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Inverter Series

User Manual

**IS1100LT/ IS2200LT/ IS3000LT/ IS5000LT
IS2000LR/ IS2700LR/ IS4000LR/ IS5000LR**

1100VA ~ 5000VA

IMPORTANT SAFETY INSTRUCTIONS

- When replacing the batteries, use the same number and the same type of batteries.
- Do not dispose of batteries in a fire; the battery may explode.
- Do not open or mutilate the battery or batteries, released electrolyte is harmful to the skin and eyes.
- A battery can present a risk of electric shock and high short circuit current. The following precaution should be observed when working on batteries.
 - * Remove watches, rings or other metal objects.
 - * Use tools with insulated handles.
- To prevent an overbalance of this unit, with the installation the additional stabilizer are to mount at the bottom side.
- This unit should be installed by service personnel.
- The equipment can be operated by any individuals with no previous experience.
- "The socket-outlet shall be installed near the equipment and easily accessible."
- "With the installation of this equipment it should be prevented, that the sum of the leakage current of the INVERTER AND UPS at the connected consumer does not exceed 3.5mA."
- **Attention:** hazardous through electric shock. Also, with disconnection of this unit from the main, hazardous voltage still may be accessible through supply of battery.
- The battery supply should be therefore disconnected in the plus and minus pole through or from the outer enclosure accessible battery fuses when maintenance or service work inside the INVERTER AND UPS is considered.
- The lead acid battery may cause chemical hazard.
- The battery presents a risk of electric shock and energy hazard.
- Batteries will be disposed by the manufacturer or importer. Customers need to send them back with no charge for disposal.

German wording:

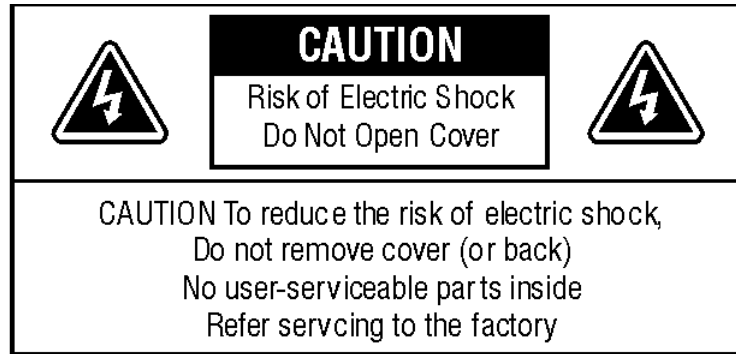
- Wenn Sie die Batterien austauschen, verwenden Sie bitte die gleiche Anzahl und den gleichen Batterietyp.
- Werfen Sie niemals die Batterien in das Feuer, die Batterien könnten explodieren.
- Öffnen oder beschädigen Sie nicht die Batterien, ausfließendes Elektrolyt ist schädlich für Haut und Augen.
- Eine Batterie kann eine Gefahr eines elektrischer Schläges und sehr großer Kurzschlußströme beinhalten. Folgende Vorkehrungen sollten getroffen werden, wenn Sie mit der Batterie arbeiten.
 - * Entfernen Sie Uhren, Ring und andere metallische Objekte.
 - * Verwenden Sie Werkzeug mit isolierten Griffen.
- Um ein Umkippen dieses Gerätes zu verhindern, sind mit der Installation dieses Gerätes die zugewinkelten Stützen an der Unterseite dieses Gerätes anzubringen.
- Dieses Gerät ist durch Elektrostatische Kräfte zu installieren.
- Bedienung durch jedermann ohne Vorkenntnisse.
- "Die Steckdose muß nahe dem Gerät angebracht und leicht zugänglich sein."
- "Bei der Installation dieses Gerätes ist darauf zu achten, daß die Summe der Ableitströme der USV und der angeschlossenen Verbraucher den Maximalwert von 3.5mA nicht überschreiten."
- "Vorsicht, Gefahr durch elektrischen Schlag. Auch nach Trennung von der Netzspannung werden Teile innerhalb der USV von der Batterie gespeist und führen gefährliche Spannung."
- Bei Instandhaltungsarbeiten ist daher die Versorgung durch die Batterie an den von außen zugänglichen Sicherungshaltern in beiden Polen zu unterbrechen."
- Die Blei-Akkumulatoren können bei unsachgemäßer Handhabung chemische Gefahren hervorrufen.
- Die Batterie birgt eine Gefahr eines elektrischen Schläges und sehr hoher Kurzschlußströme.
- Batterien werden durch den Hersteller oder Importeur entsorgt. Dazu müssen die Batterien kostenfrei angeliefert werden.

CAUTION:

- The inverter and UPS connection instructions and operation described in the manual must be followed in the indicated order.
- INVERTER AND UPS must be connected to a near by wall outlet that is easily accessible. The INVERTER AND UPS can be disconnected from the AC-power source by removing the power cord.
- Check that the indications on the rating plate correspond to your AC-power system and to the actual electrical consumption of all the equipment to be connected to the INVERTER AND UPS.
- Never install the INVERTER AND UPS near liquids or in an excessively damp environment.
- Never let a foreign body penetrate inside the INVERTER AND UPS.
- Never block the ventilation grates of the INVERTER AND UPS.
- Never expose the INVERTER AND UPS to direct sunlight or source of heat.
- If the INVERTER AND UPS must be stored prior to installation, storage must be in a dry place.
- The admissible storage temperature range is -15 °C to +55 °C.
- All handling operations will require at least two people (unpacking, installation in rack systems).
- Once installed and connected to the AC power source for the first time, the battery will start to charge. Full charging to obtain the rated battery backup time requires at least 8 hours.
- Before and after the installation, if the UPS remains de-energized for a long period, the UPS must be energized for a period of 24 hours, at least once every 6 months (for a normal storage temperature less than 25 °C). This charges the battery, thus avoiding possible irreversible damage. During the replacement of the battery module, it is imperative to use the same type and number of element previously mounted in the UPS, in order to maintain an identical level of performance and safety. In case of doubt, don't hesitate to contact our after sales department.
- Never apply the UPS as an Inverter.

Special Symbols

The following are examples of symbols used on the INVERTER AND UPS to alert you the important information.



RISK OF ELECTRIC SHOCK -

Indicates that a risk of electric shock is present and the associated warning should be observed



CAUTION; REFER TO OPERATOR'S MANUAL -

Refer to your operator's manual for additional information, such as important operating and maintenance.



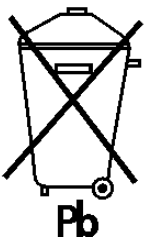
SAFETY EARTHING TERMINAL -

Indicates the primary safety ground.



RJ-45 RECEPTACLE -

For 230V units only, this receptacle provides network interface connections. Do not plug telephone or telecommunications equipment into this receptacle.



This symbol indicates that you should not discard the INVERTER AND UPS AND the UPS batteries in the trash. The UPS may contain sealed, lead-acid batteries. Batteries must be recycled.

