Please comply with all warnings and follow all operating Instructions in this manual and on the unit strictly.

Save this manual for future reference.

Do not operate this unit before reading through all safety information and operating instructions carefully.

1. SAFETY AND EMC INSTRUCTIONS 1

1.1 INSTALLATION 1

1.2 OPERATION 1

1.3 MAINTENANCE, SERVICING & FAULTS 1

1.4 TRANSPORT 1

1.5 STORAGE 2

1.6 STANDARDS 2

2. DESCRIPTION OF COMMONLY USED SYMBOLS 2

3. INTRODUCTION 3

3.1 SYSTEM AND MODEL DESCRIPTION 3

3.2 PRODUCT SPECIFICATIONS AND PERFORMANCE 3

3.2.1 GENERAL SPECIFICATIONS 3

3.2.2 ELECTRICAL PERFORMANCE 4

3.2.3 OPERATING ENVIRONMENT 4

4. DISPLAY PANEL 4

5. INSTALLATION 7

5.1 UNPACKING AND INSTALLATION 7

5.2 INPUT AND OUTPUT POWER CABLES AND PROTECTIVE EARTH INSTALLATION 7

5.2.1 NOTES FOR INSTALLATION 7

5.2.2 INSTALLATION 7

5.3 OPERATING PROCEDURE FOR CONNECTING LONG BACKUP TIME UPS WITH THE EXTERNAL BATTERY 9

5.4 PARALLEL OPERATION 10

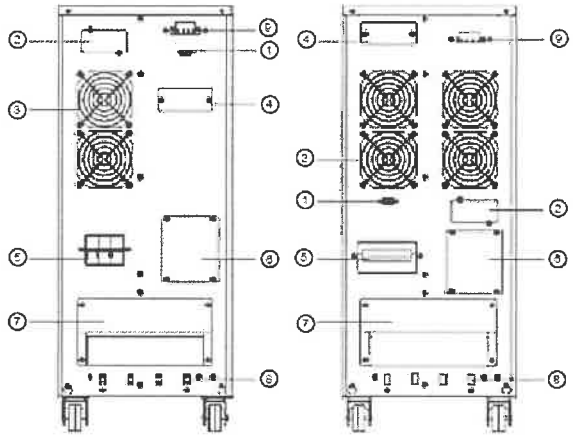
5.4.1 REDUNDANCY INTRODUCTION 10

5.4.2 PARALLEL INSTALLATIO 10

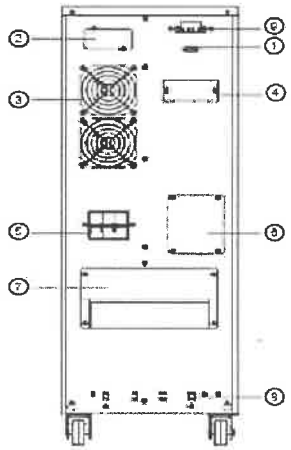
5.5 OPERATION AND MAINTENANCE 10

6. OPERATION 13

6.1 OPERATING MODE 13



REAR VIEW of OPT 3110TEB & OPT 3115TEB/OPT 3120TEB

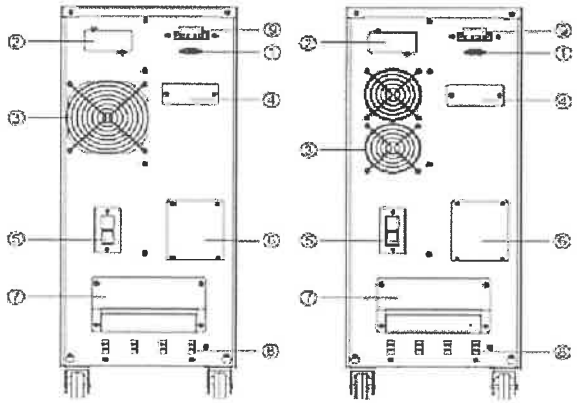


REAR VIEW of OPT 3110T

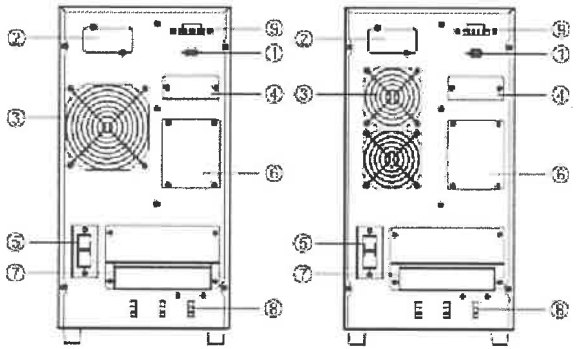
1. RS232
2. Intelligent Slot
3. Fan
4. Parallel Port
5. Input Breaker
6. Maintenance Bypass Switch
7. Terminal Block Cover
8. Cable Rack
9. EPO Operation)

-- End of document ---

Appendix 1: Rear Panels



REAR VIEW of OPT 1106T & OPT 1110T



REAR VIEW of OPT 1106TEB & OPT1110TEB

6.1.1 TURN ON THE UPS WITH UTILITY POWER AVAILABLE (IN LINE MODE) 13

6.1.2 TURN ON THE UPS WITHOUT UTILITY POWER (IN BATTERY MODE) 13

6.1.3 TURN OFF THE UPS WITH UTILITY POWER AVAILABLE (IN LINE MODE) 13

6.1.4 TURN OFF UPS WITH UTILITY POWER NOT AVAILABLE (IN BATTERY MODE) 13

7. BATTERY MAINTENANCE 14

8. BATTERY DISPOSAL AND REPLACEMENT 14

9. TROUBLESHOOTING 15

10. OPERATING MODES FOR ALL MODELS 15

10.1 BYPASS MODE 01 16

10.2 LINE MODE 02 16

10.3 BATTERY MODE 03 17

10.4 SELF TEST MODE 04 17

10.5 PARALLEL MODE 05 17

10.6 WARNING MODE 17

10.7 FAULT MODE 19

10.8 SET MODE 19

10.9 BATTERY LOW VOLTAGE WARNING 20

10.10 SHUTDOWN IMMINENT 20

11. COMMUNICATIONS 21

11.1 RS232 INTERFACE 21

11.2 INTELLIGENT SLOT 21

11.3 AS400 INTERFACE (OPTION) 21

12. SOFTWARE FOR ALL MODELS 22

1. SAFETY AND EMC INSTRUCTIONS

Please read the following user manual and safety instructions carefully before installing or using the unit !

