

The power behind competitiveness

# Delta UPS - Amplon Family

IN Series, Single Phase 1/2/3 kVA

User Manual



#### Save This Manual

This manual contains important instructions and warnings that you should follow during the installation, operation, storage and maintenance of this product. Failure to heed these instructions and warnings will void the warranty.

Copyright © 2013 by Delta Electronics Inc. All Rights Reserved. All rights of this User Manual ("Manual"), including but not limited to the contents, information, and figures are solely owned and reserved by Delta Electronics Inc. ("Delta"). The Manual can only be applied to the operation or the use of this product. Any disposition, duplication, dissemination, reproduction, modification, translation, extraction, or usage of this Manual in whole or in part is prohibited without the prior written permission of Delta. Given that Delta will continuously improve and develop the product, changes may be made to the information in this Manual at any time without obligation to notify any person of such revision or changes. Delta will make all possible efforts to secure the accuracy and the integrity of this Manual. Delta disclaims any kinds or forms of warranty, guarantee, or undertaking, either expressly or implicitly, including but not limited to the completeness, faultlessness, accuracy, non-infringement, merchantability or fitness for a particular purpose of the Manual.

## **Table of Contents**

Chapter 1:	Imp	ortant Safety Instructions	1
	1-1	Safety Instructions	
	1-2	Symbols	2
Chapter 2:	Intro	oduction	3
Service and Programme and the Indian	2-1	Initial Inspection	
	2-2	Placement	
	2-3	About UPS Operation	3
	2-4	Features	
Chapter 3:	Pan	el Overview	6
	3-1	Front Panel	
	3-2	Operation Panel	7
	3-3	Rear Panel	10
Chapter 4:	Inst	allation	12
•	4-1	Installation	
Chapter 5 :	Ope	ration	16
•	<b>5</b> -1	Cold Start When the Utility is Not Present	
	5-2	Start Up the UPS	
	5-3	Shut Down the UPS	17
	5-4	UPS Self-test	
	5-5	Silence Function	
	5-6	Charger Current Setting	
	5-7	Abnormal Conditions	
	5-8	UPS Internal Fault	
	5-9	Power Derating	
Chapter 6 :	Mai	ntenance	22
Chapter 7 :	Trou	ıbleshooting	23
Chapter 8 :	Com	nmunication Interface	26
-	8-1	RS232	
Chapter 9 :	Min	i SNMP/ Relay/ USB/ TVSS Card Installation	n 28
-	9-1	Mini SNMP/ Relay/ USB Card Installation Procedur	
		for 1kVA Model	



	9-2	Mini TVSS Card Installation Procedures for 1kVA
		Model28
	9-3	Mini SNMP/ Relay/ USB Card Installation Procedures
		for 2/ 3kVA Model29
	9-4	Mini TVSS Card Installation Procedures for 2/3kVA
		Model 30
Appen	dix A : Sp	oecifications 31
Appen	dix B : Wa	arranty 33

## Chapter 1: Important Safety Instructions

### 1-1 Safety Instructions

- The UPS contains voltages that are potentially hazardous. All repairs should be performed by qualified service personnel.
- To reduce the risk of electric shock, install this UPS in a temperature and humidity controlled indoor area, free of conductive contaminants. The ambient temperature must not exceed 45°C (113°F).
- There should be an isolated switch (breaker) at the side of UPS output, which may be supplied by the user.
- The UPS provides the function of output short protection, but the over-current protection of AC output loop should be given by the user.
- Disconnect the supply power prior to connecting or disconnecting the battery cabinet.
- Do not touch the battery terminal. The voltage may be present which is potentially dangerous.
- Inspect the packing. If there is any damage, contact your dealer.
- Do not dismantle the UPS system.
- Do not use extended cables.
- Do not operate the UPS in an environment that is extremely wet or near water.
- Do not allow water or any foreign objects to enter the UPS or put any objects containing liquid on or near the UPS.
- Install the UPS in a well-ventilated area away from gas. Do not block the ventilation holes.
- Do not operate the UPS if there is any liquid leakage or white root pulp.
- The battery contains dangerous metals and chemicals. Please follow local environmental protection laws and regulations to dispose of the battery.
- Use the power cord that meets the NEC standards, and make sure the output receptacles meet the NEC standards as well.



- The voltage may be present even if the UPS with connected battery cabinet is not connected to the mains.
- Do not move the battery cabinet when it is connected to the UPS.
- Do not connect or disconnect the battery cabinet when the UPS is in BATTERY Mode.



#### WARNING:

- 1. This is a Class-A product. In a domestic environment, this product may cause radio interference, in which case, the user is required to take adequate measures.
- 2. Never open the Manual Bypass Plate locating on the UPS's rear panel. Only qualified service personnel can open it when maintenance is required.

## 1-2 Symbols

#### Description ltem





Warning



Protective grounding terminal: A terminal which must be connected to earth ground prior to making any other connections to the equipment.



This symbol indicates the word 'PHASE'.



This symbol indicates that the principal on switch is in the 'ON' position.