TABLE of CONTENTS

1.	Over view and Features	Page 6
2.	Presentation	Page 7
2.1	LED display models	Page 7
2.2	LCD display models	Page 8
2.3	Panels	Page 9
3.	Installation	Page 12
4.	Operation	Page 13
5.	Indication and Control	Page 17
5.1	LED Display	Page 17
5.2	LCD Display	Page 17
5.3	Audible alarm	Page 19
5.4	Auto self-test Function	Page 19
5.5	Remote Control	Page 20
5.6	Reset the INVERTER AND UPS	Page 20
6.	Communication interface	Page 21
7.	Trouble shooting	Page 22
8.	Specifications	Page 23
8.1	IS-LT Long-Run Series (Tower) 1100VA~5000VA	Page 23
8.2	IS-LR Long-Run Series (Rack) 2000VA~5000VA	Page 26

1. OVER VIEW AND FEATURES

The series INVERTER AND UPS is an advanced Line-Interactive Uninterruptible Power System which produces pure sine wave power to your equipment; unlike the traditional off-line UPS, the series provides very short transference when blackouts happen, and zero transference from AC mode to battery mode and vice versa. The voltage regulation of the series is similar to an On-line UPS; however, the series provides efficiency over 96% under normal power condition. Two charge modes, quick charge and trickle charge, are provided to maintain the batteries in the best condition.

With outstanding performance and reliability, the unique benefits of the UPS include the following:

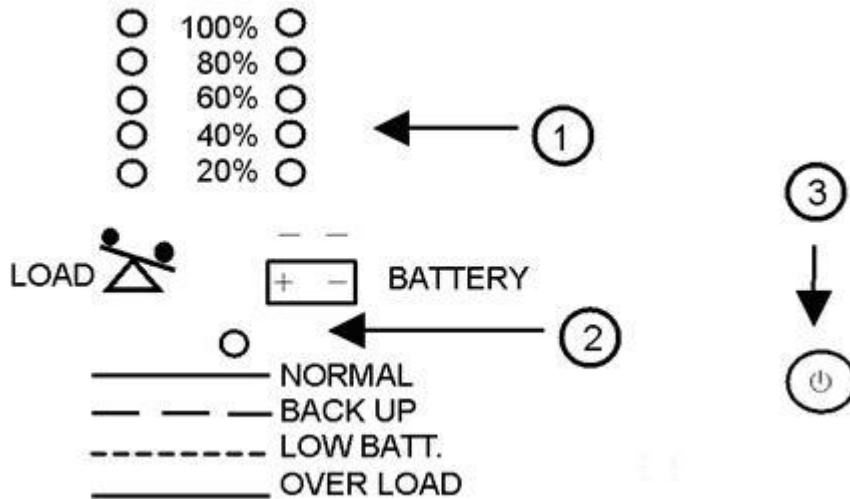
- * Pure sine wave output.
- * Microprocessor based design with true Line-Interactive structure.
- * Adjustable voltage sensitivity, charging voltage, & voltage-transfer points.
- * Remaining Estimated Backup Time indication (EBT system on LCD version).
- * Smart battery management with intelligent double stages of charging control.
- * Real time auto-detection for battery condition.
- * Automatic restart of load after UPS shutdown.
- * Smart AVR function (Two buck / boost modes).
- * Zero Transference.
- * Generator compatible.
- * “ Green Power” design with auto on/off function & adjustable level.
- * Hot-swappable batteries (Rack version/optional).
- * Network manageable (SNMP optional).
- * RS-232 interface for communication, compatible with all major O.S., including Windows, Linux, SCO UNIX, & DOS.
- * Protection for overload, short circuit, & over heat.

2. PRESENTATION

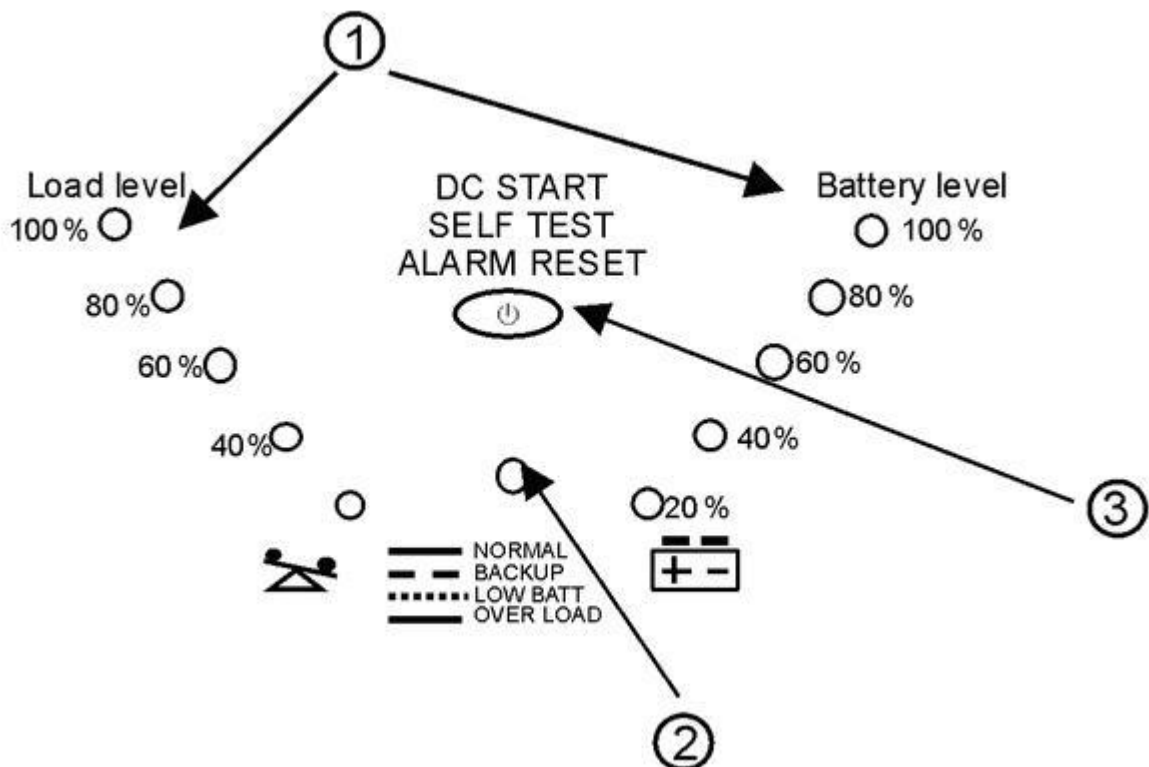
2.1 LED display models (for IS-LT LED series)

There are many types of LED display for different models; however, they all use the same control method, the following are two examples:

Front panel Example 1



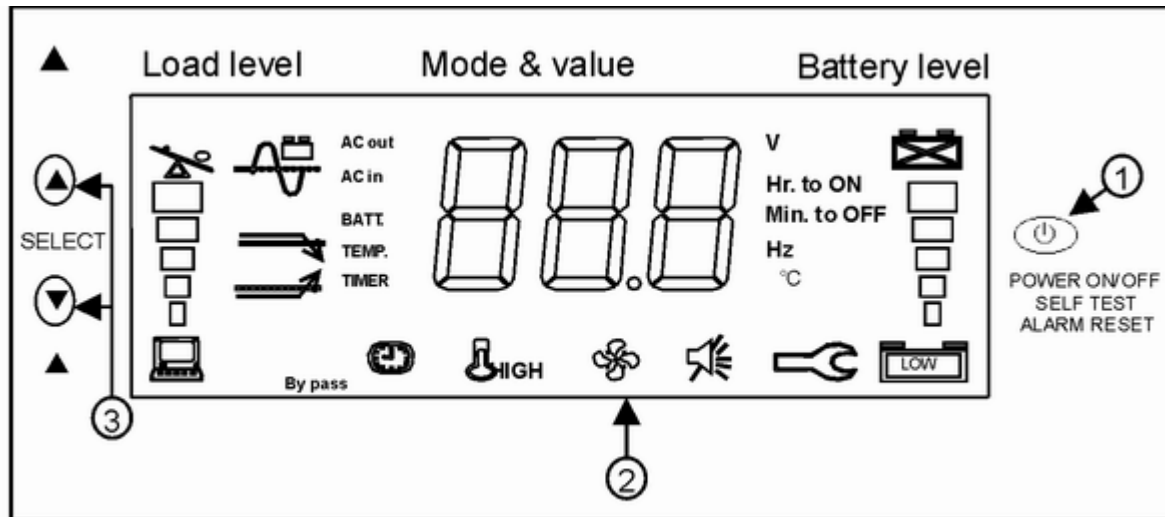
Front panel Example 2



- ① LEDs of battery voltage level and load level.
- ② LED of operation status.
- ③ Control button.

2.2 LCD display models (for IS-LT LCD series)

The following is one example of LCD display; the location of control buttons could be different for some models; however, the functions of buttons are the same.

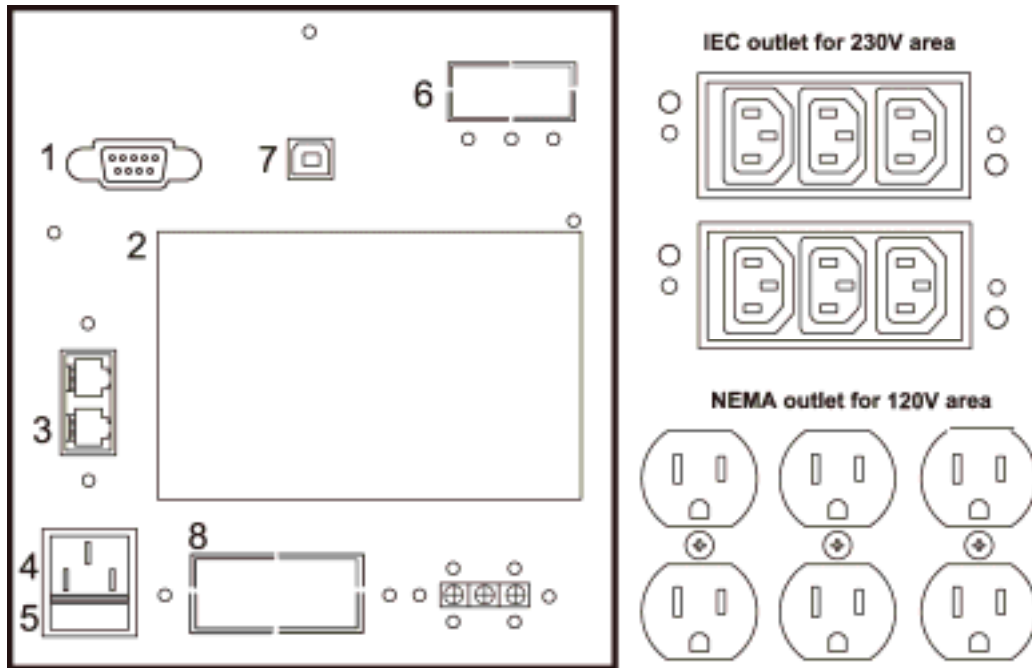


- ① Main control button.
- ② LCD screen.
- ③ Selection button for mode & value.

2.3 Panels

A -1. Tower models (for Standard IS1100LT, IS2200LT & IS3000LT)

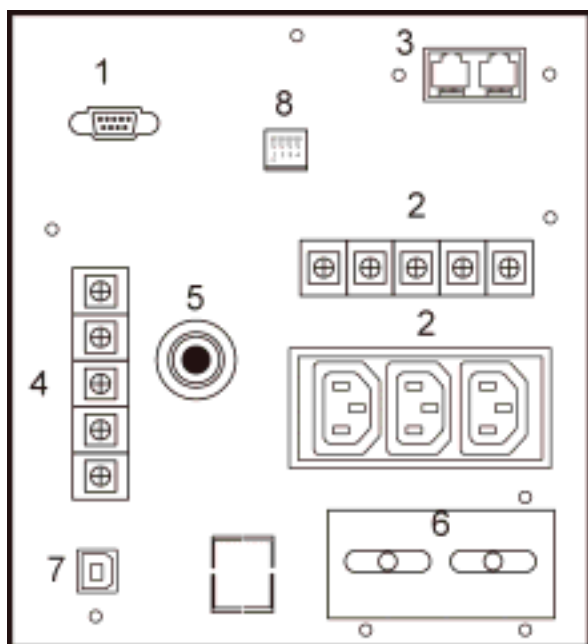
Rear Panel



1. RS-232 Interface port
2. Outlets (NEMA or IEC)
3. Data-line protection (RJ-45, Optional)
4. Inlet of city power
5. Fuse (some models apply circuit breaker)
6. Battery connector (for Long-run models only, optional for Anderson's type)
7. USB port (Optional)
8. Internal SNMP Slot (Optional)

A -2. Tower models (for Standard IS5000LT)

