETTING PROCEDURE



The UPS can be set to operate in one of the following modes:

	The LOAD is powered by:	
Operating Mode	With INPUT	Without INPUT
- ON-LINE	Inverter	Inverter
- STANDBY-ON	Input	Inverter
- SMART ACTIVE	Input / Inverter	Inverter
- STANDBY-OFF	Not powered	Inverter
- STABILIZER	Inverter	Not powered

The various operating modes are described below.

ON-LINE

The factory default settings set the UPS in ON-LINE mode when it is powered up.

Display panel message	Power supply	Switch positions		Display panel status					Load
		SWIN/ FBAT/SWOUT	SWMB	BATT led	IN led	OUT led	BY led	buzzer	
NORMAL MODE	*ok*	*closed*	*open*	*off*	*on*	*on*	*off*	*off*	*Powered by INVERTER*

The inverter always powers the load with stable voltage and frequency, using the energy from the mains power supply (INPUT). A fault on the INPUT determines the transfer, in zero time, to the batteries to supply energy to the inverter thus keeping the load powered (for the back-up time of the batteries). When the INPUT returns, the rectifier automatically charges the batteries.

When a black out occurs the output load is powered by the UPS which uses the energy accumulated by the batteries.

STANDBY-ON

The default values set the UPS to start up in ON-LINE mode. STANDBY-ON mode must be set on the display panel and the value of the bypass line voltage range must also be set (see the "personalizing in Standby-on mode" menu).

Standby-on mode reduces the energy dissipated by the system (a considerable saving); before using this function ensure that, in the event of a mains failure, the powered load can withstand an interruption in the power supply of approx. 1 ms.

The letter N appears next to the model name on the second line of the panel.

Display panel message	Power supply	Switch positions		Display panel status					Load
		SWIN/FBY/ FBAT/SWOUT	SWMB	BATT led	IN led	OUT led	BY led	buzzer	
NORMAL STANDBY ON MODE	*ok*	*closed*	*open*	*off*	*on*	*on*	*off*	*off*	*powered by INPUT*
POWER VOLTAGE ERROR OR SWIN OFF	*ok*	*closed*	*open*	*on*	*off*	*on*	*off*	*on*	*powered by INVERTER*

The RECTIFIER charges the batteries from mains power supply

The switch over from inverter to bypass line may be immediate (time set =0) or delayed for up to a maximum of 180 minutes (for the switch to take place, the bypass line must stay within acceptable limits for the set time).
The system remains on the bypass line until the voltage and the frequency return to an acceptable range. The input LED IN (green), the output LED OUT (green) and the bypass LED BY (yellow) are all lit on the display panel.

If the bypass line fails or the voltage or frequency exceeds the acceptable limits, the load is automatically switched over to the inverter output, in approx. 1ms.

The advantages and disadvantages of the two operating modes ON-LINE and STANDBY-ON are listed below:

	advantages	disadvantages
ON-LINE with respect to STANDBY-ON	- the inverter always powers the load with stable voltage and frequency - zero intervention time in cases of black outs - re-phasing of the power line	- dissipation of energy, UPS efficiency equal to 92-95% with nominal load
STANDBY-ON with respect to ON-LINE	- reduced energy dissipation with mains power, UPS efficiency equal to 98%	- load powered with mains voltage and frequency - switch over to inverter due to black out non immediate (1ms)

SMART ACTIVE

Thanks to this function, the user can let the UPS decide on the operating mode (STANDBY-ON or ON-LINE) best suited to the quality of the mains power and type of load. The UPS checks the quantity, frequency and type of interference on the network and the load and then decides whether to operate in STANDBY-ON mode (choosing low energy consumption) or in ON-LINE mode (choosing higher protection for the load).

STANDBY-OFF

The factory default values set the UPS in ON-LINE mode when it is powered up. See the paragraph "personalizing STANDBY-ON operation" for information on configurations in STANDBY-OFF mode.

With the UPS in STANDBY-OFF operating from mains power, the UPS output is nil. Output voltage is only present when the mains power fails.

The letter F appears next to the model name on the second line of the panel.

Display panel message	Power supply	Switch positions		Display panel status					Load
		SWIN/ FBAT/SWOUT	SWMB	BATT led	IN led	OUT led	BY led	buzzer	
NORMAL STANDBY-OFF MODE	*ok*	*closed*	*open*	*off*	*on*	*off*	*off*	*off*	*not powered*
POWER VOLTAGE ERROR OR SWIN OFF	*ok*	*closed*	*open*	*on*	*off*	*on*	*off*	*on*	*powered by INVERTER*

The RECTIFIER stays on and keeps the batteries charged

The system remains with output voltage = 0V until the input voltage and frequency are within the accepted range of values. The input LED IN (green) is lit up on the display panel.

If the bypass line fails or the voltage and frequency exceed the accepted values, the load is automatically powered by the inverter output. When the power line returns, the UPS automatically returns to STANDBY-OFF mode.

STABILIZER (without batteries)

The default factory values set the UPS in ON-LINE mode at start up. For the STABILIZER mode configuration, refer to the "personalizing the Stabilizer".
A letter S appears next to the model on the second line of the panel.

Display panel message	Power supply	Switch positions		Display panel status					Load
		SWIN/ FBAT/SWOUT	SWMB	BATT led	IN led	OUT led	BY led	buzzer	
NORMAL MODE	*ok*	*closed*	*open*	*off*	*on*	*on*	*off*	*off*	*powered by INVERTER*

MAINS present, load powered
The load is always powered via the inverter, with stable voltage and frequency, using the energy from the input mains. Batteries are not present.

If the input MAINS fails, the STABILIZER output is not powered.

OPERATING MODES

- Battery Mode (not in stabiliser mode)
- Operation from bypass mains
- Bypass for SWMB maintenance

"Battery Mode", "Bypass Mode" and "Operation from Maintenance Bypass Mode" apply to all setting modes, with the exception of "Battery Mode", which cannot be applied to the STABILIZER.

BATTERY MODE (not in STABILIZER mode)

Display panel message	Power supply	Switch positions		Display panel status					Load
		SWIN/ FBAT/SWOUT	SWMB	BATT led	IN led	OUT led	BY led	Buzzer	
POWER VOLTAGE ERROR OR SWIN OFF	*ok*	*closed*	*open*	*on*	*off*	*on*	*off*	*on*	*powered by INVERTER*

MAINS absent, load powered
The UPS is in this status when the MAINS is absent (black out), or is no longer in the acceptable range (over or under voltage). The energy for the equipment connected to the UPS output is supplied by the previously charged batteries.
The alphanumeric PANEL on the front of the UPS displays the expected remaining BACK-UP time, calculated on the basis of the power supplied and on the batteries charge status.
NOTE: the value provided is a guideline, as the power required by the connected load may vary during discharge.
DISCONNECTING SOME OF THE EQUIPMENTS CAN INCREASE BACK-UP TIME.
When the residual back-up time falls below the value set as the END OF BACK-UP PREALARM (default value is 5min.) the buzzer beeps more frequently and the yellow BATTERY LED starts flashing. At this point it is advisable to save the work in progress.
When the back-up time expires, the UPS will interrupt power supply to the loads.

When mains power returns, the UPS will reboot automatically and will recharge the batteries.

If the mains power is not adequate, the UPS can be booted from the batteries, following the instructions given in the "Battery start-up" paragraph.

OPERATING OFF BYPASS MAINS POWER

DEFINITION: ***This is a transitory or permanent operating status caused by a fault.***
In the latter case, contact the technical support centre.
The load is not protected in the event of a mains failure.

Display panel message	Power supply	Switch positions		Display panel status					Load
		SWIN/ FBAT/SWOUT	SWMB	BATT led	IN led	OUT led	BY led	buzzer	
BYPASS OUTPUT OVERLOAD	*ok*	*closed*	*open*	*off*	*on*	*off*	*on or flashing*	*on*	*powered by BYPASS*

The UPS may be in this mode following one of the following events:

- BYPASS command (manual or automatic)
- excessive output load (overload)
- failure

If the load is greater than the nominal value (overload), steps must be taken to reduce it, otherwise the protections upstream of the UPS will intervene by switching off the output (refer to the section GENERAL CHARACTERISTICS for the intervention time values).

BYPASS FOR SWMB MAINTENANCE

Given below is a sequence of operations to be followed carefully to set the UPS in **maintenance bypass mode** to carry out maintenance operations on the unit and keep the load powered at the same time.

1. Check that the UPS is in NORMAL MODE.
2. Close the SWMB isolating switch (the control logic automatically disconnects the inverter).
3. Open all the isolating switches and unit fuses (SWIN, SWOUT, FBAT), except for the SWMB isolating switch that is closed (maintenance BYPASS line). The indicator panel stays off.
   During the maintenance operations, any interference (e.g. black out) on the UPS power line will effect the powered loads (in this mode the batteries are disconnected).

Once the maintenance operations have been completed, restart the UPS: close SWIN, FBAT, SWOUT; wait for the UPS to power up and open SWMB. The UPS will return to NORMAL MODE.

MAINTENANCE

Maintenance inside the UPS must only be carried out by trained personnel. Even if the input and battery switches are open, there are still dangerous voltages inside the equipment. The removal of the internal panel and side doors could cause injury to unqualified personnel and may damage the equipment.

Preventive maintenance
The only components of the UPS that need periodic checks are the fans and the batteries.

- fans: these should be checked periodically
- batteries

WARNING:
The system automatically checks the efficiency of the batteries every 24 hrs, and signals when the efficiency is found to be much lower than that calculated on the basis of the stored capacity value (see key menu 3,2 BATTERY TEST).
The batteries lifetime is linked to the operating temperature and to the number of charge and discharge cycles effected. The lifetime of batteries used at 20°C is approx. 3 - 5 years, this time is halved if the operating temperature is raised to 30°C.

