USER'S MANUAL

JP9950-GX 60-400KVA

INDEX

ATTENTION

This manual contains instructions concerning the installation and putting into operation of the UPS. Read the manual carefully before carrying out installation, which must be done by a trained person.
Because this manual contains essential information on the usage of the equipment, it must be kept in a safe place and consulted before operating on the UPS.

SAFETY REGULATIONS

The ups must not be used unless it is connected to earth

The first connection to make is the connection between the grounding lead and the terminal indicated with the symbol: 

All maintenance operations inside the ups must be carried out only by trained personnel.

High voltages are present inside the equipment even when the input and battery switches are open

If it is necessary to replace the fuses, they must be replaced with other fuses of the same type (consult paragraph “set output wire connection”).

To interrupt the power supply to the utilities in dangerous conditions, open all the switches located behind the front door, or switch on the" system off " command on the ups from the control panel.

THE BATTERY SHOULD BE CHANGED IF NECESSARY ONLY BY QUALIFIED PERSONNEL. TO ELIMINATE REPLACED PARTS IT IS OBLIGATORY TO DELIVER THEM TO ONE OF THE SPECIAL CONSORTIUMS FOR DISPOSAL BY RECYCLING. THE BATTERIES ARE CLASSIFIED TOXIC WASTE BY LAW.

The Company reserves the right to make changes to the product described in this manual at any time and without notice for reasons of improvement.

EMC REQUIREMENTS

Uninterruptible Power Supply (UPS) "UPS" models, marked CE and used following the instructions listed below, have the essential requirements to comply whit the EMC directive 89/336 e 92/31 a 93/68 ECC.

Usage instructions

The "UPS" are UPS dedicated to a professional usage in an industrial and commercial environment.

The connection to "REMOTE" and "RS232" connectors must be done by means of a shielded cable.

WARNING: The " UPS " standard is a Class A-UPS Product.

In a domestic environment, this product may cause radio interference, in which case, the user may be required to take additional measures.

STORAGE

For instance: in case of disturbances received by a radio or a television set, the UPS shall be moved in order to increase the distance from above mentioned devices.

The area used to store the equipment must have the following characteristics:

Temperature:	0°-40°C (32°-104°C)
Relative humidity:	95% max

Only for UPS with internal BATTERIES.
The batteries contained in the UPS are subject to self-discharging.
If the UPS is not immediately installed is necessary to take note of the batteries date recharge printed on the label fixed to the packing case(the date is present only if the UPS contains to its inside batteries), and provide to it recharges within such date.
To recharge batteries just power up the UPS and leave it on NORMAL OPERATION for at least 24 hours.

INSTALLATION ENVIRONMENT

When choosing a suitable installation room, take note of the following:

- avoid dusty areas, or other kinds of dust in air.
- check that the floor is strong enough to support the weight of the UPS and the battery cabinet (see paragraph "DIMENSIONS AND WEIGHTS")
- avoid rooms that are too narrow as this could make normal maintenance operations difficult
- check the ambient temperature when the UPS is running. It should be between 0 and 40°C.
  - The UPS is able to function in 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. In fact, the average operating life of the batteries is 4 years at an operating temperature of 20°C, but if the operating temperature is increased to 30°C the life is

halved.
do not position the machine in areas exposed to direct sun light or hot air.

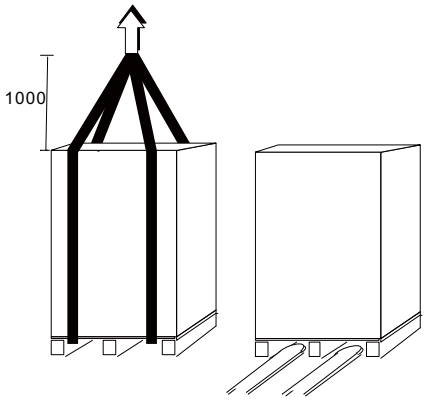
In order to keep the temperature of the installation room within the field of values mentioned above, it will be necessary to install a system for eliminating dissipated heat (the value of the kcal/kW/B.T.U. dissipated by the UPS is indicated in the paragraph "SPECIFICATIONS").
The following methods can be used:

natural ventilation;
forced ventilation, recommended if the exterior temperature is lower (e.g. 20°C) than the temperature at which you wish to run the UPS (e.g. 25°C);
air conditioning system, recommended if the exterior temperature is higher (e.g.s.30°C) than the temperature set for running the UPS (e.g.s.25°C).

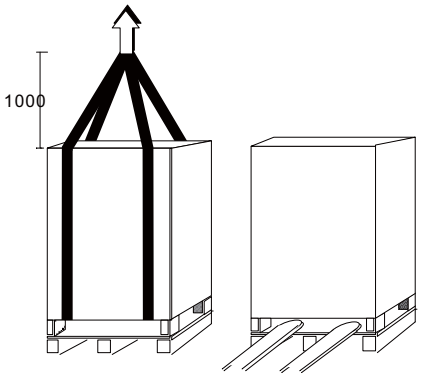
PRELIMINARY OPERATIONS

CHECK THE PACKING CASE

When you receive the UPS check that the packing case has not been damaged during transportation.
Check that neither of the two anti-shock devices fixed to the packing case has become red. If this has happened follow the instructions given
on the packing case.



MOVIMENTAZIONE CON IMBALLO / HANDLING WITH PACKING



RIMOZIONE DEL PALLET / TO REMOVE THE PALLET

Be careful when removing the packing materials so as not to scratch the UPS cabinet.
The equipment must be handled with care as it could be damaged if it is dropped or banged.

The UPS is delivered with:

guarantee
user instruction manual
battery fuses (if battery are present).

POSITIONING

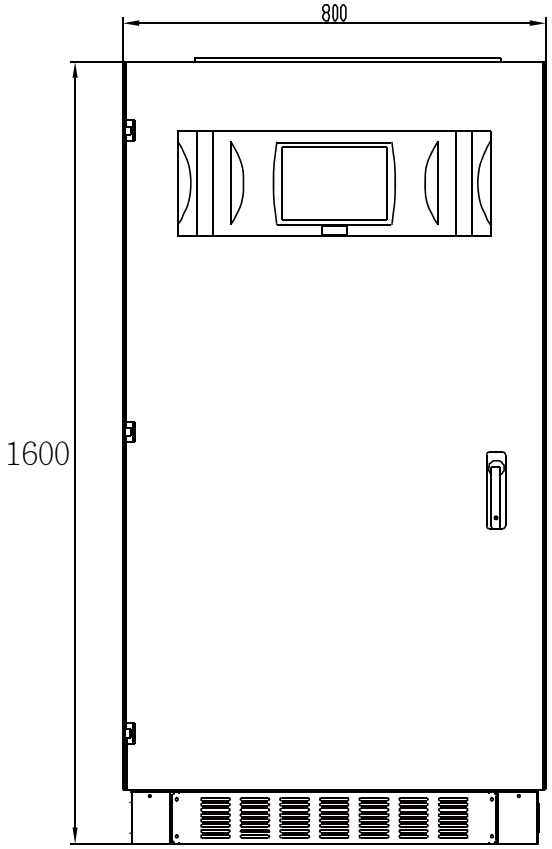
You should bear in mind the following points when positioning the UPS:

a space of at least one metre must be kept in front of the machine to leave plenty of room for maintenance operations.
a space of at least 20 cm. must be left between the back of the UPS and the wall so as not to block the flow of air from the fans, and at least 40 cm. for maintenance operations on the fans.
no objects must be placed on the top of the machine.

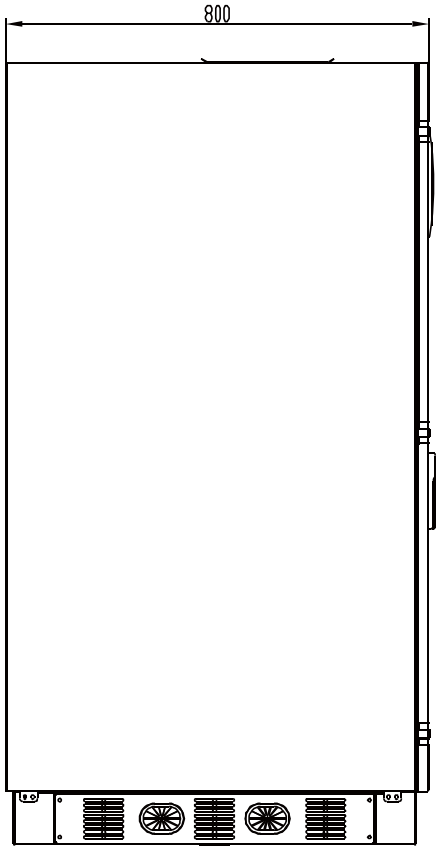
The AC-DC INPUT/OUTPUT cables may enter from the bottom or from the back of the UPS.

UPS 6 0~80KVA ：

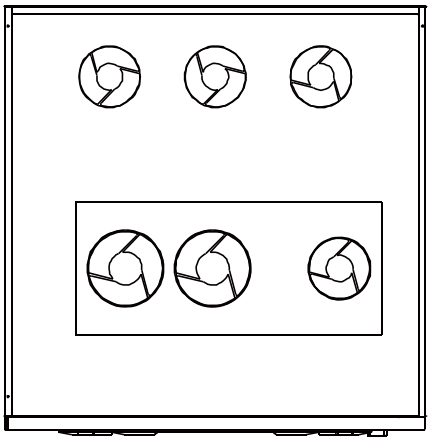
Dimension :W*D*H=800*800*1600(mm)



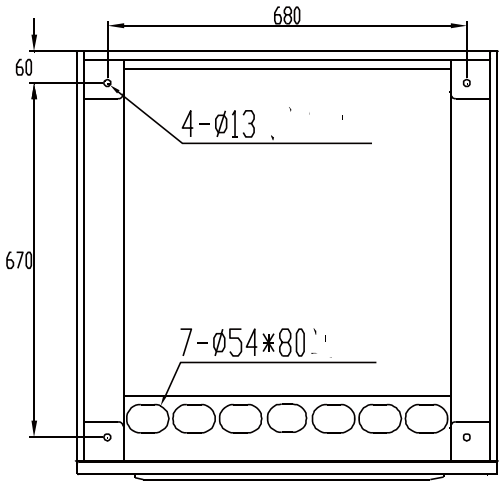
Front view



Side view



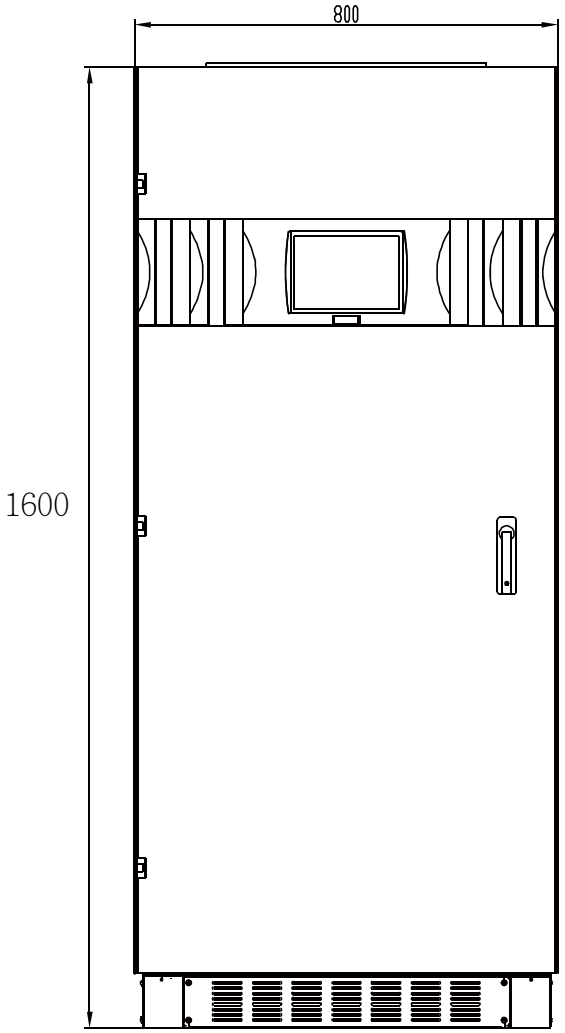
Top view



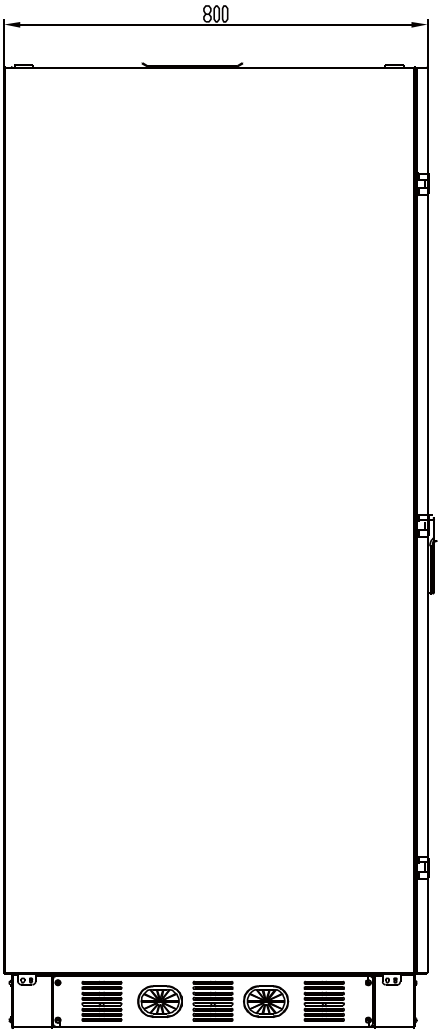
Installation of bottom view

UPS 100~120KVA ：

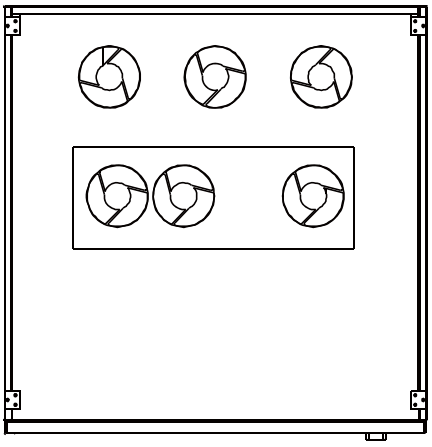
Dimension :W*D*H=800*800*1600(mm)



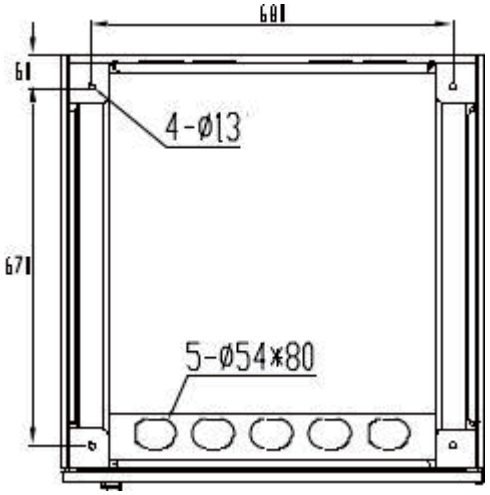
Front view



Side view



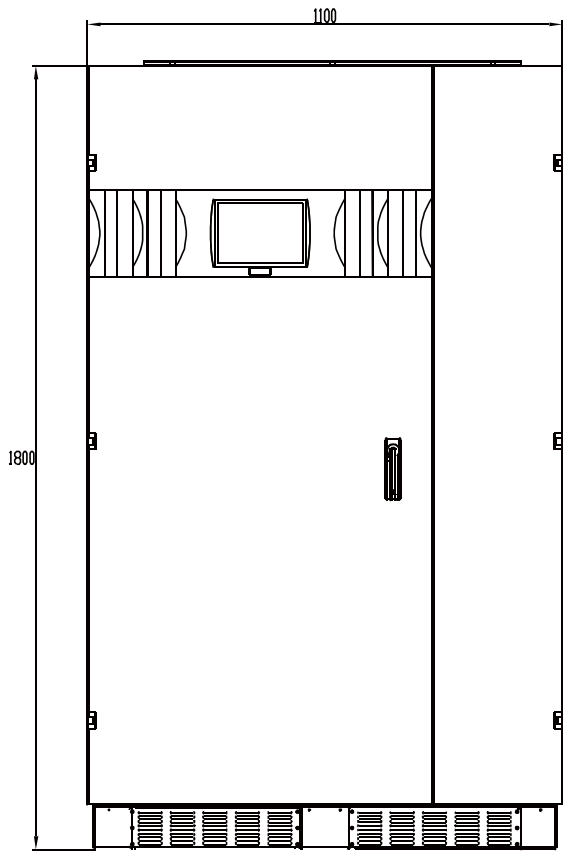
Top view



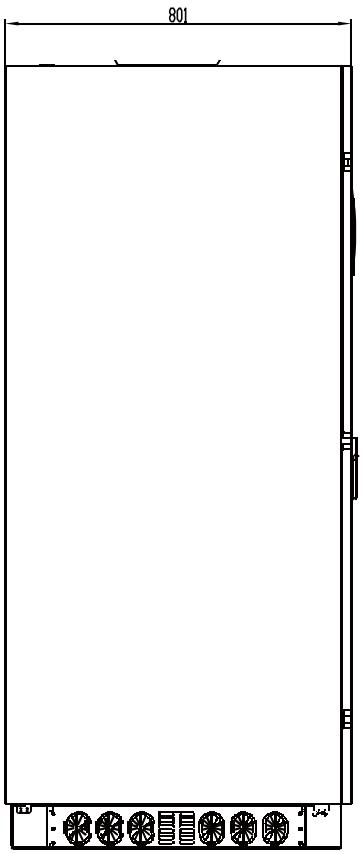
Installation of bottom view

UPS 160~200KVA：

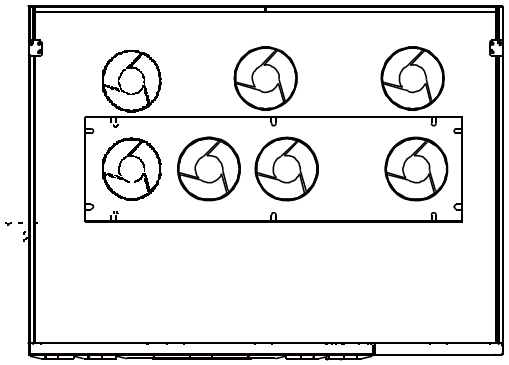
Dimension :W*D*H=1100*800*1800(mm)



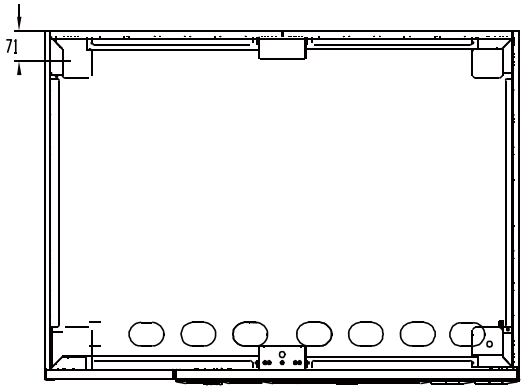
Front view



Side view



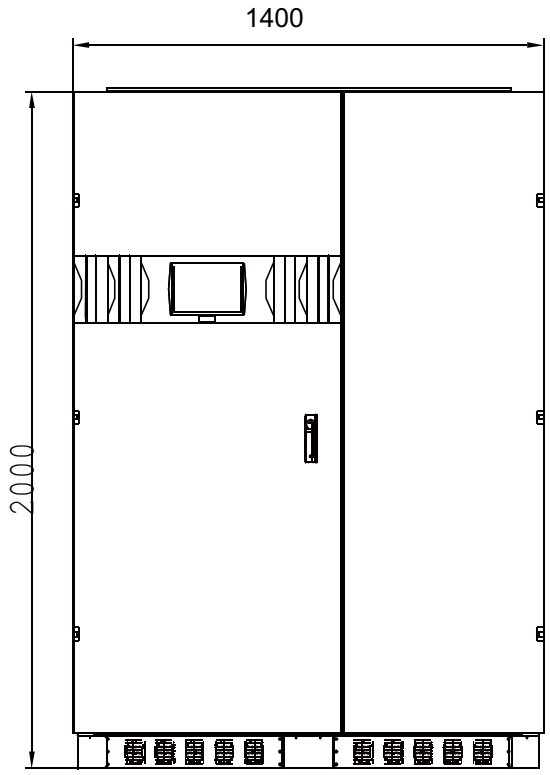
Top view



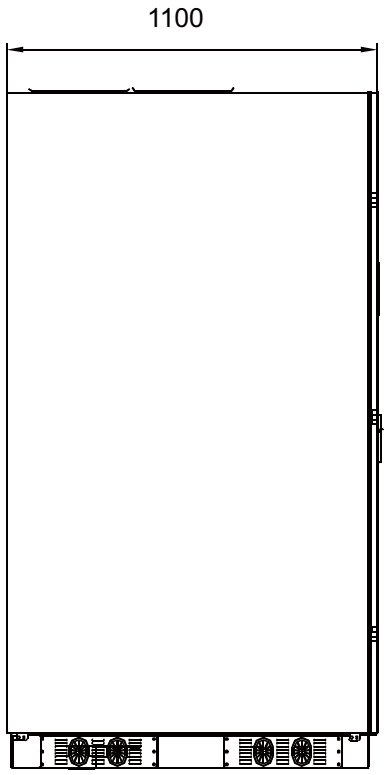
Installation of bottom view

UPS 250~300KVA：

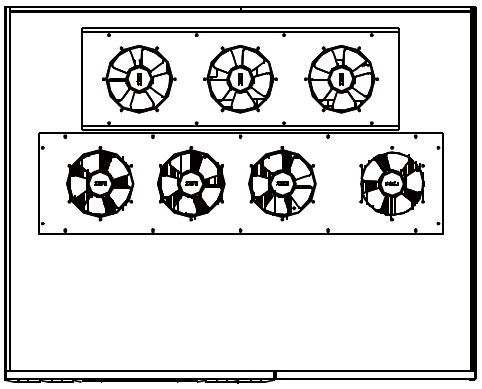
Dimension :W*D*H=1400*1100*2000(mm)