1.1 INSTALLATION

1. Do not install the UPS near water or in a damp environment.
2. Do not install the UPS where it would be exposed to direct sunlight or near any other heat sources.
3. Do not block any ventilation openings of the UPS cabinet.
4. Do not connect appliances or equipment which would overload the UPS (e.g. heaters, motors, pumps, laser printers, etc.) to the UPS output.
5. Place cables in such a way that no one can step on or trip over them.
6. Once installed, the UPS's earth terminal must be connected to the battery cabinet(s).
7. A single emergency disconnecting device which prevents supply to the load by the UPS should be provided.
8. An appropriately rated circuit breaker for short-circuit protection should be provided on the UPS output.
9. For three-phase connections, a four-poledevice which disconnects all 3 phases andthe neutral conductor should be provided.
10. As this equipment is permanently connected, it must be installed by qualified personnel.
11. Earth connections are essential before connecting to the incoming mains supply.

1.2 OPERATION

a. Never disconnect the earth conductor of the UPS or the building terminals, since this would cancel the protective earthing of the UPS system and all its connected loads.
b. The UPS output terminal block may be live even if the UPS system is not connected to the incoming mains.
c. To fully disconnectthe UPS, first press the OFF button, then disconnect from the mains.
d. Ensure that no liquids or other foreign objects enter the UPS.

1.3 MAINTENANCE, SERVICING & FAULTS

a. The UPS operates with hazardous voltages. Repairs may be carried out only by qualified personnel.
b. Caution - risk of electric shock. Even after the unit is disconnected from the mains power supply, components inside the UPS are still connected to the battery which is potentially dangerous.
c. Before carrying out any kind of service and/or maintenance, please disconnect the batteries.
d. Verify that no mains power is present and that thecapacitors and theDCBUS capacitors are discharged.
e. Batteries to only be replaced by qualified personnel.
f. Caution - risk of electric shock. The battery circuit is not isolated fromthemains input. Hazardous voltages may occur between the battery terminals and ground. Verify that no voltage is present before servicing!
g. Batteries have a high short-circuit current and pose a risk of shock.
h. Take all precautionary measures specified below and any other measures necessary when working with batteries: remove all jewellery, wristwatches, rings and other metal objects — use only tools with insulated grips and handles.
i. When changing batteries, replace only with the same quantity, type and age of batteries.
j. Donot attempt to dispose of batteries by burning them. It could cause an explosion.
k. Do not open or destroy batteries. Battery acid/gel is toxic and can cause injury to the skin and eyes.
l. Replace fuses only with the same type and amp rating to avoid fire hazards.
m. Do not attempt to repair the UPS, only qualified personnel are authorized. Warranty will be void!

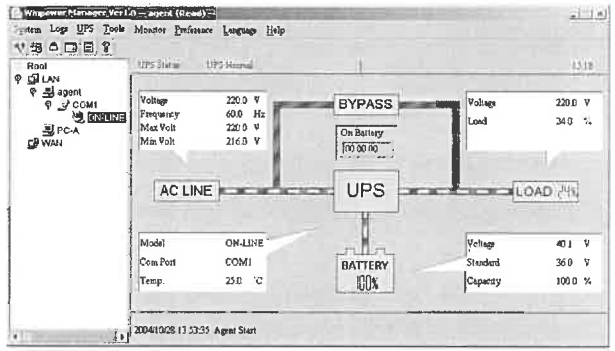
1.4 TRANSPORT

a. Please transport the UPS only in the original packaging (to protect against shock and impact).

12. SOFTWARE FOR ALL MODELS

Free Software Download – WinPower

WinPower is a brand new UPS monitoring software, which provides a user-friendly interface to monitor and control your UPS. This unique software provides safe auto shutdown for multi-computer systems in case of power failures. With this software, users can monitor and control any UPS on the same LAN regardless of distance from the UPS.



13. INSTALLATION OF SOFTWARE FOR ALL MODELS

Unpack the unit and check for damages. If you note any damages please do not switch the unit on to prevent further damage. For EB Models connect external battery set first. If unit is ok switch the unit on by pushing the "on" Button for 2 -3 seconds. The unit will start up and the unit will go through a self-test. Connect the USB or RS232 Cable and adjust to automatic search, the software will pick up the UPS automatically. Please follow further instruction via the software.

11. COMMUNICATIONS

11.1RS232 INTERFACE

The following is the pin assignment and description of DB-9 connector.

Pin #	Description	I/O
2	TXD	Output
3	RXD	Input
5	GND	Input

11.2INTELLIGENT SLOT

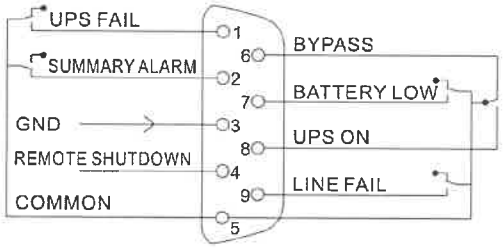
This series is equipped with an intelligent slot for WinPower (optional accessory) or other optional card to achieve remote management of the UPS through internet / intranet. Please contact your local distributor for further information.

