ИБП Borri B8031FXS - брошюра на продукцию. Юниджет

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PRODUCT MANUAL

UNINTERRUPTIBLE POWER SUPPLIES

English

- ***B8031FXS 10kVA (3PH / 1PH)***
- ***B8031FXS 15kVA (3PH / 1PH)***
- ***B8031FXS 20kVA (3PH / 1PH)***
- ***B8033FXS 10kVA (3PH / 3PH)***
- ***B8033FXS 15kVA (3PH / 3PH)***
- ***B8033FXS 20kVA (3PH / 3PH)***
- ***B8033FXS 30kVA (3PH / 3PH)***
- ***B8033FXS 40kVA (3PH / 3PH)***
- ***B8033FXS 50kVA (3PH / 3PH)***
- ***B8033FXS 60kVA (3PH / 3PH)***

- The present manual is an integrant part of the products technical back-up documentation. Read the warnings with attention, as they give important instructions concerning safe usage.
- This equipment must be used only for its appointed operation. Any other use is to be considered incorrect and therefore dangerous. The manufacturer cannot be held responsible for damages caused by incorrect, wrong and unreasonable use.
- BORRI holds itself responsible only for the equipment in its original configuration.
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1. UPS GENERAL DESCRIPTION

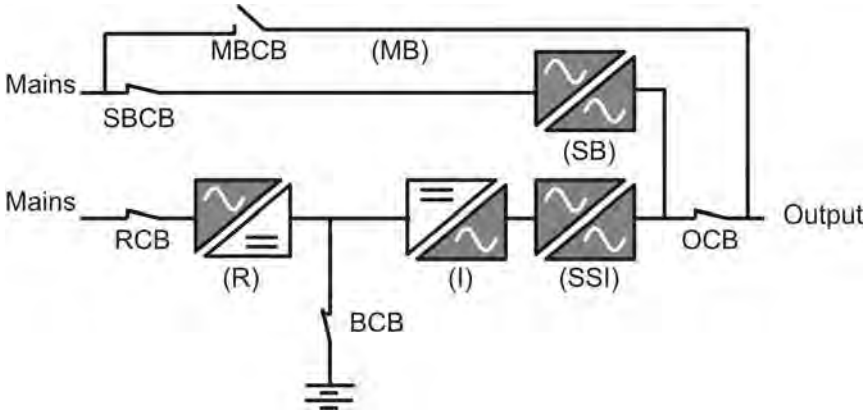
The UPS of the B8031FXS 10÷20kVA and B8033FXS 10÷60kVA series is the type “ON LINE DOUBLE CONVERSION” and is connected between main power and user loads (see picture 1). As far as architecture and lay-out is concerned, this project is optimised with particular care in order to make it suitable for applications where reliability and high performances are fundamental for critical loads.

The UPS operation is optimised by microprocessor digital control and the IGBT inverter is based on a high frequency PWM waveform.

The whole UPS is monitored by a DSP 32 bit microprocessor, implementing full digital control of the system.

Procedures for power-on, power-off, switching to and from bypass are described step by step on LCD display, so to help users to easily operate the UPS.

Results of electrical measurement, alarm, work condition, event log and battery state are indicated real time on the display.

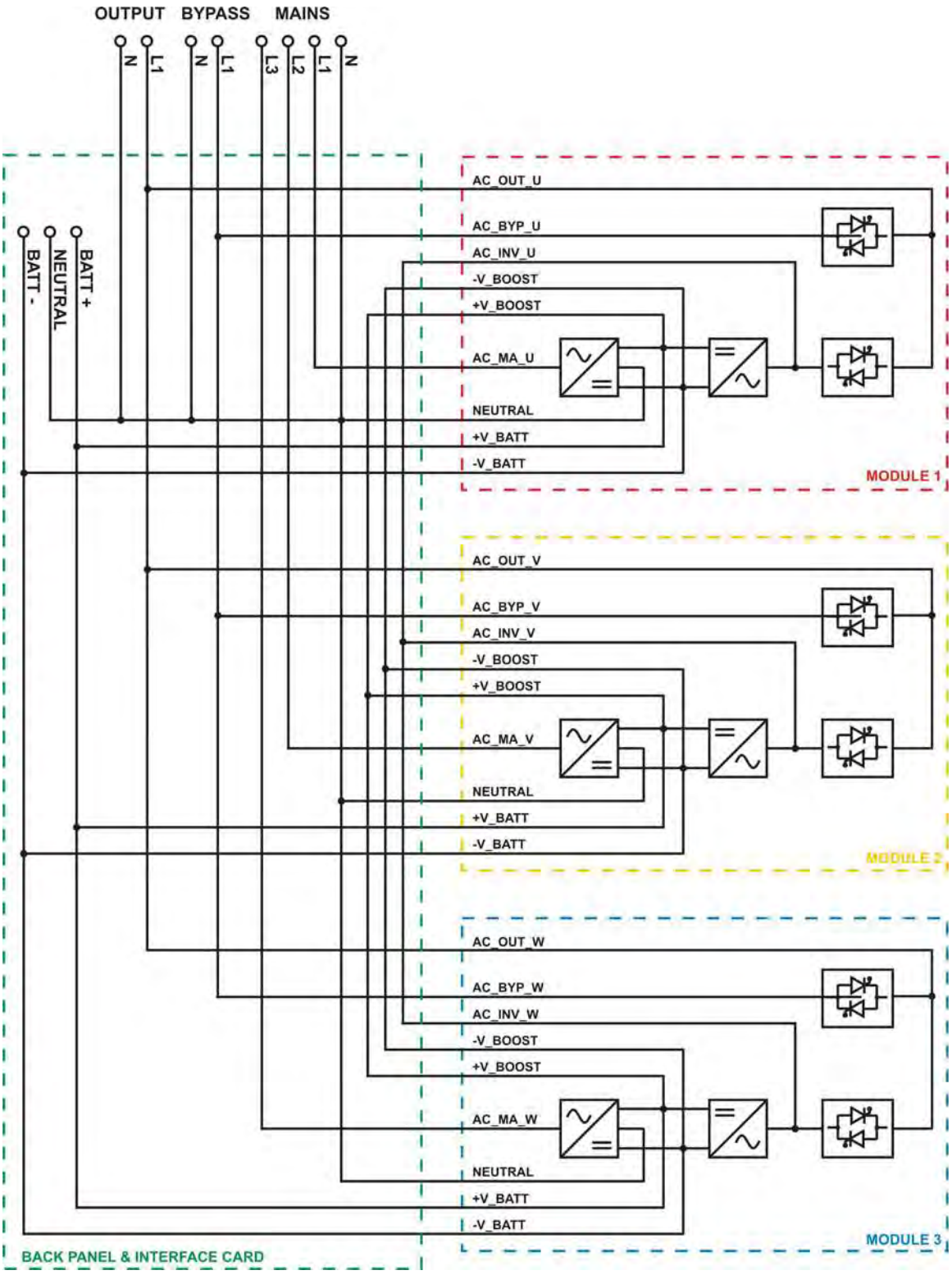


Picture 1 – UPS block diagram

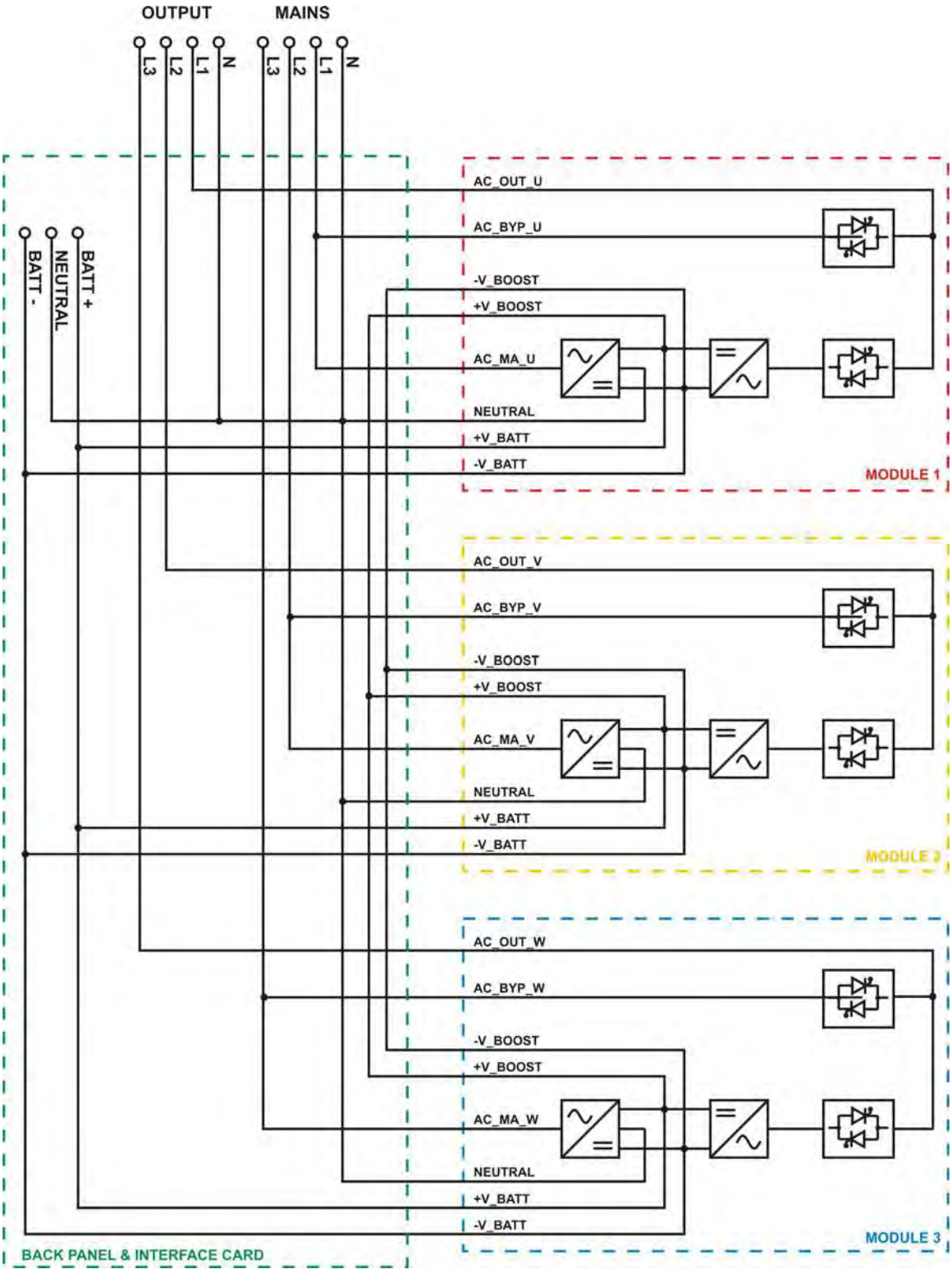
With this configuration UPS guarantees high quality output, needed by loads requiring stable and clean source of power. The main features are:

- Protection for black-out, in the limits of battery autonomy
- Complete filtering of mains power noise
- High quality output power, provided under any condition of input power and loads
- Stable output frequency, independent from input frequency
- Full compatibility with every type of load
- Configurable with any neutral wire configuration (under request)
- Automatic control of battery, during both charging and discharging phases
- Easy to interface with monitoring devices
- Auto-diagnostic feature and troubleshooting support
- Flexibility of complete bypass configuration
- Full access from the front and from the roof for maintenance

The UPS of the B8031FXS and B8033FXS series consists of three single-phase AC/AC conversion modules connected to each other in order to obtain UPS units with single or three-phase output, based on the configuration required. The microprocessor checks the operating parameters of each module. The pictures below show the interconnections of the UPS with single or three-phase output.



