

# PowerPrem Series

## Line Interactive Sine Wave UPS



This specification covers the requirements & quality assurance provisions for AC line powered uninterruptible power supplies (UPS).

The UPS shall utilize line-interactive UPS topology in which the inverter works “in reverse” charging the batteries during normal operation, providing greater efficiency, and reliability. The UPS consists of an autotransformer, battery charger control circuit, battery, Bi-lateral inverter, transfer switches and all associated controls, monitoring and major protection devices.

The UPS automatically maintains continuity of electrical power within tolerances and time frames specified in this product specification.

### 1.2 Modes of Operation

In normal operation incoming AC power is fed directly to the output or via an autotransformer. In this mode, power is also derived from the utility for the battery charger. The battery can be charged from the utility irrespective of whether the UPS is ON or OFF.

In the event of utility abnormalities (sags and swells), the AC output power shall be corrected by means of boost (sag correction) or buck (swell correction) compensation taps. Operation of the compensation taps shall be seamless and automatically maintain the proper output voltage for the connected critical equipment. The compensation taps shall be designed for indefinite operation at full rated load to their voltage limits, without discharging the battery.

In the event of a utility outage, the output is transferred from the utility power to the inverter which supports the load until the battery is discharged or the utility returns, whichever occurs first.

### 1.3 Built-in SNMP/web agent slot



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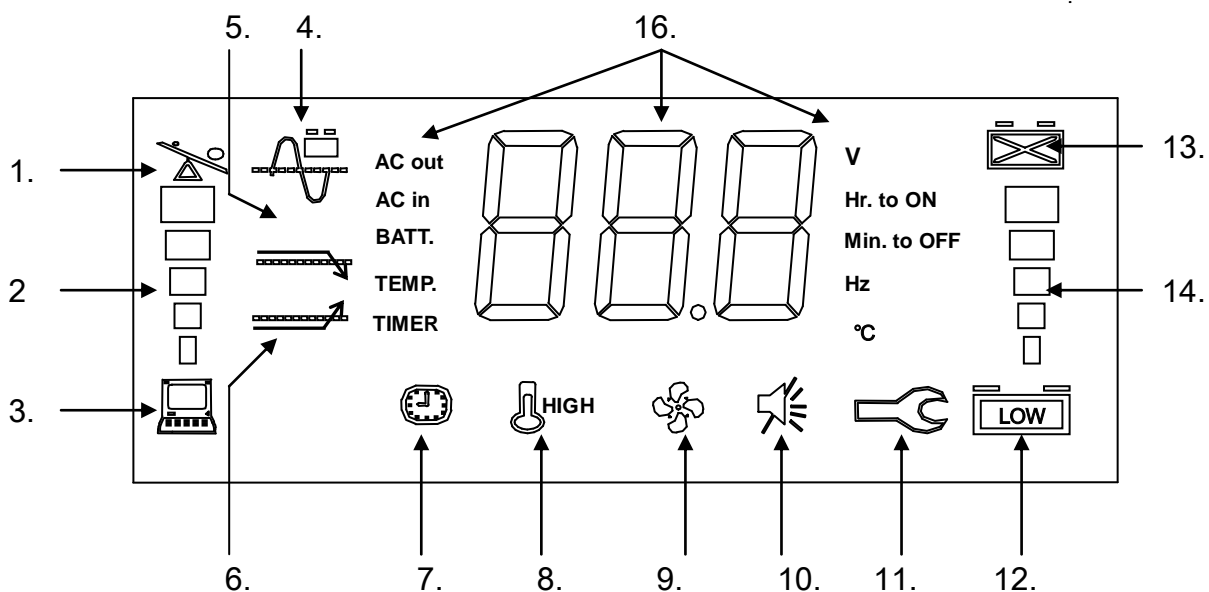
With an optional SNMP agent card, the UPS can be connected to a network as a node. It can be accessed and managed from a worldwide network via a single SNMP management console located anywhere in the network. Users can monitor their UPS with a web browser. Users have secure access to their web server UPS information from anywhere on the Internet or Intranet.

