POWER SYSTEMS

DSP Series UPS

User Guidance and Operating Instruction

Version 1.2

Caution

This manual contains instructions about UPS installation, usage and operation. Please read this manual carefully before installation of system. Do not operate this UPS before reading all information of safety and operation. Please abide by all warning and operation instructions in this manual and the machine, and meanwhile keep this manual properly.

Safety

UPS must be earthed before usage.

Batteries must be replaced by qualified maintainers. According to the laws, batteries are poisonous waste. Wasted batteries must be classified and recovered in accordance with requirements of green and environmental protection.

In case of fire, control the fire correctly by the dry powder extinguisher. Electric shock may happen if the fluid extinguisher is used.

Copyright notice

Because the product is continuously updated and upgraded, further modification will not be notified. And the product shall be subject to the real object.

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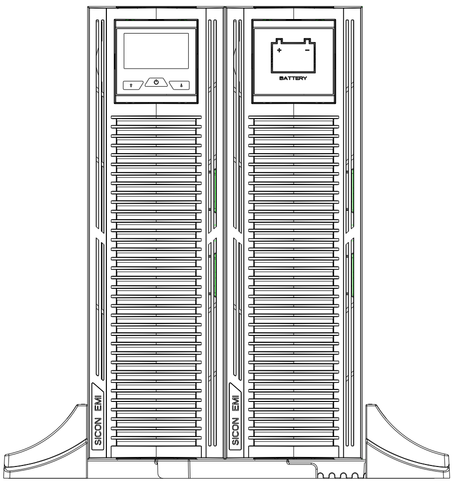
I. UPS description

DSP series UPS provides advanced electricity protection to high power density data center, banks and safety manufacturing process control, retail vending machine, telecom/VoIP devices and the like places: offers clean and continuous electricity, protects key equipment and applications from power interruption, data loss and damage and other influence during the power interruption.

For DSP series UPS, the AC input is three-phase 220V, the voltage of batteries is ±240V, and the output is three-phase AC voltage 220V. The battery pack is expanded via the battery port to realize a long backup time.



II. Environment of installation

- ✧ The placing position must be stable;
- ✧ The space from each face of UPS case to the wall must keep sufficient ventilation distance;
- ✧ It shall be far from the heat source and corrosive objects, avoiding of direct sunlight;
- ✧ Keep normal working temperature, humidity and altitude;

  Working temperature: 0℃～40℃; altitude: ≤1000m;

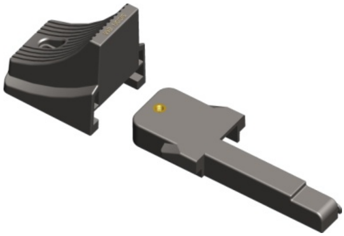
  Relative humidity: ≤93%   No condensation
- ✧ Maintain a clean working environment, which shall be far from moisture, flammable gases, flammable liquid or corrosive objects.
- ✧ There are no violent vibration and impact. The vertical gradient shall not exceed 5%.

III. Installation

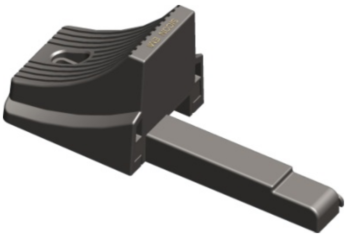
1. Tower-type

(1) First assemble the following single pieces.

A:

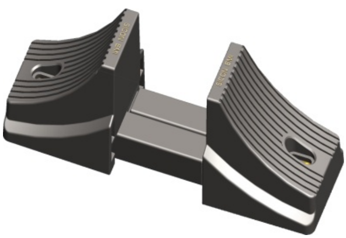


B:



(2) Assemble to a complete set of bracket according to the following figure.

C (front view):



(back view):

(3) lay two sets of assembled brackets in parallel, and put UPS on the brackets. The two sides of brackets can be adjusted. After adjusting to proper size according to the size of UPS, fix screws to brackets by a screw driver.

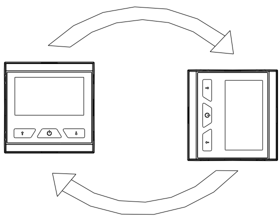
2. Rack-type

(1) Apply the fixing screws. Fix hangers to the UPS by a screw driver.

(2) Put the well mounted UPS to the bracket according to requirements. The installation completes once being fixed.