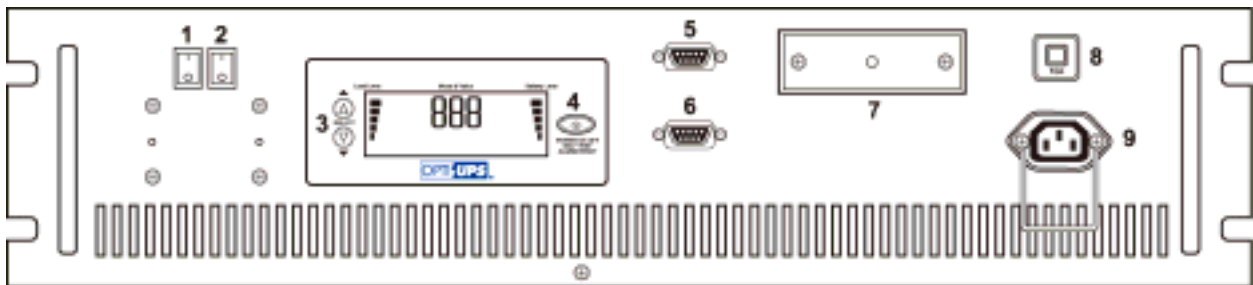
Rear Panel



1. RS-232 Interface port
2. Outlets (IEC)
3. Data-line protection (RJ-45, Optional)
4. Input
5. Circuit breaker
6. Extended battery connector
7. USB port (Optional)
8. DIP switch setting (Ref. item 5.5.1)

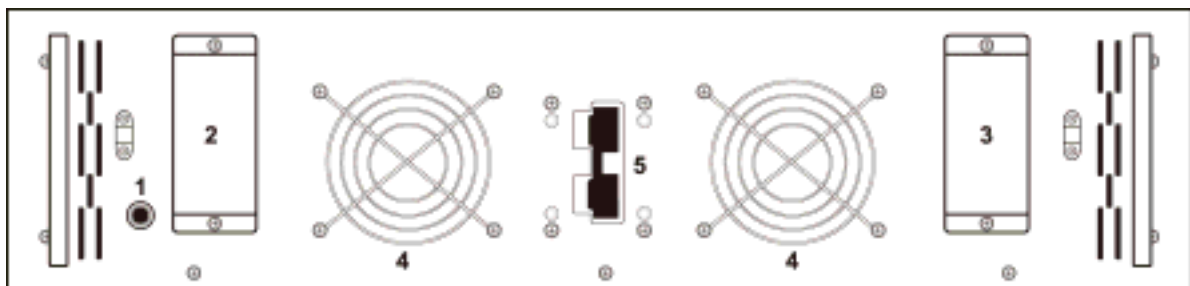
B . Rack models (for Standard IS2000LR, IS2700LR, IS4000LR & IS5000LR)

Front Panel



1. DC SW
2. AC SW
3. Selection button for mode & value
4. Main control button
5. RS-232 Interface port
6. RS-232 Interface port / DB9
7. Internal SNMP Slot (Optional)
8. Output circuit breaker
9. AC output 10A max.

Rear Panel



1. Input circuit breaker
2. Input terminal
3. Output terminal
4. Cooling fan
5. External battery terminal

3. INSTALLATION

3.1 Inspecting the packing carton for damage that may have occurred while in transit. Immediately notify the carrier and place of purchase if any damage is found. Retain the package for future use.

3.2 Plugging the power cord to a 3-wire grounding receptacle. If an extension cord must be used between the INVERTER AND UPS and the nearest wall outlet, use a 3-wire grounding type with rating, at least, for full load of input current as stated in item 8, Specifications.

3.3 Connecting your equipment to the UPS. To ensure that your computer equipment will be protected during a utility failure, it is important to make sure that the maximum power needed by the equipment is not over the rated capacity of the UPS. Red LED will light up (LED version), or the "Over load" symbol will show up (LCD version), and alarm will beep if the load is over the rated value. Meantime, if the overload is severe, the UPS will shut down immediately for protecting UPS itself.

3.4 If you are going to use the setting software (i.e. UPS Wizard), connect your computer to the communication port of UPS (RS-232) with the supplied communication cable.

3.5 After installation with normal city power, the UPS will charge the battery automatically; please keep the UPS in charging for 5 hours, at least.

3.6 Important Safety Instruction

SAVE THESE INSTRUCTIONS. This manual is important instructions that you should follow during installation and maintenance of the UPS and batteries. Please read all instructions before operating the equipment and save this manual for future reference.

4. OPERATION

4.1 Once it's connected with normal city power, the UPS will charge the battery automatically, when UPS is off, the status LED (in LED version) blinks green every 2 seconds; or in LCD version, the battery symbol and battery level will blink every second during charging. If AC auto turn-on function is enabled, the UPS will turn on automatically when city power is normal. If auto turn-on is disabled, please push the button for about one second on the front panel; then the UPS will give power to the outlets after a short-time of beeping.

4.2 Pushing the button for 4 seconds, the UPS will turn off the power on the outlets. But, the UPS will keep charging if city power is normal. To stop the charging, please pull out the power cord to shut down the UPS completely.

4.3 **DC start:** During a blackout, push the button one second for entering "OFF" mode (LCD showing "OFF" or LED blinking orange); then push again for one second, and the UPS will be turned on and enter into backup mode. To turn off the power from UPS; please push the button for 4 seconds; then the status LED (in LED version) will blink orange every 2 seconds; or LCD display will show "OFF" (in LCD version); then, wait for 10 seconds, and UPS will turn off the power automatically.

4.4 In "OFF" mode, UPS will turn off power completely in 10 seconds during a utility failure; while UPS will keep charging the batteries if the utility power is normal. When utility power is normal, please pull out the power cord if you want to turn off the UPS completely.

4.5 To test the battery and inverter of UPS, you can unplug the I/P cord, but it is more convenient to push the main control button for one second, the UPS will simulate a 10 seconds blackout and transfer to battery mode for discharging test. To cancel self-test, please push the control button for 2 seconds.

4.6 Under battery mode, when battery voltage is too low or too high, the UPS will emit alarm, if the under voltage or over voltage is too much, the UPS will turn off the UPS automatically.

4.7 When a blackout happens, the buzzer will emit two beeps every 8 seconds for alarm. You can disable the alarm by setting silence mode; to push the main control button will disable the alarm, and to push it again will enable the alarm, the setting can be shown on LCD display.

Note: The main control button will provide test function at normal mode, but will become with alarm-reset function at battery mode.

4.8 Battery charging mode: The UPS provides two charging modes for the battery, quick charging and trickle charging. The quick charging provides higher charging current when battery is empty and reduces the charging current when battery voltage increases. Trickle charging will begin automatically after battery is 90% fully charged.

4.9 Green mode setting (by UPS wizard software or through LCD display)

When "Green Power" function is enabled, the UPS will turn off the power within 60 seconds after blackout occurs with the power consumption lower than the pre-set level (adjustable from 1% to 14% of full load). The default value of green mode setting is zero (disabled). Please use the UPS wizard software to adjust this level.

4.10 Battery capacity balance discharging

In the structure, the battery is composed with many 2VDC cells in series connection. When UPS is installed, the batteries are charged and discharged by the same current. In theory, all battery cells have the same charging capacity; but in fact, each cell has a small difference of self-discharge rate in a long term, in which, the small difference of self-discharge rate will cause big difference among all the charged batteries. This phenomenon may not only shorten the battery life, but also cause wrong detection of "Replace battery". To prevent the wrong detection and to keep UPS batteries in the best condition, the battery needs capacity-balance discharge every 12 months; which is to discharge the UPS batteries to low battery alarm by disconnecting the AC input with the UPS and use a table lamp as the load. Do not use PC as the load when doing capacity-balance discharge to prevent from data loss at low battery shut-down. The lower the load, the better the balancing effect.

