

# Uninterruptible Power Supply



# What's Included

The SDU UPS is shipped with the following items:

- User manual
- UPSMON software CD
  - NOTE:** Monitoring/diagnostic software is included on the UPSMON CD. The software is compatible with Windows XP, 7, 8, 10, Server-2000, 2003, 2008 and Linux.
- PSMON High speed 2.0 Standard Type A-B USB cable, 6 ft (1.8 m)
- One SDUCOMMCVR the SDU AC-A Series communication slot cover.
- One warning label. (Refer to Installation Instructions, Item 6).

## Accessories (Optional)

- **SDU-PMBRK:** Mounting brackets to secure the UPS to the wall, back of the panel or enclosure



- **SDUEDC:** Side Mount Enhanced DIN Rail Clip



- **SDUCFRELAYCARD:** Dry contact relay status with LED diagnostics and standby Mode capability (Please refer to SDU A-Series COMM Cards Manual)



- **SDUENETIPCARD:** Network communication module is a high performance communication solution for industrial field devices. It is designed for use with high performance networks such as real time Ethernet and synchronized applications such as servo drive systems (Please refer to SDU A-Series COMM Cards Manual)



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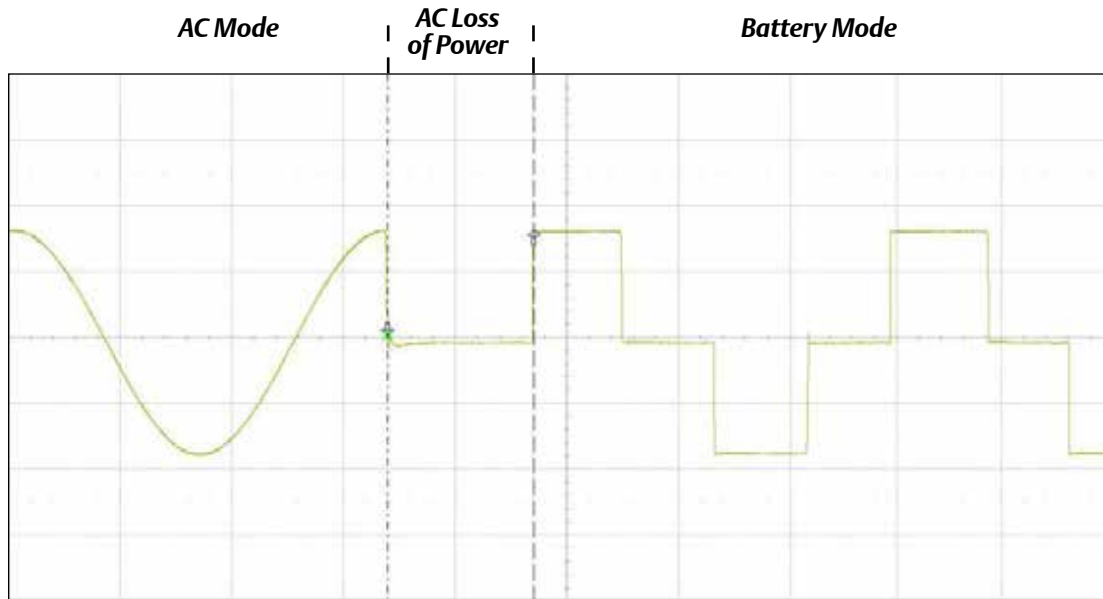
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# 1.0 Introduction

The SDU AC - A Series is a compact, “Off-Line” DIN rail mountable UPS, which provides conditioned power to sensitive electronic equipment in an industrial environment. It supplies connected equipment with stepped approximation to sinewave input during power outage to simulate the power generated by the utility.



