



# **Giganet 1kVA, 2kVA and 3kVA Online UPS**

**UPS Principle and Maintenance**

Giganet Networking Solutions

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# 1 General Information

## Getting start:

If you want to know:

1. Overview and what special for this UPS, refer to section Introduction.
2. Open external case; refer to Steps to Open the Case.
3. Electrical function and principle, refer to Principle of Operation.
4. Whether UPS works properly, refer to Alignments.
5. What happened to the UPS, refer to Trouble Shooting.

## Conventions:

This service manual uses the following conventions to alert you some important information for safe operation and quick working.



**Warning:** Denotes a procedure or operation, which, if not perform correctly, may result in personal injury. **Be sure not to continue operation until indicated conditions are fully understood and met.**



**Caution:** Denotes a procedure or operation, which, if not perform correctly, may cause damage to the UPS. **Be sure not to continue operation until indicated conditions are fully understood and met.**



**Information and Tips:** There are some tips and skills after this symbol. During service operations, these skills are provided by our design engineers which may help you quickly finish your work.

# 1.1 Important Safety Instructions

1. **For qualified service personnel only.**
2. **DO NOT** perform any internal service or adjustment of this product unless another person is capable of rendering first aid and resuscitation is present.
3. Dangerous voltage exists at several points in this product. To avoid personal injury, don't touch any exposed connections or components while UPS is active.
4. Turn off the UPS and disconnect input power cord before removing outside protective cover.
5. AC voltage is always present if the input AC power is still available.
6. High voltage may present at DC capacitors. Before opening the outside cover, wait for at least five minutes after turning off the UPS.
7. Verify input source (voltage and frequency) before service.

1. **DO NOT** make internal batteries short-circuited.
2. If the battery connectors are disconnected, be sure to plug in the input power cord and the input power is available before re-connect the battery connectors.
3. After service, verify the polarity of batteries, the tightness of all screws and connectors before restarting the UPS.

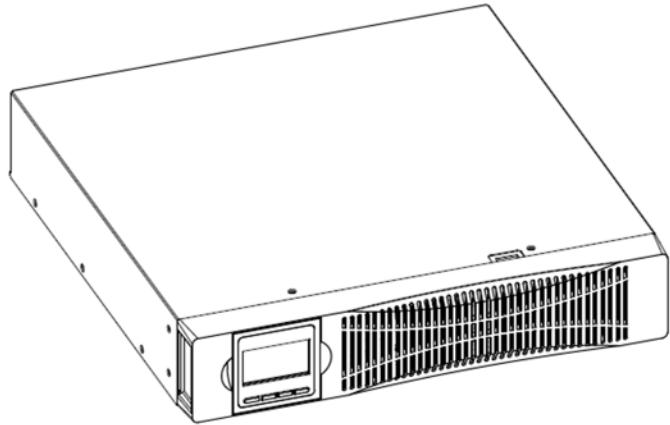
After opening the cover, please always check the tightness of all wires, connectors, and screws first. Then check if there is any de-colored components inside

## 1.2 Steps to Open the Case

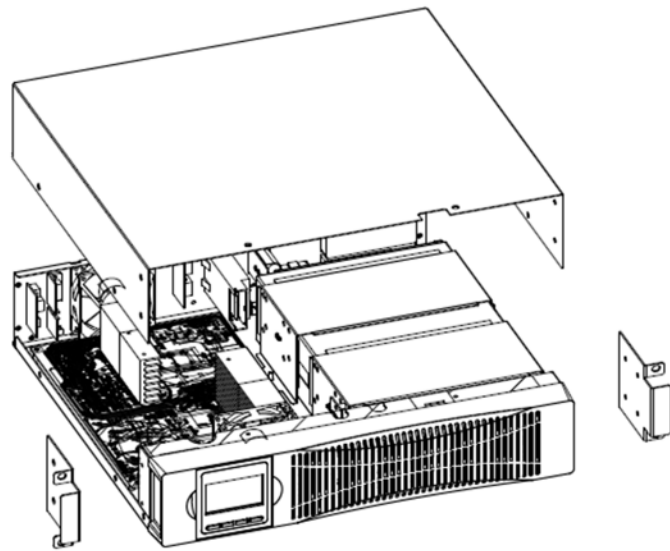
To open the outside case, please follow steps and figures 1KVA as below:

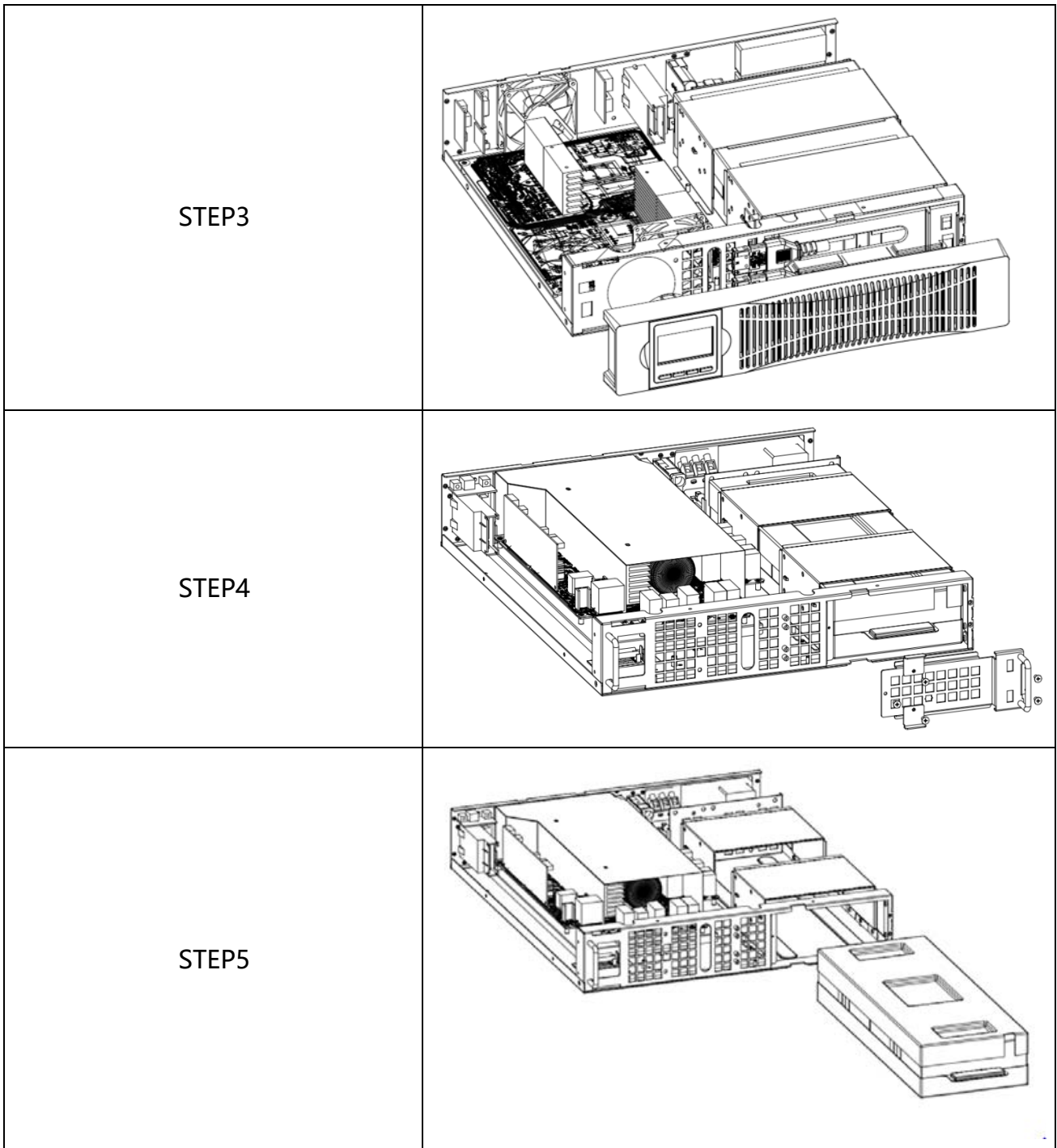
- 1.Step1: Remove related screws;
- 2.Step2: Remove the cover and related panel;
- 3.Step3&Step4: Remove the front panel of the UPS;
- 4.Step5: Remove the Battery Pack;
- 5.Done.

STEP1



STEP2

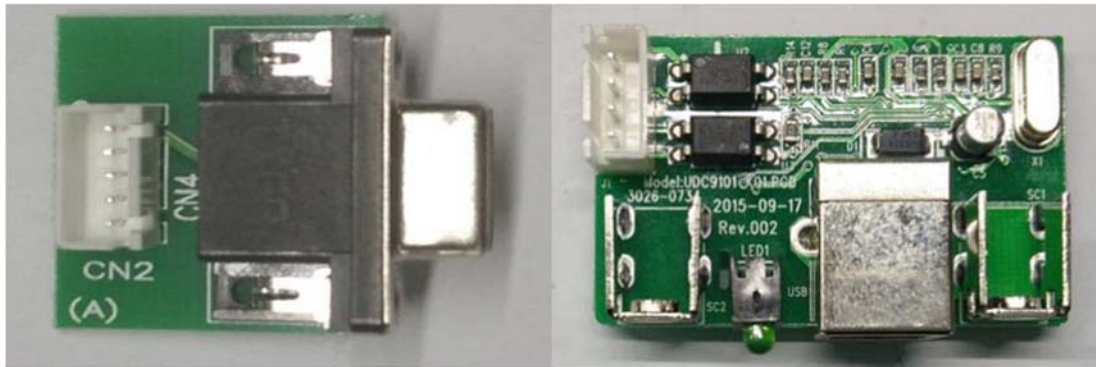




### 1.3 Customer Options Slots

#### (1).USB and RS232 card

- a. CN2 is for RS232 adapter
- b. CN4 is for RS232 DB9.
- c. J1 is for USB adapter



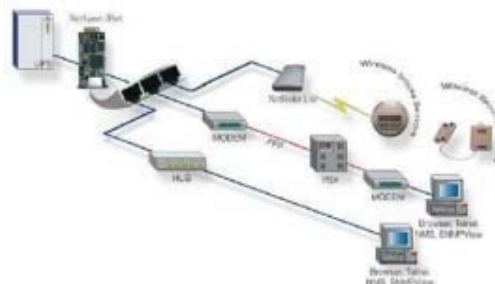
## (2).DCE (Dry Contact) card

- a. For installation, please refer to the user' s manual attached with the card
- b. Installation Position: Optional Slot



## (3).SNMP card

- a. For installation, please refer to the user' s manual attached with the card.
- b. Installation Position: Optional Slot



## 2 Introduction

For all series of UPS, they are strictly tested and carefully designed. We always do our best to make our products more reliable and safer, this is also the goal of our company. However, due to the lifetime of electrical components and some unpredictable reasons, there will be unavoidable failures of this UPS. If this situation occurs, service of qualified person is needed. This service manual will guide the technicians to repair and adjust a problematic UPS. If the UPS still does not work properly, please contact with us and we will be glad to solve any problems you met.



Because of the following unique features of this series UPS (Uninterruptible Power System), it is very easy to maintain and service.

- \* All major power components are put on PCB.
- \* All PCBs are interconnected with connectors.
- \* Major parts are simply connected with flexible insulated wires and plugs.

This service manual consists of 4 major parts:

1. Introduction.
2. Principle of operation: It describes the functions and principles of each part.
3. Alignments: It describes the locations and methods needed to adjust this UPS.
4. Trouble shooting: This part describes the possible failure conditions and procedures to repair it.

Before starting to serve this UPS, be sure to read this manual carefully for a correct and safe operation.

### 3 Principle of Operation

This 1KVA&2KVA&3KVA high input power factor UPS system contains two major PCB assemblies. They are including:

1. Main board	Contains major parts of (1) DC power supply (2) DC-DC converter, (3) inverter.(4)Input and output circuits.
2. Control board	contains major parts of protection, signaling circuits, regulation and control circuits of inverter
3.LCD Panel	LCD display board
4.COMM	Provide both RS232 and USB communication port

The simplified schematics in figure 1 shows how the major circuits are connected and illustrates the overall system functions.

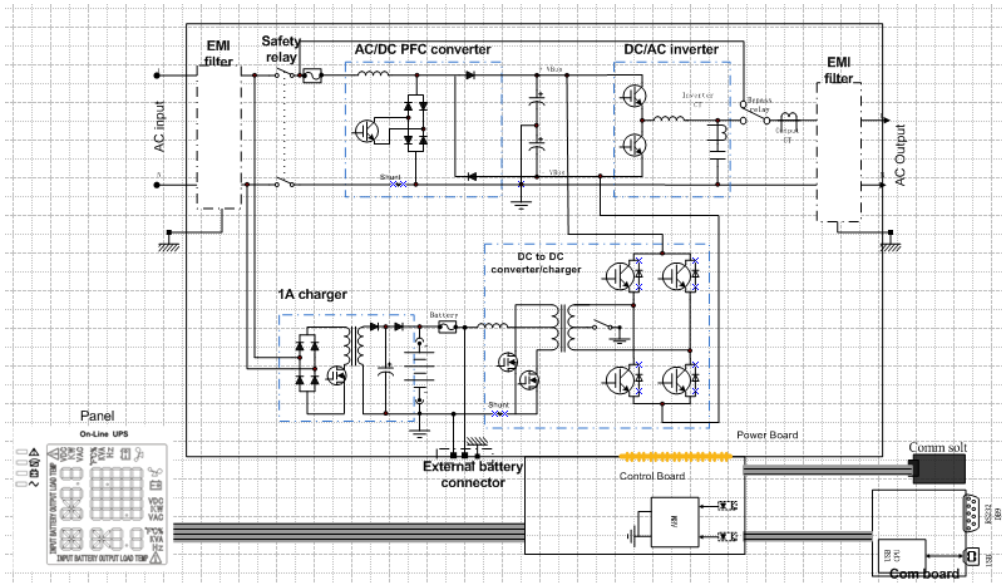


Figure 1: Circuit connection for 1-3KVA

The block diagram in figure 2 and figure 3 show the UPS at normal operation from left to right. When a protection circuit is triggered or a fault condition occurs, the output supply is transferred immediately from inverter to AC mains by a bypass relay. The operation principle will be explained in later section.

Basically, this ON-LINE UPS system utilizes high frequency PWM techniques to achieve high efficient performance. This UPS can deliver a clean, regulated sine-wave output at any load under full load. The sub-systems are described as below:

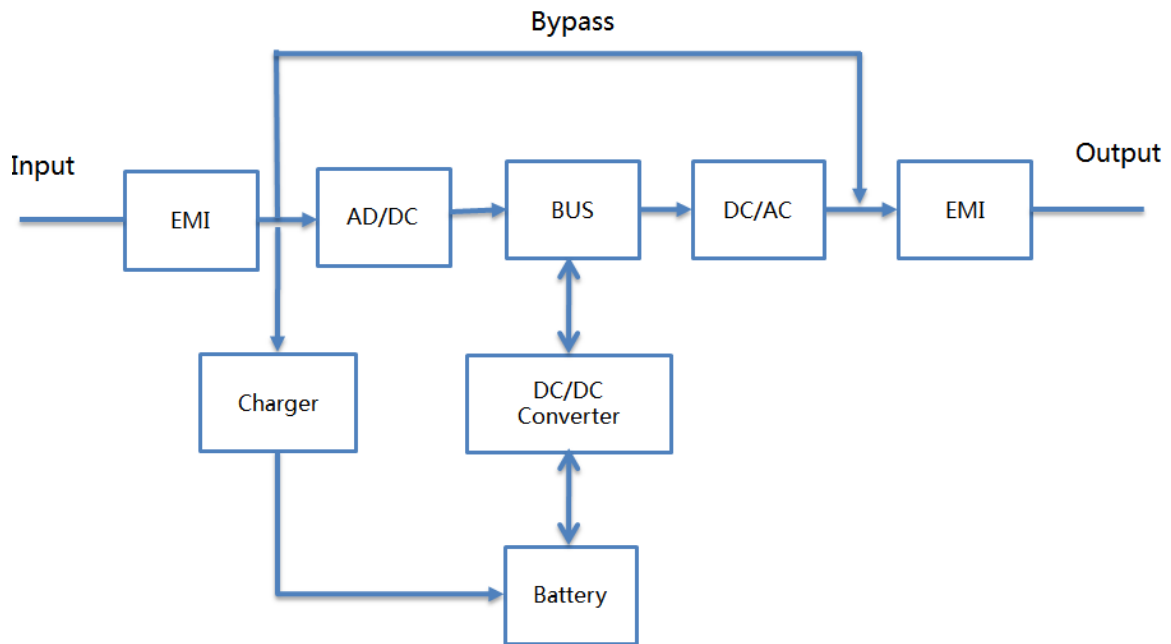


Figure 2: Block Diagram for 1KVA.

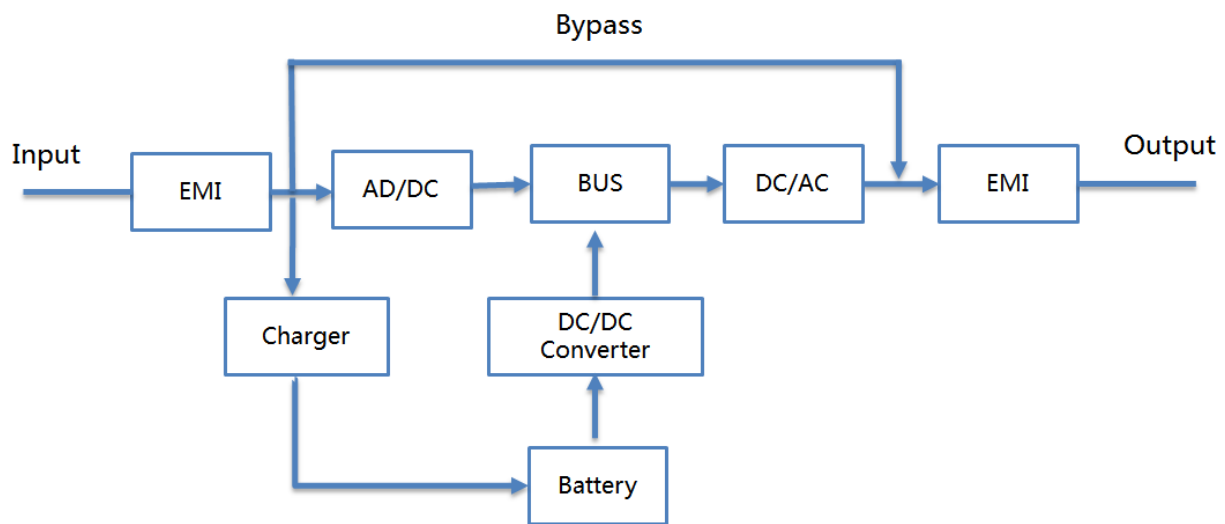


Figure 3: Block Diagram for 2&3KVA.