11.3AS400 INTERFACE (OPTION)

Except for the communication protocol as mentioned above, this series UPS has an AS400 card (optional accessory) for AS400 communication protocol. Please contact your local distributor for details. The following is the pin assignment and description of DB-9 connector in AS400 card.

Pin #	Description	I/O	Pin #	Description	I/O
1	UPS Fail	Output	6	Bypass	Output
2	Summary Alarm	Output	7	Battery Low	Output
3	GND	Input	8	UPS ON	Output
4	Remote Shutdown	Input	9	Mains Fail	Output
5	Common	Input			

DB-9 Interface of AS400 communication protocol



1.5 STORAGE

a. The UPS must be stored in a room which is ventilated and dry.

1.6 STANDARDS

*** Safety**	
IEC/EN 62040-1-1	
*** EMI**	
Conducted Emission.....:IEC/EN 62040-2	Category C3
Radiated Emission.....:IEC/EN 62040-2	Category C3
***EMS**	
ESD.....IEC/EN 61000-4-2	Level 4
RS.....:IEC/EN 61000-4-3	Level 3
EFT.....IEC/EN 61000-4-4	Level 4
SURGE.....IEC/EN 61000-4-5	Level 4
Low Frequency Signals..... IEC/EN 61000-2-2	
Warning: This product is for commercial and industrial applications in class II hazard environments. Installation restrictions or additional measures may be required to prevent incidents.	

2. DESCRIPTION OF COMMONLY USED SYMBOLS

Symbol and Explanation			
Symbol	**Explanation**	**Symbol**	**Explanation**
⚠	Alert you to pay special attention	⏚	Protective ground
⚠	Caution of high voltage		Alarm silence
|	Turn on the UPS		Overload indication
○	Turn off the UPS	⊣⊢	Battery check
⏻	Idle or shut down the UPS	♻	Recycle
~	Alternating current source (AC)		Do not dispose with ordinary trash
⎓	Direct current source (DC)		

3. INTRODUCTION

3.1 SYSTEM AND MODEL DESCRIPTION

The OPT UPS Series is an uninterruptible power supply incorporating double-converter technology. It provides perfect protection specifically for critical load. The double-converter principle eliminates all mains power disturbances. A rectifier converts the incoming AC from the mains to DC. This direct current charges the batteries and powers the inverter. In the event of power failure, the maintenance-free batteries continue to power the inverter. Thus the inverter generates a sine wave AC power, which permanently supplies the loads.

Designed with the proven on-line, double conversion architecture, this series of UPS offers the greatest degree of availability in power protection and provides continuous high-quality AC power for critical loads, especially for the basic equipment in some areas as: Finance, communication, laboratories, government, traffic, manufacture, education etc.

This manual is applicable to the following models:

Type		Model	Input	Battery
Standard	6KVA	OPT 1106T	Single phase	Internal
	10KVA	OPT 1110T	Single phase	Internal
	10KVA	OPT 3110T	Three-phase	Internal
Long back up time	6KVA	OPT 1106TEB	Single phase	External battery bank
	10KVA	OPT 1110TEB	Single phase	External battery bank
	10KVA	OPT 3110TEB	Three-phase	External battery bank
	15KVA	OPT 3115TEB	Three-phase	External battery bank
	20KVA	OPT 3120TEB	Three-phase	External battery bank

"BE" Model : Extended backup times

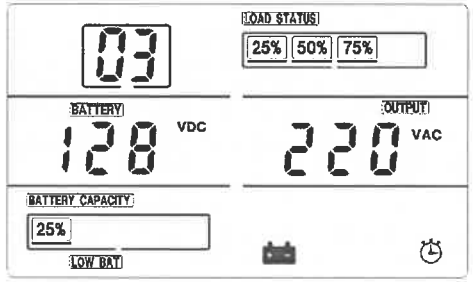
3.2 PRODUCT SPECIFICATIONS AND PERFORMANCE

3.2.1 General Specifications

Power Rating	Model	Frequency (Hz)	Input at full load and nominal input voltage		Output		Dimensions (W*D*H)mm	Weight (kg)
			Voltage	Current (Amps)	Voltage	Current		
6KVA/4.8KW	OPT 1106T	50/60	(120-275)VAC	33max	220V/230V	27A	248×500×616	60
6KVA/4.8KW	OPT 1106TEB	50/60	(120-275)VAC	37max	220V/230V	27A	248×500×460	18
10KVA/8KW	OPT 1110T	50/60	(120-275)VAC	50max	220V/230V	45A	248×500×616	61
10KVA/8KW	OPT 1110TEB	50/60	(120-275)VAC	59max	220V/230V	45A	248×500×460	20
10KVA/8KW	OPT 3110T	50/60	(208-476)VAC	55max	220V/230V	45A	248×500×885	70
10KVA/8KW	OPT 3110TEB	50/60	(208-476)VAC	59max	220V/230V	45A	248×500×616	27
15KVA/12KW	OPT 3115TEB	50/60	(208-476)VAC	86 max	220V/230V	68A	248×500×616	35
20KVA/16KW	OPT 3120TEB	50/60	(208-476)VAC	112 max	220V/230V	91A	248×500×616	35

10.9BATTERY LOW VOLTAGE WARNING

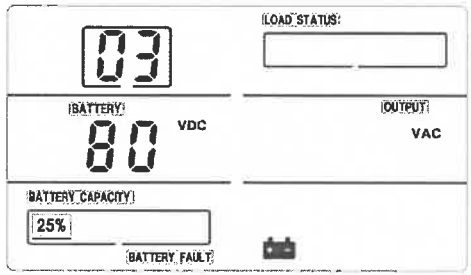
The LCD display in Battery Low Voltage Warning is shown in the following diagram.