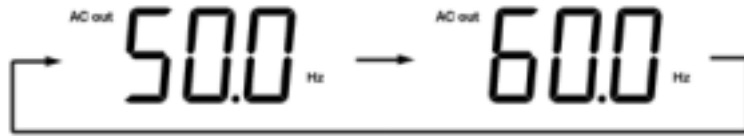
Note: If an UPS is stored in stock, please recharge the battery set every 6 months, at least; or the battery life will be shortened.

4.11 There are two ways to change the setting of UPS. The 1st way is to use the UPS Wizard software, please contact your service people for detailed information. The 2nd way is to make it through the LCD display, by the following procedures:

4.11.1 To push the two selection buttons, and , at the same time for 3 seconds until the LCD display begins to blink.

4.11.2 To change the UPS O/P frequency at DC start

When the frequency value is blinking, push any selection button, or , for 1 second to change the frequency setting! The setting will keep changing every 2 seconds if you keep pushing the button. Push two selection buttons at the same time for next setting, or leave the LCD blinking without pushing any button for 30 seconds to end the setting.



4.11.3 To change the UPS rated voltage

When the voltage value is blinking, push any selection button for 1 second to change the rated voltage. Keep pushing the button until the required voltage blinking. Then, push two selection buttons at the same time for next setting, or leave the LCD blinking for 30 seconds to end the setting.



4.11.4 To change the Auto-turn-on setting at the recovery of utility power

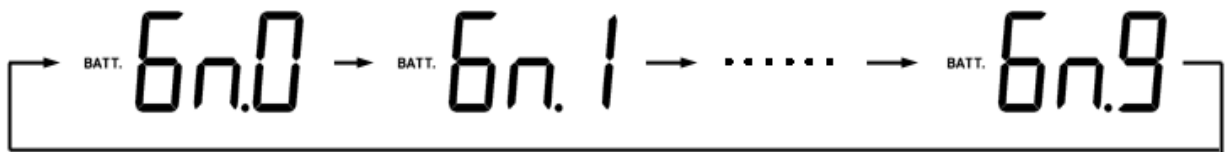
The method of changing the setting is similar to that of voltage setting. If you don't need Auto-turn-on function, please select "oFF". To select "On" is for immediate auto turning on at the recovery of utility power. While the "On.S" means auto turning on with safety mode. Sometimes, when battery is empty after blackout, the auto turn-on function will have very short backup time if blackout happened again following with a short time recovery. To select "On.S" will provide Auto-turn-on only when the battery is charged for, at least, 30% of its capacity.



4.11.5 To change the green mode level at battery mode

When the “Gn.0” is blinking, it means the green mode level is off. The UPS will not turn off the power automatically if there’s no any load connected to UPS. When the “Gn.1” is blinking, it means the green mode level is 1% of full load level. The UPS will turn off the power automatically if blackout happened when load level is less than 1% of full load.

Push the selection button “ ” for 2 seconds at least, to increase the green mode level or push “ ” to decrease the level. Push two selection buttons at the same time to end the setting.



5. INDICATION AND CONTROL

5.1 LED Display

5.1.1 Battery level and load level LEDs

The battery level LEDs show the voltage level both in back-up mode and in normal mode. When the LED indicates 20% of the capacity in back-up mode, it means that the UPS is going to shut down; for the length of backup time left, it will depend on the load. While when all five LEDs are lighted in normal mode, it means that the battery is fully charged.

The load level LEDs show the percentage of added load by the UPS's rated capacity. When all five LEDs are lighted, the UPS is over loaded.

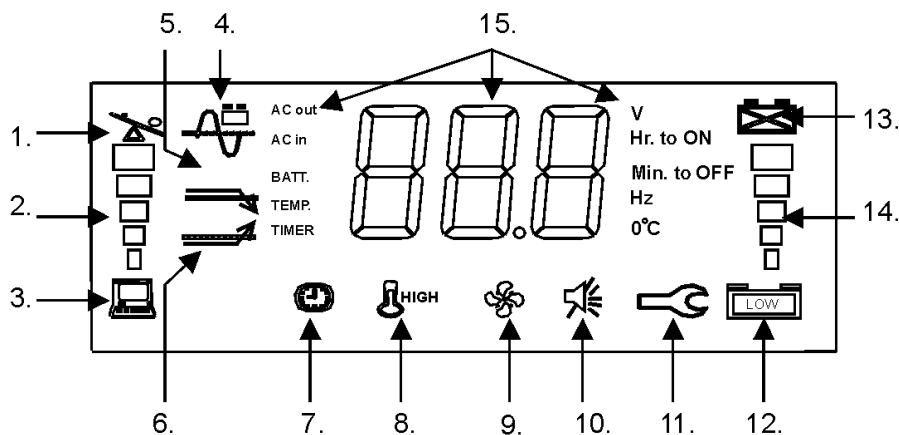
5.1.2 Operation status LED

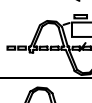
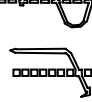
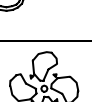
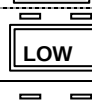
The status LED shows the UPS status. It shows Green when the utility power is normal; and shows Orange in the event of a utility outage; while if the UPS is under fault operation, it shows Red.