## POWER STAGE (PSDR):

As shown in figure1, the power stage consists of unit power factor correction, DC-DC converter, inverter and output circuits.

### 3.1. Inverter Sub-System:

The UPS transfers +, - DC bus voltages to the AC output voltage through an inverter of half bridge configuration at normal operation. The schematic diagram of inverter is shown in figure 4.

To construct a high frequency (25kHz) PWM inverter, the drivers receive switching signals from PWM generation circuit through a pair of photo-couplers to trigger the upper IGBT and the lower IGBT alternately. The output of IGBT's is filtered by an LC circuit to reduce the o/p voltage harmonics distortion.

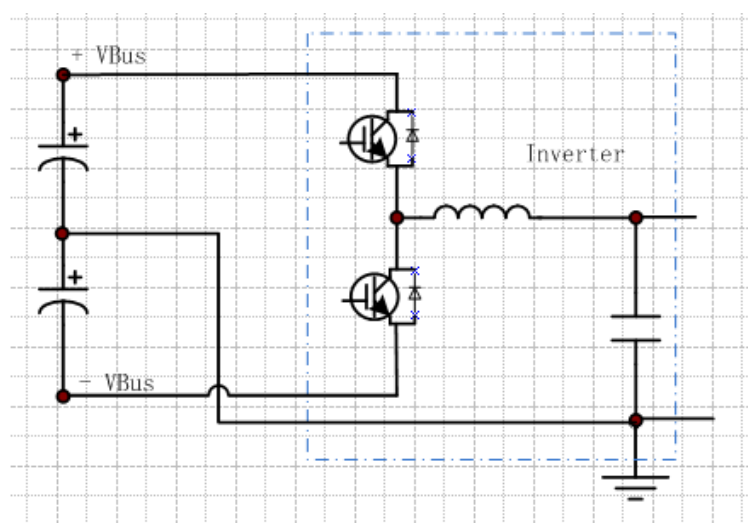


Figure 4: Schematics for inverter

### 3.2 Output Sub-System

The bypass relay receives signal from control circuit to switch the output of the UPS from bypass to inverter, and vice versa. The output noise filter circuit blocks EMI noise to the loads.

### 3.3 Input Power Factor Correction Sub-System:

The purpose of power factor correction (P.F.C.) circuit is to make the input current and voltage in phase and therefore achieve a high input power factor. The schematic is indicated in figure 5.

When the input AC power cord is plugged in, the AC relay is activated and the AC power goes through noise filter to the charger and to the line detector. Both DC buses present voltages at about 1.4 times of input RMS voltage. When the "on" switch is pressed, the P.F.C. circuit is enabled and the DC buses are regulated at  $\pm 370$  Vdc.

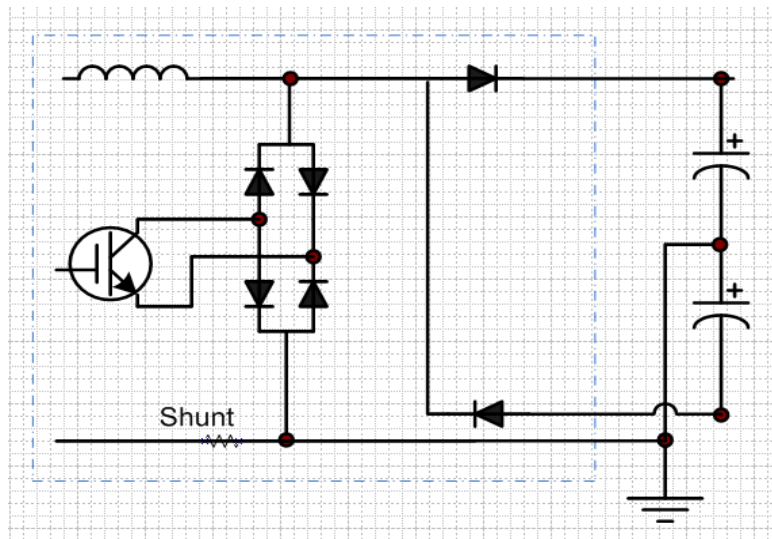


Figure5: I/P PFC configuration

### 3.4 DC-DC Converter Sub-System:

The major function of the UPS is to deliver accurate AC power to the loads connected to it whenever the AC line is correct or fails. In this system, the batteries release the stored energy to supply inverter immediately upon AC line fails.

Refer to figure 6 and figure 7, the battery voltage is transformed through a push-pull DC-DC converter to  $\pm 350\text{Vdc}$  as DC buses for inverter. When the line fails, the  $\pm 350\text{Vdc}$  DC sources are caught up to supply the power needed by the inverter immediately.