Note : In case of low battery voltage or short back-up time, both low-voltage indicator and clock indicator will light up simultaneously.

10.10 SHUTDOWN IMMINENT

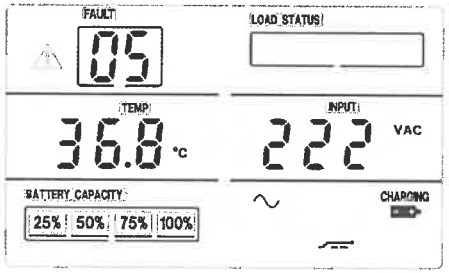
The LCD display in Shutdown Imminent warning is shown in the following diagram.



Note: In above diagrams, temperature, battery voltage, input voltage, input frequency, output voltage and output frequency are displayed alternately, once every three seconds.

10.7FAULT MODE

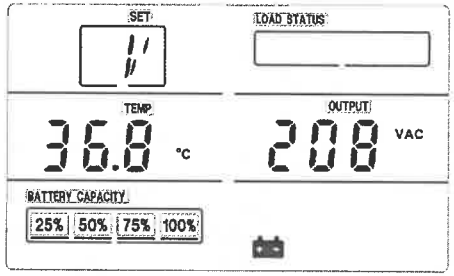
The LCD display in Fault Mode is shown in the following diagram. The symbol "MODE" is not shown but the symbol "FAULT" is shown instead in code display.



FAULT MODE (BUS FAULT)

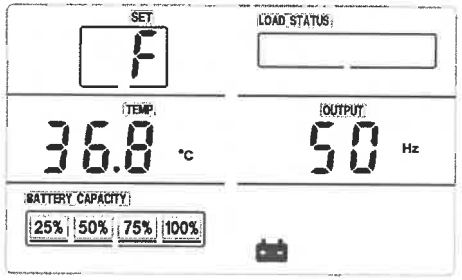
10.8SET MODE

The LCD display in Voltage Set is shown in the following diagram.



SET VOLTAGE

The LCD display in Frequency set is shown in the following diagram.



3.2.2 Electrical Performance

INPUT			
Model	Voltage	Frequency	Power Factor
OPT 1106TEB OPT 1110TEB	Single-phase (220VAC,230VAC)	50/60Hz±5% (adjustable)	>0.99(Full load)
OPT 3110TEB OPT 3115TEB OPT 3120TEB	Three-phase (380VAC/220 VAC, 380VAC/230VAC)	50/60Hz±5% (adjustable)	>0.95(Full load)

Output					
Voltage regulation	Power factor	Frequency tolerance	Distortion	Overload capacity	Current crest ratio
±1%	0.8	Synchronized 46-54Hz in Line mode (AC mode) ±1% of normal frequency in Battery mode	THD<2% Full load (Linear load)	105%-125%load transfers to bypass mode after 1 minute , >130% load transfers to bypass mode after 30seconds	3:1 maximum

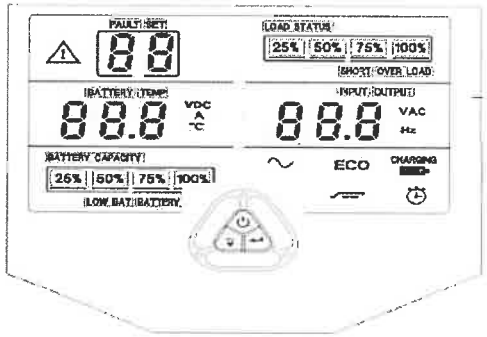
3.2.3 Operating Environment

Temperature	Humidity	Altitude	Storage temperature
0°C - 40°C	< 95%	< 1000m	0°C - 40°C

Note: If the UPS is installed above an altitude **of 1000m**, the output power must be derated. Please refer to the following :

Altitude (M)	1000	1500	2000	2500	3000	3500	4000	4500	5000
Derating Power	100%	95%	91%	86%	82%	78%	74%	70%	67%

4. DISPLAY PANEL

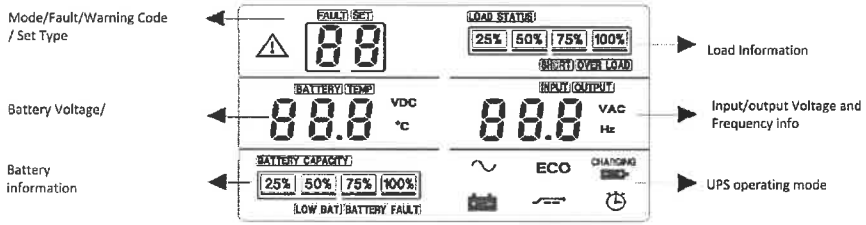


On/Off Button Select Button Enter Button

Display Panel

The following table describes the functions of the push buttons on the front panel.

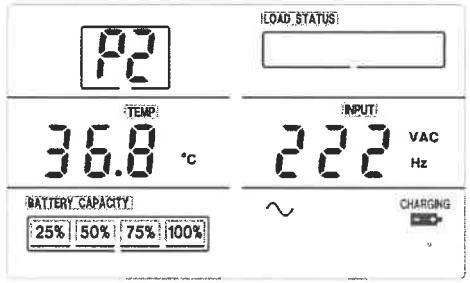
Button	Function
ON/OFF-Button	This button has two functions: - Turning on the UPS system: By pressing this button, the UPS system turns on. - Shut off the UPS system: When mains power is normal, the UPS System switches to Bypass mode by pressing OFF button, and the inverter is off.
Select Button	If the UPS system is in bypass mode or self-test mode, the output voltage / frequency and bypass selection can be done by pressing Select button, confirmed by pressing Enter button.
Enter Button	If the ups system is in bypass mode or self-test mode, the output voltage/frequency and selecting bypass can be done by pressing Select button. Selections are confirmed by pressing the Enter button.