**Figure 1: Transition to Back-Up Mode Due to Power Outage**

Input voltage range is 80% to 110% (ideal protection for the critical connected loads). Battery charging occurs automatically when ac power is applied, no need to switch ON the UPS. When power fails, the UPS can be automatically turned OFF, as long as the connected loads are not operating to save the battery energy. The SDU also includes an automatic self-test feature to test the UPS function and battery. If the battery is no longer useful, the unit will sound an alarm and an LED indicator will illuminate

This SDU AC - A Series has a communication port that can accommodate an optional communication card. Contact a SolaHD Technical Support representative for a list of currently available communication cards.

## 2.0 Important Safety Instructions

### 2.1 Safety Precautions—SAVE THESE INSTRUCTIONS

**This manual contains important safety instructions that should be followed during the installation of the Uninterruptible Power Supply (UPS). Please read all safety, installation, and operating instructions before attempting to install or operate the UPS. Follow all warnings on the unit and in this manual during installation and operation.**

- To prevent the risk of fire or electric shock, install the UPS in a temperature and humidity controlled ventilated enclosure, free of conductive contaminants, moisture, flammable liquids, gases, and corrosive substances.
- To reduce the risk of electric shock, do not remove the cover, as it has no user-serviceable parts inside. Some components are live, even when ac power is disconnected. For service, contact a qualified technician.
- Although your UPS has been designed and manufactured to assure personal safety, improper use can result in electrical shock or fire. To ensure safety, please observe the following rules:
  - Turn OFF UPS and disconnect the ac supply before cleaning. Do not use liquid or aerosol cleaners. A dry cloth is recommended to remove dust from the surface of your UPS.
  - Do not install or operate the UPS in or near water.
  - Do not place the UPS on an unstable cart, stand, or table.
  - Do not place the UPS under direct sunlight or close to heat-emitting sources.
  - To allow proper ventilation of the UPS, do not block or cover the top and bottom sides of the unit. Do not insert any objects into the ventilation holes or other openings of the UPS. Keep all vents free of dust accumulation that could restrict airflow.
  - Do not dispose of batteries in a fire; they may explode. Do not open or damage the battery. Released electrolyte is harmful to the skin and eyes and may be toxic.
  - This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, T3. When installed in a hazardous location, adhere to the following:

### **WARNING**

- **EXPLOSION HAZARD** - Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.
- **EXPLOSION HAZARD** - Batteries must only be replaced in an area known to be non-hazardous.
- **EXPLOSION HAZARD** - Do not reset circuit breaker unless power has been removed from the equipment or the area is free of ignitable concentrations.

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**If your UPS demonstrates any of the following conditions, turn OFF the UPS, disconnect the ac supply and contact your local distributor, SolaHD representative or SolaHD Technical Support at 1-800-377-4384.**

- The circuit breaker opens frequently.
- The UPS does not operate in accordance with the user manual.

## 3.0 Installation Instructions

### WARNING

To reduce risk of fire, connect only to a circuit provided with 20A maximum branch circuit overcurrent protection in accordance with the NEC, ANSI/NFPA 70, and the CEC Part 1, C22.1.

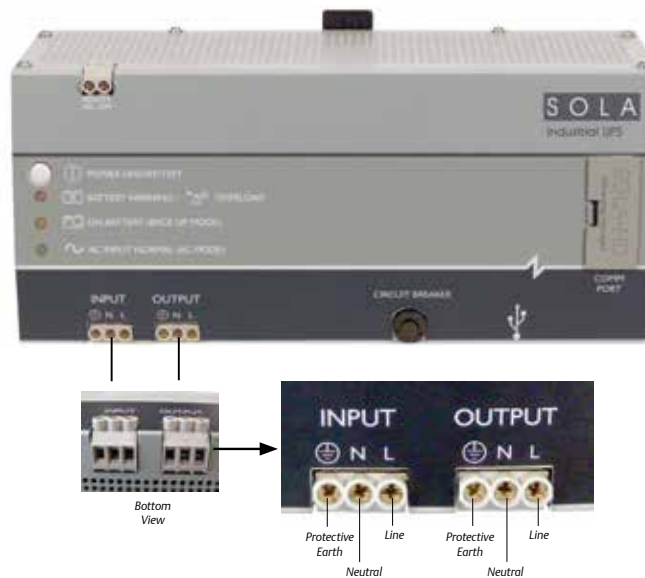
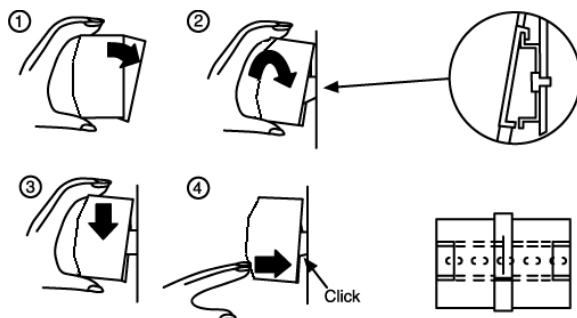