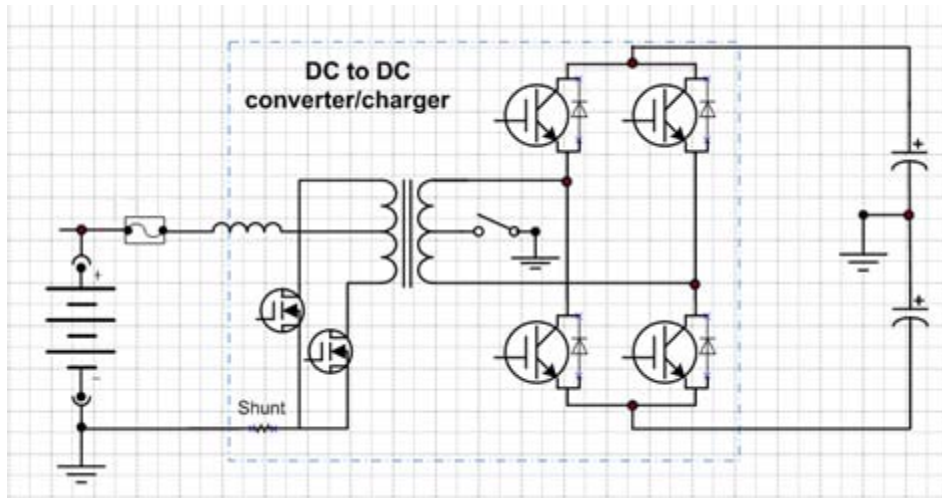


Figure6 : DC -DC circuit for 1K series

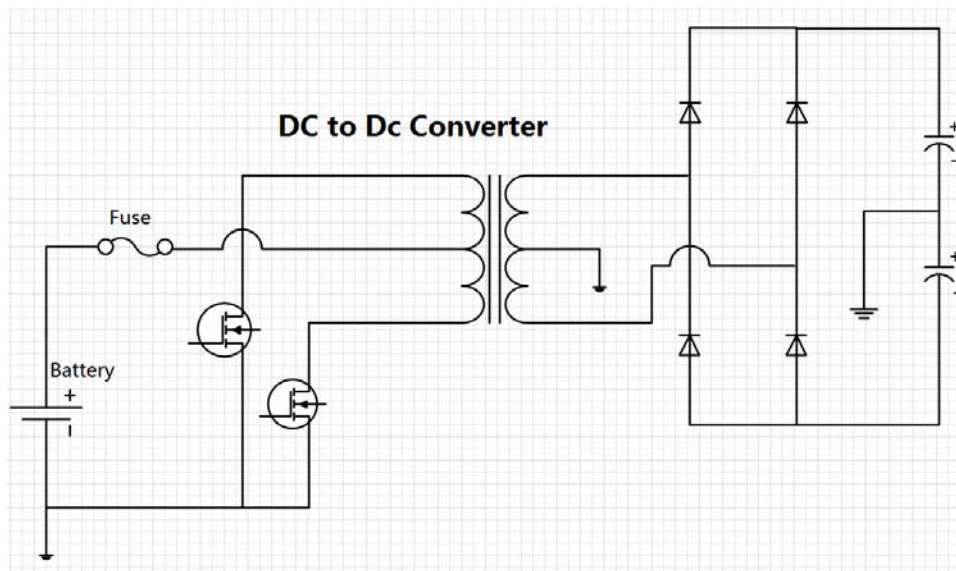


Figure7 : DC -DC circuit for 2&3K series

# 4 System Wiring Diagram

## 4.1 AC/DC

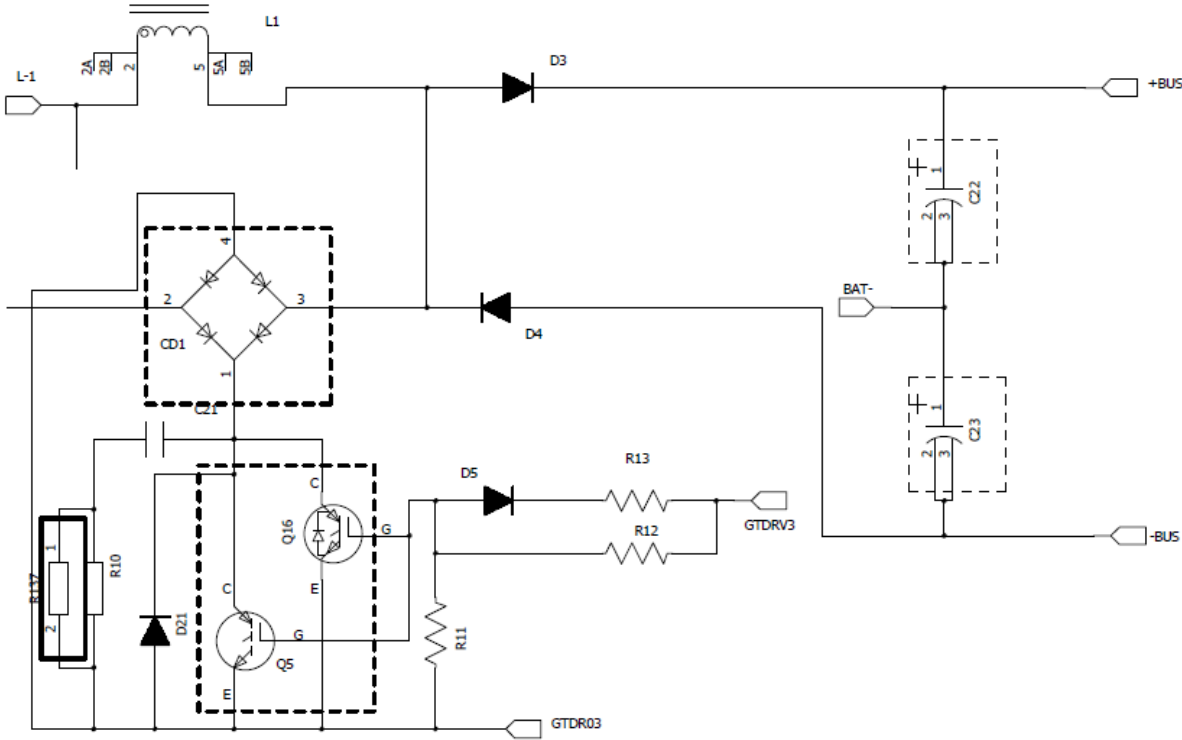


Figure8 : AC/DC circuit for 1KVA

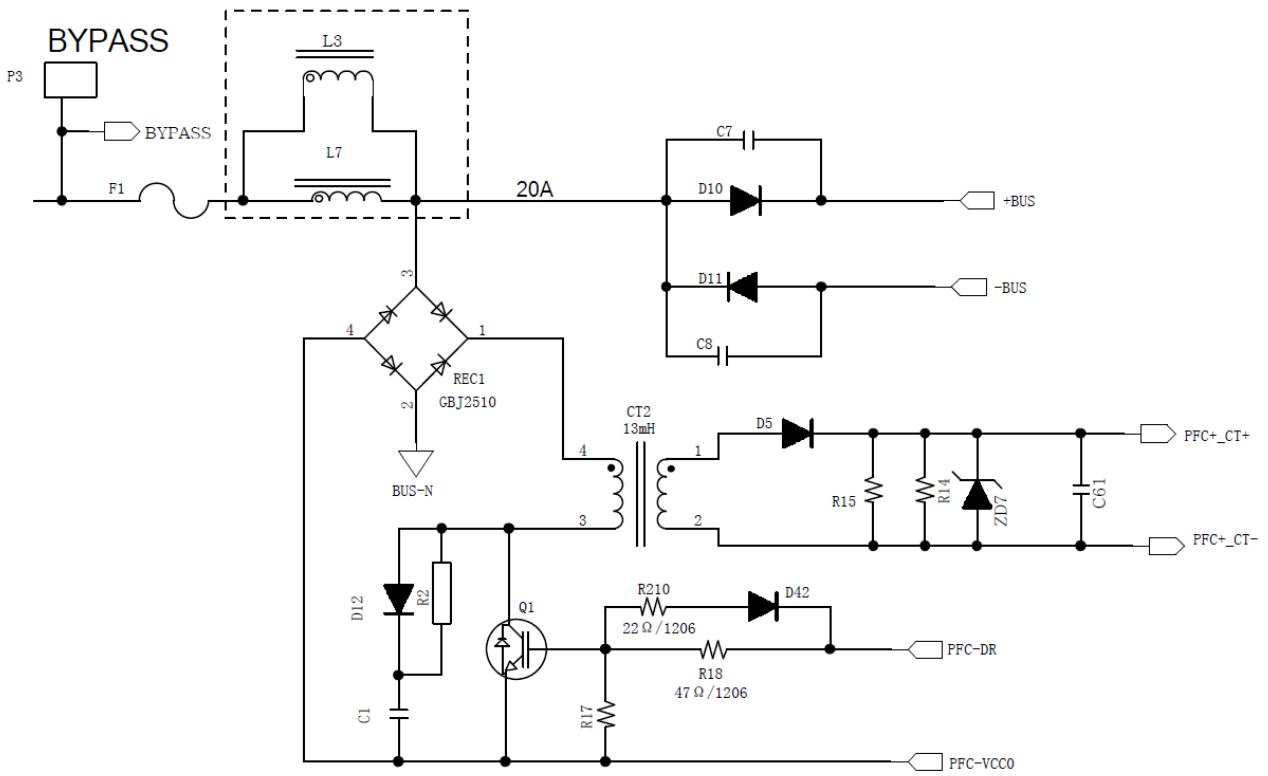


Figure9 : AC/DC circuit for 2&3KVA

## 4.2 DC/AC -Inverter

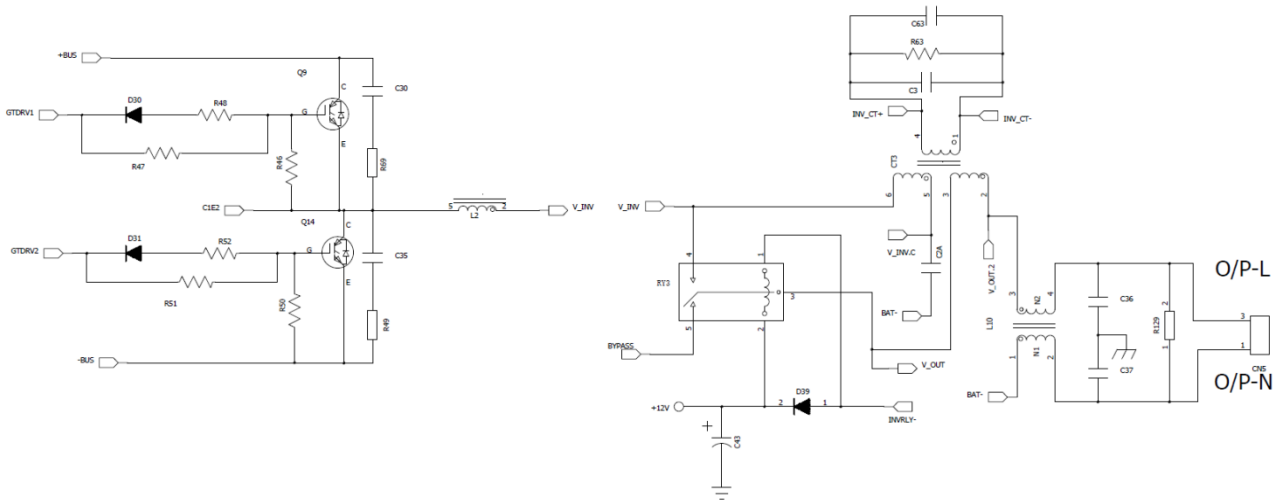


Figure10 : DC/AC circuit for 1KVA

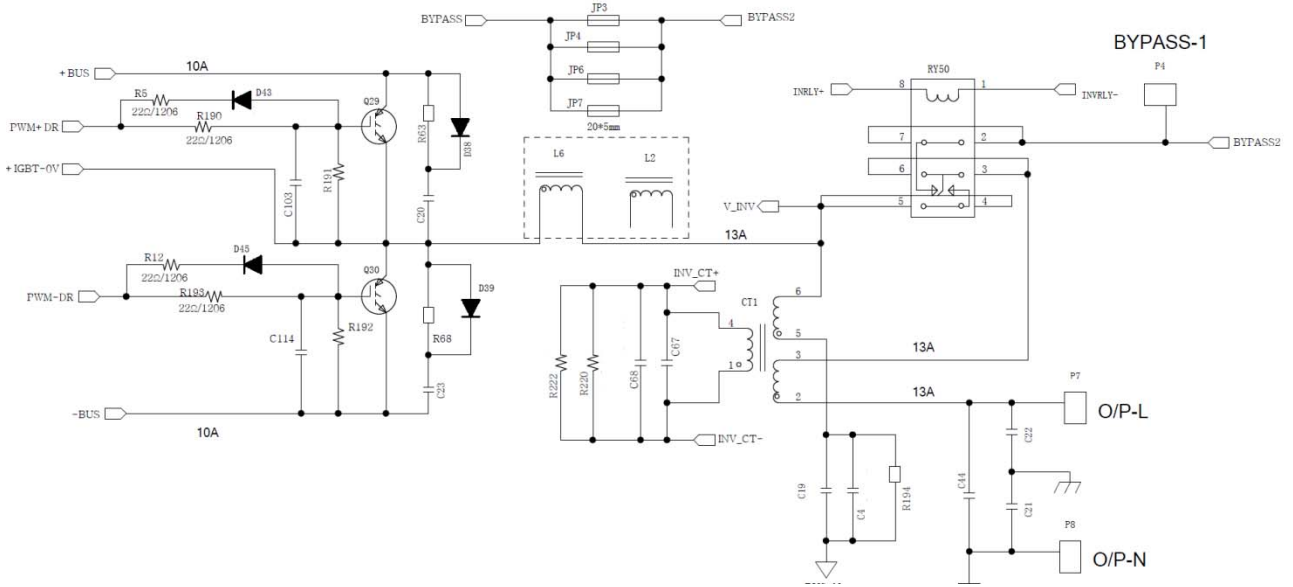


Figure11 : DC/AC circuit for 2&3KVA

### 4.3 DC/DC converter

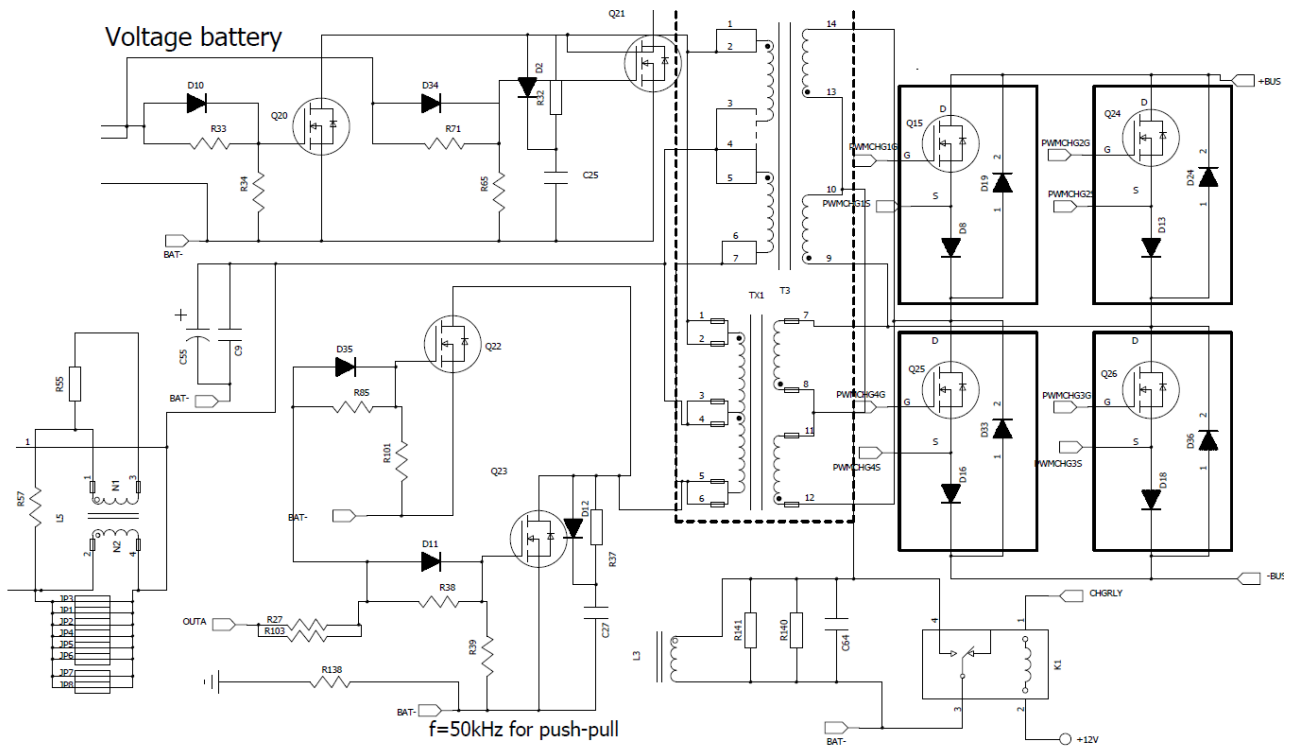


Figure12 : DC/DC circuit for 1KVA



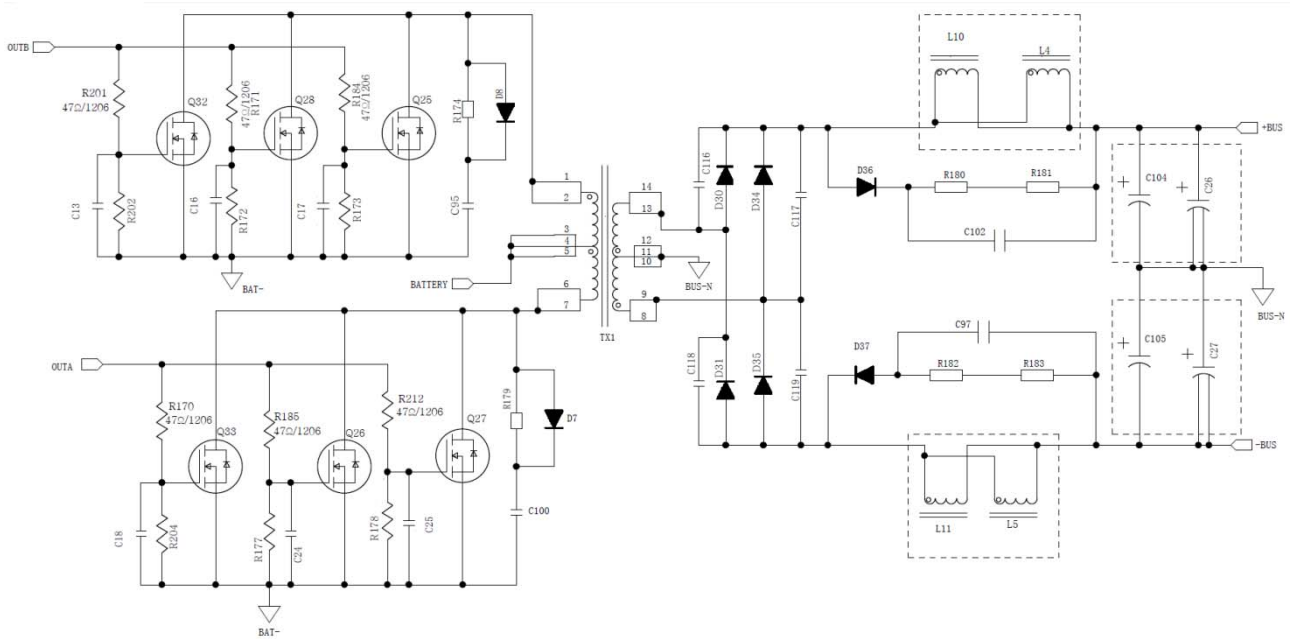


Figure13 : DC/DC circuit for 2&3KVA

Here are the driving resistances for different modules:

### 1KVA

Circuit Block	Power Device	Driver Resistance and Value
PFC	IGBT: Q16 Q5	R13-10Ω R12-30Ω
INV	IGBT: Q9 Q14	R48-10Ω R47-30Ω R52-10Ω R51-30Ω
DCDC	MOS: Q20 Q21 Q22 Q23	R33-22Ω R71-22Ω R85-22Ω R38-22Ω

### 2&3KVA

Circuit Block	Power Device	Driver Resistance and Value
PFC	IGBT: Q1	R210-22Ω R18-47Ω
INV	IGBT: Q29 Q30	R5, R190 -22Ω R12, R193-22Ω
DCDC	MOS: Q32 Q28 Q25 Q33 Q26 Q27	R201, R171, R184-47Ω R170, R185, R212-47Ω

## 5 Main Control PCB Assemblies (CNTL)

These assemblies are the control center of UPS. It is composed of three major circuits as following.

- (1) Regulation & control
- (2) Protection
- (3) Signaling

### 5.1 Regulations & Control SUB-System

This portion can be seen as brain of the UPS. It provides the control pulses to the switching elements which deliver power to the output. The sub-system also regulates the output to ensure that the UPS is delivering constant AC voltage to the loads.

The inverter signal is sensed directly by resistor division. It is compared with a reference signal from sine wave generator. The difference of these two signals (error signal) alter the pulse widths of PWM signals which control the duty cycles of switching elements to regulate the output voltage within specification.

In order to avoid un-wanted surge current at the transfer of bypass relay, the bypass signal activates the tracking circuit. It matches the inverter voltage with the line voltage by having the amplitude of the reference signal following the variation of line voltage.

When the main is applied and the switch is turned on, a 10-second timer is triggered. The bypass relay stays at bypass position in this time period. At the end of this period, the bypass signal is removed and the relay transfers to inverter output.

### 5.2 Protection Sub-System

The UPS provides the following protection circuits:

#### 5.2.1. Overload protection

The load detector senses the load current, i.e. the inverter current, and sends the signal by two paths. In battery mode, the UPS will go to failure mode if overload condition happened. The panel will indicate the fault condition. There are two kinds of protection in our UPS:

- a. **Overload Protection:** The UPS collects the continuous overload signals through CPU switch the bypass relay. If the output load is lower than 105% of rated load (either VA or Wattage detection), the UPS keeps running on inverter mode and warning. If the output load is between 105% and 125% of rated load (either VA or Wattage detection), the UPS transfers to bypass after 1min. If the output load is between 125% and 130% of rated load (either VA

or Wattage detection) the UPS transfers to bypass after 30s. If the output load is higher than 130% of rated load, the UPS transfers to bypass immediately.

- b. **Cycle by Cycle Current Limit:** When output loads sink a high surge current for a short time, a high inverter current is detected and the inverter switches, i.e. the IGBT's, are turned off pulse by pulse to protect themselves from thermal runaway. The output relay stays at inverter output position unless a continuous overload is detected or an abnormal inverter operation occurs.

## **5.2.2. Battery over or under shut down**

Upon the battery voltage declines to battery-under/over level, the UPS will warn and the LCD will display the fault code, and then shut down.

In case of the battery voltage is high voltage, the UPS will warn and the LCD will display the fault code.

## **5.2.3. Inverter output abnormal protection**

The inverter failure signal shuts down the inverter immediately, makes the buzzer a continuous alarm, and the LCD displays the fault code.

" The failure signal latches itself unless SW off or battery is empty".

## **5.2.4 Over temperature protection**

The thermal switch detects the temperature of PSDR heat sink. The thermal switch is electrically connected to the CPU. An opened thermal switch is thought as temperature failure by the UPS. The LCD will display the fault code.

## **5.2.5. Bus over/under/unbalance-voltage protection**

To protect any BUS over/under/unbalance -voltage condition especially for the half-bridge load. The LCD will display the fault code.

## **5.3 Signaling Sub-System**

When the AC line is unable to supply, the batteries release energy inside to supply the inverter immediately. At the same time, the buzzer beeps every 4 seconds.

Upon the batteries are discharged to battery-low level, the battery-low signal is activated and the buzzer beeps every 1 second.

Remote shutdown signal is enabled only when the line fails.

## 6 PCB board interface and the location of each module map

The 1KS PCB locations of these assemblies are shown in figure 14:

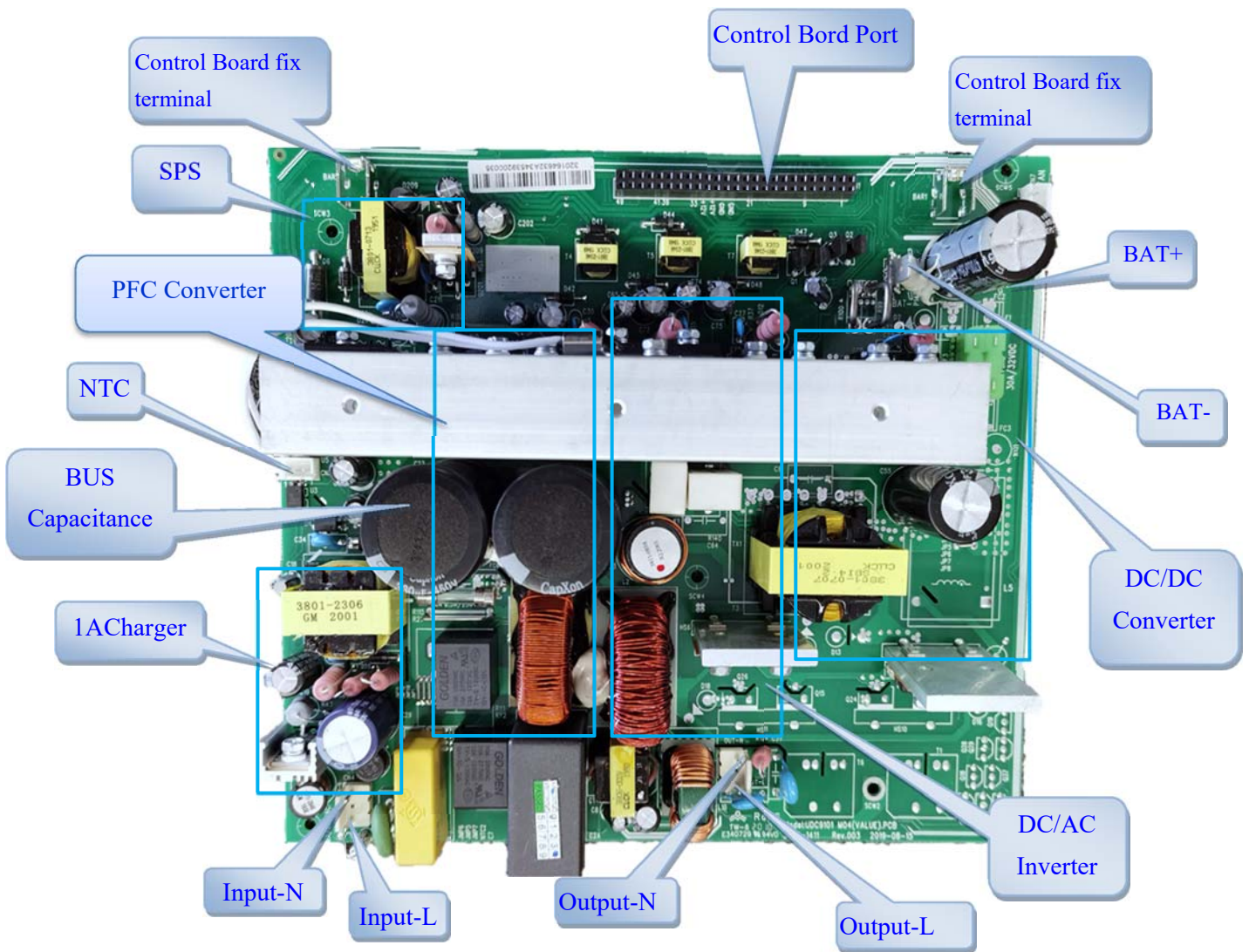


Figure14: 1KS Sub-assembly location

The 1KH PCB locations of these assemblies are shown in figure 15

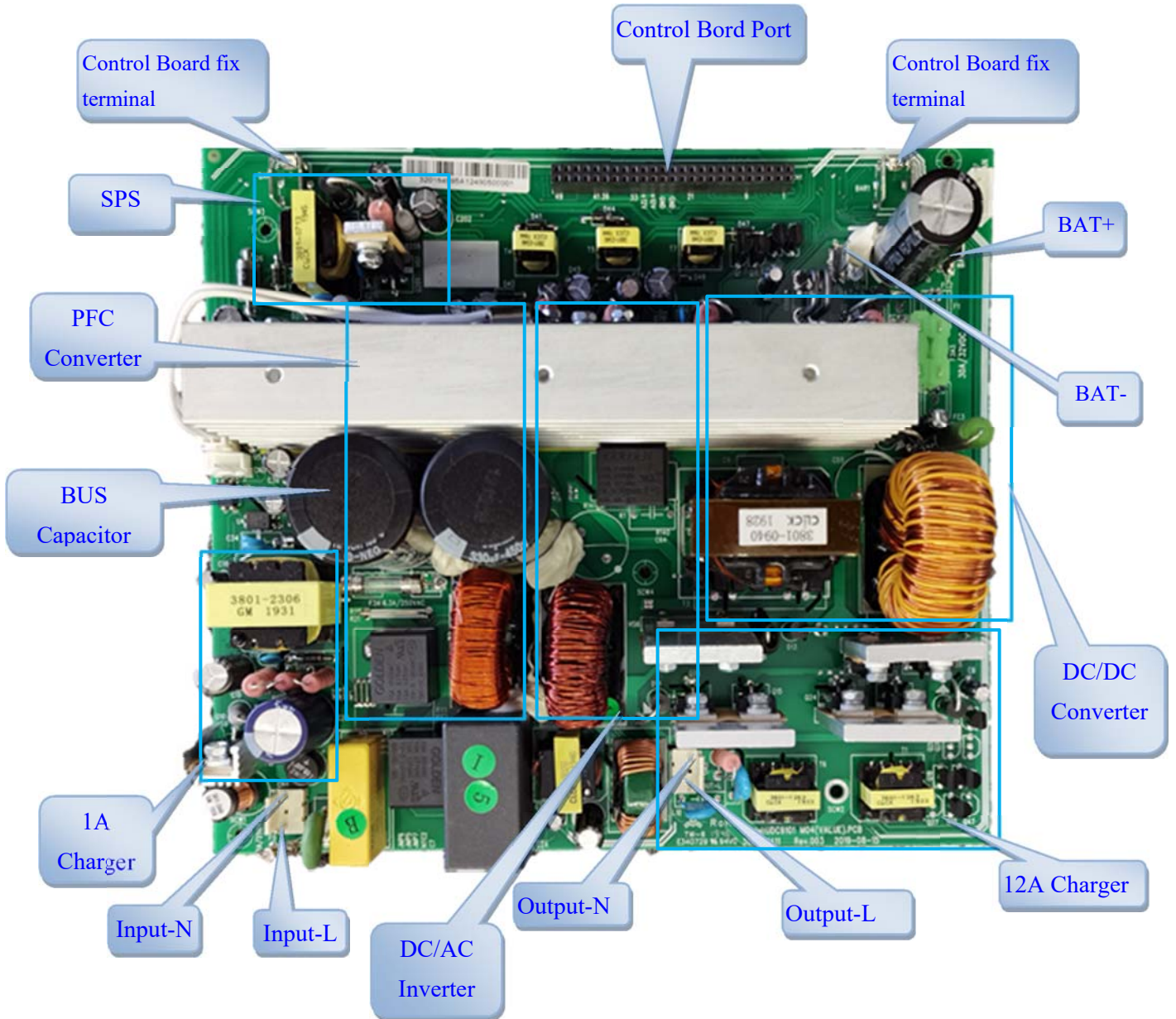


Figure15: 1KH Sub-assembly location

The 2&3K S/H PCB locations of these assemblies are shown in figure 16

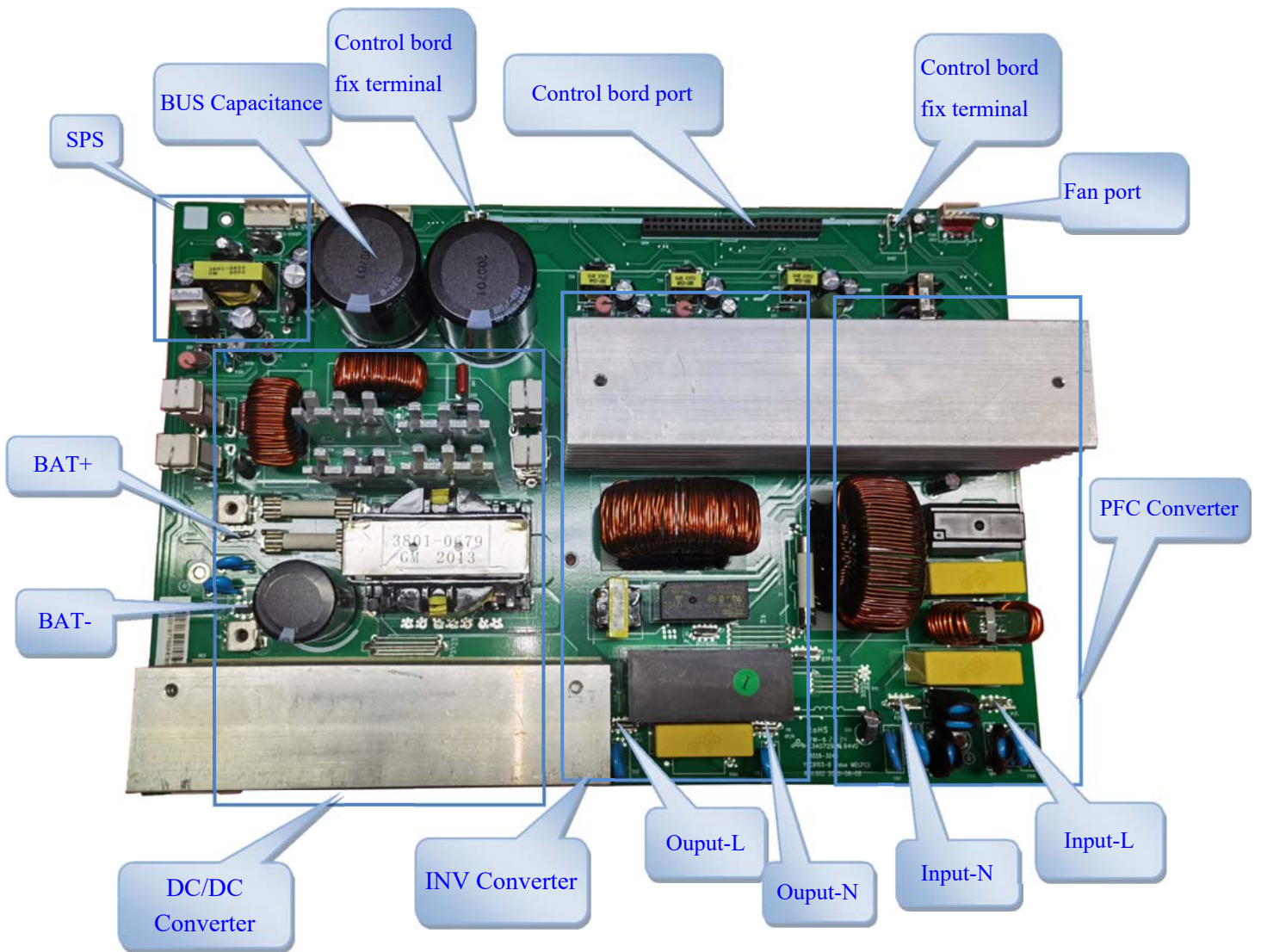


Figure 16: 2&3KS/H Sub-assembly location

The position distribution of the control panel interface is shown in figure 17 and figure 18:

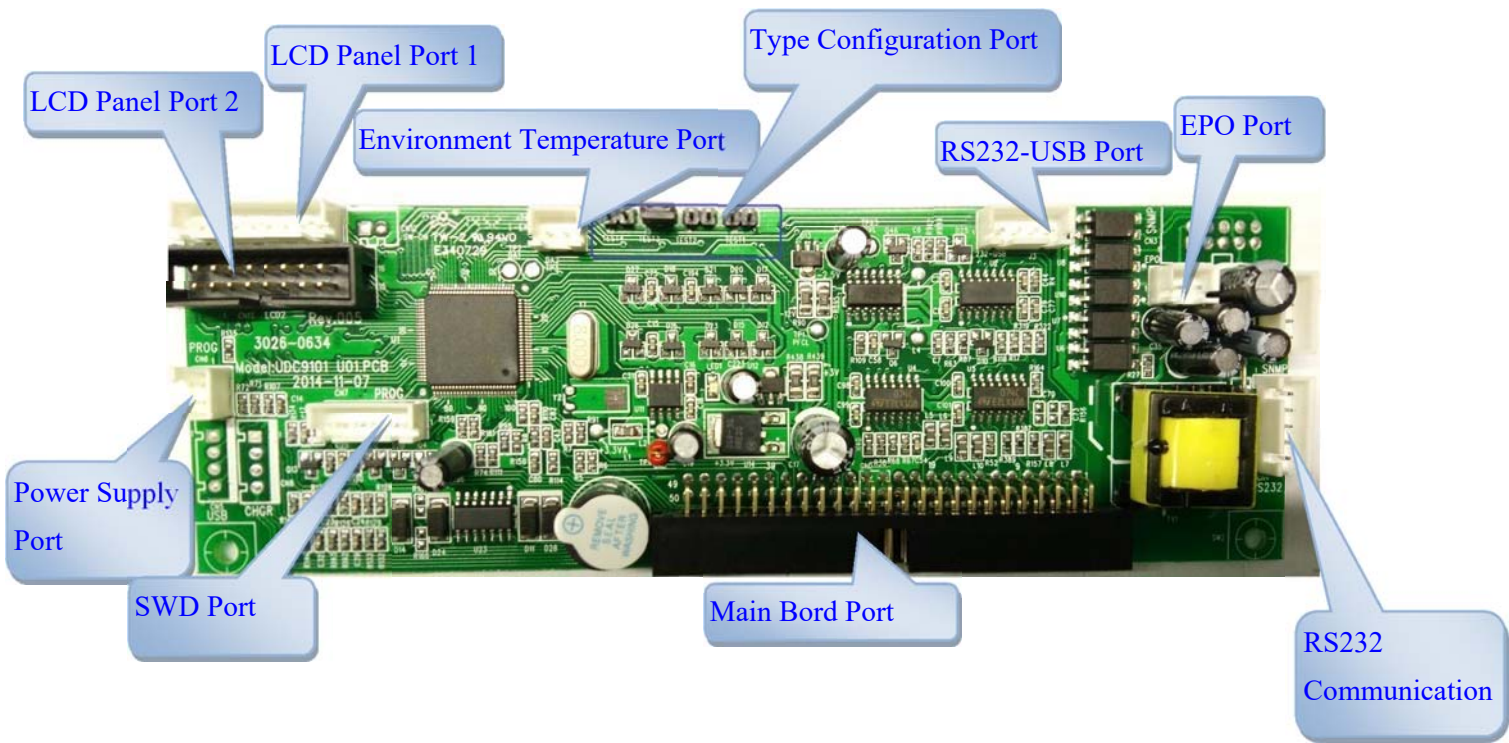


Figure 17: 1K Control board Sub-assembly location



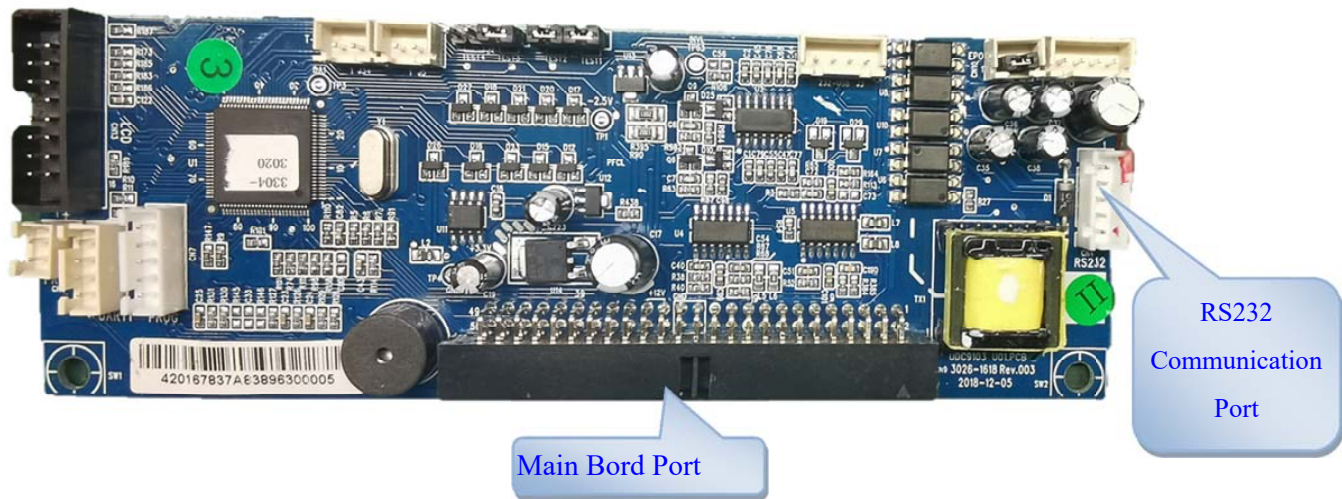


Figure 18: 2&3K Control board Sub-assembly location

The external interface position is shown in figure 19:

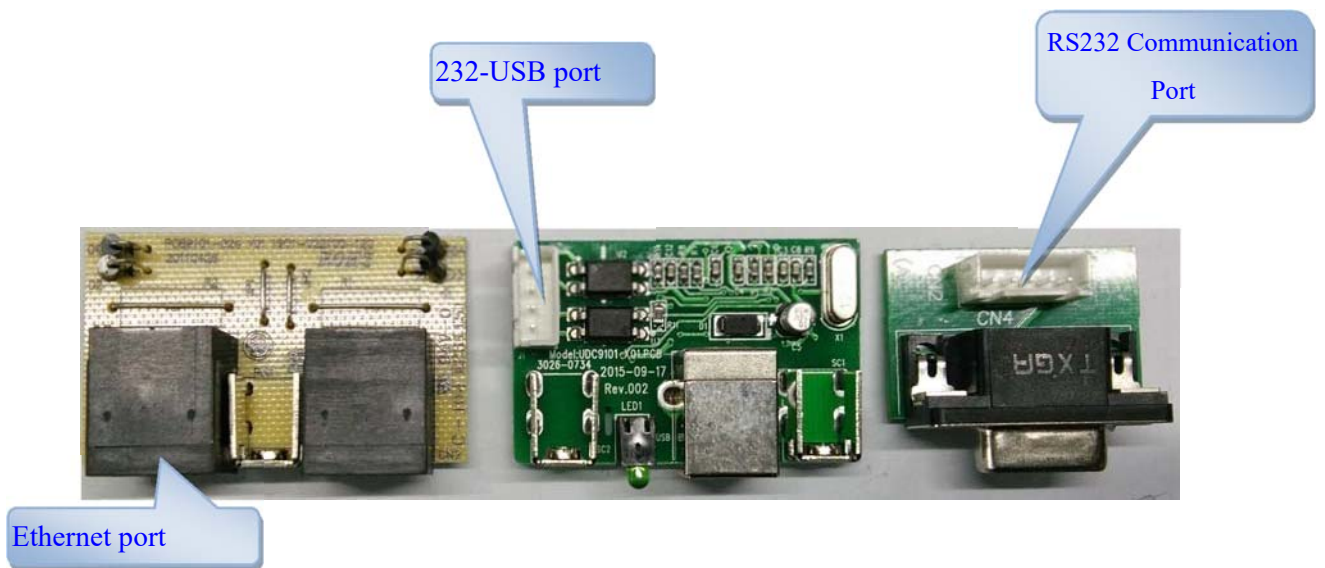
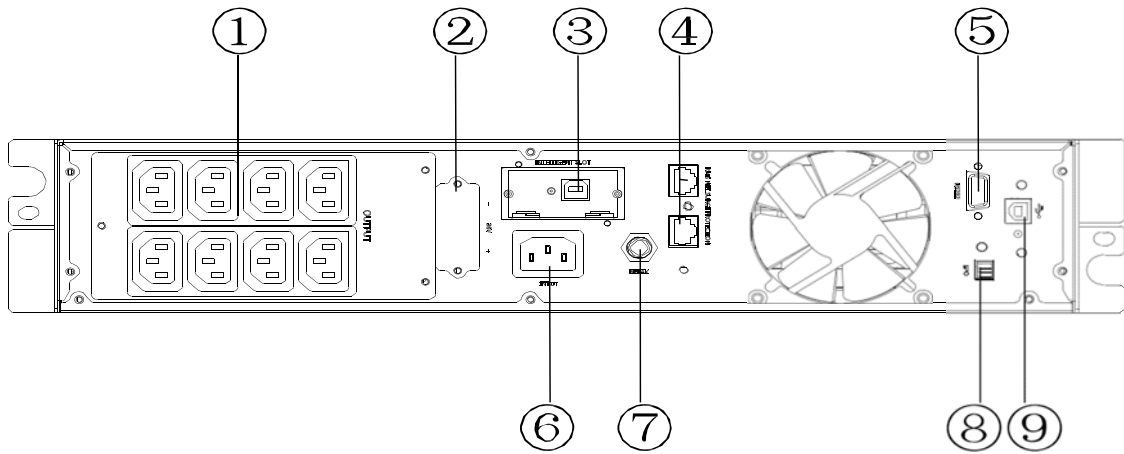


Figure 19: 1-3KVA Outlay port board Sub-assembly location

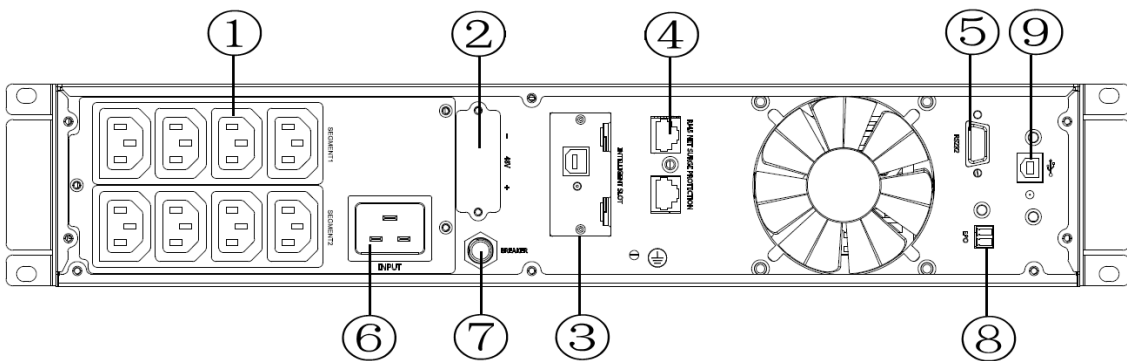
## 7 The real panel view

1KVA(S/H):

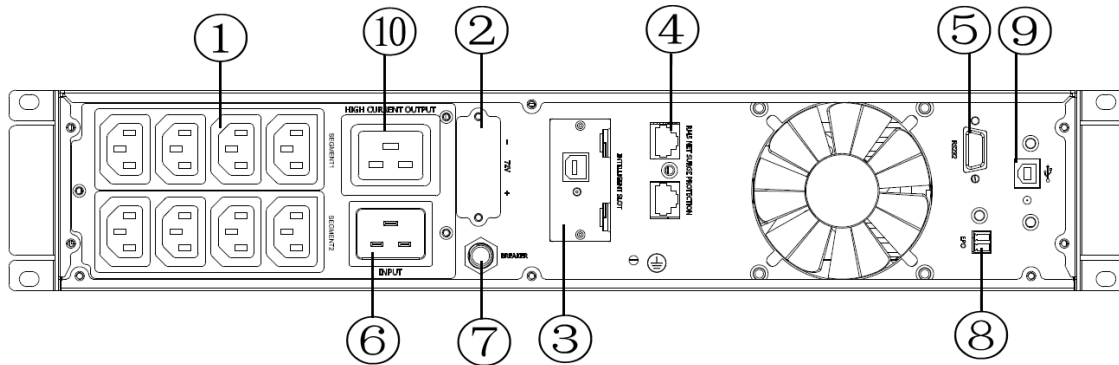




**2KVA(S/H):**



**3KVA(S/H):**



1. Output receptacles(10A)
2. Battery Terminal
3. SNMP intelligent slot (option)
4. Network /Fax/Modem Surge Protection(option)
5. RS-232 communication port
6. AC input receptacle
7. Input circuit breaker
8. EPO(option)

9. USB(option)

10. Output receptacle(16A)

## 8 Control Panel Explanation

The operation and display panel, shown in below chart, is on the front panel of the ups. It includes four indicators, four function keys and a LCD display, indicating the operating status and Input/output information.