Picture 2 – B8031FXS 10÷20kVA interconnections



Picture 3 – B8033FXS 10÷60kVA interconnections

The block diagram in picture 1 shows the UPS subsystems that will be analysed in the following chapters:

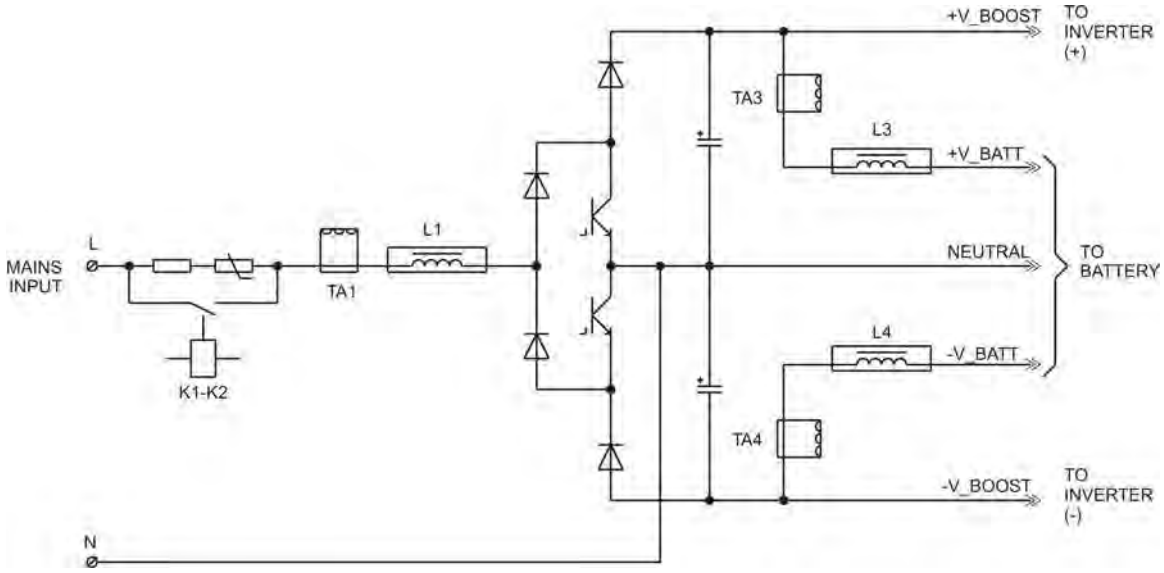
- Rectifier/Battery Charger (R)
- Inverter (I)
- Battery (B)
- Static Switch: Static Inverter Switch (SSI) and Static Bypass Switch (SB)
- Manual Bypass (MB)

NOTE

The description and the diagrams in the various sections always refer to the single conversion module.

1.1 RECTIFIER / BATTERY CHARGER

The Rectifier/Battery charger converts the AC input voltage to DC voltage, feeding the inverter and keeping the battery charged.



Picture 4 – Rectifier

The rectifier is based on a full-digital control of the IGBT bridge, which allows to minimize the harmonics re-injected into the mains and reduces the harmonic distortion of the current to less than 3%. The trend of the power absorbed by the mains is almost sinusoidal with a power factor higher than 0,99, thanks to the PFC (Power Factor Correction) technology.

Each IGBT of the rectifier bridge operates on a battery polarity, and the neutral conductor of the input line represents the central point.

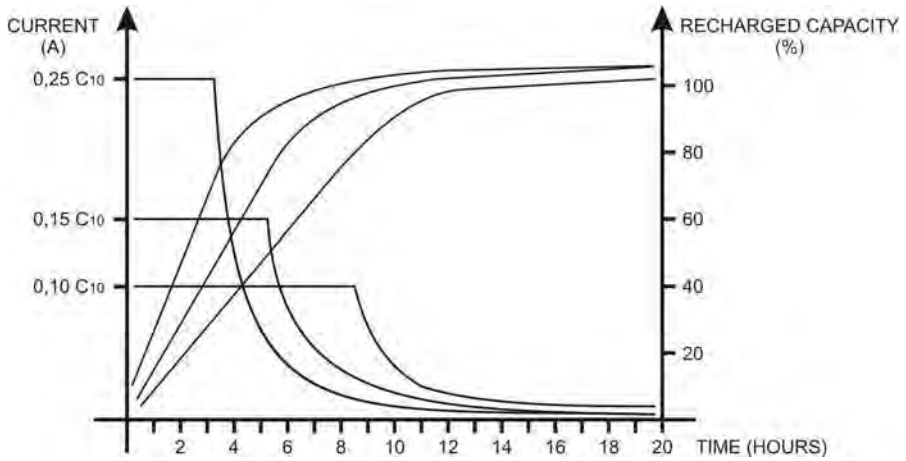
Current transducer TA1 provides the feedback for the input current waveform, that is used by the microprocessor to vary the modulation (PWM) of the IGBT's.

The battery recharging current is automatically limited by the control software, using the feedback signals provided by the transducers TA3-TA4.

Inductors L3-L4, installed as an OPTION, reduce the current ripple to optimize the expected battery life.

1.1.1 Battery charger characteristic

A single-level charge is used. This is an optimal solution with sealed lead acid batteries that, owing to the manufacturing technology, have a very narrow voltage range. In fact, the nominal charging voltage ranges between 2.25÷2.27 V/cell, with a maximum value of 2.3 V/cell. The picture below shows the charging curves at different charging currents; the higher is the current, the higher is the restored capacity versus time, the lower is the recharging time.

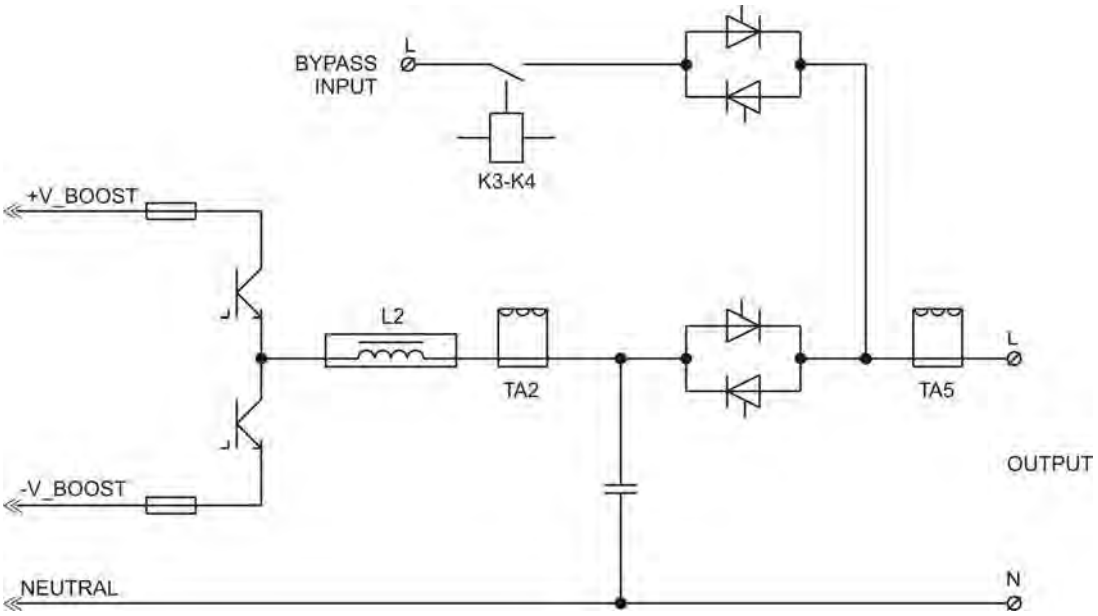


Picture 5 – Battery charger characteristic

1.2 INVERTER

The inverter converts the DC input voltage to AC voltage, stabilized in frequency and RMS value.

The DC voltage is converted by the IGBT bridge, that uses two switches, controlled using PWM (Pulse Width Modulation) technology at high commutation frequency. The PWM generation as well as the control of the operating variables is completely managed by the microprocessor.



Picture 6 – Inverter and static switch

Inductance L2 forms, together with the AC capacitors, a low-pass filter that provides to eliminate the high frequency ripple and keep the total harmonic distortion (THD) of voltage lower than 2% (with linear load).

The stability of output voltage and the dynamic response are optimized by using two nested current and voltage loops. The DC component on the output voltage is controlled by a separate loop (Anti Saturation Loop “ASL”).

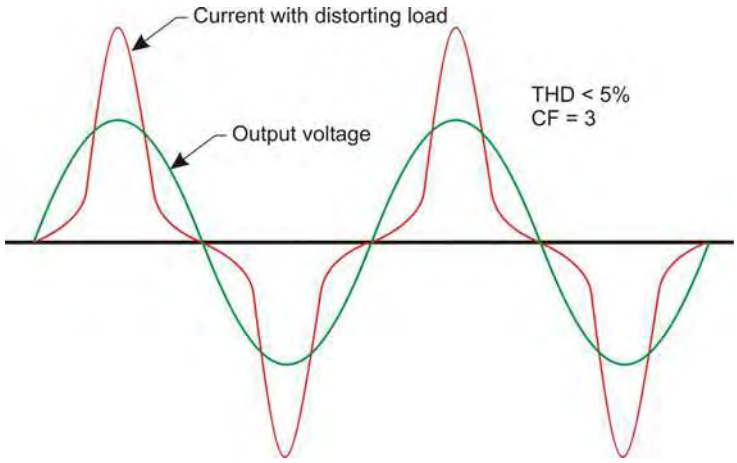
The total harmonic distortion of output voltage is kept very low with both linear and non-linear load (see description in paragraph 2.2.1) via "CBG" (Current Boost Gain) control.

The selectivity in case of short-circuit (see picture 12) is very high, and the voltage recovery time is digitally controlled (Soft Short Recovery Loop “SSRL”).

The inverter, thanks to its manufacturing technology and to the microprocessor control, is able to supply indifferently inductive or capacitive loads. . In case the load is highly capacitive (p.f. < 0.9) contact the sales department to verify whether a slight power de-rating is necessary or not.

1.2.1 Operation with non-linear load

A non-linear load is characterized by a high peak current versus its RMS value, that in normal condition would introduce a distortion on the output voltage waveform. The inverter is provided with an instantaneous voltage correction facility, completely managed by the microprocessor, that provides to vary the PWM generation according to the actual output waveform, in order to keep the THD within 5% even with loads having crest factor equal to 3.



Picture 7 – Operation with non-linear load

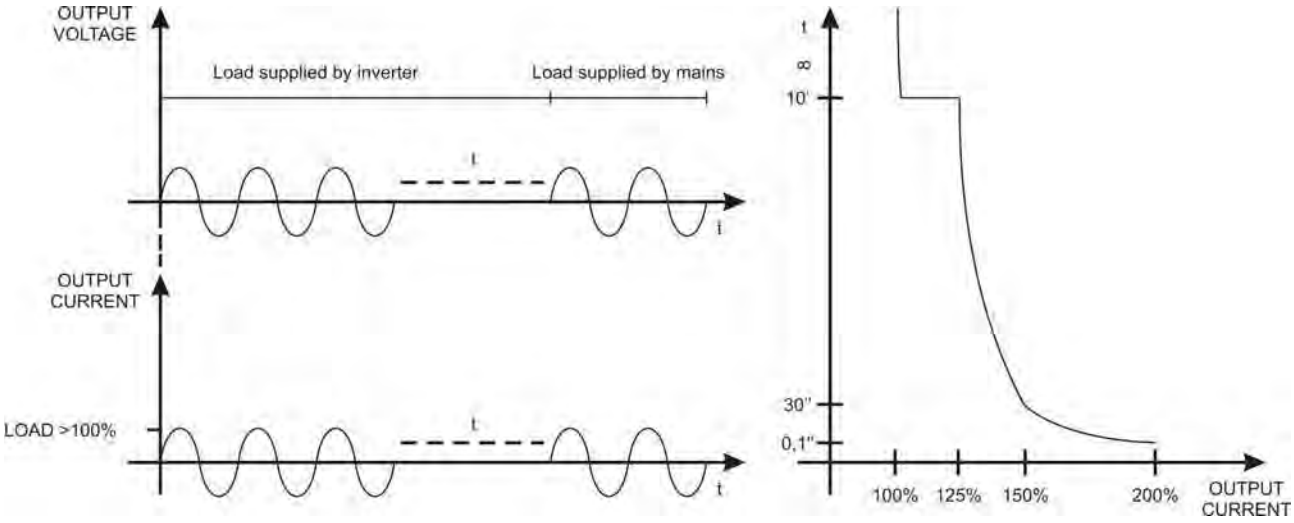
1.2.2 Overload management

The inverter can provide continuously 100% of nominal load and can tolerate overload conditions up to 125% for 10 minutes or 150% for 30 seconds.

