Galleon 3/3 Parallel Kit Installation Guide

V. 0.0

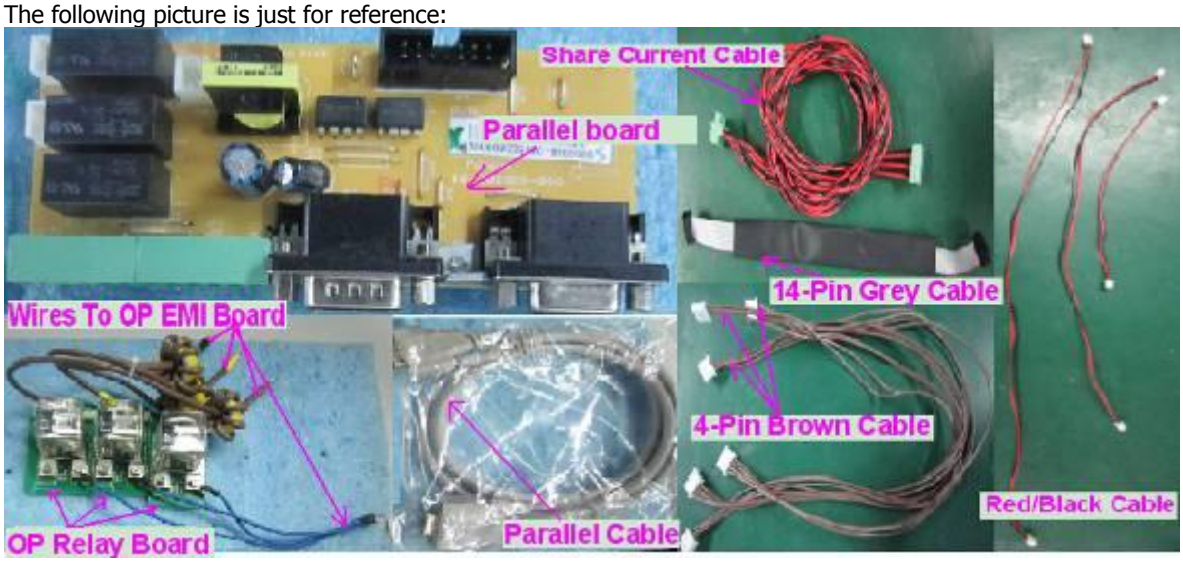
1. Package Inside

In parallel kit, you will find the following items in the package:

- 1 PCS of parallel board
- 1 PCS of parallel cable
- 3 PCS OP relay board
- 1 PCS of share current cable
- 3 PCS of 2-pin red/black cables, 3 pieces of 4-pin brown cables and 1 piece of14-pin grey cable
- 3 PCS of brown wires (each with a yellow& white core) and 1 piece of blue wire
- Long screws and short screws for assembly
- Control board and Communication board (Option)

Note: The specs of relay board, wire, and cable are different for 10K, 10k (L), 20K and 20K (L) model. Please DO NOT install 10K(L) parallel kit to 20K(L) model.

The following picture is just for reference:



2. Installation

Warning: (For standard model)

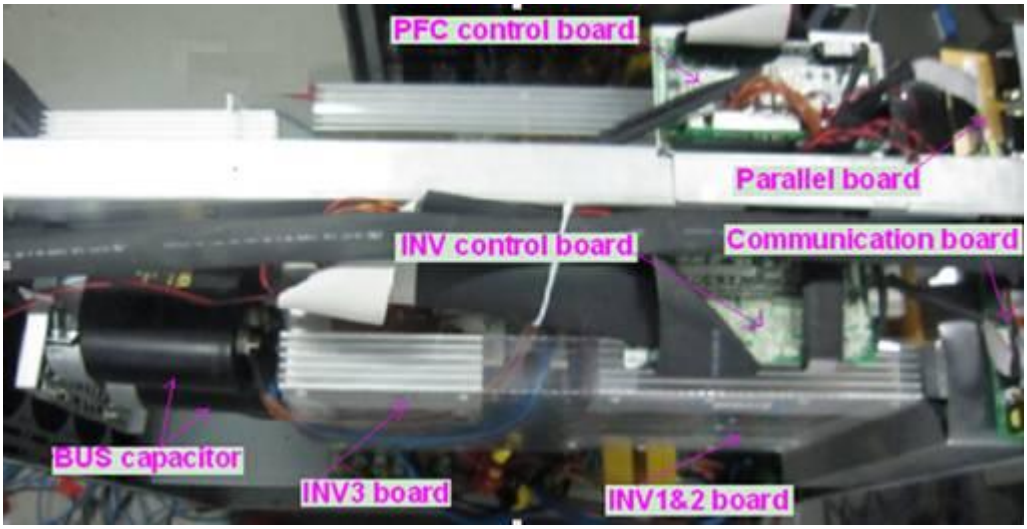
- Make sure the UPS is not turned on before installation. The UPS should not be turned on during installation.
- Cut off all the power supply to the unit before installation.

Warning: (For long-run model)

- Make sure a DC breaker or other protection device between UPS and external battery pack is installed. If not, please install it carefully. Switch off the battery breaker before installation.
- Cut off all the power supply to the unit before installation.

2.1 Disassemble the UPS

Disassemble the UPSs that will be paralleled by removing all screws, and the following picture shows the PCBA location in the UPS:



2.2 Replace the CNTL board and COMMUNICATION board

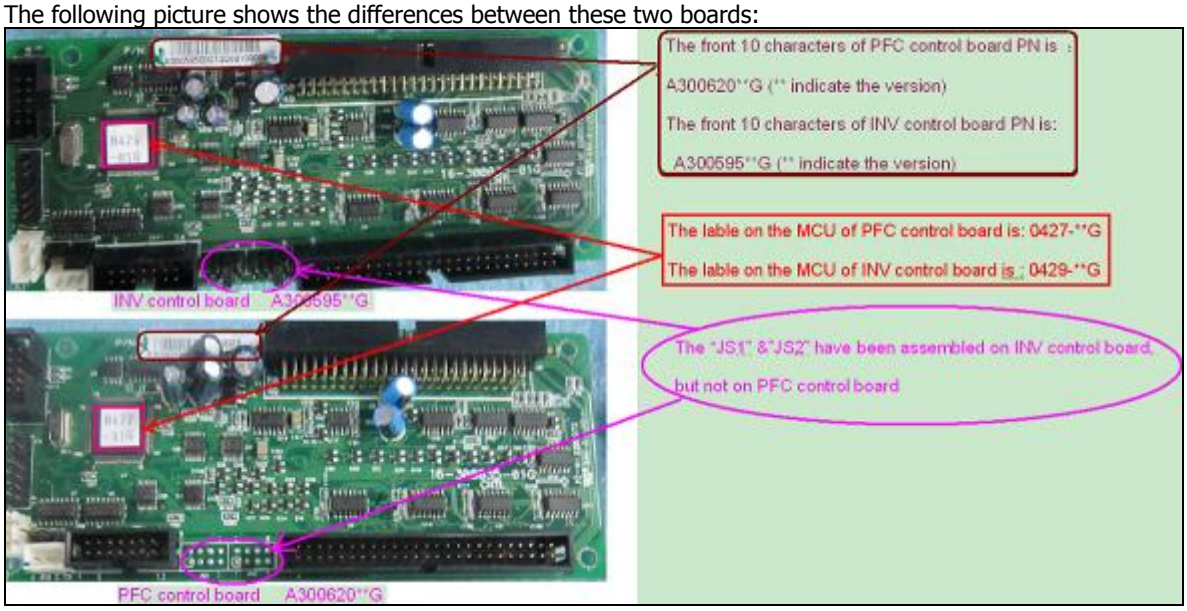
Please ignore this step if the control board and communication board of the units you have bought were suitable for parallel function already. The conditions for the UPS suitable for parallel as follows:

① The version of PFC control board is higher then A300620**04**G or the software version is higher then 0427-**03**G.

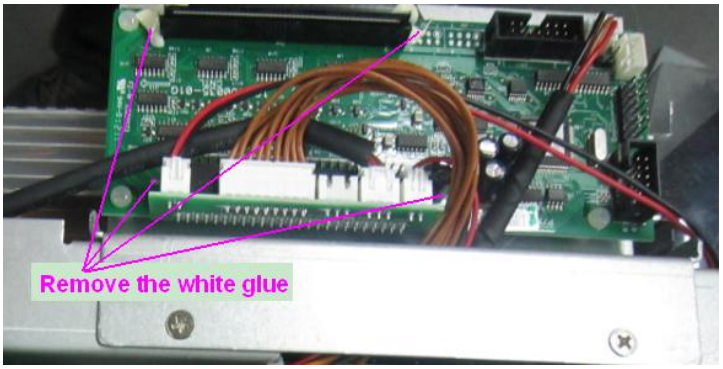
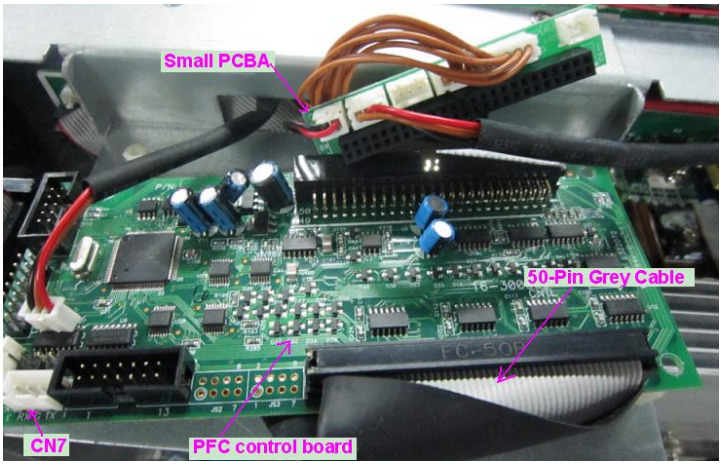
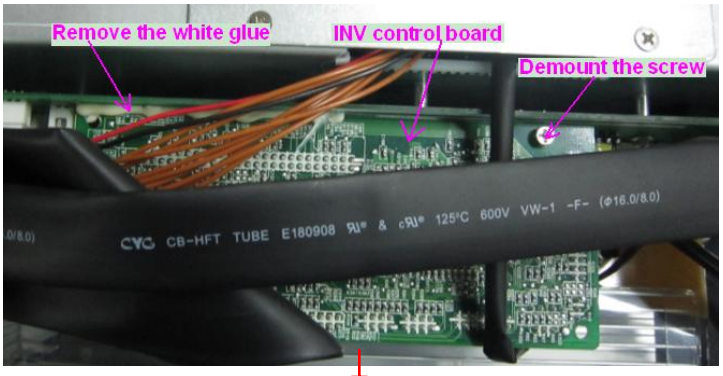
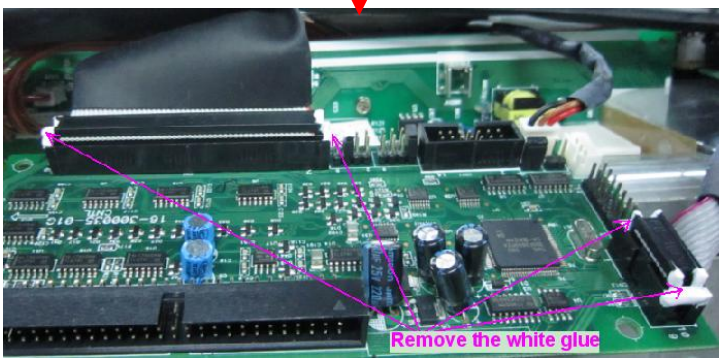
② The version of INV control board is higher then A300595**06**G or the software version is higher then 0426-**05**G.

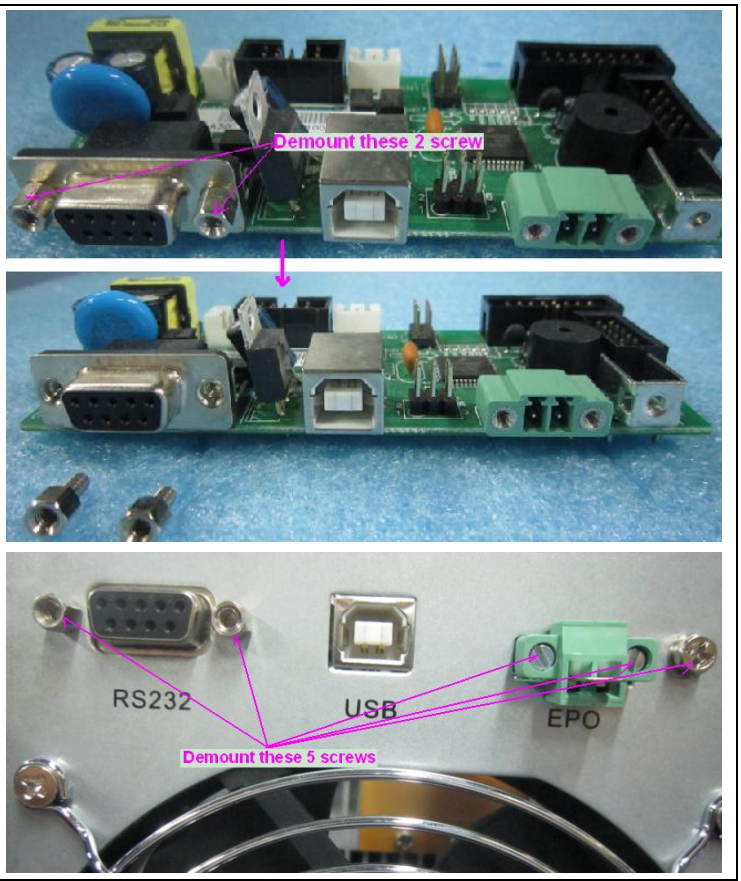
③ The version of communication board is higher then A300621**03**G or the software version is higher then 0425-**03**G.

