



# PowerShield®

USER MANUAL

## Centurion Pro Three Phase UPS



3 Phase In 3 Phase Out, 415 V (Dual Input)			
10kVA	Standard	10kVA	Long Run
20kVA	Standard	20kVA	Long Run
30kVA	Standard	30kVA	Long Run
40kVA	Standard	40kVA	Long Run
		60kVA	Long Run (only)
		80kVA	Long Run (only)

3 Phase In 1 Phase Out, 415 V (Dual Input)			
10kVA	Standard	10kVA	Long Run
20kVA	Standard	20kVA	Long Run



## TABLE OF CONTENTS

<b>1 SAFETY AND EMC INSTRUCTIONS</b>	<b>4</b>	<b>6 OPERATIONS</b>	<b>24</b>
1.1 Transportation and storage	4	6.1 Button Operation	24
1.2 Preparation	4	6.2 Screen Description	24
1.3 Installation	4	6.3 Audible Alarm	58
1.4 Connection Warnings	5	6.4 Single UPS Operation	58
1.5 Operation	6	6.5 Parallel Operation	61
1.6 Standards	6	6.6 Fault Code	63
		6.7 Warning Code	64
<b>2 INSTALLATION AND OPERATION</b>	<b>7</b>	<b>7 TROUBLE SHOOTING</b>	<b>65</b>
2.1 Unpacking and Inspection	7	<b>8 STORAGE AND MAINTENANCE</b>	<b>66</b>
2.2 Wiring Terminal View	8	8.1 Storage	66
2.3 Schedule of Components	10	8.2 Maintenance	66
2.4 Single UPS Installation	10		
2.5 Specifications 3:3 415V	11	<b>9 SPECIFICATIONS</b>	<b>68</b>
2.6 Specifications 3:1 415V/240V	13		
2.7 Terminal Block Diagrams	15		
2.8 UPS Installation for Parallel System	19		
2.9 Software Installation	22		
<b>3 INTEGRATION WITH MBP</b>	<b>22</b>		
<b>4 COMMISSIONING</b>	<b>23</b>		
<b>5 WARRANTY</b>	<b>23</b>		

## WARNING

Before energizing the UPS, please take the time to read and understand

- all of the safety information
- all of the warnings
- all of the operating instructions.

It is highly recommended to have this UPS commissioned by a Powershield Service Partner. This equipment should only be serviced and maintained by qualified PowerShield Service Partners. Failure to use a qualified service partner may impact your warranty.

All electrical work must be undertaken by qualified electricians.

## Disclaimer

We assume no responsibility or liability for loss or damages, whether direct, indirect, consequential or incidental, which might arise out of the use of this manual. Information in this manual is subject to change without notice. If you find information in this manual that is incorrect, misleading, or incomplete, we would appreciate your comments and suggestions.

## 1 SAFETY AND EMC INSTRUCTIONS

All safety instructions in this document must be read, understood, and followed.

### 1.1 Transportation and Storage

- Please transport the UPS system only in the original packaging to protect against shock and damage.
- The UPS must be stored in a facility where the temperature is well regulated. Ambient temperatures should be between 0–40°C and relative humidity shall be 0–95% non-condensing.
- Any storage of greater than 30 days refer to section 8 for more detail.

### 1.2 Preparation

- Condensation may form if the UPS system is moved immediately from cold to warm environment. The UPS system must be dry before being installed. Please allow at least two hours for the UPS system to acclimatise to the environment prior to energisation.
- If the UPS might be exposed to temperatures over 40°C, please contact PowerShield for further advise.
- Do not install the UPS where the relative humidity exceeds 95%, and it must also be non-condensing.
- Do not install the UPS near bodies of water or salt water. (conformal coating may be required to protect your UPS)
- Do not install the UPS in high dust, conductive dust environments (conformal coating may be required to protect your UPS)
- Do not install the UPS system where it would be exposed to direct sunlight or nearby heat source.
- Do not block ventilation holes on the UPS housing.

### 1.3 Installation

- Do not connect appliances or devices which would overload the UPS  
Care needs to be taken with motor start loads, or other load with high inrush to size the UPS accordingly.
- The UPS requires 50cm front, side, and rear access for maintenance and airflow.
- The UPS and any supplied battery cabinets come with an earth connection. Please ensure all earth connections are installed and tested in accordance with AS/NZS 3000 and or local regulations.
- All electrical work shall be undertaken by a qualified electrician (in your local jurisdiction)
- All commissioning / start-up shall be undertaken by either PowerShield or a locally trained service technician.
- All ongoing maintenance shall be undertaken by qualified personnel. PowerShield recommends that all maintenance work is undertaken by a PowerShield trained service technician, to ensure that the vendor warranty is maintained.
- All cabling, breakers, isolators and the like shall be sized and installed in accordance with this manual and AS/NZS 3000 (suite of standards) or local equivalent, to protect both upstream and downstream of this UPS.

- All cabling prior to energisation shall be tested in accordance with AS/NZS 3000 or local equivalent, the test result shall be made available to PowerShield or PowerShield service agent upon request. This includes a phase rotation test for three phase product.
- Secure the grounding/earthing wire before connecting to any live wire terminal.

### 1.4 Connection Warnings

- Back feed protection has been already provided in accordance with EN-IEC 62040-1, inside of the UPS. No additional back feed protection is required to be installed.
- This UPS should be connected with TN grounding/earthing system.
- The power input for this unit must be three-phase rated in accordance with the equipment nameplate. It also must be suitably grounded.

**WARNING:**  
HIGH LEAKAGE CURRENT  
EARTH CONNECTION ESSENTIAL  
BEFORE CONNECTING SUPPLY

- Use of this equipment in medical instrument or any life-sustaining equipment where failure of this equipment can reasonably be expected to cause the failure of the life-sustaining equipment or to significantly affect its safety or effectiveness is not recommended. Do not use this equipment in the presence of a flammable mixture with air, oxygen or nitrous oxide.
- Connect grounding terminal of UPS to a grounding electrode conductor. The ground conduct should be tested prior to energisation of the UPS.
- Warning labels should be placed on all primary power switches installed in places away from the unit to alert the electrical maintenance personnel of the presence of a UPS in the circuit. The label will bear the following or an equivalent text:

#### BEFORE WORKING ON THIS CIRCUIT:

- Isolate Uninterruptible Power Supply (UPS)
- Isolate the batteries (internal or external)
- Then check for Hazardous Voltage between all terminals including the protected earth

**RISK OF HIGH VOLTAGE**

## 1.5 Operation

- Do not disconnect the grounding/earthing conductor cable on the UPS or the building wiring terminals under any circumstance.
- The UPS system features its own, current source (batteries). The UPS output terminal blocks may be electrically live even if the UPS system is not connected to the building mains/live cables.
- In order to fully disconnect the UPS system, first press the 'OFF' button, isolate all batteries (internal and or external) and then disconnect the electrical cabling.
- Ensure that no foreign objects can enter the UPS.
- The UPS should only be operated by individuals that are familiar with operating UPS(s).

## 1.6 Standards

<b>Safety</b>		
IEC/EN 62040-1		
<b>EMI</b>		
Conducted Emission .....	:IEC/EN 62040-2	Category C3
Radiated Emission .....	:IEC/EN 62040-2	Category C3
<b>EMS</b>		
ESD .....	:IEC/EN 61000-4-2	CD Level 2
		AD Level 3
RS .....	:IEC/EN 61000-4-3	Level 3
EFT .....	:IEC/EN 61000-4-4	Level 3
SURGE .....	:IEC/EN 61000-4-5	Level 3
CS .....	:IEC/EN 61000-4-6	Level 3
Power-frequency Magnetic field .....	:IEC/EN 61000-4-8	Level 4
Low Frequency Signals .....	:IEC/EN 61000-2-2	
<b>Warning:</b> This is a product for commercial and industrial application in the second environment-installation restrictions or additional measures may be needed to prevent disturbances.		

## 2 INSTALLATION AND OPERATION

There are two different types of models: standard and long-run models. Standard UPSs have internal batteries, long run only have external batteries. Please refer to the following table.

VAC System	Model	Type	Mode	Type
3P IN 3P OUT	10K	STANDARD RUN	10K	LONG RUN
415 V / 415 V	20K		20K	
	30K		30K	
	40K		40K	
			60K	
			80K	

VAC System	Model	Type	Mode	Type
3P IN 1P OUT	10K	STANDARD RUN	10K	LONG RUN
415 V / 240 V	20K		20K	

We also offer optional parallel function for both models upon request. The UPS with parallel function is called the 'Parallel model'. We have detailed installation and operation procedures of the Parallel Model in the following chapter.

### 2.1 Unpacking and Inspection

Unpack the box and check the package contents. The shipping package should contain:

- One UPS
- One user manual
- One RS-232 cable
- One USB cable

**NOTE:** Before the installation, please inspect the unit. Confirm that there is no physical damage to the unit. Unfortunately, from time to time damages occurs in transit. If the unit is damaged, please do not install and energize the unit. Please contact PowerShield immediately.

Please keep the original packaging for future use. It is recommended to keep each ups and battery set in their original packaging because they have been designed to provide maximum protection during transportation and storage.

2.2 Wiring Terminal View

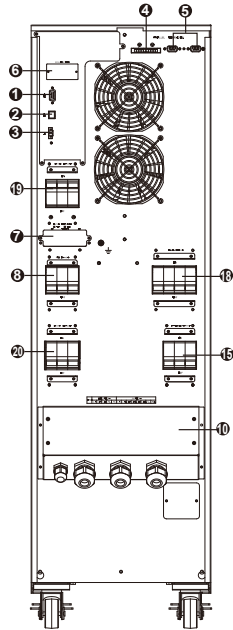


Diagram 1:  
10K(L) DUAL  
20K(L) DUAL  
Rear panel

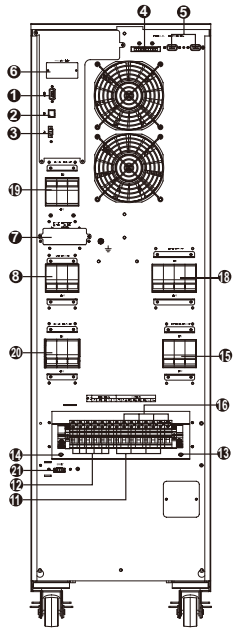


Diagram 2:  
10K(L) DUAL  
20K(L) DUAL  
Terminal cover removed

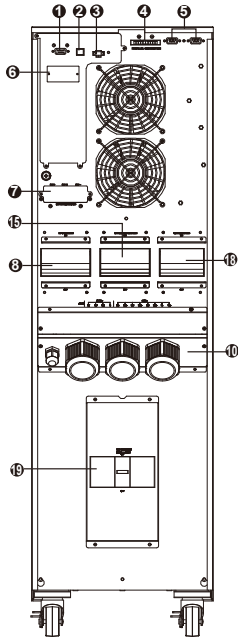


Diagram 3:  
30K(L) DUAL  
Rear panel

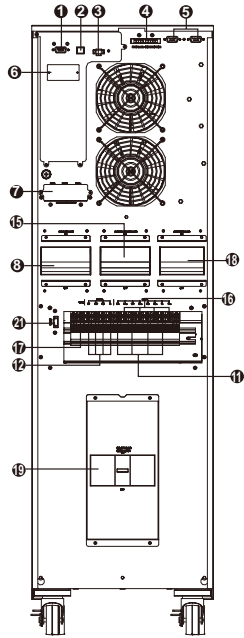


Diagram 4:  
30K(L) DUAL  
Terminal cover removed



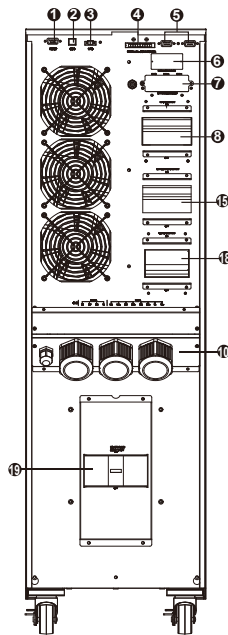


Diagram 5:  
40K(L) DUAL  
Rear panel

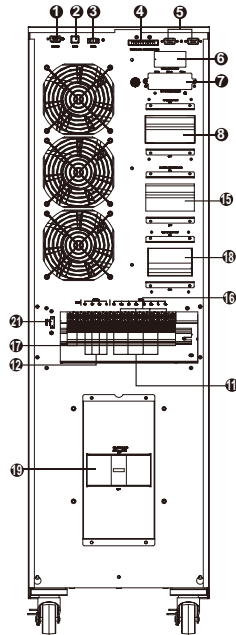
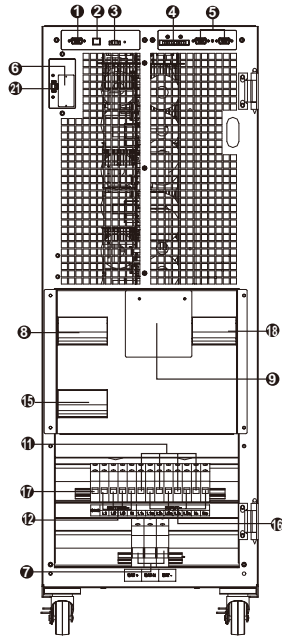
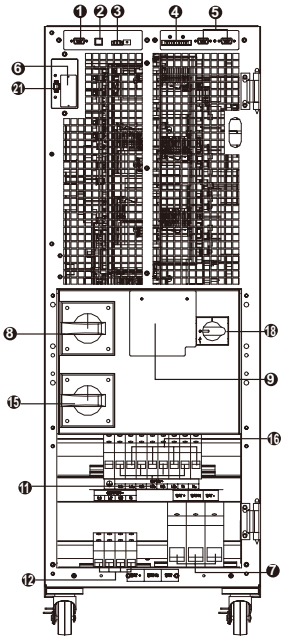


Diagram 6:  
40K(L) DUAL  
Terminal cover removed



DC Breaker 19  
mounted on rear

Diagram 7:  
60K(L) DUAL  
Front door open



19 DC Breaker  
mounted on rear

Diagram 8:  
80K(L) DUAL  
Front door open

### 2.3 Schedule of Components

- 1 RS-232 communication port
- 2 USB communication port
- 3 Emergency power off function connector (EPO connector)
- 4 Share current port (only available for parallel model)
- 5 Parallel port (only available for parallel model)
- 6 Intelligent slot
- 7 External battery connector/terminal (Only available for long-run model)
- 8 Line input circuit breaker/switch
- 9 Maintenance bypass switch (option)
- 10 Input/Output terminal (Refer to diagram 3, 4, 7, 8, 11, 12, 15, 16 and 19 for the details)
- 11 Line input terminal
- 12 Output terminal
- 13 Input grounding terminal
- 14 Output grounding terminal
- 15 Bypass input circuit breaker/switch
- 16 Bypass input terminal
- 17 Grounding terminal
- 18 Output switch
- 19 DC breaker
- 20 Battery pack protection switch (DC Isolation, 120V)
- 21 EMBS

### 2.4 Single UPS Installation

Installation and wiring must be carried out in accordance with the local electric laws and regulations by trained professionals.

