CyberPower®

SMART APP ONLINE

MODULAR 3-PHASE UPS SYSTEM

OPERATOR MANUAL

SM020KAMFA
SM040KAMFA

SAVE THESE INSTRUCTIONS
Please read this manual and follow the instructions for installation and operation.

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SAFETY PRECAUTIONS

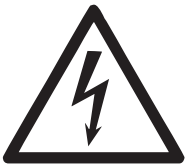
This manual contains information concerning the operation of CyberPower 3-phase online modular Uninterruptible Power Supply (UPS) systems.

For safety reasons, this 3-phase UPS must be installed by a certified electrician licensed by the state, and following all local regulations and electrical codes.

This is a Class C UPS system, and is designed exclusively for commercial or industrial use.
It is not approved for use in a life-support capacity, nor in a residential environment.

Symbols Used

The following types of safety instructions and general information appear in this document as described below:

Symbol	Description
	**WARNING** potentially hazardous situation - please use caution to prevent serious injury.
	**NOTICE** please utilize caution to avoid damage to UPS or power interruption.
	**INFORMATION** critical to ensuring optimal UPS system operation.

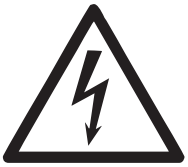
SAFETY PRECAUTIONS

CONFORMITY AND STANDARDS

This product complies with the following UPS product standards:

* UL1778, safety requirements for UPS

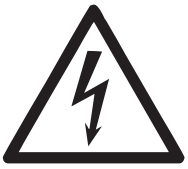
* FCC part 15, EMI requirements class A



BACK-FEEDING PROTECTION

This system has a control signal available for use with an externally located automatic device to protect against back-feeding voltage through the mains static bypass circuit. If this protection is not used with the switchgear that is used to isolate the bypass circuit, a label must be added to the switchgear to advise service personnel that the circuit is connected to a UPS system.

The text has the following meaning or is equivalent to:
Isolate the UPS before working on the circuit of this UPS.



GROUNDED CONNECTION

A grounded connection is critical before connecting the input supply (include both utility supply and battery).

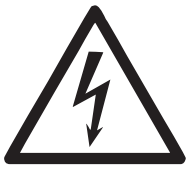
Earth leakage current introduced by the UPS, in any configuration from 10kW to 150kW, exceeds 3.5 mA and is less than 1000 mA and complies with the requirements of IEC/EN 62040-1 / UL 60950-1" Transient and steady-state earth leakage currents, which may occur when starting the equipment, should be taken into account when selecting instantaneous RCCB or RCD devices.

Residual Current Circuit Breakers (RCCBs) selected must be sensitive to DC unidirectional pulses (class A) and insensitive to transient current pulses.

Note also that the earth leakage currents of the load will be carried by this RCCB or RCD.

This equipment must be grounded in accordance with local electrical authority codes of practice.

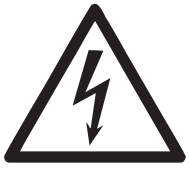
SAFETY PRECAUTIONS



NO USER-SERVICABLE COMPONENTS INSIDE

All the equipment maintenance and servicing procedures involving internal access should be carried out only by trained personnel. The components that can only be accessed by opening the protective cover with tools cannot be maintained by user.

This UPS fully complies with “IEC62040-1-1-General and safety requirements for use in operator access area UPS”. Dangerous voltages are present within the battery box. No risk exists to any personnel when operating the equipment in the normal manner, following the recommended operating procedures in this manual.



BATTERY VOLTAGE HIGHER THAN 200Vdc

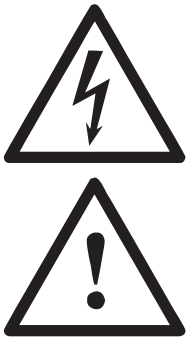
All the battery maintenance and servicing procedures should be carried out only by trained personnel.

SPECIAL CARE SHOULD BE TAKEN WHEN WORKING WITH THE BATTERIES ASSOCIATED WITH THIS EQUIPMENT.

WHEN CONNECTED TOGETHER, THE BATTERY TERMINAL VOLTAGE WILL EXCEED 200Vdc AND IS POTENTIALLY LETHAL.

Battery manufacturers supply details of the necessary precautions to be observed when working on, or in the vicinity of, a large bank of battery cells. These precautions should be followed implicitly at all times. Particular attention should be paid to the recommendations concerning local environmental conditions and the provision of protective clothing, first aid and fire-fighting facilities.

SAFETY PRECAUTIONS



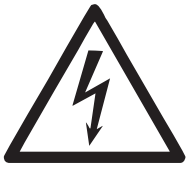
INITIAL START-UP AND COMMISSIONING CAN ONLY BE PERFORMED BY CYBERPOWER AUTHORIZED ENGINEERS

Do not apply electrical power to the UPS equipment before the commissioning engineer arrives at installation site.

The UPS should be installed by an authorized CyberPower engineer in order to retain the factory warranty. Any equipment not referred to in this manual is shipped with details of its own mechanical and electrical installation information.

3-PHASE 4-WIRE INPUT POWER IS REQUIRED

The standard UPS system can be connected to TN, TT AC distribution system (IEC60364-3) of 3-phase 4-wire, and a 3-wire to 4-wire conversion transformer is provided as an optional part. Single-phase 3-wire is also provided as an optional part.



BATTERY HAZARDS

Special care should be taken when working with the batteries associated with this equipment.

When connecting the battery, the battery connection voltage will exceed 200Vdc and is potentially lethal.

- Eye protection should be worn at all times
- Remove all jewelry, watches, and metal objects
- Only use tools with insulated handles.
- Wear rubber gloves.
- If a battery leaks electrolyte, or is otherwise physically damaged, it must be replaced, stored in a container resistant to sulfuric acid and disposed of in accordance with local regulations.
- If electrolyte comes into contact with the skin, the affected area should be washed immediately with water.

CHAPTER 1 - INTRODUCTION

1.1 Introduction

This modular UPS system utlizes an online double-conversion design and DSP-based digital control to supply stable, uninterrupted power for your critical loads. It eliminates damaging power surges and harmonic frequencies and regulates voltage to provide clean power to your devices.

The key features of the modular UPS system are:

- Online double-conversion topology
- High input power factor (>0.99), low input THDi (<3%)
- N+1 power module redundancy
- Scalable design, customizible to fit site-specific needs
- Load adaptability for linear and nonlinear loads
- Dual-feed or single-feed AC input connections
- Hot-swappable battery modules, power modules, and bypass modules
- Dual-feed or single AC input connections
- Conformal coated PCBs
- Smart Battery Management
- Digital control rectifier, inverter and charger
- Independent control of each module
- User-friendly interface
- Multicolor touchscreen LCD
- Remote management capability
- Customizable configurations
- Generator compatible

WARNING NOTICE

The components that can only be accessed by opening the protective cover with tools cannot be operated by user. Only qualified service personnel are authorized to remove such covers.

CHAPTER 1 - INTRODUCTION

The 3-Phase UPS system provides the critical load (such as communication and data processing equipment) with high-quality, uninterruptible AC power. The power from the UPS is free from voltage and frequency variations and disturbances experienced at the mains AC input supply.

This is achieved through high-frequency double-conversion. Pulse width modulation (PWM) associated with Digital Signal Processing (DSP) control, which features high reliability and convenience.

As shown in Fig.1-1, the AC input mains source is supplied at UPS input and converted into a DC source. This DC source feeds the inverter that converts the DC source into a clean and input independent AC source. The battery powers the load through the inverter in case of an AC input mains power failure. The utility source can also power the load through the static bypass.

When the UPS system needs maintenance or repair, the load can be transferred to maintenance bypass without interruption and the power module and bypass module can be removed for maintenance.

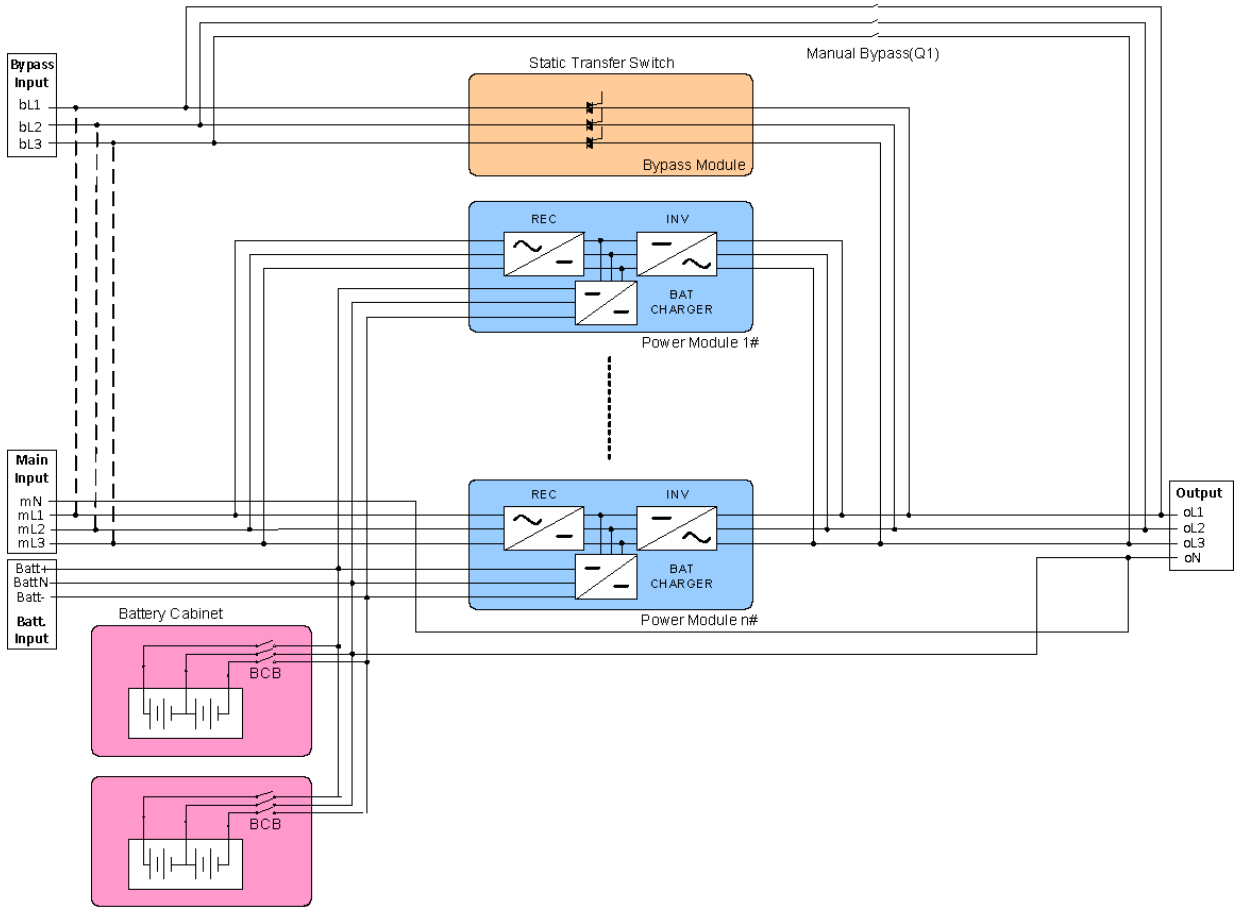


Fig 1-1: Single Unit Block Diagram

CHAPTER 1 - INTRODUCTION

1.1.1 Dual-Feed Input

Fig. 1-1 illustrates the 3-Phase UPS in what is known as the Dual-Feed configuration. In this configuration, the static bypass and maintenance bypass share the same independent bypass power supply and connect to the power supply through a separate switch. Where a separated power source is not available, the bypass and rectifier input supply connections are linked.

1.1.2 Static Transfer Switch

The circuit blocks (labeled Static Transfer Switch in Fig 1-1) contain electronically controlled switching circuits that enable the critical load to be connected to either the inverter output or to a bypass power source via the static bypass line. During normal system operation the load is connected to the inverter; but in the event of a UPS overload or inverter failure, the load is automatically transferred to the static bypass line. To provide a clean load transfer between the inverter output and static bypass line, the inverter output and bypass supply must be fully synchronized during normal operating conditions. This is achieved through the inverter control electronics, which makes the inverter frequency track that of the static bypass supply, provided that the bypass remains within an acceptable frequency window.

A manually controlled maintenance bypass supply is incorporated into the UPS design. It enables the critical load to be powered from the utility (bypass) supply while the UPS is shut down for routine maintenance.

⚠	**NOTICE** When the UPS is operating in bypass mode or on maintenance bypass, the connected equipment is not protected from power failures or surges and sags.

1.1.3 N+1 Internal Redundancy

The 3-phase UPS system can be configured for internal redundancy. When configured, the UPS system automatically becomes redundant if the load is at or below the capacity of the power modules minus the capacity of one power module. Under normal conditions, all the power modules in the UPS system share the load equally. If one or more power modules become unavailable and the load is at or below the capacity of remaining power modules, the remaining power modules supply the load instead of transferring to bypass.

1.1.4 Parallel UPS Systems

⚠	**NOTICE** Two UPS systems in a parallel system must have the same battery configuration. Each UPS system requires a separate battery cabinet.

A parallel UPS system with multiple UPSs can be installed to provide a parallel capacity and/or redundant system. This load sharing system provides more capacity than a single UPS, and can provide redundancy, depending on the load and configuration. In addition, when one UPS is taken out of service for maintenance or is not operating properly, a redundant UPS continues to supply uninterrupted power to the critical load. A built-in Controller Area Network (CAN) provides connectivity for system metering and operational mode control.