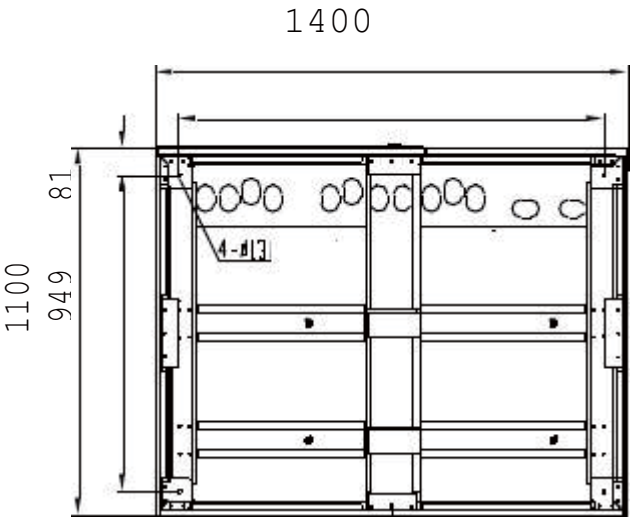
Front view



Side view



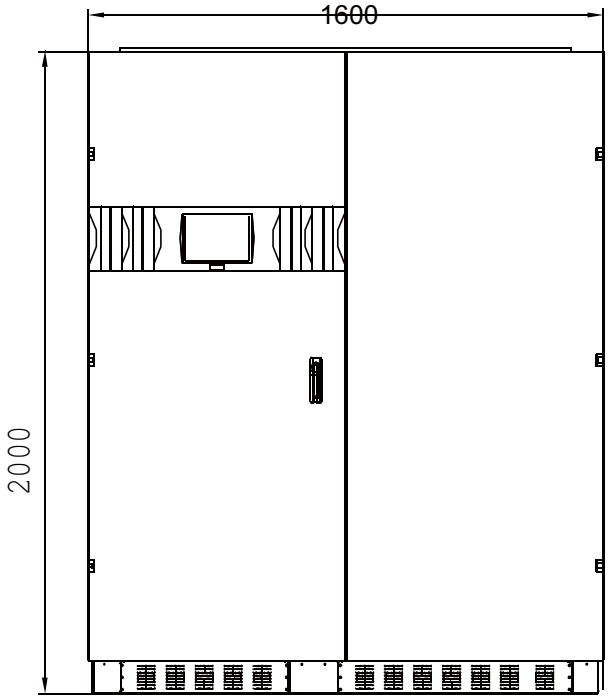
Top view



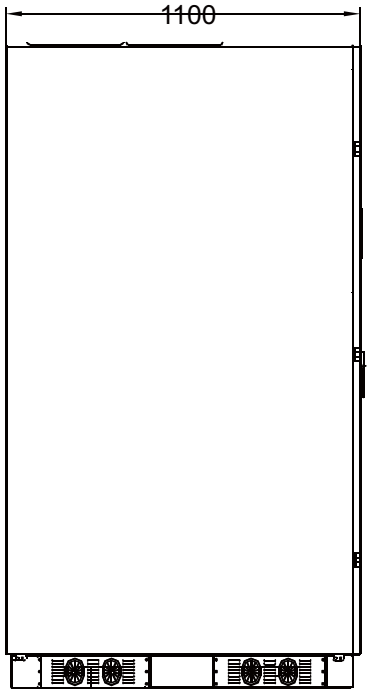
Upward view

UPS 350~400KVA：

Dimension :W*D*H=1600*1100*2000(mm)

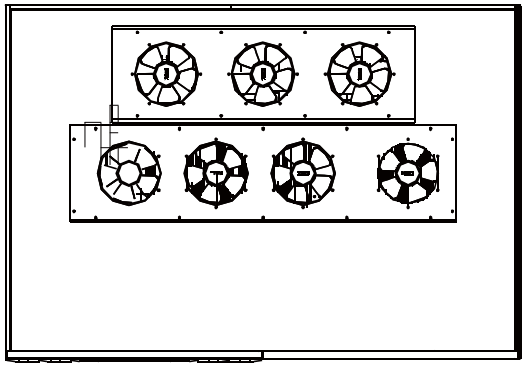


Front view

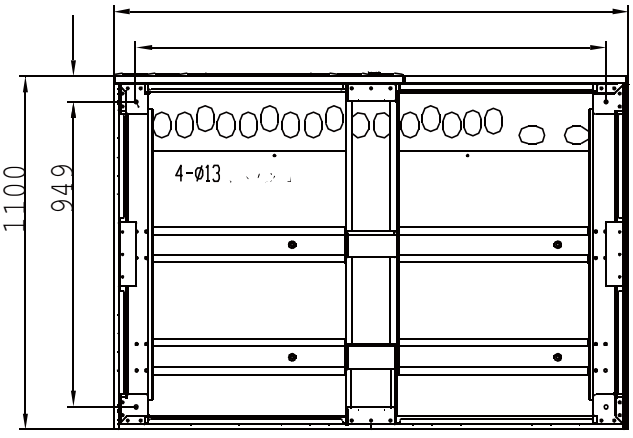


Side view

1600



Top view



SETTING UP THE INPUT/OUTPUT WIRE CONNECTION

PROTECTIONS

Inside the UPS

The size of the switches and fuses installed on the UPS input/output lines are given below (consult the block diagrams paragraph for the initial). A fuse must always be replaced by a fuse of the same capacity and with the same characteristics as those mentioned in the table.

UPS: 60-200KVA

	Internal protection						
UPS Type	Breakers		Breakers	Battery fuses	STS fuses	Max current.	Output current
[kVA]	Input rectifier	Bypass input	SWOUT/ SWMB	Battery		[A]	[A]
	SWIN	SWBY	SWOUT/SWMB	FUSE-BAT	FUSE-SCR		Nominal
60	100A(3P) type C	100A(3P) type C	100A(3P) type C	160A	32A (gG) 10x38	108	72
80	125A(3P) type C	125A(3P) type C	125A(3P) type C	200A	32A (gG) 10x38	144	96
100	200A(3P) type C	200A(3P) type C	200A(3P) type C	280A	200A	180	120
120	225A(3P) type C	225A(3P) type C	225A(3P) type C	320A	250A	216	144
160	250A(3P) type C	250A(3P) type C	250A(3P) type C	400A	300A	288	192
200	350A(3P) type C	350A(3P) type C	350A(3P) type C	500A	400A 400A	360 360A	240 240A

UPS:250-400KVA

	Internal protection						
UPS Type	Breakers		Breakers	Breakers	STS fuses	Max current	Output current
[kVA]	Input rectifier	Bypass input	SWOUT/SWMB	Battery		[A]	[A]
	SWIN	SWBY	SWOUT.SWMB	SWBAT	FUSE-SCR		Nominal
250	400A(3P)	400A(3P)	400A(3P)	630A(2P)	400A	400	300
300	630A(3P)	630A(3P)	630A(3P)	6300A(2P)	630A	480	360
350	630A(3P)	630A(3P)	630A(3P)	630A(2P)	630A	560	420
400	630A(3P)	630A(3P)	630A(3P)	**800A(2P)**	**630A**	640 640	480 480

UPS Input.

When selecting the protections to install at the input of the continuity group, you must take into consideration the maximum current absorbed in the two operating conditions:

In "NORMAL OPERATION", from the main line via the rectifier, the “max input current” is the one indicated in the table. The automatic breaker is present at the rectifier input, as shown in the table, "SWIN".
In "BY-PASS OPERATION", straight from the by-pass line, the max. value of the current is restricted by intervention of the “automatic breaker SWBY”.

UPS output, Short circuits and selectivity

Nominal current, Input/output from the UPS is the one indicated in the table "output current".

Short circuit

When a fault occurs on the load, i.e. a short circuit, the UPS protects itself by restricting the value and the duration of the supplied current (short circuit current). These values also depend on the operating status of the unit at the time of the fault. We must distinguish between two situations:

UPS in NORMAL OPERATION
the load is immediately switched onto the by-pass line, guaranteeing, before the fuses intervene, the circuit current values indicated in “SPECIFICATION BY_PASS LINE” paragraph.
UPS in BATTERY OPERATION
The UPS protects itself by supplying an output current approximately double the nominal current for 0,1s.

Output breakers Selectivity

In NORMAL OPERATION: selectivity is carried out with a type Gg fuse to protect
if you want to guarantee selectivity when operating by battery ,output fuse must be installed.

Three phase output UPS：60-80KVA

[KVA]	60	80
Max current fuse Gg in ups output [A]		
1)For selectivity in “BATTERY OPERATION”	80	100
2)For selectivity in “NORMAL OPERATION”	100	125

Three phase output UPS：100-200KVA

[KVA]	100	120	160	200
Max current fuse Gg in ups output [A]				
1)For selectivity in “BATTERY OPERATION”	125	160	200	250
2)For selectivity in “NORMAL OPERATION”	160	200	250	300

Three phase output UPS：250-400KVA

[KVA]	250	300	350	400
Max current fuse Gg in ups output [A]				
1)For selectivity in “BATTERY OPERATION”	300	350	400	450
2)For selectivity in “NORMAL OPERATION”	350	400	450	500

Leakage current circuit breaker

In the standard version, where there is no separation transformer on the by-pass line, the neutral output from the mains is connected to the output from the UPS.

When input neutral connected to output neutral, the electrical systems located upstream and downstream of the ups are identical

When operating in the presence of mains voltage, a differential breaker installed at the input intervenes because the output circuit is not isolated from the input circuit.
When operating without mains voltage (battery feeding) the input differential breaker intervenes only if it is able to switch on as a result of leakage current without voltage at its poles (for example a differential with an auxiliary relay is not suitable).

The differential switch located upstream must have the following characteristics:

a minimum differential current of 300mA (to avoid inappropriate interventions)
class A or class B
delay greater or equal to 0,1s

WIRE CONNECTION

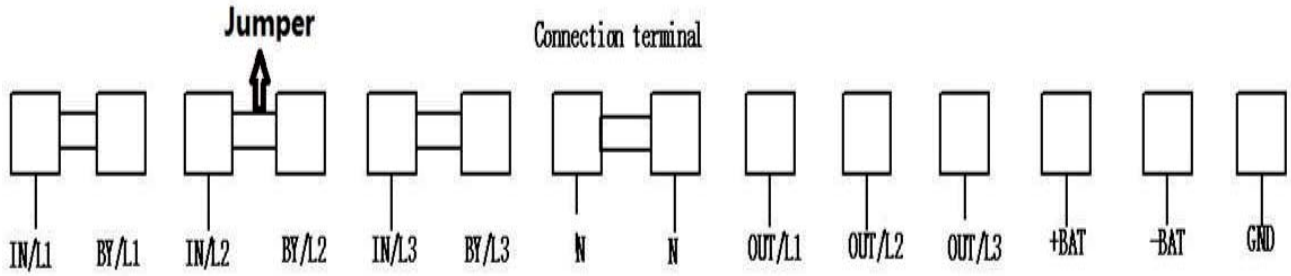
The following operations are to be performed with the UPS disconnected from the mains and all the equipment switches open.

CAUTION! THE FIRST CONNECTION TO MAKE IS THE GROUNDING LEAD TO THE TERMINAL MARKED 'PE'.
THE UPS CANNOT OPERATE WITHOUT CONNECTION TO THE GROUNDING SYSTEM.

UPS connection

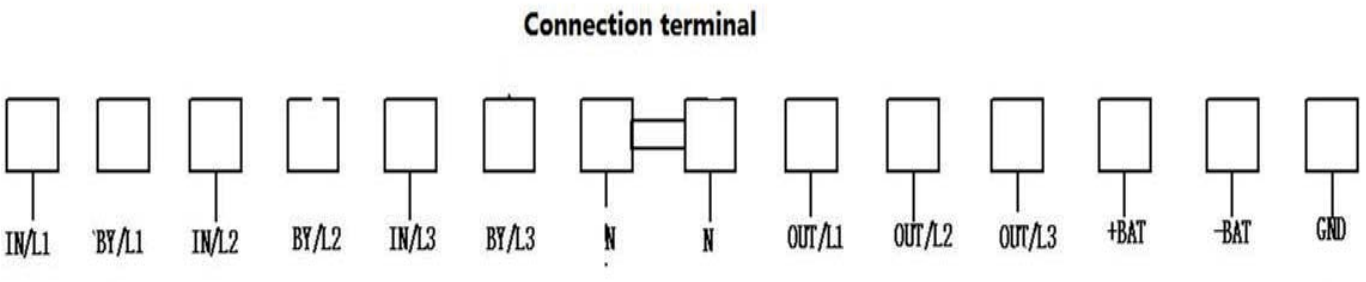
Single power input

When rectifier input and bypass input share one mains input,the following picture,the jumper should be installed before leaving factory,mains input connects IN/L1 ,IN/L2,IN/L3 ,N,loads connect OUT/L1,OUT/L2,OUT/L3,N.



Dual power input

When rectifier input uses one mains input,bypass input uses another mains input,the jumper should be removed between IN/L1 and BY/L1,IN/L2 and BY/L2,IN/L3 and BY/L3,one mains input connects IN/L1 ,IN/L2,IN/L3 ,N,another mains input connect BY/L1,BY/L2,BY/L3,N.Loads connect OUT/L1,OUT/L2,OUT/L3,N.



Use the appropriate wire diameter properly to install correctly. (between brackets max. wire size):

	Wire diameter [mmq]			
	input	output		battery
kVA	L1/L2/L3/N	PE	L1/L2/L3/N	+/-
60	35	16	35	50
80	35	16	35	50
100	50	25	50	70
120	50	25	50	70
160	70	25	70	95
200	70	25	70	95
250	95	25	95	120
300	120	25	120	150
350	150	25	150	185
400	185	25	185	240

Check connections

After connecting the INPUT/OUT and terminal wires to the terminals of the UPS and before repositioning the switch covers panel, check to make sure that:

all the input/output terminals are tightly screwed;
all fuse holders have a fuse inserted and are in the closed position;
the input/output protection wire (yellow/green earth wire) is correctly connected
the internal panel panel is connected to the yellow/green uni-potential cable coming from the earth bar located on the base of the equipment.

START-UP PROCEDURE

After completing the electrical connection as indicated above and putting the internal panel into position, proceed to start up the UPS as follows:

- Input power line
  To activate all switch on the input terminal block
- Battery cabinet
  To activate battery cabinet switches (first check the polarity of the connection),
- UPS
  To activate the following UPS switches:
  SWIN Input switch,
  SWBY By-pass line switch,
  SWOUT Output switch.

NOTE: the SWMB switch must be left open during normal operation. The SWMB is closed only in order to directly feed the mains load excluding the UPS, e.g. for maintenance purposes,After you have carried out the above-mentioned operations, you will hear the hum of the fans immediately, and for about one minute, ups will transfer into inverter.

FUNCTION CHECK

After completing the start-up operations and waiting for at least four hours to allow the batteries to charge, with the UPS in normal operation,open the input switch,input status light on the flow chart of LCD display will become gray.the discharging indicates window of the battery will become green,checking output of ups is normal,in this condition,turn off the mains input,then battery offers power to UPS.After several minutes,close the input switch,ups will be back into normal status,the indicating window of AC input on the display panel will become green.Meanwhile ,the re-charging of the batteries will happen automatically.

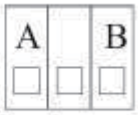
CUSTOMISATION

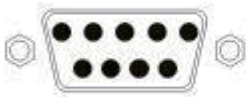
By inserting the access code 436215 on the maintenance menu of display interface, it is possible to alter some of the electric parameters pre-set in the factory
It is possible to customise the following values:

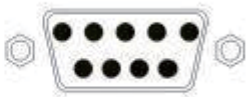
- value of the NOMINAL OUTPUT VOLTAGE,
- voltage field and the frequency of acceptance on the BY-PASS line,
- BATTERY parameters, pre-alarm for final battery discharge,
- power shut-off lower than a set value (AUTO-OFF power),
- daily scheduled shut-off (AUTO-OFF time)

RS232\RS485 COMMUNICATION PORT AND PARALLEL DATA PORT

- In the left of input/output terminal，communication port and parallel data port are as below:







RS232 communication port

UPS connects computer：

UPS		Computer terminal
P1, 9 pole female		P2, 9 pole female(computer)
pin 2 Send	to	pin 2
Pin 3 Receive	to	pin 3
Pin 5 End	to	pin 5

Defaultsetting ： 9600 baud, -no parity, -8bit, -1 bit of stop

RS485 communication port

Baud rate：9600 baud

P1, 9 pole female	
pin 9	A
Pin 8	B

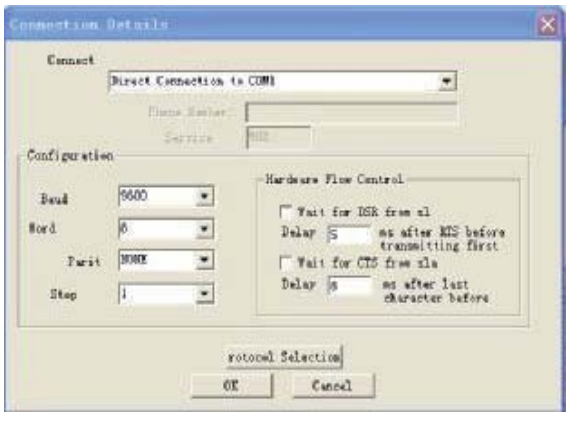
MODBUS communication protocol

This serial inverter offer RS485

port communicate with computer,adopts

Modbus as interface protocol,and

support MODBUS RTU protocol



Register definition:adopt commander 4 To check

Default modbus address:1

Baud rate: 9600

Data bite:8

Stop bite:1

Parity bite:No parity

Modscan setting

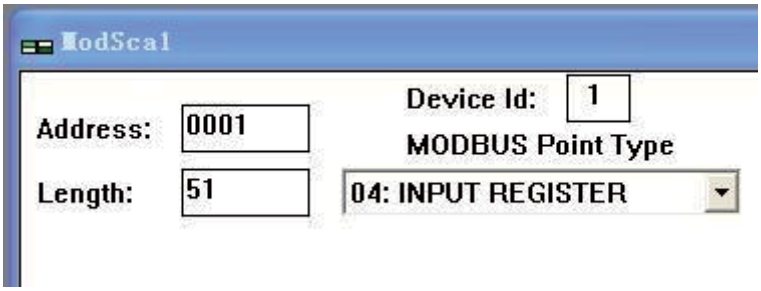
When you open Modbus,please set the following option：