For Gallon 3/3 UPS (10K, 15K, 20K),there are 2 control boards, one for PFC control and the other for INV control. The following picture shows the differences between these two boards:

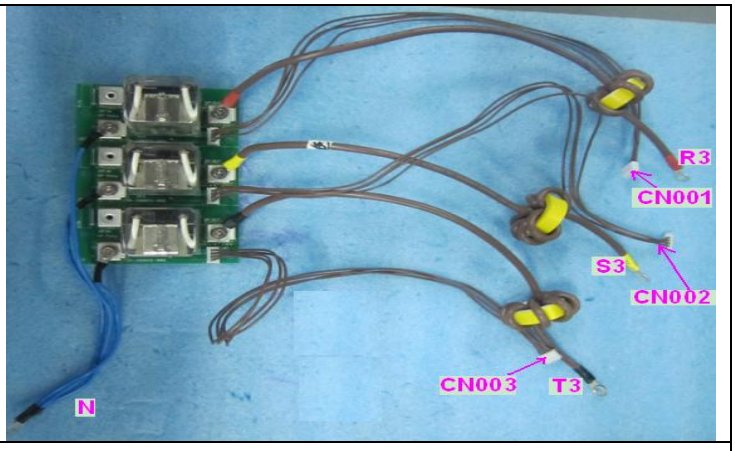
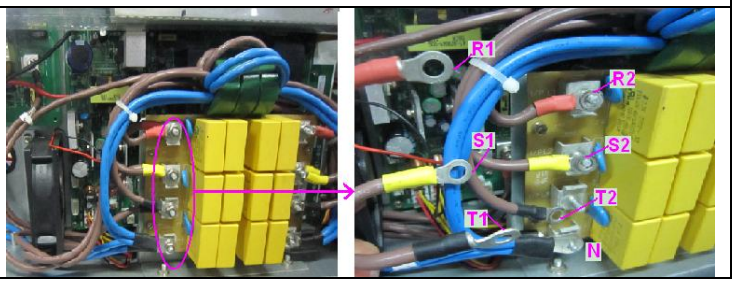


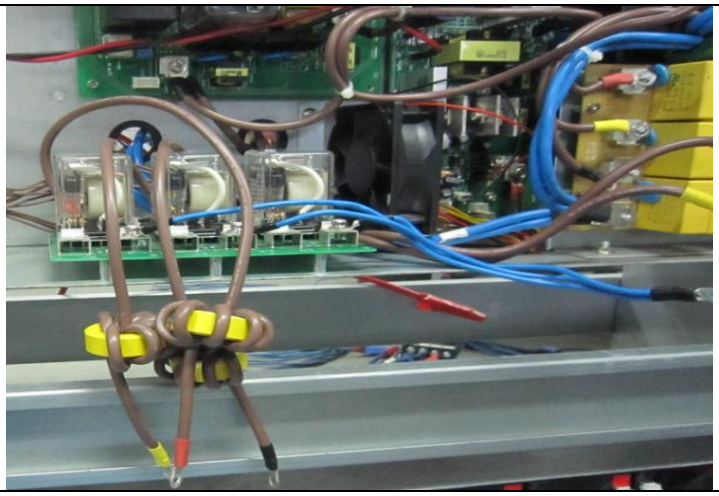
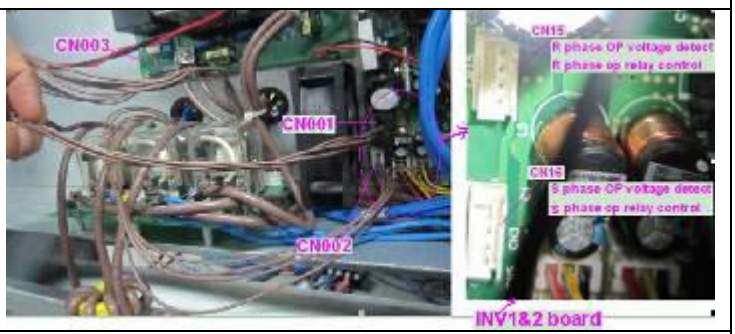
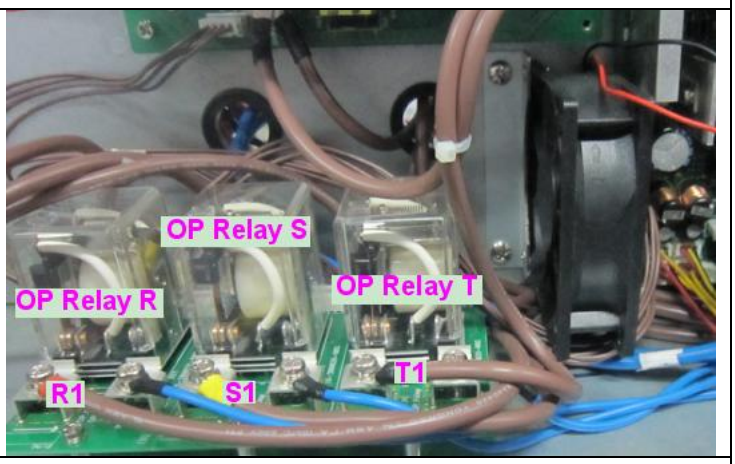
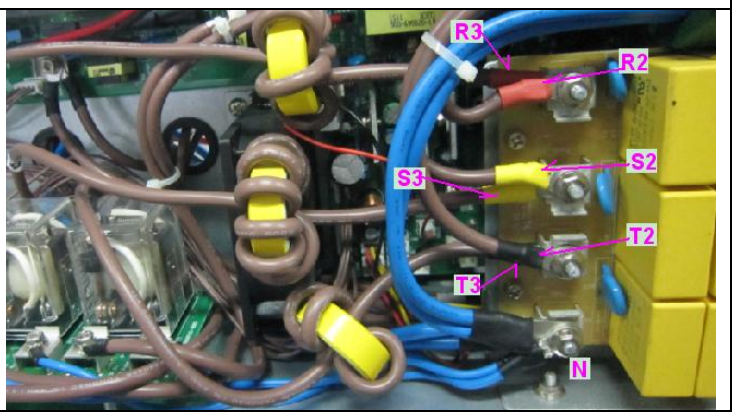
Please replace the boards according the following steps:

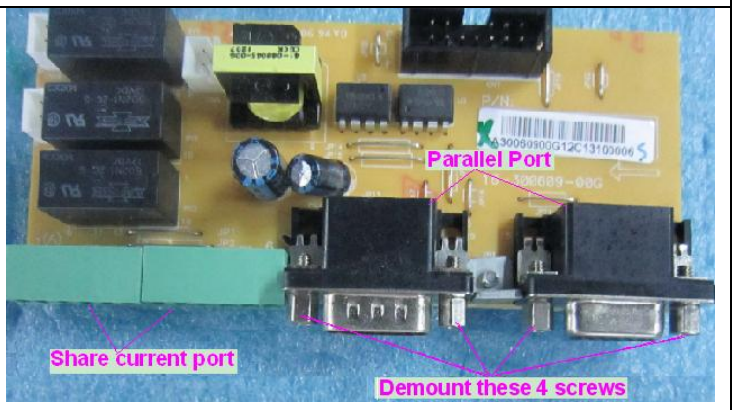
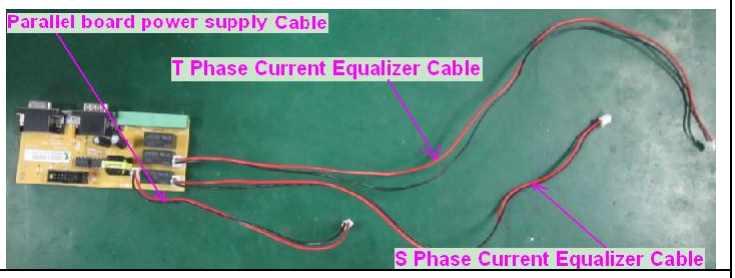
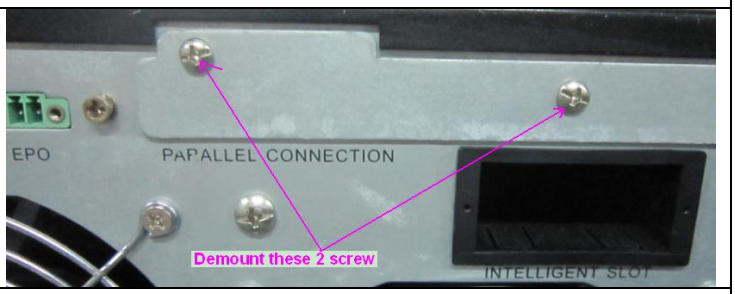
Step 1: Replace PFC control board: Remove the white glue. Disconnect the 3-pin cable from CN7 of the PFC control board and demount the small PCBA board. Remove 3 white screws and disconnect the 50-pin cable. Replace PFC control board with a new one. It is better to assemble the small PCBA first, assemble the new PFC control board with 3 screws next, and then connect the 3-pin cables and 50-pin cables.	 
Step 2: Replace the INV control board. Remove white glue and demount the screw. Then, pull out INV control board. Flipping over INV control board to see if any glue is on the connectors. If so, remove glue and disconnect all the cables. Replace the INV control board with an new one and assemble the new board back to the INV1&2 board.	 

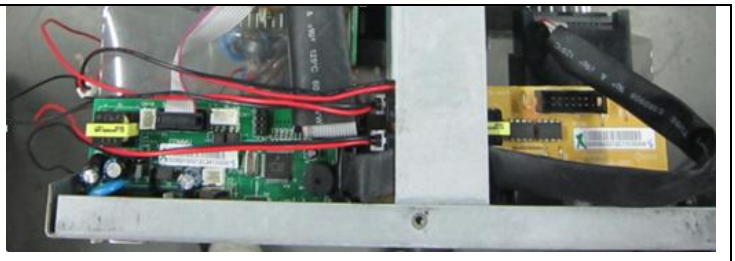
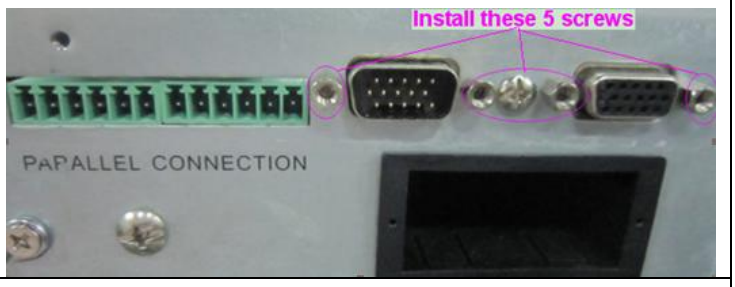
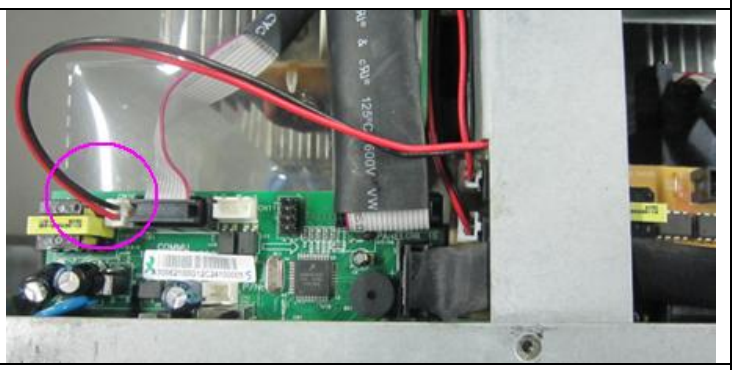
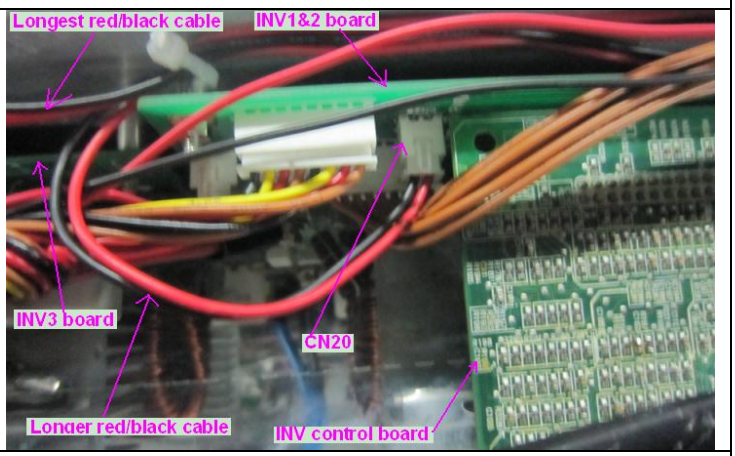
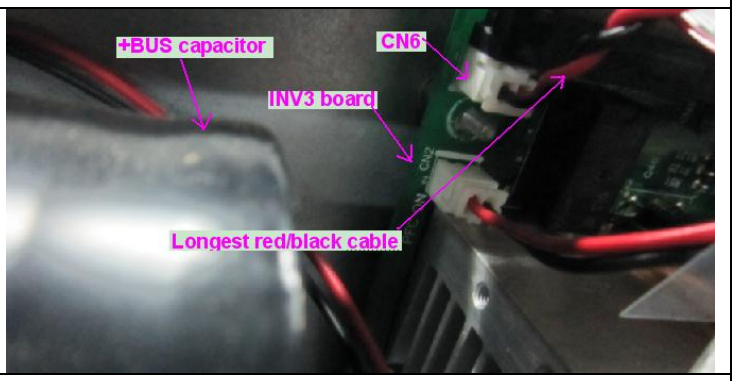
Step 3: Replace the communication board. Take a new communication board and remove 2 screws from DB-15 port. Disconnect the cables on the communication board and remove all screws that are used to fasten the communication board to the rear panel. Replace the board with a new one, connect the cables, and fasten it with the screws.	