1.1.5 Battery System

The external battery cabinet provides extended emergency short-term backup power for the SM-20kVA and SM-40kVA UPS to enhance the usability and reliability of the systems. The external battery cabinet ensures connected equipment remains operational during power events, providing cost-effective, extended battery runtime. Two compatible external battery cabinets are available, the BCT3L9N125 and BCT6L9N225 and are equipped with valve-regulated lead-acid (VRLA) batteries.

BCT3L9N125

- Contains two or three battery strings to be used with the SM-20kVA UPS.
- Up to two external battery cabinets with a total of four or six battery strings can be paralleled together to extend the run time. The 2nd battery cabinet is optional.

⚠	**NOTICE** One battery string has two battery modules. The two battery modules must put into two adjacent bays on same layer. To configure a BCT3L9N125 battery system with four strings, use two BCT3L9N125s, each with two strings.

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BCT6L9N225

- Contains four to six battery strings to be used with the SM-40kVA UPS.
- Up to two external battery cabinets with a total of eight to twelve battery strings can be paralleled together to extend the run time. The 2nd battery cabinet is optional.

⚠	**NOTICE** One battery string has two battery modules. The two battery modules must put into two adjacent bays on same layer. To configure a BCT6L9N225 battery system with eight strings, use two BCT6L9N225s, each with four strings.

The external battery cabinet is housed in a single free-standing cabinet with safety shields for hazardous voltage protection. Up to two external battery cabinets per UPS may be used to meet application runtime needs. The cabinets match the SM-UPS cabinet in style and color.

Hot-swappable battery module is designed for the external battery cabinet that reduced installation time and maintenance time. A DC-rated circuit breaker within each cabinet provides protection and servicing isolation.

Diagram of batteries connection is shown as below:

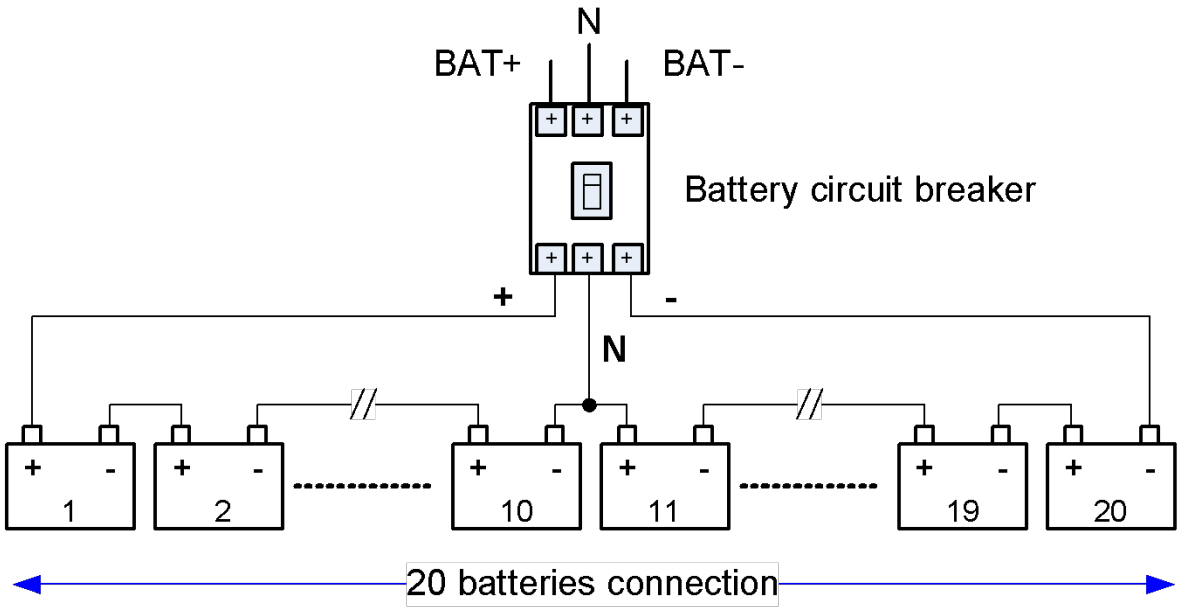

Fig 1-2: Diagram of Connected Batteries

CHAPTER 1 - INTRODUCTION

1.2 Operating Mode

This 3-phase UPS is an online, double-conversion, reverse-transfer UPS that operates in these modes:

- Normal mode
- Battery Mode
- Auto-restart mode
- Bypass mode
- Maintenance mode (manual bypass)
- Parallel redundancy mode
- ECO Mode

1.2.1 Normal Mode

The UPS inverter power modules continuously supplies the critical AC load. The rectifier/charger derives power from the AC mains input source and supplies DC power to the inverter while simultaneously FLOAT or BOOST charging its associated backup battery.

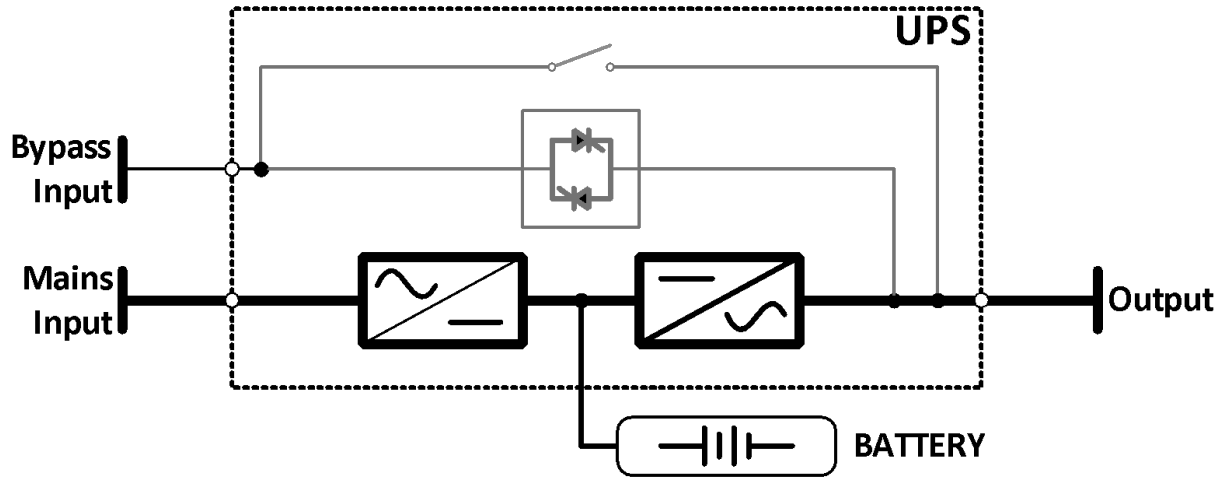

Fig 1-3: UPS Power Flow in Normal Mode

1.2.2 Battery Mode

Upon failure of the AC mains input power, the inverter power modules, which obtains power from the battery, supplies the critical AC load. There is no interruption in power to the critical load upon failure. After restoration of the AC mains input power, the “Normal Mode” operation will continue automatically without the necessity of user intervention.

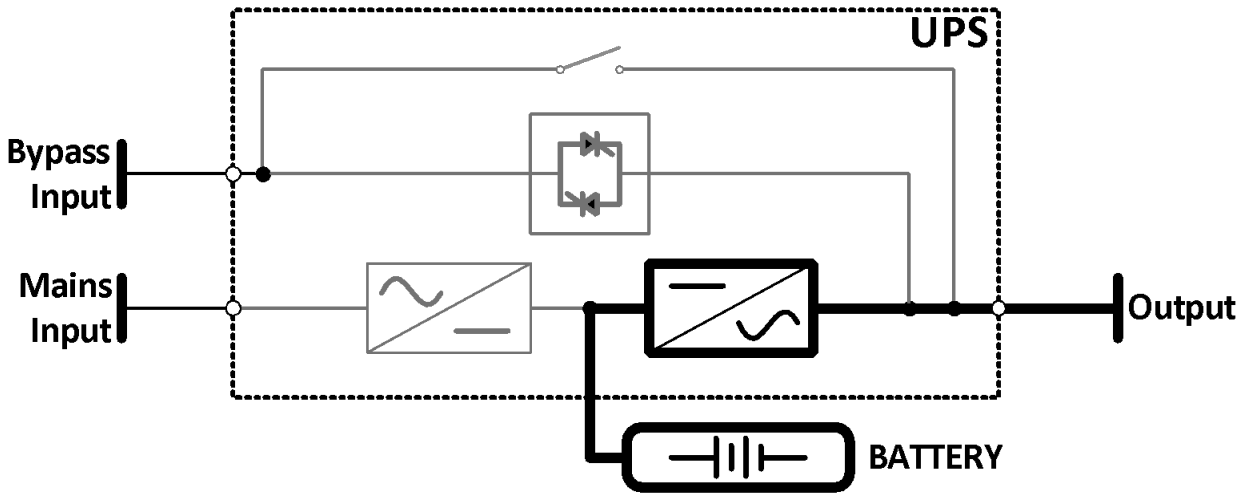

Fig 1-4: UPS Power Flow in Battery Mode

1.2.3 Auto-Restart Mode

The battery may become exhausted following an extended AC mains failure. The inverter shuts down when the battery reaches the End of Discharge voltage (EOD). The UPS may be programmed to **Auto Recovery after EOD** after a delay time if the AC mains recovery. This mode and any delay time are programmed by the commissioning engineer.

1.2.4 Bypass Mode

If the inverter overload capacity is exceeded when in normal mode, or if the inverter becomes unavailable, the static transfer switch will perform a transfer of the load from the inverter to the bypass source, with no interruption in power to the critical AC load. Should the inverter be asynchronous with the bypass, the static switch will perform a transfer of the load from the inverter to the bypass with power interruption to the load. This is to avoid large cross currents due to the paralleling of unsynchronized AC sources. This interruption is programmable but typically set to be less than 3/4 of an electrical cycle, e.g., less than 15ms (50Hz) or less than 12.5ms (60Hz).

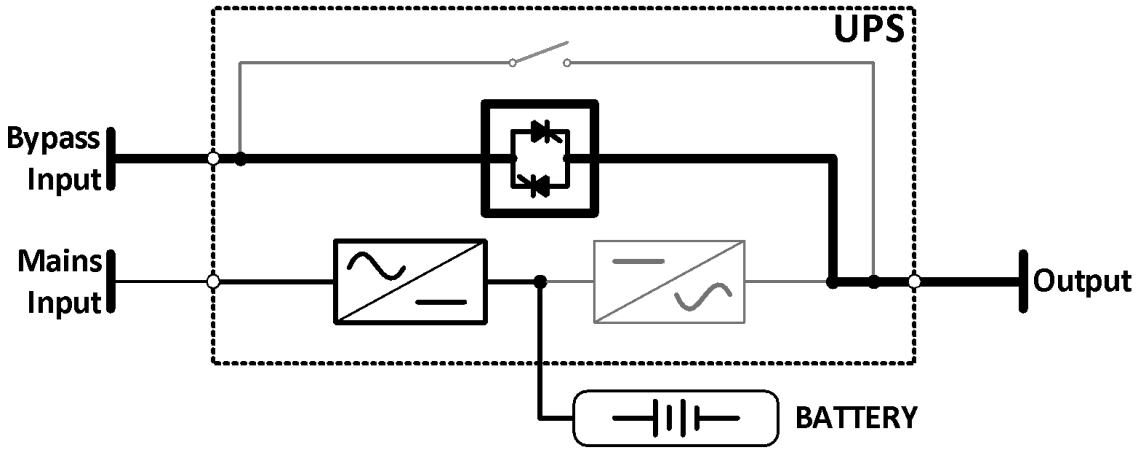

Fig 1-5: UPS Power Flow in Bypass Mode

1.2.5 Maintenance Mode (Manual Bypass)

A manual bypass switch is available to ensure continuity of supply to the critical load when the UPS becomes unavailable e.g. during a maintenance procedure.

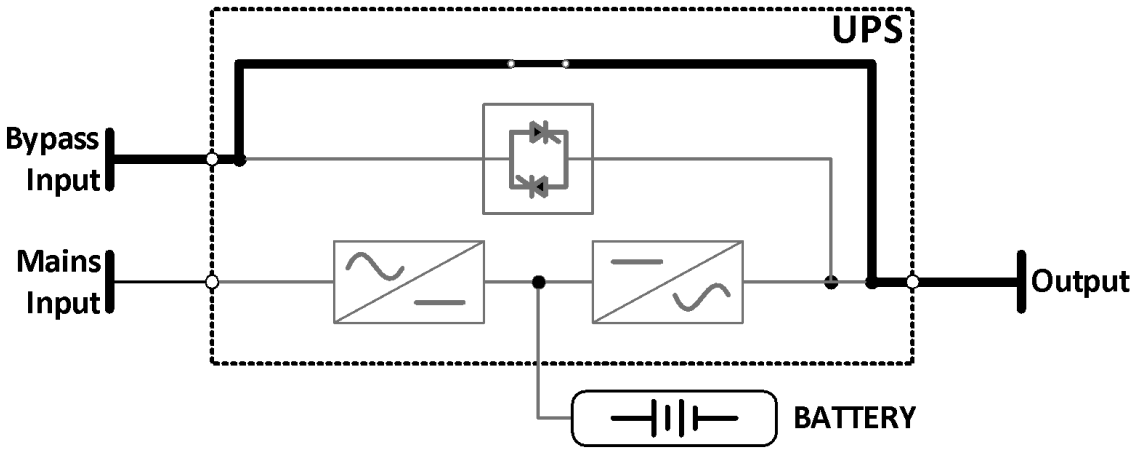

Fig 1-6: UPS Power Flow in Maintenance Mode

1.2.6 Parallel Redundancy Mode (System Expansion)

For higher capacity or higher reliability or both, the outputs of several 3-phase UPS systems can be programmed for direct parallel while a built-in parallel controller in each UPS system ensures automatic load sharing.