This symbol indicates that the principal off switch is in the 'STAND-BY' position.

## **Chapter 2: Introduction**

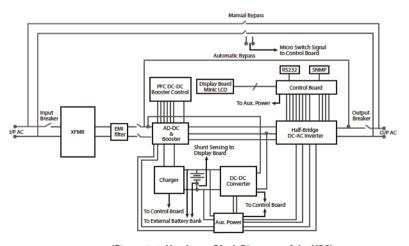
### 2-1 Initial Inspection

- Read this user manual before installing the UPS.
- Before unpacking the UPS, check the packing box. If there is any visible damage, contact your dealer at once.
  - 1) Only individuals with previous training can operate this unit.
  - 2) Only qualified service personnel can install this unit.

### 2-2 Placement

- Do not expose the UPS to direct sunlight or other heat sources.
- Choose a well-ventilated area to position your UPS to allow adequate dissipation of heat.
- Ensure that the UPS's surrounding areas are clean and free from moisture.
- Do not put heavy objects on cables or power cords.

## 2-3 About UPS Operation



(Figure 2-1: Hardware Block Diagram of the UPS)



The main topology of the UPS consists of an isolation transformer, manual bypass, relay bypass path, AC-DC converter, DC-AC inverter, battery charger, DC-DC converter, control circuit, and detection circuit. Moreover, the intelligent power management software is also optional. The function and efficiency are superior to the traditional UPS.

When the utility power is applied to the UPS, it is divided into two ways after going through input breaker and EMI filter. One way is connected to the AC-DC converter converting the utility AC power into a DC voltage that is called DC-BUS voltage. Then, it is divided into two paths. One path goes to the charger, which converts the DC-BUS voltage into a proper DC voltage to charge the UPS battery. The other path goes into the DC-AC half bridge inverter. The other way works as a bypass path. The bypass relay near the output will select either the bypass path or inverter output. In general, the UPS will internally do self-diagnosis. If there is no problem, the bypass relay will select the inverter output. This is called 'ON-LINE Mode'.

In case the utility power fails, the AC-DC converter and the charger will shut down. The DC-DC converter works and converts the battery voltage into DC-BUS voltage. The DC-AC inverter converts the DC-BUS voltage into AC voltage. This is called 'BATTERY Mode'.

The auxiliary power circuit supplies the designated power to all of the control circuit. Since the DC-AC inverter is always working, the DC-DC converter can rapidly operate and replace the AC-DC converter if the utility power fails. Furthermore, the bypass relay continuously keeps in the position of inverter output to supply the regulated power to the critical loads. Thus, there is no power failure in loading equipment.

In case the UPS needs to be shut down for maintenance or PWB board or the transformer needs to be replaced, please open the Manual Bypass Plate locating on the UPS's rear panel and make sure the UPS transfers to BYPASS Mode. After that, turn on manual bypass breaker and turn off output breaker and the input breaker. The UPS goes to relay bypass in this situation and the loads are directly connected to the utility power. This is called 'ON-MANUAL BYPASS Mode'.

#### 2-4 Features

The UPS, which is available in 1kVA, 2kVA and 3kVA, is an advanced on-line UPS providing reliable and consistent sine wave power quality to vital equipment. It supports personal computers, networks, servers, telecommunication equipment and

a variety of other facilities. With its outstanding protection features, the unit keeps your applications safe and running smoothly at all times.

#### PFC (Power Factor Correction)

With this function, the influence on the power grid can be greatly reduced. The investment in the capacity of circuit breakers can be lowered as well; especially it will be highly regarded as an important feature in critical load applications.

#### Complete Protection

On-line double conversion design, pure sine wave output and zero transfer time provide the best protection. With a built-in surge, spike and line noise protection, the UPS prevents destructive hardware damages and extends lifetime of system. The EMI/ RFI filtering design prevents electrical noise from affecting computer operation and data files.

#### Intelligent Design

Integrated with a microprocessor, the UPS is able to perform intelligent functions. The UPS triggers over-voltage protection function and transfers to 'BATTERY Mode' even when the utility voltage exceeds 280V for 230V Series. In addition, the UPS can accept large voltage variation of 80V to 280V. Wide input voltage range means less usage frequency of battery power and longer battery life span. Besides, programmable outlet design, which is suitable for power management, is also included in this unit.

#### User-Friendly Interface

The UPS provides a variety of functions to meet users' needs. Users can instantly understand the status of the UPS via informative LED instructions. Audible alarms, bar meters and status indicators (such as battery replacement indication, UPS fault, line condition, overload and so on) are simple and easy for users to understand.

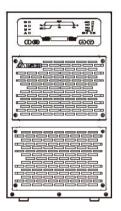
#### Network Management

The built-in communication interface port supporting RS232 protocols enhances the reliability and manageability of the UPS over all major operating systems, including Windows 95/98, Windows NT, Windows 7, Network, Unix and others.