3. Display

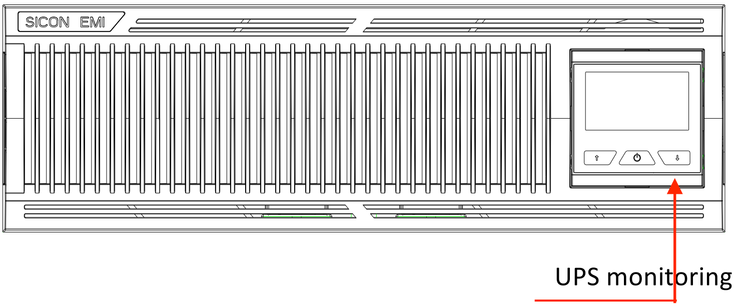
The UPS display can be rotated. It can be rotated to the following two directions only. The rotating angle is 90degree.



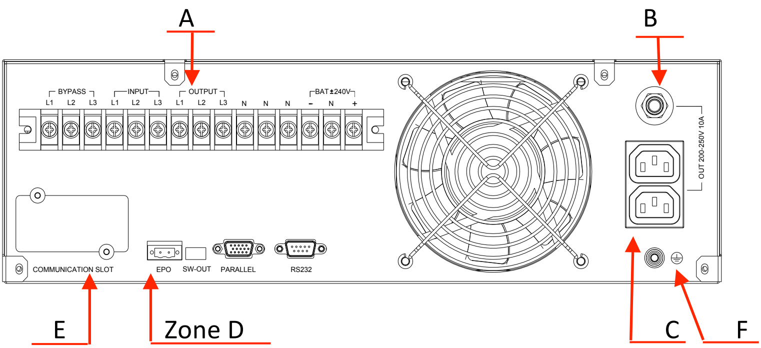
VI. Introduction of system

1. UPS appearance

Front view



Back view



A: input and output wiring terminals;

B: output overcurrent protective device;

C: output socket;

Zone D:

EPO: the signal of Emergency Power Off. When this signal is shorted for 2.5s, UPS will be shut down, and the system will be locked without output; after the status of short circuit finishes, the system must be started by a manual way.

SW-OUT: the signal of auxiliary contact for output breaker; this signal is connected to the commonly closed contact of output breaker.

> Notes: if two UPSs are combined and the SW-OUT is not connected to the commonly contact of SW-OUT, one of UPS will be restarted automatically during the starting process of two UPSs.

PARALLEL: parallel operation port (optional);

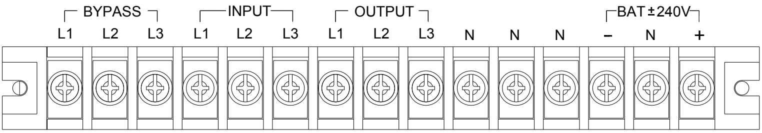
> Notes: if two UPSs are under parallel operation, the parallel operation port of two UPSs will be connected by the parallel operation wire.

RS232; RS232 communication interface;

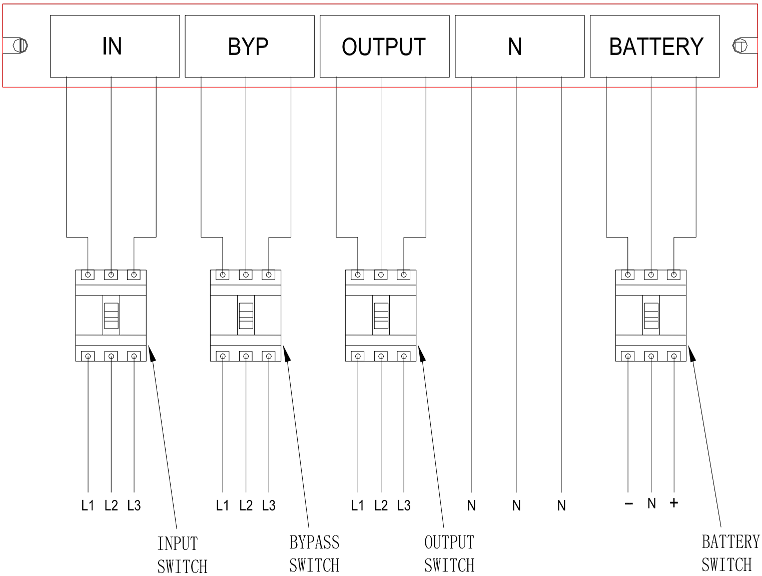
E: SNMP communication interface (optional);

F: GND

2. Input and output terminal



3. External wiring diagram



Notes: 1. During wiring, connect the UPS to corresponding wiring terminal via breaker.