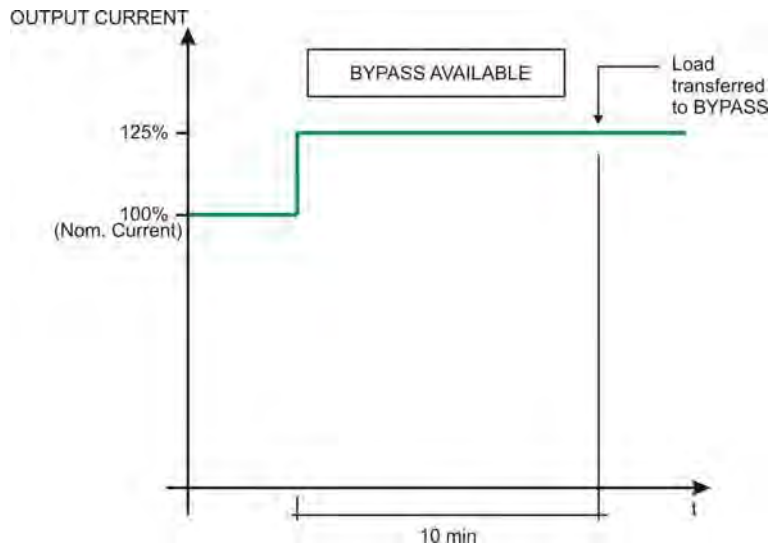
Peak conditions such as take-off of engines or magnetic parts are managed limiting the output current to 200% for 5 cycles, then reducing to 150%.

Any time output power grows above 100% the inverter keeps feeding the loads, while the microprocessor activates the “thermal image” algorithm to calculate the power overload based on the output current and duration of the overload.

User loads are powered by inverter output up to the end of maximum allowed time, then the static switch transfers the load to the emergency line without interruption of output power.



Picture 8 – Thermal image characteristic



Picture 9 – Overload with bypass available

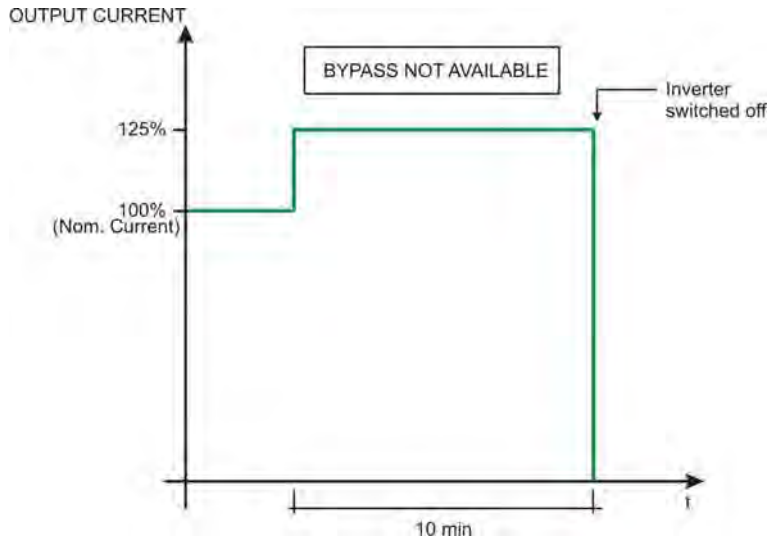
1) BYPASS AVAILABLE

As soon as an overload is detected the algorithm starts to calculate the increment of the energy.

When the threshold value is reached the load is transferred to bypass.

To allow a safe cooling of the components (IGBT's, transformer) the inverter is switched off for 30 minutes.

When this time has elapsed the inverter is switched on again and the load transferred back to the primary supply.



Picture 10 – Overload with bypass not available

2) BYPASS NOT AVAILABLE

As soon as an overload is detected the algorithm starts to calculate the increment of the energy.

When the threshold value is reached the inverter is switched off to avoid severe damages to the components.

As soon as the bypass is available again the load is supplied by the static bypass switch.

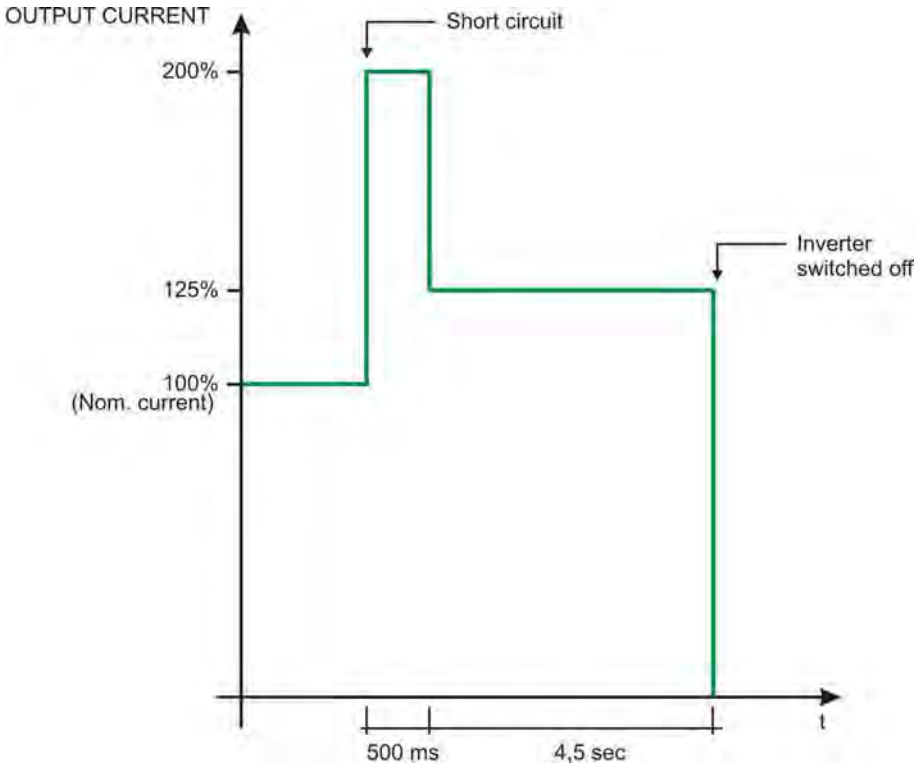
After **30 minutes** the inverter is switched on again and the load is transferred again to the primary supply.

WARNING: this operation causes the loss of the supply to the load

1.2.3 Short-circuit operation

As soon as an output short-circuit is detected (alarm A11), the load is transferred immediately to the emergency line that provides to eliminate the fault thanks to its higher short-circuit current.

In case the bypass is not available, the inverter reduces its output voltage and limits its current to 200% for 100ms, and then to 150% for 5 seconds, after that it is switched off (according to EN 62040-3 / EN 50091-3).



Picture 11 – Short-circuit characteristic (bypass not available)

1.2.4 IGBT bridge protection

The power semiconductors of the inverter bridge are protected by ultra-quick fuses connected on the bridge input.

1.3 BATTERY

On the UPS of the B8000FXS 10÷20kVA series the battery can be installed inside the UPS for 10 – 15 – 20kVA units (max. 60 or 62 9Ah battery blocks), or in an external cabinet for higher battery capacities, where as for the 30...60kVA series the battery is always installed in an external cabinet. The lead-acid sealed battery consists of two banks composed of 180 cells + 180 cells (60 battery blocks in total), or 186 cells + 186 cells (62 battery blocks in total).

The battery charger control logic is completely integrated inside the rectifier control board; the battery is charged, according to the DIN 41773 Standard, every time it has been partially or completely discharged. It is kept floating, even when it is charged, to compensate any auto-discharge.

1.4 STATIC SWITCH

The static switch, the diagram of which is shown in picture 6, is composed of thyristors, rated to work continuously at 200% of nominal output power.

The components connected to the bypass line are protected by ultra-quick fuses.

The static switch is provided with a protection which minimizes the risk caused by a possible return of the inverter voltage in case of emergency mains failure (back-feed protection). Thanks to the transfer logic integrated in the control, the load is supplied by the bypass line even in case of microprocessor failure. The overload capacity of the static switch is shown below.

Overload capacity: 200% continuous
1000% for 1 cycle

1.4.1 Inverter → Emergency Line Transfer

The transfer is activated only if the emergency line is in tolerance (in less than 0.5 ms), for the following reasons:

CAUSES	COMMUTATION CONDITIONS
Output short-circuit	Emergency line within tolerance limits
Fault of inverter or inverter voltage out of tolerance	Emergency line within tolerance limits
DC voltage out of tolerance (Inverter OFF)	Emergency line within tolerance limits
Overtemperature	Emergency line within tolerance limits
Thermal image shut down	Emergency line within tolerance limits
Forced commutation by “BYPASS SWITCH” (test or service)	Emergency line within tolerance limits and SYNCHRONIZED inverter

1.4.2 Emergency Line → Inverter transfer

As soon as inverter is correctly working and synchronized, UPS automatically switches the load to inverter in less than 1 msec. If UPS switches back and forth more than 6 times in two minutes an alarm will be generated, to inform the user, and the load will be locked to emergency line. A manual reset is necessary to switch the supply back to the inverter.

1.5 MANUAL BYPASS

To safely allow maintenance and repair of the unit, UPS is provided with a manual bypass switch.

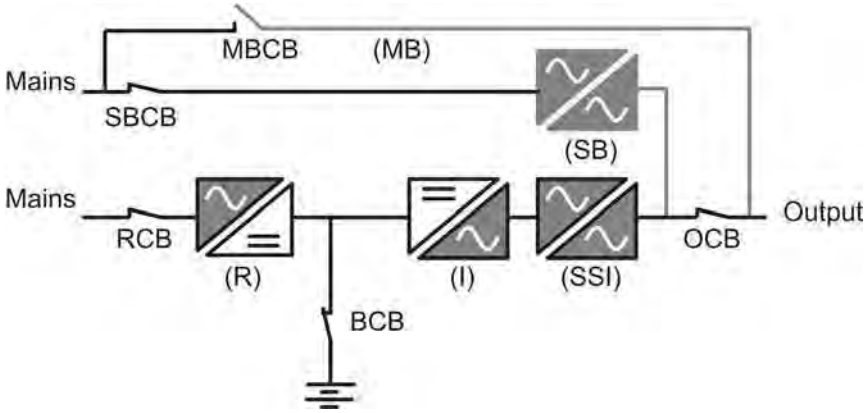
In this mode all the testing activities to verify the efficiency of the system can be carried out safely. Manual bypass must be inserted by following the instructions given in the operating manual. During the transfer to manual bypass there is no interruption of the supply to the load.

2. OPERATING MODES

2.1 NORMAL OPERATION

During normal operation all the circuit breakers/isolators are closed, except for MBCB (maintenance bypass).

The three-phase input AC voltage feeds the rectifier via the filter inductor; the rectifier supplies the inverter and compensates mains voltage fluctuations as well as load variation, maintaining the DC voltage constant. At the same time it provides to keep the battery in stand-by (floating charge or boost charge depending on the type of battery). The inverter converts the DC voltage into an AC sine-wave with stabilized voltage and frequency, and also supplies the load via its static switch SSI.



Picture 12 – Normal operation

2.2 BATTERY OPERATION

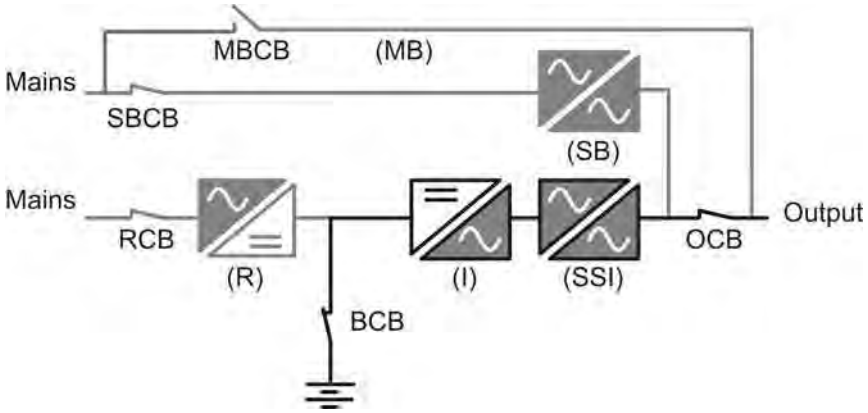
In the event of mains failure, or rectifier failure, the battery feeds the inverter without interruption. The battery voltage drops as a function of the magnitude of the discharge current. The voltage drop has no effect on the inverter output voltage since it is kept constant by varying the PWM modulation. As the battery approaches the discharge limit an alarm is activated.