- 1) Make sure that the mains wire and breakers of the building are rated for the capacity of the UPS to prevent electric shock or risk of fire.
- 2) Switch off the mains switch in the building before installation.
- 3) Turn off all the connected devices before connecting to the UPS.
- 4) Prepare cables based on the following sections 2.5 & 2.6
- 5) Remove the terminal cover at the rear panel of UPS. Then connect the cables according to the following terminal block diagrams in section 2.7  
(Connect the grounding/earthing wire first when making other wire connections. Remove the grounding/earthing wire last when connecting the UPS!)
- 6) Replace the terminal cover on the rear panel of the UPS.

**NOTE:** For dual input model with single input power system, connect input terminals to the AC power source and connect input and bypass input together (shows dashed line in below wiring diagrams)

## 2.5 SPECIFICATIONS 3:3 415V

## INPUT

MODEL	10kW/ 10kVA	20kW/ 20kVA	30kW/ 30kVA	40kW/ 40kVA	60kW/ 60kVA	80kW/ 80kVA
Nominal Current (A)	14	28	42	56	84	112
Maximum (A)	20	40	60	80	120	160
Connections	L1, L2, L3, N, PE					
Input Voltage	304V to 478V (415V)					
Frequency	46 – 54 Hz (50 Hz)					

## BYPASS

MODEL	10kW/ 10kVA	20kW/ 20kVA	30kW/ 30kVA	40kW/ 40kVA	60kW/ 60kVA	80kW/ 80kVA
Nominal Current (A)	14	28	42	56	84	112
Maximum (A)	20	40	60	80	120	160
Connections	L1, L2, L3, N, PE					

## OUTPUT

MODEL	10kW/ 10kVA	20kW/ 20kVA	30kW/ 30kVA	40kW/ 40kVA	60kW/ 60kVA	80kW/ 80kVA
Nominal Current (A)	14	28	42	56	84	112
Connections	L1, L2, L3, N, PE					
Output Voltage	415 ± 1%V					
Frequency	50 ± 0.1 Hz					

**RECOMMENDED CABLE SIZING (mm<sup>2</sup>)**

MODEL	10kW/ 10kVA	20kW/ 20kVA	30kW/ 30kVA	40kW/ 40kVA	60kW/ 60kVA	80kW/ 80kVA
Max Current (A)	20	40	60	80	120	160
<b>INPUT</b>						
L1,L2,L3	6	6	10	16	35	50
N	10	10	16	16	50	50
PE	10	16	25	25	25	35
<b>BYPASS</b>						
L1,L2,L3	6	6	10	16	35	50
N	10	10	16	16	50	50
Terminal Block						
<b>OUTPUT</b>						
L1,L2,L3	6	6	10	16	35	50
N	10	10	16	16	50	50
Terminal Block	10	10	16	16	50	50
<b>Battery Connector</b>						
Long Run	Anderson	Anderson	Anderson	Anderson	50	70
Standard	Anderson	Anderson	Anderson	Anderson	Anderson	Anderson

Cable Selection is based on the following (AS/NZS 3008)

- Single Core
- Insulation XLPE 90°C
- Trefoil
- Single Circuit, Single Tier, Perforated Tray
- Cable Length 40m
- Ambient Temperature 40°C

Final cable selection shall be undertaken by the installing electrician to confirm the cabling meets the requirements of AS/NZS 3000, AS/NZS 3008 (suite) of standards and any additional local requirements.

## 2.6 SPECIFICATIONS 3:1 415V/240V

## INPUT

MODEL	10kW/ 10kVA	20kW/ 20kVA				
Nominal Current (A)	14	28				
Maximum (A)	20	40				
Connections	L1, L2, L3, N, PE					
Input Voltage	304V to 478V (415V)					
Frequency	46 – 54 Hz (50 Hz)					

## BYPASS

MODEL	10kW/ 10kVA	20kW/ 20kVA				
Nominal Current (A)	42	84				
Maximum (A)	50	100				
Connections	L1,N, PE					

## OUTPUT

MODEL	10kW/ 10kVA	20kW/ 20kVA				
Nominal Current (A)	42	84				
Connections	L1,N, PE					
Output Voltage	240 ± 1%V					
Frequency	50 ± 0.1 Hz					

**RECOMMENDED CABLE SIZING (mm<sup>2</sup>)**

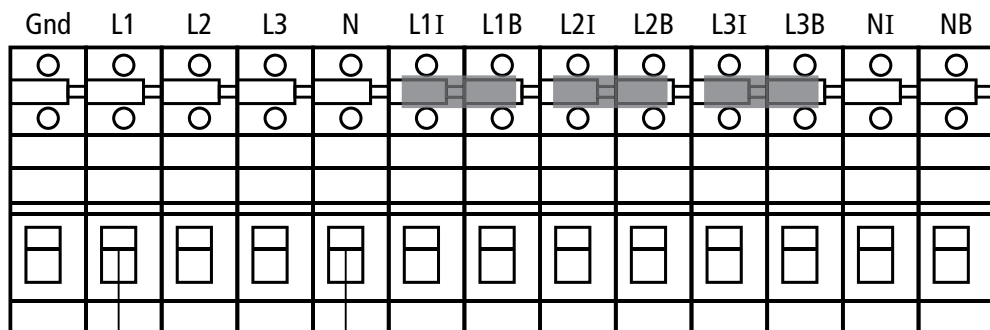
MODEL	10kW/ 10kVA	20kW/ 20kVA				
Max Current (A)	20	40				
<b>INPUT</b>						
L1,L2,L3	6	6				
N	10	10				
PE	10	16				
<b>BYPASS</b>						
L1	10	25				
N	10	25				
Terminal Block						
<b>OUTPUT</b>						
L1	10	25				
N	10	25				
Terminal Block	10	25				
<b>Battery Connector</b>						
Long Run	Anderson	Anderson				
Standard	Anderson	Anderson				

Cable Selection is based on the following (AS/NZS 3008)

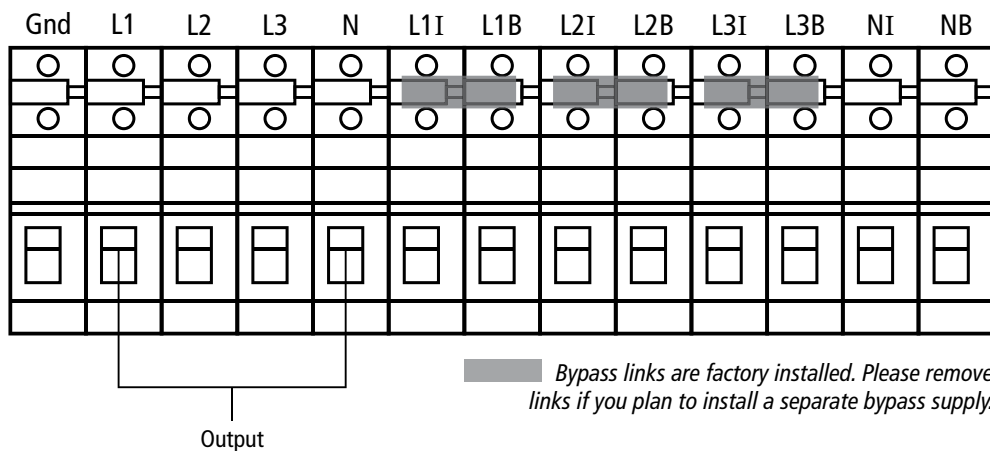
- Single Core
- Insulation XLPE 90°C
- Trefoil
- Single Circuit, Single Tier, Perforated Tray
- Cable Length 40m
- Ambient Temperature 40°C

Final cable selection shall be undertaken by the installing electrician to confirm the cabling meets the requirements of AS/NZS 3000, AS/NZS 3008 (suite) of standards and any additional local requirements.

## 2.7 Terminal Block Diagrams



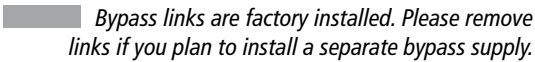
Terminal block wiring diagram for 10K(L)/20K(L) DUAL



Terminal block wiring diagram for 30K(L)/40(L) DUAL

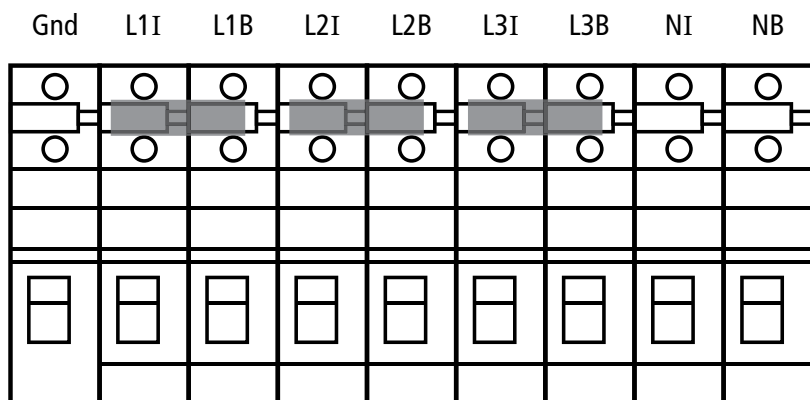
### Reference:


L1I = Input L1 (R)	L1B = Bypass Input L1 (R)
L2I = Input L2 (S)	L2B = Bypass Input L2 (S)
L3I = Input L3 (T)	L3B = Bypass Input L3 (T)

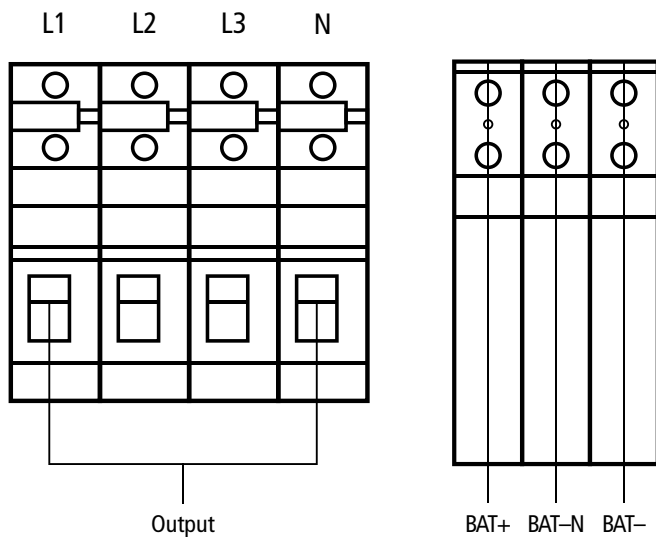


### Terminal block wiring diagram for 60KL DUAL

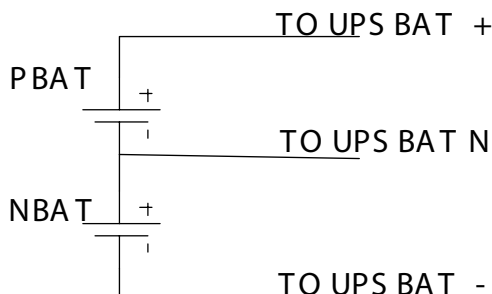




 *Bypass links are factory installed. Please remove links if you plan to install a separate bypass supply.*



Terminal block wiring diagram for 80KL DUAL



### Battery Cables connection schematic

**NOTE 1:** Make sure that the cables are connected securely with the terminals.

**NOTE 2:** Please install the output breaker between the output terminal and the load, earth leakage protection requirement is up to the installing electrical contractor and local codes and requirements.

#### Warning: (Only for standard model)

- Make sure the UPS is off before the installation. The UPS should not be turned on during wiring connection.
- Do not attempt to modify the standard model into a long-run model.

#### Warning: (Only for long-run model)

- Make sure a DC breaker or other protective device between UPS and the external battery pack is installed for added safety. If not, please install it carefully. Switch off the battery breaker before installation. If the batteries are not in line of site of the UPS additional isolators may be required.

**NOTE:** Set the battery pack breaker in 'OFF' position and then install the battery pack.

- Pay special attention to the rated battery voltage marked on the rear panel. If you want to change the numbers of the battery in a string, make sure you modify the UPS setting accordingly. Connection with wrong battery voltage may cause irreversible damage of the UPS.
- Pay special attention to the polarity marking on external battery terminal block. Connection with wrong polarity may cause irreversible damage of the UPS.
- Make sure the protective grounding/earthing wiring is adequate. The current spec, color, position, connection and conductance reliability of the wire should be verified.
- Make sure the utility input & output wiring is rated correctly. The current spec, color, position, connection and conductance reliability of the wire should be verified. Make sure the L/N side is correct, not reverse or short-circuited.