2. When the system is three-input and single-output, the by-pass and the output wiring are single-phase (three phases are connected in parallel).

4. Selection of path

Three-input and three-output

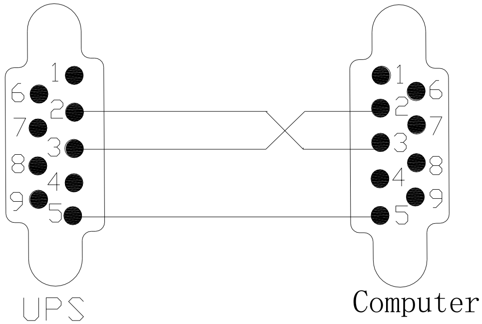
Name of system		DSP-10KVA	DSP-15KVA	DSP-20KVA
UPS capacity		10KVA	15KVA	20KVA
Input and output voltage		380		
INPUT	Maximum current A	16	25	33
	Cable mm^2	6	10	10
BYPASS	Maximum current A	16	25	33
	Cable mm^2	6	10	10
OUTPUT	Rated current A	12	18	24
	Cable mm^2	6	10	10
BATTERY	Maximum current A	17	25	33
	Cable mm^2	6	10	10
PE	Cable mm^2	4	6	6

Three-input and single-output

Name of system		DSP-10KVA	DSP-15KVA	DSP-20KVA
UPS capacity		10KVA	15KVA	20KVA
INPUT	Voltage V	380		
	Maximum current A	16	25	33
	Cable mm^2	6	10	10
BYPASS	Voltage V	220		
	Maximum current A	50	74	98
	Cable mm^2	6*2	10*2	10*2
OUTPUT	Voltage V	220		
	Rated current A	36	54	72
	Cable mm^2	6*2	10*2	10*2
BATTERY	Maximum current A	17	25	33
	Cable mm^2	6	10	10
PE	Cable mm^2	6	10	10

5. Communication interface

A: RS232 interface: RS232 standard 9-pin connector just uses three pins, #2, 3 and 5, corresponding to the receiving, sending and GND of UPS. Cross serial port lines can be used to connect to the computer directly. The wiring of cross serial port lines is showed in the figure:



Reminder: pin #2 and 3 of cross line are connected in cross way, and pin #5 is connected directly.

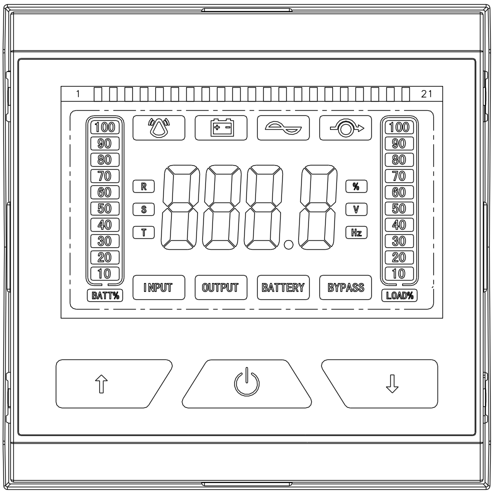
B. SNMP card communication (optional)

It is connected to the computer via a straight-through network cable.

The introduction of upper computer software is in UPS disc. Please refer to the UPS disc for help if necessary.

V. UPS monitoring

UPS monitoring adopts LED display, where the integrated display module is used. This interface reflects the current UPS status to users and submit the user input to the control unit.