LCD Display

10.5PARALLEL MODE 05

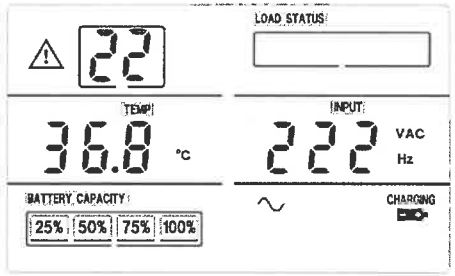
The LCD display in parallel mode is shown in the following diagram. When the UPS operating in parallel mode, the operating mode code of the UPS is "P2".



PARALLEL MODE

10.6WARNING MODE 22

The LCD display in warning mode is shown in the following diagram. The symbol "WARNING" is shown instead in the code display.

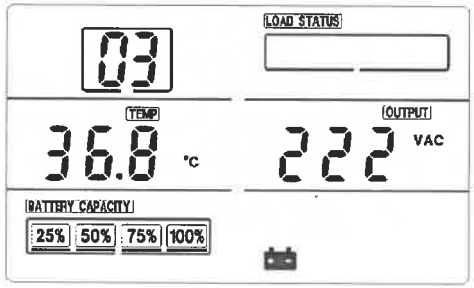


WARNING MODE

10.3BATTERY MODE 03

The LCD display in Battery Mode is shown in the following diagram. The information about the utility power, the battery, the temperature and load is displayed. The operating mode code of the UPS is "03".

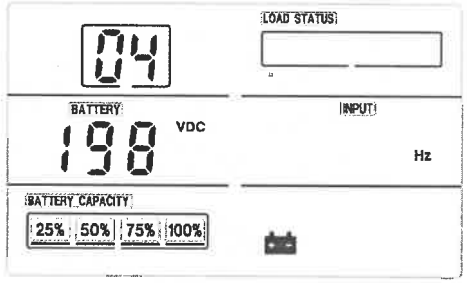
When the UPS is running in Battery mode, the buzzer beeps once every 4 seconds.



Battery mode

10.4SELF TEST MODE 04

The LCD display in Battery mode is shown in the following Diagram. The information about the utility power, the battery, temperature and load is displayed. The operating mode code of the UPS is "04".



Self-Test mode

Display	Function
FAULT SET 88	FAULT lighting indicates mode code, fault code and warning code, which is displayed from 0 to 99 . SET lighting indicates the set code, V (set voltage), F (set frequency)
BATTERY TEMP 88.8 VDC °C	BATTERY lighting indicates the battery voltage, which is displayed from 0 to 999VDC TEMP lighting indicates the UPS inside temperature, which is displayed from 0°C to 999°C The two parameters are displayed alternatively every 3 seconds.
BATTERY CAPACITY 25% 50% 75% 100% LOW BAT BATTERY FAULT	Indicates the battery capacity. For example: 25% and 50% lit simultaneously, means battery capacity is 50%. LOW BAT lit indicates the battery is weak, and the UPS will shut down soon. BATTERY FAULT lit indicates batteries must be replaced.
LOAD STATUS 25% 50% 75% 100% SHORT OVER LOAD	Indicates the present load value. For example: 25% and 50% lit simultaneously means load is 50%. When 100% is lit together with OVER LOAD and audible warning, the UPS is overloaded.
INPUT OUTPUT 88.8 VAC Hz	Indicates UPS input voltage, output voltage, output frequency, which is displayed from 0 to 999VAC The four parameters are displayed alternatively every 3 seconds. 208,220,230,240VAC. Any of the four output voltages can be selected. 50/60Hz Any the two frequencies can be selected.
ECO CHARGING	Indicates mains power is available and if mode code displays 02 , the UPS is operating on line . ECO indicates UPS is working in ECO Mode. CHARGING indicates UPS is charging with mode code 03 means the UPS is in battery mode. and with mode code 03 means UPS is in Bypass and LOW BAT together plus UPS warning indicates Battery low voltage and UPS shut down is imminent.

5. INSTALLATION

The system is to be installed and wired only by qualified Technician/ Electricians in accordance with local applicable safety regulations!

5.1 UNPACKING AND INSTALLATION

a. Unpack and confirm the contents.
b. The package contains:

- UPS
- User manual
- Communication cable
- Winpower Software CD

c. Inspect the UPS for any damage. Notify the carrier and dealer immediately if there is any damage or missing parts.

d. In case of damage, do not turn on the unit.

5.2 INPUT AND OUTPUT POWER CABLES AND PROTECTIVE EARTH INSTALLATION

5.2.1 Notes for Installation

a. The UPS must be installed in a location with good ventilation, far away from water, inflammable gas and corrosive agents.
b. Ensure the all UPS air vents are open. Allow at least 0.5m of space on all sides.
c. Condensation may occur if the UPS is unpacked coming from a very low temperature environment. In this case it is necessary to wait until the UPS is completely dry before installation and use. Otherwise danger of electric shock exists.

5.2.2 Installation

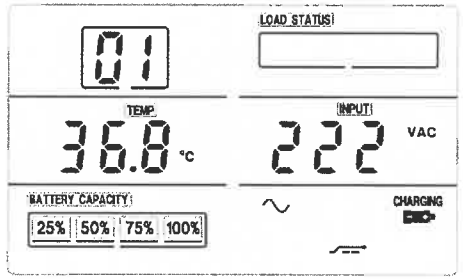
Installation and wiring must be performed in accordance with all local electrical codes and the following instructions by professional personnel. For safety, please turn off the mains power switch before installation.