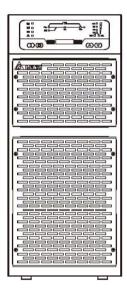


## **Chapter 3: Panel Overview**

## 3-1 Front Panel

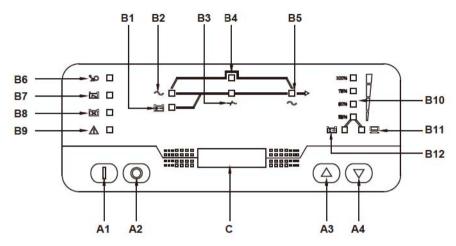


(Figure 3-1: 1kVA Front Panel)



(Figure 3-2: 2kVA/ 3kVA Front Panel )

## 3-2 Operation Panel



(Figure 3-3: Operation Panel)

#### A. Buttons

No.	Button	Name	Function	
A1		On	In 'ON-LINE Mode'. When the battery capacity is larger than 95%, press this ON button to start up the UPS. In 'BATTERY Mode' mode, you can press this button to silence the buzzer.	
A2	Q	Off	Press this <b>OFF</b> button to shut down the UPS.	
А3		UP	Moves up to change the LCD screen.	
<b>A</b> 4	$\bigcirc$	Down	Moves down to change the LCD screen.	



#### **B.** LED Indicators

No.	LED Symbol	Name	Indicates
B1	<del>0</del>	Battery	The LED indicates the UPS is operating in 'BATTERY Mode'.
B2	~	Line	The LED indicates the condition of the UPS's input line. If the input voltage is too low, too high or out of frequency, this LED will flash. When the line is blackout, this LED will shut off.
В3	-/~	Inverter	The LED indicates the UPS's DC to AC inverter is on.
B4		Bypass	The LED indicates the UPS is in 'BYPASS Mode'.
B5	$\sim$	Output	The LED indicates the UPS output is on.
В6	<b>%</b> 0	Overload	The LED indicates the load level of the UPS exceeds the rating. After a limited period of time, the UPS will transfer to 'BYPASS Mode' and the LED will still light up to alarm the user.
В7		Battery Low	The LED indicates the battery is in a low-voltage condition.
B8	×	Battery Replacement	The LED indicates the batteries are weak and it is suggested that the user should replace the batteries.
В9		Fault	The LED indicates that the UPS is faulty. The flash of this LED indicates that the UPS is overheating.
B10	100%     178%     80%	Level LEDs	The four LEDs indicate the battery capacity in 'BATTERY Mode' or the UPS's load percentage in 'ON-LINE Mode'.

No.	LED Symbol	Name	Indicates
B11		Load	When this LED lights up, 'Level LEDs' show the load level of the UPS.
B12	<b>₽</b> =	On-battery	When this LED lights up, 'Level LEDs' show the current battery capacity.



- 1. In ON-LINE Mode, B2, B3 and B5 LEDs light up.
- 2. In BATTERY Mode, B1, B3 and B5 LEDs light up.

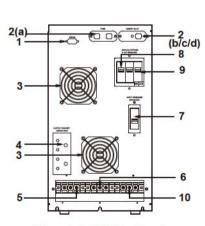
### C. LCD Display

No.	Item	Description
1	On Line	The LCD indicates the UPS is operating in <b>ON-LINE</b> Mode.
2	Standby	The LCD indicates the UPS is operating in <b>STANDBY</b> Mode.
3	Soft Start	The LCD indicates the UPS is operating in <b>SOFT START</b> Mode.
4	Bypass Mode	The LCD indicates the UPS is in <b>BYPASS</b> Mode.
5	Battery Mode	The LCD indicates the UPS is in <b>BATTERY</b> Mode.
6	Input Voltage	The LCD indicates the UPS's Input Voltage.
7	Input Current	The LCD indicates the UPS's Input Current.
8	Input Frequency	The LCD indicates the UPS's Input Frequency.
9	Output Voltage	The LCD indicates the UPS's Output Voltage.
10	Output Current	The LCD indicates the UPS's Output Current.

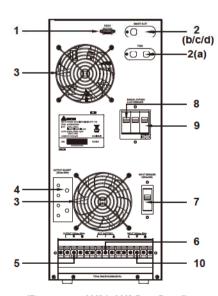


No.	Item	Description
11	Output Frequency	The LCD indicates the UPS Output Frequency.
12	Output kVA	The LCD indicates the UPS's Output kVA.
13	Output kW	The LCD indicates the UPS's Output kW.
14	Battery Charging Current	The LCD indicates the UPS's Battery Charging Current.
15	Battery Discharging Current	The LCD indicates the UPS's Battery Discharging Current.