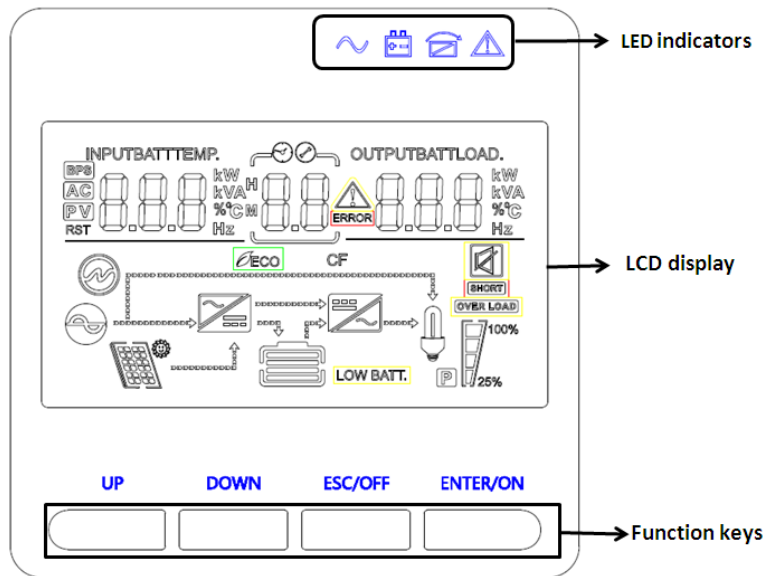






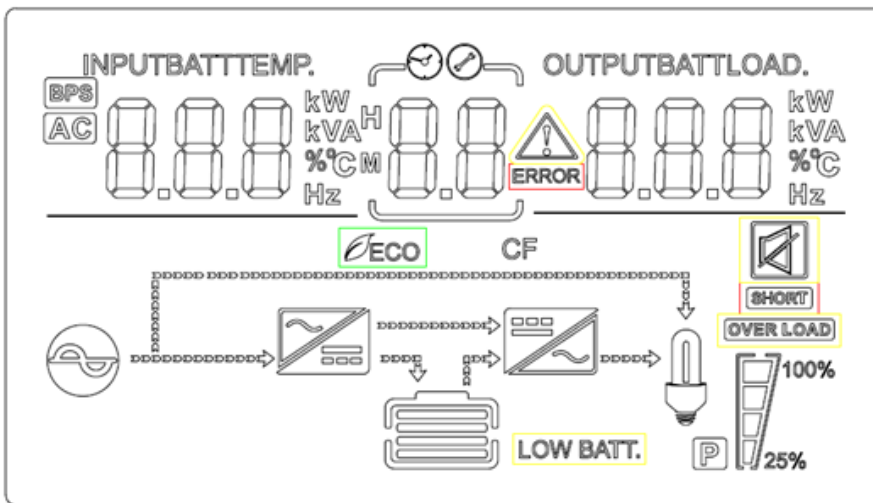
Figure 20 : LCD control panel introduction




### 8.1 LED Explanation




Indicator	Description
 Red	On The UPS has an active alarm or fault.
 Yellow	The UPS is in Bypass mode. On The UPS is operating normally on bypass during High Efficiency operation.
 Yellow	On The UPS is in Battery mode.

 Green	On The UPS is operating normally.
<p><b>NOTE:</b>When power on or startup , these indicators will turn on and off sequentially.</p> <p><b>NOTE:</b>On different operation modes , these indicators will indicate differently.</p>	


### LCD Display Icons




Icon	Function description
<b>Input Source Information</b>	
	Indicates the AC input.
INPUTBATT 	Indicates input voltage, input frequency, PV voltage, battery voltage and Temp.
<b>Configuration Program and Fault Information</b>	
	Indicates the setting programs.

	<p>Indicates the warning and fault codes.</p> <p>Warning:  flashing with warning code.</p> <p>Fault:  lighting with fault code</p>
---	--

**Output Information**

	<p>Indicate output voltage, output frequency, load percent, load in VA, load in Watt and discharging current.</p>
---	---

**Battery Information**






	<p>Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.</p>
---	---






In AC mode, it will present battery charging status.

Status	Battery capacity	LCD Display
Constant	0-24%	4 bars will flash in turns
	25-49%	Bottom bar will be on and the other three bars will flash in turns
Current mode	50-74%	Bottom two bar will be on and the other two bars will flash in turns
	75-100%	Bottom three bar will be on and the top bars will flash

**Load Information**

	<p>Indicates overload.</p>
---	----------------------------

	<p>Indicatesthe loadlevelby 0-24%,25-50%,50-74%and75-100%.</p>			
	0%~25%	25%~50%	50%~75%	75%~100%
				

Mode Operation Information	
	Indicates unit connects to the mains.
	Indicates load is supplied by utility power.
	Indicates the utility charger circuit is working.
	Indicates the DC/AC inverter circuit is working.
Mute Operation	
	Indicates unit alarm is disabled.

## 8.2 Button Function

### Function Keys

Function Key	Description
ESC/OFF	To exit setting mode Or turn off the ups
UP	To go to previous selection Or turn on the ups
Down	To go to next selection
ENTER/ON	To confirm the selection in setting mode or enter setting mode

### Button Function

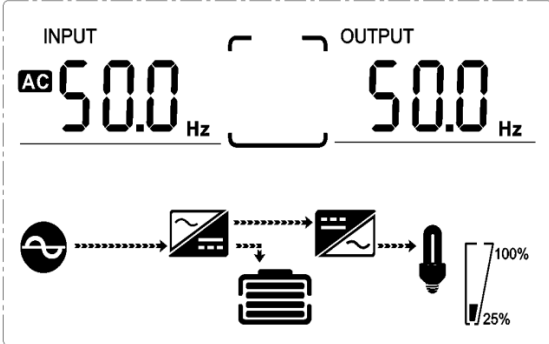
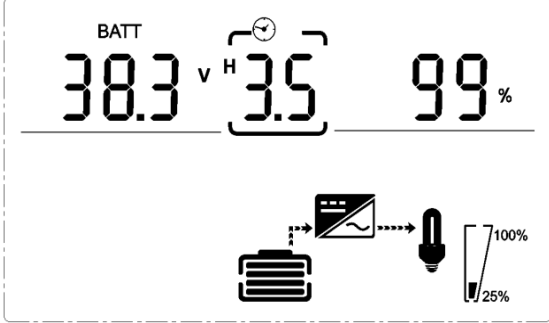
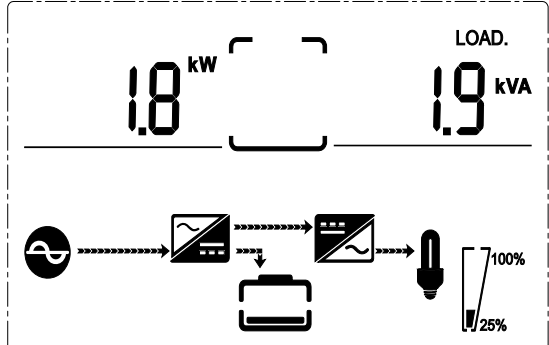
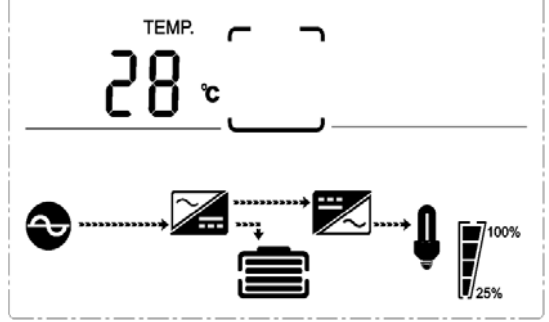
Button	Function
ON /ENTER Button	<ul style="list-style-type: none"> <li>➤ Turn on the UPS: Press and hold ON button for at least 2 seconds to turn on the UPS.</li> <li>➤ Confirm current settings: when the UPS enters the setting mode, must press this button to confirm the settings value what you want, next press up/down button to change settings information</li> </ul>

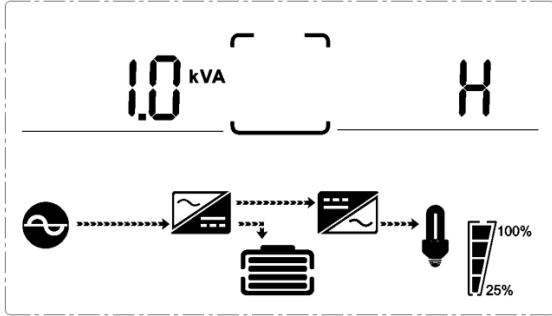
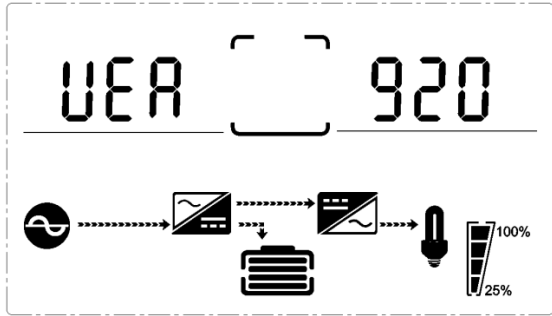
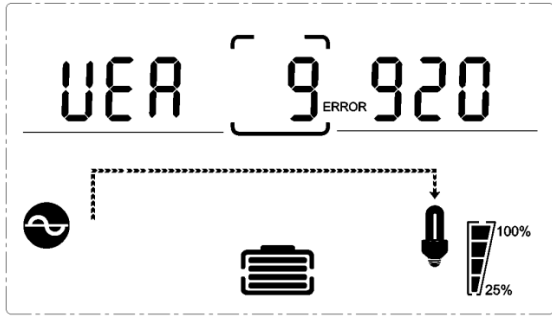
	<ul style="list-style-type: none"> <li>➤ Out off bypass mode: when the UPS enter to bypass mode, press and hold this button it will switch to normal mode.</li> </ul>
<b>OFF/ESC Button</b>	<ul style="list-style-type: none"> <li>➤ Turn off the UPS: Press and hold this button at least 2 seconds to turn off the UPS in battery mode. UPS will be in standby mode under power normal or transfer to Bypass mode if the Bypass enable setting by pressing this button.</li> <li>➤ Exit setting mode: Press this button to exit setting mode when in UPS setting mode, but save nothing.</li> </ul>
<b>UP Button</b>	<ul style="list-style-type: none"> <li>➤ Up key: Press this button to display previous selection in UPS setting mode.</li> </ul>
<b>DOWN Button</b>	<ul style="list-style-type: none"> <li>➤ Down key: Press this button to display next selection in UPS setting mode.</li> <li>➤ To confirm selection and exit setting mode: Press this button to confirm selection and exit setting mode when LCD display the last selection in UPS setting mode.</li> </ul>
<b>UP + DOWN Button</b>	<ul style="list-style-type: none"> <li>➤ Setting mode: Press and hold this button for 5 seconds to enter UPS setting mode.</li> </ul>

### 8.3 Interfaces Available in the LCD Display

There are 8 interfaces available in the LCD display:

Item	Interface Description	Content Displayed
01	Input voltage& Output voltage	<p>The image shows a digital display with 'INPUT' and 'OUTPUT' labels. The input side shows 'AC 220 v' and the output side shows '220 v'. Below the display is a schematic diagram of a UPS system. It includes an AC input symbol, a battery pack, and an output symbol. A battery level indicator shows a bar that is 25% full, with '100%' and '25%' labels.</p>

02	Input frequency& Output frequency	
03	Input frequency& Output frequency Battery voltage&Backup time& Battery capacity	
04	Load	
05	Environment Temperature	

06	UPS model.	
07	Firmware Version	
08	Alarm Code(Warming Message) All alarm codes are present when abnormal behavior(s) occur(s)	

## 8.4 Setting Programs

The UPS has setting functions. This user settings can be done under any kind of UPS working mode. The setting will take effect under certain condition. Below table describes how to set the UPS.

The setting function is controlled by 4 buttons (Up ,Down, ON/Enter,OFF/ESC):

“Up ▲ + Down ▼” ---goes into the setting page;

ON/Enter ---- confirm the settings option;

Up ▲ & Down ▼ --- value adjustment for choosing different pages;

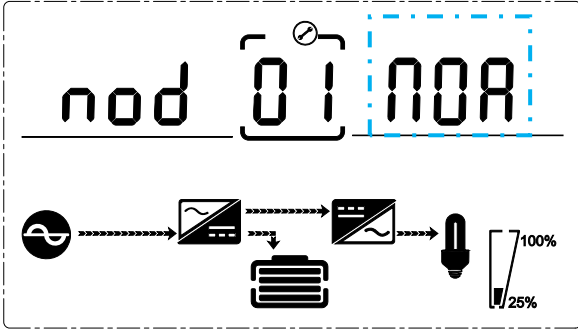
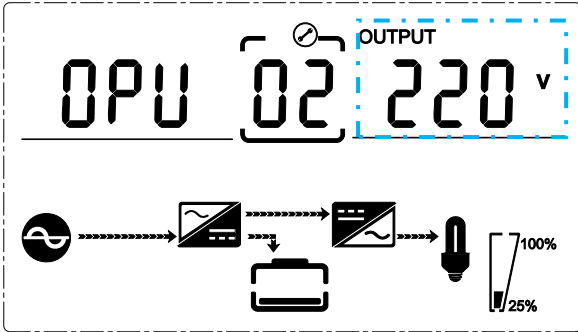
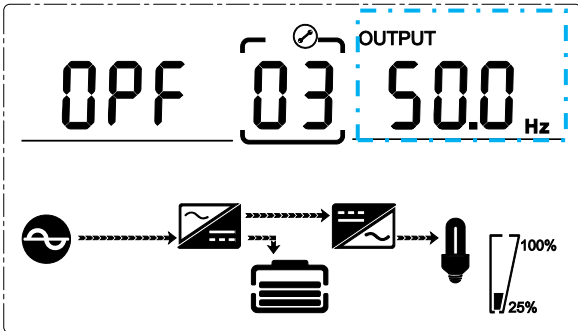

OFF/ESC--- Exit setting mode;





After the UPS turn ON, press buttons “UP+Down” for 5 seconds and then goes into the setting interface page.



**Note: Press “Down” button to confirm selection and exit setting mode when LCD**



display the last selection in UPS setting mode.

Item	Settings	Content display
01	<p style="text-align: center;">Mode setting</p> <p>Press Enter button to change the setting (ECO or NOR or CF or GEN).            Press UP ▲ button to select the previous setting.            Press DOWN ▼ button to select the next setting.</p>	
02	<p style="text-align: center;">Output voltage setting</p> <p>Press Enter button to change the setting(208, 220, 230, 240).            Press UP ▲ button to select the previous setting.            Press DOWN ▼ button to select the next setting.</p>	
03	<p style="text-align: center;">Frequency setting</p> <p>Press Enter button to change the setting (50 or 60Hz).            Press UP button ▲ to select the previous setting.            Press DOWN button ▼ to select the next setting.</p>	
04	<p style="text-align: center;">Battery capacity setting</p> <p>Press Enter button to change the setting (Battery capacity range is 1-200Ah).            Press UP button ▲ to select the previous setting.            Press DOWN button ▼ to select the next setting.</p>	

05	<p>Battery EOD voltage setting(Once)</p> <p>Press Enter button to change the setting (1.75/1.84/1.92). Press UP button ▲ to select the previous setting. Press DOWN button ▼ to select the next setting.</p>	 <p>The LCD display shows 'Eod' followed by '05' in a dashed box and '1.75 V'. Below the display is a battery level indicator showing a battery icon and a gauge with '100%' at the top and '25%' at the bottom.</p>
06	<p>Battery EOD voltage setting(Second)</p> <p>Press Enter button to change the setting (1.60/1.70/1.75/1.80). Press UP button ▲ to select the previous setting. Press DOWN button ▼ to select the next setting.</p>	 <p>The LCD display shows 'Eod' followed by '06' in a dashed box and '1.75 V'. Below the display is a battery level indicator showing a battery icon and a gauge with '100%' at the top and '25%' at the bottom.</p>
07	<p>Bypass voltage upper limit setting</p> <p>Press Enter button to change the setting(The bypass voltage upper limit range is 230-264Vac ). Press UP button ▲ to select the previous setting. Press DOWN button ▼ to select the next setting.</p>	 <p>The LCD display shows 'HLS' followed by '07' in a dashed box and '264 V'. Below the display is a battery level indicator showing a battery icon and a gauge with '100%' at the top and '25%' at the bottom.</p>
08	<p>Bypass voltage lower limit setting</p> <p>Press Enter button to change the setting(The bypass voltage lower limit range is 170-220Vac). Press UP button to select the previous setting. Press DOWN button to select the next setting.</p>	 <p>The LCD display shows 'LLS' followed by '08' in a dashed box and '170 V'. Below the display is a battery level indicator showing a battery icon and a gauge with '100%' at the top and '25%' at the bottom.</p>

09	<p style="text-align: center;">Mute setting</p> <p>Press Enter button to change the setting(ON or OFF). Press UP button to select the previous setting. Press DOWN button to save and exit the setup.</p>	
10	<p style="text-align: center;">BYPASS enable/disable setting</p> <p>Press Enter button to change the setting(ON or OFF). Press UP button ▲ to select the previous setting. Press DOWN button ▼ to save and exit the setup.</p>	