Figure 2: Input/Output Terminals

- 1. Placement:** Install the UPS in a protected area with adequate airflow and free of excessive dust. Do not operate the UPS outdoors. The products are suitable for a Pollution Degree 3 environment.
- 2. COMM CARD Installation:** To install the optional card, remove the COMM PORT cover and insert the card. Refer to the SDU COMM CARD Manual for more details. (Refer to inside cover for COMM CARD options or contact your SolaHD representative).
- 3. DIN Rail Mounting:** Follow instructions below.



- A) Tilt unit as illustrated.
- B) Put it onto the DIN rail.
- C) Push downwards until stopped.
- D) Push at the lower front edge to lock.
- E) Shake the unit slightly to ensure that the unit is secure.
- F) Check if UPS is facing upright and not tilting downward.

Figure 3: Mounting the UPS DIN Rail

 **WARNING**

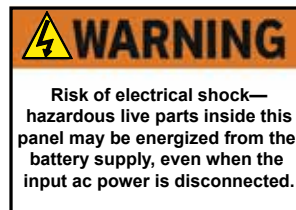
**Risk of electric shock, disconnect AC main power source before wiring. Ensure proper grounding**

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4. **I/O Wiring:** Make sure the UPS and the AC Supply is OFF (disconnected) before installation. Wire the UPS terminals with 90 °C rated copper wire according to the table below. Connect the AC input ground terminal to the main supply ground. Connect line in neutral supply conductors. Connect the loads to the output hardwire connector. Verify proper wiring connections then apply power to the UPS. Reference **Figure 2**.

<b>Wire Gauge</b>	10-18 AWG
<b>Screw Torque</b>	9 lb-in. (101.7 N-cm)



5. **Internal Battery:** Charge the UPS battery for a minimum of 8 hours before initial use. The UPS charges its battery whether the UPS is on or off, when it is connected to AC power.
6. **Warning Label:** Apply the provided electrical shock warning label to the panel, making it clearly visible to the user.



7. **Do not** connect Ground to Neutral on either input or output terminals of the UPS unit.