The capacity is not constant, but increases after a number of charge and discharge cycles. It remains constant for several hundred cycles and then decreases.
Preventive maintenance of the batteries is as follows:

- keep the operating temperature in the range 20 - 25°C
- run two or three discharge and charge cycles during the first month of use
- run the discharge/charge cycle every six months after the first month of use

Should the batteries need replacing, this must be done by trained personnel. The old batteries must be handed over to one of the special disposal/recycling associations (batteries are classified by law as "toxic waste").

UPS COMPONENTS

The UPS comprises the following components (with reference to the diagram on page 21):

- Input / output filters (EMI)
- Converter (input stage)
- Inverter (output stage)
- Static bypass
- SWMB (maintenance BYPASS), SWIN, SWOUT
- RS232 interfaces no.1 and no. 2
- Remote commands and signals
- Indicator and control panel
- EPO (Emergency Power Off) input with n.c. contact
- Harmonics filter (optional)

Input / Output Filters

These eliminate high frequency noise during normal mode, protecting the UPS and therefore the connected loads from noise on the mains. They also ensure that the high frequency inside the UPS is not transmitted to the outside.
In "standby-on" and "bypass" modes, the filters always protect the loads from mains noise.

Converter (input stage)

In normal mode, this converts the AC mains voltage into constant DC voltage, suitable for powering the inverter and for recharging the batteries. When the mains voltage fails it raises the battery voltage to the constant value required by the inverter.
The rectifier acts as a PFC (power factor control); the power factor in input is very high (> 0,95), so the UPS acts as a re-phaser with favourable effects on the installation.

Inverter (output stage)

The inverter converts the DC voltage into stable sinusoidal AC voltage to power to the load. When the UPS is in "ONLINE" mode, the connected load is always powered by the inverter.

Static bypass

This device automatically transfers the power supplied to the load from the inverter onto the bypass line and vice versa. It is implemented with SCRs to ensure switching in zero time.
It is able to support overloads that are not tolerated by the inverter electronics and ensures a continuous voltage output from the UPS even in the event of an internal fault.
Back feed protection is inserted as standard in the SCRs. In the event of a fault in the SCRs, this ensures that when the mains power supply is interrupted there is no potential at the power supply terminals with the consequent danger of electric shocks.
The bypass line has no fuses.

SWMB (Maintenance bypass), SWIN, SWOUT

SWMB is a non-automatic switch that connects the three UPS input phases plus neutral to the UPS output. When switches SWOUT and SWIN are open, maintenance operations can be safely carried out inside the UPS while keeping the load powered.
This is not possible for the switches, the line connection terminal boards and the filters on the terminal boards; the equipment must be completely disconnected before these components can be replaced.
The manual bypass line is sized for the nominal power of the UPS.

Batteries

The batteries form the energy reserve to power the load in the absence of the mains power supply to the UPS.
They are housed in dedicated cabinets.

RS232 Interfaces 1 and 2, Remote commands and signals

Two DB9 connectors are available on the UPS for the RS232 interface (one male and one female), together with a DB15 female connector for remote signalling (with change-over contacts), that have the following inputs:

- UPS-OFF command
- bypass command

Indicator and Control Panel

The panel is composed of:

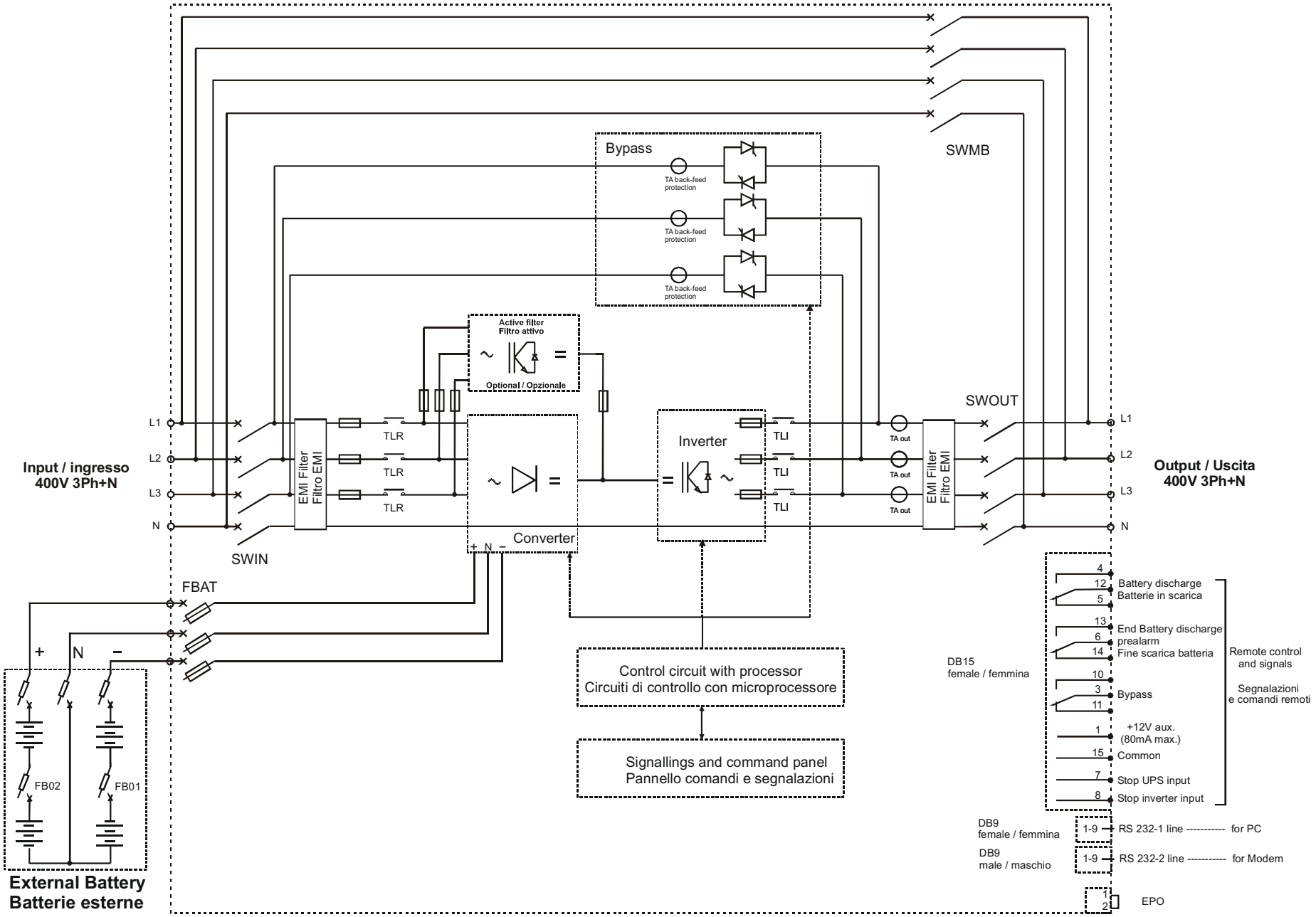
- an alphanumeric display with 2 lines of 40 characters each
- 8 keys, used to scroll the various menus and to set the various operating parameters
- a mimic panel with four LEDs indicating the operating status
- a buzzer

EPO (Emergency Power Off) input with n.c. contact

The UPS can be shut down by opening the jumper on the connector and interrupting the output voltage.
The UPS is provided ex-works with the E.P.O. terminals short-circuited.

Harmonics filter (optional)

Input filter that reduces the harmonic distortion of input current. The filter is housed inside the UPS and is protected by five fuses.


Bypass
SWMB
TA back-feed protection
TA back-feed protection
TA back-feed protection
Active filter
Filtro attivo
Optional / Opzionale
SWOUT
L1
L2
L3
N
Input / ingresso
400V 3Ph+N
TLR
TLR
TLR
EMI Filter
Filtro EMI
Converter
+ N –
Inverter
TLI
TLI
TLI
TA out
TA out
TA out
EMI Filter
Filtro EMI
Output / Uscita
400V 3Ph+N
SWIN
FBAT
+
N
–
FB02
FB01
External Battery
Batterie esterne
Control circuit with processor
Circuiti di controllo con microprocessore
Signallings and command panel
Pannello comandi e segnalazioni
DB15
female / femmina
4
12
5
Battery discharge
Batterie in scarica
13
6
14
End Battery discharge
prealarm
Fine scarica batteria
10
3
11
Bypass
1
+12V aux.
(80mA max.)
15
Common
7
Stop UPS input
8
Stop inverter input
Remote control
and signals
Segnalazioni
e comandi remoti
DB9
female / femmina
1-9
RS 232-1 line ---------- for PC
DB9
male / maschio
1-9
RS 232-2 line ---------- for Modem
1
2
EPO