## 8.5 Operating Mode Description

Operating mode	Description	Display
Online mode	When the input voltage is within acceptable range, UPS will provide pure and stable AC power to output. The UPS will also charge the battery at online mode.	Inverter led light
ECO mode	Energy saving mode:When the input voltage is within voltage regulation range, UPS will bypass voltage to output for energy saving.	Bypass/ Inverter led light
Battery mode	When the input voltage is beyond the acceptable range or power failure and alarm is sounding every 4 second, UPS will backup power from battery.	Battery led light
Standby mode	UPS is powered off and no output supply power, but still can charge batteries.	All leds turn off
Bypass mode	When input voltage is within acceptable range ,but the UPS is overloading, UPS will enter bypass mode or bypass mode can be set	Bypass led light

	by front panel.	
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### Code of Operating Mode Description

item	Content Displayed
2	Standby Mode
3	No Output
4	Bypass Mode
5	Utility Mode
6	Battery Mode
7	Battery Self-diagnostics
8	Inverter is starting up
9	ECO Mode
10	EPO Mode
11	Maintenance Bypass Mode
12	Fault Mode
13	Generator Mode

## 8.6 Alarm or Fault Reference Code

Event log	UPS Alarm Warning	Buzzer	LED
1	Rectifier fault	Beep Continuously	Fault led lit
2	Inverter fault	Beep Continuously	Fault led lit
9	Fan fault	Beep Continuously	Fault led lit
13	Charger fault	Beep Continuously	Fault led lit
15	Bus over voltage	Beep Continuously	Fault led lit
16	Bus low voltage	Beep Continuously	Fault led lit
17	Large voltage difference between $\pm$ bus	Beep Continuously	Fault led lit
18	Soft start failure	Beep Continuously	Fault led lit
20	Heatsink over temp	twice per Second	Fault led blinking
26	Battery over voltage	Once per Second	Fault led blinking
29	Output Short Circuit	Once per Second	Fault led blinking
31	Bypass Over Current	Once per Second	Bypass led blinking
32	Overload	Once per Second	INV/Bypass led blinking
33	Battery disconnected	Once per Second	Battery led blinking

34	Battery low voltage	Once per Second	Battery led blinking
35	Battery low pre alarm	Once per Second	Battery led blinking
36	Inverter overload time out	Once per 2 Seconds	Fault led blinking
37	DC component of inverter is too large	Once per 2 Seconds	INV led blinking
39	Input voltage abnormal	Once per 2 Seconds	Battery led blinking
40	Input frequency abnormal	Once per 2 Seconds	Battery led blinking
41	Bypass over protection	-	Bypass led blinking
42	Bypass over tracking	-	Bypass led blinking
43	Inverter waiting time out	Once per Second	INV led blinking
44	No fault	-	-
45	EPO fault	Beep Continuously	Fault led lit
46	Abnormal communication of lithium battery	Beep Continuously	Fault led lit

## 9 Alignments

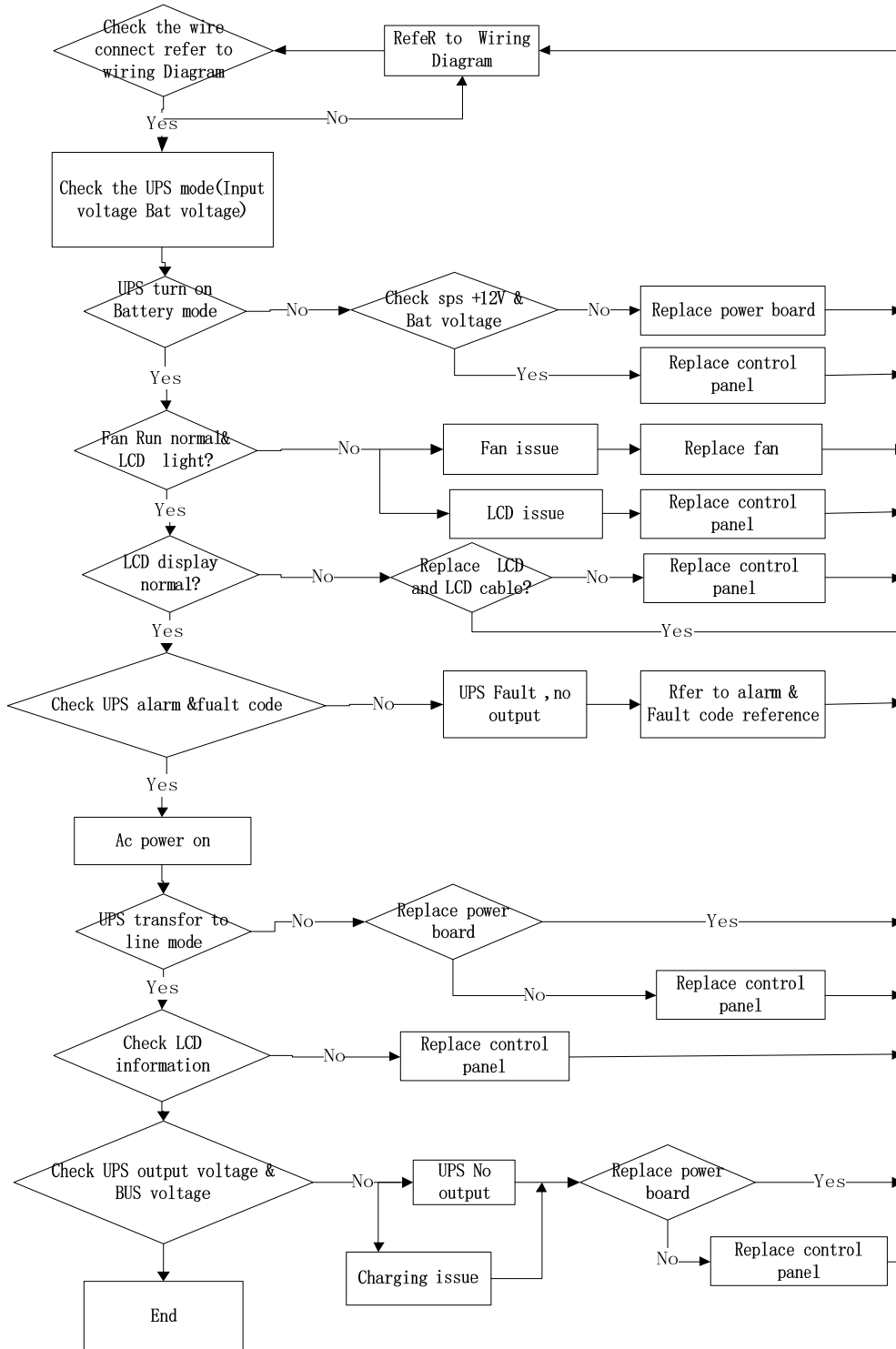
List below are some test points and procedures when a qualified service person wants to check whether EUT (Equipment under Test) will work properly. Before beginning following procedures, please make sure that EUT is OFF and disconnected from Utility.

TEST ITEM	TEST POINT	TEST AND ADJUSTMENT SEQUENCE	EXPECTED RESULT
Charger Voltage @Line mode	BAT(+), BAT(-)	1. Must disconnect battery 2. Use to multimeter detection both ends BAT(+)/BAT(-) voltage	Simple link Battery voltage 11.5-13.2V
+DC Bus Voltage @ Line Mode	BUS(+), P7(GND)	1. Must disconnect battery 2. Use to multimeter detection both ends BUS(+)/P7(GND) voltage	+370VDC±2%V
-DC Bus Voltage @ Line Mode	BUS(-), P7(GND)		-370VDC±2%V
+DC Bus Voltage @ Battery Mode	BUS(+), P7(GND)	1. Must disconnect battery 2. Use to multimeter detection both ends BUS(+)/P7(GND) voltage	+350VDC±2%V
-DC Bus Voltage @ Battery Mode	BUS(-), P7(GND)		-350VDC±2%V
BAT(+) Voltage @Battery model	BAT(+), P7 (GND)	1. Must disconnect electric supply 2. Use to multimeter detection both ends BAT(+)/P7(GND)voltage	Simple link Battery voltage 11.5-13.2V

Sps +12V @Battery mode	P1(+12V)、 P7 (GND)	Use to multimeter detection Both ends P1(+12)/P7(GND) voltage	+12V±1%
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# 10 Trouble Shooting

## 10.1 Trouble Shooting Chart

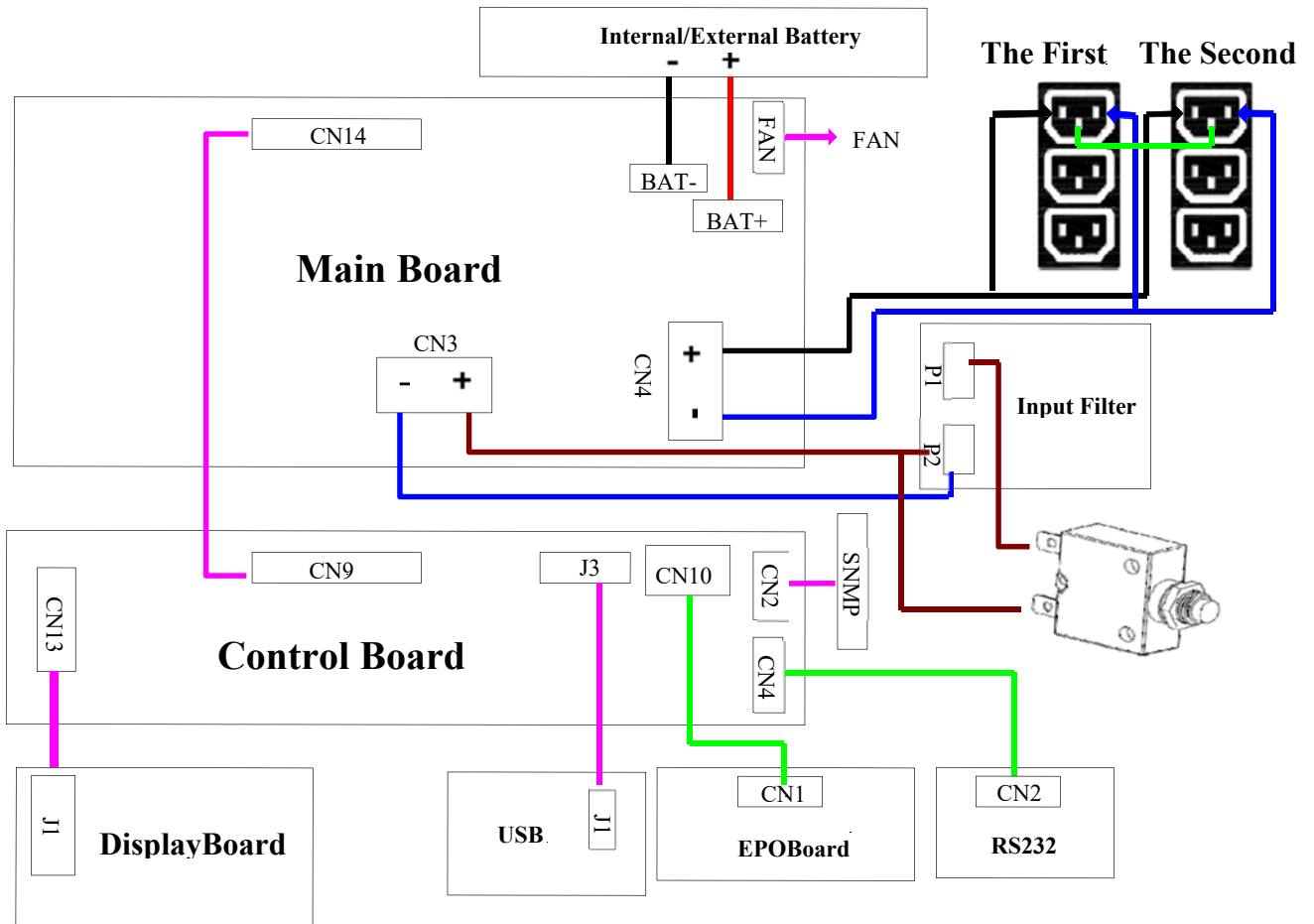


## 10.2 Troubleshooting

If the UPS system does not operate correctly, please solve the problem yourself by referring to the table below.

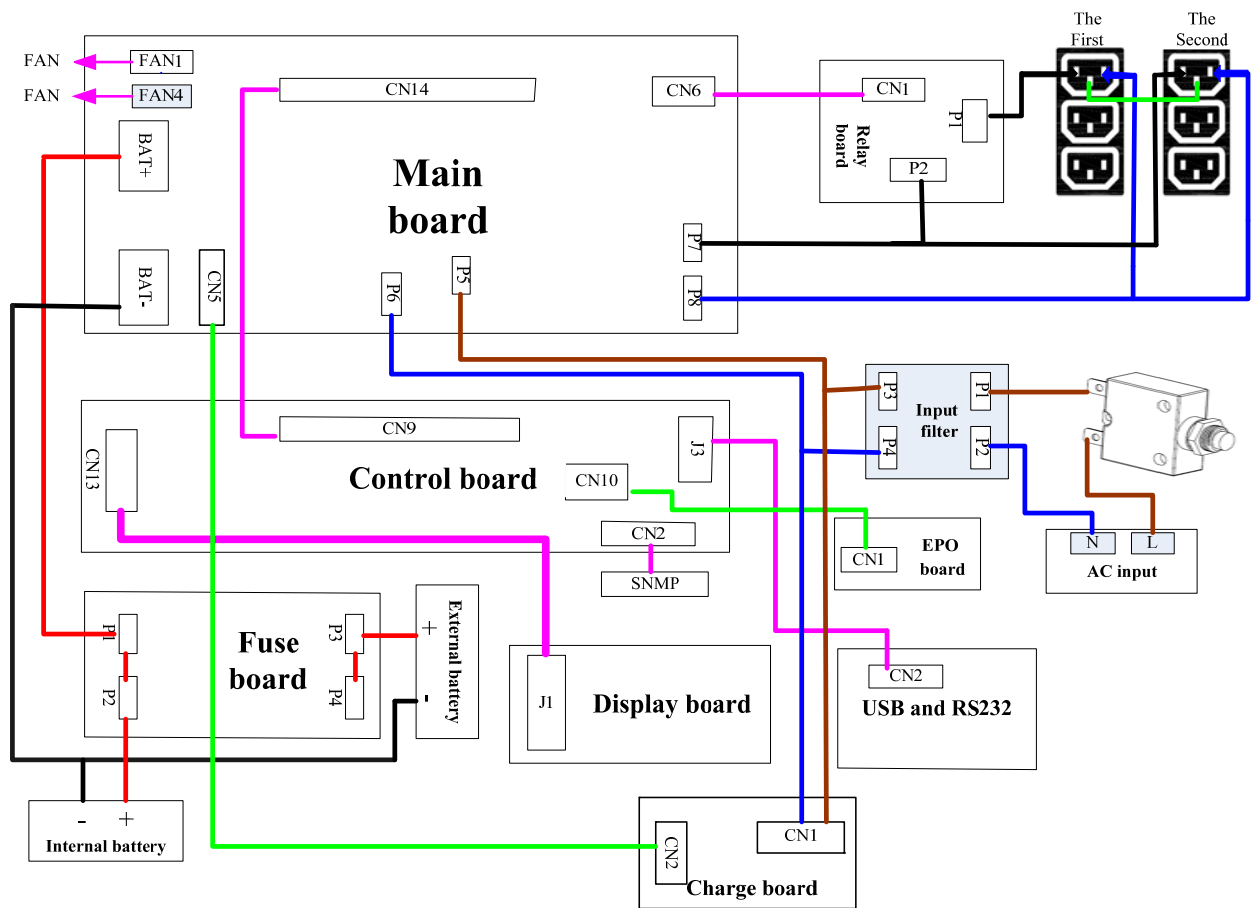
Symptom	Possible cause	Rem
Main power supply is normal, but there is no any led lights or beep rings	AC power input interface may be loose or not connected correctly.	Check whether the input power interface is loose.
	The AC power input may be wrongly connected to the UPS output.	The AC power input is correctly inserted into the UPS input interface.
Alarm code is shown as "33" and battery led blinking.	The battery voltage of the connected battery pack is too high , the charger fail, or the jumper cap model of the control board is not configured correctly.	Contact your dealer.
Alarm code is shown as "26" and battery led blinking.	Over battery voltage or charger failure.	Contact your dealer.
Alarm code is shown as "34" and INV and BYPASS led blinking.	Low battery voltage or charger failure.	Contact your dealer.
Alarm code is shown as "32" and FAULT led light	UPS is overload.	Remove excess loads from UPS output.
Alarm code is shown as "29" and FAULT led light.	The UPS shut down automatically because short circuit occurs on the UPS output.	Check output wiring and if connected devices are in short circuit status.
Alarm code is shown as "9" and FAULT led light.	Fan fault.	Please check whether the fan is stuck by other objects, shut down and
Alarm code is shown as "02,15, 16,17,18"	A UPS internal fault has occurred.	Contact your dealer.
Battery backup time is shorter than nominal value	Batteries are not fully charged	Charge the batteries for at least 5 hours and then check capacity. If the problem still persists, consult your dealer.
	batteries defect	Contact your dealer to replace the bat

# APPENDIX I : WIRING DIAGRAM



1K S/H wiring diagram





2/3K S wiring diagram



# APPENDIX II : Software Burning Description

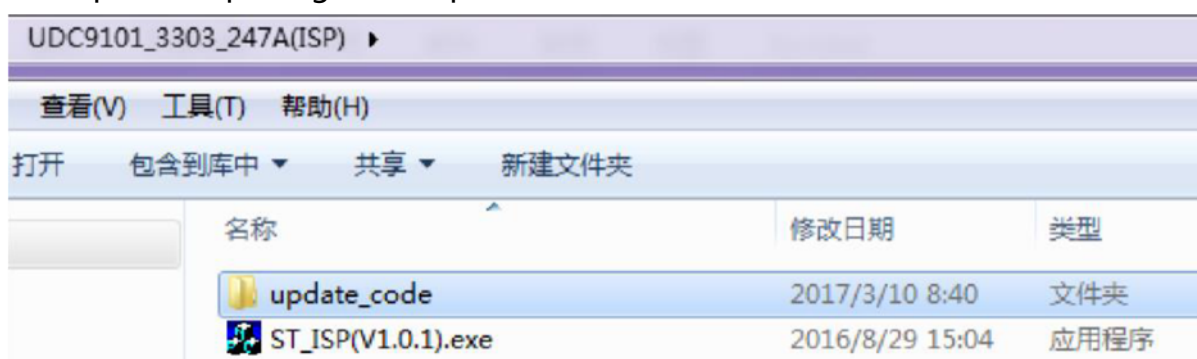
## \_ISP

### 1 Document description

This article mainly explains how to update the machine software through the serial port on the machine. The serial update command can only take effect in the first second of the machine.