## 4.0 Specifications

Description	Catalog Number			
	SDU 500A	SDU 850A	SDU 500A-5	SDU 850A-5
<b>INPUT</b>				
Capacity VA/Watts	500/300	850/510	500/300	850/510
Voltage Vac	120 V + 10%, -20%		230 V +/- -15%	
Frequency	50 or 60 Hz, +/- -10% (auto-sensing)			
Harmonic Distortion	THD: 42.1%; maximum single harmonic distortion of: 25.6%			
<b>OUTPUT (Back-Up Mode)</b>				
Voltage Vac	Simulated sine wave			
	120 V +/- -5%		230 V +/- -5%	
Frequency	50 or 60 Hz, +/- -0.5% auto-sensing			
Transfer Time	Typical <8 ms			
<b>PROTECTION</b>				
Unit Input (internal)	10A		5A	
Overload Protection	UPS shutdown if overload exceeds 105% of nominal at 20s, 120% at 10s, 130% at 3s; auto-recovery			
Short Circuit	UPS shutdown, auto-recovery			
<b>BATTERY</b>				
Type	Sealed, maintenance-free, lead acid batteries			
Typical Recharge Time	8 hours			
Back-Up Time (at full load)	4 min.	2 min.	4 min.	2 min.
<b>ALARM</b>				
ON Battery	Slow beeping every 4 seconds			
Battery Low	Rapid beeping every second			
Overload	Continuous beeping sound			
<b>ENVIRONMENT</b>				
Ambient Operation	0–95% humidity, non-condensing, 50 °C up to 6,600 ft. (2000m)			
Audible Noise	<40 dBA (1 m from surface)			
Vibration	<b>Operating</b> - IEC60068-2-6, Sine Wave: 10Hz to 500Hz @19.6m/S <sup>2</sup> , displacement of 0.35mm, 60 min per axis for all X, Y, Z direction.			
	<b>Non-operating</b> - IEC60068-2-6, Random : 5hz to 500Hz (2.09Grms); 20 min per axis for all X,Y,Z			
Shock	<b>Operating</b> - IEC60068-2-27, Half Sine Wave: 10G for a duration of 11ms, shock for 1 direction (X axis)			
	<b>Non-operating</b> - IEC60068-2-27, Half Sine Wave : 30G for duration of 11ms, 3 shocks for all 3 axes			
<b>WEIGHT &amp; DIMENSIONS</b>				
Net Weight, lb. (kg)	10.6 (4.8)	11.5 (5.2)	10.6 (4.8)	11.5 (5.2)
H x W x D, in. (mm)	4.87 x 11.1 x 4.81 (123.7 x 281.9 x 122.3)			
<b>CERTIFICATIONS</b>				
Safety	 <b>UL</b> : UL 1778, 5th Ed./CSA 107.3. UPS evaluated for use in UL 508/CSA 107.1 industrial applications overvoltage category 3, pollution degree 3 with no output derating			
	 <b>UL</b> : ISA 12.12.01/CSA 213 Class I, Div 2, Groups A, B, C, D, T3			
	CE; Low Voltage Directive - EN62040-1			
EMC	FCC Part 15, Subpart B; EN62040-2; EN55032; EN55024 - Class A			