2.3 Parallel kit installation

Step 1: Connect wires to the OP relay board.	
Step 2: Remove 3 wires from the O/P EMI board.	

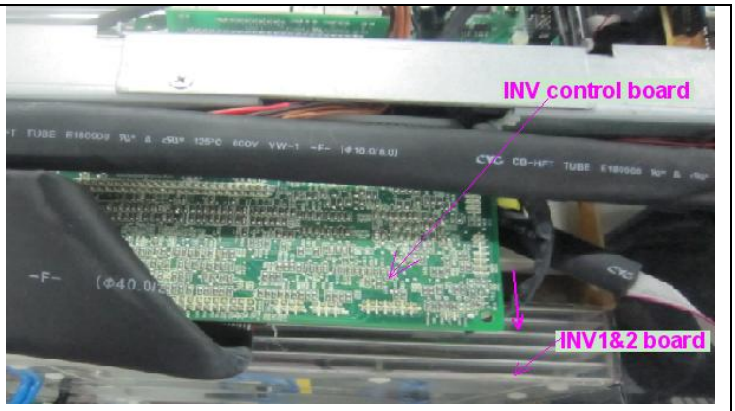
Step 3: Assemble the OP relay boards to the left side of the OP EMI board.	
Step 4: Connect the OP relay control and OP voltage detect cables (4-pin brown cable): Connect CN001 to CN15 of INV1&2 board. Connect CN002 to CN16 of INV1&2 board. Connect CN003 to CN15 of INV3 board.	
Step 5: Re-connect all wires that are removed from the OP EMI board in "**step2**": Connect R1 to P1 of OP relay board R. Connect S1 to P1 of OP relay board S. Connect T1 to P1 of OP relay board T.	
Step 6: Connect the wires that with yellow & white core to the OP EMI board:	

Step 7: Take a new parallel board and remove 4 screws from the parallel port (DB15 Connectors). Connect the "Parallel board power supply cable" to CN9 of parallel board. Connect the "S phase current equalizer cable" to CN10 of parallel board. Connect the "T phase current equalizer cable" to CN11 of parallel board.	 
Step 8: Remove covers of parallel board port by removing 2 screws.	
Step 9: Assemble the parallel board into the UPS. Refer to right pictures.	

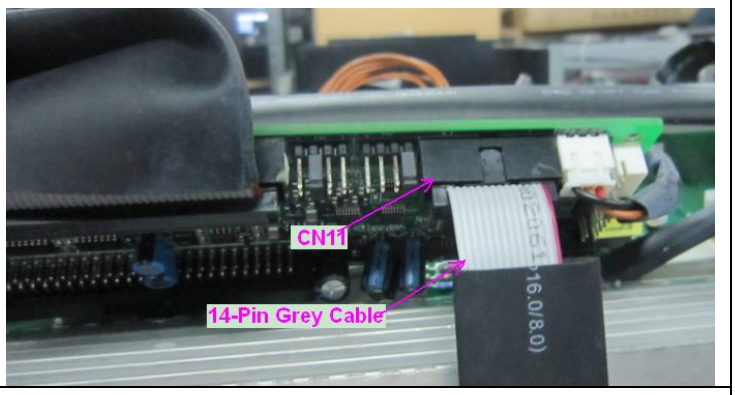
	 
Step 10: Connect the "Parallel board power supply cable" (Short red/black cable) to CN10 of communication board.	
Step 11: Connect the "S phase current equalizer cable" (the longer red/black cable) to "CN20" of INV 1&2 board.	
Step 12: Connect the "T phase current equalizer cable" (the longest red/black cable) to "CN 6" of INV 3 board.	

Step 13: Connect the 14-pin grey cable to CN11 of INV control board:

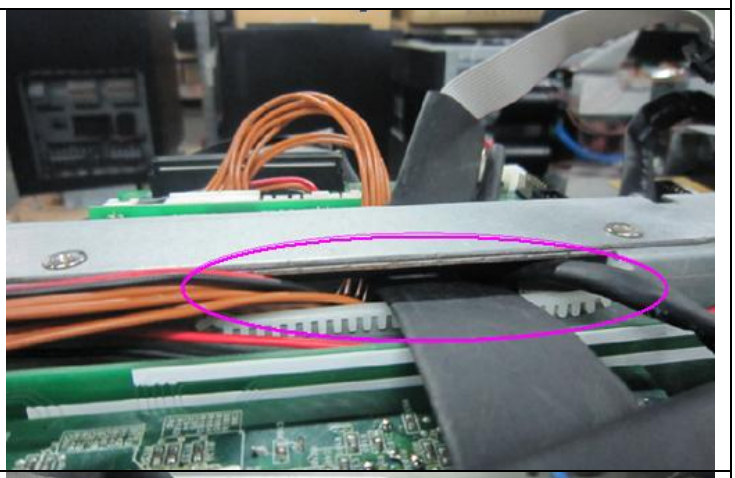
Please refer to **Part 2.2 in Step2** to remove INV control board from the INV1&2 board.



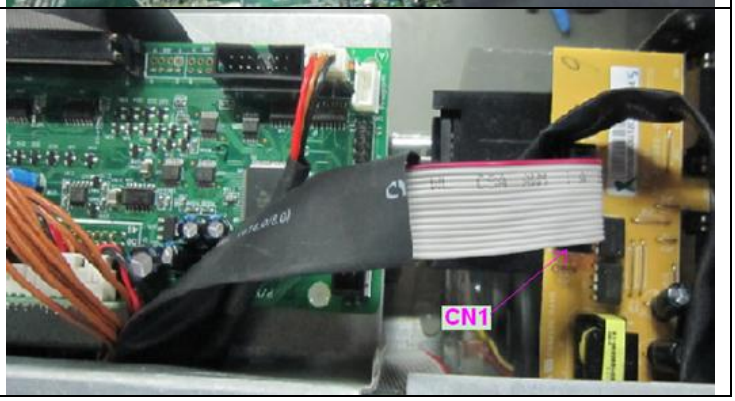
Connect the 14-pin grey cable to CN11 of INV control board.