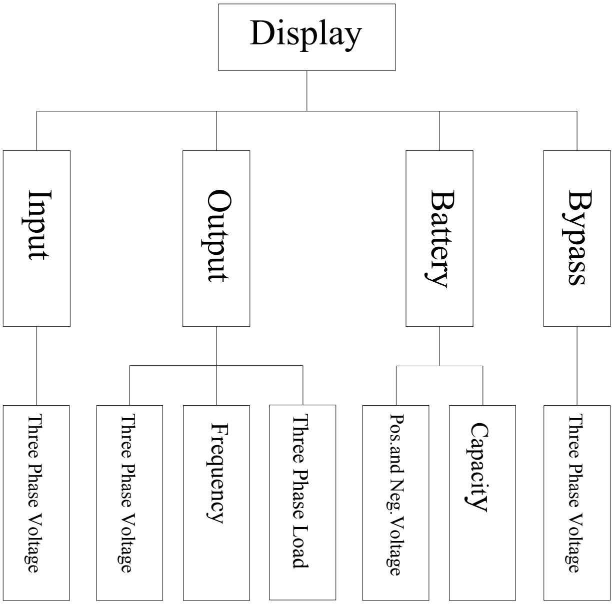
Key:

- ⇧ or ⇩ : select contents to be checked.
- ⏻ : ON/OFF key, press for 2.5s to turn on/off the machine.

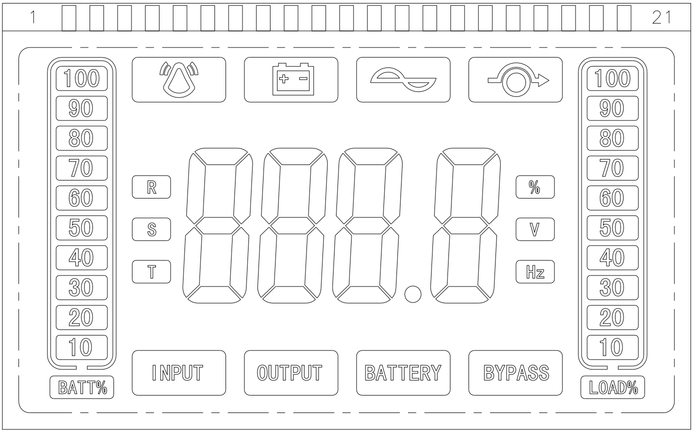
> Reminder: during operation of ON/OFF key, after the system receives a command, the buzzer will make the sound of Tick, Tick, Tick, and after that, the system starts to turn on/off.

VI. Monitoring display

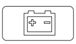
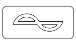
1. Structure of display

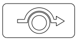


2. Introduction of display



Explanation of icons:

- BATT%: remaining power of battery;
- LOAD%: 100% of load.
- : icon of alarm; this icon will be displayed only when UPS makes an alarm.
- : icon of power supply by battery; this icon will be displayed only when the power is supplied by UPS batteries.
- : icon of inversion online; this icon will be displayed only when the UPS is at the inversion online status.

- : icon of bypass status; this icon will be displayed only when the UPS is at the bypass status.
- 

: icon of AC input parameter; this icon will be displayed only when the AC input three-phase voltage is checked.
- 

: icon of UPS output parameter: this icon will be displayed only when the output three-phase/single-phase parameter (100% load, voltage and frequency) of UPS are checked.
- 

: icon of battery parameter: this icon will be displayed only when the parameter (battery voltage: R means positive; S means negative and the percentage of remaining power volume) of battery are checked.
- 

: icon of bypass parameter; this icon will be displayed only when the bypass three-phase/single-phase voltage of UPS is checked.

Notes: 1. Check each parameter such as AC input, UPS output, battery and bypass. Switch the display by the "up" key. The specific parameters (the switching of three phases of UPS output, voltage, frequency, load percentage and charging status of battery and remaining percentage of power) can be switched by the "down" key.

2. During the starting process, the selection interface of single/parallel operation will show up, among which "S" means the single operation mode (factory default mode) and "P" means the parallel operation mode. These are switched via "up" key.

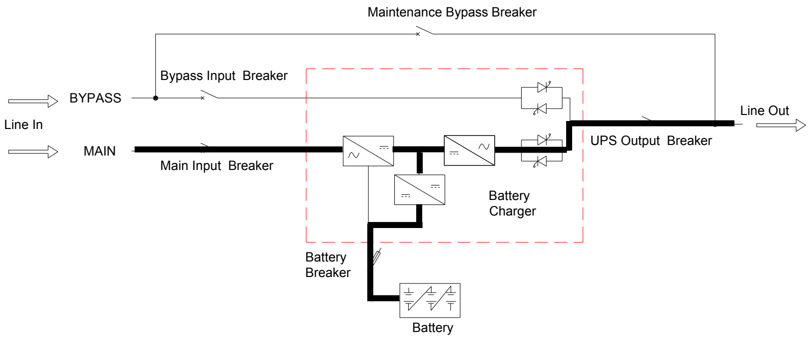
Reminder: in case of an alarm, the alarm screen shows up automatically. The alarm screen can be exited only after pressing the "up" key and the "down" key at the same time.