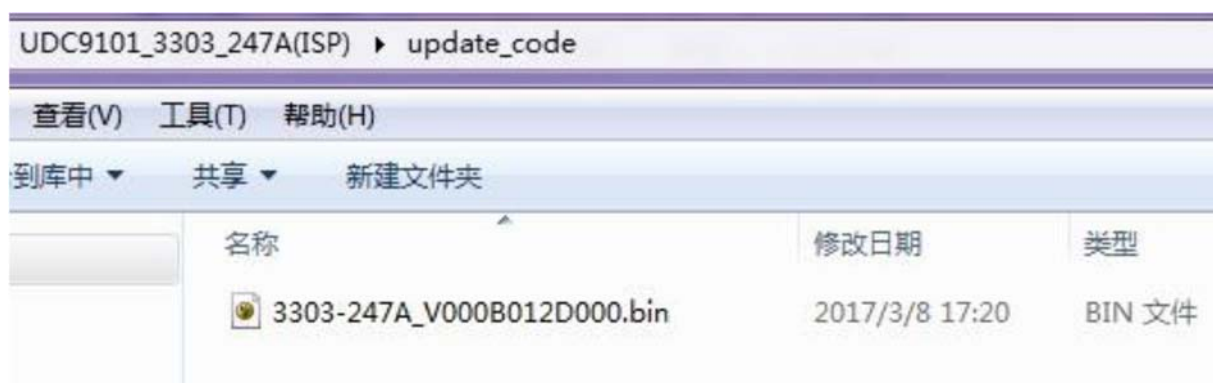
### 2 Tool preparation

The compression package is unzip as follows:



Document description:

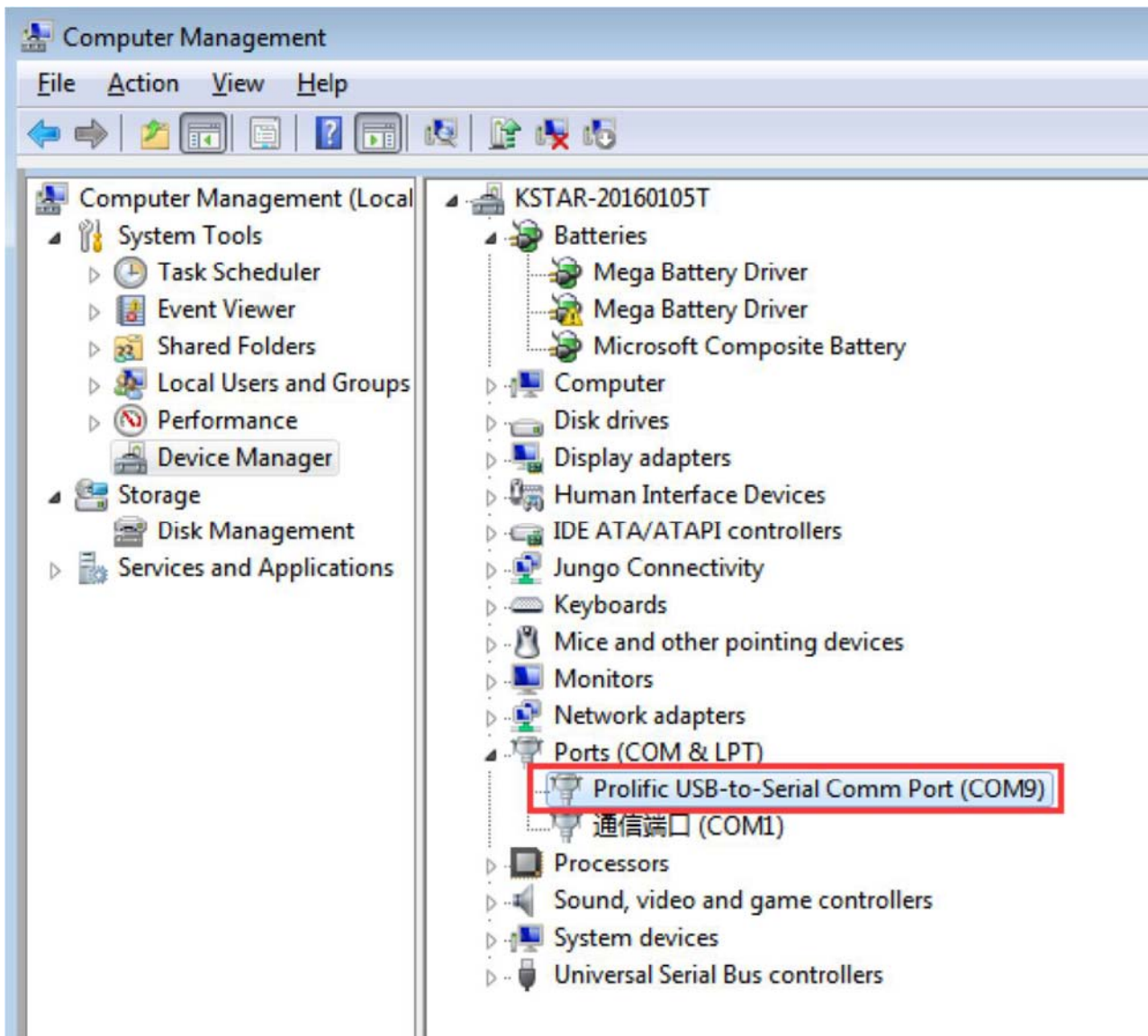
ST\_ISP(V1.0.1).exe: Serial port update tool  
update\_code: Files that store updated files, update the file type of files: \*.bin, such as the file 3303-247AV000B012D00.bin below, and the updated files in the rest contents refer to this file.



### 3 Update step

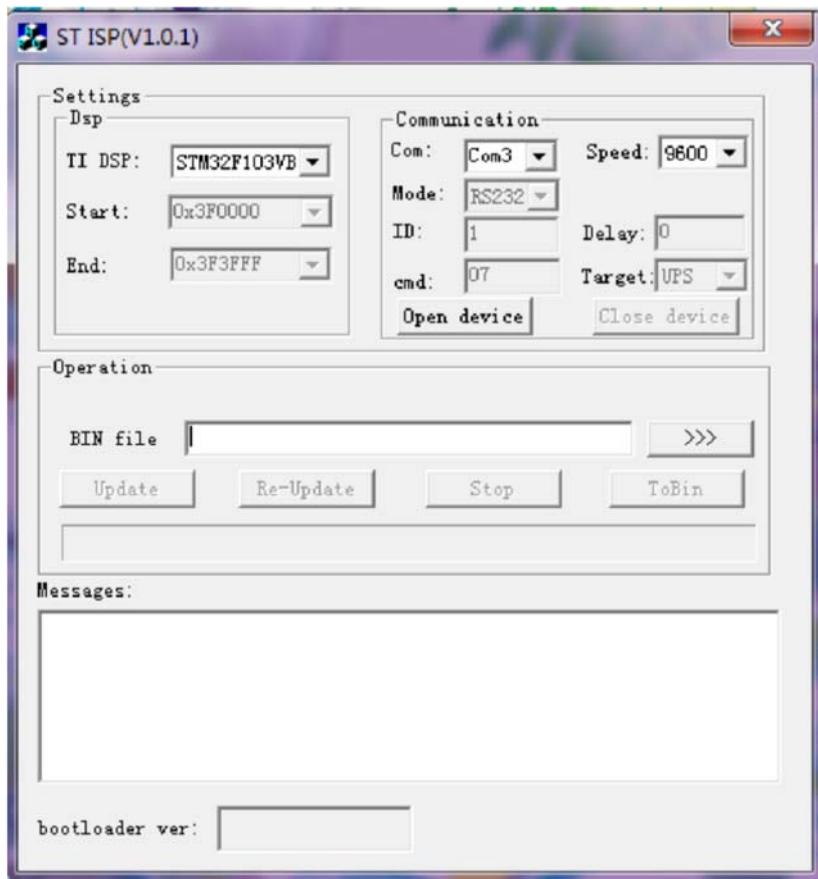
#### 3.1 PC Connect with the machine

PC is connected to the machine through the serial port /USB, and needs to get the name of the COM port that is connected to the machine in the device manager. As shown in the following COM9, the communication port in the remaining content refers to the COM9, and the different PC may be different.

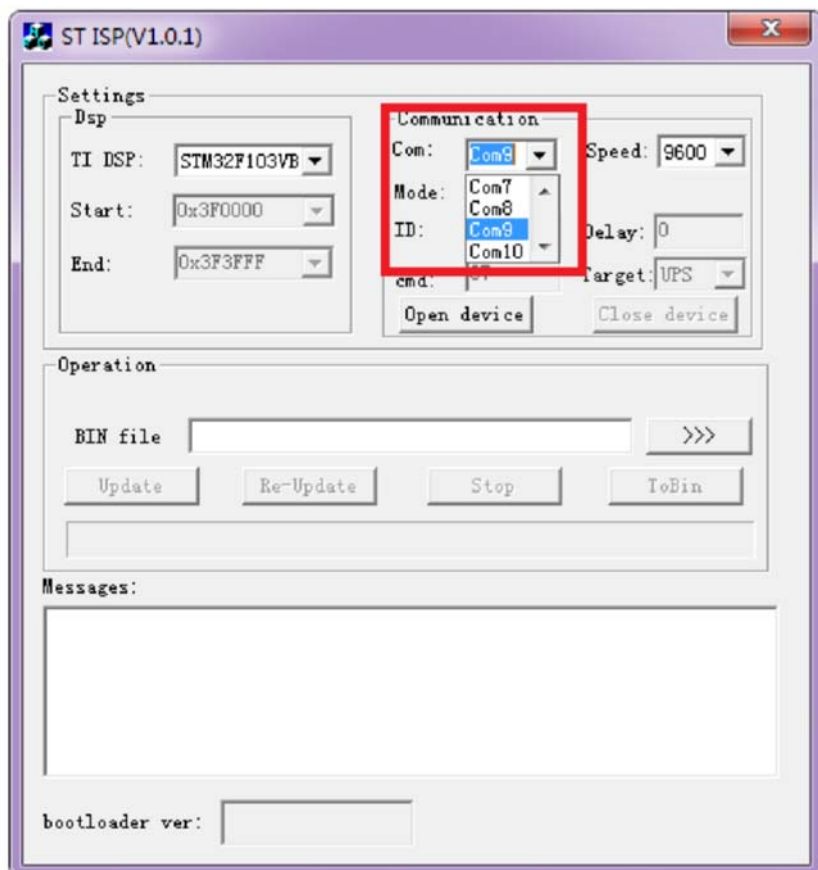


### 3.2 Set up update tool

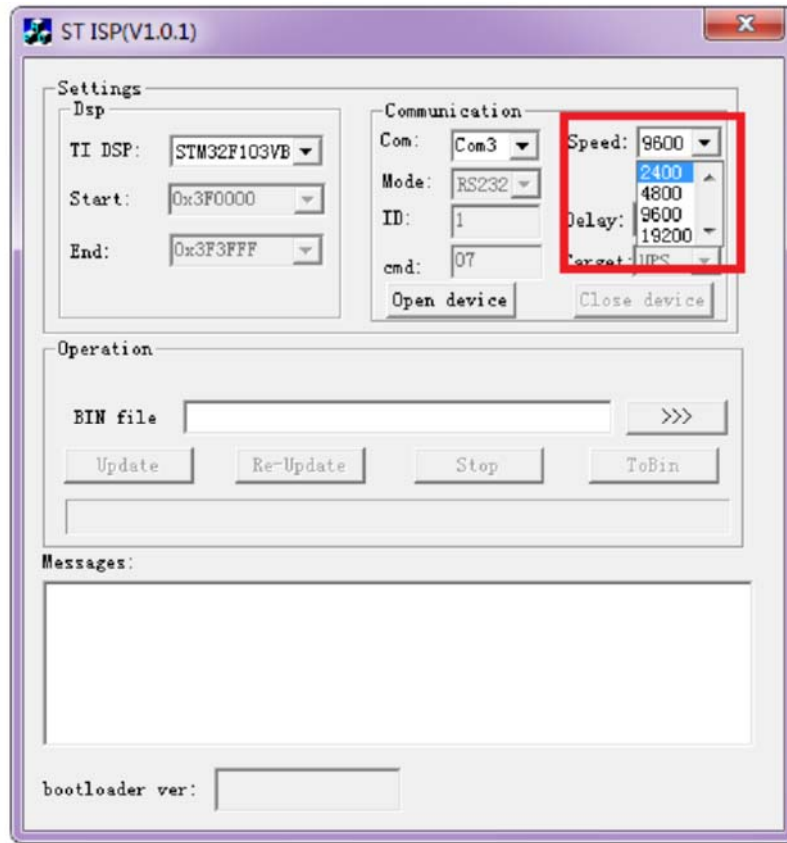
The initial interface of the update tool is shown as shown in the following diagram.



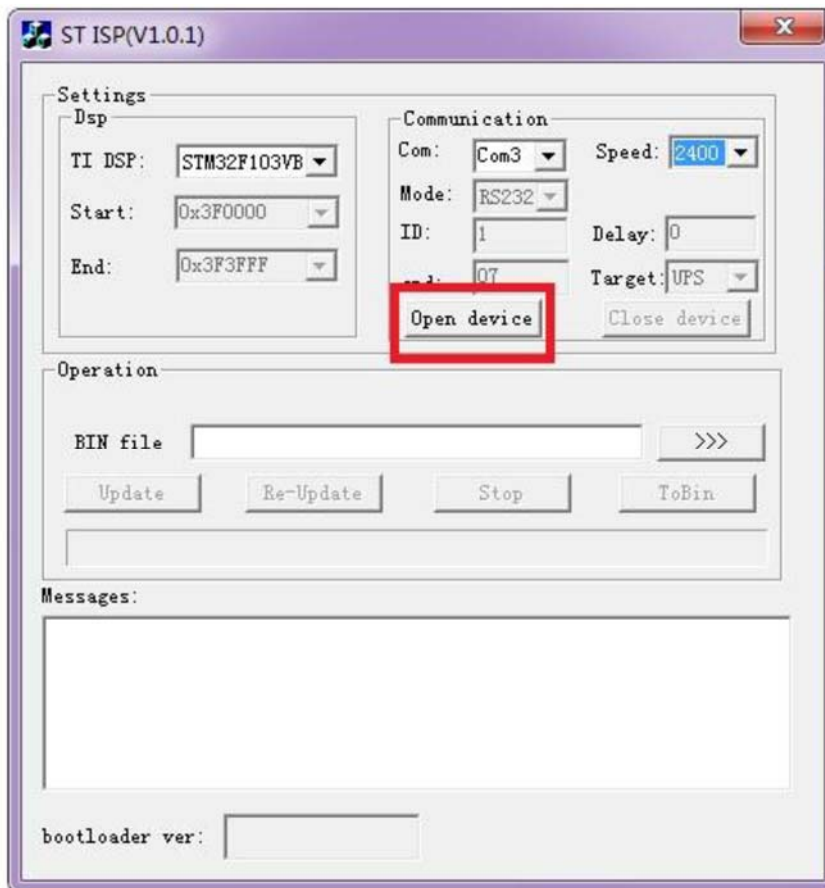
First configure the COM port, and select the communication port in Communication->Com.