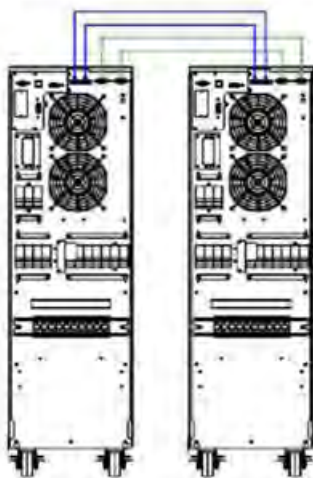
## 2.8 UPS Installation for Parallel System

The Centurion Pro UPS (both 3:3 and 3:1), can be paralleled for up to 4 units for capacity and or redundancy. Care should be taken with selection of Maintenance bypass pass panels, upstream cables and breakers, downstream cables and breakers.

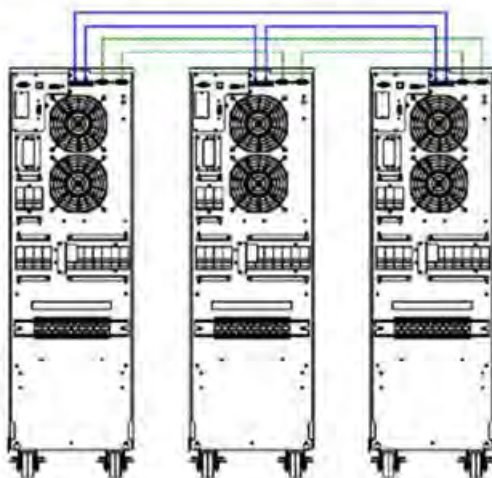
If the UPS is only for single operation, you may skip this section.

- 1) Install and cable the UPS according to the section 2.4.
- 2) Connect the output cables of each UPS to an output breaker, per UPS.
- 3) Connect all output breakers to a common breaker rated for the combined load.
- 4) Either common battery packs or independent battery packs for each UPS are allowed. Please contact PowerShield for further information and support.
- 5) Refer to the following wiring diagram:

- 1) Connect the Parallel (dash lines) & Current Share cables as per the following drawings:

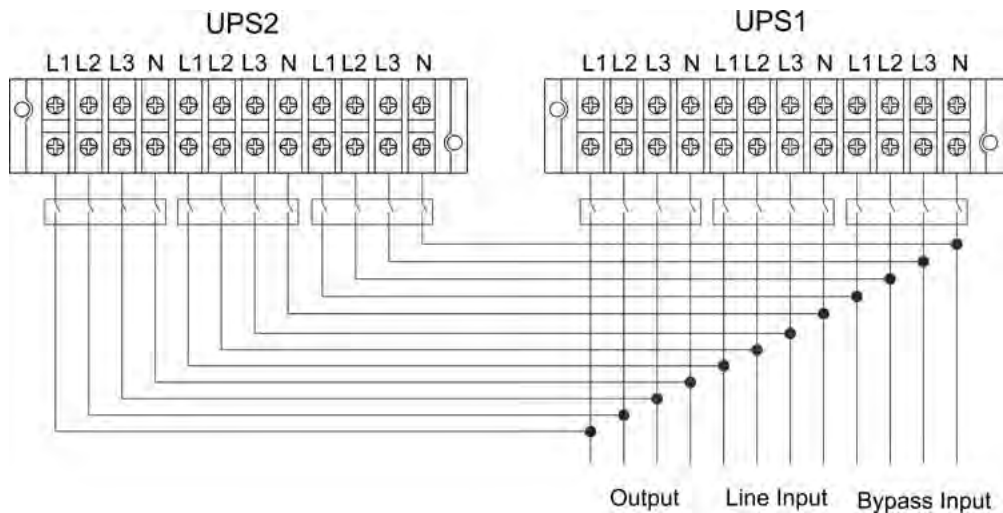


2 X SYSTEM IN PARALLEL

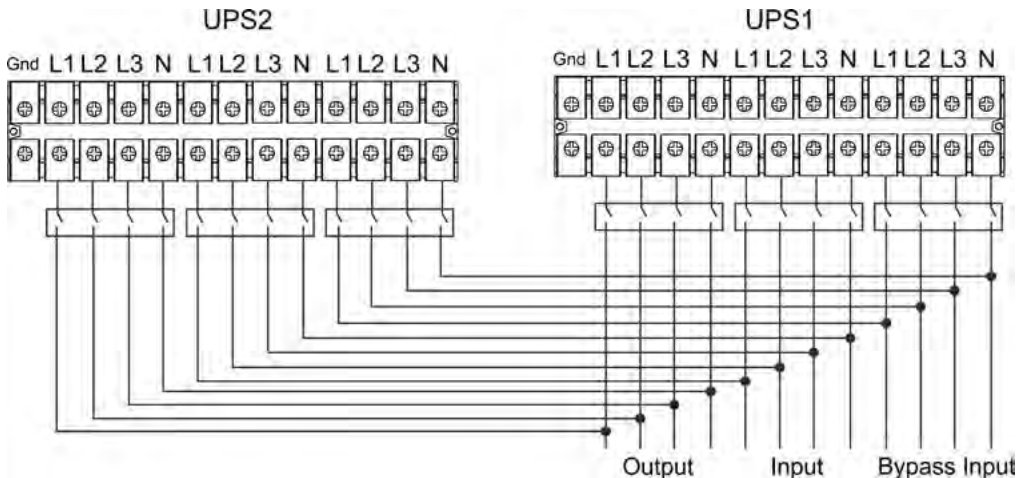


3 X SYSTEMS IN PARALLEL

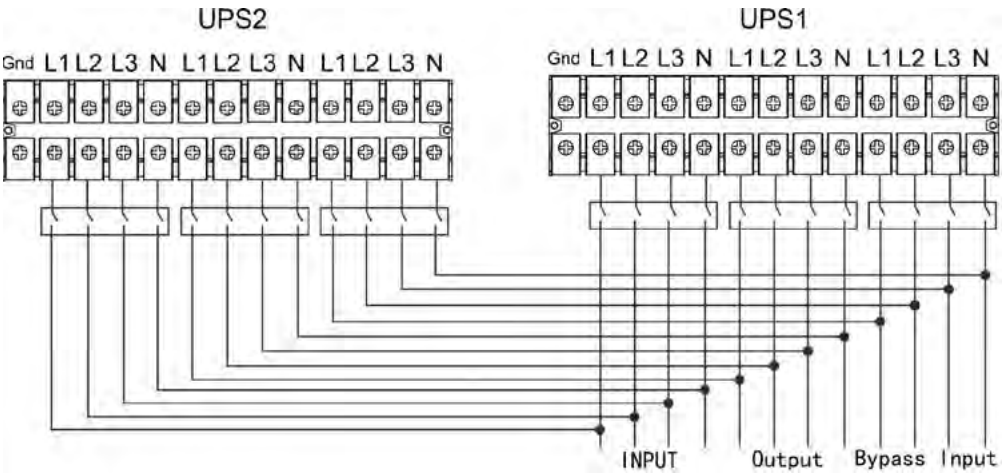
Connection Diagram for Paralleling Cables



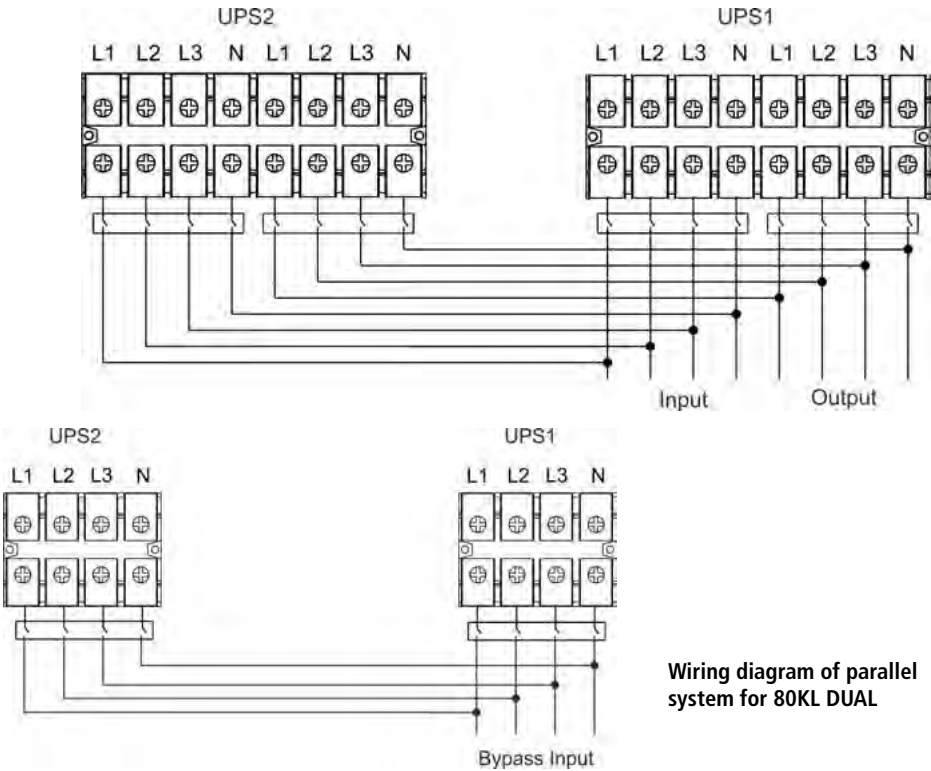
### Wiring diagram of parallel system for 10K(L)/20K(L) DUAL



### Wiring diagram of parallel system for 30K(L)/40K(L) DUAL



Wiring diagram of parallel system for 60KL DUAL



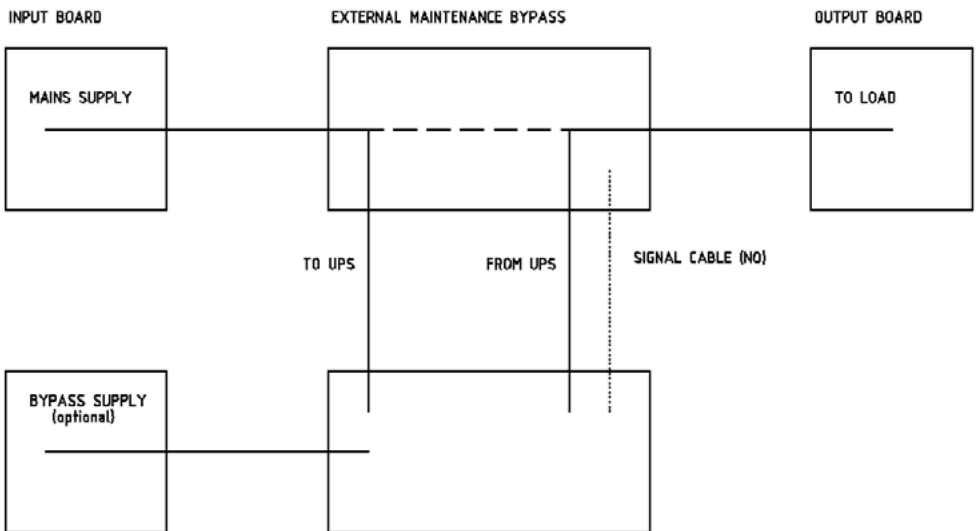
Wiring diagram of parallel system for 80KL DUAL

## 2.9 Software Installation

For optimal computer system protection, install UPS monitoring software to configure UPS shutdown operation.

## 3 INTEGRATION WITH MBP

External Maintenance Bypass or External Wrap around bypass integration with the Power Shield UPS. The Diagram below shows how the UPS would operate with a PowerShield MBP. Other Bypasses can be used as long as it operates in a similar manner.



The Signal from the bypass to force the UPS onto static transfer switch is Normally Open (NO). If you have a Normally Closed (NC) a certified service agent can modify the UPS to accommodate the different signal.

## 4 COMMISSIONING

PowerShield recommends using its trained services agents for all commissioning activities. PowerShield invests in its locally trained services agents to ensure they are trained to support our products.

Failure to use a trained service agent may impact your product warranty.

Prior to the UPS being commissioning it is incumbent on the electrical contractor to confirm

- All electrical cabling has been installed and tested as required by the local electrical authority, or at least AS/NZS 3000.
- Phase rotation has been confirmed.
- Earthing has been installed and is continuous.

## 5 WARRANTY

The UPS and batteries come standard with a 12-month warranty. Additional warranty can be purchased if required.

Failure to use a trained service agent will limit your warranty. Additional fees may be levied for PowerShield or its service agent to attend to site. If it is deemed a product fault, all fee's will be waived. If it is deemed an installation / commissioning fault the time taken to fault find plus all parts and labor to repair the fault will be charged.

<https://powershield.com.au/wp-content/uploads/Warranty/PowerShield-WARRANTY.pdf>

### **Extended Warranty**

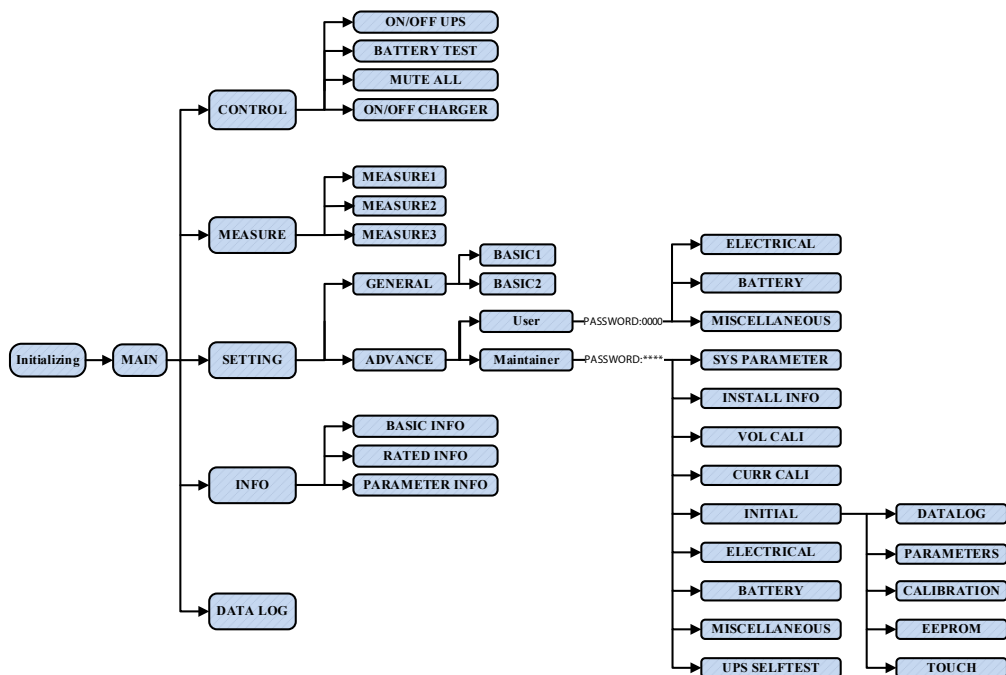
A condition of any extended warranty is at least annual preventative maintenance covering items in Section 8.2, with a copy of the service record submitted to PowerShield.