Open the terminal block cover located on the rear panel of the UPS, please refer to the diagram below.

a. For OPT 1106T/1106TEB, it is recommended to select a 6mm2 wire or other insulated wire which complies with AWG Standard for the UPS input and output wiring.
b. For OPT 1110T/1110TEB, OPT 3110T/3110TEB UPS, it is recommended to select 10mm² wire or other insulated wire which complies with AWG Standard for the UPS input and output wirings.
c. For OPT 3115TEB/3120TEB UPS, it is recommended to select 25mm2 wire or other insulated wire which complies with AWG Standard for the UPS input and output wirings.
d. Note: Do not use a wall outlet as the input power source for the UPS, as its rated current is less than the UPS's maximum input current. The wall outlet will be overloaded and destroyed by overheating and might even catch fire!
e. Connect the input and output wires to the corresponding input and output terminals according to the following diagram.

10.1BYPASS MODE 01

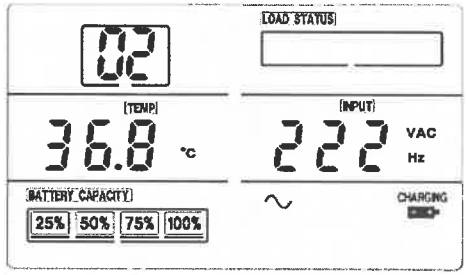
The LCD display in Bypass mode is shown in the following diagram. The information about the utility power, the battery, the UPS temperature and load is displayed. The operating mode code of the UPS is "01". The UPS beeps once every 2 minutes in Bypass mode.



Bypass mode

10.2LINE MODE 02

The LCD display in Line mode is shown in the following diagram. The information about the utility power, the battery, the temperature and load is displayed. The operating mode code of the UPS is "02".



Line mode

In case of overload, the load percentage is shown and the alarm will beep twice every second. Disconnect unnecessary loads one by one to decrease the load connected to below 90% of the UPS's capacity.

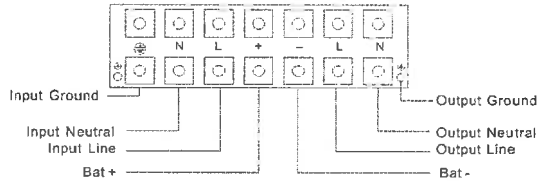
9. TROUBLESHOOTING

Problem	Possible cause	Solution
Fault code is "08", and the buzzer beeps continuously.	The UPS indicates fault mode due to internal overheating.	Make sure the UPS is not overloaded; the air vents are not blocked and the ambient temperature is not too high. Wait for 10 minutes for the UPS to cool down before turning on again. If unsuccessful, please contact the distributor or service centre.
Fault code is "09" and the buzzer beeps continuously.	Other failure	Remove all the loads. Turn off the UPS. Ensure that there is no problem with the load and the UPS has no internal faults before turning it on again. In case of failure, call the distributor or service centre.
Fault code is "05" or "06" , UPS beeps continuously.	The UPS transfers to fault mode due to its internal fault.	Please contact the distributor or service centre.
Mode code "03", UPS is in Battery mode.	The Voltage or Frequency of the utility power is out of range.	The UPS is running in Battery mode. Save your data and close the application program. Make sure the utility power is within the specified input voltage and frequency range.
Fault code "07", UPS beeps continuously.	The UPS is overloaded or the connected equipment is faulty.	Check the loads and remove all no-critical equipment. Recalculate the load demand and reduce load. Check that all connected equipment is working properly.
Warning code 13", the buzzer beeps every second.	The charger of the UPS is defective.	Please contact the distributor or service centre.

10. OPERATING MODES FOR ALL MODELS

Different codes are displayed on the LCD screen according to their operating modes, they are shown as follows :

Operating modes	Code	Operating modes	Code
Mode Codes			
Parallel Mode	P2	Battery Mode	03
Bypass Mode	01	Battery Test Mode	04
Line Mode	02		
Warning Codes			
ID Loss	21	Charger Fault	13
Fan Failure	10	IP Fuse Open	11
Battery Low	12		
Fault Codes			
Bus Fault	05	Inverter Fault	06
Overload	07	Over Temperature	08
Other	09		



Note: Ensure that all wires and terminals are connected tightly.

f. The protective earth wire refers to the connection between the equipment and the building ground connection. The diameter of protective earth wire should be at least as above mentioned for each model. Green or green/yellow wire to be used.

g. After completion of the installation, make sure the wiring is correct.

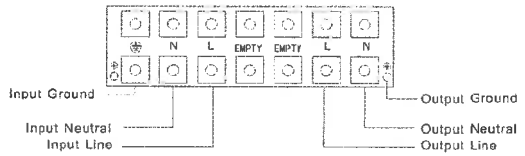
h. Install an output breaker between the output terminal and the load, the breaker should include earth leakage function if required.

i. To connect the loads to the UPS, please turn off all the loads first, then perform the connection and finally turn on the loads one by one.

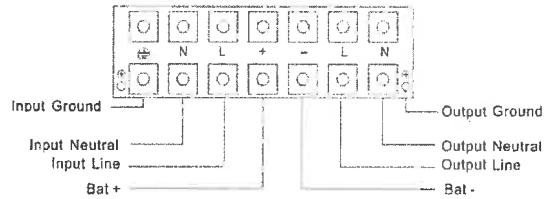
j. Regardless if the UPS is connected to the utility power or not, the output of the UPS may still believe. Components inside the UPS may still have hazardous voltages after turning the UPS off. To disable the UPS output, turn off the UPS, and then disconnect the utility power.

k. Charge the batteries for 8 hours before initial use. After connection, turn the input breaker to the "ON" position. The UPS will charge the batteries automatically. You can also use the UPS immediately without charging the batteries first, but the backup time may be reduced.