a、display start address is set to 0001

b、display data length is set to 51

c、the Device id of Modbus is set to 1

d、click drop-down menu options 04：INPUT REGISTER



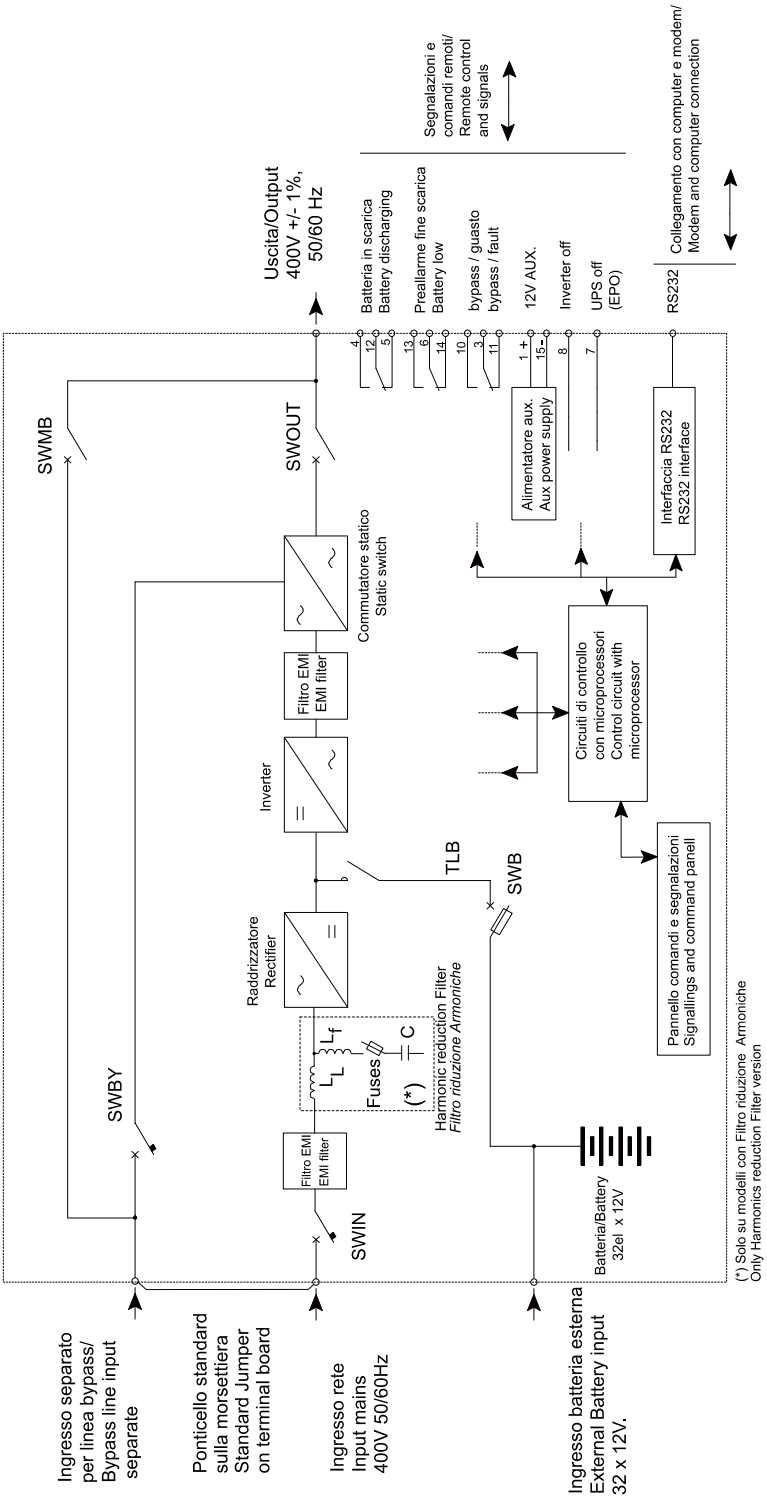
MODBUS address data query table

0	Main power input frequency Fin	Word(2Byte)	HT-L0	0.1Hz
1	Main power input line voltage Vrs	Word	HT-L0	0.1V
2	Main power input line voltage Vst	Word	HT-L0	0.1V
3	Main power input line voltage Vtr	Word	HT-L0	0.1V
4	Main power input phase voltage Vr	Word	HT-L0	0.1V
5	Main power input phase voltage Vs	Word	HT-L0	0.1V
6	Main power input phase voltage Vt	Word	HT-L0	0.1V
7	Rated charging current A	Word	HT-L0	A
8	Main power input phase capacity Sin	Word	HT-L0	0.01kVA
9	AC output frequency Fr	Word	HT-L0	0.1Hz
10	AC output line voltage Vrs	Word	HT-L0	0.1Hz
11	AC output line voltage Vst	Word	HT-L0	0.1Hz
12	Output line voltag Vwu	Word	HT-L0	0.1V
13	AC output phase voltage Vr	Word	HT-L0	0.1V
14	AC output phase voltage Vs	Word	HT-L0	0.1V
15	AC output phase voltage Vt	Word	HT-L0	0.1V
16	AC output phase current Ir	Word	HT-L0	0.1A
17	AC output phase current Is	Word	HT-L0	0.1A
18	AC output phase current It	Word	HT-L0	0.1A
19	Output phase capacity Su	Word	HT-L0	0.1kVA
20	Output phase capacity Sv	Word	HT-L0	0.1kVA
21	Output phase capacity Sw	Word	HT-L0	0.1kVA
22	Total output capacity Stotal	Word	HT-L0	0.1kVA
23	Output capacity percentage PSr	Word	HT-L0	0.1
24	Output capacity percentage PSs	Word	HT-L0	0.1
25	Output capacity percentage PSt	Word	HT-L0	0.1

Address	Define	Type	Format	Unit
26	Bypass frequency FBYP	Word	HT-L0	0.1Hz
27	Bypass input line voltage Vbrs	Word	HT-L0	0.1V
28	Bypass input line voltage Vbst	Word	HT-L0	0.1V
29	Bypass input line voltage Vbtr	Word	HT-L0	0.1V
30	Bypass input phase voltage Vbr	Word	HT-L0	0.1V
31	Bypass input phase voltage Vbs	Word	HT-L0	0.1V
32	Bypass input phase voltage Vbt	Word	HT-L0	0.1V
33	DC chain voltage Vdc	Word	HT-L0	0.1V
34	Battery voltage Vbat	Word	HT-L0	0.1V
35	Remaining percentage of battery power	Word	HT-L0	0.1
36	Battery charging current Ic	Word	HT-L0	0.1A
37	Empty			
38	Rectifier temperature	Word	HT-L0	0.1℃
39	Internal temperature of ups	Word	HT-L0	0.1℃
40	Empty			
41	Inverter temperature	Word	HT-L0	0.1℃
42	Percentage of input voltage A phase	Word	HT-L1	0.1
43	Percentage of input voltage B phase	Word	HT-L2	0.1
44	Percentage of input voltage C phase	Word	HT-L3	0.1
45	Percentage of input current A phase	Word	HT-L4	0.1
46	Percentage of input current B phase	Word	HT-L5	0.1
47	Percentage of input current C phase	Word	HT-L6	0.1
48	Input A phase current	Word	HT-L7	0.1
49	Input B phase current	Word	HT-L8	0.1
50	Input C phase current	Word	HT-L9	0.1

MODES OF OPERATION

BLOCK DIAGRAM



BLOCK DIAGRAM COMPONENTS

The UPS consists of the following subassemblies:

RECTIFIER

Convert the input AC power to DC, the function is:

- powering the inverter with direct current.
- charging the battery automatically. Battery charging is done in two phases: the first phase supplies 80% of power with limited current (recharging current) and growing voltage. The second supplies the remaining 20% of the charge with steady voltage (holding).

Recharging current is automatically limited to 15% of the capacity in Ah contained in the memory. This recharging current imposed applies only when the total power delivered to the battery and the load does not exceed maximum 110% of Pn.

EXTERNAL BATTERY

Provides the reserve energy for powering the load when there is no power input to the UPS.

HARMONIC REDUCTION FILTER (optional)

The filter is positioned to the entry of the rectifier, allows to reduce the input harmonic distortion of the input current. It is composed by two inductors and by a group of capacitors. The filter is protected in entry with some fusible.

INVERTER

Converts direct voltage from the RECTIFIER or BATTERY into stabilized sinusoidal alternating voltage.It is always in operation and the load connected to the output of the UPS is always powered by the INVERTER.

STATIC SWITCH

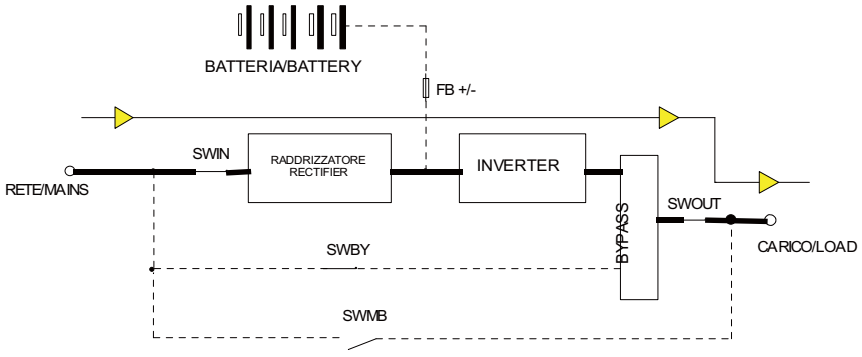
This device allows the instantaneous automatic or manual switching of the power feed from the secured line INVERTER output to an unsecured line BY-PASS line or vice versa.
The STATIC SWITCH is supplied with a device, ***"BACKFEED PROTECTION"*** that prevents the danger of current returns on the reserve line, in the case of Mains power failure due to a break on the SCR.

MAINTENANCE SWITCH (SWMB)

Maintenance switch, by closing the SWMB and opening the other switches SWIN, SWBY, SWOUT the UPS is excluded, maintaining the output feed.
This operation is necessary when you have to carry out maintenance operations inside the equipment, without being obliged to interrupt the power feed.
With the SWMB closed and all the other switches open, there is no voltage inside the equipment (voltages are present only in the terminal board area and in the switches area, N.B. in the threephase output version the neutral conductor is not interrupted!).

NORMAL OPERATION

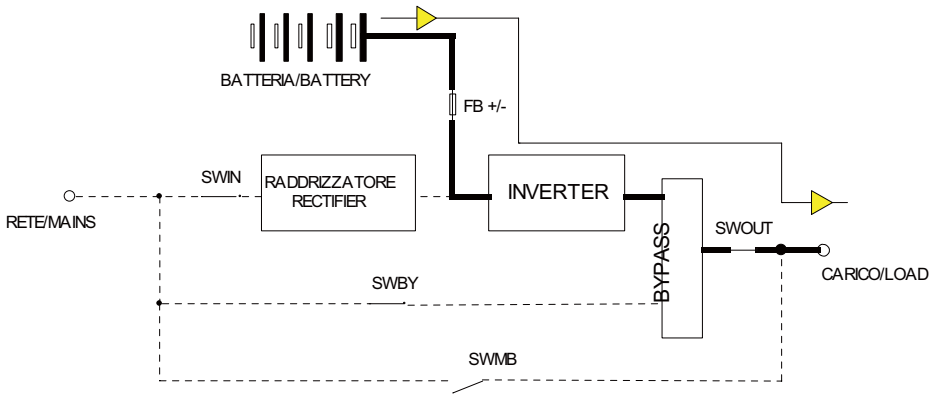
MAINS present, equipment powered. The switches SWIN, SWOUT, SWBY are closed. SWMB is open.



The connected equipment is powered by the inverter which receives the necessary energy from the mains through the rectifier.
The RECTIFIER charges the battery at the same time.
On the control panel the green LEDS MAINS and OUTPUT are lit.
In presence of a mains power failure, the output load remains fed by the UPS that uses the energy stored in the batteries.

BATTERY OPERATION

MAINS off, equipment powered. The switches SWIN, SWOUT, SWBY and SWB are closed.



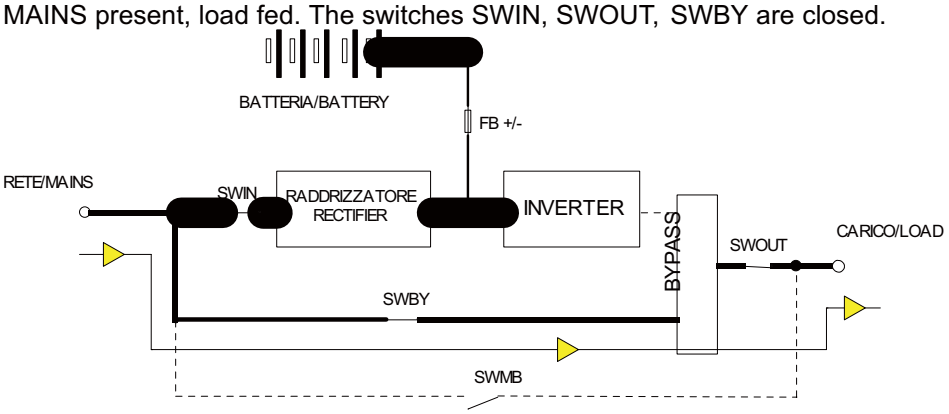
The UPS is in this operating condition when MAINS power is lacking in a blackout or is no longer in an acceptable range (over or under voltage).
In this phase of operation the energy required by the connected equipment is supplied by the battery, previously charged.
On the alphanumerical PANEL on the front of the UPS is displayed the time provided for residual AUTONOMY, calculated on the basis of the power delivered and the charge status of the batteries.
NOTE：The value displayed is approximate since the power required can change during discharge.
The green LEDs for OUTPUT (steady light) are lit on the panel and the yellow LED for the battery (STEADY LIGHT) at the moment of mains failure sounds the buzzer intermittently.
When the remaining time drops below the preset value as LOW BATTERY alarm, the buzzer increases in frequency while the yellow BATTERY LED goes to flashing. Under this condition it is wise to save any work under way.
When the mains failure continues and the battery exhausts its energy, the UPS cuts off power to the loads.

Upon return of mains power, the UPS recharges the batteries automatically.

OPERATION MODE OF BYPASS

Temporary State of operation, or permanent operation state caused by a breakdown; in this last case contact the assistance center.
The load isn't secured in case of mains failure.

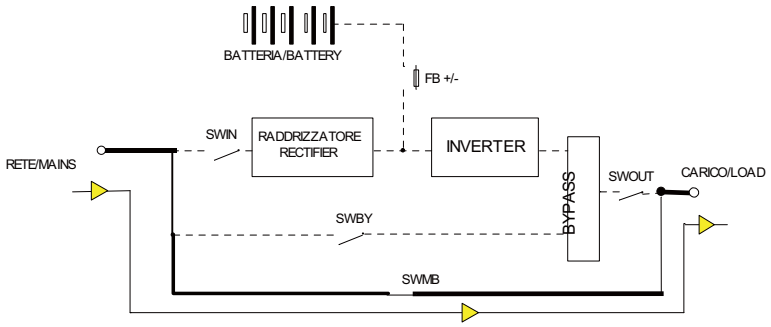
MAINS present, load fed. The switches SWIN, SWOUT, SWBY are closed.



The UPS can find itself in this condition due to one of the following events:
- BYPASS command (manual or automatic)
- excessive load in output (overload, see the paragraph “ALARM MESSAGES”)
- fault

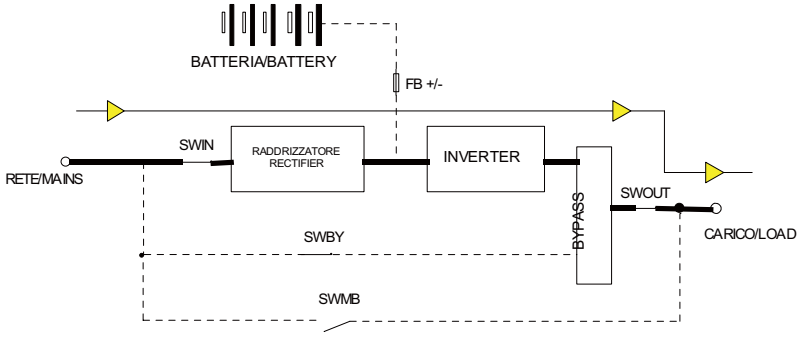
On the control panel, the green INVERTER output LED is off, the yellow BY-PASS LED will be turned on steady(if a command is present but will flash on and off in the presence of an overload or fault).
In case of a load greater than the nominal (overload) you will have to intervene to reduce it, otherwise the automatic breakers on the by-pass line will intervene, turning off the output (for times of intervention consult the “SPECIFICATIONS” paragraph).

BYPASS FOR MAINTENANCE SWMB

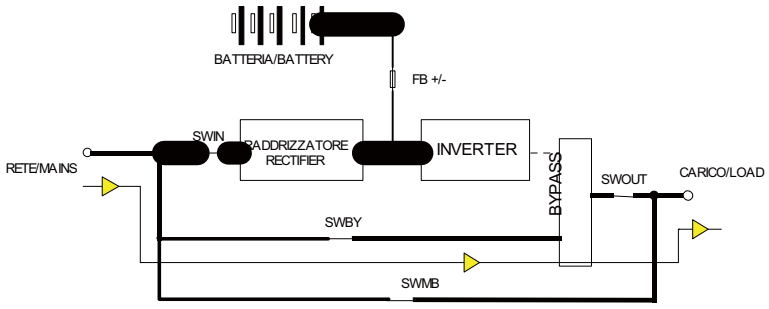


Series of operations to be carried out to place the UPS in maintenance by-pass to carry out maintenance operations on equipment while maintaining the fed load:

Status I
NORMAL OPERATION



Status II
SWMB switch closed (the control logic automatically disables the inverter)



Status III
All machine switches open.Only the SWMB switch is kept closed (by-pass maintenance line).The signal panel remains off. With the load powered through the maintenance line (during maintenance) any disturbance such as a blackout on the power line of the UPS would have repercussions on the powered equipment (under this condition the operation batteries are dis-activated

When the maintenance operations are concluded restart the UPS: close SWIN, SWBY, SWOUT and then open SWMB. The UPS will return to NORMAL OPERATION.

MAINTENANCE

[CAUTION!] Maintenance inside the UPS should only be done by qualified personnel. Inside the equipment there are voltages even with the input and battery switches open. Removal of the side panels of the UPS by unqualified personnel can cause harm to the operator and damage the equipment.

Preventive Maintenance

The only components of the UPS which require periodic checking are the blowers and batteries.

- Blowers should be checked for correct operation periodically.

- Batteries. [CAUTION!] Any battery replacement should be done by qualified personnel.For disposal of the replaced parts it is obligatory to deliver them to one of the special consortiums for disposal by recycling.Batteries are classified 'toxic waste' by law. The system automatically checks battery efficiency every 24 hours and gives an alarm when it finds efficiency very much lower than that calculated on the basis of memorized capacity (see key menu 3.2 “BATTERY TEST”). Battery life depends on operating temperature and the number of charging and discharging cycles performed. Battery life when used at 20°C is approximately 3 to 5 years while duration is halved if operating temperature goes to 30°C.Capacity is not constant but increases after a few charging and discharging cycles, then remains constant for several hundred cycles and finally decreases.

Battery maintenance should include:

- Holding operating temperature in the range 20-25 °C.
- During the first month of use carry out two or three charge/discharge cycles.
- After the first month of use perform this operation every six months.