ELECTRICAL SPECIFICATIONS

SYSTEM

	40000	60000	80000
Nominal power [kVA]	40	60	80
Nominal voltage [V]	380 - 400 - 415V 3/N/PE		
Active output power [kW]	32	48	64
Output power depends on input voltage without participation from batteries	100% with input voltage within –20% 60% with input voltage within –30% 40% with input voltage within –40%		
Efficiency (STANDBY-ON) load 0-100%	98%		
Efficiency with full load in "Normal Mode"	92%		93%
Efficiency with half load in "Normal Mode"	91%		92%
Current dispersed to earth [mA]	200 max		
Remote signals	3 change-over contacts (end of discharge prealarm, battery in discharge, bypass / fault); 12Vdc 80mA output		
Remote commands	UPS bypass and system block		
Emergency command	EPO		
Computer interface	Nr. 2 RS232/C		
SNMP interface	optional		
Operating temperature [°C]	0 ÷ 40		
Max. relative humidity	95 % (non-condensing)		
Installation altitude	1000m at nominal power (-1% power for every 100m above 1000m) max 4000m		
Cooling	forced ventilation (fan speed regulated according to load)		
Acoustic noise at 1m, depending on load and temperature [dBA]	50÷56		
Protection level	IP20		
Cable input	bottom / rear		
Reference standards	safety EN 50091-1-1, EMC EN 50091-2		
Standard feature on all machines	device against backfeed current caused by SCR BACKFEED fault		

CONVERTER INPUT

	40000	60000	80000
Nominal voltage [V]	380 - 400 - 415V 3/N/PE (400V= nominal reference for sampling)		
Voltage tolerance	±20% at maximum power		
Input frequency [Hz]	50 / 60 auto sensing		
Frequency [Hz]	45 ÷ 65		
Max. input current, with minimum nominal voltage (380V, 220V F-N) and nominal output [A]	61	91	122
Max. input current, with minimum voltage (320V, 184V F-N) and nominal output [A]	66	99	132
Nominal input current, with nominal voltage (400V, 230V F-N), nominal output and battery charger turned off [A]	53	79	106
Harmonic distortion of current Power factor	Ω27 % ∅0.95		
UPS with harmonics filter - harmonic distortion of current - power factor	 Ω4% > 0.99		

BATTERY CHARGER

		40000	60000	80000
Number of batteries		48		
Float voltage (20°C, 2,26V x el)	[V]	-325+325		
Charge voltage (2,3V x el)	[V]	-331+331		
Max. output voltage	[V]	-334+334		
Remaining AC voltage		< 1%		
Max. charge voltage	[V]	-334+334		
Max. charge current	[A]	8		
Max. recharge current with nominal load (depending on battery capacity)	[A]	6	8	8

INVERTER

		40000	60000	80000
Nominal power	[kVA]	40	60	80
Active power	[kW]	32	48	64
Nominal voltage	[V]	380 - 400 - 415V 3/N/PE (400 = factory setting)		
Nominal current	[A]	58	87	116
Voltage regulation range		200 ÷ 250 V, neutral phase (from control panel)		
Load crest factor without derating (Ipeak/Irms)		3 : 1		
Wave form		sinusoidal		
Distortion with linear load		Ω2%		
Distortion with non-linear load		Ω5%		
Static stability of the output voltage		±1%		
Dynamic stability of the output voltage		±5%		
Frequency stability: with synchronism		±2% (configurable ±1%, ±5% from control panel)		
Frequency stability: without synchronism		±0.05%		
Overload		110 / 125 / 150% nominal current 300' / 10' / 1'		
Short circuit current for 0.5s		200%		
Inverter efficiency % (100% load)		> 93	> 93	> 93

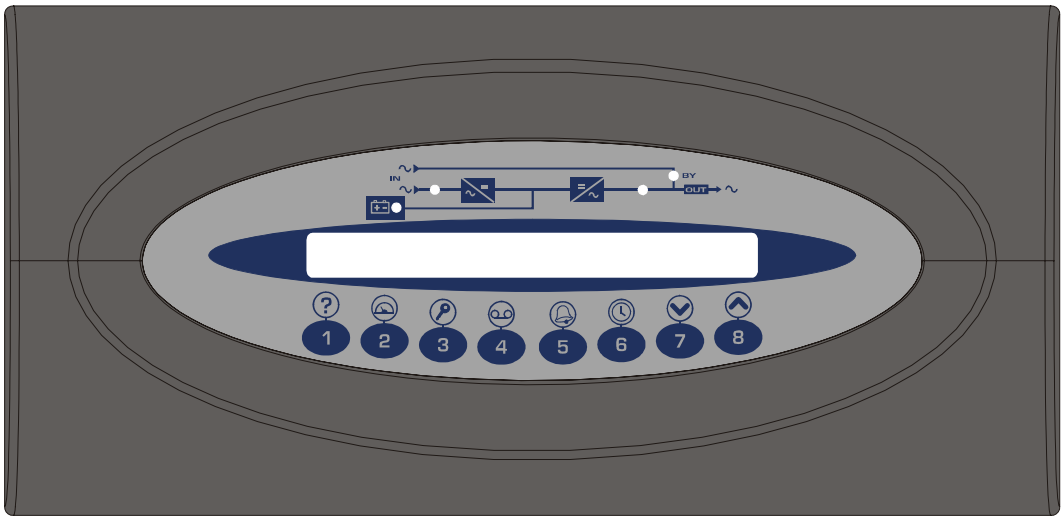
BYPASS LINE

		40000	60000	80000
Nominal power	[kVA]	40	60	80
Nominal current	[A]	58	87	116
Nominal voltage	[V]	400		
Input phases		3 + N		
Voltage tolerance		±15% (configurable ±5%, ±25% from control panel)		
Nominal frequency	[Hz]	50 / 60 (auto sensing)		
Frequency tolerance		±2% (configurable ±5% from control panel)		
Typical switch over time to standby-on bypass / inverter	[ms]	2		
Switch over time due to overload / inverter failure	[ms]	0 ÷ 1		
Overload capacity x In: *				
	10min	1,9	1,8	1,3
	1min	2,9	2,8	2,1
	1s	7,4	7,4	5,5
	10ms	28	28	21

***** N.B. If the overload exceeds the declared capacity, the bypass SCRs may be damaged. Protections can be installed outside the UPS.

FUNCTIONS OF THE UPS INDICATOR PANEL

OVERVIEW



Signalling of operational status of the UPS is supplied by:

- a liquid crystal display (LCD) with two lines of 40 characters
- four warning lights:

IN	Power & bypass input lines
OUT	Bypass line output
BY	Bypass line output
BATT	Battery input.

- an audible signal

Luminous warning lights: LED

LED warning lights supply quick information directly onto the control panel of the system. They may be steady, flashing or turned off.

Æ LED IN (green): input lines. The luminous LED signal IN means:

lit	when the input power and bypass voltages are present and correct
flashing	when one of the two voltages is not correct
extinguished	when both the voltages are neither present nor correct

ÆLED OUT (green): inverter output line. The luminous LED signal OUT means:

lit	when the system output is switched to the inverter, the output power is correct because less than 100%VA and only the output switch SWOUT is closed. If the LED BY is lit then the UPS is STANDBY-ON
flashing	when the system output is switched to inverter the output power is greater than 100%VA, or SWMB is closed also
extinguished	when the system output is switched to automatic bypass line or SWOUT is open

ÆLED BY (yellow): bypass output line. The luminous LED signal BY is:

lit	when the system output is switched to the automatic bypass line
flashing	when the system output is switched to the automatic bypass line with output power greater than 100%VA, or the manual bypass switch SWMB is closed
extinguished	when the system output is switched to inverter, or is active SYSTEM OFF command

ÆLED BATT (yellow): battery line. The luminous LED signal BATT is:

lit	when the battery is delivering
flashing	when the alarm PREALARM, LOW BATTERY VOLTAGE is active or the alarm BATTERY DISCHARGED or FBAT OPEN is active
extinguished	when the battery is not delivering and its voltage is correct

Acoustic signal

The acoustic signal sounds intermittently and pauses for about 2 seconds under all conditions different from normal operation, i.e. different from the condition in which only the two green LED signals IN and OUT are lit.
The sound is intermittent without break when the LED BATT is flashing.
The acoustic signal never operates if it has been excluded with key 5, also it does not operate when the system was stopped by the AUTO-OFF function.
Its enablement status is visible in the basic menu: 5=ON indicates enablement and 5=OFF indicates exclusion.
Exclusion with key 5 is possible in all menus where the same key is not used for other functions.
Enablement is possible only in the basic menu. **Exclusion is memorized**.

Signalling message

Under normal operating conditions, without special requests for information or entry of commands with the keys or from the RS232 remote line, the LCD viewer shows basic messages referred to even with the basic menu or menu 0 or NORMAL menu names. It is possible to obtain other information or enter commands, acceding to submenus by pressing keys from 1 to 8 with appropriate sequences. With each key pressed there is a brief sound while the change of messages takes place only when an enabled key is pressed. Key functions in the menu 0 are suggested by the symbols associated while in other submenus they are indicated explicitly by the message. For some particular functions it is necessary to refer to the manual. **Return to basic menu**, in addition to being possible by pressing keys, **takes place automatically also two minutes after the last pressing of a key**.

ALARM MESSAGES

A list is given below of the alarm messages displayed on the first line of the display panel, the alarm number in brackets shows the priority level.

[1] INTERFERENCE ON THE BYPASS LINE

An alarm condition exists when there is interference on the bypass line, such as voltage peaks or harmonic distortion, while the voltage and frequency are correct.
WARNING: in this case the inverter is not synchronized with the bypass line, so if the bypass is forced using the SWMB switch, from remote controls or from the panel, incorrect switching between voltages may occur in phase opposition.

[2] MANUAL BYPASS, SWMB – ON or CABLE FAULT

The SWMB manual bypass switch is inserted and prevents the return to normal mode. The load is powered by the bypass line input and is therefore not protected by the UPS.
“CABLE FAULT” only for UPS units in parallel configuration, the logic has detected an error in the signals exchanged between the UPS connected in parallel, and has therefore switched the whole system to bypass.