Reminder: if no operation is made to the monitoring within 1 minute, the UPS monitoring display will be switched to the default display automatically. And the the default display is the output voltage.

VII. Operation method

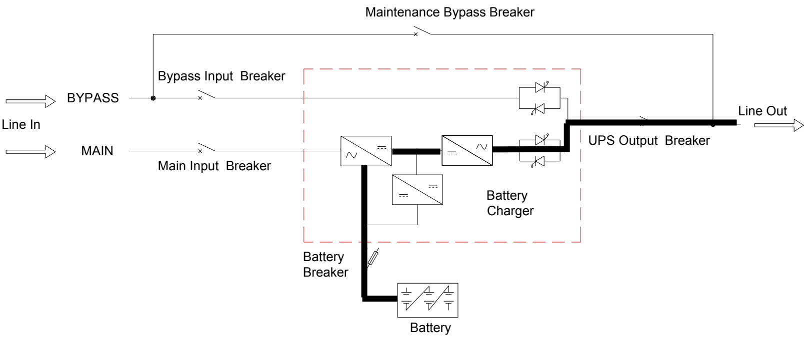
1. Normal mode

The normal mode means the input of main circuit; after the Main Input Breaker is closed, and after the change of AC/DC or DC/AC, the output load of UPS will be supplied by the Main Input, and then UPS can work normally. if at this time the Battery Breaker is closed, the battery will be charged via DC/DC.



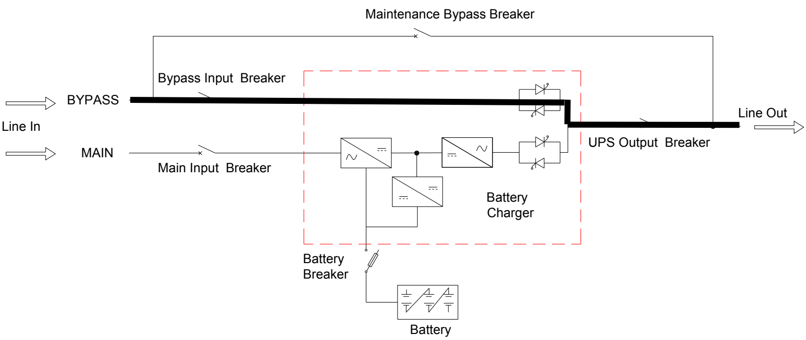
2. Operation on battery

The operation mode on battery means the UPS is not powered by Main Input and it is supplied by the batteries; after Battery Breaker is closed, and after the change of DC/DC or DC/AC, the UPS output load is provided by BATTERY, and then UPS can work normally.



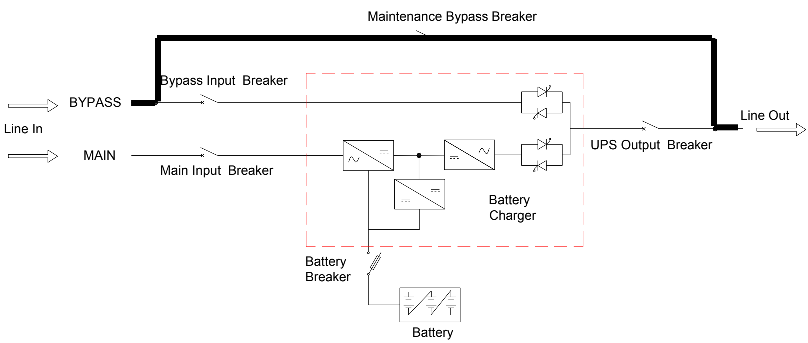
3. Bypass operation

The mode of bypass operation means that the UPS is powered by neither Main Input, nor battery, and after the Bypass Breaker is closed, the AC bypass can offer output load to UPS directly.