In case the power is restored before the limit is reached the system switches automatically back to normal operation. If not, the inverter shuts down and the load is transferred to the bypass (bypass operation). If the bypass mains is not available or outside the tolerance range the complete system shuts down as soon as the lowest battery level is reached (*black-out*).

As soon as the power is restored the rectifier charges the battery. In the standard configuration, the loads are supplied again via static switch SSB when mains is available again. The inverter is restarted when the battery has partially restored its capacity.

The system restart from the *black-out* condition can be customized based on the requirements of the plant, in three different modes:

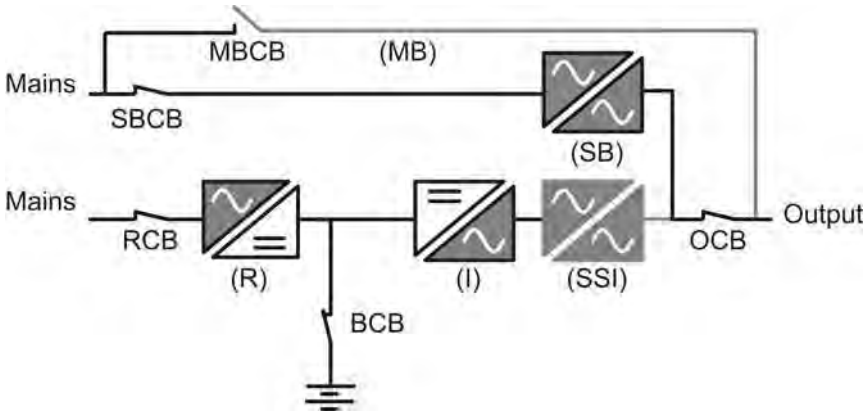
- Bypass → loads are supplied as soon as the bypass line is available (factory configuration).
- Inverter → loads are supplied by the inverter (even if the bypass line is available) when the battery voltage has reached a programmed threshold, after the rectifier restart.
- Man. Inverter → the output supply is NOT restored automatically. The system requires a confirmation to restart which can only be done manually by the user via the front panel.



Picture 13 – Battery operation

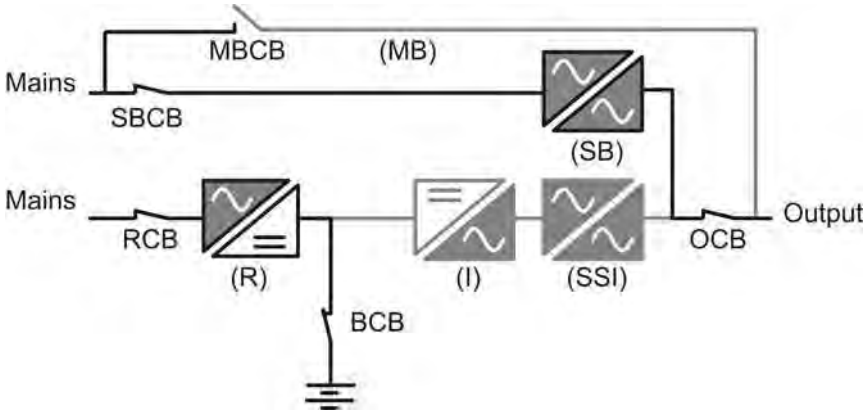
2.3 BYPASS OPERATION

Bypass operation may occur for both manual or automatic change-over. The manual transfer is due to the BYPASS SWITCH, that forces the load to bypass. In the event of a bypass failure the load is transferred back to inverter without interruption.



Picture 14 – Bypass operation (manual changeover)

The automatic change-over occurs for the reasons explained in paragraph 2.4.1; basically when the power supply to the load within the specified tolerance cannot be assured by the inverter.



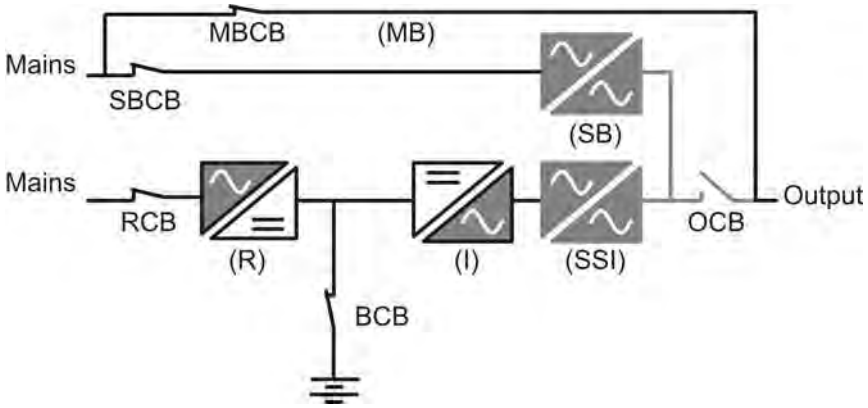
Picture 15 – Bypass operation (automatic changeover)

2.4 MANUAL BYPASS

The manual bypass operation is necessary every time the functionality of the UPS needs to be checked or during maintenance or repair works.

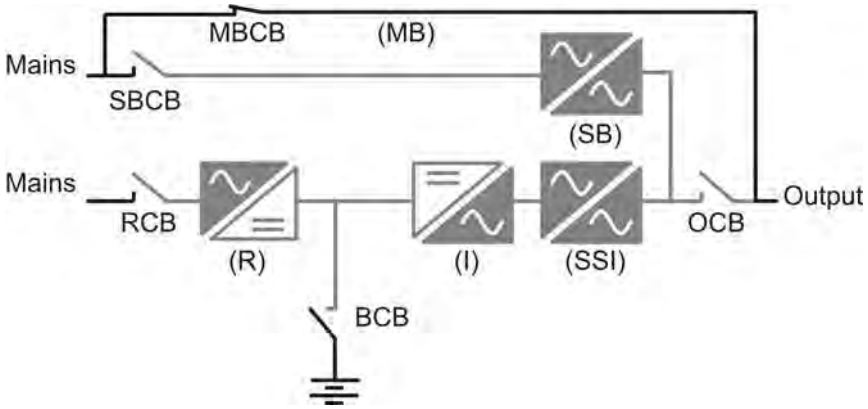
The manual bypass procedure is described in the UPS operating manual and must be followed carefully in order to avoid damages to the UPS.

During the functional check of the UPS, all the breakers can be closed, except for the output breaker OCB, and the full functionality can be tested.



Picture 16 – Manual Bypass for functional tests

During the manual bypass operation for repair or maintenance, the UPS is completely switched off and the load is supplied directly by the bypass mains.

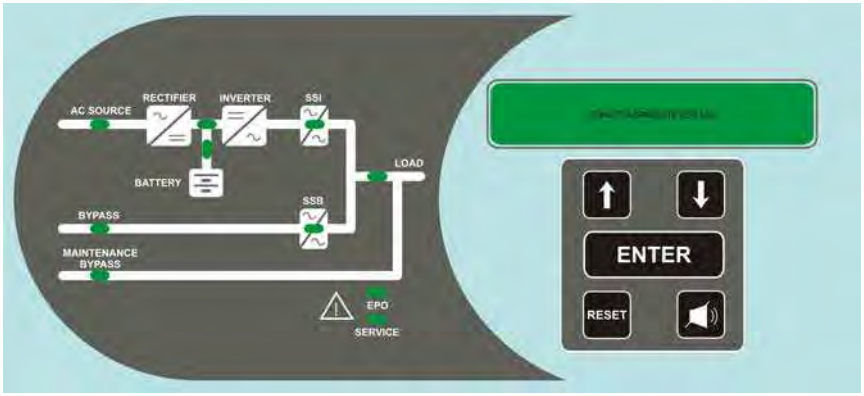


Picture 17 – Manual Bypass for repair or maintenance works

3. FRONT PANEL

The front panel of the UPS, consisting of a four-row alphanumeric display plus 5 function keys, allows the complete monitoring of the UPS status.

The mimic flow helps to understand the operating status of the UPS.



Picture 18 – UPS front panel

3.1 FUNCTION BUTTONS

The front panel of the UPS is provided with 5 buttons whose functions are indicated in the following table:

Button	Assigned functions
	➢ Scrolls up the menus ➢ Increases the values by one unit ➢ Selects a value
	➢ Scrolls down the menus ➢ Decreases the values by one unit ➢ Selects a value
	➢ Selects a menu ➢ Confirms changes
	➢ Silences the buzzer (activated due to an alarm or a failure)
	➢ Returns to the previous menu

3.2 FUNCTION OF MIMIC PANEL LED'S

LED 1		GREEN	AC line on rectifier input within tolerance
		GREEN	Wrong phase rotation
		OFF	AC mains failure on rectifier input
LED 2		GREEN	AC bypass line within tolerance
		GREEN	Wrong phase rotation
		OFF	AC bypass line out of tolerance AC bypass line failure
LED 3		GREEN	Rectifier off or faulty
		RED	DC voltage out of tolerance
		GREEN	Rectifier on and DC voltage within tolerance
LED 4		GREEN	circuit breaker BCB closed and battery charging
		GREEN	Battery discharging or under TEST
		ORANGE	Circuit breaker BCB open
		RED	Battery fault (following a battery test)
		OFF	Battery not available
LED 5		GREEN	Inverter voltage within tolerance and static switch closed
		GREEN	Inverter overload or short-circuit
		OFF	Inverter off or voltage out of tolerance
LED 6		ORANGE	Re-transfer blocked
		ORANGE	Static bypass switch closed
		OFF	Static bypass switch open
LED 7		GREEN	Output circuit breaker OCB closed
		OFF	Output circuit breaker OCB open
LED 8		ORANGE	Manual bypass switch MBCB closed
		OFF	Manual bypass switch MBCB open
LED 9		RED	Emergency power off (EPO) activated
		OFF	Normal operation
LED 10		ORANGE	Maintenance request (slow flashing)
		ORANGE	Critical alarm (fast flashing)
		OFF	Normal operation

3.3 ALARMS AND OPERATING STATUS

The alphanumeric display offers a complete diagnostic of the system by showing the description of 28 alarms and 6 operating statuses. Each alarm is associated with an internal protection controlled by a microprocessor, which disables certain UPS functions to avoid possible power supply interruptions to the loads.

Alarms and statuses are associated with codes. Alarm codes are stored in the event log.