[3] BYPASS VOLTAGE ERROR or SWIN OFF

The alarm exists if:
- the input voltage of the bypass line is incorrect
- the SWIN input switch is open

[4] POWER VOLTAGE ERROR or SWIN OFF

The power supply voltage is incorrect and so the battery is discharging.
An alarm condition exists if one of the following events occurs:
- the power voltage or frequencies of the rectifier power supply line are in an acceptable range (see General Characteristics)
- the SWIN input switch is open
- the rectifier does not recognise the voltage due to an internal fault

[5] PREALARM, LOW VOLTAGE ON BATTERY

An alarm exits if:
- the battery voltage is lower than the value calculated to give approx. 5 minutes back-up power
- the remaining back-up time is lower than the value set for the prealarm

[6] BATTERY DISCHARGE or FBAT OPEN

While the UPS is powered from the mains, the system logic runs a BATTERY TEST. The battery voltage was lower than the calculated value (see menu 3,2 BATTERY TEST).

[7] LOW POWER VOLTAGE or OVERLOAD [W]

An alarm exists if one of the following events occurs:
- the input power voltage is not sufficient to power the load (see the General Characteristics section)
- the output load, with active power [W], is higher than the nominal value

[8] OUTPUT OVERLOAD

This indicates that the power absorbed by the load powered by the inverter is greater than the nominal accepted value; therefore the value indicated, expressed in VA percentage, exceeds the value of 100%.
The same alarm is also activated when the peak current absorbed by the load exceeds the maximum accepted value.
When this alarm occurs, the load must be reduced, otherwise the system automatically effects a bypass within a time that is inversely proportional to the value of the overload.

[9] BYPASS FOR OUTPUT VA < AUTO_OFF VALUE

This alarm occurs when the power in VA % absorbed by the load is lower than the set AUTO-OFF value (see menus 3,5,“436215”,6 PERSONALIZING AUTO-OFF “VA”).
The %VA value for AUTO-OFF is factory pre-set to zero (so the alarm condition cannot occur).

[10] INTERNAL FAULT [number]

The various types of fault are shown below:

INTERNAL FAULT 1 - Precharge circuit fault
INTERNAL FAULT 2 - Inverter
INTERNAL FAULT 3 - Inverter output contactor failure
INTERNAL FAULT 4 - Booster output voltage
INTERNAL FAULT 5 - SCR on bypass line
INTERNAL FAULT 6 - Input contactor failure
INTERNAL FAULT 7 - Internal power supply error on the control board
INTERNAL FAULT 8 - Battery charger high voltage
INTERNAL FAULT 9 - SCR battery
INTERNAL FAULT 10 - Fault on parallel signal circuits
INTERNAL FAULT 11 - Switching on inverter failure
INTERNAL FAULT 20 - DC output voltage failure
INTERNAL FAULT 21 - A UPS operating as slave has distorted current flow
INTERNAL FAULT 22 - Parallel slave UPS has a different software version
INTERNAL FAULT 23 - Parallel UPS with different number of output phases
INTERNAL FAULT 24 - Transmission error from parallel master UPS
INTERNAL FAULT 25 - UPS previously activated in parallel mode
INTERNAL FAULT 26 - Switch over to bypass line failed
INTERNAL FAULT 27 - Failure on bypass SCR power supply
INTERNAL FAULT 28 - Input circuit with active filter failure
INTERNAL FAULT 29 - Active filter communication failure
INTERNAL FAULT 30 - Failure on temperature sensor
INTERNAL FAULT 31 - Microprocessor failure

[11] TRANSITORY BYPASS, WAIT

This indicates that the load is powered by the bypass line and that the system is in the phase preceding the automatic return to normal mode with power supplied by the inverter.
This transitory operation occurs, for example, during the start-up phase or while waiting for the return to the inverter after a bypass due to an overload.

[12] BYPASS CAUSED BY OUTPUT OVERLOAD (steady or flashing message)

It shows that the load is fed by the BYPASS line and is over the nominal value.
The value shown on the panel is over 100%.
The load is supplied by the BYPASS line up to the intervention of the protection on the BYPASS line.
To return in NORMAL OPERATION you must reduce the load and wait a few minutes to allow the cool.

[13] BYPASS ACTIVE COMMAND; 8 = OFF

An alarm exists if the system has been disabled and switched to bypass, via the appropriate command entered on the keyboard.
The command is also stored during a shutdown caused by power supply failure.
When mains power is restored, the system does not return to normal mode unless the intentional blockage is deactivated

[14] REMOTE COMMAND FOR BYPASS: ACTIVE

An alarm exists if the system is deactivated and switched to bypass using the appropriate command applied to the "remote command and signals" connector.
The command is not stored and the system returns to normal mode when the command is cancelled, provided mains power is available.

[15] OVERTEMPERATURE OR LACK OF VENTILATION

Alarm when one of the internal temperatures on the control board, on the power modules or on the inductors exceeds the maximum value. Possible causes may be:
- operation in an environment where the temperature is too high
- fault on the fans

[17] INPUT PHASE SEQUENCE ERROR

Indicates that the sequence of phases at the bypass line input is incorrect.
It is usually sufficient to exchange two phases to restore normal operation.

[18] NO OUTPUT CLOSE SWOUT or SWMB

Alarm when the output voltage is not present because SWOUT and SWMB are open at the same time.

[19] SYSTEM OFF COMMAND ACTIVE; 8 = OFF

An alarm exists when the COMMAND STORED total shutdown command has been entered from the panel or through the RS232 connection.
The system executes the shutdown command with a few seconds delay to allow for cancellation if necessary.
The command is also stored during a shutdown caused by mains power failure.
When the power supply is restored the system does not return to normal operation if the intentionally set blockage is not disabled. To disable it press 8.

[20] REMOTE SYSTEM OFF COMMAND: ACTIVE

See the previous alarm condition, with the command entered from the "REMOTE" connector.

[21] MEMORY CHANGED: CODE = number

The number indicates the various cases.
Code 1: the memory has been changed and the operating parameters have been brought to the standard values.
If non-standard values had been set previously, they must be entered again.
Switch off and then on again to remove the alarm from the display.

N.B. Codes different from 1 may appear temporarily, while the values are being personalized but will not affect normal operation.

[22] AUTO-OFF Timer: Toff= 0: 0', Ton= 0: 0'

An alarm sounds when the daily timer set for the cyclic automatic shutdown and restart command comes into operation (see the personalization menu).
The Toff and Ton values are factory pre-set to zero (so the timer condition is disabled).

CONTROL PANEL MENU

NORMAL MENU:

```
o=__          NORMAL OPERATION
__60, OUT=100%VA, BATT=100%Ah, 5=ON
```

In the basic menu the upper line presents a signalling message to describe the present status while the lower line indicates model, apparent power measurement by percentage output by inverter or bypass line, charging status of the batteries or time expected for duration of batteries.

If they are present one or more alarms at the same time the panel display becomes:

```
o=__  OUTPUT OFF, CLOSE SWOUT or SWMB
__60, OUT=100%VA, BATT=100%Ah, 5=ON  Al=18
```

The viewer displays a single phrase at a time. It shows all the present alarms in sequence.
The right side of the bottom line indicates the number of the visualized alarm (Al=18).

In every operating mode, the display returns to the NORMAL menu two minutes after the last key was pressed; the NORMAL menu displays messages relating to the operating status.

-o=__: this symbol appears only when one of the following codes is entered. For instructions on how to insert the codes, refer to the appropriate paragraphs

o=X. 1-3-5-7-9-B-D-F	--
o=X. -23--67--AB--EF	**AUTO-OFF Timer** command active
o=X. ---4567----CDEF	**AUTO-OFF VA** command active
o=X. -------89ABCDEF	--
o=.X 1-3-5-7-9-B-D-F	command code 47263 (**INVERTER-OFF / BYPASS**) masked on the panel
o=.X -23--67--AB--EF	**BATTERY TEST** disabled
o=.X ---4567----CDEF	--
o=.X -------89ABCDEF	--

For example:

o=02	BATTERY TEST disabled
o=23	codes active: AUTO-OFF Timer command command code 47263 masked on display BATTERY TEST disabled

- NORMAL OPERATION: signalling message to indicate that all parts of the unit are operating correctly.

- **__60**: UPS model and nominal output power

- **OUT = 100%VA**: example of the percentage of power absorbed by the load powered by inverter.

The OUT abbreviation changes to BY when the load is not powered by the inverter (normal mode) but by the mains through the bypass line.
The message OUT=100%VA changes to OUT= SWMB when the load is powered through the maintenance bypass switch line and so the output current cannot be measured.
The 100%VA value shown in the example is due to a measurement of the output current.
The measure is related to the absolute nominal value, the number indicates the highest between the RMS current value or the peak current value.

- **BATT= 100%Ah**: example of batteries recharge percentage.

The value 100%Ah is taken from a measurement of the load current and the time spent to recharge the batteries.
The number indicates the percentage of recharge based on the information of the capacity of the batteries connected and on the amount of charge used during battery mode.
The system remains automatically in quick charge status for the time required to supply batteries with the amount of charge lost during discharge.
The indication "%Ah" changes to "min." (minutes) during operation without the mains power supply or with the batteries discharged. The numeric value refers to the remaining operation time, calculated on the basis of the current supplied by the batteries and of the batteries charge status.
NOTE:
The autonomy shown is based on the measurement of: the instantaneous discharge current, the capacity of the batteries and the percentage of charge preceding the discharge.
This value is always approximate because of the large number of factors involved.
If there is a big difference, with steady load, between the expected value and the real one, see the recorded data and check the batteries status.

- **5 = ON**: example of the status of the acoustic alarm (alarm enabled). If it is silenced, the display changes to 5=OFF.