### 1.4 DIP switch setting


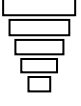








DIP 1	DIP 2	220V System	110V System
Down	Up	<b>220V / 60Hz *</b>	<b>100V / 50Hz</b>
Up	Up	220V / 50Hz	110V / 60Hz
Up	Down	230V / 50Hz	115V / 60Hz
Down	Down	240V / 50Hz	120V / 60Hz
DIP 3 for AC auto turn-on when city power returns UP = Enable / Down = Disable			
DIP 4 for Green Mode setting UP = Enable / Down = Disable			

### 1.5 INDICATION AND CONTROL

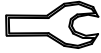
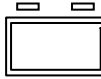



#### 1.5.1 LCD description:



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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 (approximately), and disappears when it is under 25W (approximately). Refer to User’s Manual 4.2.5. If “Green Mode” is disabled, the symbol will always display.
4.		Normal or Inverter mode	<p>(1) The sine wave symbol will display steadily without battery symbol when UPS is in the normal mode.</p> <p>(2) The sine wave symbol and battery symbol will blink when the UPS is in back-up (inverter) mode.</p> <p>(3) The sine wave symbol will display steadily with blinking battery symbol when the UPS is in testing mode.</p>
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 that the output is in the normal mode
7.		Timer is enabled	<p>This symbol will show up in the following situations:</p> <p>(1) A turn-on / turn-off schedule has been set using the monitoring software. Refer to User’s Manual 5.6 and the “Readme” file or “Help” function of the monitoring software.</p> <p>(2) The Green Mode is enabled and the loading is under 25W (approximately). The UPS will turn itself off automatically in 30 seconds. Refer to 4.2.5 of User’s Manual.</p>
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 “ON”	<p>This symbol is used only on long back-up (L) models.</p> <p>The symbol will display whenever the cooling fan is running.</p>
10.		Alarm off	The audible alarm has been silenced. To reset the alarm in Back-up mode, push the control button (not available during low battery level



			in Back-up mode).
11.		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 of Mode / Value
	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	UPS internal temperature.
	TIMER	Min. to off	The UPS will turn off when the displayed value reaches zero. For example, if the timer shows 0.5 Min to off, the UPS will shut down in 30 seconds.
	TIMER	Hr. to on	The UPS will turn on when the displayed value reaches zero. For example, if the timer shows 48.0 Hr to on, the 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).

### 1.5.2 Auto self-test Function:

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



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1.5.3 Auto battery test function:

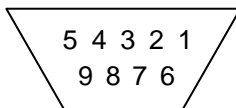
In normal mode of UPS, the UPS will test its battery connection and status every 20 minutes, when battery is NG, open circuit or not well connected, the UPS will emit low battery alarm, at the same time its LCD will show battery NG mark. The battery NG mark will not disappear until the battery is well connected or replaced by good ones.

1.6 COMMUNICATION INTERFACE:

The UPS provides both computer interfaces, smart software (RS-232) and dry contact (DB-9); by using different software and cable, the UPS shows different monitoring function.

1.6.1 The definition and setup for RS-232 is as following:

- 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

1.6.2 The definition and setup for DB9 (optional) is as following:

- Pin #2 : AC Power Failure
- Pin #4 : Common GND of Pin #2 & Pin #5
- Pin #5 : UPS Battery Low
- Pin #6 : Turn off 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.

If battery NG happen and is sensed by the UPS's auto battery test function, Pin #5 and Pin #4 will also become close loop.

The 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.