## 3-3 Rear Panel



(Figure 3-4: 1kVA Rear Panel)



(Figure 3-5: 2kVA/ 3kVA Rear Panel)

No.	Item	Description
1	RS232	The communication port is used for communication between the UPS and a PC. For more information, please refer to <i>Chapter 8</i> .
2	SMART SLOT (for Mini SNMP/ Relay/ USB/ TVSS Card)	<ul> <li>(a) Mini TVSS Card: Protects your hardware from surge, spikes and line noise traveling along communication lines.</li> <li>(b) Mini SNMP Card: For network management.</li> <li>(c) Mini Relay Card: Provides four relay output joints to monitor the UPS's status and one relay input joint to control battery test.</li> <li>(d) Mini USB Card: For communication between the UPS and a PC via an USB cable.</li> </ul>
3	FAN	For cooling purpose.
4	OUTPUT SOCKET	The UPS supplies the AC power to its connected loads via receptacles.
5	OUTPUT TERMINAL BLOCK	The UPS supplies the AC power to its connected loads by output terminal block.
6	EXTERNAL BATTERY CONNECTOR	Connects external battery cabinets to extend backup time.
7	INPUT BREAKER	Prevents the UPS from damage when high input current occurs.
8	O/P BREAKER	Provides output protection.
9	MANUAL BYPASS BREAKER	For maintenance.
10	INPUT TERMINAL BLOCK	AC input supplies power to the UPS via the input terminal block.



## **Chapter 4: Installation**

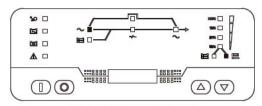
## 4-1 Installation



- AC input/ output needs a disconnect device (2-pole breaker to disconnect Line & Neutral) which has to be provided by the user.
- 2. The wire length of output power cord connected to the UPS's output socket or output terminal block should be less than 10 meters.
- 3. The over current protection and short circuit protection for the AC output are provided by the internal circuits of the UPS.
- For further details on battery voltage, ambient temperature and other specifications of the UPS, please refer to Appendix A.
- 16AWG cables for 1kVA UPS and 14AWG cables for 2kVA/ 3kVA UPS should be used for input/ output connection.

#### Connecting Utility Power

- Connect the power cable's Line, Neutral & Ground to the UPS's input terminal block's Line, Neutral & Ground. Use a 2-pole breaker to disconnect each Line & Neutral (please refer to Figure 4-4/4-5).
- Avoid using extension cords and adapter plugs.
- Connect AC input to the input terminal block. Do not connect the external battery pack first. Press the ON button to let the UPS run in 'ON-LINE Mode'. If the UPS doesn't work in 'ON-LINE Mode', please immediately contact service personnel. If the UPS does work in 'ON-LINE Mode', press the OFF button to turn off the UPS. After that, connect the external battery pack, load, and press the ON button to let the UPS run in 'ON-LINE Mode'.
- When the utility power is applied to the UPS, the fans (in the rear panel) will run, all LED indicators will light up for about 2 or 3 seconds and the LCD will be on. Meanwhile, the CPU inside the UPS will determine the initial parameters. Users can also check if all of the LED indicators are normal. The UPS is set in 'STANDBY Mode' initially. After you hear a 'beep' sound, the load LED lights up and the line LED indicator shows the AC utility status. Please see Figure 4-1.



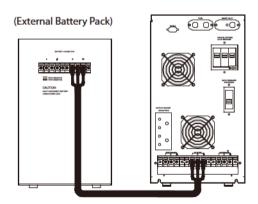
(Figure 4-1: Standby Mode)

#### Charging the Battery

 The battery charger of the UPS automatically charges the battery whenever the power cord of the UPS is connected to an acceptable utility power.

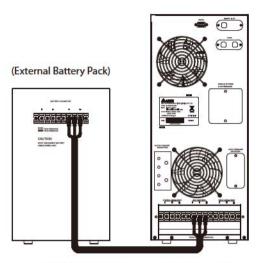
#### Connecting the Battery Pack

- Take out the battery connection cable packed in the battery pack.
- Connect one end of the cable to the external battery connector of the UPS and the other end to the one of the battery pack.
- After connecting the battery pack, be sure to replace the battery covers on the terminals of the UPS and the battery pack.
- Only qualified service personnel can install the battery pack.



(Figure 4-2: 1kVA UPS Connects to the External Battery Pack)





(Figure 4-3: 2kVA/ 3kVA UPS Connects to the External Battery Pack)

#### Connecting the Loads

- Calculate the power consumption of your loads to ensure that the overload condition will not happen.
- Plug the power cord of the equipment into the output sockets on the rear panel of the UPS.
- Turn on the equipment connected to the UPS.



#### **WARNING:**

- 1. Do not connect a laser printer to the UPS.
- 2. Do not connect the UPS to a generator.

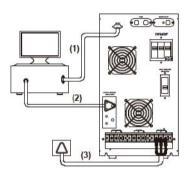


#### Connecting the RS232

- Connect the interface signal cable between the RS232 port on the rear panel of the UPS and COM1 or COM2 of a PC if necessary.
- The D-sub 9 connector can work as a RS232 communication port depending on the cable type and software. For more information, please refer to Chapter 8.

#### • 1kVA UPS Connection Illustration (Figure 4-4):

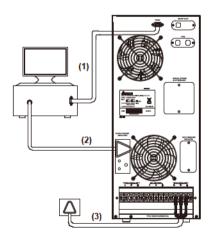
- 1) Connects to a PC with a RS232 cable.
- 2) Provides power to the PC.
- 3) Connects to utility power.