SPECIFICATIONS

UPS60-80KVA

Type	JP9950 60KVA	JP9950 80KVA
Capacity	60KVA/54KW	80KVA72KW
Parameters		
Relationship between output power factor cos φ and load		
Power factor	0.9	
Overall efficiency full load (normal mode)	92%	
Half load	90%	
Overall efficiency (ECO mode) Full load	98%	
Leakage current (mA) max	100	
Standby ECO mode	Standard function	
MTBF：	200,000 hours	
Monitoring port	RS232，RS485 / MODBUS	
Running temperature	0 ~ 40 °C	
Relative humidity max.	95 % (non condensate)	
Cooling	forced ventilation (fan speed function of the load)	
Maximum operating altitude	1000 m at rated power An (-1% An for each 100m over 4000)	
Noise(dB)	52~ 58	
Degree of protection（EN 60529）	IP20	
Cable input	bottom / rear	
Applicable Standards	Safty ：GB4943 ，EN 50091-1；Electromagnetic Compatibility ：GB7260.2，GB/T 17626.2~5 EMC， EN50091-2	
Physical parameter		
Width (mm) W	800	
Deep * height (mm) D*H	800*1600	
Weight Kg	480	560
Rectifier input		
Rated voltage	380/400/415VAC three phase three wire	
Voltage range	± 15 % （± 25 % for optional）	
Rated frequency	50/60 HZ Automatically	
Frequency range	45 ~ 65HZ	
Soft start	0 - 100% 10-300 sec	
Input power factor cos φ：	Max is 0.99（with filtering）	
THD I	Min <5%（with filtering）	
Max input current(A)	108	144

Rectifier output		
Maintenance voltage (20°C)	battery type1 and 2 type1 and 2 ：V = (2.266 * el.) Vdc	
	battery type type 3 ：V = (2.21 * el.) Vdc	
	battery type type 0 :to default the values are equal to type 1 and 2. Adjustable range V =(2.09~2.4) * el. [Vdc]	
Charging voltage (20°C)	battery type type1 and 2 ：V(%recharge<95%)= (2.32 * el.) Vdc	
	battery type type 3 ：V(%recharge<95%)= (2.4 * el.) Vdc	
	battery type type 0 :to default the values are equal to type 1 and 2. Adjustable range V =(2 09~2.4) * el. [Vdc]	
Max charging voltage	(2.32*el.)Vdc.	
Charging regulation accuracy	1%	
Ripple voltage	≤1%	
Battery		
Unit number（rated voltage）	30-34 unit(can be adjusted)	
Charging current micro setting	0.1A x C10	
End of discharge voltag	battery type1,2,3：no load discharging current，Vmin=(1.81 * el.)	
	battery type1,2,3：battery discharge current=Battery capacity，Vmin=(1.65 * el.)	
	battery type1,2,3：discharge current>Battery capacity，Vmin=(1.60 * el.)	
	Battery type 0： default ，Vmin=(1.67 * el.) [Vdc][Vdc] Adjust range Vmin =(1.57~1.88) * el.	
Three phase inverter output		
Capacity [KVA]	60	80
Rated power [KW]	54	72
Rated voltage [V]	380/400/415VAC three phase four wires	
Rated current [A]		
Phase voltage setting	200 ~ 244 V (control panel)	
Crest factor（Ipeak/Irms）	3：1	
Wave	Sine wave	
Voltage phase shift, with balanced load (degree)	± 1'	
Voltage phase shift, with unbalanced load (degree)	± 2'	
Phase voltage dissymmetry with 100% balanced load	± 1 %	
Phase voltage dissymmetry with 100% unbalanced load	± 3 %	
THDv with 100% linear load	<2%	
THDv 100%100% non- linear load	<5%	
Stability voltage at steady state	± 1 %	
Stability voltage at transient	± 5 % within10ms	
Rated frequency	the same of the input	
Frequency stability	Asynchrony ，± 0.5 % ；Synchronization ，± 2 %（settable ± 1 ~5% on the panel）	
Over load	600’ / 10’ / 1’ （110/125/150% rated current ）	
Short circuit current for 0,1s	2 double input	

Inverter efficiency load 100%	96%	
Three phase bypass input		
Rated capacity [KVA]	60	80
Rated voltage [V]	380/400/415VAC three phase four wires	
Input voltage range	±15 %（settable ± 10 % , ± 20% from control panel）	
Rated frequency [Hz]	50 / 60	
Frequency range	±2 %（settable ± 5 % from the panel）	
“Stand-by on”(in economic mode,mains transfer inverter) switch time	2~5ms	
Inverter/bypass transfer switch	<1ms	
Overload	10’/1’/18” （150/175/200% rated current）	
Standard configuration	The bypass can be separated independently	

UPS100-200KVA

Type	JP9950 100KVA/6P	JP9950 120KVA/6P	JP9950 160KVA/6P	JP9950 200KVA/6P
Capacity	100KVA	120KVA	160KVA	200KVA
Parameters				
Relationship between output power factor cos φ and load				
Power factor	0.9			
Overall efficiency full load (normal mode)	94%			
Half load	92%			
Overall efficiency (ECO mode) Full load	98%			
Leakage current (mA) max	100			
Standby ECO mode	Standard function			
MTBF：	200,000 hours			
Monitoring port	RS232，RS485 / MODBUS			
Running temperature	0 ~ 40 °C			
Relative humidity max.	95 % (non condensate)			
Cooling	forced ventilation (fan speed function of the load)			
Maximum operating altitude	1000 m at rated power An (-1% An for each 100m over 4000)			
Noise(dB)	55~ 60			
Degree of protection（EN 60529）	IP20			
Cable input	bottom / rear			
Applicable Standards	Safty ：GB4943 ，EN 50091-1；Electromagnetic Compatibility ：GB7260.2，GB/T 17626.2~5 EMC， EN50091-2			
Physical parameter				
Width (mm) W	800		1100	
Deep * height (mm) D*H	800*1600		800*1800	
Weight Kg	890	1080	1280	1380
Rectifier input				
Rated voltage	380/400/415VAC three phase three wire			
Voltage range	± 15 % （± 25 % for optional）			
Rated frequency	50/60 HZ Automatically			
Frequency range	45 ~ 65HZ			
Soft start	0 - 100% 10-300 sec			
Input power factor cos φ：	Max is 0.99（with filtering）			
THD I	Min <5%（with filtering）			
Max input current(A)	180	216	288	360

Rectifier output				
Maintenance voltage (20°C)	battery type1 and 2 type1 and 2 ：V = (2.266 * el.) Vdc			
	battery type type 3 ：V = (2.21 * el.) Vdc			
	battery type type 0 :to default the values are equal to type 1 and 2. Adjustable range V =(2.09~2.4) * el. [Vdc]			
Charging voltage (20°C)	battery type type1 and 2 ：V(%recharge<95%)= (2.32 * el.) Vdc			
	battery type type 3 ：V(%recharge<95%)= (2.4 * el.) Vdc			
	battery type type 0 :to default the values are equal to type 1 and 2. Adjustable range V =(2.09~2.4) * el. [Vdc]			
Max charging voltage	(2.32 * el.) Vdc			
Charging regulation accuracy	1%			
Ripple voltage	≤1%			
Battery				
Unit number（rated voltage）	30-34 unit(can be adjusted)			
Charging current micro setting	0.1A x C10			
End of discharge voltag	battery type1,2,3：no load discharging current，Vmin=(1.81 * el.)			
	battery type1,2,3：battery discharge current=Battery capacity，Vmin=(1.65 * el.)			
	battery type1,2,3：discharge current>Battery capacity，Vmin=(1.60 * el.) [Vdc]			
	Battery type 0： default ，Vmin=(1.67 * el.) [Vdc] Adjust range Vmin =(1.57~1.88) * el. [Vdc]			
Three phase inverter output				
Capacity [KVA]	100	120	160	200
Rated power [KW]	90	108	144	180
Rated voltage [V]	380/400/415VAC three phase four wires			
Rated current [A]	120	144	192	240
Phase voltage setting	200 ~ 244 V (control panel)			
Crest factor（Ipeak/Irms）	3：1			
Wave	Sine wave			
Voltage phase shift, with balanced load (degree)	± 1'			
Voltage phase shift, with unbalanced load (degree)	± 2'			
Phase voltage dissymmetry with 100% balanced load	± 1 %			
Phase voltage dissymmetry with 100% unbalanced load	± 3 %			
THDv with 100% linear load	<2%			
THDv 100%100% non- linear load	<5%			
Stability voltage at steady state	± 1 %			
Stability voltage at transient	± 5 % within10ms			
Rated frequency	the same of the input			
Frequency stability	Asynchrony，± 0.5 %；Synchronization，± 2 %（settable ± 1 ~5% on the panel）			
Over load	600’ / 10’ / 1’ （110/125/150% rated current ）			
Short circuit current for 0,1s	2 double input			

Inverter efficiency load 100%	96%			
Three phase bypass input				
Rated capacity [KVA]	100	120	160	200
Rated voltage [V]	380/400/415VAC three phase four wires			
Input voltage range	±15 %（settable ± 10 % , ± 20% from control panel）			
Rated frequency [Hz]	50 / 60			
Frequency range	±2 %（settable ± 5 % from the panel）			
“Stand-by on”(in economic mode,mains transfer inverter) switch time	2~5ms			
Inverter/bypass transfer switch	<1ms			
Overload	10’/1’/18” （150/175/200% rated current）			
Standard configuration	The bypass can be separated independently			

UPS 250-400KVA

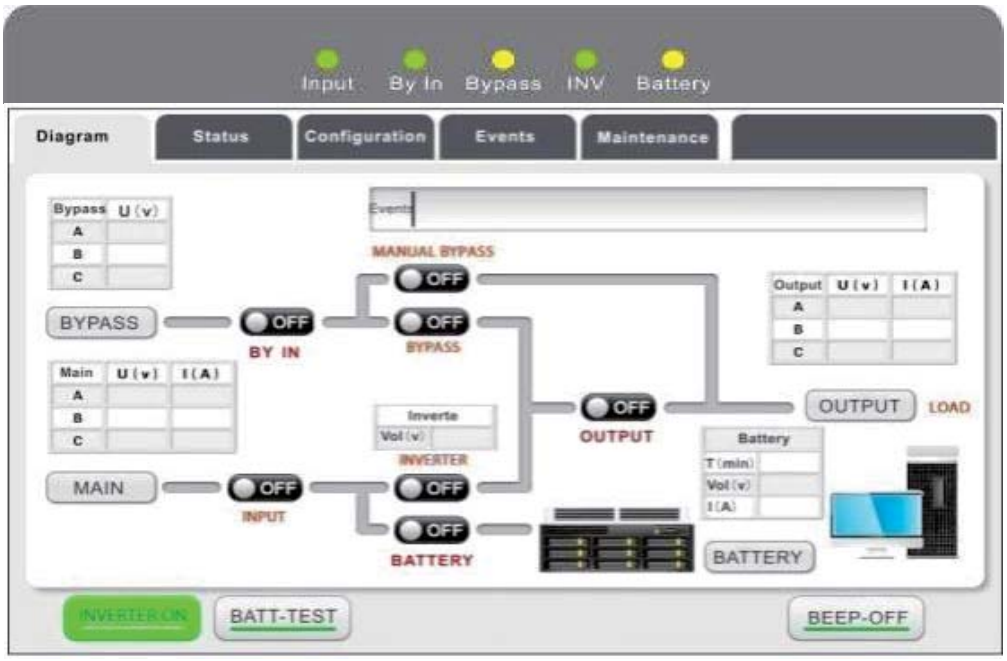
Type	JP9950 250KVA	JP9950 300KVA	JP9950 350KVA	JP9950 400KVA
Capacity	250KVA	300KVA	350KVA	400KVA
	6 pulse (12 Pulse for optional)			
Parameters				
Relationship between output power factor cos φ and load				
Power factor	0.9			
Overall efficiency full load (normal mode)	94%			
Half load	92%			
Overall efficiency (ECO mode) Full load	98%			
Leakage current (mA) max.	100			
Standby ECO mode	Standard function			
MTBF：	200,000 hours			
Dry contact signal	14 dry contact signal for optional ；output 12Vdc 80mA			
Monitoring port	RS232、 RS485 / MODBUS			
Running temperature	0 ~ 40 °C			
Relative humidity max.	95 % (non condensate)			
Cooling	forced ventilation (fan speed function of the load)			
Maximum operating altitude	1000 m at rated power An (-1% An for each 100m over 1000 m)			
Noise(dB)	54 ~ 62			
Degree of protection（EN 60529）	IP20			
Cable input	bottom / rear			
Applicable Standards	Safty ：GB4943 ，EN 50091-1；Electromagnetic Compatibility ：GB7260.2，GB/T 17626.2~5 EMC， EN50091-2			
Physical parameter				
Width (mm) W	1400		1600	
Deep * height (mm) D*H	1110*2000		1100*2000	
Weight Kg	1680	1980	2280	2480
Rectifier input				
Rated voltage	380/400/415VAC three phase three wire			
Voltage range	± 15 % （± 25 % for optional）			
Rated frequency	50/60 HZ Automatically			
Frequency range	45 ~ 65 HZ			
Soft start	0 - 100% 10-300 sec			
Input power factorcos φ：	Max is 0.99（with filtering）			

THD I	Min <5%（with filtering）			
Max input current(A)	400	500	550	630
Rectifier output				
Maintenance voltage (20°C)	battery type1 and 2 ：V = (2.266 * el.) Vdc			
	battery type type 3 ：V = (2.21 * el.) Vdc			
	battery type type 0：to default the values are equal to type 1 and 2. Adjustable range V =(2.09~2.4) * el. [Vdc]			
Charging voltage (20°C)	battery type type1 and 2 ：V(%recharge<95%)= (2.32 * el.) Vdc			
	battery type type 3 ：V(%recharge<95%)= (2.4 * el.) Vdc			
	battery type type 0：to default the values are equal to type 1 and 2. Adjustable range V =(2.09~2.4) * el. [Vdc]			
Max charging voltage	(2.32 * el.) Vdc			
Charging regulation accuracy	1%			
Ripple voltage	≤1%			
Battery				
Unit number（rated voltage）	30-34 unit (can be adjusted)			
Charging current micro setting	0.1A x C10			
End of discharge voltage	battery type1,2,3：no load discharging current，Vmin=(1.81 * el.)			
	battery type1,2,3： discharge current=Battery capacity，Vmin=(1.65 * el.) [Vdc]			
	battery type1,2,3：discharge current>Battery capacity，Vmin=(1.60 * el.) [Vdc]			
	Battery type 0： default ，Vmin=(1.67 * el.) [Vdc] Adjust range Vmin =(1.57~1.88) * el.			
Three phase inverter output				
Capacity [KVA]	250	300	350	400
Rated power [KW]	225	270	315	360
Rated voltage [V]	380/400/415VAC three phase four wires			
Rated current [A]	304	365	426	486
Phase voltage setting	200 ~ 244 V (control panel)			
Crest factor（Ipeak/Irms）	3：1			
Wave	Sine wave			
Voltage phase shift, with balanced load (degree)	± 1'			
Voltage phase shift, with unbalanced load (degree)	± 2'			
Phase voltage dissymmetry with 100% balanced load	± 1 %			
Phase voltage dissymmetry with 100% unbalanced load	± 3 %			
THDv with 100% linear load	<2%			

THDv 100%100% non- linear load	<5%			
Stability voltage at steady state	± 1 %			
Stability voltage at transient	± 5 % within10ms			
Rated frequency	the same of the input			
Frequency stability	Asynchrony，± 0.5 %；Synchronization，± 2 %（settable ± 1 ~5% on the panel）			
Over load	600’ / 10’ / 1’ （110/125/150% rated current ）			
Short circuit current for 0,1s	2 double input			
Inverter efficiency load 100%	98%			
Three phase bypass input				
Rated capacity [KVA]	250	300	350	400
Rated voltage [V]	380/400/415VAC three phase four wires			
Input voltage range	±15 %（settable ± 10 % , ± 20% from control panel）			
Rated frequency [Hz]	50 / 60			
Frequency range	±2 %（settable ± 5 % from the panel）			
“Stand-by on”(in economic mode,mains transfer inverter) switch time	2~5ms			
Inverter/bypass transfer switch	<1ms			
Overload	10’/1’/18” （150/175/200% rated current）			
Standard configuration	The bypass can be separated independently			

HUMAN-COMPUTER TOUCH SCREEN CONTROL PANEL

HUMAN-COMPUTER TOUCH CONTROL INTERFACE



Control panel

Control panel consist of LED indicator lights and 7 inch touch screen

LED indicator lights:

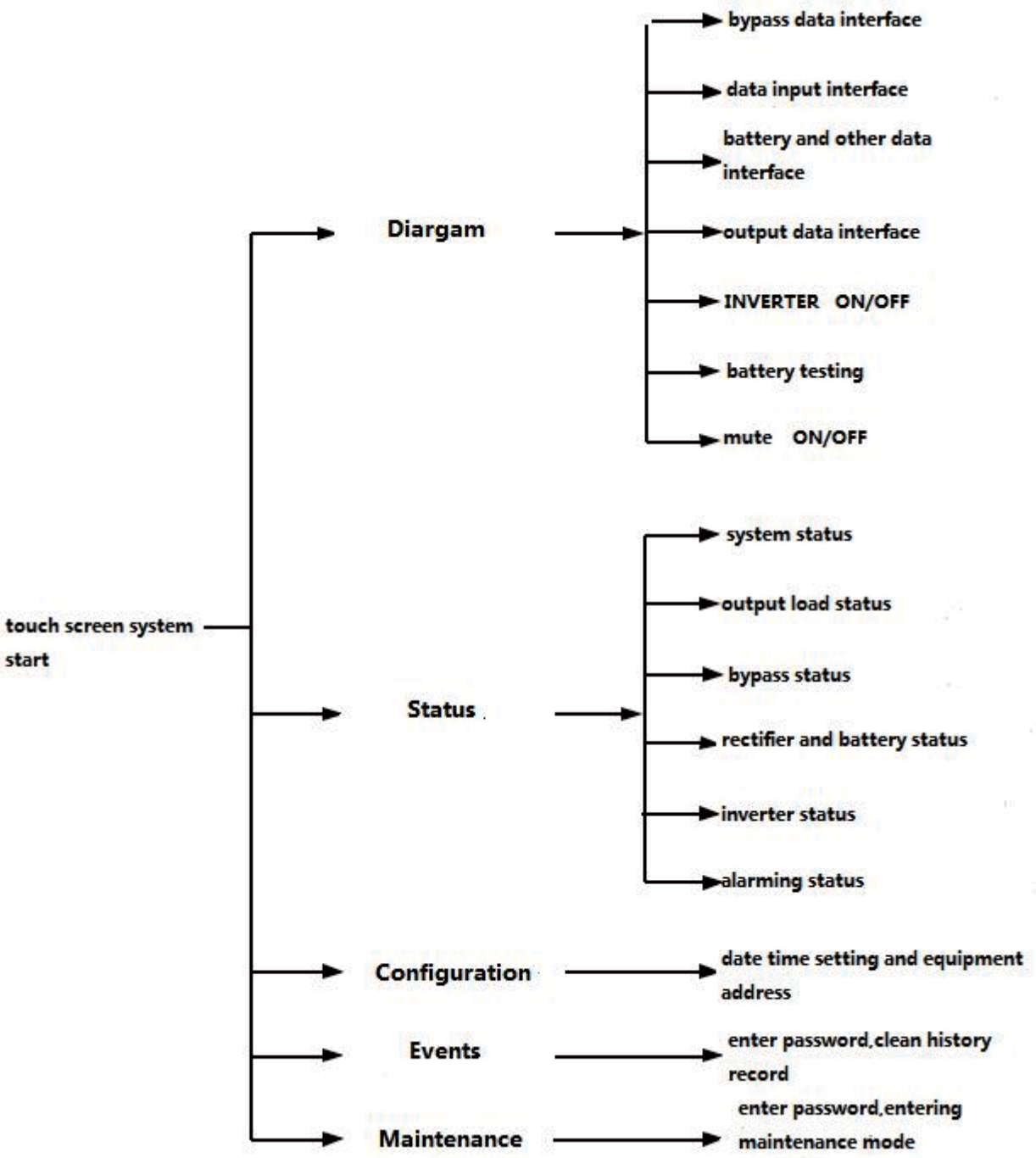
LED indicator lights on the control panel could offer fast information,LED indicator lights may be always on ,off or flashing in different state,there are 5 LED indicator lightson the panel

"Input"（green） ： main input power indicator light；
"By In"（green） ： bypass input power indicator light；
"Bypass"（yellow） ： indicatorlight in bypass working mode；
"INV"（green） ： indicator light in inverter working mode；
"Battery"（yellow） ： battery indicator light；

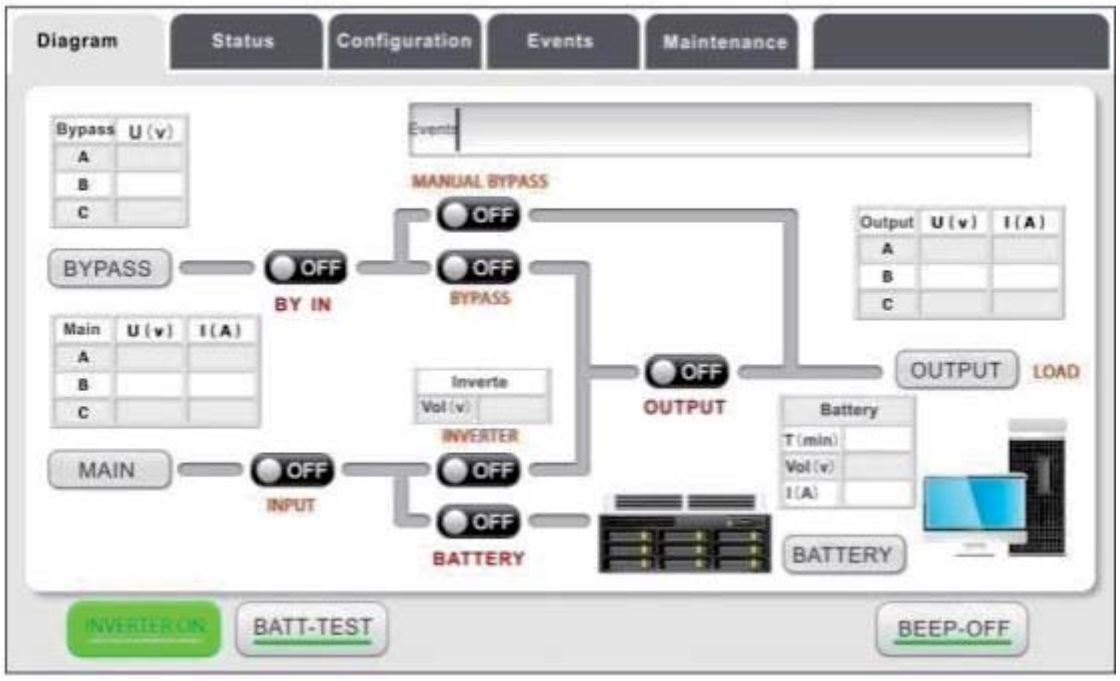
The state of LED indicator light on control panel is as follows

Indicate light / Working status	Input	By in	Bypass	INV	Battery
ON	Main input is normal	Bypass input is normal	Bypass mode	Inverter mode	Battery mode
Flashing	No	Bypass input phase sequence is abnormal	Maintenance mode or bypass overload	Inverter overload or battery under voltage	Capacity of battery is abnormal or battery under voltage
OFF	Main input voltage,frequency abnormal	Bypass input voltage or frequency is abnormal	Non-bypass mode	Non-inverter mode	Battery is normal