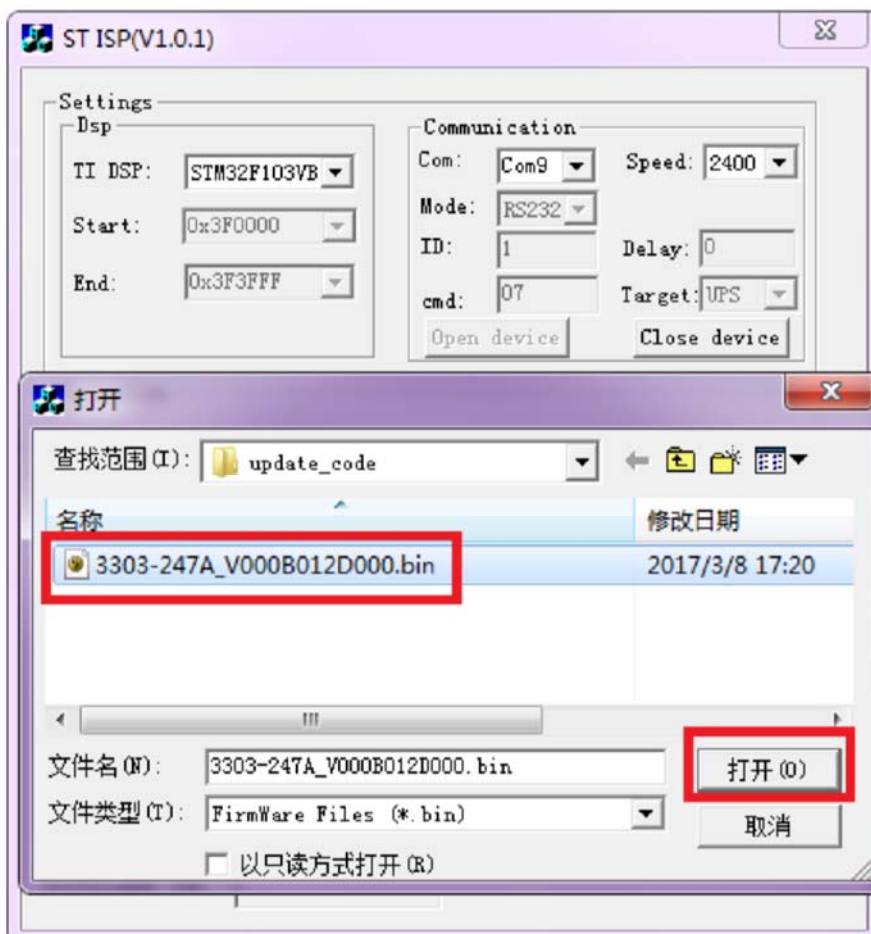
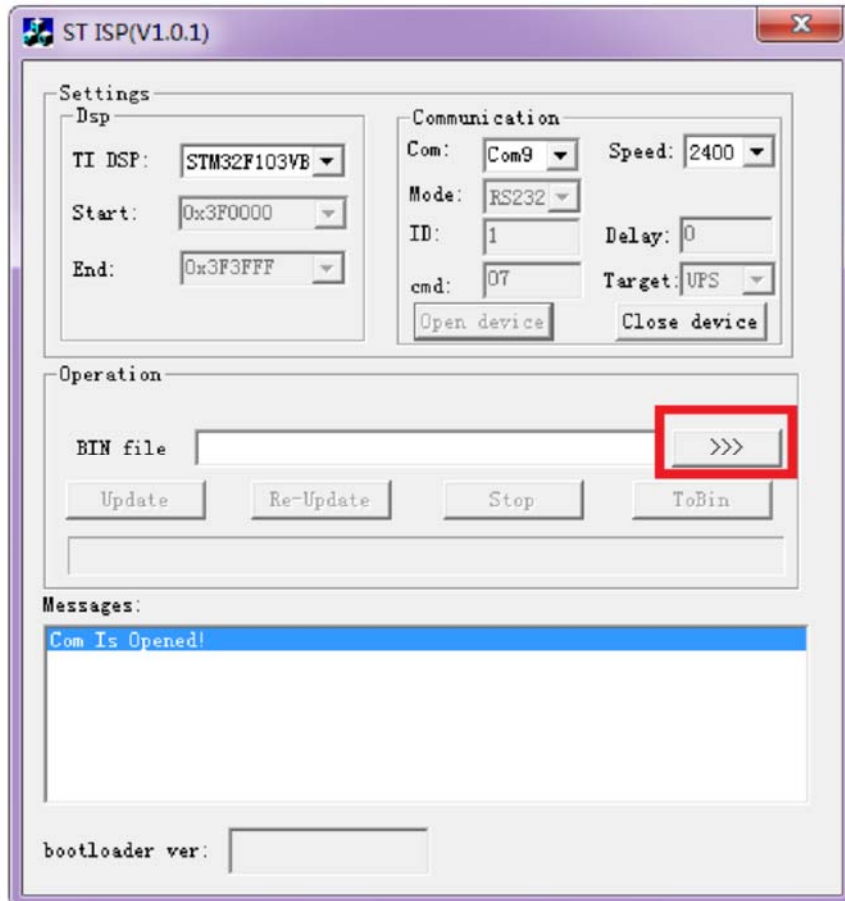
In Communication->Speed, the speed of communication is selected, and 2400 is recommended.



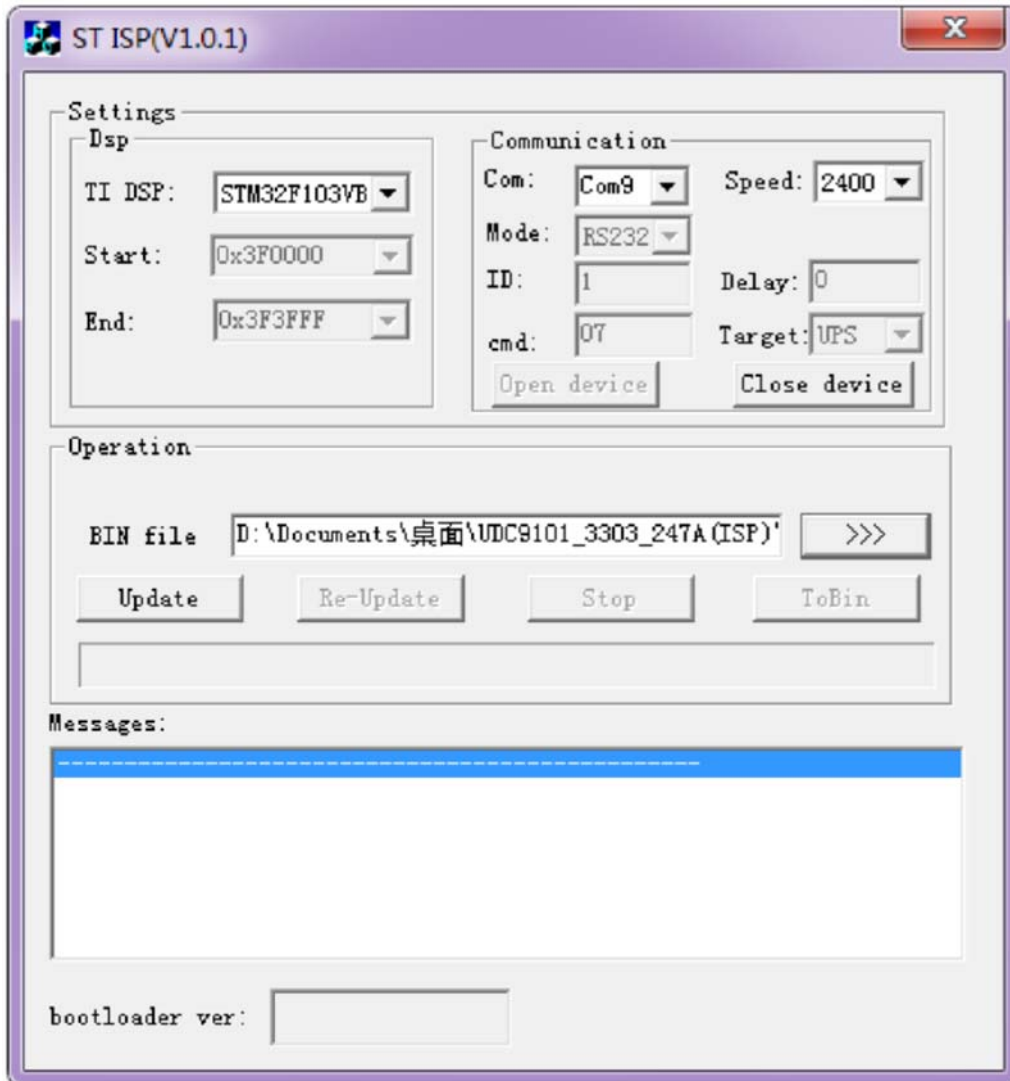
Then open the serial port (Open device) :



The next step is to select the update file to import the update tool:



When the configuration is completed, as shown in the following figure

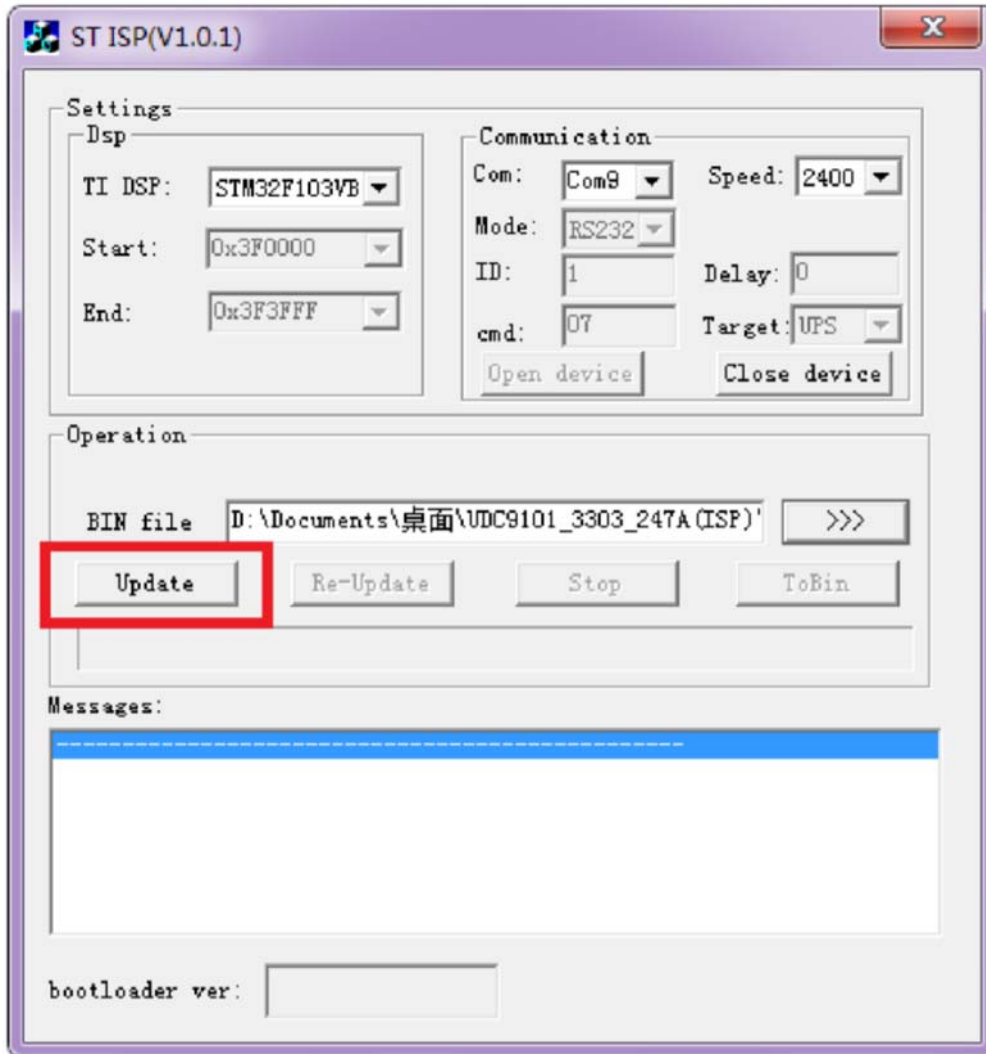


### 3.3 Shut down the UPS

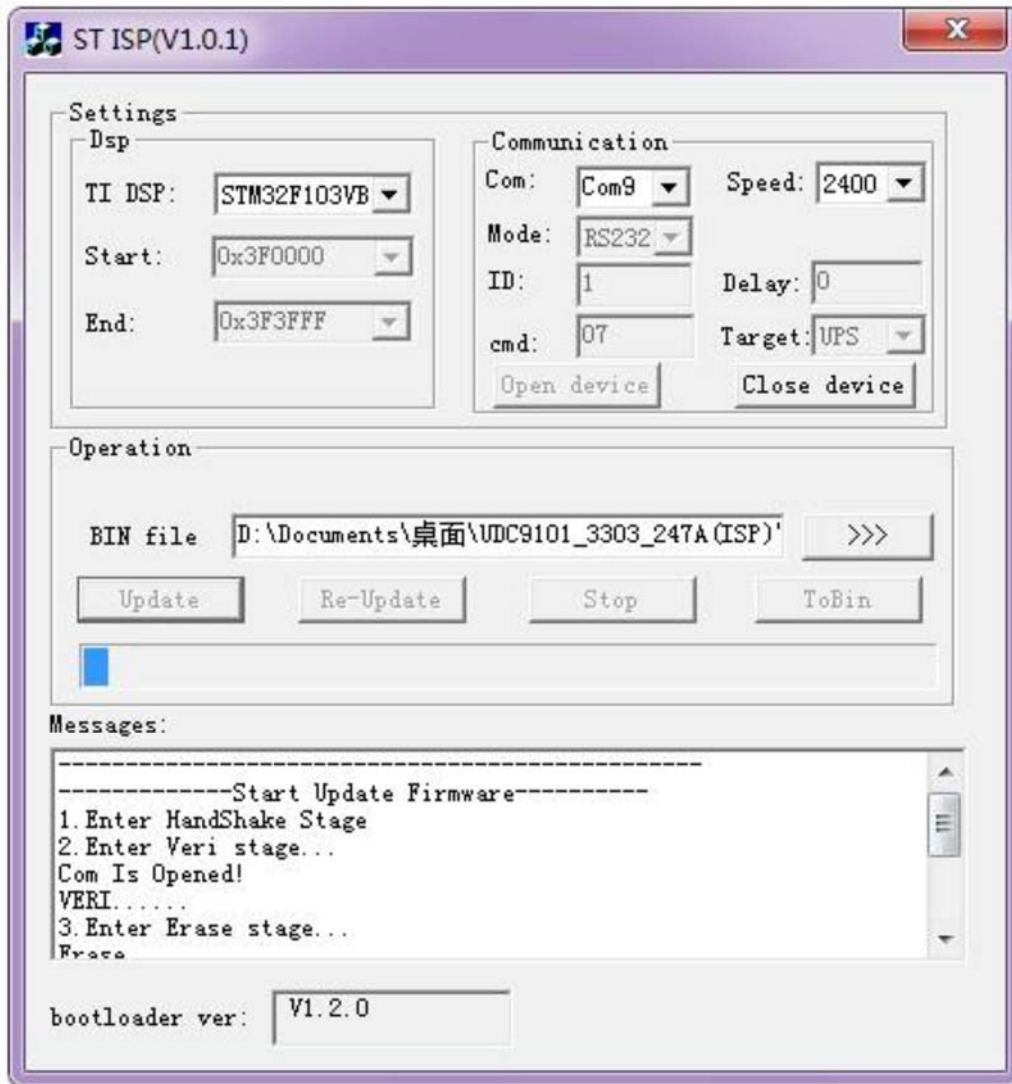
Before you update, please remove the load of the UPS first, then disconnect the electricity (AC INPUT), and manually turn off the UPS on the battery mode. When the preparatory work is complete, click Update first, and then power the UPS immediately by Press the On key. (it is recommended to connect the machine directly, only when the battery is on the boot.)



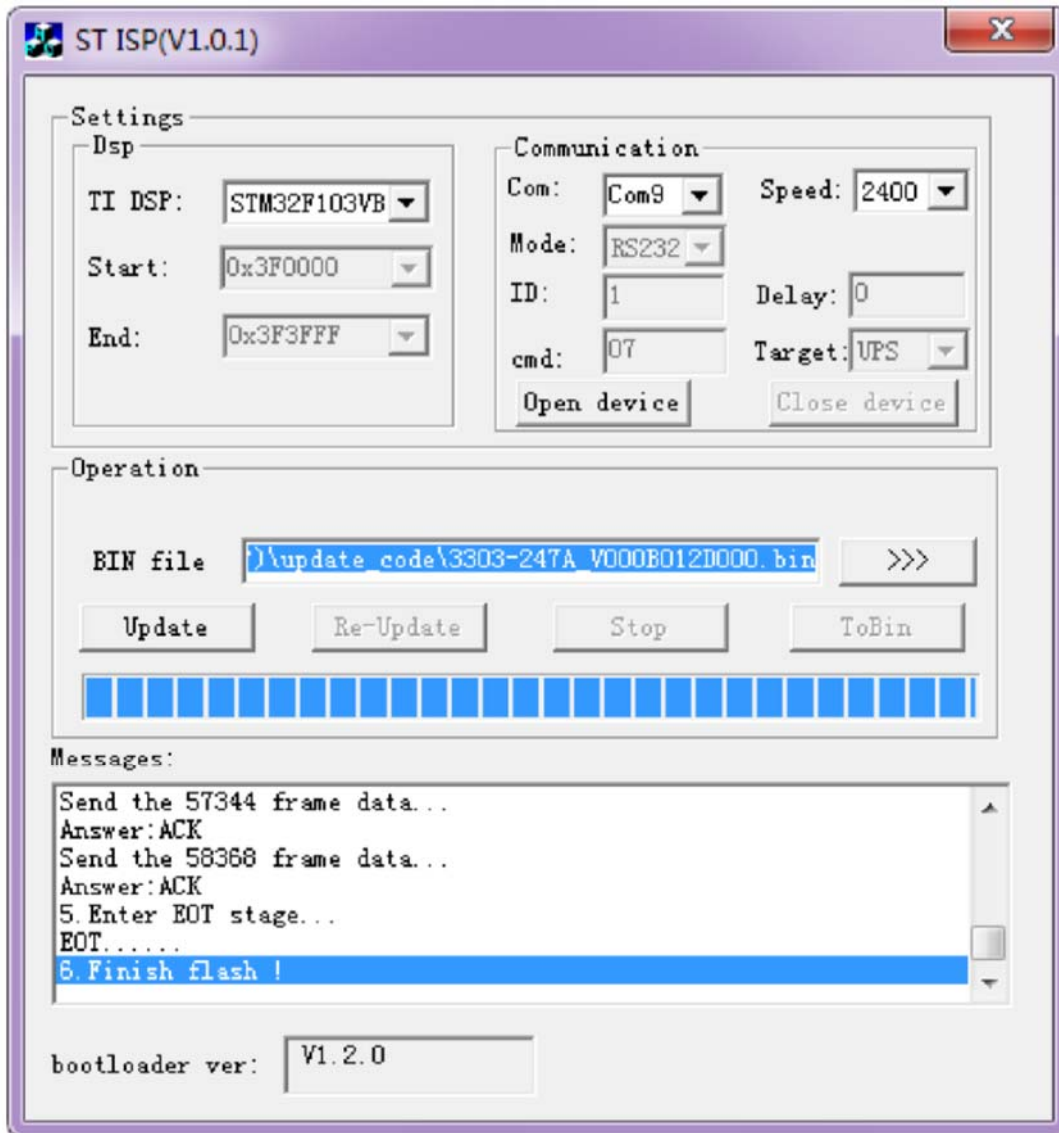
### 3.4 Serial port update



The update tool interface, as shown in the following diagram, has entered the update mode. The machine LCD panel is on FAULT\_LED and the fan speed is adjusted to full speed. Do not power off or disconnect the serial /USB line during the machine update operation



As shown in the following figure, the machine updates are completed. The UPS will automatically run the power program after the update is completed. If you need multiple updates, you need to repeat 3.3 machine closures and 3.4 serial ports to update two parts.



### 3.5 Exception handling

If the machine accident update process power, serial communication interrupt, please disconnect the electric machine waiting for automatic electric (without battery when opening electric machine immediately shut down, if the machine with a battery will need to wait 30 seconds timeout electric). It is more effective to repeat the 3.4 serial port after the power is completed under the machine.