(Figure 4-4: 1kVA UPS Connection)

#### • 2kVA/ 3kVA UPS Connection Illustration (Figure 4-5):

- 1) Connects to a PC with a RS232 cable.
- 2) Provides power to the PC.
- 3) Connects to utility power.



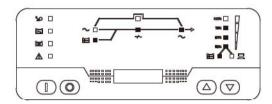
(Figure 4-5: 2kVA/ 3kVA UPS Connection)



## Chapter 5 : Operation

## 5-1 Cold Start When the Utility is Not Present

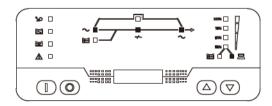
Even if there is no utility power, you can still start up the UPS when the battery pack is connected to the UPS. Press and hold the **ON** button for 2 to 4 seconds, release the button after you hear a 'beep' sound, and the UPS starts up. At this moment, the battery LED and on-battery LED light up, the UPS operates in 'BATTERY Mode', and the LCD shows BATTERY Mode message. Please see *Figure 5-1*.



(Figure 5-1: Battery Mode)

## 5-2 Start Up the UPS

To start up the UPS, press and hold the **ON** button for few seconds until you hear a 'beep' sound. The bypass LED will extinguish shortly after lighting on. When the line LED, inverter LED and output LED light up together, the UPS is operating in '**ON-LINE Mode**'. Please see *Figure 5-2*.



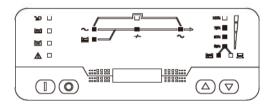
(Figure 5-2: On-Line Mode)

#### 5-3 Shut down the UPS

To shut down the UPS, press the **OFF** button until you hear a 'beep' sound. After a few seconds, the UPS will power off. Even though you have pressed the **OFF** button, the UPS will still keep charging when it operates in '**STANDBY Mode**'. To fully shut down the UPS, it is suggested that you remove the power cable from the input terminal block or switch off the input breaker (please see *Figure 3-4 & 3-5*).

#### 5-4 UPS Self-test

When the UPS is in 'ON-LINE Mode' and the battery capacity is larger than 95%, press the ON button to let the UPS transfer to 'BATTERY Mode' and perform auto self-test for about 10 seconds (see *Figure 5-3*). The self-test function checks the condition of the battery. If the UPS passes the self-test, it will return to 'ON- LINE Mode'.



(Figure 5-3: UPS Self-test)

#### 5-5 Silence Function

When the UPS is running in 'BATTERY Mode', use the ON button to turn ON or OFF the buzzer.

## 5-6 Charger Current Setting

- Press and hold the ON button for 6-8 seconds. After you hear the second 'beep' sound, the UPS will run in 'CHARGER CURRENT SETTING Mode'.
- Judge the status of charger current according to the flashing of Level LEDs.



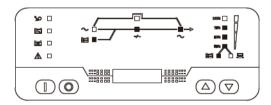
Flashing of Level LEDs	Status of Charger Current
25% LED	0.7A
50% LED	1.4A
75% LED	3A
100% LED	4A
All LEDs flash	The charger current has not been set.

- Press the ON button and then the different level LED indicators will flash with a circular sequence of 25% LED-> 50% LED-> 75% LED-> 100% LED-> All Level LEDs-> 25% LED and so on.
- Press the OFF button to confirm the charger current setting.

#### 5-7 Abnormal Conditions

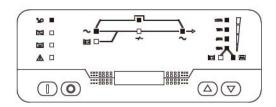
If certain abnormal conditions occur, the UPS will send the following messages.

BATTERY Mode: When the UPS is in 'BATTERY Mode', the on-battery LED will light up, the buzzer will beep for 0.5 second for every 2 seconds, and the UPS will start supplying power to the loads through the batteries. Please see Figure 5-4.



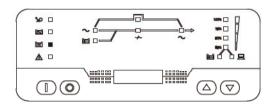
(Figure 5-4: Battery Mode)

OVERLOAD: If the total loads exceed the UPS's rating after a limited period, the overload LED will light up and the buzzer will continuously beep to alarm users. Users should unplug some uncritical loads to correct the overload condition. Please see Figure 5-5.



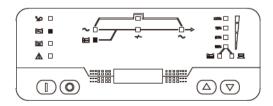
(Figure 5-5: Overload and UPS Transfers to Bypass Mode)

BATTERY REPLACEMENT: This LED function is to alert users that the batteries need to be replaced. When the microprocessor in the UPS detects a battery fault, the UPS alarm will beep 0.1 second for every 2 seconds. Please see Figure 5-6.



(Figure 5-6: Battery Replacement)

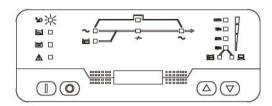
BATTERY LOW: This function informs users the remaining power capacity of the batteries. When batteries reach a low level condition, the UPS alarm will beep for 0.5 second for every 1.25 seconds until the battery capacity totally run out. Please see Figure 5-7.