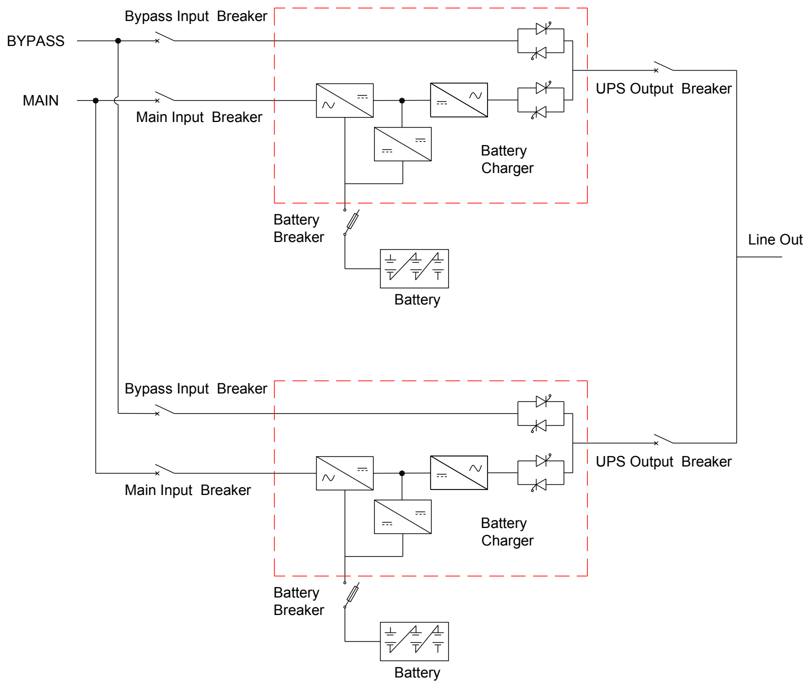
4. Maintenance bypass operation

The mode of maintenance bypass operation means that the UPS is out of working status, which is directly powered by the maintenance bypass. When users want to inspect or replace the UPS, the UPS has to be powered by the maintenance bypass. Firstly, users have to shut down the UPS manually to the bypass status. The UPS works under bypass operation mode. Now close the maintenance bypass breaker. After the output load becomes normal after being supplied by the maintenance bypass, and then disconnect the output breaker, and at last disconnect the bypass input breaker.



VIII. Parallel operation of system

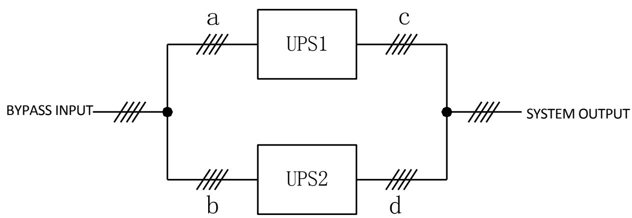
1 . Diagram of parallel operation principles



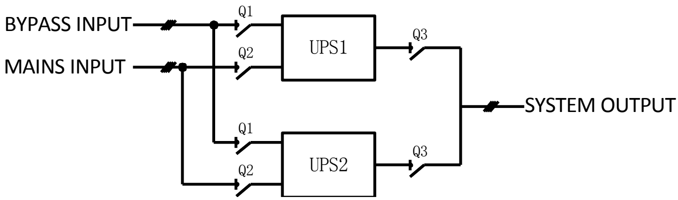
2. Connection of AC input and output lines

1) To realize better current sharing for parallel operation system when the system is under bypass output, following requirements must be satisfied strictly:

- The length of bypass input line for each system shall be the same
- The length of output line for each system shall be the same
- Bypass input line: a=b; output line: c=d



(2) Under the parallel operation status, in order to be able to exit one system when the operation of other systems are not affected, the mains input, the bypass input and the system output of each system must be equipped with breakers. Each output breaker must be added with one group of passive and commonly-opened auxiliary contact. The auxiliary contact shall have sufficient insulation with the main contact of breaker. Meanwhile it shall also have enough insulation with other contacts (if any) of the breaker.



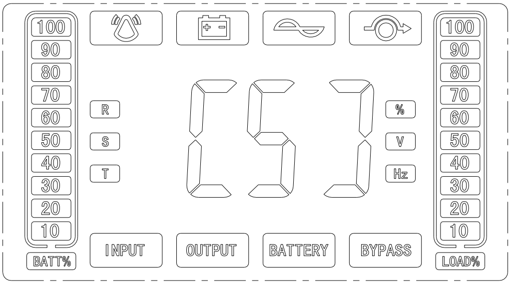
Notes: if two UPSs are under parallel operation, the parallel operation port of two UPSs will be connected by the parallel

IX. Operation

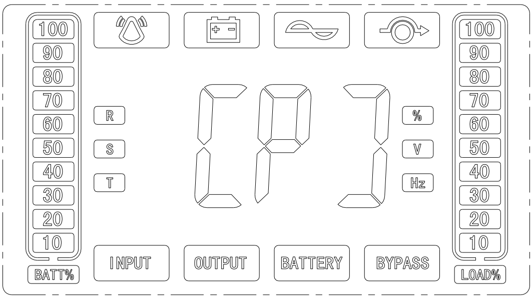
1. Start operation (mode of parallel operation)

(1) Connect each input and output cable.