1.2.7 ECO Mode

To improve UPS efficiency, the 3-phase UPS system works in bypass mode under normal operating conditions and the inverter is on standby. When utility power fails, the UPS transfer to battery mode, and the inverter powers the load. The ECO system efficiency is up to 97.5%.

NOTE: There may be a short interruption (less than 10ms) during the transfer from ECO mode to battery mode, but the loads will remain powered.

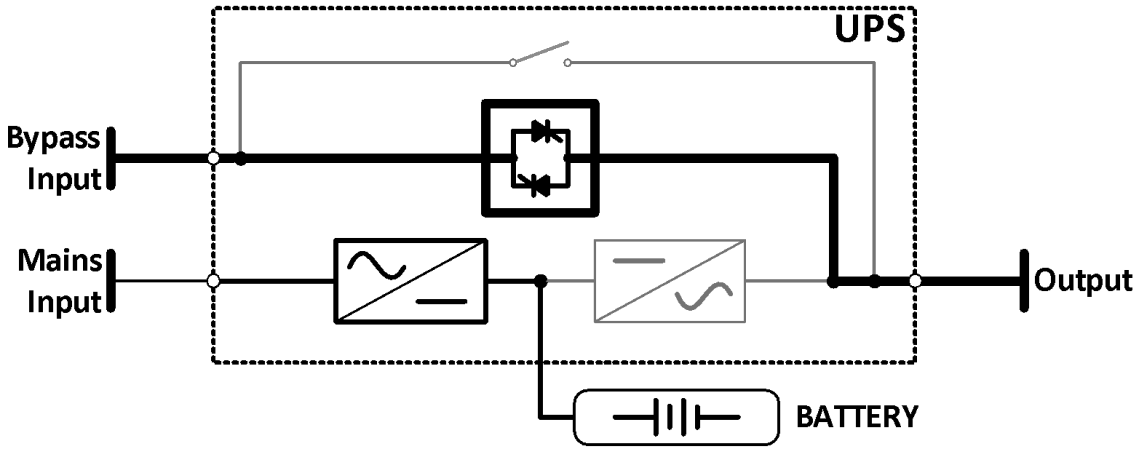

Fig 1-7: UPS Power Flow in ECO Mode

CHAPTER 1 - INTRODUCTION

1.3 System Options and Accessories

1.3.1 System Options

Table 1-1: System Options List	
Model Name	**Description**
SM020KAMFA	UPS Cabinet : 20kVA 20kW 208V 3-Phase
SM040KAMFA	UPS Cabinet : 40kVA 40kW 208V 3-Phase
SM10KAPMA	UPS Power Module: 10kVA 10kW 208V 3-Phase
BCT3L9N125	Battery Cabinet for SM020KAMFA: 3 layers (6 slots) for BM120V30ATY
BCT6L9N225	Battery Cabinet for SM040KAMFA: 6 layers (12 slots) for BM120V30ATY
BM120V30ATY	Battery Module w/8Ah 12VDC batteries 10pcs (120VDC)
SMUCB100UAC	100A Circuit Breaker for SM020KAMFA input/output switching device
SMUCB175UAC	175A Circuit Breaker for SM040KAMFA input/output switching device
PARLCARD304A	Parallel Control Cable for 3-Phase SM LV UPS Series

NOTICE SMUCB100UAC and SMUCB175UAC are installed in the back of external battery cabinet. SMUCB100UAC for BCT3L9N125. SMUCB175UAC for BCT6L9N225.

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1.3.2 Accessories

Table 1-2: UPS Cabinet Accessories			
No.	**Name**	**20kVA**	**40kVA**
1	Installation Manual	1	1
2	Product Registration Card	1	1
3	RMCARD205 RJ45/DB9 Serial Port	1	1
4	RMCARD205 Quick Start Guide	1	1
5	RMCARD205 Spare Jumper	1	1
6	RMCARD205 Test Report	1	1
7	Temperature Cable	1	1
8	M4 Screw (accessory part)	5	5
9	M6 Screw (accessory part)	12	20
10	Ext. Conn. Box (accessory part)	1	1
11	Ext. Conn. Cover (accessory part)	1	1
12	Rack Bracket (accessory part)	Small x 2	Large x 2
13	3P Dry Contact (accessory part)	4	4
14	2P Dry Contact (accessory part)	6	6
15	Cable Ring Terminal	Refer to Appendix B	
16	Heat Shrink Tube	Refer to Appendix B	

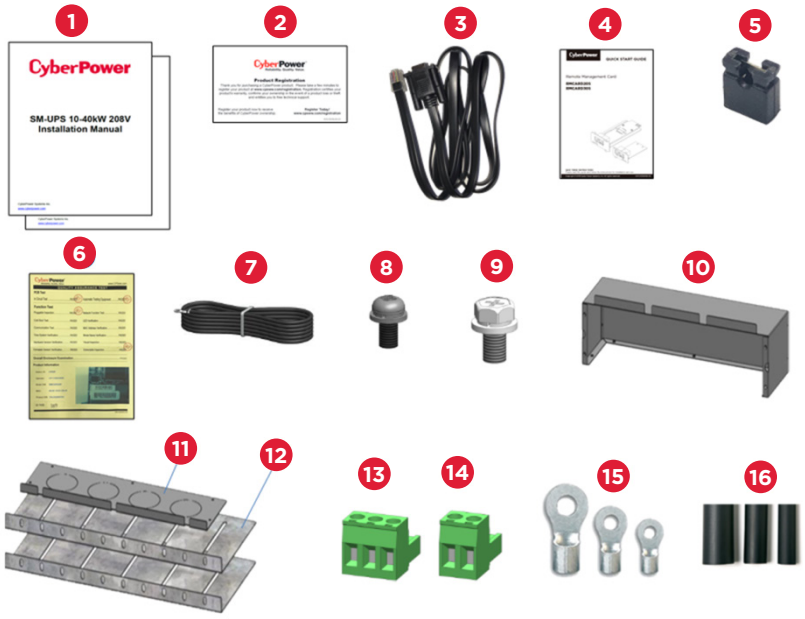

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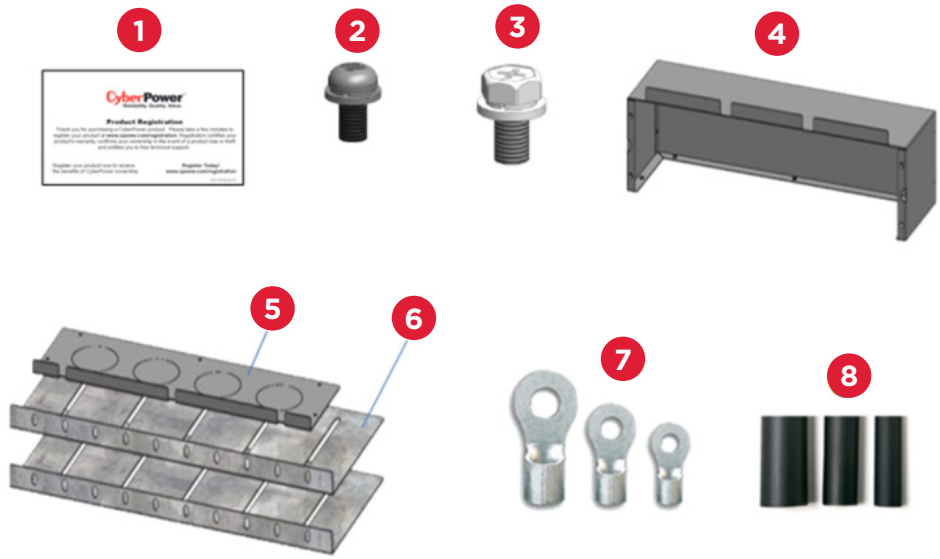
Table 1-3: External Battery Cabinet Accessories			
No.	**Name**	**BCT3L8N125**	**BCT6L8N225**
1	Product Registration Card	1	1
2	M4 Screw (accessory part)	5	5
3	M6 Screw (accessory part)	12	20
4	Ext. Conn. Box (accessory part)	1	1
5	Ext. Conn. Cover (accessory part)	1	1
6	Rack Bracket (accessory part)	Small x 2	Large x 2
7	Cable Ring Terminal	Refer to Appendix B	
8	Heat Shrink Tube	Refer to Appendix B	



CHAPTER 2 - OPERATIONS AND START UP

HAZARDOUS MAINS VOLTAGE AND/OR BATTERY VOLTAGE PRESENT(S) BEHIND THE PROTECTIVE COVER

The components that can only be accessed by opening the protective cover with tools cannot be serviced by user. Only qualified service personnel are authorized to remove such covers.

Startup and operational checks must be performed by a certified technician.

The final step in installing the external battery cabinet is completing the following Installation Checklist. This checklist ensures that you have completely installed all hardware, cables, and other equipment. Complete all items listed on the checklist to ensure a smooth installation.

NOTICE The Installation Checklist MUST been completed prior to starting the UPS system for the first time.

Installation Checklist:

- All packaging materials have been removed from each cabinet.
- The external battery cabinet is installed on a level floor suitable for computer or electronic equipment.
- All conduits and cables are properly routed between the battery cabinet and the UPS.
- All power cables are properly sized and terminated.
- A ground conductor is properly installed.
- All terminal cover plates are installed.
- Air conditioning equipment is installed and operating correctly.
- The area around the UPS system is clean and dust-free.
- Adequate workspace exists around the battery cabinet and other cabinets.
- Adequate lighting is provided around all Battery Cabinet and UPS equipment.
- Startup and operational checks are performed by a will also be preformed by the Commissioning Engineer.

CHAPTER 2 - OPERATIONS AND START UP

2.1 Introduction

The 3-phase UPS system operates in the following three modes listed in Table.2-1. This section describes various kinds of operating procedures under each operating mode, including transfer between operating modes, UPS setting, and procedures for turning on/off inverter.

Table 2-1: UPS Operating mode

Operating mode	Descriptions
Normal mode	UPS inverter powers the load
Bypass mode	The load power supply is provided by the static bypass. This mode can be regarded as a temporary transition mode between the normal mode and maintenance bypass mode, or a temporary abnormal operating status
Maintenance mode	UPS Shuts down, the load is connected to the mains via maintenance bypass. NOTE: in this mode the load is not protected against abnormal mains

Note:

1. Refer to **Chapter 3 Operator Control and Display Panel**, for user operating keys and LED displays.
2. The audible alarm may sound at various points in these procedures. This is normal.
3. The UPS function can be set via maintenance software. However, the setting and commissioning must be done by certified maintenance engineers.

2.1.1 Power Switch Devices

The 3-phase UPS system has a manual bypass breaker and all the other transfers are processed automatically by internal control logics.

Customer must install an external mains input breaker, an external maintenance bypass breaker, and an external output breaker. An external bypass breaker is needed if dual feed is applied.

The standard external battery cabinet provided optional input breaker and output breaker.