Step 14: Assemble the INV control board back to INV1&2 board, and then make the 14-PIN grey cable through the middle iron board.

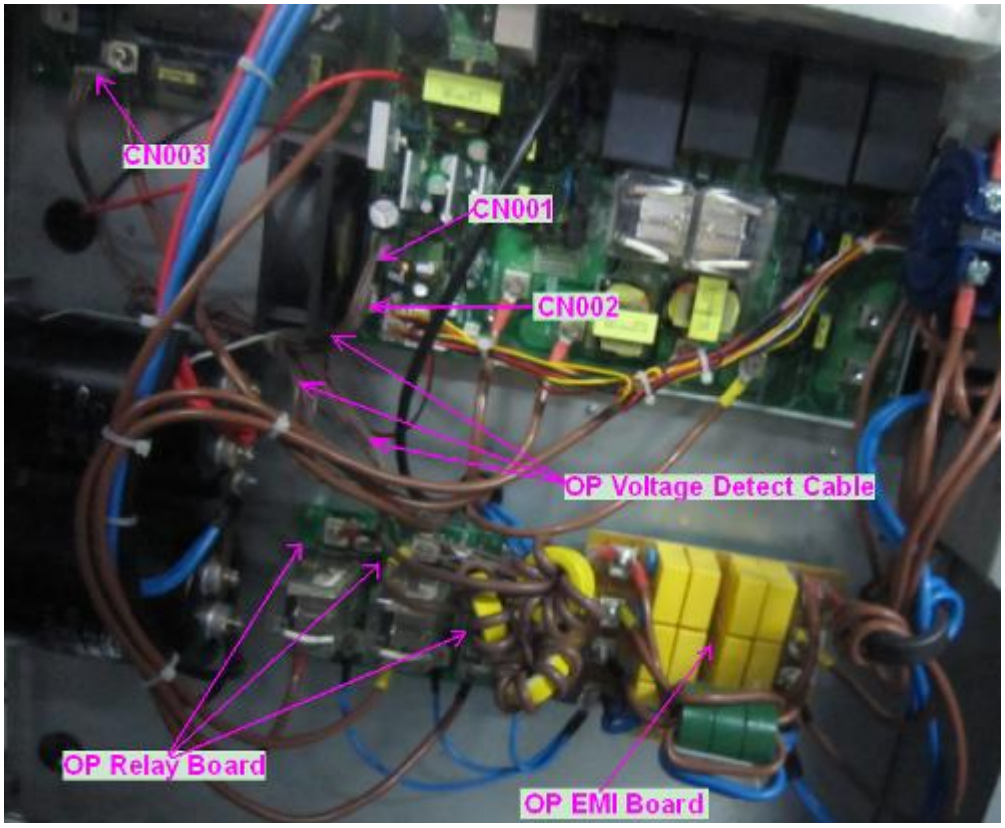


Step 15: Connect the 14-pin grey cable to CN1 of parallel board.



At last, put the cover back to the unit. Now the UPS is ready for parallel operation function.

Above is suitable for GALLON 3/3 10k, 15k, 20K standard model. For long backup model, the only difference is the OP relay boards assemble. The following picture is for reference when assembling OP relay boards to the long backup unit.

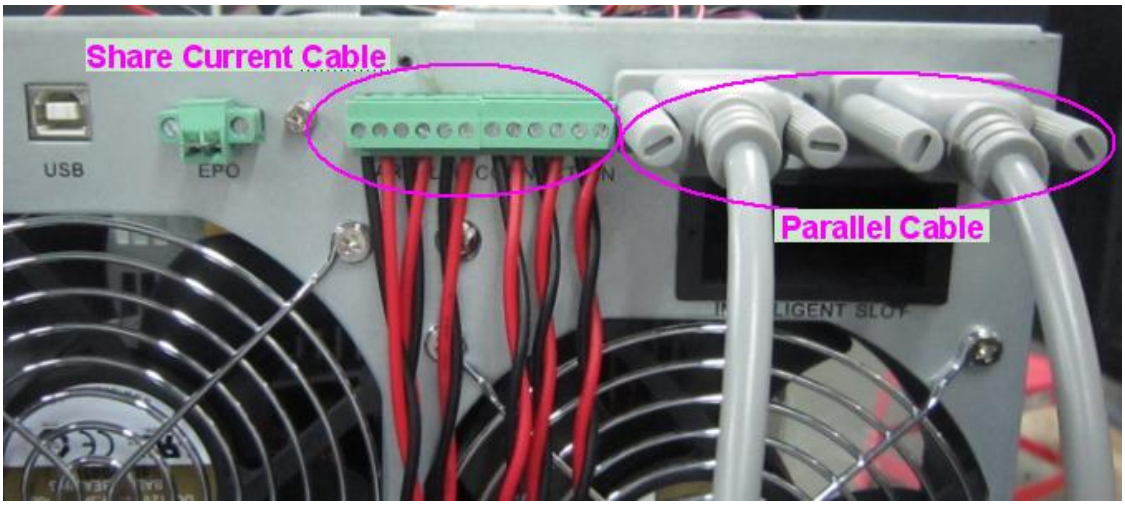


The Location Of OP Relay Board For Long Backup Unit

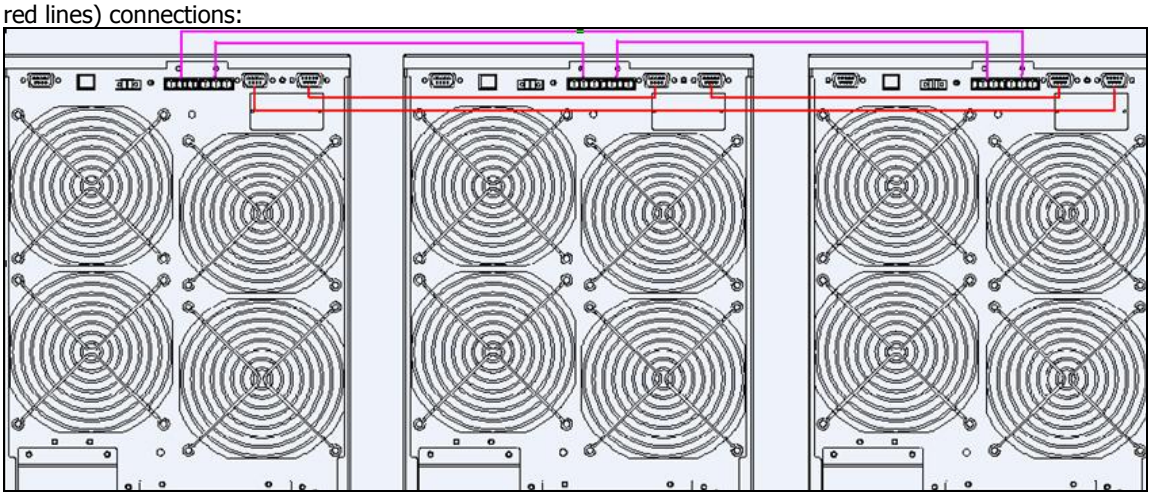
3. Wiring Connection for Parallel Operation

Please follow the below steps to connect cables and wires.