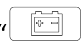
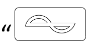
(2) Close the mains input breaker and the battery input breaker of one of UPS, and then press the ON/OFF key for over 2.5s. The UPS then will be started. During the starting process, the interface for selection of start mode will show up: it is defaulted to be "S" single-operation mode.



At this interface, press "  " key to switch, and select "P" parallel operation mode, as showed hereinafter:



Notes: after making this selection, the interface will stop for 5s. If no further selection during the dwell time, UPS will execute the working mode selected at the last time

After a normal start self-check, the monitor will display "remaining percentage of battery volume", "  " and "  ".

At this time, the mains input parameter and the battery parameter can be viewed.

(3) After normal start of the first UPS, start the second UPS according to the above steps.

(4) After the first two UPS are started normally, separately close the output breakers of UPS1 and UPS2.

2. Exit mode of parallel operation

(1) Press the ON/OFF key for over 2.5s, and then UPS is shut down.

(2) Disconnect the external output breaker of system.

(3) Disconnect the breakers for system mains, battery and output.

3. Shutdown operation (non parallel operation mode)

(1) Shut down UPS under normal mode

Press the ON/OFF key for over 2.5s, and then UPS is shut down and switched to the bypass mode. When the UPS works under the bypass mode, the UPS still has output. If trying to enable UPS without any output, you just have to disconnect the bypass input.

(2) Shut down UPS under battery mode

Press the ON/OFF key for over 2.5s, and then UPS is shut down and switched to the bypass mode. When the UPS works under the bypass mode, the UPS still has output. If trying to enable UPS without any output, you just have to disconnect the bypass input.

4. Operation of maintenance bypass breaker

When two UPS are operated under parallel operation mode, before the maintenance bypass breaker is operated, firstly shut down one UPS by manual way, to make it exit the parallel operation mode; and then shut down the other UPS and switch it to the bypass mode.

X. Description of fault code

Class	English	Alarm code
Status alert	BY-PASS	H1
	ON-LINE	H2
	BATTERY OPERATION	H3
	SYSTEM LOCKED	H4
	SYSTEM ON	H5
	SYSTEM OFF	H6
	INPUT LINE RESTORED	H7
	BYPASS LINE RESTORED	H8
	BATTERY RESTORED	H9
	LOAD RESTORED	H10
	TEMPERATURE OK	H11
	FAN OK	H12
External	INPUT VOLT ANOMALY	E1

anomaly	INPUT FREQ ANOMALY	E7
	INPUT PHASE ANOMALY	E8
	BATTERY#1 ANOMALY	E9
	BATTERY#2 ANOMALY	E14
	BATTERY OVER TEMPERATURE	E19
	LOAD PRE. ALARM	E20
	OVER LOAD	E23
	OUTPUT SHORT CIRCUIT	E26
	HIGH CURRENT PEAK	E29
	BYPASS VOLT ANOMALY	E32
	BYPASS FREQ ANOMALY	E38
	SPD WARN	E39
Internal fault	INTERNAL COMM FAULT	F1
	SYNC FAULT	F2
	PRE. CHARGE FAULT	F3
	BOOST FAULT	F5
	INVERTER FAULT	F10
	CHARGER FAULT	F16
	HEAT SINK ANOMALY	F17
	AUXILIARY POWER FAULT	F25
	STATIC SWITCH FAULT	F26
	FAN FAULT	F28
	PARALLEL FAULT	F32

XI. Maintenance

1. Battery maintenance

The battery is an important part of UPS system. During daily usage, the batteries shall be cared and maintained.

- ✧ For newly purchased UPS (or UPS stored for a long time), it can be used only after being charged. Otherwise the backup time may not be ensured.
- ✧ For the UPS that is not used for a long time, release the battery at an interval of 3～6 months, and then recharge. By this way, the service life of battery can be extended.
- ✧ For the UPS that is not used for a long time, start, use and recharge the UPS at an interval of the 3～6 months. Otherwise the service life of UPS host and the battery will be reduced.