5.2 LCD Display

5.2.1 Main control button: Please refer to point 4 & 5 (4.1~4.7 & 5.3~5.4).

5.2.2 LCD screen



No.	Symbol	Indication	Description
1.		Over load	The loading exceeds the rating of UPS.
2.		Load level	The higher the loading, the more bars will illuminate.
3.		UPS is loaded	When "Green Mode" is enabled, this symbol will display if the loading is over 30W (default, but adjustable), and disappears when it's under 25W (default, but adjustable). Please refer to User's Manual 4.9. If "Green Mode" is disabled, the symbol will always display.
4.		Normal mode	1) The sine wave symbol will display steadily without battery symbol when UPS is in the normal mode.
		Battery mode	2) The sine wave symbol and battery symbol will blink when the UPS is in back-up (inverter) mode.
		Test mode	3) The sine wave symbol will display steadily with blinking battery symbol when the UPS is in testing mode.
5.		Buck mode	The AVR (Auto Voltage Regulator) is reducing the output voltage of the UPS (when the input voltage is too high), and the sine wave symbol, as mentioned in item 4, will also display steadily to indicate that the output is in the normal mode.
6.		Boost mode	The AVR is increasing the output voltage of the UPS (when the input voltage is too low), and the sine wave symbol, as mentioned in item 4, will display to indicate it's in the normal mode.
7.		Timer is enabled	This symbol will show up in the following situations: 1) A turn-on / turn-off schedule has been set using the monitoring software. Refer to User's Manual 5.5 and the "Readme" file or "Help" function of the monitoring software. 2) The Green Mode is enabled and the loading is under 25W (default, but adjustable). The UPS will turn itself off automatically in 60 seconds. Refer to 4.9 of User's Manual.
8.		Thermal alarm	The temperature inside the UPS is over 55°C. If the user does not reduce the load, the temperature will continue to rise and the UPS will shut down automatically at 60°C.
9.		Fan is in "High speed"	The symbol will display whenever the cooling fan is running (or high speed), and will disappear when it is off (or low speed).
10.		Silence mode	The audible alarm has been silenced. To reset the alarm in Back-up mode, push the control button (not available during low battery level or abnormal condition).
11.		INVERTER AND UPS fault	The UPS has failed and must be repaired. Contact a qualified service person.
12.		Battery normal	1) In normal operation, this symbol indicates a charged battery.
		Battery low	2) When the battery charge level is low, the word "LOW" will be added to the symbol.
13.		Battery replacement	The battery has failed and must be replaced. The battery is checked each time the Test Function is executed.
14.		Battery voltage level	1) The higher the battery voltage, the more bars will illuminate. 2) When the UPS is charging the battery, the battery symbol and the level indicator will blink together.

15.	Mode	Value	Description
	AC out	V	AC output voltage.
	AC in	V	AC input voltage.
	AC out	Hz	AC output frequency.
	BATT.	V	DC battery voltage.
	TEMP.	°C	INVERTER AND UPS internal temperature.
	TIMER	Min. to off	The INVERTER UPS will turn off when the displayed value reaches zero. For example, if the timer shows 0.5 Min to off, the INVERTER UPS will shut down in 30 seconds.
	TIMER	Hr. to on	The INVERTER UPS will turn on when the displayed value reaches zero. For example, if the timer shows 48 Hr to on, the INVERTER UPS will turn on in 2 days.
	BATT.	Min. to off	The estimated remaining run time in Back-up mode. The accuracy of the value is influenced by the loading type, ambient temperature and battery condition (old or new).
Selection Button for mode & value			
All the operation data will be displayed on LCD screen. By selecting the required mode (upward or downward), the related value will be displayed.			

5.3 Audible alarm

During a utility failure or fault operation, the INVERTER AND UPS emits beep for warning. In back-up mode, the alarm can be silenced by pushing the button. However, the warning of low battery will still sound for urging user to leave computer without any data loss.

Basic Indication Table:

	STATUS	ALARM	REMARK (LED)
Idle mode	Utility Good	No Beep	Green (flash)
	Utility outage	No Beep	Orange (flash)
	Timer on, (refer to Item 5.5)	No Beep	Red (flash)
Normal / Back-up mode	Normal (Utility good)	No Beep	Green
	Back-up (No load)	One beep every 4 sec (alarm can be silenced).	Orange (flash)
	Back-up (Loaded)	2 beeps every 8 sec. (alarm can be silenced).	
	Battery Low	4 beeps per sec (alarm can Not be silenced).	Orange (flash)
Abnormal Condition	Over load	Continuous alarm (alarm can Not be silenced).	Red
	INVERTER AND UPS fault	Every other 2 sec., 32 beeps in 2 sec (alarm can Not be silenced).	Red (flash)
	Thermal alarm	Every other 2 sec., 32 beeps in 2 sec (alarm can Not be silenced).	Red (flash)

5.4 Auto Self-test Function

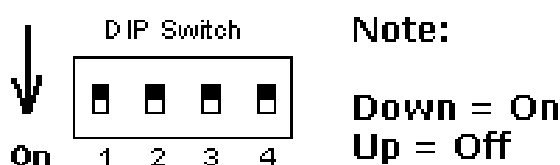
In normal mode of INVERTER UPS, turn on your computer and push the button on the front panel for self-test. The INVERTER UPS will simulate a power outage and transfer to battery mode. If low battery warning sounds during the test, it means that the battery set is weak and requires extended recharge.

5.5 Remote Control

The INVERTER AND UPS can be set for daily shutdown/wake up. This command must be set through the RS-232 interface. When this function is set, the timer inside the INVERTER AND UPS will begin to run, and the load will be turned off by the shutdown / wake-up schedule. During the period of turn-off to the next turn-on, the status LED blinks red every 2 seconds. For LCD version, the time period to next turn-on will be shown on LCD panel by hour (Ref. item 5.2 of LCD description).

5.5.1 DIP Switch Settings (Available for Tower long run model, IS5000LT, only)

DIP switch setting



DIP 1	DIP 2	230V System	DIP setting is valid only when the DIP3=Down. To apply the other setting on LCD display, Please refer to 4.11.
Down	Up	200V	
Up	Up	220V	
Up	Down	230V	
Down	Down	240V	
DIP 3 for Setting selection UP=invalid for DIP setting / Down=valid for DIP setting			
DIP 4 for Green Mode setting UP=Enable / Down = Disable			

DIP Switch Settings (for special design of IS5000LT)

DIP 1	DIP 2	Charging current	NOTE of Charging current control : The setting of DIP 1 & 2 is valid only when the DIP3 = Down.
Up	Up	25%	
Down	Up	50%	
Up	Down	75%	
Down	Down	100%	
DIP 3 = Down, UPS mode ; DIP 3 = Up, Inverter first.			
DIP 4 for Green Mode setting UP = Enabled / Down = Disabled			

P.S.: The setting active only after the inverter is re-started

5.6 Reset the INVERTER AND UPS

If any abnormal condition occurs, and the item 4.1 ~ 4.7 can not be executed, please unplug the line cord and push the button for at least 15 sec., which will reset the INVERTER AND UPS.

6. COMMUNICATION INTERFACE

The INVERTER AND UPS provides two computer interfaces, smart software (RS-232) and USB (optional). The RS-232 also includes dry contact (DB-9, optional) for different monitoring application.

The models with USB interface are applying the same control port for both USB & RS-232 so that the only interface can be used at the same time.

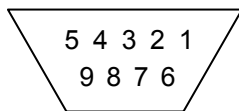
6.1 The definition and setup for RS-232 is shown as follows:

Baud Rate : 2400 dps

Data Length : 8 bits

Stop Bit : 1 bit

Parity : None



Pin #6 : RS-232 data Tx out.

Pin #7 : Common of Pin #6 and Pin #9

Pin #9 : RS-232 data Rx In

6.2 The definition and setup for DB9 (optional) is shown as follows:

Pin #2 : AC Power Failure

Pin #4 : Common GND of Pin #2 & Pin #5

Pin #5 : INVERTER AND INVERTER AND UPS Battery Low

Pin #6 : Turn off INVERTER AND INVERTER AND UPS

Pin #7 : GND of Pin6

The interface with computer is diagramed as above for your reference. Use Pin #4 as the common of Pin #2 and Pin #5, Pin #2 and Pin #4 will become close loop from open when the utility fails, Pin #5 and Pin #4 will become close loop from open when the battery level is low.