Step 1: Parallel cable and share current cable connection:
It is better to connect the "Share current cable" first, then connect the "parallel cable". It's all dummy-proof design which can prevent customers from mis-connection. However, any stress to cables will cause bad contact or broken inner wires. Please be aware of that.



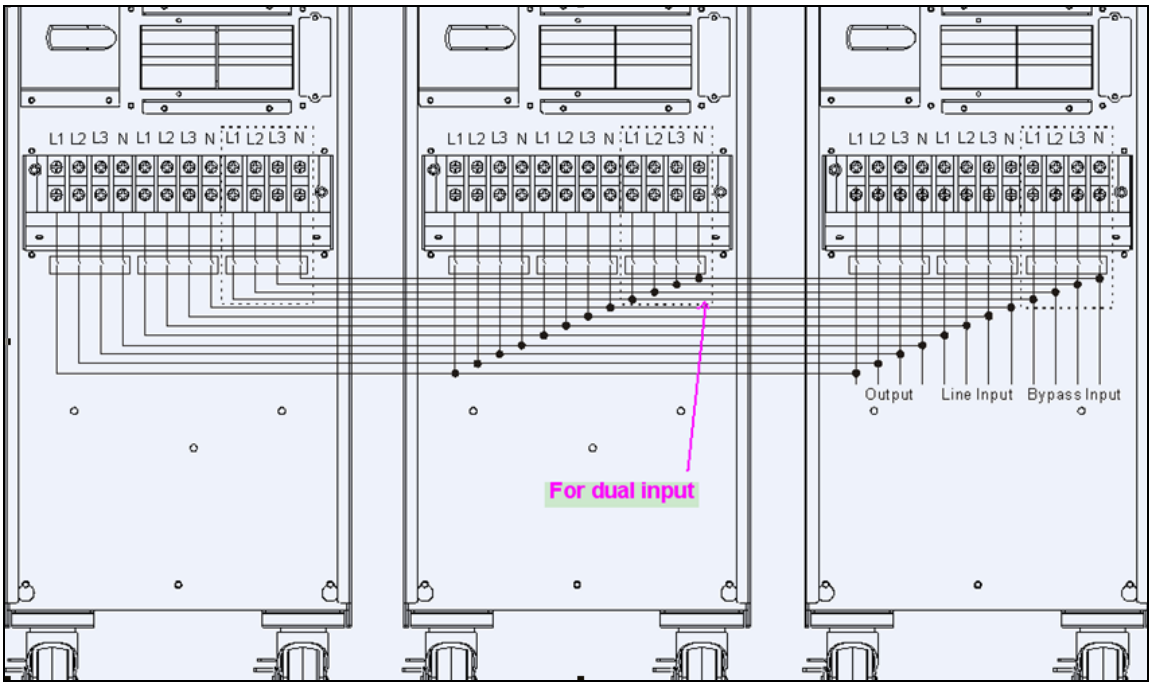
The following picture shows the share current cable connection (The pink lines) and the parallel cable (The red lines) connections:



Step 2: Input and output wires connection:

Please connect the input and output wires according to the following steps :

1) Connect the input wires of each UPS to a breaker.
2) Connect all input breakers to a major breaker. The major breaker will directly connect to the mains.
3) Connect the output wires of each UPS to an output breaker.
4) Connect all output breakers to a major output breaker. Then this major output breaker will directly connect to the loads.



Step 3: If the UPS is connected to external battery pack, it's required to install battery breaker (DC type) for each UPS. **Each UPS should be connected to an independent battery pack.**

We strongly suggest to installs a breaker (AC type, D curve) for input/output terminals in each unit. Please refer to UPS user manual for the selection of diameter and color of the wires.

NOTE: Each UPS should be connected to an independent battery pack. Otherwise, it will cause system permanent failure.

4. Parallel Operation

1) Make sure that the parallel board and OP relay board have been installed correctly.
2) Make sure that each UPS has the same configuration, including the following parameters:
   a) output voltage,
   b) output frequency,
   c) bypass voltage range,
   d) bypass frequency range,
   e) converter enable or disable,
   f) bypass enable or disable,
   g) bypass open or forbidden,
   h) frequency auto detect enable or disable,
   i) inverter short clear enable or disable
3) Turn on the UPS into the line mode or battery mode respectively, and measure the output voltage by a multimeter. Make sure the difference of the each phase output voltages among the UPSs is less than 1.5V(typical 1V). If not, you can adjust the inverter voltage of each UPS via LCD as bellow:

Inverter A voltage adjustment

Interface	Setting
	**Parameter 2:** you may choose **Add** or **Sub** to adjust inverter A voltage **Parameter 3:** the voltage range is from 0V to 9.9V, the default value is 0V.

Inverter B voltage adjustment

Interface	Setting
	**Parameter 2:** you may choose **Add** or **Sub** to adjust inverter B voltage* **Parameter 3:** the voltage range is from 0V to 9.9V, the default value is 0V. *The number 1 under the Add or Sub represent the inverter B

Inverter C voltage adjustment

Interface	Setting
	**Parameter 2:** you may choose **Add** or **Sub** to adjust inverter C voltage* **Parameter 3:** the voltage range is from 0V to 9.9V, the default value is 0V. *The number 2 under the Add or Sub represent the inverter C

After adjusting the inverter voltage, check whether the output voltage detecting is ok or not. Entering the pictures as below via LCD, the LCD will display the detected output voltage. If the difference between the display value and the voltage measured by mutimeter is more than 1V, adjust it to make sure the difference is no more

than 1V. Then, shut down the UPS to save this setting into EEPROM.

Output A voltage calibration

Interface	Setting
	**Parameter 2:** it always shows **OP.V** as output voltage. **Parameter 3:** it shows the internal measurement value of the output A voltage, and you can calibrate it by pressing **Up** or **Down** according to the measurement from an external voltage meter. The calibration result will be effective by pressing **Enter**. The calibration range is limited within +/-9V. This function is normally used for parallel operation.