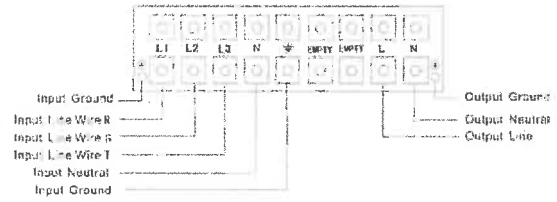
l. If loads with excessive inrush or start-up currents such as monitors, laser printers or motors / pumps are connected to the UPS, the start-up peak power demand must be used for determining the UPS power capacity.



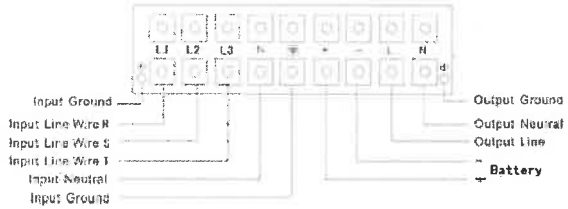
Input and Output Terminal Block wiring diagram for OPT 1106T/1110T



Input and Output Terminal Block wiring diagram of OPT 1106TEB/1110TEB



Input and Output Terminal Block wiring diagram of OPT 3110T



Input and Output Terminal Block wiring diagram of OPT 3110TEB/3115TEB/3120TEB

5.3 OPERATING PROCEDURE FOR CONNECTING LONG BACKUP TIME UPS WITH THE EXTERNAL BATTERY

The nominal DC voltage of external battery pack is 192VDC. Each battery pack consists of 16 pieces of 12V maintenance free batteries in series. To achieve longer backup times, it is possible to connect multi-battery packs, but the principle of "same voltage, same type" must be strictly followed.

For all "EB" versions, the battery bank installation procedure must be complied with. Danger of electric shock.

a. A fuse or DC breaker must be connected between the battery pack and the UPS. The capacity of the fuse/breaker must be not less than specified below.

Model	OPT 1106T	OPT 1106TEB	OPT 1110T	OPT 1110TEB	OPT 3110T	OPT 3110TEB	OPT 3115TEB	OPT 3120TEB
Battery voltage	192VDC	192VDC	192VDC	192VDC	192VDC	192VDC	192VDC	192VDC
Battery current	34A max	34A max	56A max	56A max	46A max	46A max	70A max.	102A max.

Note: (240VDC battery voltage can be selected for following models :
OPT 1106TEB/1110TEB, and OPT 3110TEB/3115TEB/3120TEB)

b. Open fuse or switch the battery breaker to "OFF" position and connect the 16 (20 in case of 240 VDC) batteries in series.

c. To complete the battery installation by plugging the connector of the external battery cable into the external battery socket of the UPS. Do not connect any loads to the UPS yet. Connect the input power first. Then insert the fuse or switch the battery breaker to the "ON" position. After that, switch the mains input breaker to the "ON" position. The UPS begins to charge the batteries.

7. BATTERY MAINTENANCE

a. This series UPS only requires minimal maintenance. The batteries used for standard models are valve regulated sealed lead-acid, maintenance free batteries. The only requirement is to charge the UPS regularly in order to maximize the expected life. When being connected to the utility power, whether the UPS is turned on or not, the UPS keeps charging the batteries, at the same time preventing overcharging as well as over-discharging.
b. In case of non-use, the UPS must be connected to mains to charge the batteries once every 4 to 6 month.
c. In hot climates, the battery should be charged every 2 month. The standard charging time should be at least 12 hours.
d. Under normal conditions, the battery life expectancy is three to five years.
e. This depends largely on number of discharges, depth of discharges and ambient temperatures. In case shortened backup times, earlier replacement should be made.
f. Battery replacement should be performed by qualified personnel.
g. Replace batteries with the identical number and type of batteries.
h. Do not replace any battery individually. All the batteries should be replaced at the same time, following the instructions of the battery supplier.
i. Normally, the batteries should be charged once every 4 to 6 months. Charging should take place soon after the UPS shuts down due to a discharged battery. The standard charging time should be at least 12 hours.
j. Never allow a battery to remain in a discharged state for more than a few days.

8. BATTERY DISPOSAL AND REPLACEMENT

a. When working with batteries, remove any conductive jewellery such as necklaces, wrist watches and rings.
b. If any connecting cables need to be replaced, replace with identical diameter and length to avoid overheating, which could result in fire.
c. Do not dispose of batteries or battery packs in a fire, they may explode.
d. Do not open batteries, acid / gel is highly poisonous and harmful to the skin and eyes.
e. Do not short the positive and negative of the battery, it may result in electric shock, fire or even explosion.
f. Make sure that mains is off before touching the batteries.
g. The battery circuit is not isolated from the mains input circuit.
h. There are hazardous voltages between the battery terminals and the ground.
i. Even though the mains input breaker is switched off, some components inside the UPS are still connected to the batteries, which is potentially dangerous.
j. Therefore, before any maintenance and repairs work is carried out, remove the fuse or switch off the battery breaker.
k. Batteries produce hazardous voltages at extremely high currents. Battery maintenance or battery replacement must be carried out by qualified personnel only.

6. OPERATION

6.1 OPERATING MODE

6.1.1 Turn on the UPS with utility power available (in Line mode)

a. Make sure that the power supply connection is correct, then insert fuse or set the battery breaker to the "ON" position (only for long backup time models). Switch the mains input breaker to the "ON" position. The fan(s) start to rotate and the UPS supplies power to the load via the Bypass. The UPS operates in Bypass mode, mode code "01" is displayed.
b. Switch on the UPS by simply pressing the "ON" button continuously for more than 1 second, the buzzer will beep once.
c. A few seconds later, the UPS switches to Line mode, and the mode code is "02". If utility power is lost or abnormal, the UPS will operate in Battery mode without any output interruption.