CHAPTER 2 - OPERATIONS AND START UP

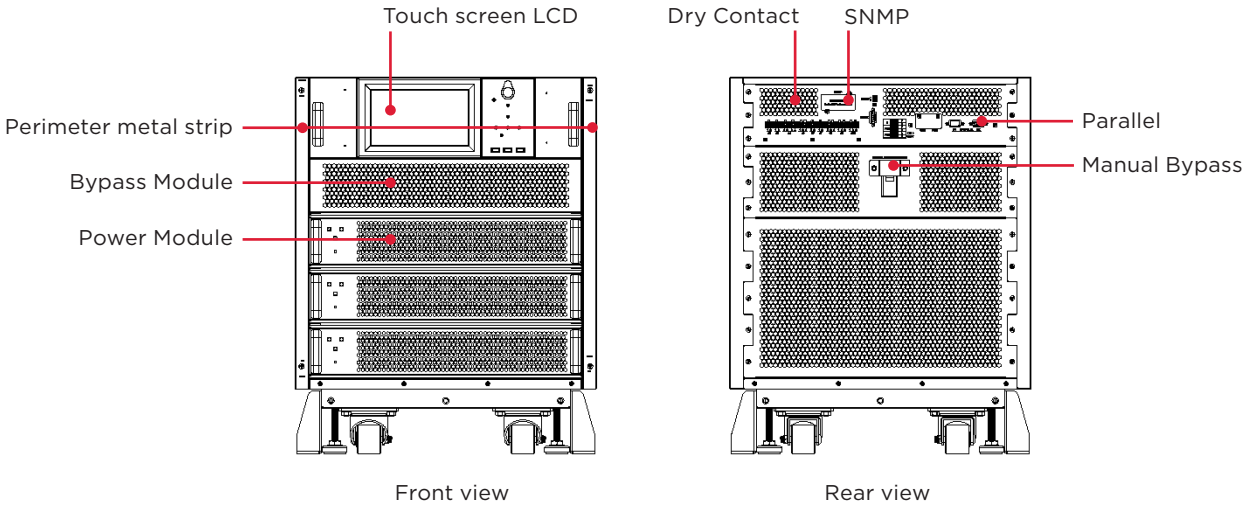


Fig 2-1: SM-20kVA UPS Cabinet

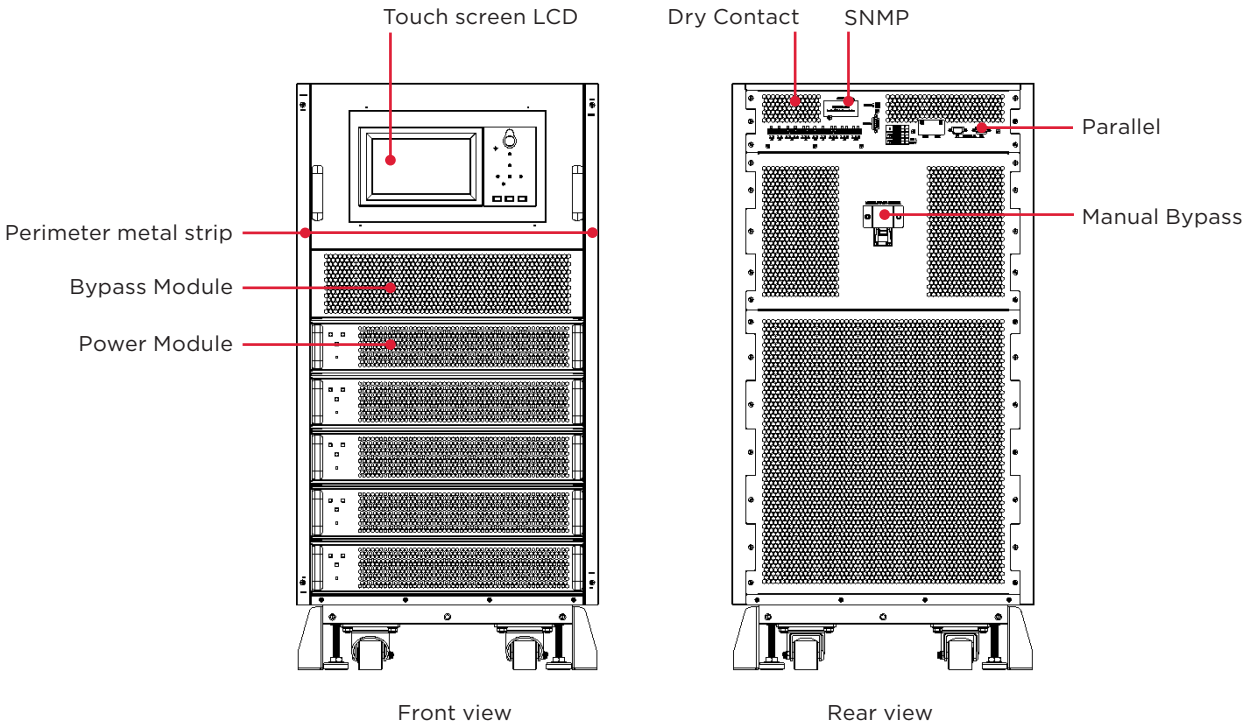


Fig 2-2: SM-40kVA UPS Cabinet

CHAPTER 2 - OPERATIONS AND START UP

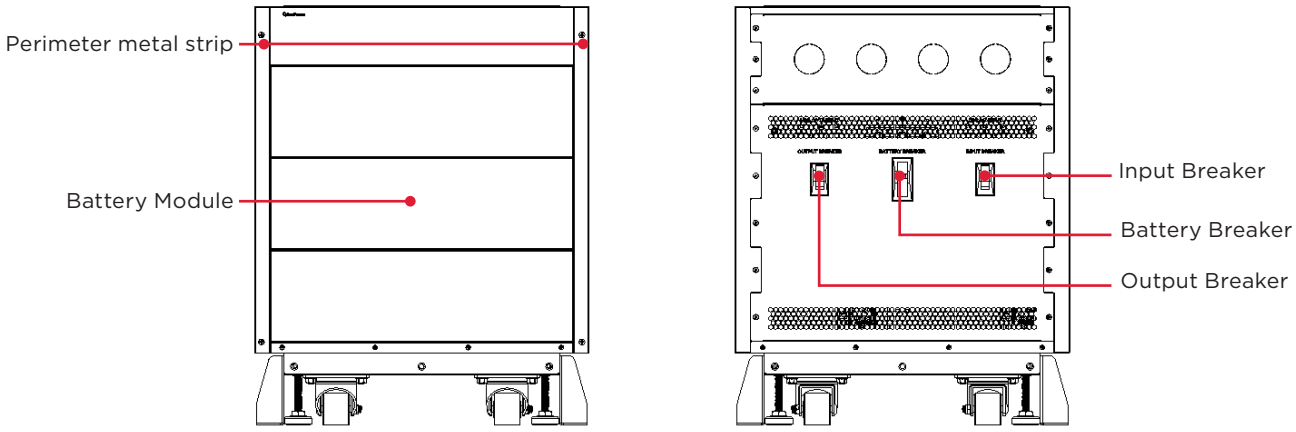


Fig 2-3: BCT3L9N125 Battery Cabinet

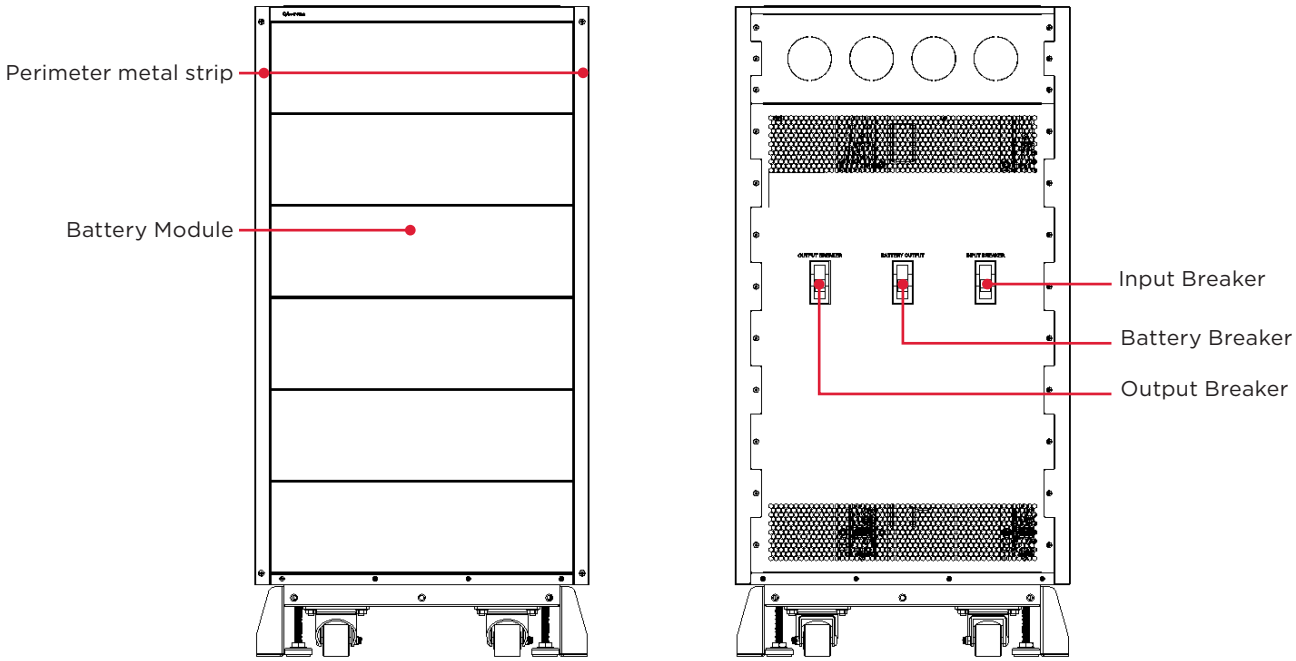


Fig 2-4: BCT6L9N225 Battery Cabinet

⚠	**NOTICE** The input and output breakers are optional.

CHAPTER 2 - OPERATIONS AND START UP

2.2 UPS Start Up

Do not apply input power to the UPS until the installation is completed and the system has been commissioned by authorized personnel and the external power isolators are closed.

	**NOTICE** Before UPS start up, make sure the dry contact J4 pin1 and pin2 have been shorted. If customer used optional input breaker and output breaker, these breakers are allocated in standard external battery cabinet.

2.2.1 Start-Up Procedure

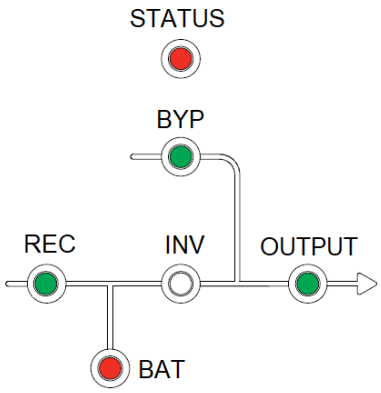
When the UPS is being turned on from a powered-down state, follow these steps:

1. **Open the external power switch.** Open the internal power switch. Open the UPS door, connect the power supply cables and ensure the correct phase rotation.

	**WARNING** During this procedure the UPS output terminals are live. If any load equipment is connected to the UPS output terminals please check with the load user that it is safe to apply power. If the load is not ready to receive power then ensure that it is safely isolated from the UPS output terminals.

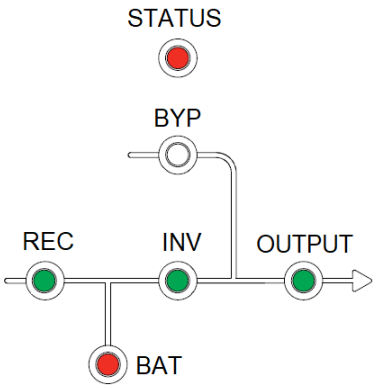
2. **Close external output circuit breaker. Close external mains input circuit breaker and connect the mains power.** The LCD starts up at this time. The Rectifier indicator flashes during the startup of rectifier. The rectifier enters normal operation state, and after about 1 minute, the rectifier indicator goes steady green. After initialization, the bypass static switch closes. The UPS Mimic LEDs will indicate as following:

LED	Status
Rectifier Indicator	Green
Battery Indicator	Red
Bypass Indicator	Green
Inverter Indicator	Off
Load Indicator	Green
Status Indicator	Red



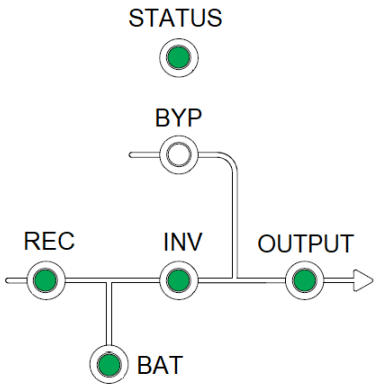
3. **The inverter starts up automatically.** The inverter indicator flashes during the startup of inverter. After about 1 minute, the inverter is ready, the UPS transfers from bypass to inverter, the bypass indicator turns off, and the inverter and load indicators turn on. The UPS is in normal mode. The UPS Mimic LEDs will indicate as following:

LED	Status
Rectifier Indicator	Green
Battery Indicator	Red
Bypass Indicator	Off
Inverter Indicator	Green
Load Indicator	Green
Status Indicator	Red



4. **Close external battery switch,** battery indicator turn off, wait for a few minutes, the battery will be charged by UPS. The UPS Mimic LEDs will illuminate as following:

LED	Status
Rectifier Indicator	Green
Battery Indicator	Green
Bypass Indicator	Off
Inverter Indicator	Green
Load Indicator	Green
Status Iindicator	Green



Note: The front panel has 6 mimic indicators: rectifier, inverter, bypass, battery, load, and status.

CHAPTER 2 - OPERATIONS AND START UP

2.2.2 Procedures for Switching Between Operation Modes

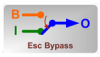
Switch from normal mode to bypass mode

Press the 

button in the operate menu to switch to bypass mode.

Note: In bypass mode, the load is directly fed by the mains power instead of the pure AC power from the inverter.

Switch from bypass mode to normal mode

Press the 

menu in bypass mode, the UPS will transfer to normal mode

2.3 Procedure for Switching the UPS between Maintenance Bypass and Normal Mode

2.3.1 Procedure for Switching from Normal Mode to Maintenance Bypass Mode

This procedure transfers the load from the UPS inverter output to the maintenance bypass power supply, but the UPS must be in normal mode prior to the transfer.

⚠	**NOTICE** To avoid short power interruptions during this procedure, please read any messages on LCD display before beginning the process to ensure the bypass supply and inverter are operating normally and synchronously.

1 Press the 

button in the “operate” menu on the bottom right side of the LCD. The UPS Mimic indicator Inverter will green flash and also the Status Indicator will turn red and will be accompanied by an audible alarm. The load transfers to static bypass, and the inverter standby.

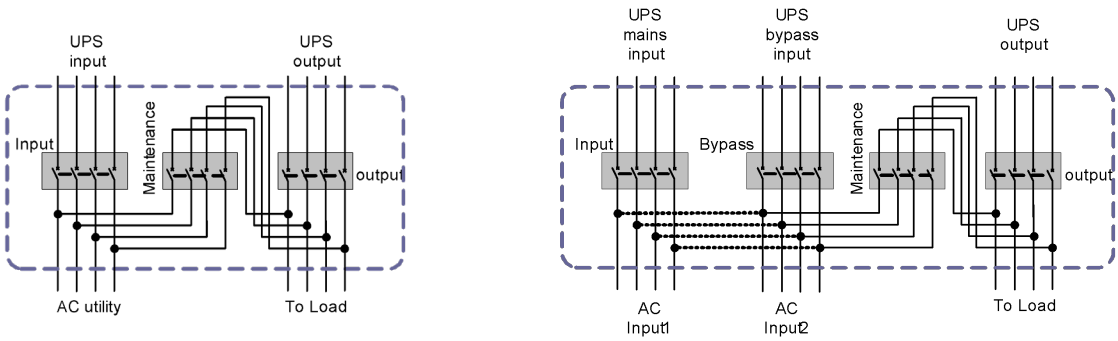
Note: User can press the mute on/off button 

in the operate menu to cancel the audible alarm but leaves the warning message displayed until the alarm condition is rectified.