Output B voltage calibration

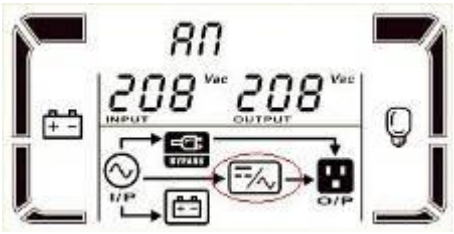
Interface	Setting
	**Parameter 2:** it always shows **OP.V** as output voltage*. **Parameter 3:** it shows the internal measurement value of the output B voltage, and you can calibrate it by pressing **Up** or **Down** according to the measurement from an external voltage meter. The calibration result will be effective by pressing **Enter**. The calibration range is limited within +/-9V. This function is normally used for parallel operation. *The number 1 under the OP.U represent the output S

Output C voltage calibration

Interface	Setting
	**Parameter 2:** it always shows **OP.V** as output voltage. **Parameter 3:** it shows the internal measurement value of the output C voltage, and you can calibrate it by pressing **Up** or **Down** according to the measurement from an external voltage meter. The calibration result will be effective by pressing **Enter**. The calibration range is limited within +/-9V. This function is normally used for parallel operation. *The number 2 under the OP.U represent the output C

4) Connect the UPSs referring to the Section 3.
5) Turn on the parallel system with utility power supply (in AC mode)
   a) Supply the parallel system with utility power.
   b) Set each UPS's breaker of the battery pack at "ON" position (only for long-run model).
      NOTE: The parallel UPSs can not use one battery pack. Each UPS should have its own battery pack.
      Then, set each UPS's input breaker and output breaker at "ON" position. At the same time, the fans are running and all UPSs enter to power on mode for initialization. After few seconds, all UPSs operate in Bypass mode. After UPSs' output relays become closed status, the parallel system supplies power to the loads via the bypass.
   c) Check if it displays parallel information in LCD panel as showed in the below picture. If parallel UPS systems are successfully set up, it will show "**PAR**" with assigned number. The master UPS will be default assigned as "**001**" and slave UPSs will be assigned as either "002" or "003". If no parallel information is displayed, you can not go to next step and please check if the parallel cables have been connected well.

d) Press and hold the "ON" button for 0.5s to turn on the UPS one by one. The buzzer will beep once and the LCD will display the UPS operation process as below picture. The symbol marked in circle will flash until all UPSs enter to AC mode synchronously. Then, the parallel system starts to supply power to the load.



6) Turn on the parallel system without utility power supply (in Battery mode)

a) Check if the parallel cables are connected well and please follow the below steps to turn on the system:

I) Turn on the battery breaker of each UPS (only for long-run model).

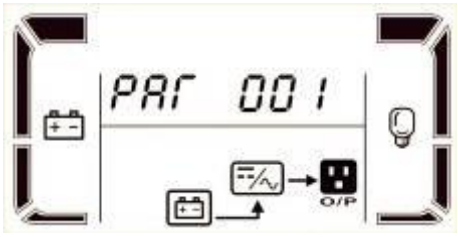
NOTE: 1.Do not turn on the output breaker of each UPS!

2.The parallel UPSs can not use one battery pack. Each UPS should have its own battery pack!

II) Press the "ON" button of one UPS to set up the power supply, UPS will enter to power on mode. After initialization, UPS will enter to No Output mode and then press and hold the "ON" button for 0.5s to turn on the UPS. The buzzer will beep once. A few seconds later, the UPS will be turned on and enter to Battery mode.

III) Please follow the same procedure to turn on other UPSs according to step of II. The LCD will display the parallel UPS operation process as below picture. The symbol marked in circle will flash until the UPSs enter to the battery mode:

IV) Check if it will display the parallel information as showed in below picture. If parallel UPS systems are successfully set up, it will show "**PAR**" with assigned number. The master UPS will be default assigned as "**001**" and slave UPSs will be assigned as either "**002**" or "**003**". If no parallel information is displayed, you can not go to next step and please check if the parallel cables have been connected well.



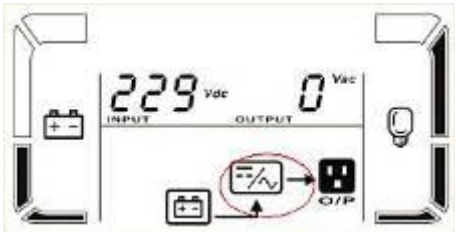
V) Press "OFF" button of each UPS for 0.5s one by one to turn off all UPSs in parallel system.

b) Turn on the battery breaker (only for long-run model) and output breaker of each UPS.

c) Press the "ON" button of one UPS to set up the power supply. UPS will enter to power on mode. After initialization, UPS will enter to No Output mode. Then, press and hold the "ON" button for 0.5s to turn on the UPS and the buzzer will beep once.

d) A few seconds later, the UPS will be turned on and enter to Battery mode.

e) Then, follow the same procedure to turn on other UPS according to step c). The LCD will display the parallel operation process as below picture. The symbol marked in circle will flash until the UPSs entering to the battery mode:



f) Then, the parallel system has been installed and starts to supply power to the load.

7) Turn off the parallel system

Press and hold the "OFF" button for 0.5s to turn off all UPSs one by one. The buzzer will beep once. After a while, all UPSs will enter to bypass mode or no output mode synchronously.

8) Add one new unit into the parallel system

a) You can not add one new unit into the parallel system when whole system is running. You must cut off the load and shut down the system.

b) Make sure all of the UPSs are parallel models, and follow the connection steps in section 3.

c) Refer to the previous section to install the new parallel system.

9) Remove one unit from the parallel system

There are two methods to remove one unit from the parallel system:

First method:

a) Press the "OFF" key twice and each time should be lasted for more than 0.5s, then the UPS will enter into bypass mode or no output mode without output.

b) Turn off the output breaker of this unit, and then turn off the input breaker of this unit.

c) After it shutdown, you can move the parallel cable and share current cable. And then remove the unit out of the parallel system.

Second method:

a) If the bypass is abnormal, you can not remove the UPS without interruption. You must cut off the load and shut down the system first.

b) Make sure the bypass setting is enabled in each UPS and then turn off the running system. All UPS will transfer to bypass mode.

c) Remove all the maintenance bypass covers and set the maintenance switches from "UPS" to "BPS".

d) Turn off all the input breakers and battery breakers in parallel system.

e) Turn off the output breaker and move the parallel cable and share current cable of the UPS which you want, then remove it out of the parallel system.

f) Turn on the input breaker of the remaining UPS and the system will transfer to Bypass mode. Set the maintenance switches from “BPS” to “UPS and put the maintenance bypass covers back.

g) Turn on the remaining UPS according to 5).