## 6.1 Button Operation

- 1) Before operation, make sure that the two strings of batteries are connected correctly in order of '+, GND, -' terminals and the breaker of the battery pack is at 'ON' position (only for long-run model).
- 2) Press the 'COLD START' button to power on the power supply for the UPS to turn on the LCD display. UPS will enter initialization mode. After initialization, follow the 'CONTROL' menu to operate the UPS. This button only works when UPS is completely off with battery connected but without AC input. When the UPS is with AC grid connected, just follow the 'CONTROL' menu to operate the UPS after LCD initialization.

## 6.2 Screen Description

After initialization, the LCD will display main screen. There are five sub-menus: Control, measure, setting, information and data log. Touch any sub-menu icon to enter into the sub-screen.

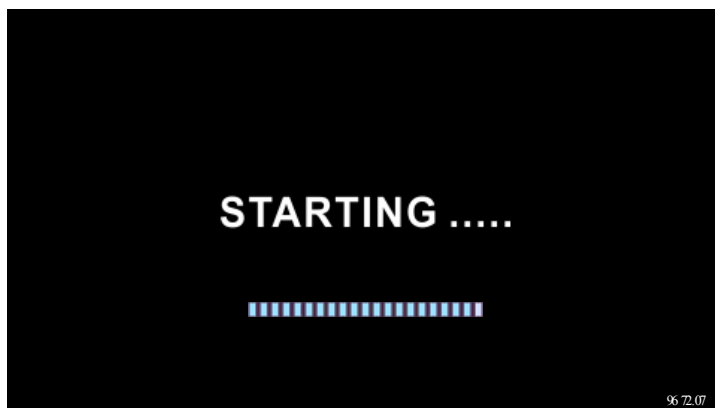


Menu Tree

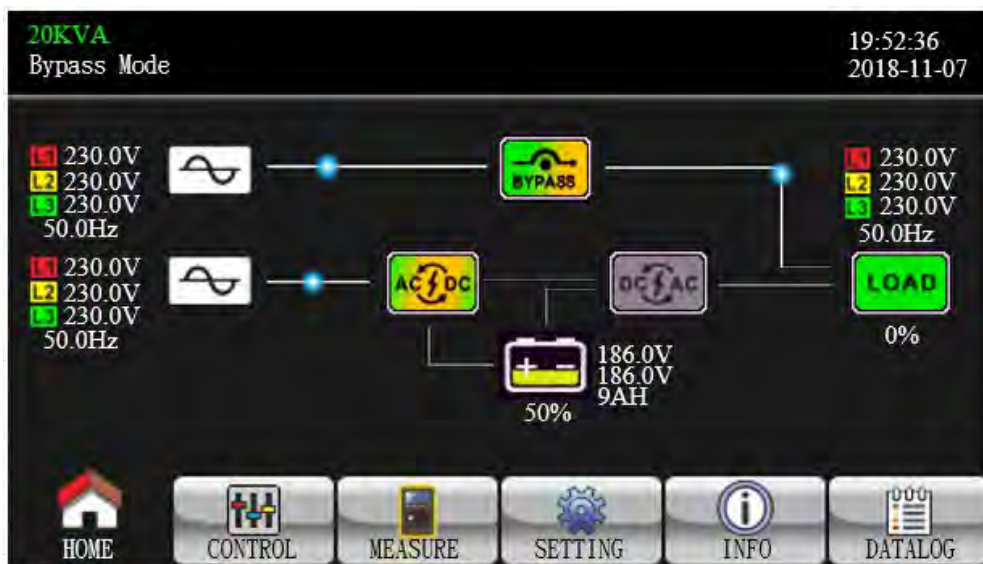


### Main screen


Upon powering on, the LCD will start initialization approximately few seconds as shown below.



After initialization, the main screen will display as shown below. There are five button icons to represent five sub-menus: Control, measure, setting, information, data log.

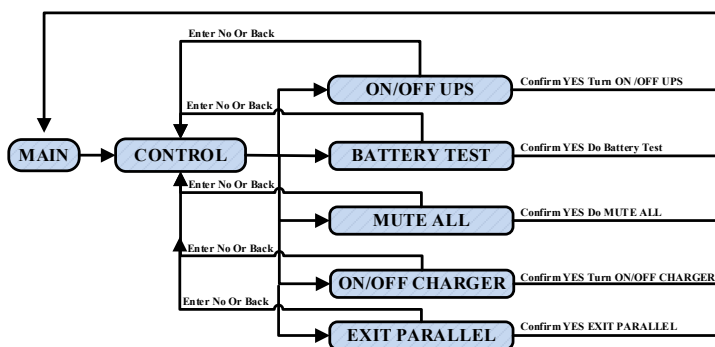


## 6.2.1 Control screen

Touch the  icon to enter control sub-menu.



Touch  icon to return back to main screen no matter it's in any screen of any submenu.



Screen 1.0 «Control» and its sub-menus

## On/Off UPS

It will show 'Turn on UPS?' when UPS is off.

It will show 'Turn off UPS?' when UPS is on.

Touch 'YES' to turn on or off the UPS. Then, the screen will return to main screen (screen 0.0).

Touch 'Back' to return to main screen immediately or 'No' to cancel this operation and back to main screen (screen 0.0).



TURN ON UPS



TURN OFF UPS

## Battery Test

It will show 'Battery Test' if the UPS is not in test. Touch 'Yes' to start battery test. Then, it will show 'Battery testing.....' during battery test period. After few seconds, battery test result will show on the screen. Touch 'Back' to return to main screen immediately or 'No' to cancel this operation and back to main screen (screen 0.0).

It will show 'Cancel battery test' if the UPS is in test.



BATTERY TEST



CANCEL BATTERY TEST

### Audio mute

It will show 'Mute all' if the audio is active. Touch 'Yes' to activate mute. If 'Mute all' is active, it will show 'MUTE' icon on the top left corner of the main screen. Touch 'Back' to return to CONTROL screen immediately or 'No' to cancel this operation and back to CONTROL screen (screen 0.0).

It will show 'Cancel mute' if the UPS is mute already. Touch 'Yes' to activate audio function or 'No' keep mute. Touch 'Back' to return to CONTROL screen. (screen 0.0)



MUTE ALL



CANCEL MUTE ALL

### On-Off Charger

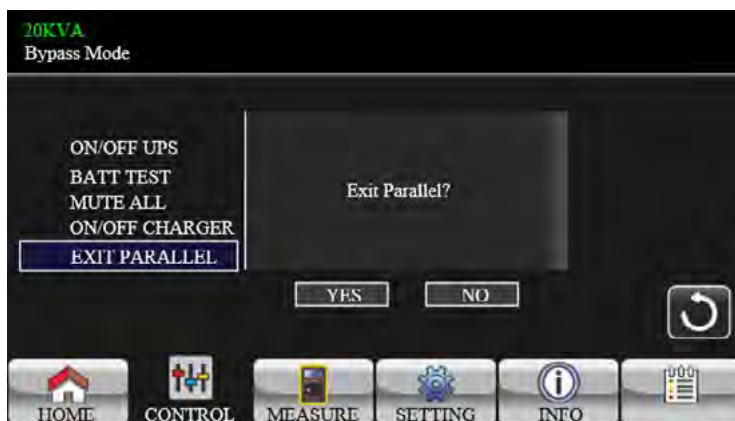
It will show 'Turn on Charger?' when the charger is off. It will show 'Turn off Charger?' when the charger is on. Touch 'YES' to turn off or off the charger. Or touch 'NO' to cancel this operation. Then, the screen will return to the main screen.

Touch 'Back' to return to CONTROL screen immediately.








### Exit parallel

It will show 'Exit Parallel?' when the units in parallel system. Touch 'YES' to remove units from the parallel system. Or touch 'NO' to cancel this operation. Then, the screen will return to the main screen.



### 6.2.2 Measure screen

Touch the icon  to enter measure page. Touch the icon  or  to browse information.

Touch the icon  to return to main screen. Touch the icon  to go back to previous menu.



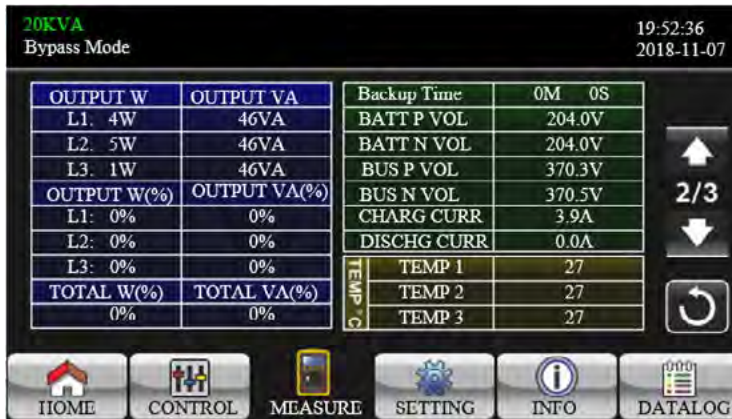
MEASURE SCREEN PAGE 1

**LINE VOL:** The real time value of L1, L2 and L3 phase voltage, L1L2/L2L3/L3L1 voltage and input frequency.

**INVERTER VOL:** The real time value of L1, L2 and L3 inverter voltage, L1L2/L2L3/L3L1 voltage and frequency.

**BYPASS VOL:** The real time value of L1, L2 and L3 bypass voltage, L1L2/L2L3/L3L1 voltage and frequency.

**OUTPUT VOL:** The real time value of L1, L2 and L3 output voltage, L1L2/L2L3/L3L1 voltage and frequency.



MEASURE SCREEN PAGE 2

**OUTPUT W:** L1, L2 and L3 output power in watt.

**OUTPUT VA:** L1, L2 and L3 output power in VA.

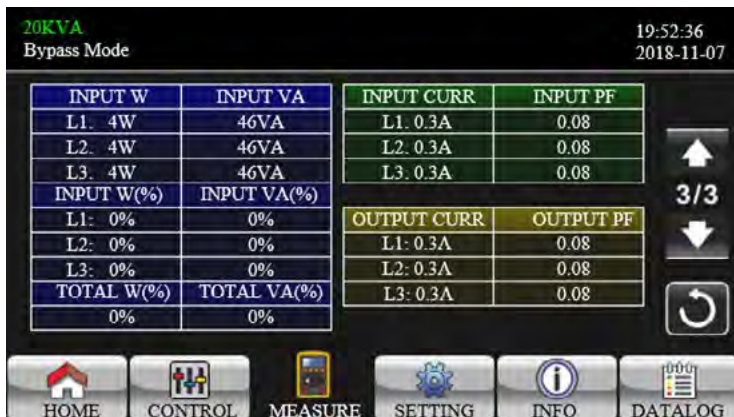
**OUTPUT W (%):** L1, L2 and L3 output power watt in percentage.

**OUTPUT VA (%):** L1, L2 and L3 output power VA in percentage.

**Total watt and VA:** Total output load in watt and VA.

**BATT Voltage/Bus Voltage/Charging Current/Discharging Current:** The real time value of DC related information.

**TEMPERATURE:** Temperature of L1, L2 and L3 phases.



MEASURE SCREEN PAGE 3

**INPUT W:** L1, L2 and L3 input power in watt.

**INPUT VA:** L1, L2 and L3 input power in VA.

**INPUT W (%):** L1, L2 and L3 input power watt in percentage.




**INPUT VA (%):** L1, L2 and L3 input power VA in percentage.

**INPUT CURRENT:** The real-time value of input current in L1, L2 and L3 phases.

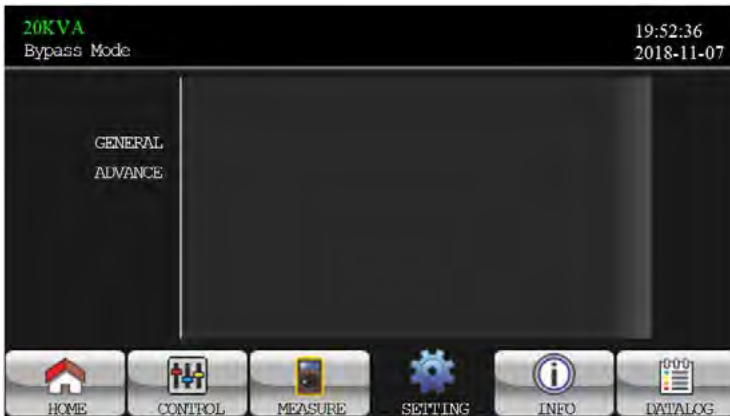
**OUTPUT CURRENT:** The real-time value of output current in L1, L2 and L3 phases.



### 6.2.3 Setting screen

This sub-menu is used to set the parameters of UPS. Touch the icon  **SETTING** to enter setting menu page. There are 2 options: Basic and Advanced. Touch the icon  **HOME** to return to main screen. Touch the icon  to go back to previous menu.

**NOTE:** Not all settings are available in every operation mode. If the setting is not available in present mode, the LCD will keep its original setting parameter shown instead of changing the parameters.



SETTING SCREEN

**GENERAL:** It is used to set up basic information of the UPS. It's not related to any function parameter.

**ADVANCE:** It's required to enter password to access to the 'ADVANCED' setting. There are two types of authority, User and Maintainer.