2. Close the manual bypass breaker from OFF to ON position in the rear of UPS cabinet. The load power supply is provided by the manual bypass.

3. Press EPO to make sure the charge current is 0. Open the external battery breaker. Then power modules can be maintained.

4. If cabinet maintenance is needed, external maintenance bypass breaker is required. If external maintenance bypass breaker is available, close external maintenance bypass breaker, open the external input breaker and external output breaker, the UPS cabinet can be serviced.



(a) Single input (b) Dual Feed input

Fig 2-5: External Maintenance Bypass

⚠	**WARNING** If you need to service the module, wait for 10 minutes to let the DC bus capacitor fully discharge before removing corresponding module. When the manual bypass switch is in the on position, some parts of the UPS circuit still have hazardous voltage. Therefore, only qualified technicians can maintain the UPS.
⚠	**NOTICE** When the UPS is in maintenance bypass or manual bypass mode, the load is not protected against abnormal mains supply.

2.3.2 Procedure for Switching from Maintenance Mode to Normal Mode

Reference Fig 2-5.

1. Close manual internal bypass breaker. Close external output breaker. Close external mains input breaker. The LCD starts up at this time. The rectifier indicator flashes during the startup of rectifier. The rectifier enters normal operation state, and after about 20s, the rectifier indicator goes steady green. After initialization, the bypass static switch closes and bypass indicator goes steady green.
2. After bypass indicator goes steady green, open the external maintenance breaker. And open the manual bypass breaker in the rear of UPS cabinet.

⚠	**NOTICE** Before opening the maintenance breaker, make sure that static bypass switch is working and the proper power flow is displayed on LCD screen.

3. After about 1 minute, UPS transfers to inverter. Close external battery breaker.

2.3.3 Procedure for Switching from Normal Mode to Manual Bypass Mode

Reference Fig 2-5.

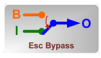
1. Press the 

button in the operate menu on the LCD. The audible alarm will sound, the UPS Mimic indicator inverter will flash green and the Status indicator will turn a steady red. The load transfers to Static Bypass and the inverter is on standby.
2 Close manual bypass breaker to ON position in the rear of UPS cabinet. If external maintenance bypass breaker is available, close external maintenance bypass breaker. Open bypass breaker.
3. Press EPO button to ensure the battery current is 0. Open the battery circuit breaker or disconnect battery connections.

2.3.4 Procedures for Switching from Manual Bypass Mode to Normal Mode

Reference Fig 2-5. The external main input breaker should be closed.

1. Press the 

button in the operate menu to clear EPO alarm.
2. Close bypass breaker if available, and bypass indicator turns steady green.
3. Open manual bypass breaker.
4. Press the 

button in the operate menu. The UPS will transfer to inverter after about 1 minute.
5. Close external battery circuit breaker.

⚠	**NOTICE** Before opening the manual breaker, make sure that static bypass switch is working according power flow displayed on LCD screen.

2.4 Procedure for Powering Down a UPS

Reference Fig 2-5.

1. Press and hold EPO button on the front panel
2. Open external battery breaker.
3. Open external main input breaker, external output breaker.

If the rectifier and bypass use separate power supplies, open these two input breakers.

CHAPTER 2 - OPERATIONS AND START UP

2.5 EPO Procedure

The EPO button is designed to switch off the UPS in emergency conditions (e.g., fire, flood, etc.). To achieve this, just press and hold the EPO button, and the system will turn off the rectifier, inverter and stop powering the load immediately (including the inverter and bypass), and the battery stops charging or discharging.

If the input utility is present, the UPS control circuit will remain active; however, the output will be turned off. To completely isolate the UPS, you need to open the mains input breaker and battery breaker.

2.6 Auto Start

Most often, the 3-phase UPS systems start up in Static Bypass Mode. If the the mains power fails, the UPS draws power from the battery system to supply power to the load until the battery voltage reaches the end of discharge (EOD) voltage, and then the UPS will shut down.

The UPS will automatically restart and enable output power:

- After the mains power is restored
- If the Auto Recovery after EOD enabling feature is enabled

2.7 UPS Reset Procedure

After using EPO procedure to shut down the UPS, refer to section 2.2.1 to restart the UPS.

After the UPS is shut down due to inverter over temperature, or overload, or too many switching times, UPS will reset the fault automatically when fault is cleared.

Note: The rectifier will be turned on automatically when the over temperature fault disappears after the disappearance of over temperature signals.

After pressing the EPO button, if the UPS mains input has been disconnected, the UPS is completely powered down. When the input of mains is restored, the EPO condition will be cleared and the UPS system will enable static bypass mode to restore the output.

	**WARNING** If the maintenance bypass breaker is put to ON and the UPS has mains input, then the UPS output is energized.

CHAPTER 2 - OPERATIONS AND START UP

2.8 How to Replace Power Module

The following procedures should only be performed by a certified technician.

Maintenance guidance for power modules
If the system is in normal mode, and the bypass is available and the redundant number of power module is at least 1:

1. Go to operate menu and press the 

button to release shutdown power module function.
2. Press “off” button on the front panel of power module.
3. Remove perimeter metal strip on two sides and loose the screws of the power module, then remove the module after 5 minutes.

If there are no redundant power modules:

1. Go to operate menu and press the 

button to transfer to bypass mode.
2. Remove perimeter metal strip on both sides and loose the screws of the power module, then remove the module after 5 minutes.

	**WARNING** To ensure the safety, be sure to use a multi-meter to measure the DC bus capacitor voltage and ensure the voltage is below 60V before operation..

3. After servicing the power module, insert the main power module, the power module will automatically join the system operation, and then tighten the screws at two sides of the power module.
4. Secure the perimeter metal strip to cover screws on both sides of the panel.

2.9 Language Selection

The touch screen LCD menus and data display are available in 3 languages: Simple Chinese, English, and Traditional Chinese.

1. Perform the following procedure to select a language needed:
2. In main menu, press the 

button to enter in setting menu on the LCD screen.
3. Select LANGUAGE menu.
4. Select the language.

CHAPTER 2 - OPERATIONS AND START UP

2.10 Changing the Current Date and Time

To change system date and time:

1. In main menu, press the 

button to enter the function setting menu in the LCD screen.
2. Select date and time.
3. Enter new date and time, then enter to confirm it.

2.11.2 Advanced Functions

At periodic intervals, 25% of the rated capacity of the battery will be discharged automatically, and the actual load must exceed 25% of the rated UPS (kVA) capacity. If the load is less than 25%, auto-discharge cannot be executed. The periodic interval can be set from 720 to 3000 hours.

Conditions: Battery at float charge for at least 5 hours, load equal to 25~100% of rated UPS capacity Trigger—Manually through the command of Battery Maintenance Test in LCD panel or automatically Battery self-test interval.

2.12 Battery Protection

Battery Low Pre-warning
The battery under voltage pre-warning occurs before the end of discharge. After this pre-warning, the battery should have the capacity for 3 remaining minutes discharging with full load.

End of discharge (EOD) protection
If the battery voltage is lower than the EOD, the battery converter will be shut down.

Battery Disconnect Devices Alarm
The alarm occurs when the battery disconnect device disconnects. The external battery connects to the UPS through the external battery circuit breaker. The circuit breaker is manually closed and tripped by the UPS control circuit.

2.13 Control Password 1

The system is password protected to limit the operator's operating and control authorities.
You can only operate and test the UPS and battery after entering correct password 1.
The default password 1 is **1203**.

CHAPTER 3 - CONTROL AND DISPLAY PANEL

This chapter introduces the functions and operation instructions of the UPS operator control and LCD display.

3.1 Introduction

The operator control and display panel is located on the front panel of the UPS. Through the LCD panel, the operator can operate and control the UPS, and check all measured parameters, UPS and battery status, event and history logs. The operator control panel is divided into three functional areas as shown in Fig.3-1: mimic LED, LCD display & Menu and function buttons. The detailed description of control and display panel is shown in Table.3-1. User can use his finger or a soft end of pen to wake up touch screen LCD.

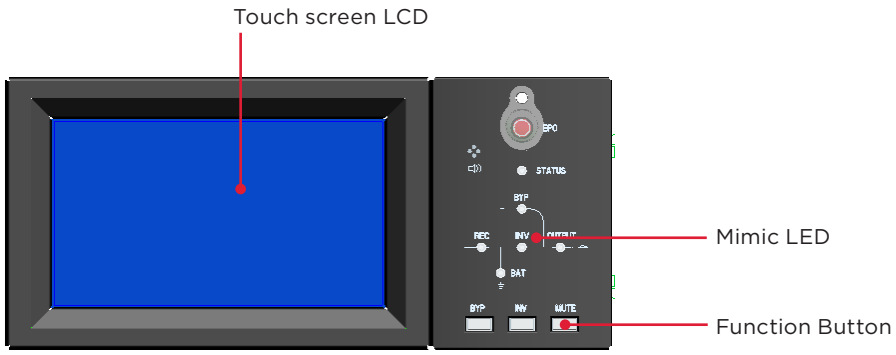


Fig 3-1: UPS Operator Control and Display Panel

Table 3-1: Description of UPS Operator Control and Display Panel

Indicator	Function	Button	Function
REC	Rectifier indicator	EPO	EPO (emergency power off)
BAT	Battery indicator	BYP	Transfer to Bypass mode
BYP	Bypass indicator	INV	Transfer to Inverter (Online) mode
INV	Inverter indicator	MUTE	Disable the audible alarm
OUTPUT	Load indicator		
STATUS	Status indicator		

CHAPTER 3 - CONTROL AND DISPLAY PANEL

3.1.1 Mimic LED

The LEDs shown on the mimic current path represent the various UPS power paths and show the current UPS operating status. The status description of indicators is shown in Table 3-2.

Table 3-2: Status Description of Indicator

Indicator	State	Description
Rectifier indicator	Steady green	Rectifier of all modules is normal
	Flashing green	At least one rectifier module is starting
	Steady red	At least one rectifier module has a fault condition
	Flashing red	Main input of at least one module is abnormal
	Off	Rectifier is not working
Battery indicator	Steady green	Battery is charging
	Flashing green	Battery is discharging
	Steady red	Battery is abnormal (battery failure, no battery or battery reverse) or battery converter is abnormal (failure, over current or over temperature), EOD
	Flashing red	Battery voltage is low
	Off	Battery and battery converter is normal, battery is not charging
Bypass indicator	Steady green	UPS is working in bypass mode
	Steady red	Bypass failure
	Flashing red	Bypass voltage is abnormal
	Off	Bypass is normal and is not selected
Inverter indicator	Steady green	Inverter is feeding the load
	Flashing green	Inverter is starting, or UPS is working in ECO mode
	Steady red	At least one module's inverter is faulted, and inverter is not feeding the load
	Flashing red	Inverter is feeding load, and at least one module's inverter is faulted
	Off	Inverter is not operating
Load indicator	Steady green	UPS output is on and is normal
	Steady red	UPS output is off, shorted, or has reached the overload time-out. (check fault history)
	Flashing red	UPS is overloaded
	Off	No output voltage
Status indicator	Steady green	Normal operation
	Steady red	Fault

3.1.2 Audible Alarm (buzzer)

There are two different types of audible alarms during UPS operation.

Table 3-3: Audible Alarms	
Alarm	**Purpose**
Two short, one long	When system has general alarm (for example: main input abnormal), this audible alarm can be heard
Continuous alarm	When system has serious faults (ex. fuse or hardware fault) or loses UPS function (ex. Bypass mode, EPO or shutdown), this audible alarm will sound

3.1.3 Functional Keys

There are four functional buttons on operator control and display panel, which are used together with LCD.

Table 3-4: Functional Keys	
Functional key	**Functions**
EPO	To cut off the load power to shut down the rectifier, inverter, static bypass and battery
BYP	Transfer to Bypass mode
INV	Transfer to Inverter (Online) mode
MUTE	Disable the audible alarm

3.2 Touch Screen LCD

Following the self-check of UPS LCD display, the main LCD display, which can be divided into four display windows: system information, power path, current warning messages and main menu.