3.3.1 Alarms

A1	MAINS FAULT	**A27**	EEPROM ERROR
A2	INPUT WRONG SEQ	**A28**	CRITICAL FAULT
A3	RECT OFF	**A29**	MAINTENANCE REQ
A4	RECT FAULT	**A30**	COMMON ALARM
A5	WRONG DC VOLTAGE	**A31**	MBCB BUS CLOSED
A6	BATT IN TEST	**A32**	BUS EPO
A7	BCB OPEN	**A33**	ASYMMETRIC LOAD
A8	BATT DISCH	**A34**	SERVICE REQUIRED
A9	BATTERY AUT END	**A35**	DIESEL MODE
A10	BATTERY FAULT	**A36**	DC FAST SHUTDOWN
A11	SHORT-CIRCUIT	**A38**	INV --> LOAD
A12	STOP TIMEOUT SC	**A39**	INV ERROR LOOP
A13	INV OUT TOL	**A40**	SSI FAULT
A14	BYPASS WR SEQ	**A41**	RECT VOLT ERROR LOOP
A15	BYPASS NOT AVAILABLE	**A43**	RECT CURR ERROR LOOP
A16	BYP --> LOAD	**A46**	LOST REDUND
A17	RETRANSFER BLOCK	**A47**	SEND PARAM ERROR
A18	MBCB CLOSED	**A48**	RCV PARAM ERROR
A19	OCB OPEN	**A49**	TEST MODE ERROR
A20	OVERLOAD	**A50**	SSW BLOCKED
A21	THERMAL IMAGE	**A51**	BATT TEMPERATURE
A22	BYPASS SWITCH	**A53**	FIRMWARE ERROR
A23	EPO CLOSED	**A54**	CAN ERROR
A24	HIGH TEMPERATURE	**A55**	PAR CABLE DISC
A25	INV OFF	**A56**	MAINS UNBALANCE
A26	COMMUNIC ERROR	**A63**	START SEQ BLOCK

3.3.2 Operating status

S1	BOOSTER OK
S2	BATTERY OK
S3	INVERTER OK
S4	INV --> LOAD
S5	BYPASS INVERTER SYNCHR
S6	BYPASS OK
S7	BYPASS --> LOAD
S9	MASTER INV SYNCHR

3.4 MEASUREMENTS ON THE DISPLAY

Submenu	Displayed data	Accuracy
INPUT	Rectifier input voltage (1) (2)	1 V
	Rectifier input current (3)	1 A
	Frequency	0,1 Hz
	Input power	1 kVA
OUTPUT	Voltage (1) (2)	1 V
	Current (3)	1 A
	Frequency	0.1 Hz
	Active power	1 kW
	Apparent power	1 kVA
	Load percentage	1 %
BYPASS	Voltage (1) (2)	1 V
	Frequency	0.1 Hz
INVERTER	Voltage (1) (2)	1 V
	Frequency	0.1 Hz
AC/DC	Rectifier output voltage	1 V
BATTERY	Voltage and current	1 V / 1 A
	Nominal capacity	1 Ah
	Residual autonomy	1 min / 1 %

(1) The voltage measures are always referred to the phase-to-neutral value

(2) The three voltages are displayed in one screen as “xxx yyy zzz V”

(3) The three line currents are displayed in one screen as “xxx yyy zzz A”

4. GENERAL TECHNICAL INFORMATION

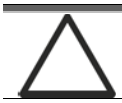
4.1 TECHNICAL DATA

For information regarding the technical data of the product, please refer to the technical specification.

4.2 INSTRUCTIONS FOR INSTALLATION

4.2.1 Receipt of the UPS

Please inspect the device before proceeding with installation. If the condition of the packaging or the external appearance of the equipment indicates any kind of damage, contact the shipping company or your dealer immediately. The damage statement must be made within 6 days from receipt of the product and must be notified to the shipping carrier directly. Should the product need to be returned to the manufacturer, please use the original package.



Danger to persons due to transport damages

Mechanical damage to the electrical components constitutes a serious danger to persons and property. In case of doubt regarding the non-integrity of the package or of the product contained therein, contact the manufacturer before carrying out the installation and/or the start-up.

4.2.2 Storage

The package normally ensures protection from humidity and possible damages during transport. Do not store the UPS outdoor.

Risk of damage due to inappropriate storage

- For the environmental storage conditions, refer to the indications given for the installation of the device.
- The device must only be stored in rooms protected from dust and humidity.
- The device cannot be stored outdoor.

When the UPS is received, please attend immediately to its unpacking and carry-out an accurate visual check to be sure that the equipment has not been damaged during transport.

IMPORTANT

In case of objections relating to damage incurred during transport, these must be immediately notified to the transportation company after receipt of the equipment.

When the UPS is not installed immediately it must be stored carefully in vertical position, as indicated on the packing and conserved in a dry and sheltered room. Cover it with an envelope so that it is protected from dust.

4.3 HANDLING OF THE UPS

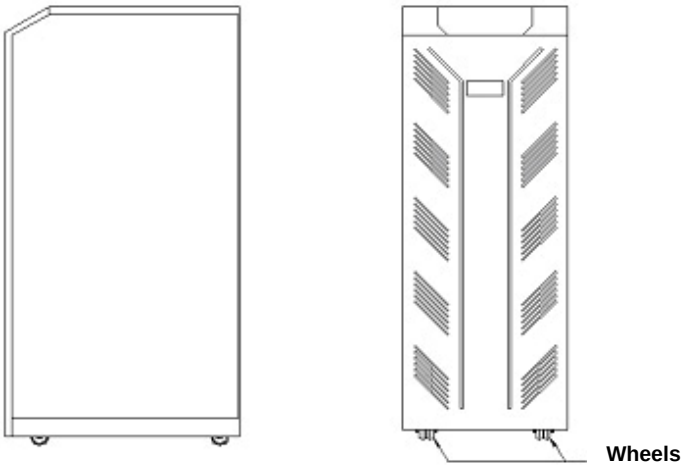
Before positioning the UPS, in order to avoid risks of turnover, it's recommended to move the system on the wood pallet on which the UPS is fixed.

Before the positioning in the final location, remove the UPS from the pallet taking away the fastening brackets.

The UPS can be lifted and handled using a pallet truck or a forklift.

UPS units up to 60kVA (*B8031FXS and B8033FXS* series) are moved via the four castors provided.

The UPS technical data are shown on a label fixed on the rear.



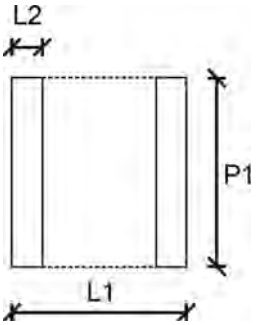
Picture 19 – Handling of a UPS unit up to 60kVA

4.4 POSITIONING AND INSTALLATION

The UPS must be installed in a clean and dry room, preferably not dusty. The User must ensure that there is enough air exchange in the room so that the equipment can be adequately cooled. If this is not guaranteed, the room must be adequately cooled.

In case the UPS contains batteries inside (10-15-20kVA), adequate air exchange must be ensured as provided for by EN62040-1, annex N.

4.4.1 Base plan, static load and weights



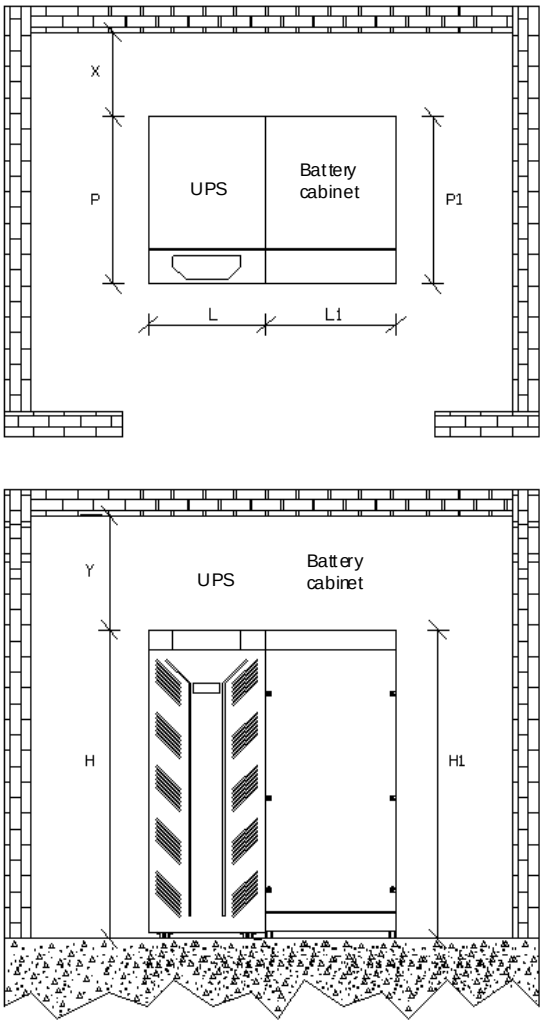
Picture 20 – Base plan

UPS (kVA)	10	15	20	30	40	50	60
	B8031FXS/B8033FXS			B8033FXS			
L1 – mm	450						
P1 – mm	650						
L2 – mm	-						

B8031FXS (kVA)	10	15	20
Weight w/o battery - kg	100	110	110
Weight with battery - kg	Min. 175 Max. 285	Min. 260 Max. 285	Min. 260 Max. 285
Static load w/o batteries – kg/m^2	315	348	348
Static load with batteries – kg/m^2	Min. 470 Max. 945	Min. 829 Max. 895	Min. 829 Max. 895

B8033FXS (kVA)	30	40	50	60
Weight w/o battery - kg	140	140	170	170
Weight with battery - kg	350	350	-	-
Static load w/o battery – kg/m^2	464	464	563	563
Static load with battery – kg/m^2	1160	1160	-	-

4.4.2 Dimensions and distances



Picture 21 – Dimensions and distance from the walls

Power (kVA)	10	15	20	30	40	50	60
	B8031FXS/ B8033FXS			B8033FXS			
L - mm	450						
P - mm	670						
H - mm	1200						
X (min.) - mm	50			100			
Y (min.) - mm	500						
ADD. CABINET	**COD. AS553**						
L1 - mm	503						
P1 - mm	647						

The table below shows the air volume required for an optimal ventilation and cooling of the UPS.

4.4.3 Installation criteria

The UPS must be so installed as to ensure its serviceability and to allow a correct air flow as much as possible.

The table below shows the air volume required for an optimal ventilation and cooling of the UPS.

Power (kVA)	**10**	**15**	**20**	**30**	**40**	**50**	**60**
	B8031FXS/ B8033FXS			**B8033FXS**			
Air volume (m^3/h)	500		600	800	900	1100	1100

4.4.4 Environmental installation conditions

The air is classified by the EN 60721-3-3 standard (Classification of environmental parameters and their severities – Stationary use at weather-protected locations) based on climatic and biological conditions as well as on mechanically and chemically active substances.

Therefore the place of installation must meet specific requirements to ensure compliance with the conditions for which the UPS was designed.

- **Climatic conditions according to the technical specification of B8000FXS**

Environmental parameter	
Minimum operating temperature (°C)	– 10
Maximum operating temperature (°C)	+ 40
Minimum relative humidity (%)	5
Maximum relative humidity (%)	95
Condensation	NO
Rainfall with wind (rain, snow, hail, etc.)	NO
Water with an origin other than rain	NO
Ice formation	NO

- **Classification of biological conditions (EN 60721-3-3)**

Environmental parameter	Classe		
	3B1	3B2	3B3
a) Flora	NO	Presence of mildew, fungus, etc.	Presence of mildew, fungus, etc.
b) Fauna	NO	Presence of rodents and other animals that are harmful to products, excluding termites	Presence of rodents and other animals that are harmful to products, including termites

➢ Classification of mechanically active substances (EN 60721-3-3)

Environmental parameter	Class			
	3S1	3S2	3S3	3S4
a) Sand [mg/m^3]	No	30	300	3000
b) Dust (suspension) [mg/m^3]	0,01	0,2	0,4	4,0
c) Dust (sedimentation) [mg/(m^2·h)	0,4	1,5	15	40
Places where precautions have been taken to minimize the presence of dust. Places away from dust sources	x			
Places without any special precaution to minimize the presence of sand or dust, however not in proximity to sand or dust sources		x		
Places in proximity to sand or dust sources			x	
Places in proximity to working processes that generate sand or dust, or in geographic areas having a high proportion of sand brought by the wind or of dust suspended in the air				x

➢ Classification of chemically active substances (EN 60721-3-3)

Environmental parameter	Class					
	3C1R	3C1L	3C1	3C2	3C3	3C4
a) Sea salt	No	No	No	Salt fog	Salt fog	Salt fog
b) Sulphur dioxide [mg/m^3]	0,01	0,1	0,1	1,0	10	40
b) Hydrogen sulphide [mg/m^3]	0,0015	0,01	0,01	0,5	10	70
a) Chlorine [mg/m^3]	0,001	0,01	0,1	0,3	1,0	3,0
a) Hydrochloric acid [mg/m^3]	0,001	0,01	0,1	0,5	5,0	5,0
a) Hydrofluoric acid [mg/m^3]	0,001	0,003	0,003	0,03	2,0	2,0
a) Ammonia [mg/m^3]	0,03	0,3	0,3	3,0	35	175
h) Ozone [mg/m^3]	0,004	0,01	0,01	0,1	0,3	2,0
i) Nitric oxide (expressed in equivalent values of nitrogen dioxide) [mg/m^3]	0,01	0,1	0,1	1,0	9,0	20
Places where atmosphere is strictly monitored and regulated (“clean spaces” category)	X					
Places where atmosphere is permanently monitored		X				
Places located in rural and urban regions where industrial activities are few and where traffic is moderate			X			
Places located in urban regions with industrial activities and/or considerable traffic				X		
Places in proximity to industrial sources with chemical emissions					X	
Places located in industrial installations. Emissions of highly concentrated chemical pollutants						X

UPS B8000FXS is designed to be installed in an environment that meets the following classifications.