The INVERTER AND UPS will shut down itself when the high level from RS-232, sustained for 3 seconds, which is applied between Pin #6 and Pin #7.

7. TROUBLE SHOOTING

Problem	Possible Cause	Action to Take
INVERTER AND UPS no reaction while AC is connected	1. Line cord plug is loose 2. Fuse on rear panel blown (Inside the drawer of inlet) 3. Dead wall socket	1. Check the line cord plug 2. Replace fuse 3. Check wall socket with a table lamp.
Power output is normal, INVERTER AND UPS emits continuous beep, status LED shows RED, or LCD shows "overload".	INVERTER AND UPS is over loaded	Turn off INVERTER AND UPS and unplug excessive loads from INVERTER AND UPS.
No power on outlets, INVERTER AND UPS emits continuous beep, status LED show RED or LCD shows "over load".	INVERTER AND UPS has shut down due to severe overload.	Unplug excessive loads from INVERTER AND UPS, press button to reset the buzzer, and turn on the INVERTER AND UPS again.
INVERTER AND UPS does not provide expected run time	1. Excessive loads connected at INVERTER AND UPS's outlets. 2. Battery is weak and cannot provide enough capacity.	Do not operate the INVERTER AND UPS, and leave the INVERTER AND UPS plugged in for 10 hours. Then, test it again, if INVERTER AND UPS still cannot provide expected run time, battery should be replaced.
Button on front panel doesn't work	1. The CPU inside INVERTER AND UPS is not running correctly. 2. Button damaged.	1. Unplug the line cord & push the button for 15 seconds to reset the INVERTER AND UPS. 2. Unplug all loads and line cord from the INVERTER AND UPS to let it shut down automatically, and call for service.
To push button for testing under AC mode, INVERTER AND UPS emits urgent beep and LCD display shows "battery replacement" at the same time.	Battery is weak and should be replaced	Replace batteries.
INVERTER AND UPS cannot be turned on.	1. Battery polarity wrong 2. INVERTER AND UPS fault	1. Check battery connection. 2. Call for service.

8. SPECIFICATIONS

8.1 IS-LT Long-Run Series (Tower) 1000VA~5000VA

General Features:

- Smart backup time estimation for any kind of battery
- Adjustable voltage sensitivity, voltage-transfer points, & charging voltage
- Generator compatible
- Automatic restart of load after INVERTER AND UPS shutdown
- Smart AVR function (Two buck / boost modes)
- Cold-start capable
- Audible alarm
- Hot-swappable batteries
- Network manageable (SNMP optional)
- Full function of LCD display (LED display optional)
- Smart battery management
- Intelligent double stages of charging control, Wet battery compatible
- Thermal control cooling fan

Output

	120V Models	230V Models
Power Levels crated at nominal inputs	IS1100LT : 1100VA / 660W IS2200LT : 2200VA / 1350W IS3000LT : 3000VA / 1800W	
	N / A	IS5000LT : 5000VA / 3200W
Output Voltage	100V/110V/120V Selectable	220V/230V/240V Selectable
Voltage Waveform	Sine wave	
Crest Factor	3 : 1 ; (4.5 : 1 optional)	
Output Frequency (Synchronized to Mains)	Auto Select for 50/60Hz 47Hz ~ 55Hz for 50Hz nominal; 56Hz ~ 65Hz for 60Hz nominal	
Regulation (Nominal)	±5% typical of nominal voltage (optional at ±10% AVR for wide I/P up to ±35%)	
Regulation (Battery mode)	±3% of selected output voltage (adjustable with the remote set-up software)	
Transfer time (Typical)	Blackout 4ms; Brownout 4ms; Battery mode to Normal mode : 4ms typical	
Over current protection	Over load alarm level 100% ~ 120%, Over load shutdown level 120% ~ 190% (Adjustable by using the remote set-up software)	

Input

	120V Models	230V Models
Nominal Voltage	100V/110V/120V Selectable	220V/230V/240V Selectable
Input Frequency	47Hz ~ 65Hz, 50/60Hz auto-sensing	
Efficiency	97% (Normal mode)	
Noise Filtering	Full time EMI/RFI filtering	
Over current protection	IS1100LT : by AC fuse IS2200LT / IS3000LT : by re-settable over current protector	IS1100LT / IS2200LT : by AC fuse IS3000LT / IS5000LT : by re-settable over current protector
Voltage Range	-20% ~ +22% for selected nominal voltage. -29% ~ +33% adjustable by using the remote set-up software	
AVR Range (2 Bucks, 2 Boosts)	Enhanced Buck: +15% of selected nominal voltage Buck mode: +5% of selected nominal voltage Boost mode: -5% of selected nominal voltage Enhanced Boost: -12.5% of selected nominal voltage	
Surge Protection	IS1100LT : 220 Joules IS2200LT : 440 Joules IS3000LT / IS5000LT : 660 Joules	

Battery

Battery type	Lead-Acid 25Ah	250Ah
Voltage	IS1100LT(1100VA/ 660W) : 24Vdc (48Vdc optional) IS2200LT(2200VA/ 1350W) : 48Vdc (24/36Vdc optional) IS3000LT(3000VA/ 1800W) : 72Vdc (24/36/48Vdc optional)	
	N / A	IS5000LT(5000VA/ 3200W) : 48Vdc
Typical backup time	No Limit	
Charging method	Smart pulse charging with two charging modes : Quick charging when battery is not fully charged, trickle charging when battery is 90% fully charged.	
Charging current	11A for IS1100LT / IS2200LT / IS3000LT 30A for IS5000LT(48Vdc) 20A Optional for IS1100LT / IS2200LT / IS3000LT(Below 48Vdc) P.S. At normal line and normal temperature (Average)	
Average charging voltage for each battery	Quick charging mode : 14V maximum. Trickle charging mode : 13.2V ~ 13.9V adjustable with the remote set-up software.	

Protection	Over current protection & Over charging voltage protection (SCR control) Thermal protection (CPU control) : When temperature inside INVERTER AND UPS is over 45 °C, charger will stop charging for 2.5 minutes followed by an 1.5 minutes charging. The cycle will be repeated until the temperature is lower than 44 °C.
Monitoring	Smart monitoring & warning for failed battery or open-circuit battery. Auto-detection each time when power on or every 6 days.