(Figure 5-7: Battery Low)



SHORT CIRCUIT: When the UPS output short circuit occurs in 'ON-LINE Mode' or in 'BATTERY Mode', the UPS will turn off the inverter (without output voltage). As soon as the short circuit happens, the fault LED will light up and the UPS alarm will sound continuously. Once the short circuit issue is solved, the UPS output will recover. If the short circuit happens in 'BYPASS Mode', the UPS will protect itself by tripping the input breaker to shut itself down. Please see Figure 5-8.



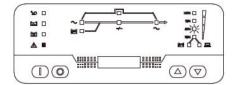
(Figure 5-8: Short Circuit)

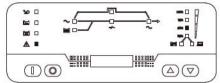
If the short circuit happens during AC soft-start process, the input breaker will be tripped off. After solving the fault, press the OFF button until the fans stop and then turn on the input breaker.

#### 5-8 UPS Internal Fault

If the following conditions occur, the UPS will fail and transfer to 'BYPASS Mode'. The bypass LED and the fault LED will light up and the alarm will continuously sound. If the utility is too low or too high, the UPS output will be disabled. For fault messages, please refer to *Chapter 7 (Troubleshooting*).

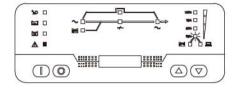
- When the UPS's inner component overheats, the UPS will protect itself by thermo switches. This situation is called 'O.T.P'.
- When under (or over) voltage happens in the UPS output, the microprocessor in the UPS will detect such fault. This situation is called 'U.V.P' ('O.V.P').
- When under (or over) bus voltage happens in the UPS, this kind of fault is called 'Bus U.V.P' ('Bus O.V.P').

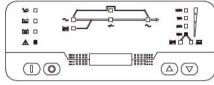




(Figure 5-9: Output U.V.P)

(Figure 5-10: Output O.V.P)





(Figure 5-11: DC Bus U.V.P)

(Figure 5-12: DC Bus O.V.P)

## 5-9 Power Derating

In the range between 80Vac and 176Vac, the UPS's load capacity will decrease. This function provides a wider operating power voltage range.



## Chapter 6: Maintenance

- To replace the batteries, contact your qualified service personnel.
- Only qualified service personnel can open the Manual Bypass Plate.
- If the UPS has not been used for a period of time, the batteries will discharge slightly. It is recommended that you should charge the UPS once every three months.
- Use a vacuum to clean all of the dust that may rest on the opening of the fans.
- Unplug the UPS if you plan not to use it for a long time.
- Use a piece of soft and dry cloth to clean the front panel. If the case or the front panel is very dirty, use a neutral and non-abrasive detergent to clean it. Do not use alcohol or ammonia based solutions.
- While moving your UPS, always handle it with care.
- Avoid pouring or splashing liquid on the UPS.
- Only individuals with previous training can repair and install the UPS.
- While installing the UPS, note that the leakage current of the UPS and its loads must not exceed 3.5mA in total for safety concern.

## **Chapter 7: Troubleshooting**

No.	Problem	Possible Cause	Solution
	UPS is not turned on (No alarm sounds and No LED lights up).	The <b>ON</b> button is not pressed.	Press the <b>ON</b> button to start up the UPS. Please refer to <b>5-2 Start Up</b> the UPS.
		Low battery shutdown or the utility is absent.	Wait for line recovery.
1		Input breaker on the rear panel is tripped.	<ol> <li>Remove some loads connected to the UPS.</li> <li>Reset the input breaker and press the <b>ON</b> button.</li> </ol>
		UPS fault.	Contact your service personnel if the actions mentioned above still cannot solve the problems.
	UPS does not provide ex- pected back- up time.	The battery pack is not fully charged.	Recharge the battery pack for at least 8 hours.
		The UPS is overloaded.	Remove some unnecessary loads.
			Batteries become weaker when they are often used or operating at higher temperature.
2		Weak batteries.	If a battery is near the end of its life, contact your service personnel. Replace the battery even if the battery replacement LED does not light up.
		Charger fault or other reasons.	Contact your service personnel.
3	All LEDs light up.	UPS internal fault.	<ol> <li>Shut down the UPS.</li> <li>Contact your service personnel.</li> </ol>



No.	Problem	Possible Cause	Solution
4	The battery replacement LED lights up.	Weak batteries.	<ol> <li>Recharge the batteries for at least 8 hours.</li> <li>If the problem still exists, contact your service personnel to replace the batteries.</li> </ol>
_	PC-UPS com- munication does not	Incorrect transmission speed.	Re-test it after using the other transmission speed.
5	work prop- erly.	Incorrect RS232 connection.	Please refer to <b>Chapter 8</b> .
	UPS operates	No incoming utility.	Check the input power connection.
6	in 'BATTERY Mode' even	Input breaker on the rear panel is tripped. (Breaker is turned off).	<ol> <li>Reduce some loads connected to the UPS.</li> <li>Reset the input breaker.</li> </ol>
		Very high, low or distorted utility voltage.	Have a qualified electrician to check the input voltage.
7	Wiring fault (the fault LED flashes).	Wiring error (The line and neutral wires are reversed).	Have a qualified electrician to check the wiring.
8	UPS over temperature.	The fans and ventila- tion grills may be obstructed.	Choose a well-ventilated area to position your UPS to allow adequate dissipation of heat.
•		The environment temperature exceeds 40°C (104°F).	Position your UPS in a cooler area.
9	The fault LED lights up or an alarm beeps	UPS failure.	Contact your service engineer.