#### GENERAL SETTING



SETTING SCREEN PAGE 1



**LANGUAGE:** Set the LCD language. There are three options: English, Simplified Chinese and Traditional Chinese. English is default setting.

**INPUT SOURCE:** Select the input source. There are two options: Line (utility) and generator. Line is default setting. This setting value will show on the main page. When “generator” is selected, the acceptable input frequency will be fixed at the range of 40~75Hz. This setting value will show on the status bar.

**CONTACT:** Set the name of contact person and the maximum length is 18 characters.

**PHONE:** Set the service phone number. Only 0~9, + and – are accepted. The maximum length is 14 characters.

**MAIL:** Set the service email and the maximum length is 18 characters.





GENERAL SCREEN PAGE 2

**AUDIO ALARM:** There are two events available to mute. You may choose ‘Enable’ or ‘Disable’ alarm when related events occur.

**Enable:** When selected, alarm will be mute when related events occur.

**Disable:** When selected, UPS will alarm when related events occur.

- **All Mute:** When ‘enable’ is selected, all the faults and warnings will be mute. It will show  icon on the top right corner of the main screen.
- **Mode Mute:** UPS status mode alarm enable/disable. If ‘Mode Mute’ is activated, it will show  icon on the top right corner of the main screen.

## ADVANCE SETTING



ADVANCE PASSWORD PAGE

It's required to enter password (4 digits) to access to the 'ADVANCE' page.

- **Advance → User**

To access to the 'Advance → User' Setting menu page, the default password is '0000'.

If entered password is right, the page will jump to setting screen. If the password is wrong, it will ask to enter again.



PASSWORD ERROR PAGE



ADVANCE SETTING MENU PAGE

There are three sub-menus under 'Advance → User' setting: ELECTRONIC, BATTERY and MISCELLANEOUS.

### ELECTRONIC



ELECTRICAL SETTING PAGE 1

**Output VOL:** Select the output rated voltage.

- There are four options, 208V, 220V, 230V and 240V.

**Output FRE:** Select output rated frequency.

- **50Hz:** The output frequency is setting for 50Hz.
- **60Hz:** The output frequency is setting for 60Hz.

**CVCF Mode** (constant voltage and constant frequency function)

- **Enable:** CVCF function is enabled. The output frequency will be fixed at 50Hz or 60Hz according to setting of 'OP Freq.'. The input frequency could be from 40Hz to 70Hz.
- **Disable:** CVCF function is disabled. The output frequency will synchronize with the bypass frequency within 45~55 Hz for 50Hz system or within 55~65 Hz for 60Hz system. Disable is the default setting.

**Bypass Forbid:**

- **Enable:** Bypass forbid is allowed. When selected, it's not allowed for running in Bypass mode under any situations.
- **Disable:** Bypass forbid is not allowed. When selected, UPS will run in Bypass mode depending on 'Bypass at UPS off' setting. It is the default setting.

**Neutral Line Check:** Indicates neutral loss detection function.

- **Disable:** Disable the neutral line check function. The UPS will not detect if the neutral line is loss or not.
- **Auto:** The UPS will automatically detect if the neutral is lost or not. If neutral loss is detected, an alarm will be generated. If the UPS is turned on, it will transfer to battery mode. When neutral line is restored and detected, the alarm will be muted automatically and the UPS will go back to normal mode automatically.
- **Check:** The UPS will automatically detect the neutral loss. If neutral loss is detected, an alarm will be generated. If the UPS is turned on, it will transfer to battery mode. When neutral is restored, the alarm will NOT be muted automatically and the UPS will NOT go back to normal mode automatically.

**ISO Compensation:**

When UPS is connected to output isolation, it will compensate the output voltage.



**Bypass UPS off:** Select the bypass status when manually turning off the UPS. This setting is only available when 'Bypass forbid.' is set to 'Disable'.

- **Enable:** Bypass enabled. When selected, bypass mode is activated.
- **Disable:** Bypass disabled. When selected, no output through bypass when manually turning off the UPS.

**Bypass Voltage Range:** Set the bypass voltage range.

- **L:** Low voltage point for bypass. The setting range is 176V ~ 209V
- **H:** High voltage point for bypass. The setting range is 231V ~ 264V

**Bypass FRE Range:** Set the bypass frequency range.

The acceptable bypass frequency range from 46Hz to 54Hz when UPS is 50Hz system and from 56Hz to 64Hz when UPS is 60Hz system.

**ECO mode:** Enable/Disable ECO mode. Default setting is 'Disable'.

**ECO VOL Range:** Set the ECO voltage range.

- **L:** Low voltage point for ECO mode. The setting range is from (Rated output voltage – 5V) to (Rated output voltage - 11V). 'Rated output voltage – 5V' is default setting.
- **H:** High voltage point for ECO mode. The setting range is from (Rated output voltage + 5V) to (Rated output voltage + 11V). 'Rated output voltage + 5V' is default setting.

**ECO FRE Range:** Set the ECO frequency range. The setting range is from 46Hz to 54Hz when the UPS is 50Hz system and from 56Hz to 64Hz when the UPS is 60Hz system.

## BATTERY



BATTERY SETTING PAGE

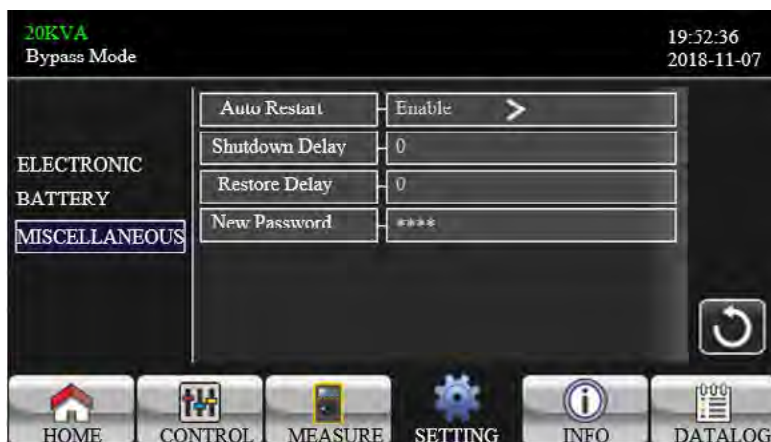
**BATT Warning VOL:**

- **HIGH:** High battery warning voltage. The setting range is 14.0V ~ 15.0V. 14.4V is default setting.
- **LOW:** Low battery warning voltage. The setting range is 10.1V ~ 14.0V. 11.4V is default setting. This parameter setting is related to 'Shutdown Voltage' setting. This setting value should be higher than 'Shutdown Voltage' setting.

**Shutdown VOL:** If battery voltage is lower than this point in battery mode, UPS will automatically shut down. The setting range is 10.5V ~ 12V. 10.7V is default setting. (This setting is only available for long-run model)

**Battery Parameters:**

- **Battery AH:** setting battery capacity

**MISCELLANEOUS****MISCELLANEOUS SETTING PAGE****Auto Restart:**

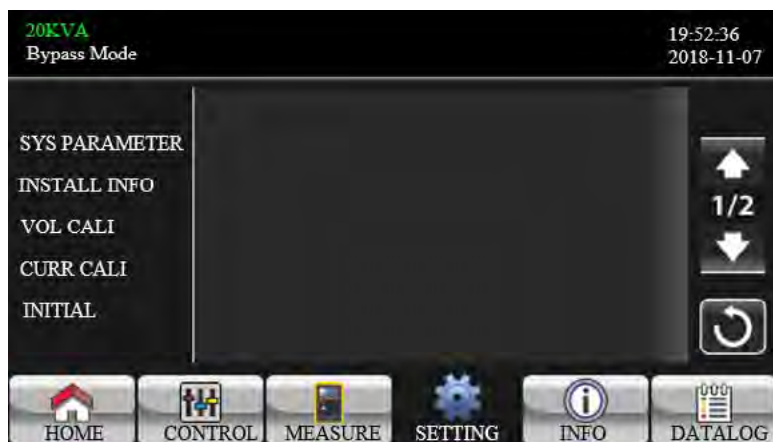
- **Enable:** After 'Enable' is set, no matter what the UPS previous status is, the UPS will restart to Online mode automatically after utility restores.
- **Disable:** After 'Disable' is set, the UPS will operate normally. If the UPS shuts down due to low battery, the UPS will still restart to online mode after utility restores. If the UPS was turned OFF manually and the utility restores, the UPS will switch to standby mode or bypass mode depends on the UPS configuration.

**Shutdown Delay:** UPS will shut down in setting minutes. The countdown will start after confirming the pop-up screen.

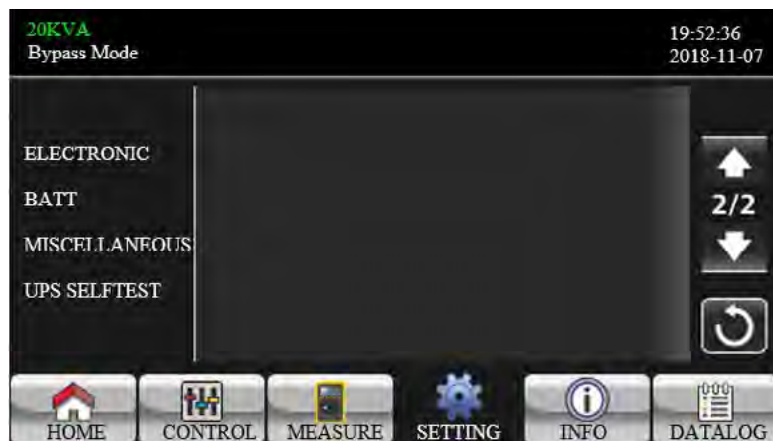
**Restore Delay:** UPS will automatically restart in setting minutes after the UPS shuts down.

**New Password:** Set up new password to enter 'Advance » User' menu.

## ADVANCE → MAINTAINER



ADVANCE: MAINTAINER SETTING MENU PAGE 1



ADVANCE: MAINTAINER SETTING MENU PAGE 2

To access the 'Advance → Maintainer' Setting menu page, it's required to enter password. Please contact your local dealer to get maintainer password.

**CAUTION:** This setting menu is only for qualified technician. Otherwise, mis-operation will cause UPS damage.

There are nine sub-menus under 'Advance → Maintainer' setting: SYS PARAMETER, INSTALL INFO, VOL CALI, CURR CALI, INITIAL, ELECTRONIC, BATT, MISCELLANEOUS and UPS SELFTEST.

## SYS PARAMETER

20KVA  
StandbyMode

19:52:36  
2018-11-07

SYS PARAMETER	Model Name	
INSTALL INFO	Serial Number	85211810100018000
VOL CALI	Manufacturer	
CURR CALI	Charger Number	1PCS
INITIAL	Max Charge CURR	12A >
	BATT Number	16

HOME CONTROL MEASURE SETTING INFO DATALOG

## SYS PARAMETER PAGE 1

**Mode Name:** Set the UPS model name.

**Serial Number:** Set the serial number.

**Manufacturer:** Set the UPS manufacturer.

**Charger Number:** The number of charging boards installed in the UPS.

**NOTE:** It's required to restart the UPS after setting.

**Max Charge CURR:**

- One piece of charger: There are twelve options: 1A, 2A, 3A, 4A, 5A, 6A, 7A, 8A, 9A, 10A, 11A, 12A.
- Two pieces of charger: There are twelve options: 2A, 4A, 6A, 8A, 10A, 12A, 14A, 16A, 18A, 20A, 22A, 24A

**BATT Number:** The total number of installed battery. (It's required to restart the UPS after setting.) The setting range is 16 ~ 20. 16 is default setting.





#### SYS PARAMETER PAGE 2

**Float VOL:** The setting point of battery float voltage. 13.6V is default setting.

**UPS Type:** There are two options, HV and LV. This change is only allowed for qualified technician.

**NOTE:** It's required to restart the UPS after setting.

**Power Setting:** Set power factor in percentage.

**Output setting:** Set UPS output setting. There are two selections, 3-1 and 3-3.

**NOTE:** It's required to restart the UPS after setting.

**Customer Code:** Set customer code. It's a necessary setting when using dynamic password function.

**DynamicPassword:** Enable or disable dynamic password function.

## INSTALL INFO

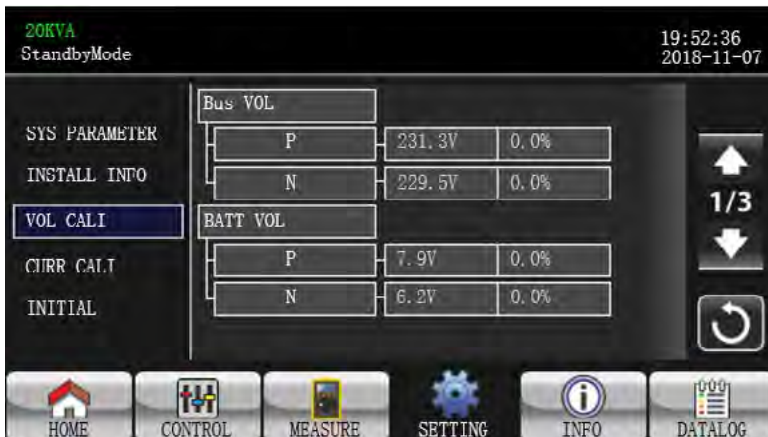


INSTALL INFO PAGE



**SYS Install Date:** Set the date of UPS installation.



**BAT Install Date:** Set the date of Battery installation.

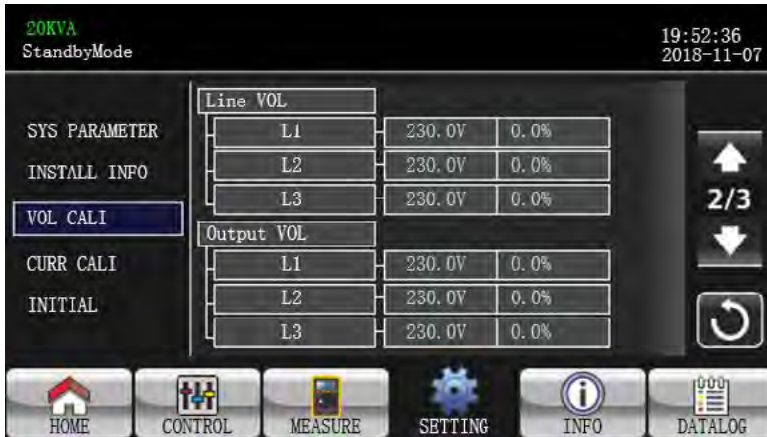
**Date/Time:** Set the date and time. The format is YYYY-MM-DD HH:MM:SS. The calendar day will be automatically changed when the year, month and date are set.