K	Climatic conditions	**In accordance with the technical specification**
B	Biological conditions	**3B1 (EN 60721-3-3)**
C	Chemically active substances	**3C2 (EN 60721-3-3)**
S	Mechanically active substances	**3S2 (EN 60721-3-3)**

In the event that the environmental conditions of the installation room do not comply with the specified requirements, additional precautions must be taken to reduce excessive values to the specified limits.

4.5 ELECTRICAL CONNECTION

The electrical connection is part of the work which is normally provided by the company that carries out the product installation. For this reason, the UPS manufacturer shall not be held responsible for any damages due to wrong connections.

Use qualified personnel only

All electrical wiring operations must be carried out by qualified, trained personnel.

Work in compliance with local law

The installation of UPS B8000FXS must be carried out in compliance with national and local regulations.

Connection of ground cable

The grounding of the UPS via the relevant terminal is mandatory. It is strongly recommended to connect the ground terminal as first terminal.

The electrical connection is part of the work which is normally provided by the company that carries out the electrical installation and not by the UPS manufacturer. For this reason, the following recommendations are only an indication, as the UPS manufacturer is not responsible for the electrical installation. In any case we recommend to carry out the installation and the electrical input and output connections in compliance with the local standards.

Cables must be selected bearing in mind technical, financial and safety aspects. The selection and the sizing of cables from a technical viewpoint depend on the voltage, on the current absorbed by the UPS, on the bypass line and on the batteries, on the ambient temperature and on the voltage drop. Finally, the kind of cable laying must be taken into particular consideration.

For more explanations regarding the selection and the sizing of cables, please refer to the relevant IEC standards, in particular to IEC 64-8 standard.

“Short-circuit currents” (very high currents with a short duration) and “overload currents” (relatively high currents with a long duration) are among the main causes of cable damage. The protection systems normally used to protect the cables are: thermal magnetic circuit breakers or fuses. Protection circuit breakers must be selected according to the maximum short-circuit current (max Isc) that is needed to determine the breaking power of automatic circuit breakers, and to the minimum current (min Isc) that is needed to determine the maximum length of the line protected. The protection against short-circuit must operate on the line before any thermal and electrothermal effects of the overcurrents may damage the cable and relevant connections.

During the electrical installation take particular care to respect the phase rotation.

Mains connection

The connection to the mains must be carried out with protection fuses between the mains and the UPS.

The use of differential protection devices in the line supplying the UPS is unadvisable. The leakage current to ground due to the RFI filters is rather high and it can cause spurious tripping of the protection device.

According to IEC EN62040-1 standard, in order to take into account the UPS' leakage current, residual current devices having adjustable threshold can be used.

Mains connection

Use a suitable and readily accessible disconnect device in the fixing wire connecting the UPS to the mains.

To protect the output against the risk of electric shock, use the following residual current devices:

B8033FXS: DEVICE AS TYPE B (IEC/TR 60755/A2)

B8031FXS: DEVICE AS TYPE A (IEC 61081-1 or IEC 61091-1)

Electrical connection data				
Power (kVA)		**10**	**15**	**20**
		B8031FXS		
Input Fuses (A)	Rectifier	3x25	3x32	3x32
	Bypass	1x80	1x110	1x150
Input cables (mm^2)	Rectifier	4x6	4x10	4x10
	Bypass	2x16	2x25	2x35
Output cables (mm^2)		2x16	2x25	2x35
Battery cables (mm^2)		3x6	3x6	3x6
Ground cable (mm^2)		16	16	16

Electrical connection data								
Power (kVA)		10	15	20	30	40	50	60
		B8033FXS						
Input Fuses (A)	Rectifier	3x25	3x32	3x32	3x70	3x70	3x100	3x135
	Bypass	3x25	3x32	3x32	3x70	3x70	3x100	3x135
Input cables (mm^2)	Rectifier	4x6	4x6	4x10	4x25	4x25	4x35	4x35
	Bypass	4x6	4x6	4x10	4x25	4x25	4x35	4x35
Output cables	(mm^2)	4x6	4x6	4x6	4x10	4x25	4x25	4x35
Battery cables	(mm^2)	3x6	3x6	3x6	3x6	3x16	3x16	3x35
Ground cable	(mm^2)	16	16	16	16	35	35	50

4.6 BACKFEED PROTECTION DEVICE

The back-feed protection device, as indicated by the EN 62040-1 Standard, is optional and can be installed during the UPS production phase; the installation on site can only be carried out by skilled personnel.

The device is a contactor that automatically disconnects the bypass line in case of failure of the static switch, in order to avoid voltage feed-back on the input terminals during the a mains failure.

The use of a device installed inside the UPS allows a higher flexibility of use, as only the bypass line is cut leaving the rectifier battery charger in operation.

The use of an external device forces the user to separate the UPS supply lines (rectifier and bypass) if the flexibility and availability of the UPS are supposed to be kept unaltered.

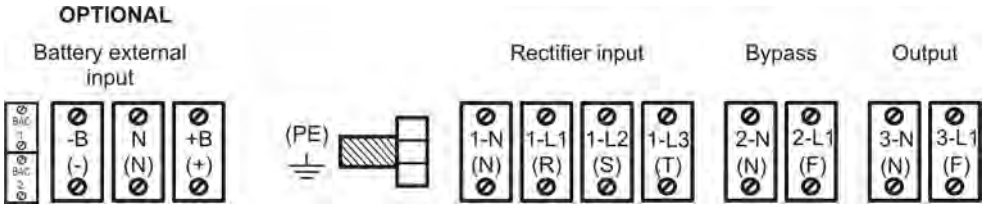
The following table shows the main electrical characteristics of the external sectioning device in case this solution is chosen.

Backfeed protection device			
UPS power (kVA) – B8031FXS	**10**	**15**	**20**
Maximum operating voltage (Vac)	690		
Minimum rated current (A)	65	100	130
Category	AC-1		

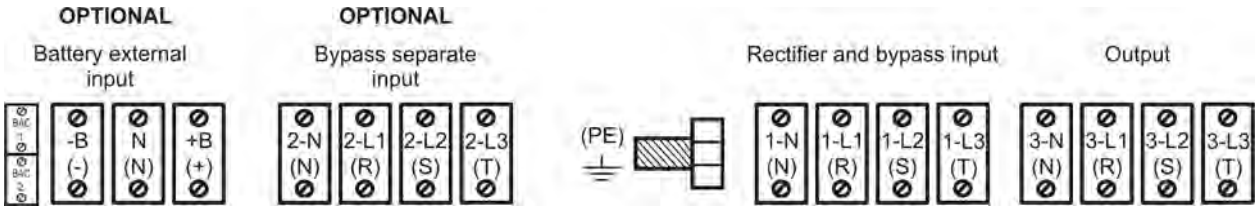
Backfeed protection device							
UPS power (kVA) – B8033FXS	**10**	**15**	**20**	**30**	**40**	**50**	**60**
Maximum operating voltage (Vac)	690						
Minimum rated current (A)	25	35	50	70	100	125	150
Category	AC-1						

4.7 TERMINAL BOARDS

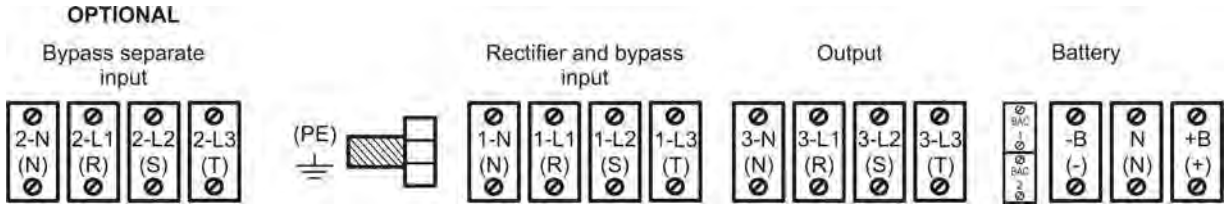
UPS B8000FXS is provided with terminal boards for the connection of power cables and auxiliary loads.



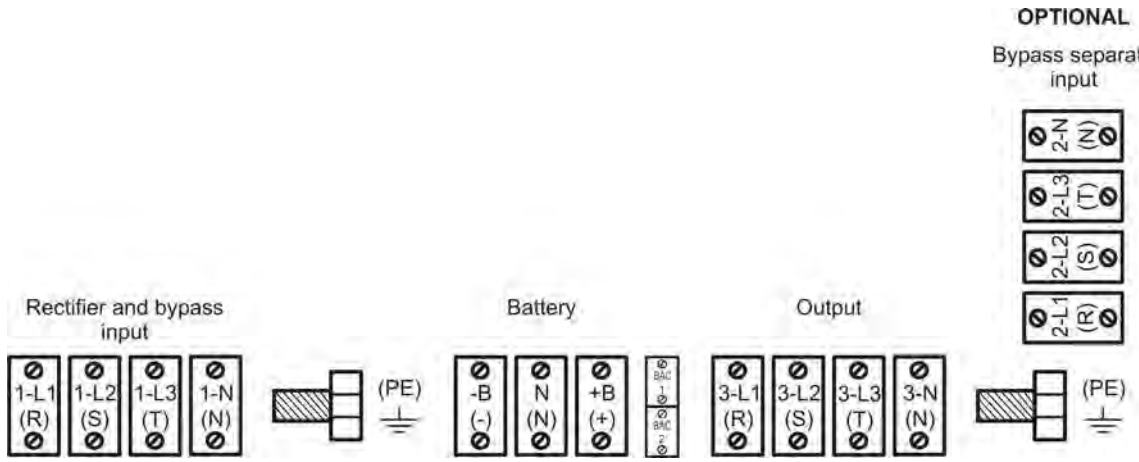
Picture 22 – Terminal board B8031FXS 10-15-20kVA



Picture 23 – Terminal board B8033FXS 10-15-20kVA



Picture 24 – Terminal board B8033FXS 30-40kVA



Picture 25 – Terminal board B8033FXS 50-60kVA

4.7.1 Electrical connection data

The electrical connection is part of the work which is normally provided by the company that carries out the electrical installation and not by the UPS manufacturer. For this reason, the following recommendations are only an indication, as the UPS manufacturer is not responsible for the electrical installation. In any case we recommend to carry out the installation and the electrical input and output connections in compliance with the local standards.

During the electrical installation take particular care to respect the phase rotation.

- UPS 10...20kVA

The terminal boards are positioned at the rear of the UPS, under the breakers. To access the terminals remove the rear protection, extracting the fixing bolts.

- UPS 30...60kVA

The terminal boards are positioned at the front of the UPS. To access the terminals remove the front protection, extracting the fixing bolts.

4.8 CONNECTION OF POWER CABLES

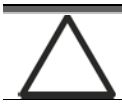
For the electric connection of UPS B8000FXS, connect the following cables:

- DC supply from the battery;
- AC supply from the rectifier and bypass supply mains;
- AC output to the loads.

Injury hazard due to electric shock!

Very high voltages are present at the ends of the cables coming from the battery:

- isolate the battery via DC circuit breakers before connecting it to the UPS;
- connect the ground cable to the relevant bar before carrying out any other connection inside the device.



Risk of damages to the device due to insufficient insulation

- The cables must be protected from short-circuits and leakage currents to earth;
- the connection points must be hermetically sealed to prevent the air from being sucked through the cable passage.

Risk of damages to the device due to incorrect wiring

To connect the device, follow the electrical drawing scrupulously and respect the polarity of cables.