## 5.0 General Description

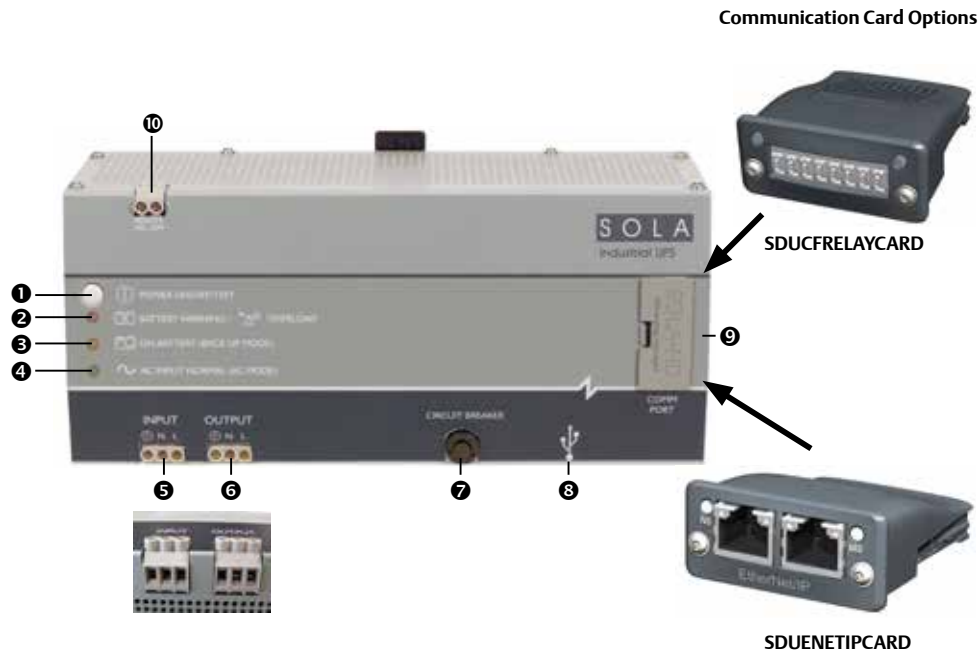


Figure 4: Front Panel

### 1. POWER ON/OFF/TEST:

ON - To turn the UPS ON, press and release the button for more than 2 seconds until you hear “3 quick beeps” and the LEDs light. SELF-TEST - Press the button for less than one second to activate the self-testing. OFF - Press for more than five seconds to turn OFF LED , UPS turn on.

### 2. Battery Warning/Overload Indicator (Red LED):

The LED flashes when the battery needs to be recharged and tested.  
The LED will illuminate when the unit is subjected to an overload condition.  
If the unit shuts down due to overload, the LED and alarm will continue for two minutes.

### 3. ON Battery Indicator (Yellow LED):

The LED illuminates when the UPS is supplying battery power to the loads.

### 4. AC Input Normal Indicator (Green LED):

The LED illuminates when the line input voltage is normal.

### 5. Input:

IP20-rated Input Screw Terminals.

### 6. Output:

IP20-rated Output Screw Terminals.

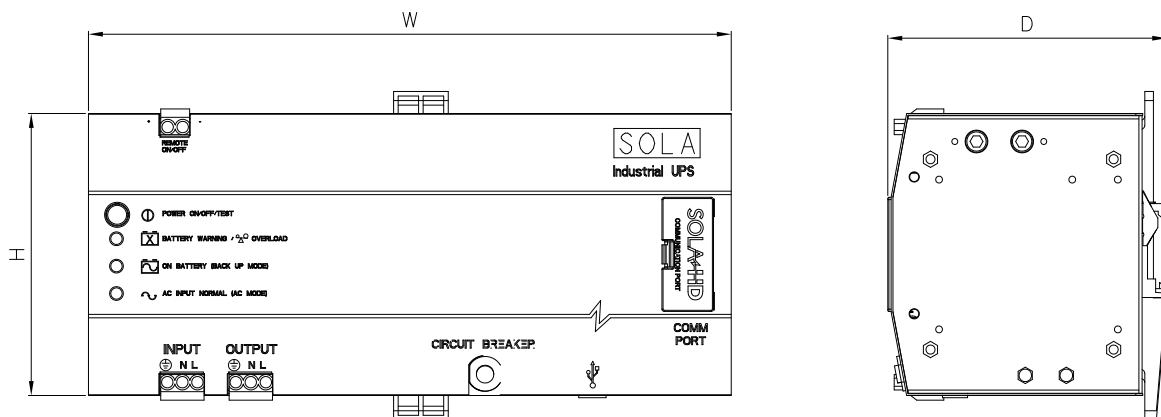
7. **Input Circuit Breaker:** Protection from AC overload and short circuit.
8. **USB Port:** High speed 2.0 Standard USB Type B Peripheral Communication Port used to establish control and monitoring with UPSMON software.
9. **COMM PORT: Communication card slot.**  
 COMM CARDS: SDUCFRELAYCARD and SDUENETIPCARD NETWORK COMM CARD can be purchased separately.  
 The UPS can detect the presence of a COMM CARD and identify what kind of COMM CARD is inserted.  
 USB communication will have precedence over COMM CARDS.
10. **REMOTE ON/OFF TERMINALS:** Use a switch to remotely toggle ON/OFF state. Non-Polarized terminals.  
**No external voltage is required.** We recommend using stranded UTP (Unshielded Twisted Pair) wire for connections.