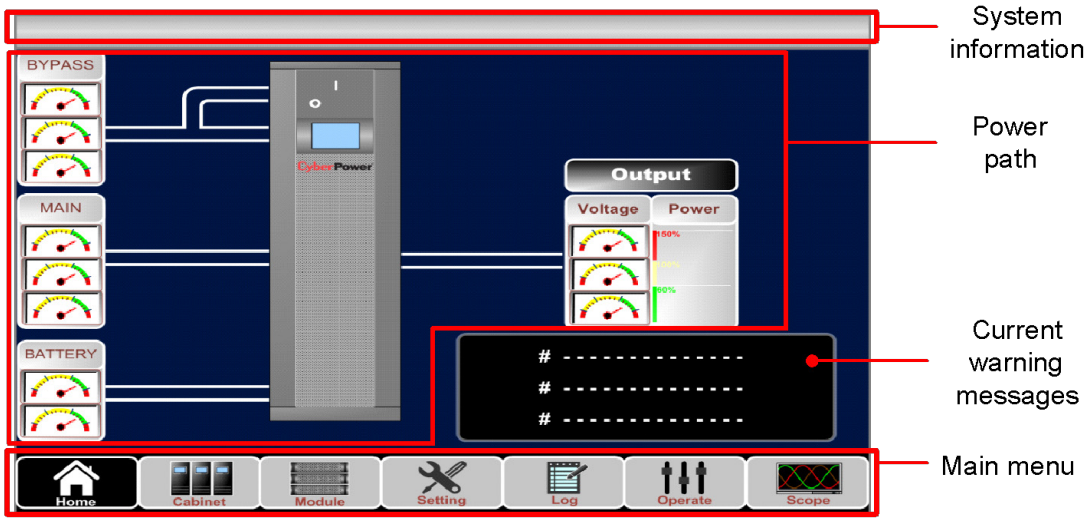
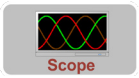


Fig 3-2: Main LCD Display

CHAPTER 3 - CONTROL AND DISPLAY PANEL

Table 3-5: LCD Icons	
Icon	**Description**
	Return to main menu page
	Bypass, main, output (voltage, current, PF, frequency), battery information(capacity, remained time, worked days, battery temperature, ambient temperature), load information(percent, active load, reactive load, apparent load)
	Information of power module(main, output, load, S-code, module information)
	Date and time, language, communication, user (use user password 1), battery set, service set, rate set, configure
	History Log
	Mute ON/OFF, Fault clear, transfer to bypass, transfer to inverter, enable module “off”, reset battery history data, battery test, battery maintenance, battery boost, battery float, stop test
	Scope of output voltage, output current, bypass voltage

Please refer to Table 3-7: Item Description of UPS Menu

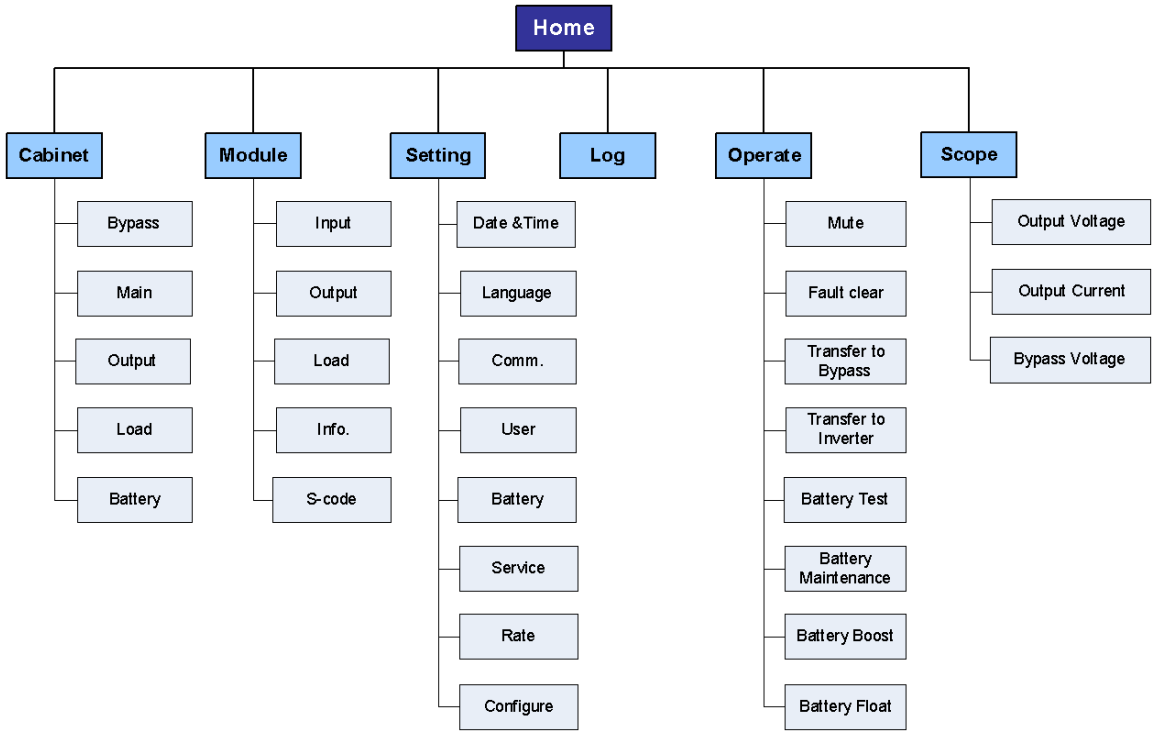


Fig 3-3: Menu Structure

CHAPTER 3 - CONTROL AND DISPLAY PANEL

3.3 Detailed Description of Menu Items

UPS system information window

UPS information window: unit model, module numbers, unit mode, current date and time are displayed. The information in the window is not necessary for the user to operate.

Table 3-6: Description of Items in UPS System Information Window

Display contents	Definition
40/10	Unit model
N=01	1 Power module in system
(s)	Unit mode: S — single unit P-0/1 — parallel mode E — ECO mode L — LBS mode PE-0/1 — parallel ECO mode PL-0/1 — parallel LBS mode
11:03	Time

Main menu window

Enter the 

menu to get cabinet information.

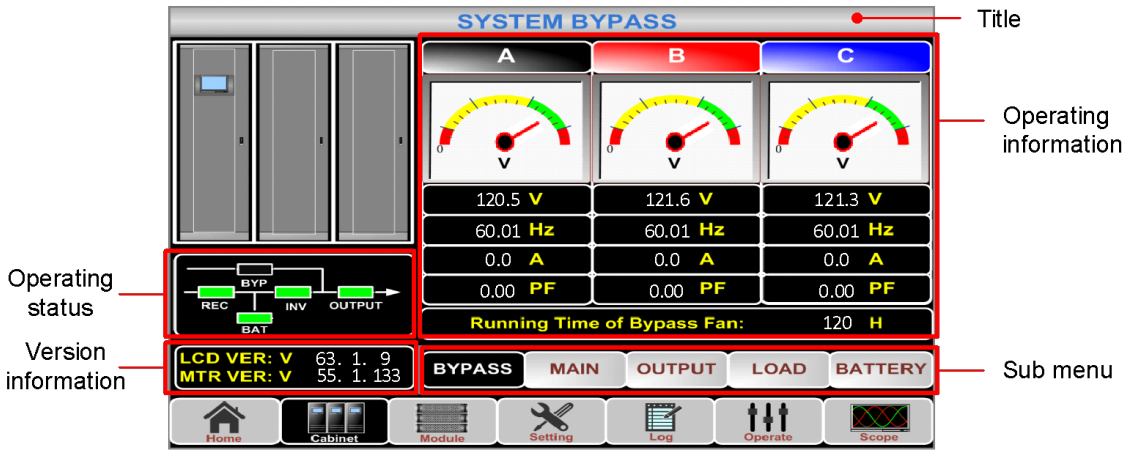
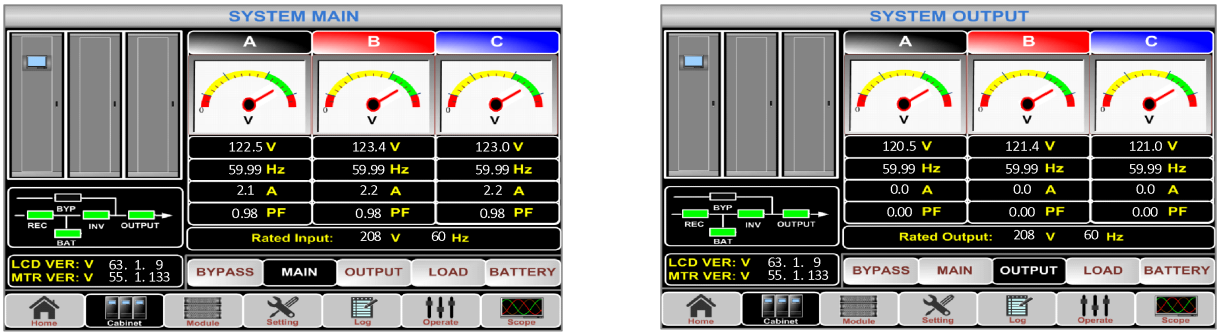


Fig 3-4: Cabinet Menu

CHAPTER 3 - CONTROL AND DISPLAY PANEL

Submenu BYPASS, MAIN, OUTPUT

Bypass information, main input and output information (voltage, current, frequency, PF) are displayed in cabinet menu, voltage is also shown in meter type. Current mimic status indicators, LCD and monitoring version are displayed.

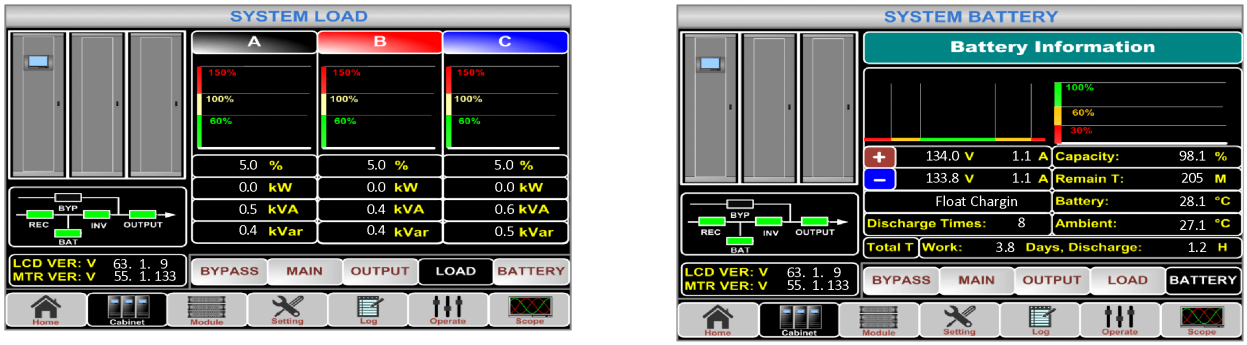


(a) Main input information (b) Output information

Fig 3-5: Main Input and Output Information

Submenu LOAD, BATTERY

Load information includes load percent, active load, reactive load, apparent load. Battery information includes battery number, battery voltage, battery current, remained capacity, remained discharge time, discharge times, working days, discharge hours, battery temperature (optional), ambient temperature (optional).



(a) System load information (b) System battery information

Fig 3-6: Load and Battery Information

CHAPTER 3 - CONTROL AND DISPLAY PANEL

Enter the 

menu to get power module information

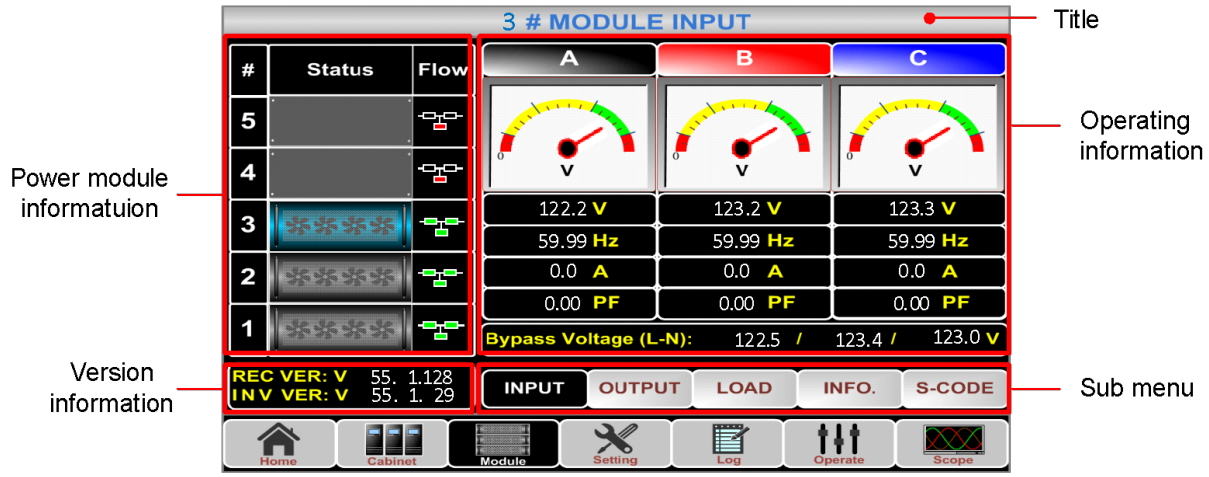


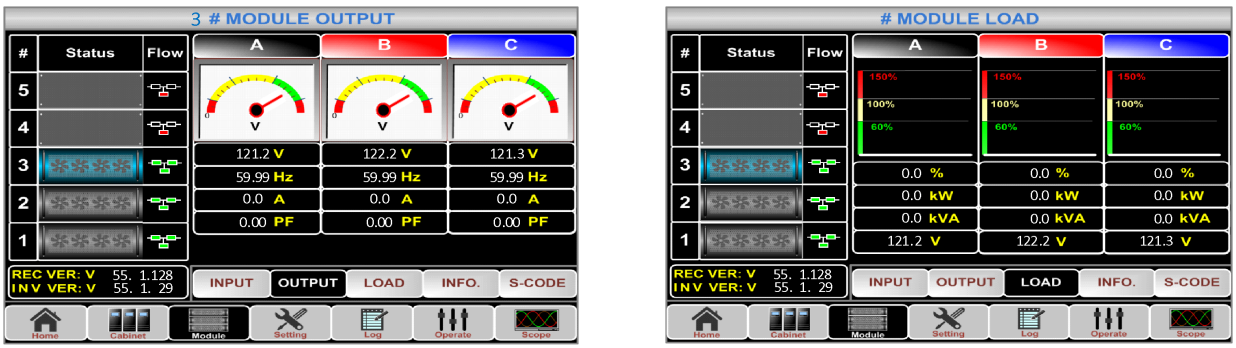
Fig 3-7: Power Module Information

⚠	**NOTICE** The 20kVA UPS can utilize up to 3 power modules and a 40kVA UPS can utilize up to 5 power modules.