VOL CALI PAGE1



**Bus VOL:** BUS voltage calibration. Click value columns and it will pop up . Then, each click is 0.1% no matter it's pressing up or down key . Press 'up' key to increase 0.1% and press 'down' key to decrease 0.1%. Press 'OK' key to confirm the modification.

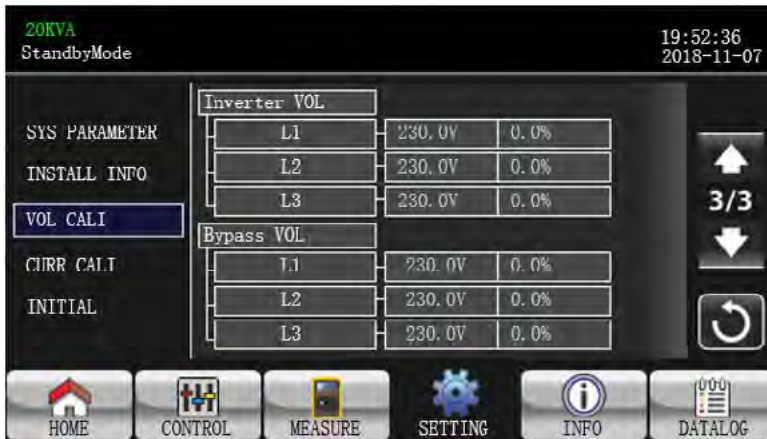
**BATT VOL:** Battery voltage calibration. Click value columns and it will pop up . Then, each click is 0.1% no matter it's pressing up or down key . Press 'up' key to increase 0.1% and press "down" key to decrease 0.1%. Press 'OK' key to confirm the modification.



## VOL CALI PAGE 2

**Line VOL:** Line voltage calibration. Click value columns and it will pop up . Then, each click is 0.1% no matter it's pressing up or down key . Press 'up' key to increase 0.1% and press 'down' key to decrease 0.1%. Press 'OK' key to confirm the modification.

**Output VOL:** Output voltage calibration. Click value columns and it will pop up . Then, each click is 0.1% no matter it's pressing up or down key . Press 'up' key to increase 0.1% and press 'down' key to decrease 0.1%. Press 'OK' key to confirm the modification.



## VOL CALI PAGE 3



**Inverter VOL:** Inverter voltage calibration. Click value columns and it will pop up . Then, each click is 0.1% no matter it's pressing up or down key . Press 'up' key to increase 0.1% and press 'down' key to decrease 0.1%. Press 'OK' key to confirm the modification.

**Bypass VOL:** Bypass voltage calibration. Click value columns and it will pop up . Then, each click is 0.1% no matter it's pressing up or down key . Press 'up' key to increase 0.1% and press 'down' key to decrease 0.1%. Press 'OK' key to confirm the modification.

## CURR CALI



## CURR CALI PAGE

**Output CURR:** Output current calibration. Click value columns and it will pop up . Then, each click is 0.1% no matter it's pressing up or down key . Press 'up' key to increase 0.1% and press 'down' key to decrease 0.1%. Press 'OK' key to confirm the modification.

## INITIAL



INITIAL MENU PAGE



INITIAL » DATA LOG PAGE

**DATA LOG:** After clicking 'DATA LOG', it will pop up a message board as shown in above screen. Touch 'YES' to clear the DATALOG page. Touch 'Back' or 'No' to cancel this operation and back to INITIAL menu page.



#### INITIAL » PARAMETERS PAGE

**PARAMETERS:** After clicking 'PARAMETERS', it will pop up a message screen as shown in above screen. Touch 'YES' to restore default value. Touch 'Back' or 'No' to cancel this operation and back to INITIAL menu page.



#### INITIAL » CALI PAGE

**CALI:** After clicking 'CALI', it will pop up a message board as shown in above screen. Touch 'YES' to restore default calibration value. Touch 'Back' or 'No' to cancel this operation and back to INITIAL menu page.



#### INITIAL » EEPROM PAGE

**EEPROM:** After clicking 'EEPROM', it will pop up a message board as shown in above screen. Touch 'YES' to clear all setting value in EEPROM. Touch 'Back' or 'No' to cancel this operation and back to INITIAL menu page.



#### INITIAL » TOUCH CALI PAGE

**TOUCH CALI:** After pressing the confirmation window, it will pop up as shown in above screen. Touch screen to recalibrate. Then, the blue screen appears and please click on the place of the cross with your mouse.



## ELECTRONIC



## ELECTRICAL SETTING PAGE 1

**Output VOL:** Select the output rated voltage.

- There are four options, 208V , 220V ,230V and 240V.

**Output FRE:** Select output rated frequency.

- **50Hz:** The output frequency is setting for 50Hz.
- **60Hz:** The output frequency is setting for 60Hz.

**CVCF Mode** (constant voltage and constant frequency function)

- **Enable:** CVCF function is enabled. The output frequency will be fixed at 50Hz or 60Hz according to setting of 'Output Freq.'. The input frequency could be from 46Hz to 64Hz.
- **Disable:** CVCF function is disabled. The output frequency will synchronize with the bypass frequency within 46~54 Hz for 50Hz system or within 54~64 Hz for 60Hz system. Disable is the default setting.

**Bypass Forbid:**

- **Enable:** Bypass Forbid is enabled. It's not allowed for running in Bypass mode under any situations.
- **Disable:** Bypass Forbid is disabled. UPS will run in Bypass mode. It is the default setting.

**Neutral Line Check:** Check if neutral line is correctly connected or not.

- **Disable:** Disable the neutral loss detection function. The UPS will not detect the neutral loss or not.
- **Auto:** The UPS will automatically detect the neutral is lost or not. If neutral loss is detected, an alarm will be generated. If the UPS is turned on, it will transfer to battery mode. When neutral is restored and detected, the alarm will be muted automatically and the UPS will go back to normal mode automatically.



- **Check:** The UPS will detect the neutral loss or not only when first commission. If neutral loss is detected, an alarm will be generated. If the UPS is turned on, it will transfer to battery mode. When neutral is restored, the alarm will NOT be muted automatically and the UPS will NOT go back to normal mode automatically. Please be sure to enter this selection and re-start the UPS again to mute alarm.

**ISO Compensation:** When UPS is connected to output isolation, it will compensate the output voltage.



**ELECTRICAL SETTING PAGE 2**

**Bypass UPS off:** Select the bypass status when manually turning off the UPS. This setting is only available when 'Bypass forbid' is set to 'Disable'.

- **Enable:** Bypass enabled. When selected, bypass mode is activated.
- **Disable:** Bypass disabled. When selected, no output through bypass when manually turning off the UPS. To protect power continuity on output load, when UPS fault or UPS transfers to bypass due to overload on AC mode, the UPS will force to turn on bypass output by default.

**Bypass VOL Range:** Set the bypass voltage range.

- **L:** Low point for bypass. The setting range is 176V ~ 209V.
- **H:** High point for bypass. The setting range is 231V ~ 264V.

**Bypass FRE Range:** Set the bypass frequency range.

The acceptable bypass frequency range from 46Hz to 54Hz when UPS is 50Hz system and from 56Hz to 64Hz when UPS is 60Hz system.

**ECO mode:** Enable/Disable ECO mode. Default setting is 'Disable'.

**ECO VOL Range:** Set the ECO voltage range.

- **L:** Low voltage point for ECO mode. The setting range is from (Rated output voltage – 5V) to (Rated output voltage - 11V). 'Rated output voltage – 5V' is default setting.
- **H:** High voltage point for ECO mode. The setting range is from (Rated output voltage + 5V) to (Rated output voltage + 11V). 'Rated output voltage + 5V' is default setting.

**ECO FRE Range:** Set the ECO frequency range. The setting range is from 48Hz to 52Hz when the UPS is 50Hz system and from 58Hz to 62Hz when the UPS is 60Hz system.

## BATTERY



**BATTERY SETTING PAGE**

**Battery Warning VOL:**

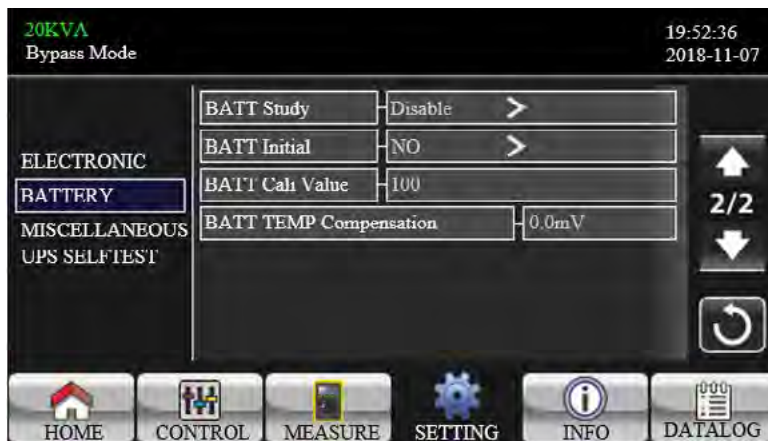
- **HIGH:** High battery warning voltage. The setting range is 14.0V ~ 15.0V. 14.4V is default setting.
- **LOW:** Low battery warning voltage. The setting range is 10.1V ~ 14.0V. 11.4V is default setting. This parameter setting is related to 'Shutdown Voltage' setting. The setting value should be higher than 'Shutdown Voltage' setting.

**Shutdown VOL:** If battery voltage is lower than this point in battery mode, UPS will automatically shut down. The setting range is 10.5V ~ 12.0V. 10.7V is default setting. (This setting is only available for long-run model)

**BATT Age:** Set up battery age.

**BATT Parameters:**

- **BATT AH:** setting battery capacity.
- **BATT Groups:** setting battery groups.



**Battery Study:** When battery aging occurs, this function is to calibrate backup time estimation. It's a self-learning function for battery. Currently, this function is not available.

- **Enable:** When enabled, UPS will enter battery test mode one time. It will calibrate backup time estimation by calibrating battery virtual capacity according to a complete charging and discharging process.
- **Disable:** When disabled, the backup time will not be updated during the charging and discharging process.

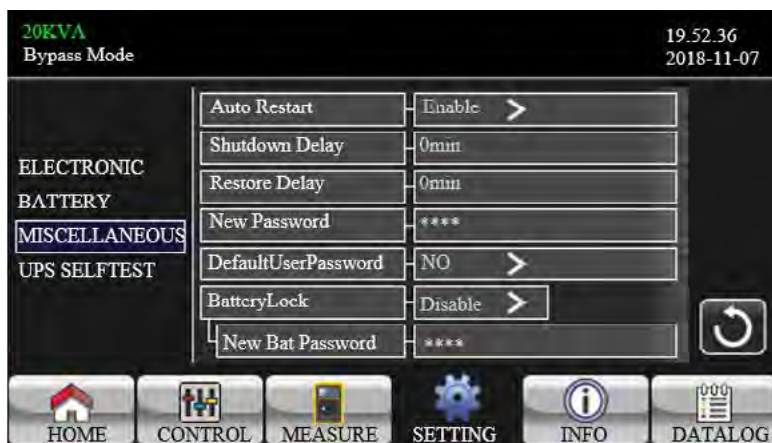
#### Battery Initial:

- **Yes:** When selected, the battery virtual capacity will be initialized to 100%. Because battery study is a self-learning function, after the battery is used for a long time, the virtual capacity of the battery will be continuously updated based on each full charging process. After replacing the new battery, the virtual capacity of the battery needs to be initialized.
- **No:** When selected, the virtual capacity of the battery will not be initialized.

**BATT Cali Value:** Calibrate backup time.

**BATT TEMP Compensation:** Compensate charging voltage according to battery temperature.

## MISCELLANEOUS



## MISCELLANEOUS SETTING PAGE

**Auto Restart:**

- **Enable:** After 'Enable' is set, no matter what the UPS previous status is, the UPS will restart to Online mode automatically after utility restores.
- **Disable:** After 'Disable' is set, the UPS will operate normally. If the UPS shuts down due to low battery, the UPS will still restart to online mode after utility restores. If the UPS was turned OFF manually and the utility restores, the UPS will switch to standby mode or bypass mode depends on the UPS configuration.

**Shutdown Delay:** UPS will shut down in setting minutes. The countdown will start after confirming the pop-up screen.

**Restore Delay:** UPS will automatically restart in setting minutes after the UPS shuts down.

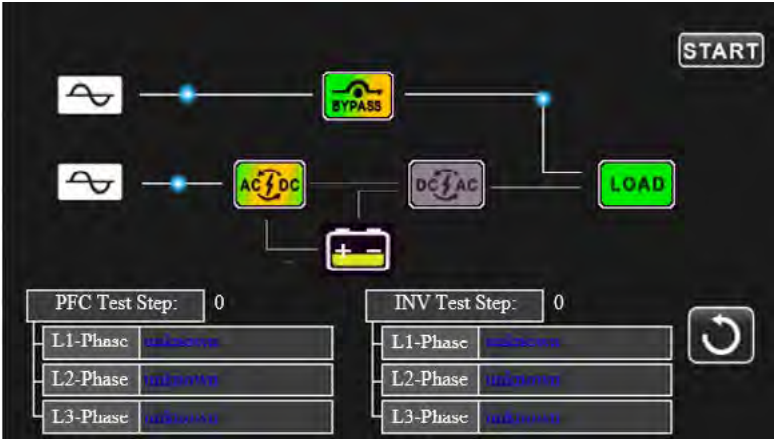
**New Password:** Set up new password to enter 'ADVANCE » User' menu page.