4.9 POSITIONING AND CONNECTION OF BATTERIES

CAUTION

A battery can present a risk for electrical shock and high short circuit current. The following precautions should be observed when working on batteries:

a) Remove watches, rings or other metal objects;
b) Use tools with insulated handles;
c) Wear rubber gloves and boots;
d) Do not lay tools or metal parts on top of batteries;
e) Disconnect the charging source prior connecting or disconnecting battery terminals;
f) Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

IMPORTANT

For battery installation please respect EN62040-1-2 strictly and follow the installation manual of the UPS.

To obtain the battery life indicated by the battery manufacturer, the operating temperature must remain between 0 and 25 °C. However, although the battery can operate up to 40°C, there will be a significant reduction of the battery life.

To avoid the formation of any kind of potentially explosive hydrogen and oxygen mixture, suitable ventilation must be provided where the battery is installed (see EN62040-1-2 annex N).

For the materials installed in France, we have to apply the rules according to NFC 15-100 article 554.2: the volume of the renewed air has to be at least 0,05 NI m^3 per hour, where N is the number of the elements inside the battery and I is maximum current of the rectifier.

The batteries can be internal or external; however it is recommended to install them when the UPS is capable of charging them. Please remember that, if the battery is not charged for periods over 2-3 months it can be subject to irreparable damage.

IMPORTANT

UPS B8031FXS and B8033FXS from 10 to 20kVA have internal batteries.
Servicing of batteries should be performed by qualified personnel only.
Replace the batteries with the same number of cells and capacity.
Replace only with original batteries.

CAUTION: do not expose the battery to heat sources. It may explode.
CAUTION: do not open the battery container. Released electrolyte is harmful to the skin and eyes. It may be toxic.
CAUTION: do not dump the exhausted batteries in the environment.

For the battery installation follow the instructions in the Operating Manual.

4.9.1 External battery cabinet

The battery cabinet can be used to increase the UPS autonomy for the B8000FXS line 10-15-20kVA where the battery can be fitted into the UPS.

IMPORTANT

With an external battery the internal battery is not necessary.

The external batteries, (consisting of 120 battery blocks, with 6 cells each for 720 cells in total), are installed in the cabinet:

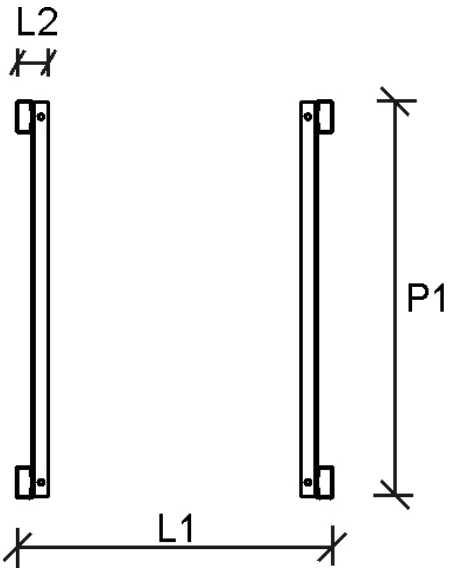
- AS533 for 7Ah, 9Ah and 12Ah batteries

The battery circuit breaker and the protection fuses are installed inside the external cabinet.

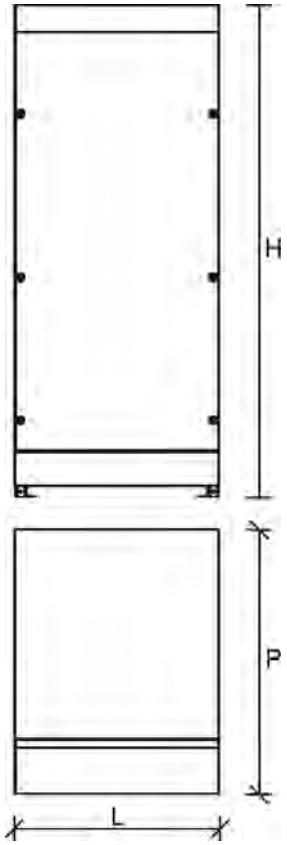
With regard to the installation of the external battery cabinet, follow the instructions in the Operating Manual.

4.9.1.1 Dimensions and weights

The dimensions and weights of the battery cabinet are indicated below.



Picture 26 – Base plan of the external battery cabinet



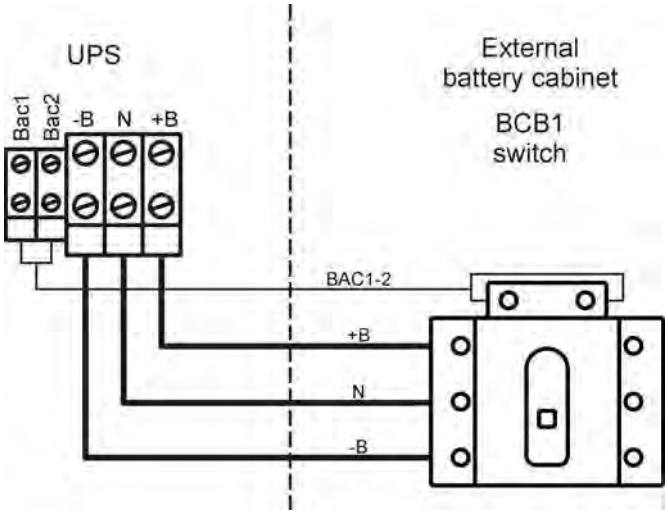
Picture 27 – Dimensions of the external battery cabinet

Cabinet	AS553
W (mm)	503
D (mm)	647
H (mm)	1200
L1 (mm)	500
P1 (mm)	625
L2 (mm)	50

Cabinet AS553	120 x 7Ah	120 x 9Ah	120 x 12Ah	60 x 12Ah
Weight w/o battery (kg)	120	120	120	120
Weight with battery (kg)	408	459	645	385
Static load with battery (kg/m^2)	1255	1412	1984	1184

4.9.1.2 Connection

The following picture shows the electrical connection between the UPS and the external battery cabinet.



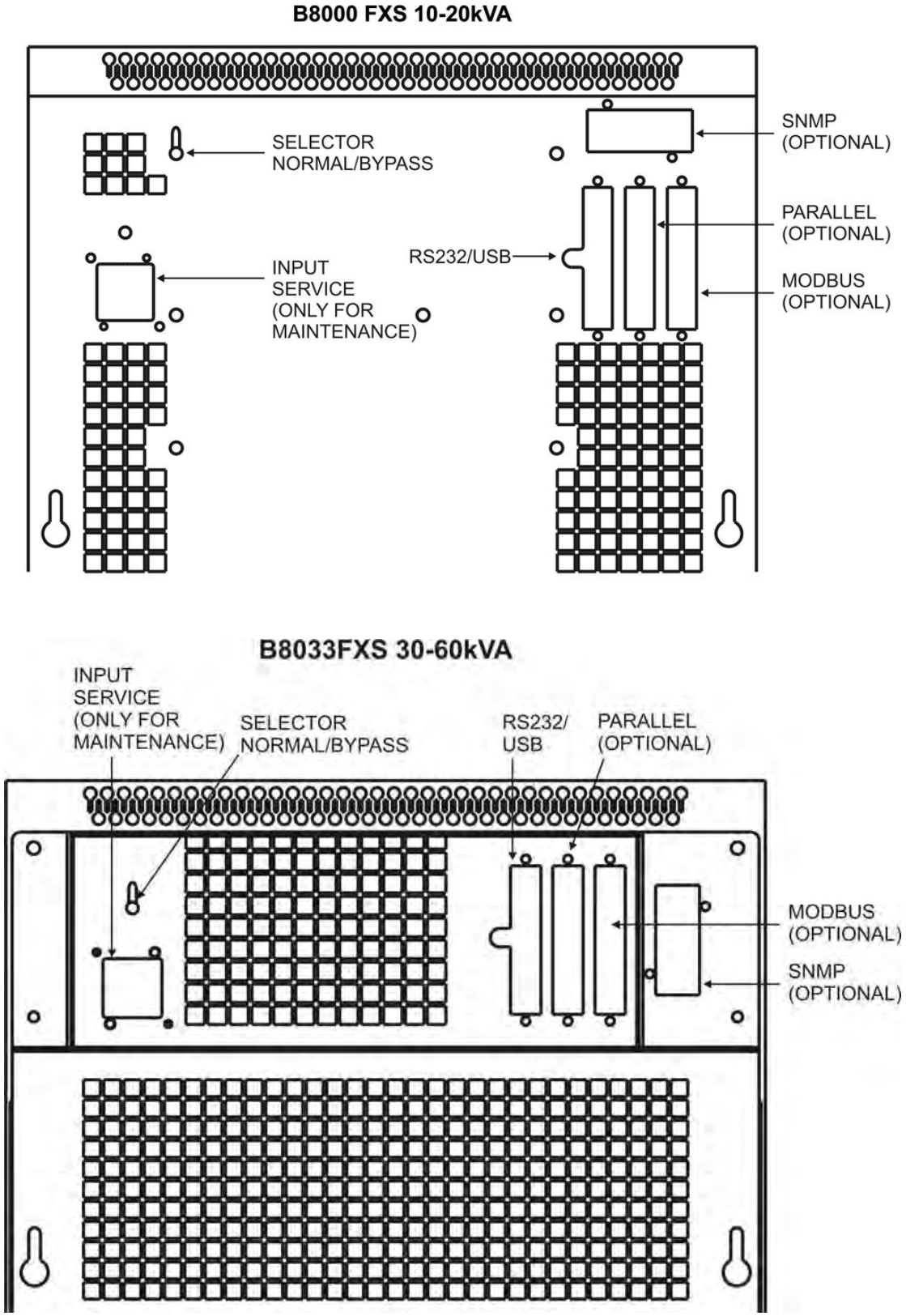
Picture 28 – Battery cabinet and UPS connection

For the connection shown above you can use the cables supplied in the battery cabinet.

4.10 SERIAL INTERFACES

The UPS is provided with serial interfaces for the external communication of the operating status and parameters.

- RS232/USB: is used for connection to the proprietary programming and control software.
- MODBUS (OPTIONAL): is used for the transmission of data to the outside via MODBUS protocol (RS485). With terminal board.
- PARALLEL (OPTIONAL): is used for communication between paralleled UPS units.
- SNMP (OPTIONAL): is used for the external transmission of data via LAN.
- NORMAL/BYPASS SELECTOR: transfers the load to bypass.
- SERVICE INPUT: used for service only.



Picture 29 – Interfaces of UPS B8000FXS

5. OPTIONS

5.1 STANDARD OPTIONS INCLUDED TO BE SET VIA SOFTWARE

1. Off-line
2. Programmable rectifier soft-start (Walk-In)
3. Sequential rectifier start for parallel systems (Hold-off)
4. Frequency converter

5.1.1 Off-line

The OFF-LINE function can be enabled in the “single configuration” via the Test Software. The load will be supplied by the electronic bypass until the bypass is present and within tolerance. In the event of a bypass line failure, the load is transferred to the inverter without interruption.

5.1.2 Programmable rectifier soft-start (Walk-In)

The values of the “Walk-In” Soft-Start function can be enabled and set via the Test Software. The setting range of the values is 5 to 30 seconds.

The Walk-in function allows to change the rectifier soft-start from the DC voltage generated by the SCR bridge to the one imposed by the Battery charge or by the floating voltage. The Walk-in function, like the delayed start function of the rectifier, allows to reduce disturbances to the diesel generator due to the supply of the UPS systems.

5.1.3 Sequential rectifier start for parallel systems (Hold-off)

The values of the Sequential Rectifier Start function can be enabled and set via the Test Software. The setting range of the values is 1 to 300 seconds.

The delayed rectifier start function is useful when several UPS systems are supplied by the same diesel generator. In fact in this case it might be useful to restart the UPS rectifiers at different time intervals, in order to temporally distribute the load supplied by the generator.

5.1.4 Frequency converter

The values of the Frequency Converter function can be enabled and set via the Test Software.

The frequency converter function allows to have a 60 Hz frequency on the UPS output, whereas the input frequency is 50 Hz or vice versa. When enabling this function, the bypass will be automatically disabled as it is no longer possible to synchronize the two sources.