HUMAN-COMPUTER TOUCH CONTROL INTERFACE FLOW CHART

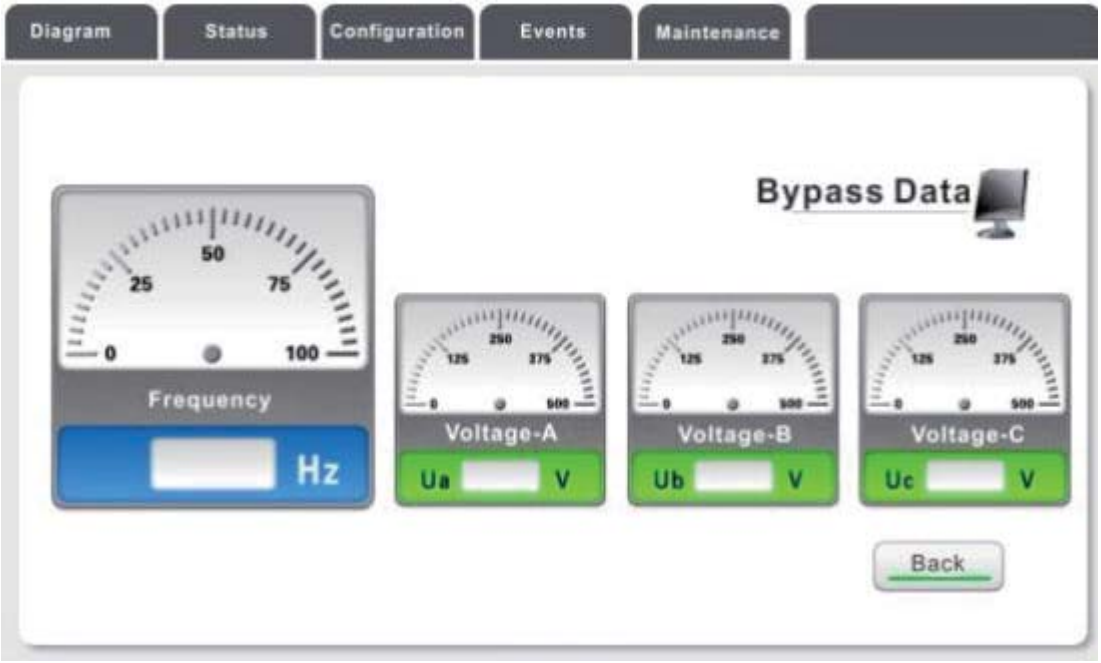


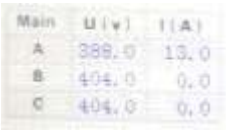
1.Diagram interface(there are three buttons as below,invert ON/OFF,BATT-TEST,BEEP ON/OFF,)

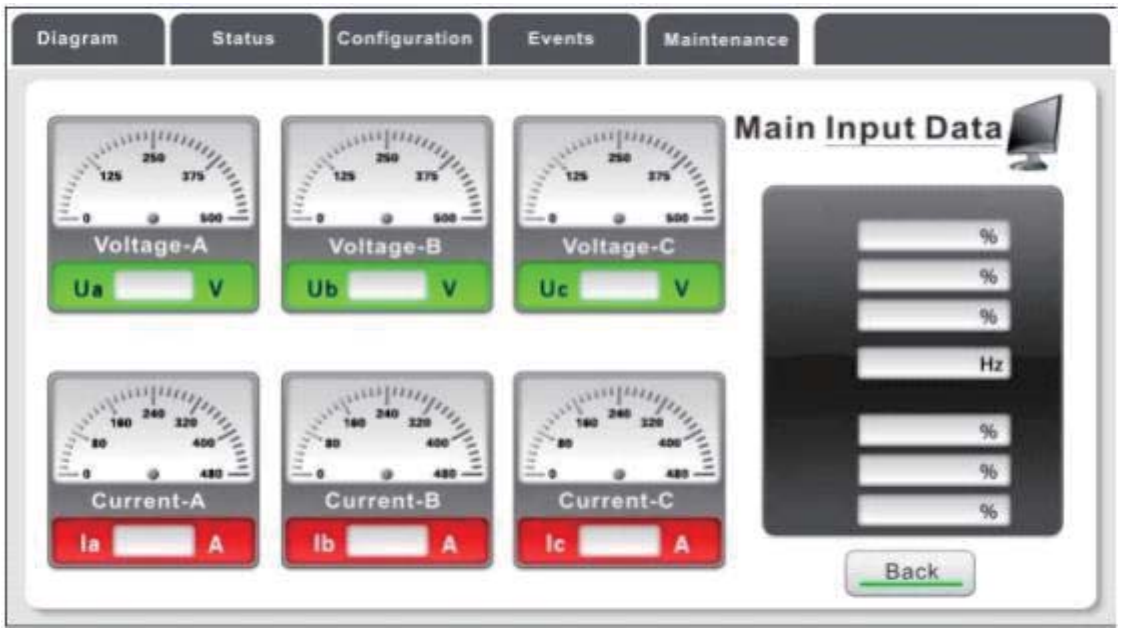


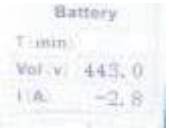
2.UPS bypass data interface(click “BYPASS” in Diagram interface or click bypass input table 

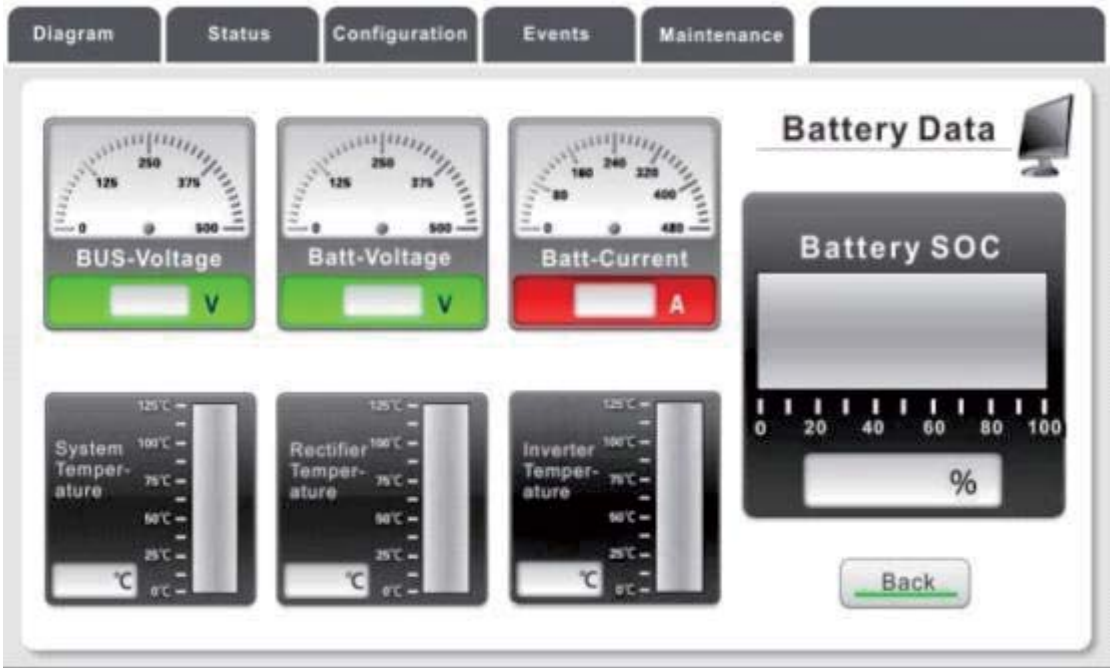
to enter)



3.UPS input data interface(click “MAIN” in Diagram interface or click main input table  to enter)



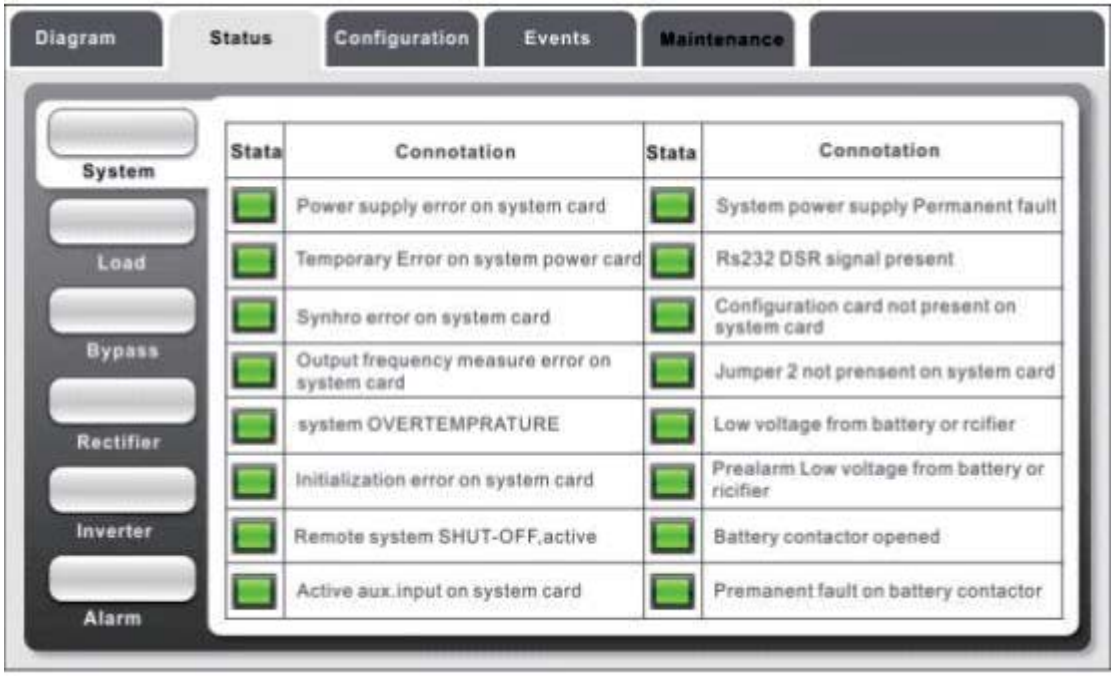
4.UPS battery and other data interface(click “BATTERY” in Diagram interface or click battery table  to enter)



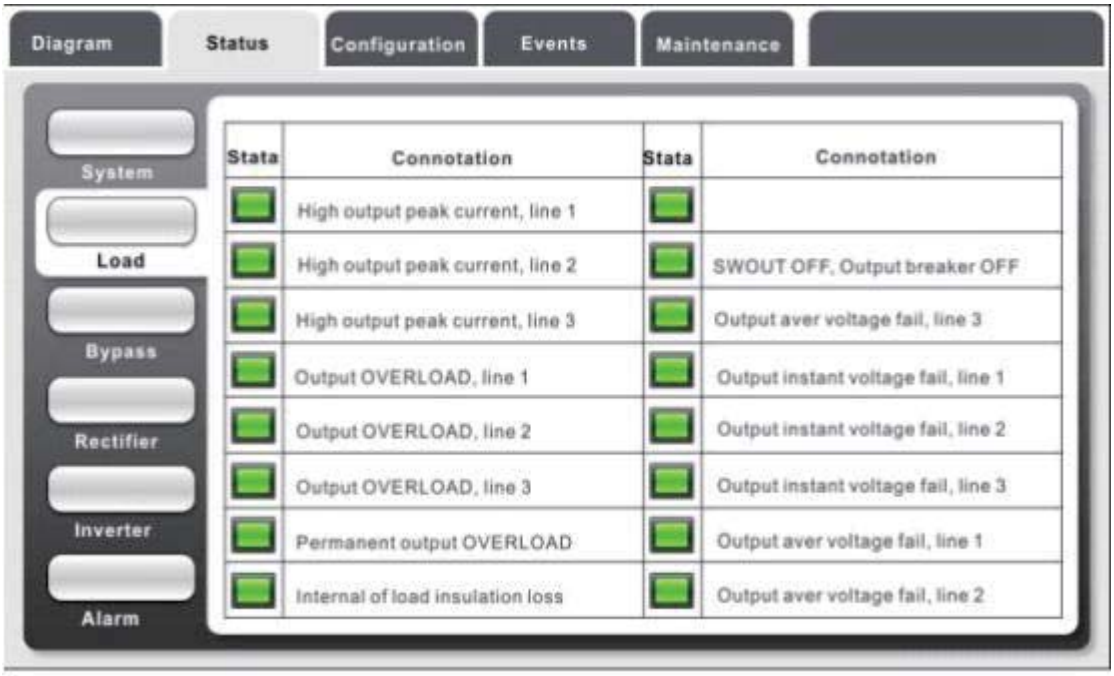
Output	U(v)	I(A)	Ipk(%)
A	0.0	0.0	0.0
B	0.0	0.0	0.0
C	0.0	0.0	0.0

5.UPS output data interface(click"OUTPUT" in Diagram interface or click output table to enter)

6."Status" interface(click "System" button in "Status" interface to check)

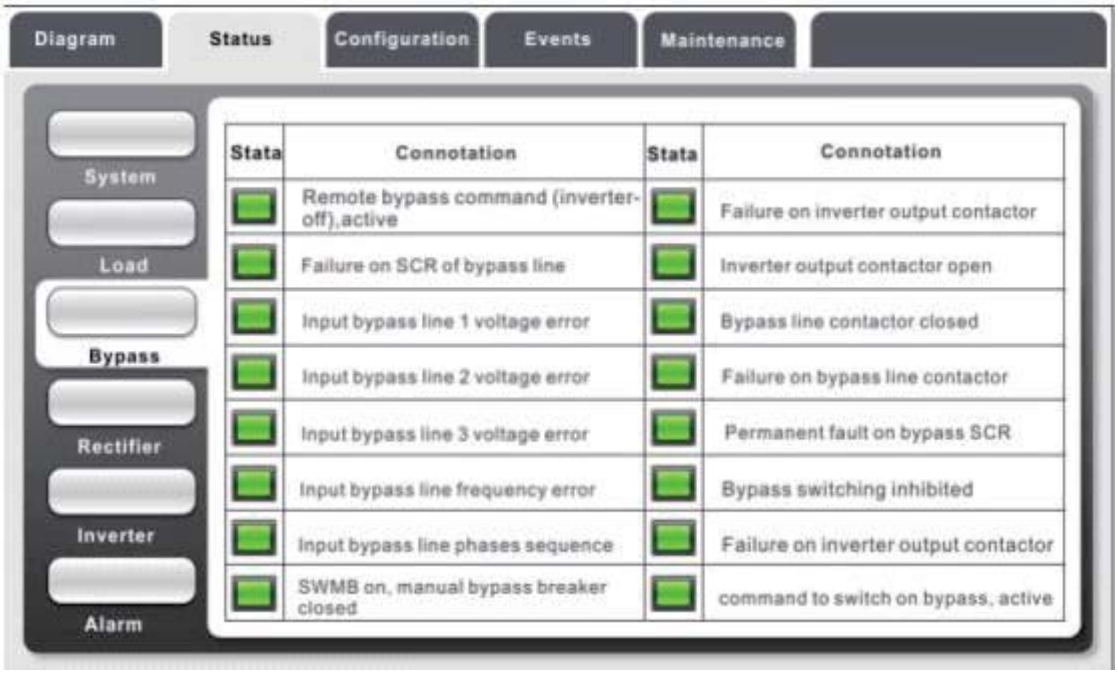


7.Click “load” button in “Status” interface to enter.

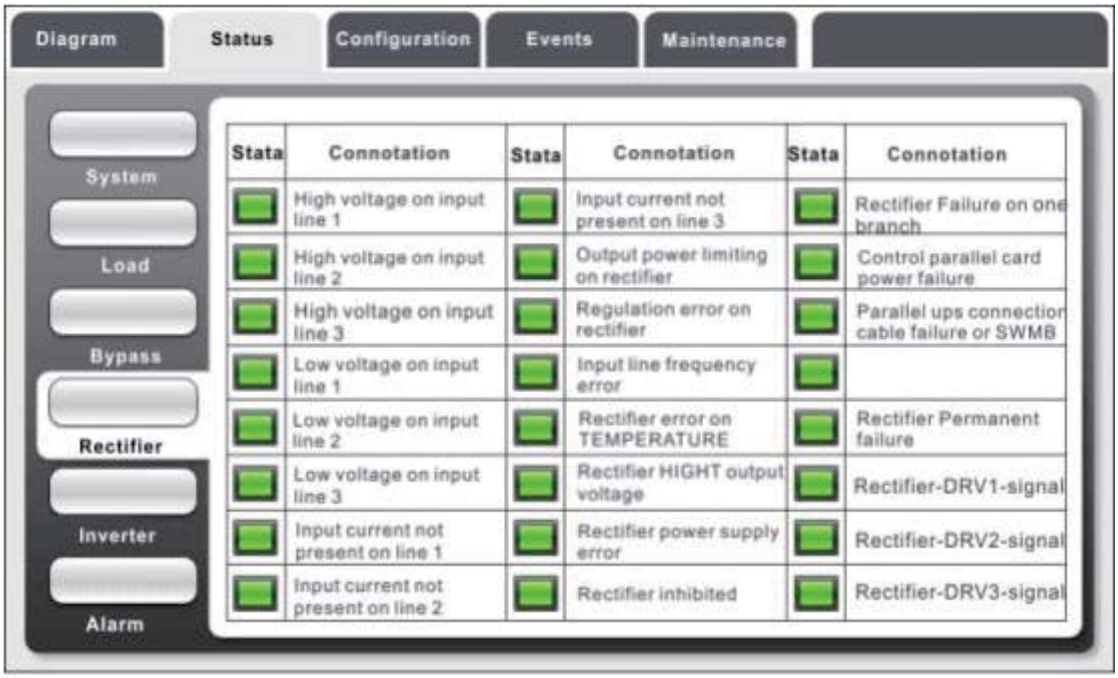


.

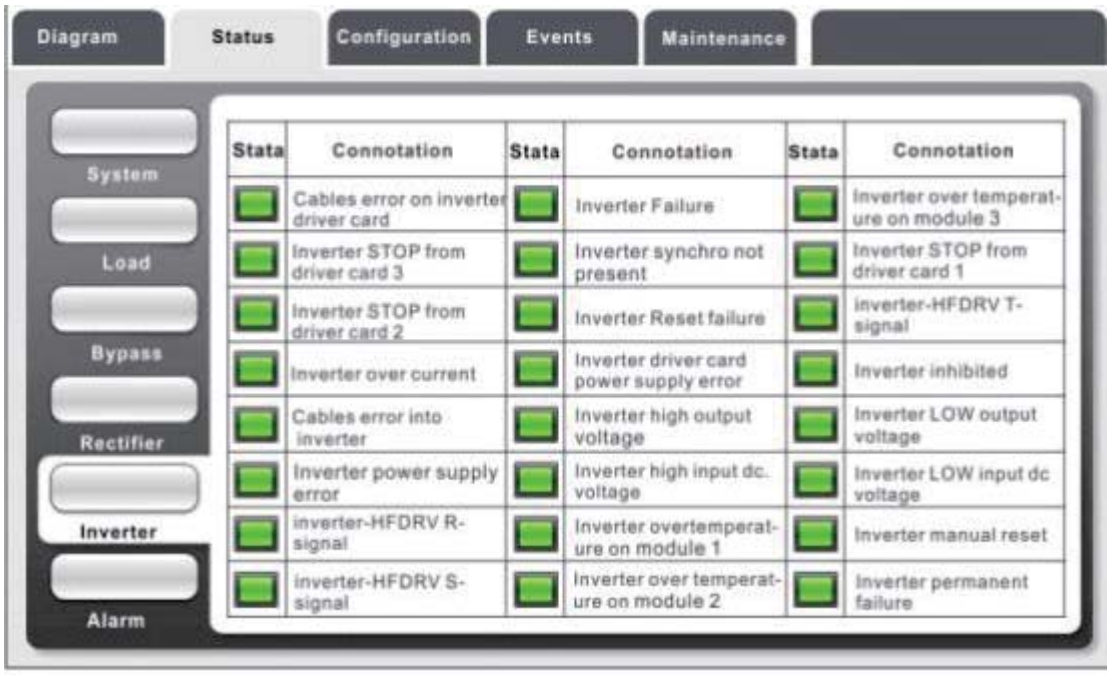
8.Click ”Bypass” button in “Status” interface to enter.