6.1.2 Turn on the UPS without utility power (in Battery mode)

a. Ensure that the battery breaker is in the "ON" position (this step only for long backup time model).
b. Press the ON button for more than 1second to power on the UPS. The buzzer will beep once, UPS operates in No Output mode, the mode code is "00".
c. A few seconds later, the UPS turns into Battery mode, and the mode code is "03".

6.1.3 Turn off the UPS with utility power available (in Line mode)

a. Turn off the inverter by pressing the OFF button for more than 1 second, the buzzer will beep once.
b. The UPS will turn into Bypass mode.
c. Having turned the inverter off, output power is still present. In order to switch off the UPS output, simply cut off the utility power supply. A few seconds later, the display is off and no output is available from the UPS.

6.1.4 Turn off UPS with utility power not available (in Battery mode)

a. Power off the UPS by pressing the OFF button for more than 1 second, the buzzer will beep once.
b. When being powered off, the UPS will turn into No Output mode. Finally the display is off and no power is available from the UPS output.

Suggestion : Please turn off the connected loads before turning on the UPS and turn on the loads one by one after the UPS is working in INV mode. Turn off all of the connected loads before turning off the UPS.

5.4 PARALLEL OPERATION

5.4.1 Redundancy Introduction

a. N+X is currently the most reliable UPS configuration. N represents the minimum UPS number to feed the load; X represents the redundancy UPS number, i.e. the number of faulty UPS's that the system can handle simultaneously. A higher X indicates higher system reliability. For situations where high reliability is required, N+X is the optimal mode. As long as the UPS is equipped with parallel cables, up to 3 UPS's with identical power ratings can be connected in parallel to realize output power sharing and redundancy.

5.4.2 Parallel Installatio

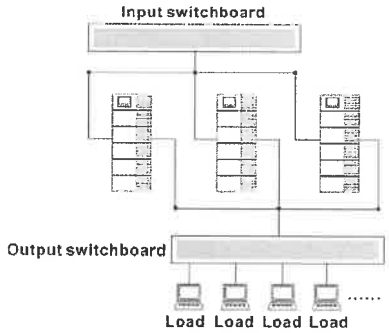
a. For general operation, follow the stand-alone operating requirements.
b. Startup : The units transfer to INV mode simultaneously.
c. Shutdown : All units receive a shut-down instruction sequentially in INV mode.
d. When the last unit receives the shutdown request, all units will shut down simultaneously and transfer to Bypass mode.

Model No.	Capacity of breaker
OPT 1106TEB	≥40A/250VAC
OPT 1110TEB/OPT3110TEB	≥60A/250VAC
OPT 3115TEB/3120TEB	≥100A/250VAC

*** Note regarding input and output wiring: The difference between each individual input and output cable length should be less than 10 %!**

5.5 OPERATION AND MAINTENANCE

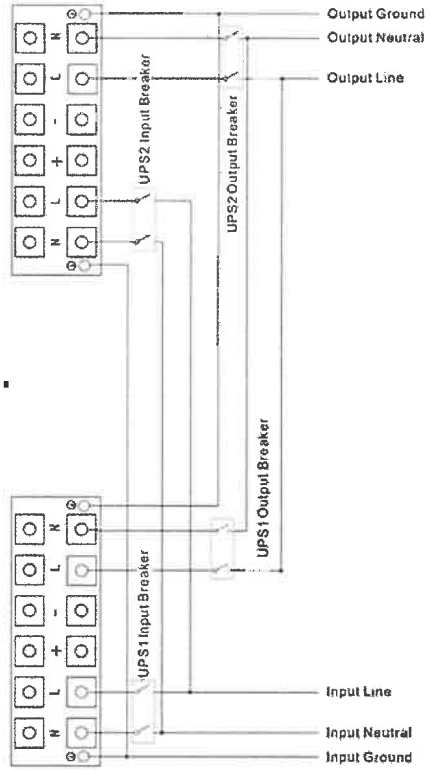
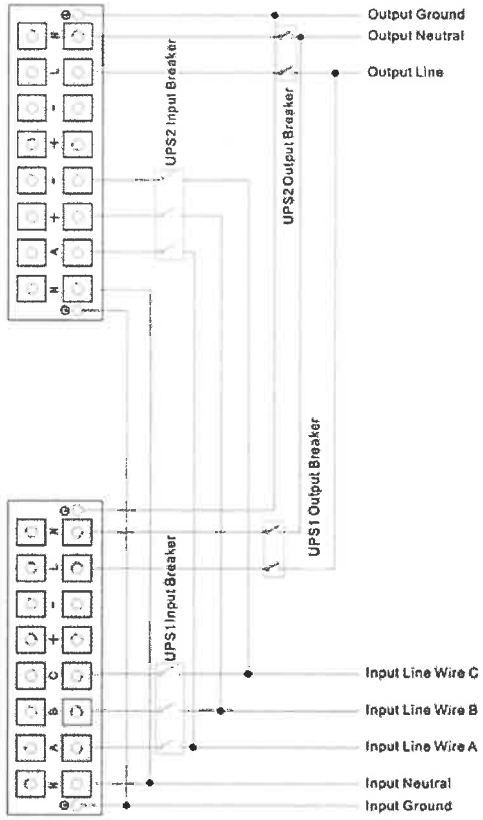
a. For general operation, follow the stand-alone operating requirements.
b. Startup : The units transfer to INV mode simultaneously.
c. Shutdown : All units receive a shut-down instruction sequentially in INV mode.
d. When the last unit receives the shutdown request, all units will shut down simultaneously and transfer to Bypass mode.



Basic Parallel Installation Diagram

e. To perform maintenance, follow the stand-alone requirement

Wiring diagram of OPT 1106TEB/ OPT 1110TEB parallel System



Wiring diagram of OPT 3110TEB/3115TEB/3120TEB parallel System