**DefaultUserPassword:**

- **YES:** After 'YES' is set, User password will restore default setting value.
- **NO:** After 'NO' is set, the UPS will cancel this operation.

**BatteryLock:** Currently, this setting is not available.

UPS SELFTEST



After the UPS self-test passes, the screen will be black automatically. If the UPS self-test is abnormal, it will stop on the abnormal screen. At this time, the maintenance personnel should repair the UPS according to the self-test instructions. Please check local dealer for self-test instructions.

### 6.2.4 Information screen

Touch the icon



to enter information page. Touch the icon



or



to browse information.

Touch the icon



to return to main screen. Touch the icon



to go back to previous menu.



**BASIC INFORMATION PAGE 1**

#### Basic Information

**MCU Version:** MCU version.

**DSP Version:** DSP version.

**Serial NO.:** The serial number of UPS.

**Manufacturer:** The information about manufacturer.

**Service Contact:** The contact name is set in 'Basic Setting'.

**Service Phone:** The listed numbers are set in 'Basic Setting'.

**Service Mail:** The service email account is set in 'Basic Setting'.

**PAR State:** The information of parallel status.

**PAR ID:** The UPS ID number in parallel status.

**Customer Code:** Customer code.

**DynamicPassword:** Enable/disable dynamic password.



BASIC INFORMATION PAGE 2



RATED INFORMATION PAGE

### Rated Information

**Output VOL:** It shows output rated voltage.

**Output FRE:** It shows output rated frequency.

**CVCf Mode:** Enable/Disable CVCf mode.

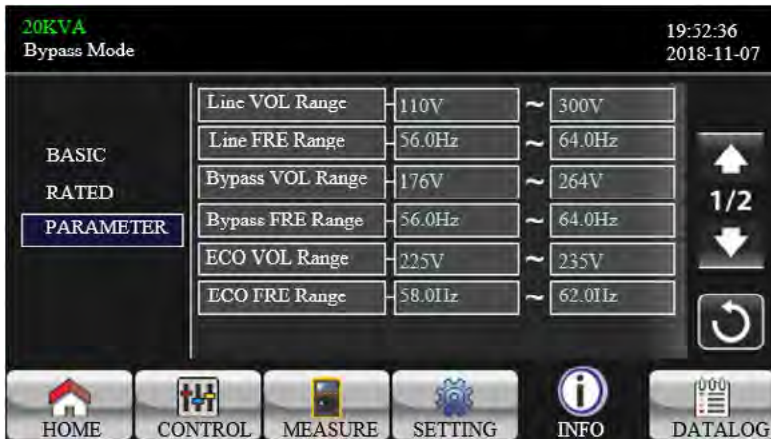
**Bypass Forbid:** Enable/disable bypass function.

**Bypass UPS Off:** Enable/disable auto bypass function when UPS is off.

**ECO Mode:** Enable/disable ECO function.

**Auto Restart:** Enable/disable auto-restart function.





PARAMETERS INFORMATION PAGE 1

### Parameter Information

**Line VOL Range:** The acceptable line input voltage range.

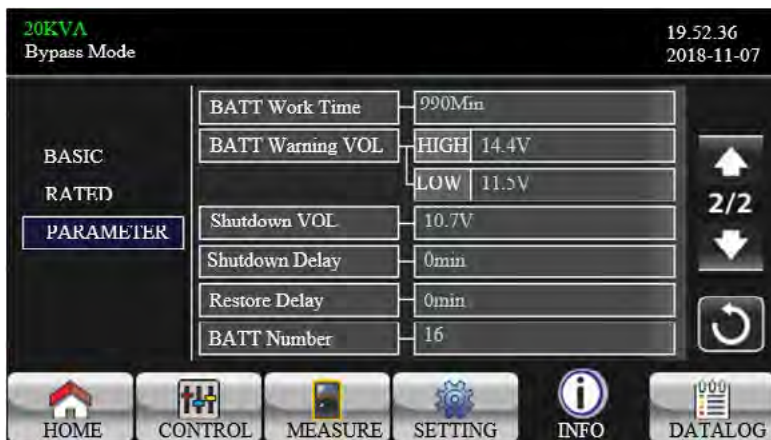
**Line FRE Range:** The acceptable line input frequency range.

**Bypass VOL Range:** The acceptable input voltage range for bypass mode.

**Bypass FRE Range:** The acceptable input frequency range for bypass mode.

**ECO VOL Range:** The acceptable input voltage range for ECO mode.

**ECO FRE Range:** The acceptable input frequency range for ECO mode.



PARAMETERS INFORMATION PAGE 2



**BATT Work Time:** The maximum discharge time in battery mode.

**BATT Warning VOL:**

- **HIGH:** High battery warning voltage.
- **LOW:** Low battery warning voltage.


**Shutdown VOL:** If battery voltage is lower this point, UPS will automatically shut down.



**Shutdown Delay:** UPS will shut down in setting minutes. The countdown will start after confirming the pop-up screen.



**Restore Delay:** UPS will automatically restart in setting minutes after the UPS shuts down.

**BATT Number:** It shows battery number.

### 6.2.5 Data Log screen

Touch the icon  to enter date log page. Data log is used to record the warning and fault information of the UPS. The record contains date & time, code, type and description.

Touch the icon  or  to page up or down if there are more than one page in

the date log. Touch the icon  to return to main screen. Press the icon  to go

back to main menu. Please refer to Section 3-6 and 3-7 for warning and fault code list.



Date Time	CODE	TYPE	Description
2018/11/8 17:02:30	01	Mode	Bypass Mode
2018/11/8 17:02:30	02	Mode	Standby Mode

DATA LOG PAGE

### 6.3 Audible Alarm

Description	Buzzer status	Muted
UPS status		
Bypass mode	Beeping once every 2 minutes	Yes
Battery mode	Beeping once every 4 seconds	
Fault mode	Beeping continuously	
Warning		
Overload	Beeping twice every second	No
Others	Beeping once every second	
Fault		
All	Beeping continuously	Yes

### 6.4 Single UPS Operation

#### 6.4.1 Turn on the UPS with utility power (in AC mode)

- 1) After power mains is connected correctly, set the breaker of the battery pack to 'ON' position (this step only necessary for long-run model). Then set the line input breaker to 'ON' position. At the same time the fan will start running and the UPS will start initialization. In just a few seconds, the UPS will supply power to the loads via the Bypass mode.

**NOTE:** When UPS is in Bypass mode, the output voltage will be directed from mains after you switch on the input breaker. In Bypass mode, the load is not protected by the UPS. To protect your equipment, you should turn on the UPS. Refer to next step.

- 2) Touch 'CONTROL' and select 'UPS on/off' icon. It will show 'Turn on UPS?' in screen and select 'Yes'. Refer to On/Off UPS screen.
- 3) In just a few seconds, the UPS will enter into AC mode. If the mains is abnormal, the UPS will operate in Battery mode without interruption.

**NOTE:** When the UPS runs out battery, it will shut down automatically in Battery mode. When the mains is normalized, the UPS will auto restart in AC mode.

#### 6.4.2 Turn on the UPS without utility power supply (in Battery mode)

- 1) Make sure that the two strings of batteries are connected correctly in order of '+, GND, -' terminals and the breaker of the battery pack is at 'ON' position (only for long-run model).
- 2) Press the 'COLD START' button to wake up the LCD screen first. Touch 'CONTROL' and select 'UPS on/off' icon. It will show 'Turn on UPS?' in screen and select 'Yes'. Refer to On/Off UPS screen.
- 3) In just a few seconds, the UPS will be turned on and enter into Battery mode.

### 6.4.3 Connect devices to UPS

After the UPS is turned on, you can connect devices to the UPS.

- 1) Turn on the UPS first and then switch on the devices one by one. The LCD panel will display total load level.
- 2) If it is necessary to connect inductive loads such as a printer, the in-rush current of the load should be calculated carefully to see if it meets the overload capability of the UPS. Any load more than 150% for 60ms will disable the UPS.
- 3) If the UPS is overload, the buzzer will beep twice every second.
- 4) When the UPS is overload, please remove some loads immediately. It is recommended to have the total loads connected to the UPS less than 80% of its nominal power capacity to prevent overload for system safety.
- 5) If the overload time is over acceptable time listed in spec in AC mode, the UPS will automatically transfer to Bypass mode. After the overloading was resolved, it will return back to AC mode. If the overload time is over acceptable time listed in spec in Battery mode, the UPS will enter fault status. At this time, if bypass is enabled, the UPS will power to the load via bypass. If bypass function is disabled or the input power is not within bypass acceptable range, it will cut off output entirely.

### 6.4.4 Charge the batteries

- 1) After the UPS is connected to the mains and turned on in AC mode, the charger will charge the batteries automatically except in battery mode, during battery self-test, overload or when battery voltage is high.
- 2) It is recommended to charge batteries for at least 10 hours before operation. Otherwise, the backup time may be shorter than expected.

### 6.4.5 Battery mode operation

- 1) When the UPS is in Battery mode, the buzzer will sound according to different battery capacity. If the battery capacity is more than 25%, the buzzer will beep once every 4 seconds. If the battery voltage drops to the alarm level, the buzzer will beep once every sec to remind users that the battery is at low level and the UPS will shut down imminently. Users could switch off some non-critical loads to disable the shutdown alarm and prolong the backup time. If there is no more load to be switched off, you have to prepare shutdown procedure to preserve working data or devices. Otherwise, there is a risk of data loss or load failure.
- 2) In Battery mode, users can touch 'SETTING' » 'Basic' » Audio Mute to enable 'Mode Mute' to disable the buzzer.
- 3) The backup time of the long-run model depends on the external battery capacity.
- 4) The backup time may vary from different operating temperature and load type.
- 5) When setting discharging time for 16.5 hours (default value from LCD menu), after discharging 16.5 hours, UPS will shut down automatically to protect the battery.

#### 6.4.6 Test the batteries

- 1) If you need to check the battery status when the UPS is running in AC mode/CVCF mode, you could touch 'CONTROL' and select 'Battery Test'. Refer to 'Battery Test' screen.
- 2) Users also can set battery self-test through monitoring software.

#### 6.4.7 Turn off the UPS with utility power supply in AC mode

- 1) Touch 'CONTROL' and select 'On/Off UPS' icon. It will show 'Turn off UPS?' in screen and select 'Yes'. Refer to 'On/Off UPS' screen.

**NOTE 1:** If the UPS has been set to bypass output, it will bypass voltage from the mains to output terminal even though you have turned off the UPS (inverter).

**NOTE 2:** After turning off the UPS, please be aware that the UPS is working in Bypass mode, there will be risk of power loss for connected devices.

- 2) In Bypass mode, output voltage of the UPS is still present. In order to cut off the output, switch off the line input breaker. The LCD display will turn off and UPS is now completely off.

#### 6.4.8 Turn off the UPS without utility power supply in Battery mode

- 1) Touch 'CONTROL' and select 'On/Off UPS' icon. It will show 'Turn off UPS?' in screen and select 'Yes'. Refer to 'On/Off UPS' screen.
- 2) Then UPS will cut off power to output terminals.

#### 6.4.9 Mute the buzzer

- 1) Touch 'SETTING' and select 'BASIC' item. There are two events available to mute. Refer to 'SETTING' screen.
- 2) Some warning alarms can't be muted unless the error is fixed. Please refer to section 3-3 for details.

#### 6.4.10 Operation in warning status

- 1) When warning code flashes and the buzzer beeps once every second, it means that a warning event occurs on UPS. Users can read the warning message(s) from 'DATA LOG' menu. Please refer to the Chapter 4 for details.
- 2) Some warning alarms can't be muted unless the error is fixed. Please refer to section 3-3 for details.

#### 6.4.11 Operation in Fault mode

- 1) When fault code lights on the LCD screen and the buzzer beeps continuously, it means that there is a fatal error with the UPS. Users can get the fault code from 'DATA LOG' menu. Please refer to the Chapter 4 for details.
- 2) Please check the loads, wiring, ventilation, mains, battery and so on after the fault occurs. Don't try to turn on the UPS again before solving the issues. If the problems persist, contact the distributor or service personnel immediately.
- 3) In case of an emergency, shut off connections from mains, external battery, and output immediately to avoid possible damage to the UPS or equipment.

### 6.4.12 Operation in maintenance bypass mode

This operation should only be performed by maintenance personnel or qualified technicians. When the UPS needs to repair or service and the load could not be shut off, the UPS needs to be put into maintenance mode.

- 1) First, switch off the UPS.
- 2) Then, remove the cover of maintenance bypass switch on the panel.
- 3) Turn the maintenance switch to 'BPS' position.

## 6.5 Parallel Operation

### 6.5.1 Parallel system initial startup

Please make sure that all of the running UPSs are parallel models and have the same configuration.

- 1) Turn on each UPS in AC mode respectively (Refer to section 3-4(1)). Then, measure the inverter output voltage of each phase for each UPS with a multi-meter. Calibrate the inverter output voltage by configuring inverter voltage adjustment (Refer to SETTING » Advance » Maintainer » VOL CALI » Inverter CALI screen) in LCD menu until the inverter output voltage difference of each UPS is within 1V or less.
- 2) Turn off each UPS (Refer to section 3-4(7.)). Then, follow the wiring procedure in section 2-4.
- 3) Remove the cover of parallel share current cable port on the UPS, connect each UPS one by one with the parallel cable and share current cable, and then replace the cover.
- 4) Turn on the parallel system in AC mode:
  - a) Turn on the line input breaker of each UPS. If using dual-input unit, please also turn on the external bypass input breaker. After all UPSs enter into bypass mode, measure the output voltage between two UPSs for the same phase to make sure the phase sequence is correct. If these two voltage differences are near to zero, that means all connections are met. Otherwise, please check if the wirings are connected correctly.
  - b) Turn on the output breaker of each UPS.
  - c) Turn on each UPS in turns. After a while, the UPSs should enter into AC mode synchronously and then, the parallel system is now complete.
- 5) Turn on the parallel system in Battery mode:
  - a) Turn on the battery breaker (only available in long-run model) and external output breaker of each UPS.
  - b) Turn on any UPS. A few seconds later, the UPS will enter into battery mode.
  - c) Turn on the next UPS in sequence until all the UPSs enter into Battery mode and add to the parallel system. Now the parallel system is now complete.