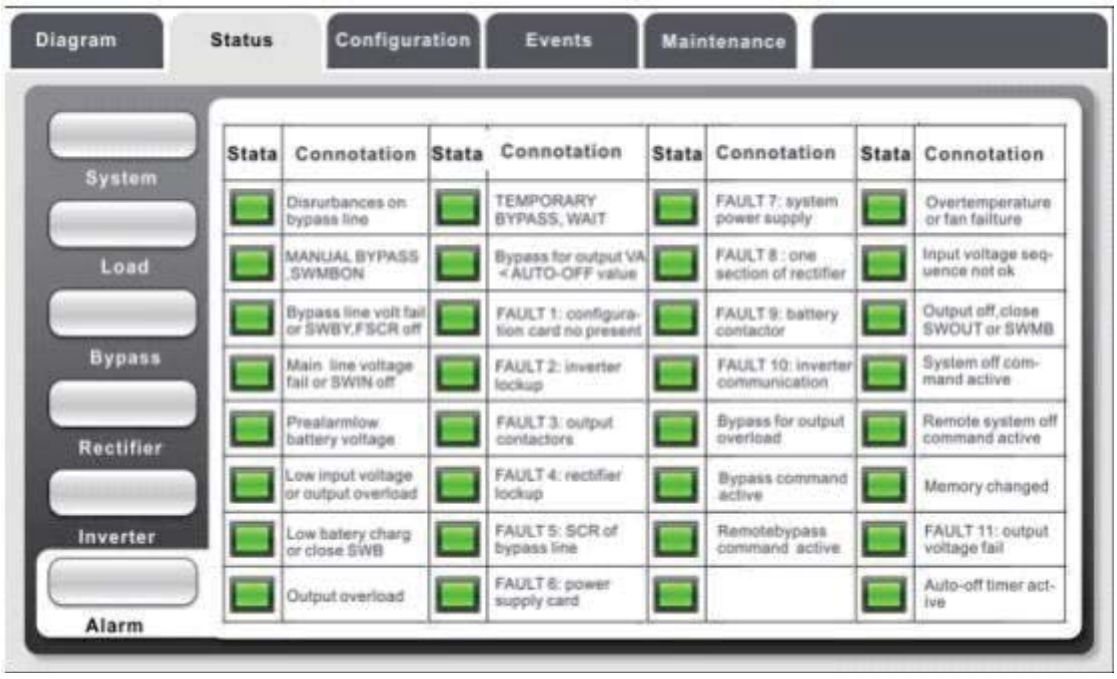
9.Click “Rectifier” button in “Status” interface to enter.



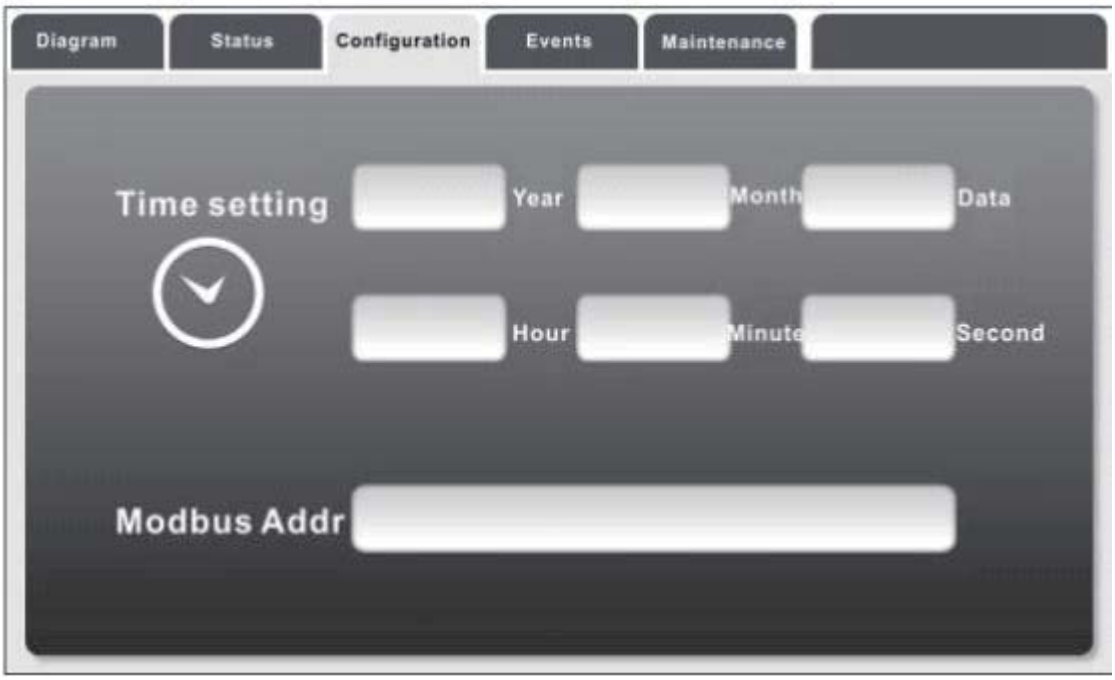
10.Click ”Inverter” button in “Status” interface to enter.



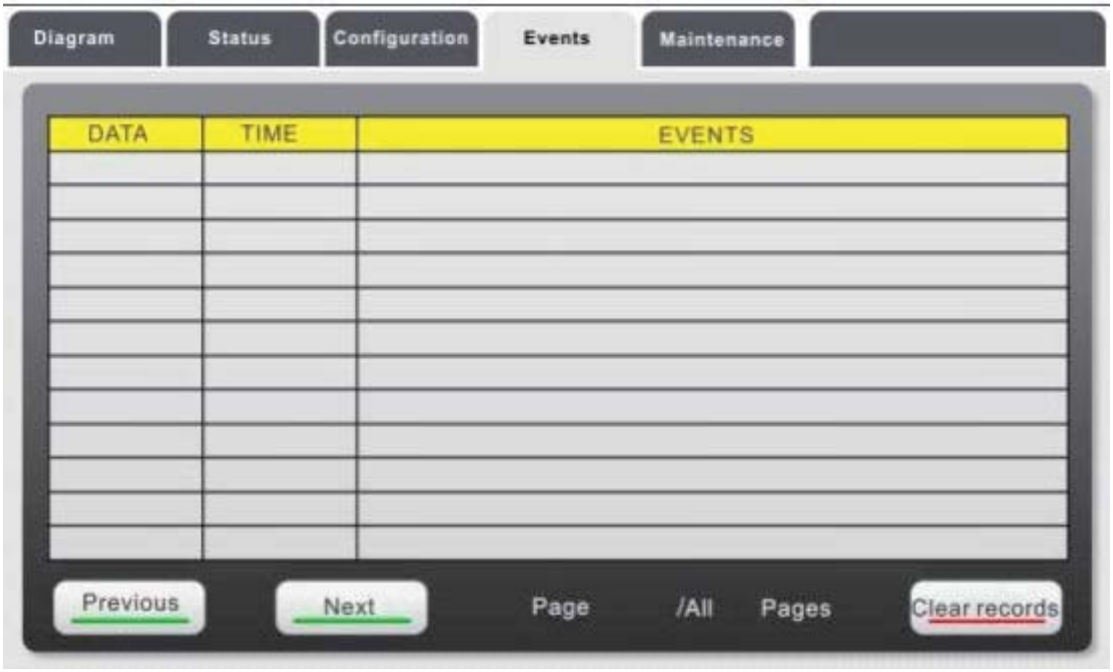
11. Click “Alarm” button in “Status” interface to enter.



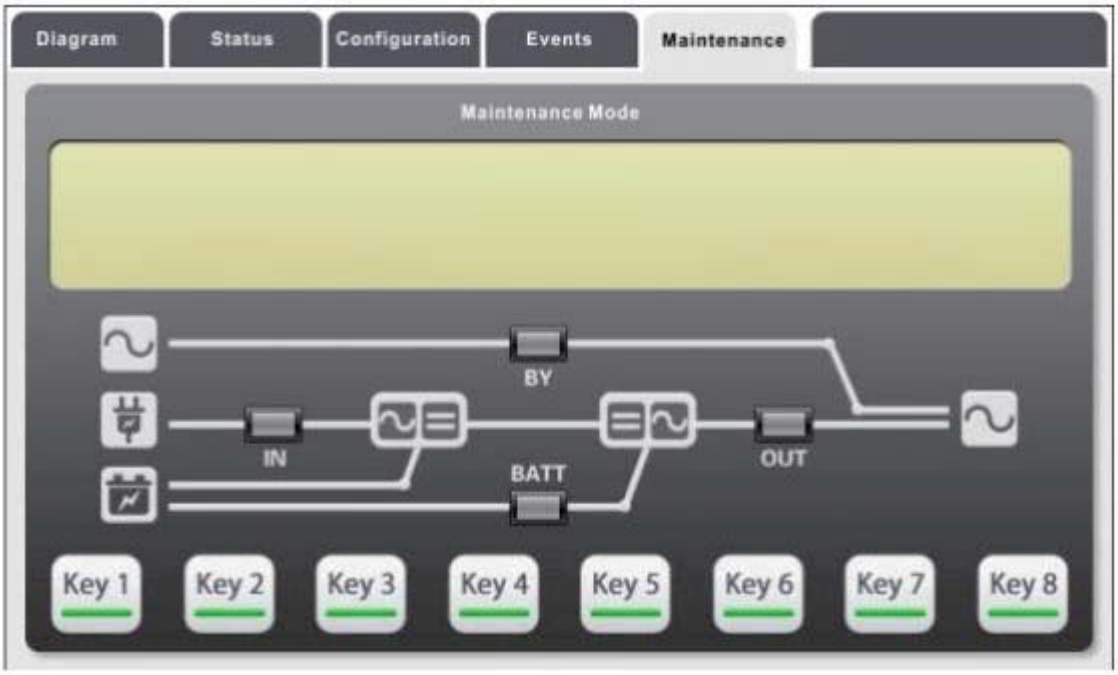
12.Click ”Configuration” interface to check data time and device address.



13.Click “Events” interface to check history record.



14.Click “Maintenance” interface to enter(you need to input password first)
Click “Maintenance” button to enter into maintenance interface,check and set the working parameters of UPS, Initial operation is “436215”.



IN: mains input and bypass input indicator light
OUT: inverter output indicator light
BY: bypass working indicator light
BATT: the state of battery indicator light

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.

IN (green): input

lit	when the input power and bypass voltages are present and normal
flashing	when one of the two voltages is abnormal
extinguished	when both the voltages are neither present abnormal.

OUT (green): inverter output line

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
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

BY. (yellow): bypass output

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 and	when the system output is switched to inverter or the output is switched to the bypass line both switches SWOUT and SWMB are open, or is active (SYSTEM OFF) command

BATT (yellow): battery output

lit	when the battery is delivering
flashing	when the alarm PREALARM, LOW BATTERY VOLTAGE is active or the alarm BATTERY DISCHARGED OR SWB open is active
extinguished	when the battery is not delivering and its voltage is normal.

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.

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 menu 0, 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] DISTURBANCES ON BYPASS LINE

Alarm present when there are disturbances on the bypass line of the voltage peaks or harmonic distortions type, while voltage and frequency are correct. **CAUTION!** In this case the inverter is not synchronised with the bypass line, hence if the bypass is forced with the switch SWMB or the remote controls or panel there could be wrong switching between voltages in counter-phase.

[2] BY-PASS MANUAL, SWMB - ON or cable defect

Manual BY-PASS SWMB Switch inserted and therefore return to normal operation is prevented. Load is fed by the input of the BY-PASS line and therefore isn't secured by the continuity unit. " cable defect" only for UPS in parallel version, logic has revealed an error in signals exchanged between the UPSs connected in parallel, and has therefore switched the entire system to BY-PASS.

[3] BYPASS VOLT. FAIL or SWBY, FSCR OFF

Alarm is present if:
- bypass line input voltage is abnormal,
- bypass line turn-on switch SWBY is open.
- SCR fuse of the bypass line is open or burnt out following output short circuit.

[4] MAIN LINE VOLTAGE FAIL or SWIN OFF

Input voltage is wrong and battery is discharging.
The alarm appears if: - input voltage or frequency are without range
- SWIN power switch is open
- the rectifier does not recognize the voltage due to internal anomaly.

[5] PREALARM, LOW VOLTAGE ON BATTERY

The alarm is present if:
- the battery voltage is lower than calculated to supply approximately 5 minutes duration or the residual ;
- autonomy time is lower than the time set for the pre-alarm.

[6] BATTERY DISCHARGED OR SWB OPEN

The logic of the UPS has carried out A BATTERY TEST, during presence of mains feeding, the voltage of the battery was lower than the estimated value, see the chapter 3.2 "BATTERY TEST".

[7] LOW VOLT. SUPPLY or OVERLOAD [W]

This alarm is present if one of the following conditions is verified:
- voltage of feeding in input is insufficient to feed load, (see "general characteristics")
- load of output, in active power W, is higher than the nominal value .

[8] OUTPUT OVERLOAD

Indicates that the power absorbed by the load at the output is greater than allowed rated power, hence the indicated value expressed in %VA exceeds 100%. The same alarm is activated also when the peak absorbed current of the load exceeds the maximum admitted. When this alarm is on it is necessary to reduce the load, otherwise the system automatically goes on bypass (within a time period inversely proportional to the amount of the overload).

[9] BY-PASS FOR VA OUTPUT < AUTO_OFF VALUE

This alarm is present when power in %VA, absorbed by the load is lower than the set value of" AUTO-OFF" (see menu 3.5.6 "CUSTOMISING" , "AUTO-OFF " VA). The value of %VA for AUTO-OFF is set to 0 in the factory.

[10] INTERNAL FAULT: Number

The number indicates the different causes of fault:
1. indicates that the configuration circuit is defective or absent.

2. Inverter fault.
3. Inverter output line contactor fault (or bypass line contactor fault if present).
4. Rectifier fault.
5. Fault of an SCR on bypass line.
6. Main internal power supply fault or short circuit into one control card.
7. A voltage feeding the system control card is not correct.
8. Fault of one of the three sections of the rectifier because one of them does not absorb current or absorbs 30% less than the other.
9. Battery contactor fault.
10. Communication line between inverter and system not correct, fault on one of the two cards.
11. Fault of a power connections in SCR or bypass circuit.

[11] TEMPORARY BYPASS, WAIT

Indicates that the load is powered by the bypass line and the system is in the previous phase of automatic return to normal operation powered from the inverter. This transitory operation occurs e.g. during the starting phase of waiting for return on inverter after bypass for overload.

[12] BY-PASS FOR OUTPUT OVERLOAD (displayed steady or flashing)

Flashing display ALARM MEMORISED

It shows that the overload condition of the BY-PASS line has been memorised.
In order to be memorised the overload has to remain for a certain time. Some situations are shown here:
150% for 10', 175% for 1' or 150% for 18".
In versions with power <100KVA the load remains fed by the BY-PASS line, if no one intervenes to reduce the load, until the intervention of the thermal-magnetic guard of the SWBY switch in input.
In versions with power 100kVA or greater in this alarm condition the load remains without power.

After reducing the load to remove the memory, to return to the NORMAL OPERATION, it is necessary carry out the following procedure: close SWMB, open SWBY then close SWBY and open SWMB.

Steady display
It shows that the load is fed by the BY-PASS line and is over the nominal value, the alarm has not yet been memorised, the value shown on the panel, expressed in percentages %VA, is over 100%.
To return to the NORMAL OPERATION situation before the memorising, reduce the load and wait a few minutes to allow cooling (e.g. time to return to NORMAL OPERATION is 60s if the load reduces to 50%, and 8 minutes if the load reduces to 75%).

[13] BYPASS COMMAND ACTIVE; 8=COMMAND OFF

The system has been disactivated and switched to bypass by a special command entered with the keyboard. The command does not remain in the memory after a shutdown due the end of battery discharging.
In that case, upon return of power the system returns to normal operation also if the intentional lockup were not disactivated.

[14] REMOTE BYPASS CONTROL: ACTIVE

The system has been disactivated and switched to bypass by special command applied to the connector 'remote controls and signals'. The command is not memorized and the system returns to normal operation when the command is cancelled provided power voltage is present.

[15] OVERTEMPERATURE or FAN FAILURE

1、UPS
2、power modules of the inverter
3、power modules of the rectifier
4、the output transformer

exceeded the maximum allowed (as a result of operation in an environment with excessive heat or failure of the fans).

[16] INPUT VOLTAGE SEQUENCE NOT OK

Input phase sequences of the bypass line is not correct. Normally it is sufficient to reverse two phase to obtain normal operation.

[17] OUTPUT OFF, CLOSE SWOUT OR SWMB.

Output voltage is absent because both switches SWOUT and SWMB are open.

[18] SYSTEM OFF COMMAND ACTIVE ; 8=DISACTIVE.

Alarm present when total shut-down command has been inserted from the panel or through the RS232 connection,

The System carries out the shut-down command with a few seconds of delay to allow for possible cancellations. The command remains memorised also during a shut-down due to lack of feeding.
When the feed returns, the system does not return to normal operation mode unless the deliberately (SYSTEM OFF) is disactivated. To disactivate it, close SWBY or, if required, press 8.

[19] SYSTEM OFF COMMAND ACTIVE; 8=COMMAND OFF.

Like previous alarm, with present command from REMOTE connector

[20] MEMORY CHANGED: CODE = number

Number shows the different cases.
Code 1 memory has been changed and the operation parameters have been set to standard values.
If previously non-standard values have been set, it is necessary to carry out a new customising of these values.
To remove alarm from the display turn off then turn on.

NOTE: codes different from 1 can only appear temporarily. During variations of customising they do not influence normal operation.

[21] AUTO-OFF Timer: T off= 0: 0', T on 0: 0'

The alarm appears when the internal daily timer is operating for a daily cycle of system self-starting and self-stopping
(see menu “CUSTOMISING”).
This timer cycle is inhibited if Toff and Ton value are equal.

CLICK “MAINTENANCE” INTERFACE TO ENTER BASIC MENU

BASIC MENU

```
          NORMAL OPERATION
__10,   OUT=100%VA   BATT=100%Ah   5=ON
```

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

The viewer permits display of a single phrase at a time, hence a priority is established according to which the most important message is displayed, while other information is entrusted to the interpretation of the internal codes.
Under all operating conditions, after two minutes from the last command with the keys, the viewer returns to BASIC MENU in which are presented the signaling messages for operating status.

NORMAL OPERATION:
__10:
Example of identifying initials of the type of unit with 10kVA rated power.

OUT = 100%VA:
Example of indication of the percentage of power absorbed by the load at output when the inverter is operating.

The initials “OUT” change to “BY” when the load is not powered by the inverter but by the mains through the bypass line.
All the indication “OUT=100%VA” changes to “OUT=SWMB” when load is powered through line of maintenance bypass switch, hence it is not possible to supply measurement of the output load current.

The value 100%VA supplied in the example is taken from the measurement of the output current. The number indicates the output current with the value relative to the absolute rated value and the value indicated is the greater of (effective current) or (peak current).

BATT=100%Ah:
Example of indication of present status of battery recharge percentage. The value 100%Ah is taken from measurement of the charging current and the time elapsed in recharging.
The number indicates the percentage of recharge based on the information of the capacity of the connected battery and the amount of charge used during battery operation. The system remains automatically on quick charge for the entire time necessary to supply the battery with the quantity of charge lost during discharge.
The indication “%Ah” changes to “min.” during operation in absence of mains power supply or with battery discharged. In this case the numerical value refers to the remaining minutes of operation calculated on the basis of the current delivered by the battery and the charge status thereof.

NOTE!
The autonomy indicated is calculated on the basis of measurement of the discharge current at that moment, the value memorized for the capacity of the connected battery and the value memorized for the percentage of charge preceding the discharge. The autonomy value shown is always approximate because of the large number of factors involved.
If large differences are noted between the expected value and the real time of a discharge with steady load, check the memorized battery data and its status.

5=0N:
Example of the indication for sound alarm enablement status: in case of exclusion, the indication changes to “5=OFF”.

Key menu 1, "?", HELP

?

```
1=?, 2=MEASURES, 3=COMMANDS,  4=HISTORY
 6= DATE/TIME,    7= CODES,    8=NORMAL
```

Access to the “HELP” menu is by pressing key 1 from the basic menu and indicating the menu to which to accede by pressing the other keys from the basic menu.
When many other menus are active push-button 1 returns to basic menu.

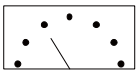
1=? indicates button 1 for access to language change menu
2=MEASURES indicates button 2 for access to measurements menu
3=COMMANDS indicates button 3 for access to command entry menu or selection or customizing of operating values.
4=HISTORY indicates button 4 for access to menu for viewing events recorded in internal memory.
6=DATE/TIME indicates button 6 for access to menu for viewing and management of internal clock and calendar.
7=CODES indicates button 7 for access to menu for viewing internal codes corresponding to operating status of all the internal subassemblies.
8=NORMAL indicates button 8 for immediate return to basic menu NORMAL which also takes place automatically after two minutes from the last pressing of key.

KEY MENU 1 : LANGUAGES

```
   2=ITALIANO   3=ENGLISH   4=FRANCAIS
        5=DEUTSCH    6=ESPANOL
```

Access to the LANGUAGES menu is by key 1 only from HELP menu “1”.
Pressing the key corresponding to the desired language selects the language with which the system supplies all the following messages.
Language selection remains memorized even after turning off and restarting the system.
To change current language always use LANGUAGES menu.