No.	Problem	Possible Cause	Solution
10	The overload LED lights up and buzzer beeps con- tinuously.	Overload.	Remove some critical loads.
11	UPS works in 'BYPASS Mode' only	Manual Bypass Plate is opened.	Have a qualified electrician to check whether the Manual Bypass breaker is off, the output breaker is on and the input breaker is on. After that, replace the plate.



## **Chapter 8: Communication Interface**

The UPS provides RS232 protocols in one D-sub 9 connector. Using proper UPS management software and a suitable cable, you can manage the UPS over an IP network (LAN/ intranet/ internet). To download the UPS management software, please go to http://59.125.232.140.

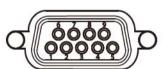
The pin assignment of the D-sub 9 connector is defined as follows.

Pin	RS232 Pin Assignment Description			
1		GND	5	
2	UPS TxD (typical RS232 level)		6	
3	UPS RxD (typical RS232 level)	Reserved for PNP	7	
4			8	
			9	

#### 8-1 RS232

#### Pin Assignment:

- Pin2: PC receives RS232 data from the UPS.
- Pin3: PC transmits RS232 data to the UPS.
- Pin5: Signal ground.
- Pin7: Reserved for plug and play function.
- The RS232 communication port provides the following functions:
  - Charger status monitoring
  - Battery status and condition monitoring
  - Inverter status monitoring
  - Utility status monitoring
  - Power switch function: to turn on/ off the utility via PC on schedule to save power.
  - Transfer voltage adjustment



The UPS data is provided at 2400 bps baud rate and made up of 8-bit, 1 stopbit and no parity bit. All information is encoded in ASCII format.

#### HARDWARE:

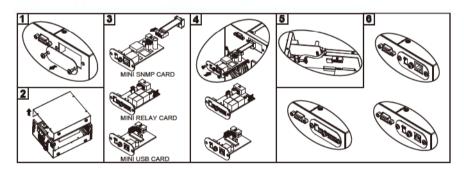
- 1) Baud Rate-----2400 bps
- 2) Data Length -----8 bits
- 3) Stop Bit -----1 bit
- 4) Parity -----NONE
- Cable type: Standard D-sub 9 cable (UPS side: Male, PC side: Female)



## Chapter 9: Mini SNMP/ Relay/ USB/ TVSS Card Installation

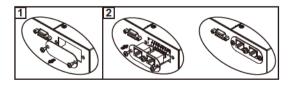
# 9-1 Mini SNMP/ Relay/ USB Card Installation Procedures for 1kVA Model

- **Step 1** Remove the smart slot cover from the rear panel.
- Step 2 Remove the UPS's top cover.
- Step 3 Take out the Mini SNMP/ Relay/ USB card from the packing box, and install the flat cable in the card.
- Step 4 Insert the Mini SNMP/ Relay/ USB card into the slot and tighten the screws.
- Step 5 Insert the other end of the flat cable into control board's CN7.
- **Step 6** Replace the UPS's top cover and tighten the screws.



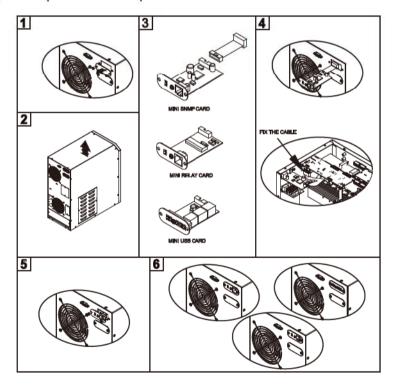
# 9-2 Mini TVSS Card Installation Procedures for 1kVA Model

- **Step 1** Remove the smart slot cover from the rear panel.
- Step 2 Insert the Mini TVSS card in the slot and tighten the screws.



## Mini SNMP/ Relay/ USB Card Installation Procedures for 2/ 3kVA Model

- Step 1 Remove the smart slot cover from the rear panel.
- Step 2 Remove the UPS's top cover.
- Step 3 Take out the Mini SNMP/ Relay/ USB card from the packing box, and install the flat cable in the card.
- Step 4 Insert the Mini SNMP/ Relay/ USB card into the slot and insert the other end of the flat cable into control board's CN7.
- Step 5 Tighten the screws for the card.
- Step 6 Replace the UPS's top cover.