Communications & Management

Standard Interface port	UPSilon2000 compatible RS232 (USB port is optional)
Optional Interface part	RJ45 (Surge protection), DB9, SNMP
Control panel	LCD or LED Selectable
Audible alarm	Alarm on battery : Low battery & Battery over voltage Alarm on abnormal operation : Over load, Short-circuit, & Over heat
EBT (Estimation of Backup Time) system	Support for LCD display
Green mode function (Auto-shutdown during blackout)	1% to 14% of full load (adjustable by using the remote set-up software) The default setting is OFF.
Cooling fan control	Auto on / off, controlled by temperature & operation mode

Environmental and Safety

Operating Temperature	Up to 1500 meters : 0 °C to 40 °C (32 °F to 104 °F)
Transit/storage Temperature	-15 °C to 55 °C (5 °F to 131 °F)
Relative Humidity	5 - 95% non condensing
Operating Altitude	0 ~ 3000 meters
Audible noise at 1M from surface of unit	50 dBA
Isolation	3KVac for 1 minute between battery and AC side
Quality control system	ISO 9001

Physical

Dimensions: (L×W×H) Physical / Packing	IS1100LT / IS2200LT / IS3000LT : 17.5x7.8x7 / 21x12.8x11.7 (inch) 445x198.1x178 / 533x325.1x297.2 (mm) IS5000LT : 19.9x7.8x7 / 23.8x12.9x11.7 (inch) 505.4x198.1x177.8 / 604.5x327.7x297.2 (mm)
Weight: Net / Gross	IS1100LT : 33.1 / 35.3(lbs) ; 15 / 16(kg) IS2200LT : 42 / 44.2(lbs) ; 19 / 20(kg) IS3000LT : 50.8 / 53(lbs) ; 23 / 24(kg) IS5000LT : 88.4 / 92.8(lbs) ; 40 / 42(kg)
Packing	Export carton for each unit, 16 - 30 units per pallet

8.2 IS-LR Long-Run Series (Rack) 2000VA~5000VA

General Features:

- Smart backup time estimation for any kind of battery
- Adjustable voltage sensitivity, voltage-transfer points, & charging voltage.
- Generator compatible
- Automatic restart of load after INVERTER AND UPS shutdown
- Smart AVR function (Two buck / boost modes)
- Cold-start capable
- Audible alarm
- Hot-swappable batteries
- Network manageable (SNMP optional)
- Full function of LCD display (LED display optional)
- Smart battery management
- Intelligent double stages of charging control, Wet battery compatible
- Thermal control cooling fan

Output

	120V Models	230V Models
Power Levels crated at nominal inputs	IS2000LR : 2000VA / 1250W IS2700LR : 2700VA / 1700W IS4000LR : 4000VA / 2500W	IS5000LR : 5000VA / 3200W
Output Voltage	100V/110V/120V Selectable	220V/230V/240V Selectable
Voltage Waveform	Sine wave	
Crest Factor	3 : 1	
Output Frequency (Synchronized to Mains)	Auto Select for 50/60Hz 47Hz ~ 55Hz for 50Hz nominal; 56Hz ~ 65Hz for 60Hz nominal	

Regulation (Nominal)	±5% typical of nominal voltage (optional at ±8% AVR for wide I/P up to ±35%)
Regulation (Battery mode)	±3% of selected output voltage (adjustable with the remote set-up software)
Transfer time (Typical)	Blackout 3ms; Brownout 1ms; Battery mode to Normal mode : 1ms typical
Over current protection	Over load alarm level 100% ~ 120%; Over load shutdown level 120% ~ 190% (Adjustable by using the remote set-up software)

Input

	120V Models	230V Models
Nominal Voltage	100V/110V/120V Selectable	220V/230V/240V Selectable
Input Frequency	47Hz ~ 65Hz, 50/60Hz auto-sensing	
Efficiency	97% (Normal mode)	
Noise Filtering	Full time EMI/RFI filtering	
Over current protection	By re-settable over current protector	
Voltage Range	-20% ~ +22% for selected nominal voltage. -29% ~ +33% adjustable by using the remote set-up software	
AVR Range (2 Bucks, 2 Boosts)	Enhanced Buck: +15% of selected nominal voltage Buck mode: +5% of selected nominal voltage Boost mode: -5% of selected nominal voltage Enhanced Boost: -12.5% of selected nominal voltage	
Surge Protection	IS2000LR / IS2700LR : 440 Joules IS4000LR / IS5000LR : 660 Joules	

Battery

Battery type	Lead-Acid 25Ah 250Ah
Voltage	IS2000LR / IS2700LR : 48Vdc (24Vdc optional) IS4000LR : 48Vdc (72Vdc optional) IS5000LR : 48Vdc
Typical backup time	No Limit
Charging method	Smart pulse charging with two charging modes. Quick charging when battery is not fully charged, trickle charging when battery is 90% fully charged.
Average charging current	11A for IS2000LR / IS2700LR / IS4000LR 20A for IS5000LR(48Vdc) 20A Optional for IS2000LR / IS2700LR / IS4000LR(Below 48Vdc) P.S. At normal line and normal temperature (Average)

Average charging voltage for each battery	Quick charging mode : 14V maximum : Trickle charging mode : 13.2V ~ 13.9V adjustable with the remote set-up software.
Protection	Over current protection (SCR control) Over charging voltage protection (SCR control) Thermal protection (CPU control) : When temperature inside INVERTER AND UPSis over 45 , charger will stop charging for 2.5 minutes followed by an 1.5 minutes charging. The cycle will be repeated until the temperature is lower than 44 .
Monitoring	Smart monitoring & warning for failed battery or open-circuit battery. Auto-detection each time when power on or every 6 days

Communications & Management

Standard Interface port	UPSilon2000 compatible. RS232 (USB port is optional)
Optional Interface part	RJ45 (Surge protection), DB9, USB, SNMP
Control panel	LCD
Audible alarm	Alarm on battery : Low battery & Battery over voltage Alarm on abnormal operation : Over load, Short-circuit, & Over heat
EBT (Estimation of Backup Time) system	Yes
Green mode function (Auto-shutdown during blackout)	1% to 14% of full load (adjustable by using the remote set-up software) The default setting is OFF.
Cooling fan control	Auto on / off, controlled by temperature & operation mode

Environmental and Safety

Operating Temperature	Up to 1500 meters : 0 to 40 (32 to 104)
Transit/storage Temperature	-15 to 55 (5 to 131)
Relative Humidity	5 - 95% non condensing
Operating Altitude	0 ~ 3000 meters
Audible noise at 1M from surface of unit	50 dBA
Isolation	1.5KVac for 1 minute between battery and AC side
Quality control system	ISO 9001

☐ Physical

Dimensions: (L×W×H) Physical / Packing	IS2000LR / IS2700LR / IS4000LR : 51.9x17.6x51.9 / 23x12.9x23(inch) 132x447x132 / 584x327.7x584(mm) IS5000LR : 6.9x18.7x6.9 / 25x15.6x23.4(inch) 176x475x176 / 635x396x594.3(mm)
Weight: Net / Gross	IS2000LR / IS2700LR : 57.5 / 66.3(lbs) ; 26 / 30(kg) IS4000LR : 75.1 / 84(lbs) ; 34 / 38(kg) IS5000LR : 97.2 / 106(lbs) ; 44 / 48(kg)
Packing	Export carton for each unit, 16 - 30 units per pallet



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