KEY 1 MENU: HELP

(When several other menus are enabled, the key 1 is used to return to the NORMAL menu)

```
1=?, 2=Measurements, 3=Commands, 4=Record
6=Date/Time,     7=Codes,     8=Normal
```

1=?,	press button 1 to access the change language menu
2=MEASUREMENTS	press button 2 to access the measurements menu
3=COMMANDS	press button 3 to access the menu for inserting commands, selecting or customizing operating values
4=RECORD	press button 4 to view events recorded in the internal memory
6=DATE/TIME	press button 6 to view and control the internal clock and calendar
7=CODES	press button 7 to view the internal codes indicating the status of all the internal subsets
8=NORMAL	press button 8 to access immediately to the NORMAL menu. The display returns automatically to the NORMAL menu two minutes after the last button pressed

Key Menu 1,1: LANGUAGES

```
2=Italiano    3=English    4=Frencais
5=Deutsch     6=Espanol    7=>
```

Press a key to choose the language in which the system will display all subsequent messages. Press key 7 to see the next menu

```
2=Nederland   3=Svenska    4=Polski
5=Magyar      6=Turkce     7=>
```

The selected language remains stored even after the system has been shutdown and restarted. The LANGUAGES menu must always be accessed in order to change the current language.

```
2=Cesky       3=Russian
```

KEY MENU 2: MEASUREMENTS

MEASUREMENTS OF INPUT VALUES

```
IN=100,100,100%V, 50.0Hz; 101,101,101%Ain
BY=220,221,222Vl, 50.1Hz;
```

The “MEASUREMENTS OF INPUT VALUES” menu can only be accessed from the NORMAL menu.
Press key 1 to return to the NORMAL menu immediately.
The measurements shown have the following meaning:

IN=100,100,100%V,	measurement of the three phase voltages measured at the power supply input. The voltage is expressed as a percentage of the nominal value, the value 100%V indicates a voltage of 230V
50.0Hz	measurement of the power supply input voltage
101,101,101%Ain	measurement of the three input currents. The currents are expressed as a percentage of the nominal value
BY=220,221,222Vl	measurement of the three phase voltages of the bypass line
50,1Hz	measurement of the bypass line input frequency

Key Menu 2, 2: MEASUREMENTS OF OUTPUT VALUES

```
OUT=230,230,231Vln;50.0Hz;  100,100,100%W
     100,100,100%A;     147,147,147%Ap
```

Access to the "MEASUREMENTS OF OUTPUT VALUES" menu is only via key 2 from menu 2. Press key 1 to return to the NORMAL menu. The measurements shown have the following meaning:

OUT=230,230,231Vln	measurement of the three system output voltages (phase-neutral)
50.0Hz	measurement of the system output frequency
100,100,100%	measurement of the active output power expressed as a percentage of the nominal value
100,100,100%A	measurement of the three system output currents. The current is expressed as a percentage of the nominal efficiency value
147,147,147%Ap	measurement of the system peak output current expressed as a percentage of the nominal value (1.41* nominal efficiency value)

During operation powered from bypass the letters OUT change to BY.
During operation with switch SWMB inserted for maintenance bypass, the currents cannot be measured while the values of the three voltages are still available. In this case the display changes to OUT= SWMB.

Key Menu 2, 2, 2: MEASUREMENTS OF SYSTEM VALUES

```
BATT=+323, -323V;+0,0A;  i=230V, 360V+, 360V-
   Ts=28, Tr=50, Ti=49, Tc=29°C; IN=101%A
```

Access to the "MEASUREMENTS OF SYSTEM VALUES" menu is only via key 2 from menu 2, 2. Press key 1 to return to the NORMAL menu, press key 2 to return to “MEASUREMENTS OF INPUT VALUES” menu. The measurements have the following meanings:

BATT=+323, -323V	batteries voltages, positive branch and negative branch with batteries inserted, battery charge voltages with battery fuses open (in this case, the reading may vary)
+0,0A	current in battery, positive if supplied, negative if absorbed.
i=230V	inverter output voltage
360V+, 360V-	inverter input DC voltage
Ts=28, Tr=50, Ti=49, Tc=29°C	display of the following temperatures: internal system, converter module, inverter module, and inductors
IN=101%A	measurement of the converter input current expressed as a percentage of the nominal value

Key Menu 2, 6: TIME MEASUREMENTS

```
OUT= 10000h; BY= 10000h; BATT= 10000 sec
nBATT= 1000; n0%Ah= 100;     2001-01-01
```

Press key 1 to return to the NORMAL menu. The values indicated have the following meaning:

OUT= 10000h	indicates the hours spent operating with the load on the inverter
BY= 10000h	indicates the hours spent operating with the load on the bypass
BATT= 10000	sec; indicates the seconds spent operating with the battery discharging
nBATT=1000	indicates the number of times the battery mode was activated, and therefore also the number of times the mains power failed
n0%Ah= 100	indicates the number of times the battery has fully discharged. It is useful to know the number of full discharge cycles, as this is a way of assessing the battery efficiency
2001-01-01	indicates the stored date of the day the unit was activated for the first time

This information constitutes a permanent log that remains stored even when the system is shut down.

KEY 3 MENU: COMMANDS

```
2=BATTERY TEST  4=DISPLAY CONTRAST
5=PERSONALIZ. 6=BYPASS 7=TOTAL BLOCK
```

The LCD display proposes a choice for subsequent submenus.

Key Menu 3, 2: BATTERY TEST

```
          Battery Test          12 sec.
BATT= +396  -396V + 2,4A; Vbc= 370V;  100 min
```

This activates an 12-second cycle to check the battery efficiency status.
Press key 8 to interrupt the test and return to the NORMAL menu before the time limit expires.

The values have the following meanings:

BATT= +396 -396V + 2,4A	measurement of the battery voltage and current
Vbc= 370V	calculated battery voltage
100 min	indicates the calculated back-up time

The battery test cycle with a reduction of the rectifier output voltage gives the possibility to assess the effective power supplied to the load even when mains power is available.
The reduction of the rectifier output voltage occurs only if the bypass line voltage is available, so as to prevent any problems to the output load without the bypass alternative.

At the end of the test cycle, the voltage supplied by the battery is compared to a voltage value "Vbc" calculated on the basis of the measured supplied current, the battery capacity values and half the value of the recharge percentage contained in the memory.
If the voltage measured on the battery is lower than the calculated voltage:
- the "BATTERY DISCHARGE or FBAT OPEN" alarm is activated
- the percentage value of the stored charge is halved
- another test cycle is prepared, which will be automatically activated after 60 seconds

The battery test cycle is activated:
- manually
- automatically every 60 sec. after each failed test (for three times), or each time the system is switched on
- automatically every 24 hours
- automatically in invisible mode during operation without mains power supply

At the end of each test, if the voltage measured is lower than the calculated voltage, the alarm is activated, and the value of the stored charge and the indicated back-up time are halved.

Sixty seconds after the activation of the alarm, a new test is run and if the result is negative, the alarm is activated again after a further 60 sec.
The alarms continue to halve the value of the stored charge until the value of the calculated battery voltage is less than the voltage actually measured. In practice, this system of battery control produces an alarm each time the battery has less than half of the expected charge.
The PERMANENT presence of this alarm indicates that the battery is inefficient or the battery circuit has been interrupted or one of the batteries fuse holders FBAT is open or one of the protection fuses has intervened.
The TEMPORARY presence indicates a loss of battery efficiency proportionate to the alarm frequency.

Disabling the BATTERY TEST: enter keys 3, 5: "PERSONALIZATION", insert code 323232.
After inserting the code, "o=02" is displayed on the top left of the NORMAL menu.
To reactivate the battery test enter code 323232 again.

Key Menu 3, 4: DISPLAY CONTRAST

DISPLAY CONTRAST VALUE: 6
ADJUSTMENT: 7=-, 8=+

The display contrast can be decreased using key 7 or increased with key 8. The value 6 expresses the present contrast level, which can be changed from 1 to 11.
To exit from this menu, press any key other than 7 and 8, for example key 1.

Key Menu 3, 5: PERSONALIZATION

Cod. ? .....

Access to the "PERSONALIZING" menu starts with key 5 on menu 3 COMMANDS, then an intermediate menu is displayed, in which a sequence of keys has to be entered in order to access the final menu.

The "CODE PERSONALIZING" sequence **is the same in all cases** and is **436215**.
Access via code to the personalization menu should ensure that unauthorized persons do not change the operating parameters of the system. After inserting the code, it will not be requested for approx. 2 minutes.
Access to the next menu is only via insertion of the correct code, otherwise the system returns to the NORMAL menu.

2=Nom. Output voltage	3= Battery	8=Stby
4=Prealarm	6=Auto-OFF	7=Others

Press key 7 to go to the second part of the menu:

2=By. Volt. range		3=By. Freq. range	
4=Modem	5=RS232	6=Echo	7=Ident.

In both cases, pressing one of the keys: 2, 3, 4, or 5 gives access to the next operating sub-menus while key 8 takes you back to the NORMAL menu.

Key Menu 3, 5, "436215", 2: PERSONALIZING THE NOMINAL OUTPUT VOLTAGE

Nominal output voltage	= 225Vln	
Adjustment:	5/6=-/+5	7=-, 8=+

Press any key other than 5, 6, 7 and 8 to exit the menu.
Keys 7 and 8 reduce or increase the nominal output voltage within the range 200 to 250V with variations of 1 Volt at a time while keys 5 and 6 change the output voltages with steps of 5 Volts.
In the example, the nominal output voltage has been set at 225V, measured between the phase and neutral "Vln" (note that reference is always only to the voltage between phase and neutral "Vln").
The value in the example modifies the inverter operation in such a way as to have the output voltage at 225V between phase and neutral during normal operation.
It is also set at 225Vln the reference for the acceptable range of the bypass line input voltage. The acceptable range of the power supply voltage does not change and cannot be modified.