**If you would like to have more information regarding the parallel operation, please contact your supplier or service center for detail parallel operation instruction.**

### 6.5.2 Add new units into the parallel system

- 1) You can not add new unit into the parallel system when whole system is running. You must cut off the load and shutdown the system.
- 2) Make sure all of the UPS are the parallel models, and follow the wiring reference in section 2-4.
- 3) Install the new parallel system as per section 2.8.

### 6.5.3 Remove units from the parallel system

There are two methods to remove units from the parallel system:

#### First method:

- 1) Touch 'CONTROL' » 'Turn off UPS' and select 'Yes' to turn of the UPS. Then, the UPS will enter into Bypass mode or No Output mode without output.
- 2) Turn off the output breaker of this unit, and then turn off the input breaker of this unit.
- 3) Turn off the battery breaker (for long-run model) and remove the parallel and share current cables. And then remove the unit from the parallel system.

#### Second method:

- 1) If the bypass is abnormal, you can not remove the UPS without interruption. You must cut off the load and shut down the system.
- 2) Make sure the bypass setting is enabled in each UPS and then turn off the system. All UPSs will transfer to Bypass mode. Remove all the maintenance bypass covers and set the maintenance switches from 'UPS' to 'BPS' position. Turn off all the input breakers and battery breakers in parallel system.
- 3) Turn off the output breaker and remove the parallel cable and share current cable of the UPS which you want to remove. Now, you can remove the UPS from parallel system.
- 4 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' position and put the maintenance bypass covers back on.
- 5) Turn on the remaining UPS according to the previous section.



#### **Warning: (Only for the parallel system)**

- Before turning on the parallel system to activate inverter, make sure that all units maintenance switch are at the same position.
- When parallel system is turned on, please do not operate the maintenance switch of any unit.
- The parallel system DOES NOT support ECO mode. Therefore, please DO NOT 'enable' ECO mode in any unit.

## 6.6 Fault Code

Fault code	Fault event	Fault code	Fault event
01	Bus start failure	45	Charger fault
02	Bus over	46	Incorrect UPS setting
03	Bus under	47	MCU communication failure
04	Bus unbalance	49	Phase error on input and output
06	Converter over current	61	Bypass SCR short circuited
11	Inverter soft start failure	62	Bypass SCR open circuited
12	High inverter voltage	63	Voltage waveform abnormal in L1 phase
13	Low inverter voltage	64	Voltage waveform abnormal in L2 phase
14	Inverter L1 output(line to neutral) short circuited	65	Voltage waveform abnormal in L3 phase
15	Inverter L2 output(line to neutral) short circuited	67	Bypass O/P short circuited
16	Inverter L3 output(line to neutral) short circuited	68	Bypass O/P line to line short circuited
17	Inverter L1-L2 output (line to line) short circuited	69	Inverter SCR short circuited
18	Inverter L2-L3 output (line to line) short circuited	6C	BUS voltage drops too fast
19	Inverter L3-L1 output (line to line) short circuited	6D	Current sampling error value
1A	Inverter L1 negative power fault	6E	SPS power error
1B	Inverter L2 negative power fault	6F	Battery polarity reverse
1C	Inverter L3 negative power fault	71	PFC IGBT over-current in L1 phase
21	Battery SCR short circuited	72	PFC IGBT over-current in L2 phase
23	Inverter relay open circuited	73	PFC IGBT over-current in L3 phase
25	Line wiring fault	74	INV IGBT over-current in L1 phase
31	Parallel communication failure	75	INV IGBT over-current in L2 phase
41	Over temperature	76	INV IGBT over-current in L3 phase
42	DSP communication failure	77	ISO Over temperature fault
43	Overload	78	LCD & MCU communication failure

## 6.7 Warning Code

Warning code	Warning event	Warning code	Warning event
01	Battery unconnected	22	Bypass situations are different in parallel system
02	IP Neutral loss	24	Unbalanced load in parallel system
04	IP phase abnormal	33	Locked in bypass after overload 3 times in 30 minutes
05	Bypass phase abnormal	34	Unbalanced converter current
07	Over charge	36	Unbalanced inverter current
08	Low battery	3A	Cover of maintain switch is open
09	Overload	3C	Utility extremely unbalanced
0A	Fan failure	3D	Bypass is unstable
0B	EPO enable	3E	Battery voltage too high
0D	Over temperature	3F	Unbalanced battery voltage
0E	Charger failure	40	Charger short circuited
42	ISO over temperature	41	Bypass loss
21	Line situations are different in parallel system	43	Bus soft start error



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

Symptom	Possible cause	Remedy
No indication and alarm in the front display panel even though the mains is normal.	The AC input power is not connected well.	Check if input cable firmly connected to the mains.
The warning code 0B.	EPO function is activated. At this time, the EPO switch is in "OFF" status or the jumper is open.	Set the circuit in closed position to disable the EPO function.
The warning code 01.	The external or internal battery is incorrectly connected.	Check if all batteries are connected well.
The warning code 09.	UPS is overload.	Remove excess loads from UPS output.
	UPS is overloaded. Devices connected to the UPS are fed directly by the electrical network via the Bypass.	Remove excess loads from UPS output.
	After repetitive overloads, the UPS is locked in the Bypass mode. Connected devices are fed directly by the mains.	Remove excess loads from UPS output first. Then shut down the UPS and restart it.
Fault code is shown as 43.	UPS is overload too long and becomes fault. Then UPS shut down automatically.	Remove excess loads from UPS output and restart it.
Fault code is shown as 14, 15, 16, 17, 18 or 19.	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.
Other fault codes are shown on LCD display and alarm beeps continuously.	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 7 hours and then check capacity. If the problem still persists, consult your dealer.
	Batteries defect	Contact your dealer to replace the battery.
The warning code 0A.	Fan is locked or not working. Or the UPS temperature is too high.	Check fans and notify dealer.
The warning code 02.	The input neutral wire is disconnected.	Check and correct the input neutral connection. If the connection is ok and the warning is still displaying, please enter LCD setting menu »ADVANCE»User»Electronic. Then, select "CHE" in Neutral Line Check item and restart the UPS.

## 8.1 Storage

Before storing, charge the UPS at least 7 hours. Store the UPS covered and upright in a cool, dry location. During storage, recharge the battery in accordance with the following table:

Storage Temperature	Recharge Frequency	Charging Duration
-25°C - 40°C	Every 3 months	1-2 hours
40°C - 45°C	Every 2 months	1-2 hours

## 8.2 Maintenance

To maximize the longevity of the UPS, PowerShield highly recommends ongoing preventative maintenance. Failure to maintain your assets may lead to the UPS not performing as expected.

PowerShield recommends annual servicing that should include at least the following.

### 8.2.1 Visual Inspection

of the UPS, batteries, battery terminals and cabling.

### 8.2.2 Record and Measure

Existing logs existing fault codes – understand the codes before proceeding

Software / Firmware versions – update as required

UPS / Battery room temperatures

Input Voltage, Frequency, Current

Output Voltage, Frequency, Current

Individual battery (12V Block) voltages

Individual battery (12V Block) impedances / internal resistance – optional but highly recommended

### 8.2.3 Functionality

Confirm external communication (if installed) are operational

Confirm functionality of display

Confirm operation of UPS – if possible, on bypass / off bypass, on battery / off battery.

### 8.2.4 Miscellaneous

Clean filters

Clean UPS and batteries – if safe to do so.

Record the works undertaken in a service report or similar.

PowerShield recommends using its trained services agents for all maintenance activities.

PowerShield invests in its locally trained services agents to ensure they are trained to support our products.

### 8.2.5 Warning

- The UPS system operates with hazardous voltages. Repairs shall only be carried out only by qualified maintenance personnel.
- Even after the unit is disconnected from the mains, components inside the UPS system are still connected to the battery packs which are potentially dangerous.
- Before carrying out any kind of service and/or maintenance, disconnect the batteries and verify that no current and no hazardous voltage exists in any of the terminals including the terminals of high capability capacitor such as BUS-capacitors.
- Only persons who are adequately familiar with batteries, and DC power, with the required precautionary measures may replace batteries and supervise operations. Unauthorized persons must be kept well away from the batteries. A standard electrician without training may not be familiar with DC power.
- Verify that no voltage between the battery terminals and the ground is present before maintenance or repair. In this product, the battery circuit is not isolated from the input voltage. Hazardous voltages may occur between the battery terminals and the grounding/earthing.
- Batteries may cause electric shock and have a high short-circuit current.
- When replacing batteries, install the same number and same type of batteries. If you adjust the number of batteries please consult PowerShield or its local service agent prior to making any changes.
- Please dispose of all batteries in accordance with local rules and guidelines.
- Please replace the fuse only with the same type and amperage in order to avoid fire hazards.
- Do not disassemble the UPS system.

## 9 SPECIFICATIONS

MODEL		10K(L) DUAL	20K(L) DUAL	30K(L) DUAL	40K(L) DUAL	60KL DUAL	80KL DUAL
Model Number		PSCEP10K(L) 3/1 or 3/3	PSCEP20K(L) 3/1 or 3/3	PSCEP30K(L) 3/3	PSCEP40K(L) 3/3	PSCEP60KL 3/3	PSCEP80KL 3/3
Capacity		10kVA / 10kW	20kVA / 20kW	30kVA / 30kW	40kVA / 40kW	60kVA / 60kW	80kVA / 80kW
INPUT							
Voltage Range	Low Line Loss	110VAC(Ph-N) ± 3% at 50% Load; 176VAC (Ph-N) ± 3% at 100% Load					
	Low Line Comeback	Low Line Loss Voltage + 10V					
	High Line Loss	300VAC(L-N) ± 3% at 50% Load; 276VAC (L-N) ± 3% at 100% Load					
	High Line Comeback	High Line Loss Voltage – 10V					
Frequency Range		46Hz~54Hz @ 50Hz system; 56Hz~64Hz @ 60Hz system					
Phase		3 Phase with Neutral					
Power Factor		≥0.99 at 100% Load					
OUTPUT							
Phase		3 Phase with Neutral					
Output voltage		360/380/400/415VAC (Ph-Ph)					
		220/230/240VAC (Ph-N)					
AC Voltage Regulation		± 1%					
Frequency Range (Synchronized Range)		46Hz~54Hz @ 50Hz system; 56Hz~64Hz @ 60Hz system					
Frequency Range (Batt. Mode)		50Hz ± 0.1 Hz or 60Hz ± 0.1Hz					
Overload	AC mode	100%~110%: 60min; 110%~125%: 10min; 125%~150%:1min;>150% : immediately					
	Battery mode	100%~110%: 60min; 110%~125%: 10min; 125%~150%:1min;>150% : immediately					
Current Crest Ratio		3:1 max					
Harmonic Distortion		≤ 2 % @ 100% Linear Load; ≤ 5 % @ 100% Non-linear Load					
Transfer Time	Line ↔ Battery	0 ms					
	Inverter ↔ Bypass	0 ms (When phase lock fails, <4ms interruption occurs from inverter to bypass)					
	Inverter ↔ ECO	<10 ms					
Power Factor		0.9 leading to 0.9 lagging					
EFFICIENCY							
AC mode		95.5% at full load					
Battery Mode		94.5% at full load					
BATTERY							
Standard Model	Type	12V / 9Ah	12V / 9Ah	12V / 9Ah	12V / 9Ah	N/A	
	Numbers	(20+20)pcs	(20+20)pcs	(16+16)pcs x 2 strings			
	Recharge Time	9 hours recover to 90% capacity					
	Charging Current (max)	2.0 A ± 10% (Recommended) 1.0~12.0A (Adjustable)					
	Charging Voltage	+/-273 VDC ± 1%		+/-218 VDC ± 1%			
Long-run Model	Type	Depending on applications					
	Numbers	32 ~ 40 (adjustable as ±16, ±18, ±20 )					
	Charging Current(max.)	1.0~12.0A ±10% (Adjustable)				2.0~24.0A ±10% (Adjustable)	
	Charging Voltage	+/- 13.65 VDC * N ± 1% (N = 16~20)					
PHYSICAL							
Standard Model	Dimension, D x W x H (mm)	626 x 250 x 826		815 x 300 x 1000		N/A	
	Net Weight (kgs)	126	141	230	260		
Long-run Model	Dimension, D x W x H (mm)	626 x 250 x 826		815 x 300 x 1000		790 x 360 x 1010	
	Net Weight (kgs)	39	45	65	71	112	117
ENVIRONMENT							
Operation Temperature		0~40°C (the battery life will decrease when > 25°C)					
Operation Relative Humidity		<95% and non-condensing					
Operation Altitude		<1000m*					
Acoustic Noise Level		Less than 55dB @ 1 Metre	Less than 58dB @ 1 Metre	Less than 65dB @ 1 Metre	Less than 70dB @ 1 Metre	Less than 70dB @ 1 Metre	Less than 75dB @ 1 Metre
MANAGEMENT							
Smart RS-232 or USB		Supports Windows® 2000/2003/XP/Vista/2008/7/8/10, Linux, Unix, and MAC					
Optional SNMP		Power management from SNMP manager and web browser					
STANDARDS							
Safety		IEC/EN62040-1-1, Performance IEC 62040-3					
EMC		EMC/EMI/RFI IEC 62040-2 Environmental IEC 62040-4					

\*If the UPS is installed or used in a place where the altitude is above than 1000m, the output power must be derated 1% per 100m. 'L' refers to long range model with no internal batteries. Product specifications are subject to change without further notice.