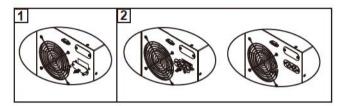




## 9-4

# Mini TVSS Card Installation Procedures for 2/3kVA Model

- **Step 1** Remove the smart slot cover from the rear panel.
- Step 2 Insert the Mini TVSS card in the slot and tighten the screws.



## **Appendix A: Specifications**

Model Name		1kVA	2kVA	3kVA		
Capacity		1kVA/700W	2kVA/1400W	3kVA/2100W		
	Rated Voltage	230V				
Input	Voltage Range	176V ~ 280V (full load); 80V ~ 176V (100% to 50% load de-rating linearly)				
	Frequency	50 Hz (± 5.0 Hz)				
	Power Factor	≥ 0.97				
	Voltage	230V				
	Frequency	50 Hz				
	Voltage Regulation	± 1%				
	Frequency Accuracy	± 0.05 Hz				
	Wave Form	Pure Sine Wave				
Output	Transient Response	± 8% (10% ~ 90% linear load)				
	THD	≤ 3% (linear load)				
	Overload Capacity	105% ~ 125% for 3 minutes; 125% ~ 150% for 30 seconds; > 150% for 1 second				
	Crest Factor	3:1				
	Efficiency (ON-LINE Mode)	> 85% (battery fully charged)	> 86% (battery fully charged)	> 86% (battery fully charged)		
Outlet	Receptacle	BS546 × 2 (10A) and Terminal Block × 1				
Battery Pack	Battery Voltage	36V	72V	72V		
Bypass Transfer Time	Transfer Time	4 ms				



LCD Output kVA, Output kW, Charging Current, Discharging Current, Online Mode, Bypass Mode, Standby Mode, Battery Mode  DB9 RS232		LED Status	Line, Inverter, Output, Bypass, On-battery, Overload, Battery Low, Fault, Battery Replacement, Battery Level and Load Level.			
Input Voltage, Input Current, Input Frequency, Output Voltage, Output Current, Output Frequency, Output kVA, Output kW, Charging Current, Discharging Current, Online Mode, Bypass Mode, Standby Mode, Battery Mode    DB9		Alarm	Buzzer			
Mini SNMP Card   Yes (Optional)	LCD Dis- play	LCD	Output Voltage, Output Current, Output Frequency, Output kVA, Output kW, Charging Current, Discharg- ing Current, Online Mode, Bypass Mode, Standby			
Mini TVSS Card   Yes (Optional)		DB9	RS232			
Noise (At 1   Meter from   54 dBA   Front Side)	Interface	Mini SNMP Card	Yes (Optional)			
Meter from Front Side		Mini TVSS Card	Yes (Optional)			
Temperature	Environ-	Meter from	54 dBA			
Safety Approval         EMC         CISPR PUB 22 Class A           Lighting         IEEE 62.41 Category A           Battery Start (No AC)         Yes           External Battery Pack         Yes (Optional)           AC Start (No Battery)         Yes           Dimensions (W x D x H)         225.4 x 425 x 400 mm         225.4 x 500 x 527.4 mm           527.4 mm         527.4 mm	ment		0 ~ 45°C			
Dimensions		Humidity	0% ~ 90% (non-condensing)			
Battery Start (No AC)   Yes	Safety	EMC	CISPR PUB 22 Class A			
Others         (No AC)         Yes           External Battery Pack         Yes (Optional)           AC Start (No Battery)         Yes           Dimensions (W x D x H)         225.4 x 425 x 400 mm         225.4 x 500 x 527.4 mm           527.4 mm         527.4 mm	Approval	Lighting	IEEE 62.41 Category A			
Pack AC Start (No Battery)  Dimensions (W × D × H)  Appearance  Pack Yes  Yes  Yes  225.4 x 425 x 225.4 x 500 x 225.4 x 500 x 527.4 mm  527.4 mm			Yes			
(No Battery)    Dimensions	Others		Yes (Optional)			
Appear- ance         (W × D × H)         400 mm         527.4 mm         527.4 mm			Yes			
	ance	Weight	25 kg	40 kg	45 kg	



<sup>\*</sup> Refer to the rating label for the safety rating.

<sup>\*</sup> All specifications are subject to change without prior notice.

## Appendix B: Warranty

Seller warrants this product, if used in accordance with all applicable instructions, to be free from original defects in material and workmanship within the warranty period. If the product has any failure problem within the warranty period, Seller will repair or replace the product at its sole discretion according to the failure situation.

This warranty does not apply to normal wear or to damage resulting from improper installation, operation, usage, maintenance or irresistible force (i.e. war, fire, natural disaster, etc.), and this warranty also expressly excludes all incidental and consequential damages.

Maintenance service for a fee is provided for any damage out of the warranty period. If any maintenance is required, please directly contact the supplier or Seller.



**WARNING:** The individual user should take care to determine prior to use whether the environment and the load characteristic are suitable, adequate or safe for the installation and the usage of this product. The User Manual must be carefully followed. Seller makes no representation or warranty as to the suitability or fitness of this product for any specific application.