Key Menu 3, 5, "436215", 3: PERSONALIZING THE BATTERY

Battery: Type=1	Capacity=12Ah
Adjustment: 2-/3+ 5/6=-/+10	7=-,8=+

Keys 2/3 are used to select the type. Keys 5, 6, 7 and 8 are used to reduce or increase the battery capacity value stored in the memory, with variations of 10 or 1 unit at a time, in the range 1 to 9998 Ah.
The nominal value of the capacity of the connected battery must be inserted; this is usually printed on the battery container.
All units supplied with batteries are personalized in the factory.
For devices supplied without batteries the correct value must be inserted otherwise the system uses the default value of 12Ah.

Keys 2 and 3 are used to decrease or increase the value identifying the type of battery.
In the case of batteries with high discharge intensity, value 1 (usually pre-set for normal batteries) should be changed to value 2. Value 3 is to be used for open vase batteries.
For all these batteries types the key 4 open a new sub-menu:

Ac=8A,	Vbat min=240	ch=326	max=333
Adjustment: Ac-			

Use key 4 to halve the nominal recharge current . To restore the nominal value press key 4 again.
Alternatively, if you select type 0 and press key 4 again you can set the following values manually (example for UPS with 48 batteries):

Ac=8A,	Vbat min=240	ch=326	max=333
Adjustment: Ac-	2-/3+ ,	5-/6+	7=-,8=+

Ac=8A max. recharge current value (this depends on the battery capacity value)
Vb_min (end of discharge voltage) = 225-270V
Vb_ch (float voltage) = 300-345V
Vb_max (load voltage) = 300-345V

The control system uses the data on battery capacity and type:
- to automatically check battery efficiency
- to calculate the estimated residual back-up time
- to calculate the battery voltage levels to activate the prealarm and then shutdown
- to set the optimum value for the recharge current

Use key 4 to halve the nominal recharge current . To restore the nominal value press key 4 again.

Key Menu 3, 5, "436215", 4: PERSONALIZING PREALARMS

(229Vmin, 248Vp)	Prealarm	5 min
Adjustment:		7=-, 8=+

Press any key other than 7 and 8 to exit the menu.

Vmin= minimum battery voltage
Vp= end of discharge prealarm voltage

The voltage values Vmin and Vp are not fixed but are depend on the battery discharge current (Vp= Vmin+5V+10*(battery current [A]/battery capacity [Ah]).

Keys 7 and 8 can be used to decrease or increase the time taken to activate the prealarm before the system blocks due to battery end of discharge. Variations of 1 minute in the range of 2 to 254 minutes are possible.
The prealarm signal is activated when the remaining calculated time is lower than the set prealarm value, or when the battery voltage is lower than value Vp of the prealarm voltage.

It is important to provide a wide safety margin for the prealarm function, as the expected back-up value cannot anticipate any increases in absorption by the output load, and cannot take into account for sudden and unexpected battery defects such as for example faulty individual components or connections.

Keys Menu 3, 5, “436215”, 6: PERSONALIZING AUTO-OFF "VA"

```
Automatic Switch-Off When    output< 10%VA
Adjustment:            (5=Toff,Ton)       7=-, 8=+
```

Press any key other than 7 and 8 to exit the menu.
Keys 7 and 8 are used to reduce or increase the percentage threshold of the output load for the AUTO-OFF function. Variations of 1% in the range 0 to 99% of the nominal output load are possible.

When the AUTO-OFF value is set:
- if the mains voltage is present and the recharge percentage is less than 60%, only the following information is displayed:

```
BYPASS FOR OUTPUT VA < AUTO-OFF
 _ 60,   OUT=100%VA   BATT=  50%Ah    5=ON
```

The system waits until the battery recharge exceeds the value of 60% before switching off.

- if the mains voltage is available and the recharge percentage is greater than 60%, or if no mains voltage is available and operation is in battery mode, the system waits until the time pre-set for the end of battery discharge prealarm has expired before switching off, and the following is displayed:

```
BYPASS FOR OUTPUT VA  <AUTO-OFF
 _60, OUT=100%VA   0FF:  4 min,    5=ON
```

In addiction switches the contact "end of discharge prealarm" for remote alarms.
In this case the system remains active for the next 4 minutes, after which it switches onto the bypass line and turns off. After turning off, if the voltage is present at the bypass line input, the voltage is also present at the output.*********
The load remains on the bypass line until the output power is lower than the "AUTO-OFF" value. The system waits to return to normal mode until the load increases.
The "AUTO-OFF" function is more useful to switch off the system during battery operation by merely turning off the output load. In normal mode, the "AUTO-OFF" function is also useful to reduce the consumption near zero. In fact, when the power circuits are disabled, the battery is isolated and only the control circuits remain active, so the consumption is equivalent to a light lamp.

Key Menu 3, 5, “436215”, 6, 5, 6: PERSONALIZING AUTO-OFF Timer

```
AUTO-OFF Timer:    Toff = 0: 0',       Ton= 0: 0'
ADJUSTMENT:          5=-, 6=+          7=-, 8=+
```

Press any key other than 5, 6, 7 or 8 to exit the menu.
The keys have the following functions:
- 5 and 6 to change the Toff value
- 7 and 8 to change the Ton value
Toff and Ton are time values used by the system to create an automatic daily shutdown and restart cycle.
Set Toff = Ton to inhibit the timer cycle.

If the mains voltage is available and the recharge percentage is lower than 60% and the internal clock reaches the Toff time the following information is displayed:

```
AUTO-OFF Timer: Toff= 20:00', Ton= 7:00'
__60,    OUT=100%  BATT= 50%Ah   5=ON
```

Before turning off the UPS the system waits until the battery charge reaches the value of 60%.

If the mains voltage is available and the recharge percentage is greater than 60%, if no mains voltage is available and operation is in battery mode, when the internal clock reaches the Toff time (20:00') the following is displayed:

```
AUTO-OFF Timer: Toff= 20:00', Ton= 7:00'
__60, OUT=100%  OFF:4 min   5=ON
```

In addiction switches the contact "end of discharge prealarm" for remote alarms.
In this case the system remains active for the next 4 minutes, after which it switches onto the bypass line and turns off.
On UPS systems with the Standby-on function, there is no output voltage after turning off; otherwise, on the other UPS versions, if the mains of the bypass line is present also the voltage at the output is present.
The interval between the start of the alarm and deactivation is equal to the pre-set PREALARM value.
When the internal clock reaches the Ton time (7:00') and mains voltage is present, the system is automatically restarted and returns to normal mode.

Keys Menu 3, 5, "436215", 7, 2: PERSONALIZING THE BYPASS VOLTAGE RANGE

When the UPS is in ON-LINE mode, the following menu is visible:

```
          By. Voltage range          15%
Adjustment:                          7=-, 8=+
```

Press any key other than 5, 6, 7 or 8 to exit the menu.
Use keys 7 and 8 to change the acceptable voltage range. When the bypass line values are outside the set range, the UPS logic inhibits the switch over from the inverter to the bypass line.
The choice is from +/- 5% to +/- 25% of the value set for the NOMINAL OUTPUT VOLTAGE (the UPS is factory pre-set at ±15%).

When the UPS is in standby mode the following menu is displayed:

```
(StbyON=10%)  By. Voltage range          15%
Adjustment:  (5-, 6+)                    7=-, 8=+
```

Use keys 5 and 6 to modify the accepted voltage range when operating on the bypass line. If this value is exceeded, the load is automatically switched to the inverter (the UPS is factory pre-set with two coinciding threshold values).

Key Menu 3, 5, "436215", 7, 3: PERSONALIZING THE BYPASS FREQUENCY RANGE

```
By. Frequency range       2%
Adjustment:             7=-, 8=+
```

Press any key other than keys 7 and 8 to exit from the menu.
Use keys 7 and 8 to reduce or increase the percentage value of the acceptable range for the bypass line input voltage.
The choice is for values in the range from +/- 1% to +/- 5%, the percentage is relative to the nominal system value (50 or 60 Hz).

Key Menu 3, 5, "436215", 7, 4: PERSONALIZING THE MODEM

```
4=Dial/Send;   MODEM –1 = 0;   MODEM-2 = 0
Adjustment:      5=-, 6=+;              7=-,  8=+
```

Use any key other than keys 7, 8, 5, 6, 4 to exit the menu.
Keys 7 and 8 are used to reduce or increase the control value for modem management. The choice is between values from 0 to 5, with 0 being the initial value.

0= the modem connected to the RS232 port is disabled, as terminal no. 20 on the RS232 connector assumes a low level (-12V) (DTR signal disabled).
N.B. the MODEM=0 configuration is essential when the modem is not in use and the RS232 connector is used for connection to the remote panel.

1= the DTR signal is activated (terminal 20 at +12V), the modem is enabled to reply (remember that a remote panel connected to the RS232 connector instead of the modem stays off).

2= the DTR signal is activated, the modem is enabled to reply and for the automatic call.

After 30 seconds of alarm "internal fault n.", the system automatically dials the stored "DIAL" number. When it receives the reply from the receiving modem it sends a message with the abbreviation UPS, the stored "SEND" number, the copy of the text shown on the visual display, the alarm code and the date and time of transmission.
N.B.: to ensure that the operation is successful, use a modem that has already been configured to recognize "HAYES" type of commands and that is able to dial the telephone number using pulses or tones as required by the telephone line that will be used.