KEY MENU 2 : VOLTAGE MEASUREMENT



```
IN=100,100,100%V,50.0Hz; BATT=430V,+100A
 BY=230V,50.0Hz      OUT=230V,50.0Hz,100%
```

The measurements indicated have the following meanings:
The contents of the measurements menu is different for single-phase and 3-phase units.
:
IN=100,100,100%v, 50.0Hz
The voltage is expressed in percentage of rated value; the value 100%V indicates a voltage of 230Vln (ln = voltage between phase and neutral).

BATT.=430V
Example of voltage measured at the output of the rectifier to the battery+ 100A
Example of discharge current issuing from battery, the sign (-) indicates the value of the charging current entering the battery.

BY=230V, 60.0Hz
Example of measurement of frequency and voltage at the input of the bypass line.

NOTE:
In 3-phase systems the voltage indicated is the average of the three concatenated output voltages.

OUT= 230V,50.0Hz, 100% Example of measurement of voltage, frequency and percentage power for rated power at the system output..

The mark “OUT” changes to “BY” when the load is fed from the bypass line.
The entire measurement changes from OUT=230v,50.0Hz,100% to OUT=SWMB when the maintenance bypass switch SWMB is closed because the internal system is excluded, hence not able to measure the load current.

Key menu 2 6 : TIME MEASUREMENT

```
OUT= 10000h; BY= 10000h; BATT= 10000h
nBATT= 1000; n0%Ah= 100;    1993-01-12
```

Access to the menu TIME MEASUREMENT is by key 6 only from the SYSTEM MEASUREMENT menu.
Pressing key 1 causes return to the basic menu.

The values indicated have the following meanings:

OUT = 10000h	Example of indication of hours elapsed in operation with load on inverter.
BY = 10000h	Example of indication of hours elapsed in operation with load on bypass.
BATT = 10000H	Example of indication of hours elapsed in operation with battery in discharge.

nBATT = 1000	Example of indication of the number of times the battery started delivering and hence also the number of times supply voltage was lacking.
n0%Ah = 100	Example of indication of the number of times the battery was completely discharged to 0%Ah. The number of complete discharge cycles is useful for knowing and appraising the efficiency of the battery. The average life of ordinary sealed lead batteries is limited to 200-300 cycles of complete discharging.
1993-01-12	Example of indication of date memorized for day when the unit was activated for the first time.

The above data constitute the (HISTORY) and remain memorized even with the unit turned off and cannot be zeroed.

Key menu 2 2: CURRENT MEASUREMENT

```
IN=100,100,100%A;Ts=25°C,Tr=45°C,Ti=45°C
 i=230Vln,430Vb     OUT=100,100,100%Arms
```

Access to the menu CURRENT MEASUREMENT is by key “2” only from menu 2.

The measurements indicated have the following meanings:

IN=100,100,100%A	Example of measurement of the three currents at the power supply inlet, viewed by the three sections making up the input rectifier. Current is expressed in percentage of maximum input value.
Ts=25°C	Example of indication of temperature inside system.
Tr=45°C	Example of indication of temperature of rectifier power modules
Ti=45°C	Example of indication of temperature of inverter power modules

i=230Vln,430Vb	Example of measurement of alternating and continuous voltages inside inverter.

OUT=100%Arms,200%Apk (Single-phase type)	Example of measurement of effective current and peak current percentages at the output during operation of the inverter. During operation by bypass the sign “OUT” changes to “BY”. During operation with the switch SWMB on for maintenance bypass, current measurements are not possible and the indication changes to “OUT=SWMB”.
OUT=100,100,100%Arms (Three-phase type)	Example of measurement of the three effective current percentages for the three output phases during inverter operation. In the other cases the sign OUT changes as for single-phase.

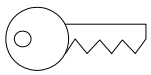
Key menu 2 2 2: 3-PHASE VOLTAGE MEASUREMENT

```
BY=230,230,230Vln;    OUT=230,230,230Vln
                      OUT=100,100,100Apk
```

Pressing “key 2” causes return to preceding menu 2,2.

BY=230,230,230Vln	Example of measurement of the three voltages at the input of the bypass line measured between the phases 1,2,3 and neutral.
OUT=220,220,220Vln	Example of measurement of the three output voltages measured between phases 1, 2, 3 and neutral
OUT=100,100,100Apk	Example of measurement of the three peak current percentages for the three output phases during operation on the inverter. During operation on bypass the sign “OUT” changes to “BY”. During operation with the switch SWMB for the maintenance bypass current measurements are not possible, hence only the voltage measurements remain and the indication changes to “OUT=SWMB”.

KEY MENU 3 "KEY", COMMANDS



```
2=BATTERY TEST  4=DISPLAY CONTRAST
 5=CUSTOMIZING   6=BYPASS  7=SYSTEM OFF
```

.

Key menu 3 2: BATTERY TEST

```
      BATTERY  TESTING FOR  6 sec.
BATT= 400V + 10A; Vbc= 430V;  999 min
```

In this case there is activated the cycle of efficiency status checks of the battery, which last 6 seconds.
Pressing key 8 interrupts the test and returns to the basic menu before the end of the period.
The values indicated are:

BATT= 400V + 10A	Example of indication of battery voltage and current measurement.
Vbc= 390V	Example of indication of calculated battery voltage
999 min.	Example of indication of calculated autonomy time.

The battery test cycle with rectifier output voltage drop permits evaluation of the battery with the true delivery on the load even during the presence of the power supply voltage. In any case, lowering of the output voltage of the rectifier takes place only if there is voltage on the bypass line so as to avoid any ANOMALY with output load without the bypass reserve.

At the end of the test cycle a comparison is made of the voltage supplied by the battery and a 'Vbc' voltage (calculated on the basis of the measured delivered current at the capacity values of the battery and half the percentage of recharge contained in the memory).
If the voltage measured on the battery is less than calculated voltage:
- the alarm “BATTERY DISCHARGE” or “SWB OPEN” is activated;
- the memorized recharge percentage is halved;
- the next test cycle is prepared and will be activated automatically after 60 seconds.

The battery test cycle is activated:
- manually;
- automatically every 60 seconds after each failed test or each system starting;
- automatically every 24 hours starting from return of power;
- automatically and invisibly during operation without mains power supply.

When 60 seconds have elapsed after activation of the alarm a new test is performed and if the result is negative the alarm is reactivated for another 60 seconds.

The alarms continues to halve the memorized charge value until the value for which the battery voltage calculated is less than actually measured.
In practice, this battery check system produces an alarm each time the battery has less than the design charge.
The PERMANENT presence of this alarm indicates that the battery is inefficient or the battery circuit is broken or the battery switch SWB is open or one of the protective fuses has blown.
TEMPORARY presence indicates a loss of battery efficiency proportionate to the alarm frequency.

Cancel the battery test function: type keys 3, 5: " CUSTOMISING", insert code 323232.
To reactivate insert code 323232 again.
On the BASIC MENU on the lower line in the 2 cases will appear::
BATT=XXX % with BATTERY TEST ON
BAT. =XXX % with BATTERY TEST OFF

Key menu 3 4: DISPLAY CONTRAST

```
        DISPLAY CONTRAST : 10
ADJUSTMENT:                7=-, 8=+
```

In this case it is possible to change the viewer contrast: decrease with key 7; increase with key 8. The value 6 expresses the contrast level and can change from 1 to 11. To leave the menu, press one of the other keys different from 7 and 8, e.g. key 1.

Key menu 3 5: CUSTOMIZING

```
        TYPE CODE  __________
.....................................
```

The sequence "CODE OF CUSTOMISING" **is the same in all cases** and is 436215.

Access to the CUSTOMISING menu using the code must prevent unauthorised persons from modifying the operation parameters of the machine. Code isn't required again for 2 minutes after its first insertion.
Only with the insertion of the correct code can you have access to the following menu, otherwise you are returned to the main menu.

```
1=Stby  2=RATED OUTPUT VOLTAGE  3=BATTERY
   4=PREALARM    6=AUTO-OFF  7=others
```

By pressing key 7 you get the second part of the menu:

```
2=BY. VOLT. RANGE  3=BY. FREQ. RANGE
 4=Conf.  5=RS232   6=ECHO   7=IDENT.
```

key 8 " ", you are returned to menu 2 of base. e.
NOTE: "1=Stby" is visible and enabled only for UPS with the function STANDBY ON.

Key menu 3 5 1: CUSTOMIZING OPERATION IN STANDBY ON (only on enabled UPS)

```
                                    Stby=0
ADJUSTMENT:                        7=-, 8=+
```

You can exit the menu by pressing a key different from 7 and 8.
By pressing key 8 STBY=1 the UPS switches itself to " normal operation " in STANDBY-ON mode and vice versa

Key menu 3 5 2: CUSTOMIZING RATED OUTPUT VOLTAGE

```
  RATED OUTPUT VOLTAGE =    225Vln
ADJUSTMENT:                7=-, 8=+
```

Keys 7 and 8 are used to reduce or increase the rated output voltage in the range from 200V to 244V with increments of 1V.
In the example, the rated output voltage has been set for 225V measured between phase and neutral 'ln'.
Note that even in the systems only the voltage between phase and neutral 'Vln' is in referred to.
The value set in the example changes operation of the inverter so as to have output voltage of 225V between phase and neutral, during normal operation.
In addition, the reference voltage for the range of acceptance of the input voltage of the bypass line is also set at 225Vln. The range of acceptance of the power supply voltage remains unchanged and cannot be changed.

Key menu 3 5 3: BATTERY CUSTOMIZING

```
  BATTERY Type=1          Capacity=15Ah
Adjustment:2-/3+   5/6=-/+10      7=-,8=+
```

With keys 5, 6, 7 and 8 it is possible to decrease or increase the value of the capacity of the battery contained in memory, with variations of 10 units or of 1 unit, in a field from 1 to 9998 Ah.
You must insert the nominal capacity value of the battery connected. This is usually also printed on the container of the battery itself.
All machines supplied complete with battery, are customised in the factory.
In the case of machines supplied without batteries it is necessary to insert the correct values, (otherwise the system uses value of 12Ah).

With keys 2 and 3 it is possible to decrease or increase the identification value of the type of battery.
In the case of batteries with "high discharge intensity" you must pass from a value of 1 (normally predetermined for normal batteries) to a value of 2, value 3 is used for "lead-acid no sealed" batteries.
By choosing type 0 and pressing key 4 again, it is possible instead to set the following values manually:

32 batteries UPS:

```
  Vb_min=320   Vb_ch=435        Vb_max=445
Adjustment: 2-/3+ ,    5-/6+        7=-,8=+
```

Vb_min (end discharge voltage) =300-360V
Vb_ch (maintenance voltage) = 400-460V
Vb_max (charge voltage) = 400-460V

36 batteries UPS:

```
 Vb_min=360     Vb_ch=489     Vb_max=500
 Adjustment: 2-/3+ ,    5-/6+          7=-,8=+
```

Vb_min (end discharge voltage) =337-405V
Vb_ch (maintenance voltage) = 450-510V
Vb_max (charge voltage) = 488-510V

40 batteries UPS:

Vb_min=400	Vb_ch=543	Vb_max=555
Adjustment: 2-/3+ ,	5-/6+	7=-,8=+

Vb_min (end discharge voltage) =374-450V
Vb_ch (maintenance voltage) = 500-566
Vb_max (charge voltage) = 542-566V

The checking system uses data concerning the capacity and type of battery for:
- automatic check by the inverter of the efficiency of the battery;
- calculation of estimate of residual autonomy time;
- calculation of levels of battery voltage to activate the pre-alarm and afterwards the shut-down;

Key menu 3 5 4: PREALARM CUSTOMIZING

(306Vmin, 345Vp)	Prealarm	5 min.
ADJUSTMENT:		7=-, 8=+

Vmin= minimum voltage of the battery
Vp= voltage of the discharge pre-alarm (these two values of voltage Vmin and Vp aren't fixed values, but are a function of battery discharging

Vp= Vmin+5V+10*(current of the battery [A]/capacity of the battery [Ah])

With keys 7 and 8 it is possible to decrease or increase the time required to activate the pre-alarm before the system lock itself due to the complete discharge of the battery. Variations of a minute are possible within a field ranging from 2 to 254 minutes. The pre-alarm signal activates itself when the estimated remaining time is less than the value set for the pre-alarm or when the battery voltage is lower than the value Vp of the pre-alarm voltage.
It is important to allow a broad safety margin when using the pre-alarm function, since the value of autonomy required cannot foresee possible increases in absorption for the output load, and cannot take into consideration unexpected and unforeseen faults in the battery, such as, for example faulty single elements or connections.

Key menu 3 5 6: AUTO-OFF CUSTOMIZING "VA"

AUTOMATIC SWITCH-OFF WHEN OUTPUT < 10%VA
ADJUSTMENT: *(5=Toff, 6=Ton)* 7=-, 8=+

Keys 7 and 8 are used to reduce or increase the percentage of output load for the AUTO-OFF function. Increments of adjustment are by 1 % in the range from 0 to 99%.
When the AUTO OFF alarm is present , if the input main line voltage is present and the battery charge is lower than 60% there is only the display of:

BYPASS FOR OUTPUT VA < AUTO-OFF VALUE
_30, OUT=100%VA BATT= 50%Ah 5=ON

The system does not start the "off procedure" because it waits to charge the battery over 60%.

When the alarm is present, if the input main line voltage is present and the battery charge is higher than 60%, or if the system is in battery operation, there is the display of:

BYPASS FOR OUTPUT VA < AUTO-OFF VALUE
_30, OUT=100%VA 0FF: 4 min, 5=ON

Moreover the "prealarm low battery" remote alarm contact switches on alarm position.
In the case of status displayed above, the system continue to operate for the next 4 minutes, after those it switches on bypass.

The interval of time between the arise of alarm and the switching on bypass is by default 5 minutes or it is equal to the value fixed when customizing PREALARM.
After the prealarm time, if the input bypass line voltage were present before, the system switches on bypass and it remains in standby status waiting for increasing of output load over the AUTO-OFF value.

If the input bypass line voltage is NOT present when the prealarm time is finished, the system switches off. After that, when the input bypass line voltage will come back, the system will start again remaining on bypass in standby status waiting for increasing of output load over the AUTO-OFF value to perform automatic return to normal operation.

The AUTO-OFF function is more useful for turning off the system during battery operation by merely turning off the output load. In case of normal operation, the AUTO-OFF function is still useful for zeroing consumption since the power circuits are disactivated, the battery is isolated and only the control circuits with consumption equivalent to a light bulb remain active.

Key menu 3 5 6 5 (6): AUTO-OFF Timer CUSTOMIZING

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

Key 5 to adjust Toff, 6 to adjust Ton.

The Toff and Ton values fix the clock time in which operates the daily cycle for self-stopping and self-starting This timer cycle is inhibited if Toff and Ton value are equal.

if the input main line voltage is present and the battery charge is lower than 60% there is only the display of:

```
AUTO-OFF Timer: Toff=20:00', Ton= 7:00'
_30, OUT=100%VA     BATT=   50%Ah      5=ON
```

The system does not start the "off procedure" because it waits to charge the battery over 60%.

if the input main line voltage is present and the battery charge is higher than 60%, or if the system is in battery operation, there is the display of:

```
AUTO-OFF Timer: Toff=20:00', Ton= 7:00'
_30, OUT=100%VA     0FF:   4 min,      5=ON
```

Moreover the "prealarm low battery" remote alarm contact switches on alarm position.
In the case of status displayed above, the system continue to operate for the next 4 minutes, after those it switches on bypass.
In UPS type with the (standby-on) function, after the disactivation , the output voltage is absent, in the other UPS versions, if the input voltage of the by-pass line is present, the output voltage also remains present .

When the time is equal to Ton, the UPS return in normal operation.

Key menu 3 5 7 2: BYPASS VOLTAGE RANGE CUSTOMIZING

```
BY. VOLTAGE RANGE          = +/- 10%
 ADJUSTMENT:               7=-,  8=+
```

Access to the menu BYPASS VOLTAGE RANGE CUSTOMIZING begins with the key sequence 3, 5, requires the code 436215 and the keys 7 and 2. The code is not required for 2 minutes after its first previous entry.
To leave the menu press a key different from 7 or 8. Keys 7 and 8 are used to reduce or increase the percentage of the range of acceptance of the voltage at the bypass line input. The choice is between the values: 10%, 15% or 20% of the value set for (RATED OUTPUT VOLTAGE).

Key menu 3 5 7 3: BYPASS FREQUENCY RANGE CUSTOMIZING

```
BY. FREQUENCY RANGE          = +/- 1%
   ADJUSTMENT:                 7=-,  8=+
```

Access to the BYPASS FREQUENCY RANGE CUSTOMIZING, requires the code 436215 and then keys 7 and 3. The code is not required for 2 minutes after its first previous entry.
Keys 7 and 8 are used to reduce or increase the percentage of the range of acceptance of voltage at the bypass line input. The choice is between 1% and ±5% (for rated value of the system of 50Hz or 60Hz).

Key menu 3 5 7 4 : MODEM CUSTOMIZING

```
PREALARM BEFORE STOPPING      = 100min..
  ADJUSTMENT:                 7=-,  8=+
```

Access to the menu MODEM CUSTOMIZING, requires the code 436215 and then keys 7 and 4. The code is not required for 2 minutes after its first previous entry.
Keys 7 and 8 are used to reduce or increase the control value for modem operation, the range is from 0 to 5 and 0 is default value.

Value 0 = the pin n. 20 of RS232 connector is set to low level (-12V) to inhibit the operation of a connected modem.
NOTE: when a remote control panel is connected to the RS232 connector, instead of a modem, the value MUST BE SET to 0 otherwise the remote panel does not operate.

Value 1= the pin n. 20 of RS232 connector is set to high level (+12V) to enable the operation of answer for a connected modem.
Value 2= the pin n. 20 of RS232 connector is set to high level (+12V) to enable the operation of answer and automatic calling for a connected modem.

When the automatic calling is set, 30 seconds after all "INTERNAL FAULT" alarm the system gives to the modem the command "ATD" followed by the memorized "Dial" number.

The modem must be previously set to recognize the "HAYES" command and to dial numbers with (pulses or tones) as required by the used telephone line.
After the “ATD” and Dial number, the system send to the modem the memorized "Send" number and a copy of the panel display with a=..... code and date/time.
For example, if Dial = 123456, Send = 456789, 30 seconds after starting of alarm "Internal Fault 5" the system sends to modem:
ATD123456.
The system, after receiving the message "CONNECT" from modem, sends to the modem the message:
UPS 456789
INTERNAL FAULT
M100, OUT=100%VA, BATT= 78%Ah, 5=On a=00200300 1994-12-21, 13:24:28

The system sends also the sequence to close connection:
+++ ATH
As last the system put on low level the DTR signal for 0.5 sec.
In case of busy line or modem not giving the response "CONNECT", the system wait 5 minute than repeats again the commands ATD..... in order to try another phone call. The system continues to try calling every 5 minutes until it receives the response "CONNECT" from modem or the alarm condition disappears.

Value 3= like value 2 with the automatic calling for any kind of alarm or fault.

Value 4= like value 2 with the automatic calling only with alarm 10 (Internal Fault) but with sending of display message only after received the character "}".
This operation can been used for avoiding the loss of a message, because the system sends its message only after receiving the special character "}" that can send only by a computer.

Value 5= like value 4 with the automatic calling for any kind of alarm.

Key menu 3 5 7 4 5 (6) : Modem 'Dial /Send' CUSTOMIZING.

```
MODEM dial n.=6543210///////// <=2..3=>
ADJUSTEMENT: (5=dial, 6=send) 7=-, 8=+
```

Access to the menu "MODEM 'Dial /Send' CUSTOMIZING", requires the code 436215 and the keys 7, 4, 5(dial) or 6(transfer). The code is not required for 2 minutes after its first previous entry.

Keys 7 and 8 are used to reduce or increase the digit on which the cursor points.
The cursor position is shown in the first time by the symbol "_", its position can be moved left with key 2 and right with key 3. The digits can be set in the range 0, 1, 2 ... 9, /. The symbol / indicates a digit inhibited.
The correct setting requires only number starting from left. All number inserted after a "/ " are ignored.
A setting of "0123/45" will be recognized only as number 0123.

Key menu 3 5 7 5: RS232 CUSTOMIZING

```
RS232: 8bit,no parity,1b.stop, baud=9600
ADJUSTMENT:                    7=-,  8=+
```

Access to the RS232 CUSTOMIZING menu, requires the code 436215 and then keys 7 and 5. The code is not required for 2 minutes after its first previous entry. Keys 7 and 8 are used to reduce or increase (baud transmission speed). The choice is among 1200, 2400, 4800 and 9600.