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## 2.0 Electrical Requirements

### 2.1 Input

#### Input Range when it is with 5% Output (Standard)

AVR FUNCTION	OVER HIGH VOLTAGE PROTECTION	( + ) 22% of rated voltage
	HIGH VOLTAGE TRANSFER POINT 2	( + ) 15% of rated voltage
	HIGH VOLTAGE TRANSFER POINT 1	( + ) 5% of rated voltage
	LOW VOLTAGE TRANSFER POINT 1	( - ) 5% of rated voltage
	LOW VOLTAGE TRANSFER POINT 2	( - ) 13% of rated voltage
	TOO LOW VOLTAGE PROTECTION	( - ) 20% of rated voltage

#### Input Range when it is with 8% Output (Option upon request)

AVR FUNCTION	OVER HIGH VOLTAGE PROTECTION	( + ) 36% of rated voltage
	HIGH VOLTAGE TRANSFER POINT 2	( + ) 25% of rated voltage
	HIGH VOLTAGE TRANSFER POINT 1	( + ) 8% of rated voltage
	LOW VOLTAGE TRANSFER POINT 1	( - ) 8% of rated voltage
	LOW VOLTAGE TRANSFER POINT 2	( - ) 21% of rated voltage
	TOO LOW VOLTAGE PROTECTION	( - ) 32% of rated voltage

#### 2.1.1 Inrush current (initial start up)

Tested at 220 VAC RMS., 25 deg C: the UPS should not sink any inrush current from AC input when initial start up.

#### 2.1.2 Input line transient immunity

No component failures or malfunction should be found when the UPS is subjected to an input line transient.

#### 2.1.3 Surge Protection

Both the AC input and AC output should have surge protection with energy rating totally 800 joules. By checking at the AC output of UPS, the surge protection should have zero clamping response time.

### 2.2 Output

<b>Model</b>	<b>PowerPrem 5000</b>
Power (VA) max.	5000VA



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Power (Watts) max.	3500W
Output	
Waveform	Pure Sine wave
Nominal Voltage	220/230/240VAC by DIP switch setting
Transfer Time	2.5 ms typical, 3.5ms maximum
Line Mode Voltage	
Nom. Range (no load)	220/230/240VAC $\pm 5\%$
Battery Mode Voltage Regulation	220/230/240VAC $\pm 3\%$
Transient Response (Battery mode with R type load)	0%, 100%, 0% $\pm 15\%$ max  50ms to stable
Peak Voltage	390V peak
Transient Recovery	Zero ~ 1ms
Output Frequency (battery mode)	50/60Hz $\pm 0.1\text{Hz}$

Output Voltage Distortion	
R Load	< 4 % before pre-alarm < 8 % after pre-alarm
SMPS Load	< 7 % before pre-alarm < 15 % after pre-alarm
Efficiency	
Line Mode	> 97 %
Boost/Buck Mode	> 93 %
Battery Mode(R load)	> 80 %
Short Circuit Protection	
Line Mode	Circuit protection
Battery Mode	Current limit with fuse



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## 2.2 Battery (all parameters are defined at 25 Deg. C)

		<b>PowerPrem 5000</b>	
Type / Rating		12V 7Ah 12PCS	
Acceptable Manufacturers		BPC, Yuasa, CSB	
Life		Standard life (3 – 5 years)	
Back-up Time (at full load)		> 6 minutes typical	
Protection			
Battery Protection		Fuse	
Low Batt. Alarm Level		63.6V $\pm$ 3%	
Low Batt. Shut Down Level		57.6V $\pm$ 3%	
RECHARGER	RECHARGER VOLTAGE	82V	
	RECHARGER METHOD	ON/OFF Control with Constant Voltage and Current Limiting	
	RECHARGER CURRENT	6A maximum	10A maximum
	RECHARGER TIME	2 hrs to 90%, 6hrs to 100%	
	PROTECTION	Charging Voltage and Current Limited by control IC, Over charge protected by CPU	

<b>PowerPrem 5000</b>	
Tower Dimensions	180mm W x 500mm D x 435mm H
Rackmount Dimensions	435mm W x 500mm D x 180mm H
Unit Weight	80Kgs (inc Batteries)