Example of messages sent to the modem in the event of an "INTERNAL FAULT 5" alarm.
Assuming the following settings: Modem =2, Dial=23456, Send=123456, the system sends, 30 seconds after the start of the alarm, the following command to the modem:
ATD 23456
After receiving the message "CONNECT" from the modem, the system sends:
UPS 123456
INTERNAL FAULT: 5
__60, OUT=100%VA, BATT= 78%Ah, 5=OFF a=00200300 1999-12-21, 13:12:28
Then the system sends the sequence to close the communication:
+++ ATH
Finally also the DTR signal is lowered for 0.5 sec.

If the telephone line is busy or the remote modem does not reply, the system tries to call again every 5 minutes until the connection is made or the alarm condition disappears.

3= like 2 with automatic call when any alarm is verified.

4= like 2 with automatic call only for "internal fault n.", and with the message sent only after recognition of the reply from the remote modem via reception of the character "}".
This procedure ensures that the receiving computer does not lose any messages.

5= like 4 with automatic call when any alarm condition is detected.

Key Menu 3, 5, “436215”, 7, 4, 4, 5 (6): PERSONALIZING "Dial / Send" Modem

```
MODEM dial n.= / / / / / / / / / / / / / / / / / / / <=2..3=>
Adjustment: (5=dial, 6=send) 7=-, 8=+
```

Use any keys other than keys 7, 8, 5, 6, 2, 3 to exit the menu.
Keys 7 and 8 are used to reduce or increase the figure indicated by the cursor.
The cursor is moved by keys 2 and 3, and at the beginning is indicated with the character '_'.
Each figure can assume values from 0 to 9; the symbol “/” indicates that the corresponding figure is disabled.
A correct "dial" number must start after the symbol “=”. All numbers after “/” are ignored (for example: the setting of “0123/45” will be recognized only as “0123”).
The "send" number can be set by selecting menu 3, 5, “436215”, 7, 4, 4, 6 or by pressing key 6 when menu 3, 5, “436215”, 7, 4, 4, 5 is active.

Key Menu 3, 5, “436215”, 7, 5: PERSONALIZING RS232

```
RS232 - 1: baud=9600.     RS232 - 2: baud=9600.
Adjustment: 3= -, 4= +                7= -, 8= +
```

Use any key other than keys 7 and 8 to exit the menu.
Keys 3 and 4 (7 and 8) are used to reduce or increase the baud transmission rate of the RS232 –1 (RS232-2). The choice is between values 1200, 2400, 4800 and 9600.

Key Menu 3, 5, "436215", 7, 6: PERSONALIZING ECHO

Echo RS232-1=0,	RS232-2=0
Adjustment: 5=-, 6=+	7=-, 8=+

Use any key other than keys 5, 6, 7 and 8 to exit the menu.
Keys 5 and 6 (7 and 8) can be used to decrease or increase the number used to enable the "ECHO" function. The number can be either 0 or 1 to disable or enable the function respectively. The "0" is the starting number.
When the function is enabled the system automatically sends a message that is a copy of the display to the RS232 output with the addition of the "a=FFFF-FFFF" code and the current date and time.
The message is sent every time there is a variation in the status of the alarms (or a change in the code a=.....).
Using this function each alarm variation can be printed on a connected serial printer or can be displayed on a terminal.
NOTE: this function must be SET TO 0 when a computer with an active dialogue program is connected. The messages automatically sent via the ECHO function contrast with those requested by the computer.

Key Menu 3, 5, "436215", 7, 7: PERSONALIZING THE ID

Ident. = 0
Adjustment: 7=-, 8=+

Use any key other than keys 7 and 8 to exit the menu.
Keys 7 and 8 can be used to decrease or increase the number used for the identification of a single unit in the case of systems with several UPS systems connected to a single RS232 serial line.
The base number is 0 and can be changed to a value from 0 to 7.

Key Menu 3, 5, "436215", 8 PERSONALIZING STANDBY-ON MODE

Stby = 0 min.	Stby-ON = 0
Adjustment: 5-,6+	7 = -, 8 = +

Use any key other than keys 5, 6, 7 and 8 to exit the menu.
Pressing key 8 Stby_ON=1 switches the UPS from ON-LINE mode to Standby-on mode and vice versa by pressing 7.
Switch over to the bypass line may be immediate, Stby = 0 min, or delayed by using keys 5 and 6.
The mains must remain within the acceptable range for the time set before the switch over can take place (see menu "PERSONALIZING THE BYPASS VOLTAGE RANGE").
The setting is stored even during shutdown due to power failure.
See the paragraph "SETTING PROCEDURE" for a description of the procedure.

Key menu 3, 5, "436215", 8, 4: PERSONALIZING SMART ACTIVE

SMART ACTIVE S.	Stby=5 min.	Stby-ON =1
Adjustment: 4=Sma.OFF,	5-,6+	7 = -, 8 = +

Use any key other than keys 5, 6, 7 and 8 to exit the menu.
Key 4 actives the function Smart Active (Stby_ON=1).
The command remains memorized even during a shut-down for lack of power.
The delay time to transfer the load from inverter to bypass line is 5 minutes (SMART ACTIVE S).
After this time if the value of the input voltage does not remain within the range values the delay time becomes 75' (SMART ACTIVE L), the indication of the panel becomes:

SMART ACTIVE L.	Stby=75 min.	Stby-ON =1
Adjustment: 4=Sma.OFF,	5-,6+	7 = -, 8 = +

For the description of the operation see the "SETTING PROCEDURE" paragraph of the UPS User Manual.

Key menu 3, 5, “642137”: PERSONALIZING STANDBY-OFF OPERATION

Before inserting the displayed code, open the output switch SWOUT, then enter the code and close the output switch again.
The setting is stored, even during shutdown due to power failure.
See the section “SETTING PROCEDURE” for a description of the operation.
Return to ON-LINE operating mode by opening SWOUT and reinserting the code “642137”.

Key Menu 3, 5, “156234”: PERSONALIZING THE STABILIZER

Before inserting the displayed code, open the SWOUT output switch, then enter the code and close the output switch again.
If the code has been inserted correctly, the letter “S” will appear on the second row of the display panel, next to the information on the model. The setting is stored, even during shutdown due to power failure.
See the section “SETTING PROCEDURE” for a description of the operation.
Return to ON-LINE operating mode by opening SWOUT and reinserting the code “156234”.

Key Menu 3, 5, “156236”: PERSONALIZING 60HZ OUTPUT CONVERTER

Before inserting the displayed code, open the SWOUT output switch, then enter the code and close the output switch again.
The setting is stored, even during shutdown due to power failure.
Also insert the code “156234” in case of converter without batteries, the indication of the panel becomes:

```
o=__              NORMAL OPERATION
__60A K C OUT=100%VA, BATT=NO-BATT, 5=ON
```

See the section “SETTING PROCEDURE” for a description of the operation.
Return to ON-LINE operating mode by opening SWOUT and reinserting the code “156236”.

Key Menu 3, 5, “156235”: PERSONALIZING 50HZ OUTPUT CONVERTER

Before inserting the displayed code, open the SWOUT output switch, then enter the code and close the output switch again.
The setting is stored, even during shutdown due to power failure.
Also insert the code “156234” in case of converter without batteries, the indication of the panel becomes:

```
o=__              NORMAL OPERATION
__60 K C OUT=100%VA, BATT=NO-BATT, 5=ON
```

See the section “SETTING PROCEDURE” for a description of the operation.
Return to ON-LINE operating mode by opening SWOUT and reinserting the code “156235”.

Key Menu 3, 6: INVERTER-OFF / BYPASS

```
Inverter OFF and ByPass Command  = 47263
it shuts OFF,     if Bypass line is NOT OK
```

Press key 8, or any other key in a different sequence from that described, to exit the menu.
Press keys 4, 7, 2, 6, 3 in succession, as indicated on the display, to activate the bypass command and shut down the inverter.
The action following the command is executed after a delay of a few seconds to allow for cancellations.
When this command is enabled, the display shows the alarm:
"BYPASS COMMAND ACTIVE; 8=OFF".
To return to normal operation, even after the system shutdown, the command must be cancelled by pressing key 8 or by sending the key code via the RS232.
N.B.: to mask the command code “47263” on the panel, insert code “436213” on the PERSONALIZING Menu (keys 3, 5). Repeat the operation to display the code again.

Key Menu 3, 7: TOTAL BLOCKAGE

```
Total System Shut-Off Command  =  47263
 Warning, The Output Voltage Will Be Off
```

Press key 8, or any other key in a different sequence from that described, to exit the menu.
Press keys 4, 7, 2, 6, 3 in succession as indicated on the display, to activate the command for the Total Blockage of the system. When this command is enabled, the display shows the alarm message:
"SYSTEM OFF COMMAND ACTIVE; 8=OFF".
The action following the command is executed after a delay of a few seconds to allow for cancellations.
This command is useful in emergencies to completely deactivate the system by remote control via the RS232 line.
Button 8 must be pressed to reactivate the UPS.
NOTE: to mask the command code "47263" on the panel, insert code "436213" on the PERSONALIZING Menu (keys 3, 5). Repeat the operation to display the code.