Module information menu includes: input, output, load, internal information, S-code, software version.

Submenu INPUT, OUTPUT, LOAD

Input and output information include voltage, current, frequency, PF. Load information includes load percent, active load, reactive load, apparent load.

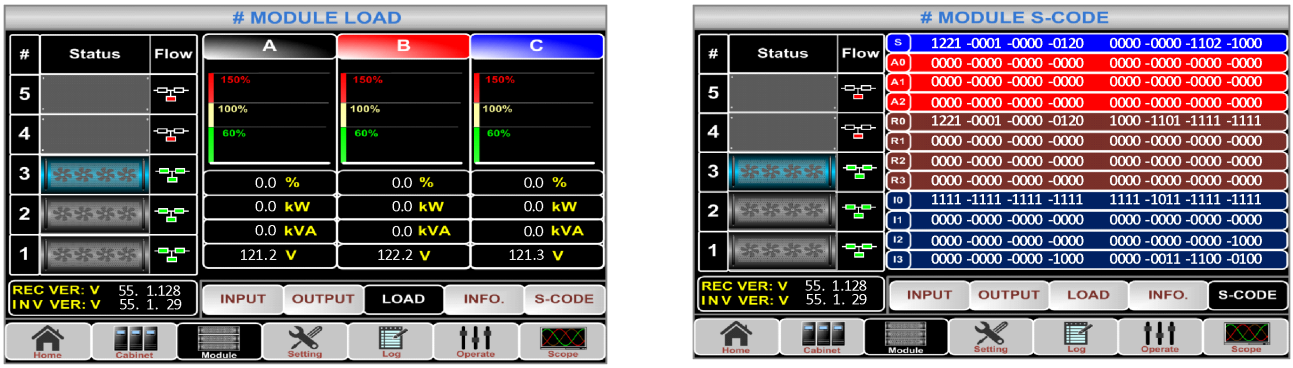


(a) Module output information (b) Module load information

Fig 3-8: Module Output and Load Information

Submenu INFO., S-Code

INFO menu includes modules battery information, inlet temperature, outlet temperature, IGBT temperature. And S-code menu displays S-codes of power modules to help diagnose any faults that occur in the power modules.



(a) Module information (b) S-code of the power module

Fig 3-9: Module Information and S-code

Enter the 

menu to set UPS system.

It includes date and time, language, communications, user, battery, service, rate, configure. The submenu battery, service, rate, configure is only available to factory-authorized service engineers.

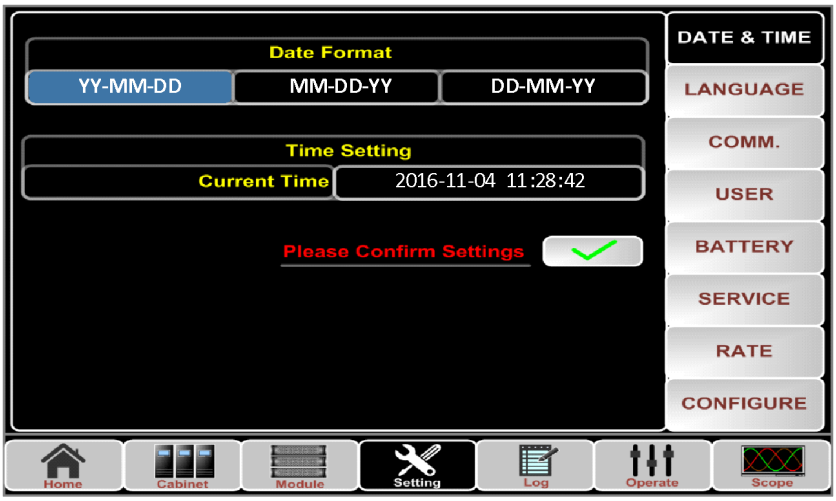


Fig 3-10: Setting Menu

Table 3-7: Description of Details of Submenu in Setting

Submenu Name	Contents	Meaning
Date & Time	Date format setting	Three formats: (a) year/month/day (b) month/date/year (c) date/month/year
	Time setting	Set current time
Language	Current language	Language in use
	Language selection	Simplified Chinese, English, and Traditional Chinese selectable (This setting takes action immediately after touching the language icon)
Comm.	Device Address	Set the communication address
	RS232 Protocol Selection	SNT Protocol, ModBus Protocol, YD/T Protocol and Dwin (For factory use)
	Baudrate	Setting the baudrate of SNT: ModBus and YD/T selectable
	Modbus Mode	Setting mode for Modbus: ASCII and RTU selectable
	Modbus parity	Set the parity for Modbus
User	Output voltage Adjustment	Set the output voltage
	Bypass Voltage Up Limited	Up limited working voltage for Bypass,
	Bypass Voltage Down Limited	settable: +10%, +15%, +20%, and +25%
	Bypass Frequency Limited	Down limited working Voltage for Bypass,
Battery	Battery Number	settable: -10%, -15%, -20%, -30%, and -40%
	Battery Capacity	Permitted working Frequency for Bypass
	Float Charge Voltage/Cell	Settable: ±1Hz, ±3Hz, and ±5Hz
	Boost Charge Voltage/Cell	Setting the number of the battery
	EOD(End of discharge) Voltage/ Cell, @0.6C Current	EOD voltage for cell battery, @0.6C
	EOD(End of discharge) Voltage/ Cell, @0.15C Current	EOD voltage for cell battery, @0.15C
	PM Charge Current Percent Limit	Set charge power (% of rated power)
	Battery Temperature Compensate	Coefficient for battery temperature compensation
	Boost Charge Time Limit	Set boost charging time
	Auto Boost Period	Set the auto boost period
	Auto Maintenance Discharge Period	Set the period for auto maintenance discharge
Service	System Mode	Set the system mode: Single, parallel, Single ECO, parallel ECO, LBS, parallel LBS
Rate	Configure the rated Parameter	For the factory use
Configure	Configure the system	For the factory use

CHAPTER 3 - CONTROL AND DISPLAY PANEL

Enter the 

menu to get history log of UPS system. Use  to scroll the list.

Enter the 

menu to control UPS system. The function and test command are shown as below:

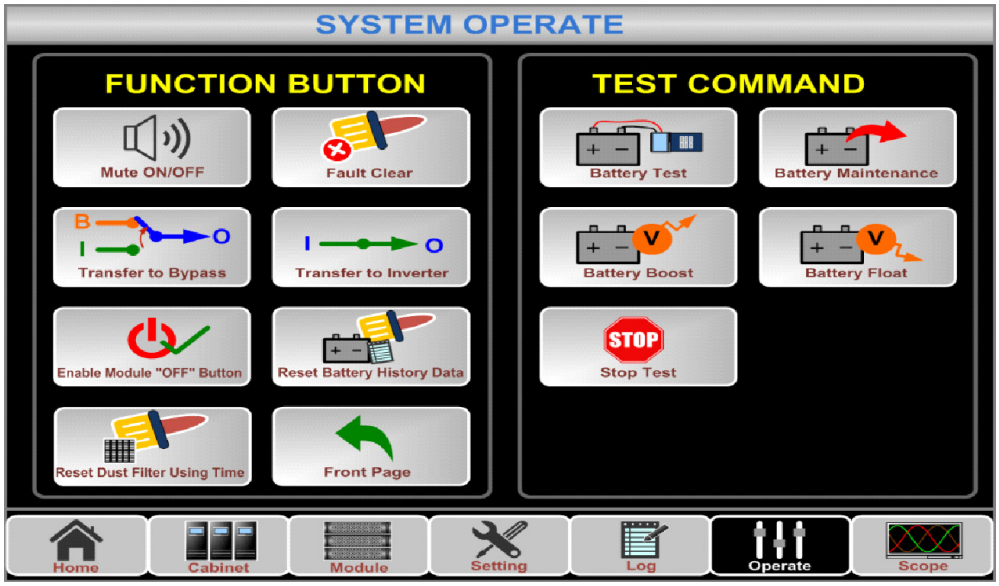


Fig 3-11: System Operate

⚠	**NOTICE** The **Reset Dust Filter Using Time** is only applicable to units with the dust filter option.

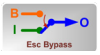
CHAPTER 3 - CONTROL AND DISPLAY PANEL

Menu of Operations

Functional operation

Mute off or mute on.

Fault clear manually



Manually transfer to bypass or escape from bypass mode

Transfer to inverter mode manually. The output could be interrupted.

Enable the “OFF” button on the front panel of power module. Then the “OFF” button is available, user can press the button to shutdown the power module.

Reset battery history data including discharge dates and hours, discharge times. Normally reset battery history data after replacing new batteries.

Command

Battery test command. UPS transfers to battery mode, main LED indicator is dark and battery LED indicator flashes green. If battery is low or battery has failed, the UPS will trigger an alarm and transfer back to normal mode or transfer to bypass mode. Make sure there are not any current warnings or alarms, make sure that battery voltage is higher than 90% of float voltage. If the battery is normal, the UPS will transfer back to normal mode after 20 seconds. If battery test fails, the UPS will trigger an alarm in the history log.

Battery maintenance command. The UPS transfers to battery mode, main LED indicator is dark and battery LED indicator flashes green. Make sure that there are not any warnings or alarms, make sure that battery voltage is higher than 90% of float voltage. If the batteries are normal, the UPS will transfer back to normal mode until battery voltage is down to 105% of EOD voltage and then transfer back to normal mode.

Manually enable charger in boost charge mode to charge the batteries more quickly.

Manually enable charger in float charge mode.

Stop battery test or battery maintenance.

See the waveform of the output voltage, output current and bypass voltage.

CHAPTER 3 - CONTROL AND DISPLAY PANEL

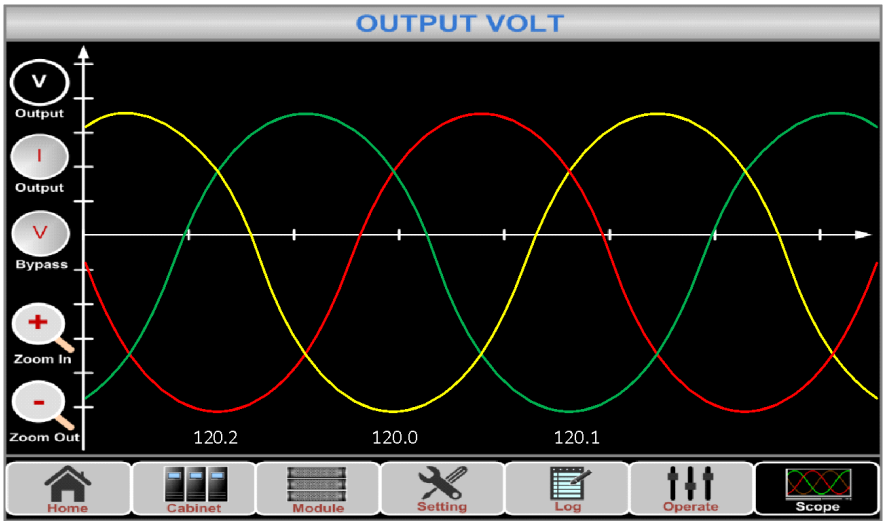


Fig 3-12: Output and Bypass Waveforms

CHAPTER 3 - CONTROL AND DISPLAY PANEL

3.4 UPS Event Log

Table 3-8: UPS Events

NO.	UPS events	Description
1	Fault Clear	Manually clear fault
2	Log Clear	Manually clear History log
3	Load On UPS	Inverter feeds load
4	Load On Bypass	Bypass feeds load
5	No Load	No load
6	Battery Boost	Charger is working in boost charging mode
7	Battery Float	Charger is working in float charging mode
8	Battery Discharge	Battery is discharging
9	Battery Connected	Battery is connected
10	Battery Not Connected	Battery is not connected
11	Maintenance CB Closed	Manual maintenance breaker is closed
12	Maintenance CB Open	Manual maintenance breaker is opened
13	EPO	Emergency Power Off
14	Module On Less	Available power module capacity is less than the load capacity. Please reduce the load capacity or add extra power module to make sure that the UPS capacity is sufficient.
15	Generator Input	Generator is connected and a signal is received by the UPS.
16	Utility Abnormal	Input power mains is abnormal. Mains voltage or frequency exceeds the upper or lower limit and results in rectifier shutdown. Check the input phase voltage of rectifier.
17	Bypass Sequence Error	Bypass phase rotation is reversed. Check if input power cables are connected correctly.