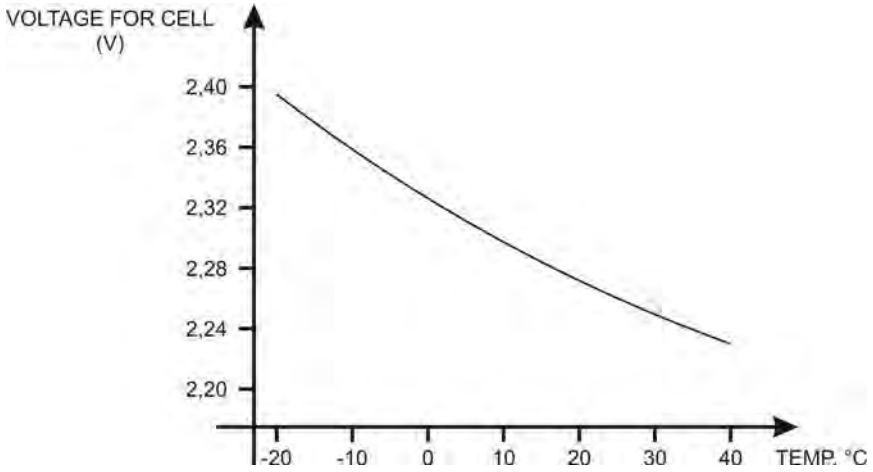
5.2 OPTIONS PROVIDED ON REQUEST

1. THERMAL COMPENSATION PROBE FOR BATTERY VOLTAGE
2. INSULATION TRANSFORMER ON BYPASS LINE
3. SEPARATE INPUT KIT
4. AUTO-TRANSFORMER FOR THE ADAPTATION OF INPUT VOLTAGE
5. ALARM CARD
6. SERIAL INTERFACE RS-485 (ModBus protocol)
7. SNMP ACCESSORY
8. REMOTE PANEL
9. PARALLEL KIT
10. BATTERY CABINET
11. WALL MOUNTED ISOLATOR WITH BATTERY FUSES
12. SPECIAL PAINTING
13. “LOAD-SYNC BUS” KIT
14. DIESEL GENERATOR
15. AUXILIARY CONTACT FOR EXTERNAL EPO
16. AUXILIARY CONTACT FOR EXTERNAL MBCB
17. BACK FEED PROTECTION

5.2.1 Thermal compensation of battery charge

This option provides a temperature sensor to be installed near the battery room in order to detect the operating temperature. This transducer is able to interface with the control logic of the rectifier in order to modify its floating voltage based on temperature, according to the typical curve supplied by the battery manufacturer. It is normally used for sealed batteries, which are particularly temperature sensitive.

The temperature measured by the probe can be visualized on the front display. If it is outside the limits set with the software, the UPS will activate an alarm.



Picture 30 – Charging voltage / temperature curve

The temperature sensor installed is provided with a connection cable that must be connected to an interface card installed in the UPS’ terminal board section. The temperature sensor can be installed at a maximum distance of 15 meters from the UPS.

5.2.2 Bypass insulation transformer

It is used when the input line is without neutral, or the galvanic isolation between the mains and the loads is required.

During normal operation the inverter transformer provides for this task, while during the bypass condition the mains feeds the load directly. Generally the insulation transformer is used when the output neutral conductor must be different from the input, thus discriminating two different grounding systems.

5.2.3 Separate input kit

The following Kit can only be used for UPS units with a three-phase input and output. It is used when the rectifier input line must be separated from the bypass input line.

For UPS units with a single-phase output, the bypass input and the rectifier input are already separate.

5.2.4 Voltage adaptation transformers

A voltage adaptation transformer can be connected at the UPS output terminals to adapt the standard output voltage to the value requested by the loads. It can also be connected at the input terminals to adapt the actual mains voltage to the values defined in the technical specification. In case the galvanic isolation is not required an auto-transformer can be used.

5.2.5 Alarm card

UPS B8000FXS, in its full configuration, is provided with a relay card for repeating alarms and operating statuses remotely. Its electric connection is carried out directly on the terminals located on the card.

Relay	Alarms/Status	Status	M1		Led	
			Pin	Normal operating status	Name	Normal operating status
RL1	Alarm = A30 GENERAL ALARM	Not energized if the alarm is present	2-3	Closed	DL1	On
			1-2	Open		
RL2	Alarm = A1 MAINS FAULT	Not energized if the alarm is present	5-6	Closed	DL2	On
			4-5	Open		
RL3	Alarm = A9 BATTERY AUT END	Not energized if the alarm is present	8-9	Closed	DL3	On
			7-8	Open		
RL4	Alarm = A13 INV OUT TOL	Not energized if the alarm is present	11-12	Closed	DL4	On
			10-11	Open		
RL5	**NORMAL MODE** Alarm = A16 BYP → LOAD - **ECO MODE** Status = S7 BYPASS → LOAD	Not energized if the alarm is present - - - - - - - - - - - - - Energized if the status is present	14-15	Closed	DL5	On
			13-14	Open		
RL6	BATTERY NOT DISCHARGING	Not energized if the battery is discharging	17-18	Closed	DL6	On
			16-17	Open		
RL7	**NORMAL MODE** Status = S4 INV → LOAD - **ECO MODE** Alarm = A38 INV → LOAD	Energized if the status is present - - - - - - - - - - - - - Not energized if the alarm is present	20-21	Closed	DL7	On
			19-20	Open		
RL8	Status = S6 BYPASS OK	Energized if the status is present	23-24	Closed	DL8	On
			22-23	Open		

Relay output characteristics:

120 VAC voltage 1A current
50 VDC voltage 1A current resistive load

The package contains:

- interface card SRC
- 4 plastic nuts for the installation
- installation and user manual

5.2.6 Serial interface RS-485 (Mod-Bus protocol)

It consists of an additional card which must be installed in a specific space provided on the UPS front. This card contains a “+”, “-“ and “ground” three-pole connector, as well as a serial port RS485 which must be used for the connection to the MODBUS-master. The operating parameters of the UPS converted into MODBUS protocol are also available on this card.

5.2.7 SNMP adapter

On the Evo line, the SNMP adapter can be directly installed on the UPS front. In fact the standard UPS is already provided with a supply cable as well as with a flat cable to exchange data with the microprocessor card.

The SNMP adapter converts the communication protocol of the UPS into SNMP protocol (Simple Network Management Protocol), which belongs to the suite of Internet protocols, so that all the main information regarding the operation and the conditions of the UPS is available in the network.

It is also possible to configure the SNMP adapter as an RCCMD (Remote Console CoMmanD) Server to start a shutdown of one or more PCs when the UPS has a problem.

To enable this function it is necessary to install the RCCMD software onto each PC required to start the “shutdown”; (the SNMP adapter has, as standard, only one shutdown license. Additional licenses must be purchased separately).

5.2.8 Remote panel

The remote panel is used to display 4 independent visual alarms. Each event activates the flashing of the last LED “General Alarm” and an acoustic signal that can be silenced by the user. The regular operating conditions of the UPS are indicated by the lighting of LED “UPS OK”.

5.2.9 Parallel kit

The parallel kit allows to prearrange a UPS configured as a single unit for its connection and configuration in a parallel redundant system. Thanks to the DSP microprocessor and to the CAN-BUS communication system, configuring the UPS from single to parallel operation is very easy, basically plug-and-play. Moreover, the UPS units composing the parallel system can also be located in different rooms, with a maximum length of the parallel cable of 50 m.

There are two types of parallel which can configured by software: parallel redundant and power parallel.

In both cases the system can consist of “n” UPS units (up to 6). Only the manual bypass can be external and the same for all the units.

The parallel redundant system ensures an uninterrupted power supply even in case of various failures in the system.

This is possible because all the units are constantly running, and each of them supplies the load in parallel to the “total load / n”, where “n” is the number of units.

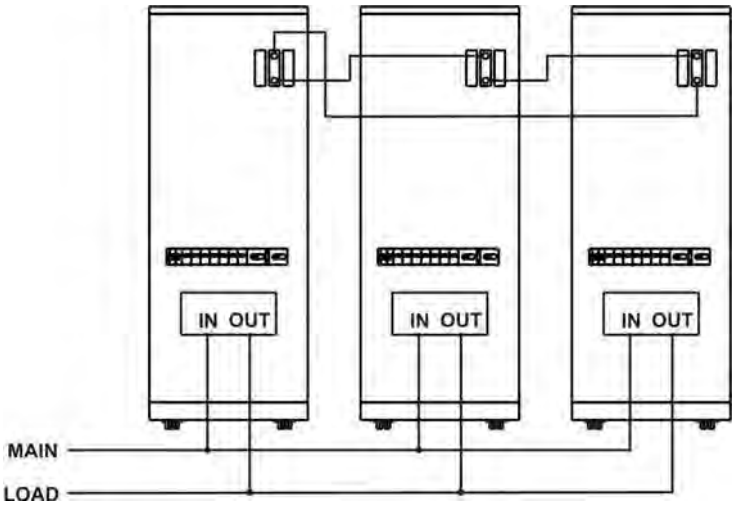
The automatic sharing control of AC current equalizes the currents of “n” units and reduces the offset to less than 10% under any load condition. The load is supplied by the inverters in parallel also in the event of an instantaneous overload ≤ “n x 150%” of the nominal load of the single unit. In case of a failure in one unit, the other units supply

the load. The load is supplied by the mains only if there is an additional failure in the other units.

Also for the power parallel system, the automatic sharing control of AC current equalizes the currents of “n” units and reduces the offset to less than 10% under any load condition.

The load is supplied by the inverters in parallel also in the event of an instantaneous overload ≤ “n x 150%” of the nominal load of the single unit.

In the event that a failure occurs to one of the units, the load is switched to the Emergency Line (Bypass), like in the case of a UPS in single configuration.



Picture 31 – Example of UPS units connected in parallel

5.2.10 Connection kit for external battery cabinet

The connection kit is always furnished together with the external battery cabinet (see paragraph 4.7) and consists of additional terminals and cables which allow the connection of the UPS to the additional cabinet.

It can be purchased separately in case the external battery is not directly supplied by BORRI.

5.2.11 Wall mounted isolator with battery fuses

The isolator with battery fuses is used to separate the UPS from the external battery. The isolator is required in plants where the battery is installed in a dedicated room, therefore it is necessary to use an isolation device between the UPS and the battery.

It is installed in a separate box and equipped with an auxiliary contact to indicate the position of the isolator (open-closed) and the fuse status.

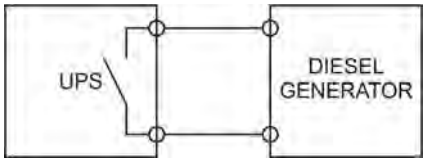
5.2.12 Special painting

All the RAL colours can be requested with an additional cost.

5.2.13 Diesel generator

The DIESEL GENERATOR Kit allows to preset a UPS for the Diesel Mode function. The diesel generator interface provides to limit the rectifier output voltage in order not to recharge the batteries during the Gen Set operation. In this way the rectifier needs a lower current to feed the DC loads (inverter) and a considerable amount of energy is saved, therefore the rating of the generator power can be lower.

A contact indicating the Gen Set operation must be connected to two terminals XD1 XD2 already provided on the UPS terminal board.



Picture 32 – Block diagram of Diesel Generator interface

5.2.14 External manual bypass

The EXTERNAL MANUAL BYPASS Kit allows to prearrange an auxiliary contact in the terminal board (terminals MBY1-MBY2) to be connected to the External Manual Bypass Switch.

A normally open contact has to be connected to the UPS terminals (MBY1-MBY2); when the contact is closed (see Manual Bypass procedure), the microprocessor will acquire the status of the contact and shut down the inverter.

5.2.15 Remote emergency power off (EPO)

The REMOTE EPO Kit allows to prearrange an auxiliary contact in the terminal board (terminals EAC1-EAC2) to be connected to the External EPO button.

The voltage supply to the loads can be interrupted from a remote location by using this contact (e.g. for safety requirements). A normally closed contact must be connected to the UPS terminals (EAC1-EAC2); when this contact is open the static inverter and by-pass switches are opened so that the output supply is interrupted.

5.2.16 BACK FEED (protection from power return to mains)

This option is standard on 10-20kVA units, while it is optional on 30...60kVA units. The back feed protection prevents the risks deriving from power return to mains and from the faults caused by the failure of the SCR’s of the static bypass switch.