KEY 4 MENU: RECORDER

```
alarm message recorded
a=FFFF-FFFF;          2001-3-14 / 14:52:50; n=100
```

Access to the "RECORDED EVENTS" menu is with key 4 of the basic menu.
Press key 1 to return to the NORMAL menu. Key 2 activates the submenu "MEASUREMENT OF STORED VOLTAGES".
Keys 3, 4 and 5 maintain their normal functions.
Key 6 activates the submenu 4, 6 "RECORDED CODES" and enables the stored alarm message to be exchanged with the display of the status codes at the time of the stored event, and vice versa.
The status codes allow an in-depth analysis of the event. See the key menu 7 "INTERNAL CODES" and the table of the stored codes for more details on code meanings.

Keys 7 and 8 are used to display the events before and after the displayed event.
For example, if key 7 is pressed the display n=100 changes to n= 99 and the "stored alarm message" of the previous event is displayed.

The components of the menu are as follows:

- "alarm message recorded"
  this indicates one of the alarm messages corresponding to the one displayed during the last event that took place and contained in the event log.
  The memory can hold up to 120 events. When the memory is full, each new event is stored by rejecting the oldest event

- a=FFFF-FFFF
  indicates the stored code relating to the other alarms present at the same time together with the code indicated by the "alarm message recorded"

- n= 100
  indicates the number of events held in the memory

- 2001-3-14 / 14:52:50; n=100
  indicates the date / time at which the displayed event occurred.
  It is expressed in years, months, days / hours, minutes, seconds

Key Menu 4, 2: MEASUREMENT OF INPUT VALUES

```
IN=100,100,100%V, 50.0Hz; 101,101,101%Ain
BY=220,221,222Vl, 50,1Hz;                 n 35
```

Press key 2 to access the "MEASUREMENT OF INPUT VALUES" menu, only from menu 4 “RECORDED EVENTS” or menu 4, 6 "RECORDED CODES".
Press key 1 to return immediately to the NORMAL menu.

In the example, n 35 (with “n” flashing) indicates that the measurements shown refer to the status of stored event number 35. The meaning of the measurements is the same as for menu 2.

Key Menu 4, 2, 2: MEASUREMENT OF OUTPUT VALUES

```
OUT=230,230,231%V, 50.0Hz; 101,101,101%W
100,100,100%A;   147,147,147%Ap          n 35
```

Access the "MEASUREMENT OF OUTPUT VALUES" menu only with key 2 from menu 4, 2.
Press key 1 to return immediately to the NORMAL menu.

In the example, n 35 (with “n” flashing) indicates that the measurements shown refer to the status of stored event number 35. The meaning of the measurements is the same as for menu 2.

Key Menu 4, 2, 2, 2: MEASUREMENT OF SYSTEM VALUES

```
BATT=+323, -323V; +0,0A;  i=230V, 360V+, 360V-
Ts=28, Tr=50, Ti=49, Tc=29°C; IN=101%A    n 35
```

Access the "MEASUREMENT OF SYSTEM VALUES" menu only with key 2 from menu 4, 2, 2. Press key 2 to return to menu 4, 2 "MEASUREMENT OF INPUT VALUES".
Press key 1 to return immediately to the NORMAL menu.

In the example, n 35 (with “n” flashing) indicates that the measurements shown refer to the status of stored event number 35. The meaning of the measurements is the same as for menu 2.

Key Menu 4, 6: RECORDED CODES

```
s=FFFF c=FFFF b=FFFF r=FFFF-FF i=FFFF-FF
a=FFFF-FFFF;          2001,03,14 /14:45:  n 35
```

Press key 6 to access the "RECORDED CODES" menu from menu 4 "RECORDED EVENTS" and menus 4, 2; 4, 2, 2; 4, 2, 2, 2 i.e. from the recorded measurements menus.
Press key 1 to return to the NORMAL menu.

Except for key 6, all other keys and the indications on the bottom row have the same functions as in menu 4.

The top row: s=FFFF c=FFFF b=FFFF r=FFFF-FF i=FFFF-FF shows the internal codes.

Key 6 enables the return to menu 4 while maintaining the current event. So the user can switch from the description of the event with the "alarm message recorded" to the description with the internal codes several times.

KEY 5 MENU: ACOUSTIC ALARM EXCLUSION

During operation on the NORMAL menu, the user can permanently silence or activate the buzzer by pressing key 5. "5=ON" is displayed in the basic menu when the buzzer is activated and “5=OFF" is displayed when the buzzer is silenced.
On other menus, provided no other functions are allocated to it, key 5 is used to silence the buzzer.
The setting is stored, even during shutdown due to power failure.

KEY 6 MENU: DATE / TIME

```
Date/Time              2001-  3-14 / 15:52:23
              Cod.  ?    ......
```

Press key 6 on the NORMAL menu to access the “DATE / TIME” menu.
The display shows the current content of the internal calendar and clock in the format:
DATE / TIME = years, months, days / hours, minutes, seconds.
The contents can be modified by calling up the appropriate menu and inserting the personalizing code “436215”. The correct code must be inserted to access the next menu, otherwise the system returns to the NORMAL menu. The code is not requested for 2 minutes after it has been inserted.

```
Date/Time              2001-  3-14 / 15:52:23
Adj.: 2=Ye. 3=Mo. 4=Day. 5=Hours  6=Min.
```

Press one of the keys 2, 3, 4, 5 or 6 to change the values.
Press keys 7 or 8 to increase or reduce the chosen value by one unit at a time. Press key 1 to exit the menu.

KEY 7 MENU: INTERNAL CODES

```
s=FFFF c=FFFF b=FFFF r=FFFF-FF i=FFFF-FF
a=FFFF-FFFF;                          V.=1022-ABCD
```

Press key 7 on the “NORMAL” menu to access the “INTERNAL CODES” menu.
Press key 7 again to access a second menu of internal codes.

```
e=FFFF g=FFFF u=FFFF y=FFFF j=FFFF-FFFF
k=FFFF v=FFFF p=FFFF l=FFFF m=FFFF-FFFF
```

Press key 7 once more to access a third menu of internal codes. Press any other key to exit.

```
e2=FFFF e3=FFFF b1=FFFF b2=FFFF
u2=FFFF u3=FFFF p2=FFFF p3=FFFF p4=FFFF
```

Press key 7 once more to access a fourth menu of internal codes. Press any other key to exit.

```
c1=FFFF c2=FFFF c3=FFFF c4=FFFF
f0=FFFF f1=FFFF f2=FFFF f3=FFFF f4=FFFF
```

Press key 7 once more to access a fifth menu of internal codes. Press any other key to exit.

```
St=0, OUT:       -5mV3,    -7mV2,     +2mV1
A%dc321=+   2,+   1,-   2;    V321=230,230,230
```

The codes of the first menu are recorded, the codes of the others menus are not recorded.
N.B.: the codes shown in the last four menus are only used for factory tests.
In the first menu “V.=1022-ABCD” is an example of the identifying number of the system program version.

KEY 8 MENU: NORMAL

```
o=__                NORMAL OPERATION
__60    OUT=100%VA, BATT=NO-BATT, 5=ON
```

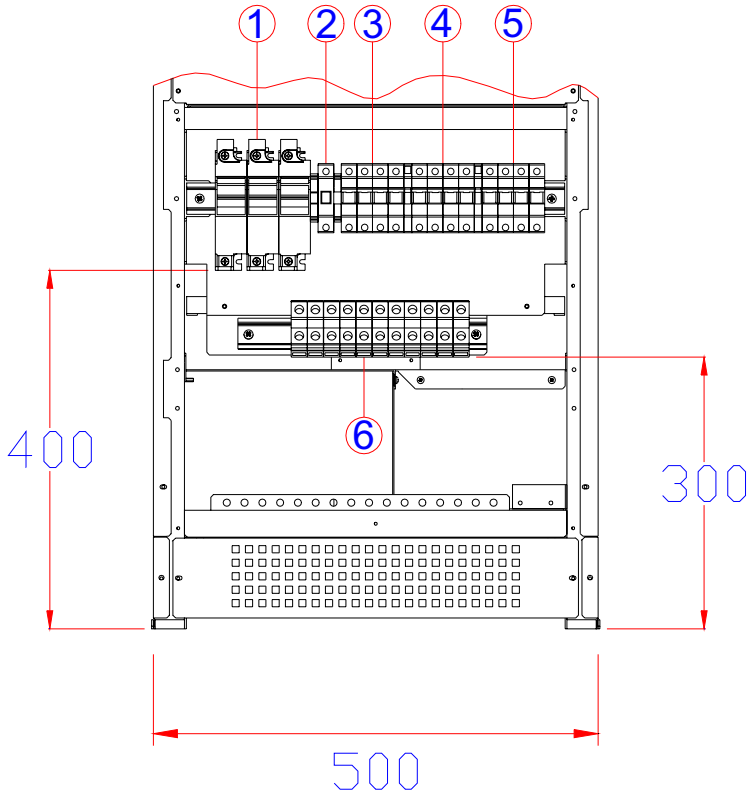
To access the “NORMAL" menu press key 8 on menu 1 “HELP”, or on all other menus where no other functions have been allocated to this key.
The system always returns AUTOMATICALLY to the “NORMAL” menu two minutes after the last key is pressed.
All the other functions are the same as those indicated for the “NORMAL” menu.

APPENDICES

INTERNAL LAYOUT

INPUT/OUTPUT PANEL

1. battery input fuses FBAT
2. “Start up from battery” button (optional)
3. input switch SWIN
4. output switch SWOUT
5. maintenance switch SWMB
6. Input and output terminal board



SIZE AND WEIGHT

P p.f.0.8 [kVA]	Fasi/phases Input Ingresso	Output uscita	Dimensions/dimensioni Lxpxh WxDxH [mm]	Weight/pesi [kg]
40	3+N	3+N	500x740x1400	180
60	3+N	3+N	500x740x1400	200
80	3+N	3+N	500x740x1400	220

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