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NO.	UPS events	Description
18	Bypass Volt Abnormal	This alarm is triggered by an inverter software routine when the amplitude or frequency of bypass voltage exceeds the limit. The alarm will automatically reset if the bypass voltage becomes normal. First check if relevant alarm exists, such as “bypass circuit breaker open”, “Byp Sequence Err” and “Ip Neutral Lost”. If there is any relevant alarm, first clear this alarm. 1. Then check and confirm if the bypass voltage and frequency displayed on the LCD are within the setting range. Note that the rated voltage and frequency are respectively specified by “Output Voltage” and “Output Frequency”. 2. If the displayed voltage is abnormal, measure the actual bypass voltage and frequency. If the measurement is abnormal, check the external bypass power supply. If the alarm occurs frequently, service engineers may increase the bypass high limit set point if acceptable to the load.
19	Bypass Module Fail	Bypass Module Fails. This fault is locked until power off. Or bypass fans fail.
20	Bypass Module Over Load	Bypass current is over the limitation. If bypass current is under 135% of the rated current. The UPS alarms but has no action.
21	Bypass Over Load Tout	The bypass overload status continues and the overload times out.
22	Byp Freq Over Track	This alarm is triggered by an inverter software routine when the frequency of bypass voltage exceeds the limit. The alarm will automatically reset if the bypass voltage becomes normal. First check if relevant alarm exists, such as “bypass circuit breaker open”, “Byp Sequence Err” and “Ip Neutral Lost”. If there is any relevant alarm, first clear this alarm. 1. Then check and confirm if the bypass frequency displayed on the LCD are within the setting range. Note that the rated frequency is respectively specified by “Output Frequency”. 2. If the displayed voltage is abnormal, measure the actual bypass frequency. If the measurement is abnormal, check the external bypass power supply. If the alarm occurs frequently, service engineers may increase the bypass high limit set point if acceptable to the load.
23	Exceed Tx Times Lmt	The load is on bypass because the output overload transfer and re-transfer is fixed to the set times during the current hour. The system can recover automatically and will transfer back to the inverter with 1 hour

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NO.	UPS events	Description
24	Output Short Circuit	Output short Circuit. Fist check and confirm if loads have something wrong. Then check and confirm if there is something wrong with terminals, sockets or some other power distribution unit. If the fault is solved, press “Fault Clear” to restart UPS.
25	Battery EOD	Inverter turned off due to low battery voltage. Check the mains power failure status and recover the mains power in time
26	Battery Test	System transfer to battery mode for 20 seconds to check if batteries are normal
27	Battery Test OK	Battery Test OK
28	Battery Maintenance	System transfer to battery mode until to be 110% of EOD voltage to maintain battery string
29	Battery Maintenance OK	Battery maintenance succeed
30	Module inserted	Power Module is inserted in system.
31	Module Exit	Power Module is pulled out from system.
32	Rectifier Fail	The N# Power Module Rectifier Fail, The rectifier is faulted and results in rectifier shutdown and battery discharging.
33	Inverter Fail	The N# Power Module Inverter Fail. The inverter output voltage is abnormal and the load transfers to bypass.
34	Rectifier Over Temp.	The N# Power Module Rectifier Over Temperature. The temperature of the rectifier IGBTs is too high to keep rectifier running. This alarm is triggered by the signal from the temperature monitoring device mounted in the rectifier IGBTs. The UPS recovers automatically after the over temperature signal disappears. If over temperature exists, check: 1. Whether the ambient temperature is too high. 2. Whether the ventilation channel is blocked. 3. Whether fan fault happens. 4. Whether the input voltage is too low.
35	Fan Fail	At least one fan has failed in the N# power module.

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NO.	UPS events	Description
36	Output Overload	The N# Power Module Output Over Load. This alarm appears when the load rises above 100% of nominal rating. The alarm automatically resets once the overload condition is removed. 1. Check which phase has overload through the load (%) displayed in LCD so as to confirm if this alarm is true. 2. If this alarm is true, measure the actual output current to confirm if the displayed value is correct. Disconnect non-critical load. In parallel system, this alarm will be triggered if the load is severely imbalanced.
37	Inverter Overload Tout	N# Power Module Inverter Over Load Timeout. The UPS overload status continues and the overload times out. **Note:** The highest loaded phase will indicate overload timing-out first. When the timer is active, then the alarm “unit over load” should also be active as the load is above nominal. When the time has expired, the inverter Switch is opened and the load transferred to bypass. If the load decreases to lower than 95%, after 2 minutes, the system will transfer back to inverter mode. Check the load (%) displayed in LCD so as to confirm if this alarm is true. If LCD displays that overload happens, then check the actual load and confirm if the UPS has over load before alarm happens.
38	Inverter Over Temp.	The N# Power Module Inverter Over Temperature. The temperature of the inverter heat sink is too high to keep inverter running. This alarm is triggered by the signal from the temperature monitoring device mounted in the inverter IGBTs. The UPS recovers automatically after the over temperature signal disappears. If over temperature exists, check: Whether the ambient temperature is too high. Whether the ventilation channel is blocked. Whether fan fault happens. Whether inverter overload time out has occurred.
39	On UPS Inhibited	Inhibit system transfer from bypass to UPS (inverter). Check: Whether the power module’s capacity is adequate for load. Whether the rectifier is ready. Whether the bypass voltage is normal.

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NO.	UPS events	Description
40	Manual Transfer Byp	Transfer to bypass manually
41	Esc Manual Bypass	Escape from “transfer to bypass manually” command. If UPS has been transferred to bypass manually, this command enable UPS to transfer to inverter.
42	Battery Volt Low	Battery Voltage is Low. Before the end of discharging, battery voltage is low warning should occur. After this pre-warning, battery should have the capacity for 3 minutes discharging with full load.
43	Battery Reverse	Battery cables are connected not correctly.
44	Inverter Protect	The N# Power Module Inverter Protect. Check: Whether inverter voltage is abnormal Whether inverter voltage is much different from other modules, if yes, please adjust inverter voltage of the power module separately.
45	Input Neutral Lost	The mains neutral wire is lost or not detected. For 3 phases UPS, it’s recommended that user use a 3-poles breaker or switch between input power and UPS.
46	Bypass Fan Fail	At least one of bypass module Fans Fails
47	Manual Shutdown	The N# Power Module is manually shutdown. The power module shuts down rectifier and inverter, and there’s on inverter output.
48	Manual Boost Charge	Manually force the Charger work in boost charge mode.
49	Manual Float Charge	Manually force the charger work in float charge mode.
50	UPS Locked	Forbidden to shutdown UPS power module manually.
51	Parallel Cable Error	Parallel cables error. Check: If one or more parallel cables are disconnected or not connected correctly If parallel cable round is disconnected If parallel cable is OK
52	Lost N+X Redundant	Lost N+X Redundant. There is no X redundant powers module in system.
53	EOD Sys Inhibited	System is inhibited to supply after the battery is EOD (end of discharging)
54	Battery Test Fail	Battery Test Fail. Check if UPS is normal and battery voltage is over 90% of float voltage.
55	Battery Maintenance Fail	Check If UPS is normal and not any alarms If the battery voltage is over 90% of float voltage If load is over 25%
56	Ambient Over Temp	Ambient temperature is over the limit of UPS. Air conditioners are required to regulate ambient temperature.

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NO.	UPS events	Description
57	REC CAN Fail	Rectifier CAN bus communication is abnormal. Please check if communication cables are not connected correctly.
58	INV IO CAN Fail	IO signals communication of inverter CAN bus is abnormal. Please check if communication cables are not connected correctly.
59	INV DATA CAN Fail	DATA communication of inverter CAN bus is abnormal. Please check if communication cables are not connected correctly.
60	Power Share Fail	The difference of two or more power modules' output current in system is over limitation. Please adjust output voltage of power modules and restart UPS.
61	Sync Pulse Fail	Synchronization signal between modules is abnormal. Please check if communication cables are not connected correctly.
62	Input Volt Detect Fail	Input voltage of N# power module is abnormal. Please check if the input cables are connected correctly. Please check if input fuses are broken.
63	Battery Volt Detect Fail	Battery voltage is abnormal. Please check if batteries are normal. Please check if battery fuses are broken on input power board.
64	Output Volt Fail	Output voltage is abnormal.
65	Bypass Volt Detect Fail	Bypass voltage is abnormal. Please check if bypass breaker is closed and is good. Please check if bypass cables are connected correctly.
66	INV Bridge Fail	Inverter IGBTs are broken and opened.
67	Outlet Temp Error	Outlet temperature of power module is over the limitation. Please check if fans are abnormal. Please check if PFC or inverter inductors are abnormal. Please check if air passage is blocked. Please check if ambient temperature is too high.
68	Input Curr Unbalance	The difference of input current between every two phases is over 40% of rated current. Please check if rectifier's fuses, diode, IGBT or PFC diodes are broken. Please check if input voltage is abnormal.
69	DC Bus Over Volt	Voltage of DC bus capacitors is over limitation. UPS shutdown rectifier and inverter.

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NO.	UPS events	Description
70	REC Soft Start Fail	While soft start procedures are finished, DC bus voltage is lower than the limitation of calculation according utility voltage. Please check Whether rectifier diodes are broken Whether PFC IGBTs are broken Whether PFC diodes are broken Whether drivers of SCR or IGBT are abnormal Whether soft start resistors or relay are abnormal
71	Relay Connect Fail	Inverter relays are opened and cannot work or fuses are broken.
72	Relay Short Circuit	Inverter relays are shorted and cannot be released.
73	PWM Sync Fail	PWM synchronizing signal is abnormal
74	Intelligent Sleep	UPS works in intelligent sleep mode. In this mode, the power modules will be standby in turn. It will be more reliability and higher efficiency. It must be confirmed that remained power modules' capacity is big enough to feed load. It must be conformed that working modules' capacity is big enough if user add more load to UPS. It's recommended that sleeping power modules are waken up if the capacity of new added loads is not sure.
75	Manual Transfer to INV	Manually transfer UPS to inverter. It's used to transfer UPS to inverter when bypass is over track. The interrupt time could be over 20ms.
76	Input Over Curr Tout	Input over current timeout and UPS transfer to battery mode. Please check if input voltage is too low and output load is big. Please regulate input voltage to be higher if it's possible or disconnect some loads.
77	No Inlet Temp. Sensor	Inlet temperature sensor is not connected correctly.
78	No Outlet Temp. Sensor	Outlet temperature sensor is not connected correctly.
79	Inlet Over Temp.	Inlet air is over temperature. Make sure that the operation temperature of UPS is between 0-40°C.
80	Capacitor Time Reset	Reset timing of DC bus capacitors.
81	Fan Time Reset	Reset timing of fans.
82	Battery History Reset	Reset battery history data.
83	Byp Fan Time Reset	Reset timing of bypass fans.
84	Battery Over Temp.	Battery is over temperature. It's optional.
85	Bypass Fan Expired	Working life of bypass fans is expired, and it's recommended that the fans are replaced with new fans. It must be activated via software.

continued on next page

NO.	UPS events	Description
86	Capacitor Expired	Working life of capacitors is expired, and it's recommended that the capacitors are replaced with new capacitors. It must be activated via software.
87	Fan Expired	Working life of power modules' fans is expired, and it's recommended that the fans are replaced with new fans. It must be activated via software.
88	INV IGBT Driver Block	Inverter IGBTs are shutdown. Please check if power modules are inserted in cabinet correctly. Please check if fuses between rectifier and inverter are broken.
89	Battery Expired	Working life of batteries is expired, and it's recommended that the batteries are replaced with new batteries. It must be activated via software.
90	Bypass CAN Fail	The CAN bus between bypass module and cabinet is abnormal.
92	Battery Test Fail	Battery test function is forbidden. Please check if battery voltage is higher than Please check if load is higher than 25% Please check if battery connection is OK
93	Stop Test	Manually stop battery test or battery maintenance, UPS transfer back to normal mode.
94	Wave Trigger	Waveform has been saved while UPS fail
95	Bypass CAN Fail	Bypass and cabinet communicate with each other via CAN bus. Check If connector or signal cable is abnormal. If monitoring board is abnormal.
96	Firmware Error	Manufacturer used only.
97	System Setting Error	Manufacturer used only.
98	Bypass Over Temp.	Bypass module is over temperature. Please check If bypass load is overload If ambient temperature is over 40°C If bypass SCRs are assembled correctly If bypass fans are normal
99	Module ID Duplicate	At least two modules are set as same ID on the power connector board, please set the ID as correct sequence

CHAPTER 4 - SNMP CARD

4.1 Replace SNMP card

SNMP card (RMCARD205) is installed on the back panel of bypass module in SM020KAMFA and SM040KAMFA. For detailed setting information, please refer to the RMCARD205 User Manual.

To replace SNMP card:

1. Remove the two screws of intelligent slot (see Fig. 4-1).
2. Pull out the SNMP card and Install a new SNMP card into the slot and tighten it with screws.

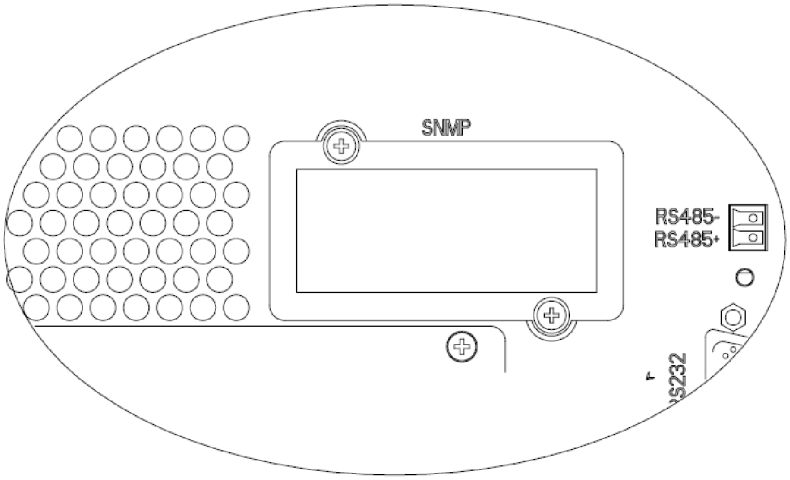

Fig 4-1: SNMP card

⚠	**NOTICE** SNMP Card and serial port (RS-232) share a SCI of UPS controller. SNMP card and serial port (RS-232) cannot be used at the same time. The SNMP Card is pre-installed by the factory

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