Caution: 1. Shut down the UPS before replacing the battery.

2. Take off metal objects such as rings and watches.
3. The screw driver being used shall have insulation handle. Do not put tools or other metal objects on the battery.
4. The positive and negative poles of battery shall not be short-circuited or connected reversely.

2. Inspect the status of UPS

During each site maintenance, inspect the UPS from the following aspects:

✧ Operation status of UPS

If the mains is normally supplied, the UPS shall work at the normal mode; if the mains is abnormal, the UPS shall work at the battery operation status. No failure phenomenon shall exist.

✧ Switching operation mode of UPS

To disconnect the mains input and simulate the mains anomaly, the UPS shall be switched to the battery operation status, and the operation is normal; and then reconnect the mains input, the UPS shall be switched to the normal mode and without abnormal status.

✧ Monitoring display

When the above inspection is performed, pay attention if the monitoring display of UPS is consistent to the actual operation mode.

XII. Protection function

Overvoltage protection under AC input: switch to battery supply; after the AC voltage is restored to normal status, it can be switched to mains supply automatically.

Low-voltage protection under AC input: switch to battery supply; after the AC voltage is restored to normal status, it can be switched to mains supply automatically.

Low-voltage protection of battery: switch to bypass supply.After the battery voltage is restored to normal status, it can be switched to battery supply automatically.

Inverse overvoltage protection: shut down and switch to bypass mode under the inverse output status, the inversion will be restarted automatically for one time, and after two restart within 1 minute, no further restart is allowed.

Inverse low-voltage protection: shut down and switch to bypass mode under the inverse output status, the inversion will be restarted automatically for one time, and after two restart within 1 minute, no further restart is allowed.

Output overload protection: 125％ rated load, operated for 1 minute.

Overtemperature protection: the temp is higher than 90℃, shut down.

XIII. Technical parameters

Model specification	DSP-10KVA	DSP-15KVA	DSP-20KVA
Battery characteristics			
Battery voltage	±240V, 40 batteries		
Battery current	21A	31.3A	41.7A
Maximum charging current	2A	3A	4A
AC input characteristics			
Input rated voltage	Three phase and four wire 380V		
Scope of input voltage	304Vac～456Vac		
Input current	3*19A	3*28	3*38
Input current harmonics	≤5% rated input and rated linear load		
Input power factor	0． 99 (100% linear load)		
Input frequency	45～65Hz (rated linear load of load)		
Tracking scope of frequency	±10%		
Tracking rate of frequency	0.5～2Hz/s		
AC output characteristics			
Output AC voltage	220V/230V/240V		
Output power factor	0.8		
Output active power	8KW	12KW	16KW
Output frequency	50/60Hz		
Stabilization	±0.1°(battery supply)		

precision of output frequency	
Distortion factor of output voltage	100% (linear load)
Stabilized voltage precision of output	±3%
Transient range	±5% (load 0%～100%～0% change)
Transient time	20ms
Peak factor	3:1 (rated input)
Start output delay	5～60s
Overload capacity	1 minute 125% rated load
Overall efficiency	≥92%
Unbalance parallel operation current	5% (over 50% load)
Communication interface	RS232/SNMP (optional)
Basic parameter	
Size W*D*H(mm)	430*615*132
Weight	25Kg
Installation method	Tower or rack-mounted mode
Noise	≤58dB
MTBF	100000h
Heat-dissipation	Reinforced air cooling
Protection level	IP20
Material of case	Cold-roll steel sheets, plastic cover

XIV. After-sales service

1、 We are responsible for providing timely commissioning for user in free charges, repairing or replacing elements promptly within 2 years from the date of delivery if products are damaged or unable to work normally due to poor quality or improper selection, on condition that users have abided by the required rules of storage, installation, usage and operation; after the warranty period is expiry, we are obligated to offer the paid service of maintenance for the whole usage life of our products.

2、 Our service commitment: two years of warranty and forever maintenance. We will response to users' request of maintenance within 2 hrs, and arrive at the site within 24 hrs, and solve your problems within 48 hrs. We provide the 24-hour service.

SCU Power Systems B.V.

www.scupower.eu

+31 (0)85 273 3606

support@scupower.eu