Key menu 3 5 7 6: ECHO CUSTOMIZING

```
ECHO ON RS232:    = 1
ADJUSTMENT:                    7=-,  8=+
```

Access to the ECHO CUSTOMIZING, requires the code 436215 and then keys 7 and 5. The code is not required for 2 minutes after its first previous entry. Keys 7 and 8 are used to reduce or increase the check value of the ECHO function. The choice is between 0 and 1. 0 is starting value. When 1 is selected the ECHO function is activated. The ECHO function is useful for automatically sending to the serial outlet RS232 the same message as appears on the panel viewer.
Automatic sending occurs for each alarm or change in viewer content.
Using this function it is possible to automatically print all messages through a printer connected to the RS232 outlet.
The message includes:

- copying the characters on the viewer
- copying the internal code (a=FFFF-FFFF)
- date and hour of activation of the message.

NOTE: the ECHO must be set to 0 when using some special software to receive information from UPS by a computer, because in that case the message must be sent only under computer control.

Key menu 3 5 7 7: IDENT. CUSTOMIZING

```
IDENT. = 0
ADJUSTMENT:                    7=-,  8=+
```

Access to the IDENT. CUSTOMIZING, requires the code 436215 and then keys 7 and 8. The code is not required for 2 minutes after its first previous entry. Keys 7 and 8 are used to reduce or increase the identification number of a single unit in case of systems using several UPS units connected to a single RS232 serial line.
The basic number is 0 and can be changed among values from 0 to 7.

Key menu 3 6: INVERTER-OFF/BYPASS

```
INVERTER OFF AND BYPASS COMMAND = 47263
```

IT SHUTS OFF, IF BYPASS LINE IS NOT OK

To leave the menu press key 8 or any key with a sequence other than that indicated.
Pressing keys 4, 7, 2, 6 and 3 in succession as shown on the viewer activates the bypass command and shuts off the inverter. This command is mostly useful if sent through an RS232 remote connection if it is desired to disactivate only the power circuits while keeping the control circuit alive.The action following the command is executed with a few minutes of delay to allow for cancellations.
When this command is active the viewer shows the alarm “BYPASS COMMAND ACTIVE; 8=DISACTIVATION”.
To return to normal operation even after shutting off the system it is necessary to cancel the command with key 8 or sending the key code through the RS232.
NOTE. To mask the code of the command, 47263, you must insert code 436213, in the CUSTOMISING menu on the panel (keys 3,5). Repeat the operation to display the code.

Key menu 3 7: TOTAL SYSTEM SHUT-OFF COMMAND.

```
TOTAL SYSTEM SHUT-OFF COMMAND  = 47263
WARNING, THE OUTPUT VOLTAGE WILL BE OFF
```

Exit from the menu is obtained by pressing key 8.
When this control is active, the display presents the alarm

SYSTEM OFF COMMAND ACTIVE ; 8=DISACTIVE.

The action following the command is carried out with a few seconds of delay to permit possible cancellations.
This control is useful in the event of an emergency to obtain complete disactivation, operating from a distance through line RS232.
To reactivate the UPS close SWBY or, if required, press button 8 on the local or remote panel.
NOTE. To mask the code of the command, 47263, you must insert code 436213, in the CUSTOMISING menu on the panel . Repeat the operation to display the code.

KEY MENU 4: RECORDED EVENTS

```
          alarm message recorded
a=FFFF-FFFF;  n=100, 1992,12,31/14:45:50
```

Access to the RECORDED EVENTS menu is with key 4 of the basic menu. Press key 1 to return to the basic menu.
Key 2 activates the sub menu “MEASUREMENT OF RECORDED VOLTAGES”.
Keys 3, 4 and 5 remain with normal functions.
Key 6 activates the sub menu 4, 6 “RECORDED CODES” and permits exchange of the alarm message memorized with display of the status codes corresponding to the moment of the memorized event and vice versa.
The status codes permit thorough analysis of the event. For interpretation see the menu of the key 7 INTERNAL CODES and the table of memorized codes.

Keys 7 and 8 secure display of the events preceding and following the event displayed.

alarm message recorded	Indicates one of the alarm messages corresponding to that displayed during the last event and contained in the memory of the events. The memory can contain up to 120 events. When the memory is full each new event is memorized and cancels the last one.
a=FFFF-FFFF	Indicates the memorized code for the other alarms present at the same time together with that indicated by the 'memorized alarm message'.
n=100	Indicates the number of events contained in the memory.
1992,12,31/14:45:50	Indicates the date and hour of the moment when the displayed event occurred. It is expressed in year, month, day / hour, minute, second

Key menu 4 2 RECORDED VOLTAGES MEASUREMENT

```
IN=100,100,100%V,50.0Hz; BATT=430V,+100A
BY=230V,50.0Hz; n35 OUT=220V,50.0Hz,100%
```

Press key 1 to return immediately to the basic menu.
In the example, n35 (flashing) indicates that the measurements shown are for the status of recorded event 35.

Key menu 4 2 2: RECORDED CURRENT MEASUREMENT

```
IN=100,100,100%A;Ts=25°C,Tr=45°C,Ti=45°C
i=230Vln,430Vb;n 35 OUT=100,100,100%Arms
```

Press key 2 to return to menu 4,2; key 1 to return to basic menu.
In the example, n35 (flashing) indicates that the measurements shown are for the status of recorded event 35.

Key menu 4 2 2 2: RECORDED 3-PHASE VOLTAGE MEASUREMENT

```
BY=230,230,230Vln;    OUT=230,230,230Vln
                n 35   OUT=100,100,100Apk
```

Press key 2 to return to menu 4,2,2; key 1 to return to basic menu.
In the example, n35 (flashing) indicates that the measurements shown are for the status of recorded event 35.

Key menu 4 6: RECORDED CODES

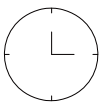
```
s=FFFF c=FFFF b=FFFF r=FFFF-FF i=FFFF-FF
a=FFFF-FFFF;  n=100, 1992,12,31/14:45:50
```

Access to the menu RECORDED CODES is with key 6 from menu 4 RECORDED EVENTS and menus 4,2; 4,22; 4,2,2,2, i.e. those of recorded measurements.
Press key 1 to return to basic menu.
The other keys except 6 and the indications of the bottom line have the same functions as those of menu 4.
The top line: s=FFFF c=FFFF b=FFFF r=FFFF-FF i=FFFF-FF,
shows the internal codes, explained in menu 7, recorded at the same time as the event.
Press key 6 to return to menu 4 keeping the event current

KEY MENU 5: ACOUSTIC ALARM EXCLUSION

During operation with the presence of the basic menu the operator can exclude or again enable permanently the audible alarm by pressing key 5.
In the basic menu 5=ON appears when the audible alarm is enabled and 5=OFF appears when the audible alarm is excluded.
In other menus, when other functions are not provided, key 5 can be used only for sound exclusion.

KEY MENU 6: "CLOCK": DATE/TIME



```
DATE/TIME=  ymd/h =  2000 12 31/24:60'60
                TYPE CODE ....
```

The viewer shows the present contents of the internal calendar and clock in the format:
DATE/TIME = ymd/h=year,month,day/hour,minute,second

It is possible to change the contents by recalling the related menu by entry of the customizing code 436215.The code is not required for 2 minutes after the first previous entry thereof.
Only entering the correct code secures access to the next menu, otherwise one returns to the basic menu.

```
DATE/TIME=  ymd/h =  1993 12 31/24:60'60
Adj.:  2=ye. 3=mo. 4=day. 5=hours 7=min..
```

The number to be changed is selected with one of the keys 2, 3, 4, 5 or 7.

```
DATE/TIME=  Xmd/h =  1993 12 31/24:60'60
  ADJUSTMENT:                7=-,  8=+
```

Pressing key 7 or 8 increases or decreases by one unit the value selected. Pressing one of the other keys exits from menu.

KEY MENU 7 "ARROW DOWN": INTERNAL CODES

```
s=FFFF c=FFFF b=FFFF r=FFFF-FF i=FFFF-FF
a=FFFF-FFFF;  INTERNAL CODES;  ver.10001
```

(memorized internal codes)

Access to the INTERNAL CODES menu is with key 7 from the basic menu.

Press key 7 again to accede to the second menu of internal codes. Press any other key to exit.

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

(unmemorized internal codes). N.B. these codes are used only during the testing in factory.
In the first menu, ver. 10001 is an example of an identifying number of the system program version.

It is recalled that hexadecimal enumeration can use the following symbols for each single figure:
1,2,3,4,5,6,7,8,9,A,B,C,D,E,F.

The figures of the 6 groups of the first menu are memorized upon each event, hence are useful for having information on the internal status present and past. The other figures of the other groups are not memorized.

The first group contain variables related to:
s=system c=output load, b=bypass, r=rectifier and battery, i=inverter, a=alarms.
The next group are related to:
e=input, g=general, u=output, y=bypass, j=inverter, k=load, v=voltages, p=peripherals, l=LED, m=memory.

Each figure of the various groups supplies the status of 4 or information or variables, e.g. to the first figure of the group s=.... correspond:

(with 1 if true, 0 if false) high system temperature
(with 2 if true, 0 if false) initialization error
(with 4 if true, 0 if false) remote shut-down command active
(with 8 if true, 0 if false) auxiliary input on system card active.

When s=F.... is read, hence the first figure of the group s is F. Since in the hexadecimal system F = 1 + 2 + 4 + 8,
it is inferred that:

1=system temperature is high	=TRUE, i.e. there is high temperature in the system
2=initialization correct	=TRUE, i.e. system initialization is correct
4=remote shutoff command active	=TRUE, the command is active
8=auxiliary input on system card active	= TRUE, the input is active.

If s=A.... is read, since A = 2 + 8, it is inferred that:

1=system temperature is high	=FALSE, i.e. there is NO high temperature in the system
2=initialization correct	=TRUE, i.e. system initialization is NOT correct
4=remote shutoff command active	=FALSE, the command is NOT active
8=auxiliary input on system card active	= TRUE, the input is active.

KEY MENU 8 "ARROW UP": NORMAL

```
            NORMAL OPERATION
  M100,   OUT=100%VA   BATT.=100%Ah   5=ON
```

Access to the menu NORMAL is with key 8 from menu 1 HELP and from all the other menus in which no other function is provided. In addition, the system returns AUTOMATICALLY to the menu NORMAL, i.e. the basic menu, always after two minutes after last pressing a key.

TABLE OF MEMORIZED INTERNAL CODE

[s =system, c=load, b=bypass, r=rectifier, i=inverter, a=alarm]

s=X...	1		3		5		7		9		B		D		F	High system temperature
		2	3			6	7			A	B			E	F	Initialisation error
(1)				4	5	6	7					C	D	E	F	System off command active.
								8	9	A	B	C	D	E	F	Auxiliary input on system card.

s=.X..	1		3		5		7		9		B		D		F	System card power supply error.
		2	3			6	7			A	B			E	F	Temporary anomaly in power supply card.
(2)				4	5	6	7					C	D	E	F	Synchronism error on system card.
								8	9	A	B	C	D	E	F	Output frequency measurement error on system card.

s=..X.	1		3		5		7		9		B		D		F	Low voltage from battery or rectifier.
		2	3			6	7			A	B			E	F	Low voltage pre alarm from battery or rectifier.
(3)				4	5	6	7					C	D	E	F	Battery contactor open.
								8	9	A	B	C	D	E	F	Permanent anomaly in battery contactor.

s=...X	1		3		5		7		9		B		D		F	Power supply card anomaly. (only ver.<=152)
		2	3			6	7			A	B			E	F	Presence of the signal RS232 DSR_ON..
(4)				4	5	6	7					C	D	E	F	Configuration circuit not present.
								8	9	A	B	C	D	E	F	Jumper CONFIG2 not present.

c=X...	1		3		5		7		9		B		D		F	Output overload, line 2
		2	3			6	7			A	B			E	F	Output overload, line 3
(1)				4	5	6	7					C	D	E	F	Permanent overload.
								8	9	A	B	C	D	E	F	TA DIFF. signal present

c=.X..	1		3		5		7		9		B		D		F	High peak output current, line 1
		2	3			6	7			A	B			E	F	High peak output current, line2
(2)				4	5	6	7					C	D	E	F	High peak output current, line3
								8	9	A	B	C	D	E	F	Output overload, line 1

c=..X.	1		3		5		7		9		B		D		F	Instantaneous output voltage error, line 2
		2	3			6	7			A	B			E	F	Instantaneous output voltage error, line 3
(3)				4	5	6	7					C	D	E	F	Average output voltage error, line 1.
								8	9	A	B	C	D	E	F	Average output voltage error, line 2.

c=...X	1		3		5		7		9		B		D		F	-
		2	3			6	7			A	B			E	F	Output switch SWOUT open
(4)				4	5	6	7					C	D	E	F	Average out. voltage error, line 3.
								8	9	A	B	C	D	E	F	Instantaneous output voltage error, line 1

b=X...	1		3		5		7		9		B		D		F	Bypass line no. 3 input voltage error
		2	3			6	7			A	B			E	F	Bypass line frequency error
(1)				4	5	6	7					C	D	E	F	Sequence error in phases 1 and 2 at bypass line input
								8	9	A	B	C	D	E	F	Manual bypass switch SWMB closed.

b=.X..	1		3		5		7		9		B		D		F	Active remote command bypass (inverter OFF).
		2	3			6	7			A	B			E	F	Static switch anomaly (SCR) for bypass
(2)				4	5	6	7					C	D	E	F	Bypass line no. 1 input voltage error
								8	9	A	B	C	D	E	F	Bypass line no. 2 input voltage error

b=..X.	1		3		5		7		9		B		D		F	SCR bypass line permanently closed
		2	3			6	7			A	B			E	F	Bypass line disabled.
(3)				4	5	6	7					C	D	E	F	Permanent anomaly closing inverter output contactor
								8	9	A	B	C	D	E	F	Bypass command active

b=...X	1		3		5		7		9		B		D		F	Anomaly in inverter output contactor
		2	3			6	7			A	B			E	F	Inverter output contactor open
(4)				4	5	6	7					C	D	E	F	Bypass line contactor closed.
								8	9	A	B	C	D	E	F	Anomaly in bypass line contactor.

r=X...-..	1		3		5		7		9		B		D		F	Low input voltage, line 2
		2	3			6	7			A	B			E	F	Low input voltage, line 3.
(1)				4	5	6	7					C	D	E	F	No input current, line 1.
								8	9	A	B	C	D	E	F	No input current, line 2

r=.X..-..	1		3		5		7		9		B		D		F	High input voltage, line 1
		2	3			6	7			A	B			E	F	High input voltage, line 2
(2)				4	5	6	7					C	D	E	F	High input voltage, line 3.
								8	9	A	B	C	D	E	F	Low input voltage, line 1.

r=..X.-..	1		3		5		7		9		B		D		F	High rectifier temperature
		2	3			6	7			A	B			E	F	High rectifier output voltage
(3)				4	5	6	7					C	D	E	F	Power supply error on rectifier control.
								8	9	A	B	C	D	E	F	Rectifier disablement

r=....X-..	1		3		5		7		9		B		D		F	No input current, line 3
		2	3			6	7			A	B			E	F	Power limitation in rectifier.
(4)				4	5	6	7					C	D	E	F	Adjustment error in rectifier
								8	9	A	B	C	D	E	F	Rectifier input line frequency error.

r=....-X.	1		3		5		7		9		B		D		F	Permanent anomaly rectifier (only ver.<=152)
		2	3			6	7			A	B			E	F	Error in voltage DRV1 in rectifier
(5)				4	5	6	7					C	D	E	F	Error in voltage DRV2 in rectifier
								8	9	A	B	C	D	E	F	Error in voltage DRV3 in rectifier

r=....-.X	1		3		5		7		9		B		D		F	Anomaly in one section of rectifier. (only ver.<=152)
		2	3			6	7			A	B			E	F	-(SGP power fail *)
(6)				4	5	6	7					C	D	E	F	(Parallel cable fail or SWMB close-*)
								8	9	A	B	C	D	E	F	-

i=X...-..	1		3		5		7		9		B		D		F	Error in inverter connections
		2	3			6	7			A	B			E	F	Error in inverter power supply.
(1)				4	5	6	7					C	D	E	F	(parallel syncro fail *)
								8	9	A	B	C	D	E	F	(parallel UPS Master *)

i=.X..-..	1		3		5		7		9		B		D		F	Cables reversed on pilot (only ver.<=152)
		2	3			6	7			A	B			E	F	Lockup by card or module 3 in inverter
(2)				4	5	6	7					C	D	E	F	Lockup by card or module 2 in inverter.
								8	9	A	B	C	D	E	F	Instantaneous overcurrent

i=..X.-..	1		3		5		7		9		B		D		F	High voltage at inverter output
		2	3			6	7			A	B			E	F	High continuous voltage at inverter input (Vdc)
(3)				4	5	6	7					C	D	E	F	High temperature on sensor 1 in inverter
								8	9	A	B	C	D	E	F	High temperature on sensor 2 in inverter

i=....X-..	1		3		5		7		9		B		D		F	Anomalia inverter/ Inverter anomaly
		2	3			6	7			A	B			E	F	Absence of synchronism between inverter and by pass line
(4)				4	5	6	7					C	D	E	F	Auto reset of inverter control
								8	9	A	B	C	D	E	F	Auxiliary feeder error for IGBT modules

i=....-X.	1		3		5		7		9		B		D		F	Low alternating voltage at inverter output
		2	3			6	7			A	B			E	F	Low continuous voltage at inverter output
(5)				4	5	6	7					C	D	E	F	Manual reset of inverter control.
								8	9	A	B	C	D	E	F	Permanent inverter anomaly (only ver.<=152), reverse cable on pilot (only ver. >153)

i=....-.X	1		3		5		7		9		B		D		F	High temperature on sensor 3 in inverter
		2	3			6	7			A	B			E	F	Lockup by card or module 1 in inverter
(6)				4	5	6	7					C	D	E	F	(parallel serial data fail *)
								8	9	A	B	C	D	E	F	Inverter disablement.

a=X...-....	1		3		5		7		9		B		D		F	LOW BATTERY VOLTAGE
		2	3			6	7			A	B			E	F	LOW INPUT VOLTAGE OR OVERLOAD [W].
(1)				4	5	6	7					C	D	E	F	BATTERY DISCHARGED OR SWB OPEN
								8	9	A	B	C	D	E	F	OUTPUT OVERLOAD.

a=.X..-....	1		3		5		7		9		B		D		F	DISTURBANCE ON BYPASS LINE
		2	3			6	7			A	B			E	F	MANUAL BY PASS, SWBM ON
(2)				4	5	6	7					C	D	E	F	BY PASS LINE VOLTAGE FAIL or SWBY, FSCR OFF
								8	9	A	B	C	D	E	F	MAINS LINE VOLTAGE FAIL or SWIN OFF

a=..X.-....	1		3		5		7		9		B		D		F	INTERNAL FAULT: 3 output contactor
		2	3			6	7			A	B			E	F	INTERNAL FAULT: 4 rectifier lockup
(3)				4	5	6	7					C	D	E	F	INTERNAL FAULT: 5 SCR bypass line.
								8	9	A	B	C	D	E	F	INTERNAL FAULT: 6 power supply.

a=...X-....	1		3		5		7		9		B		D		F	TEMPORARY or PERMANENT BYPASS
		2	3			6	7			A	B			E	F	BYPASS FOR OUTPUT VA < AUTO_OFF
(4)				4	5	6	7					C	D	E	F	INTERNAL FAULT: 1 no circ configuration.
								8	9	A	B	C	D	E	F	INTERNAL FAULT: 2 inverter lockup

a=....-X...	1		3		5		7		9		B		D		F	BYPASS FOR OUTPUT OVERLOAD
		2	3			6	7			A	B			E	F	ACTIVE BYPASS COMMAND; 8=COMMAND OFF
(5)				4	5	6	7					C	D	E	F	REMOTE BYPASS COMMAND: ACTIVE.
								8	9	A	B	C	D	E	F	

a=....-.X..	1		3		5		7		9		B		D		F	INTERNAL FAULT: 7 system card power supply.
		2	3			6	7			A	B			E	F	INTERNAL FAULT: 8 one rectifier section
(6)				4	5	6	7					C	D	E	F	INTERNAL FAULT: 9 battery contactor.
								8	9	A	B	C	D	E	F	INTERNAL FAULT: 10 inverter - converter comunicat

a=....-..X.	1		3		5		7		9		B		D		F	REMOTE SYSTEM OFF COMMAND: ACTIVE.
		2	3			6	7			A	B			E	F	memory changed: CODE=....
(7)				4	5	6	7					C	D	E	F	- INTERNAL FAULT: 11, inverter output connection or bypass
								8	9	A	B	C	D	E	F	- stop for internal timer

a=....-...X	1		3		5		7		9		B		D		F	OVERTEMPERATURE OR FAN FAILURE.
		2	3			6	7			A	B			E	F	ERRONEOUS INPUT PHASE SEQUENCE.
(8)				4	5	6	7					C	D	E	F	OUTPUT OFF CLOSE SWOUT OR SWMB
								8	9	A	B	C	D	E	F	SYSTEM OFF COMMAND ACTIVE; 8=DISACTIVATION.