**⚠ WARNING**

Remote ON/OFF is grounded to the UPS internal signal ground so it should be isolated from the chassis ground to prevent any ground potentials that may cause a unit malfunction or damage. In addition, isolate the Remote ON/OFF wiring away from high current, high voltage, and high frequency components to prevent any magnetically coupled noise on the Remote On/Off connections.

<b>Screw</b>	M3.0; Current rating = 30 A, AC 300 V
<b>Insulation Withstands Volts</b>	Ac 2000 V min.
<b>Preferred AWG</b>	10–18 AWG
<b>Screw Torque</b>	9 lb-in (101.68 N-cm)

**Screw Terminals Description**



Catalog Number	Dimensions in Inches (Millimeters)		
	H	W	D
SDU AC - A SERIES	4.87 (123.7)	11.10 (281.9)	4.81 (122.3)

**Figure 5: Product Dimensions**

## 6.0 System Block Diagram

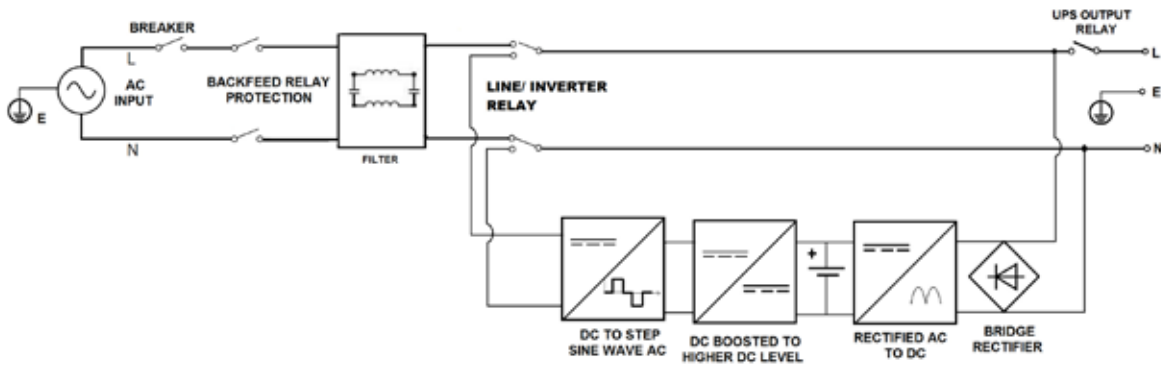


Figure 6: SDU AC - A Series UPS System Block Diagram

# 7.0 Operating Instructions

## 7.1 TURNING ON THE UPS

- Press the POWER ON/OFF/TEST button for more than 2 second until you hear the “3 quick beeps” and the LEDs turn ON.

Note: If utility power is not present, the UPS will be in back-up mode. The load will be powered from the internal batteries until the discharge point is reached.

## 7.2 TURNING OFF THE UPS

- Hold the POWER ON/OFF/TEST button until the LEDs turn OFF.

## 7.3 ALARM

- Factory default setting is alarm enabled.
- To enable/disable Alarm:
- When the UPS is in back-up mode, press the POWER ON/OFF/TEST button for at least 1 second to silence the alarm (this function is disabled when the UPS status is either LOW BATTERY or OVERLOAD MODE). To re-enable the alarm, press the POWER ON/OFF/TEST button for at least 1 second. Additionally, you can enable/disable the alarm via UPSMON Software.

## 7.4 SELF TEST

- This UPS has a self diagnostic feature that verifies both the operation of the UPS and the condition of the battery.
- In AC mode, press and release the POWER ON/OFF/TEST button for at least 1 second to perform a self-test. During the self-test, the UPS momentarily operates in back-up mode (YELLOW LED will illuminate momentarily then goes back to GREEN). If the UPS passes the self-test, it returns to AC mode.
- If the YELLOW LED does not illuminate momentarily, please contact SolaHD Technical Support or your local SolaHD distributor for a replacement.
- Additionally a self-test can be ran via UPSMON software.

## 7.5 GREEN MODE

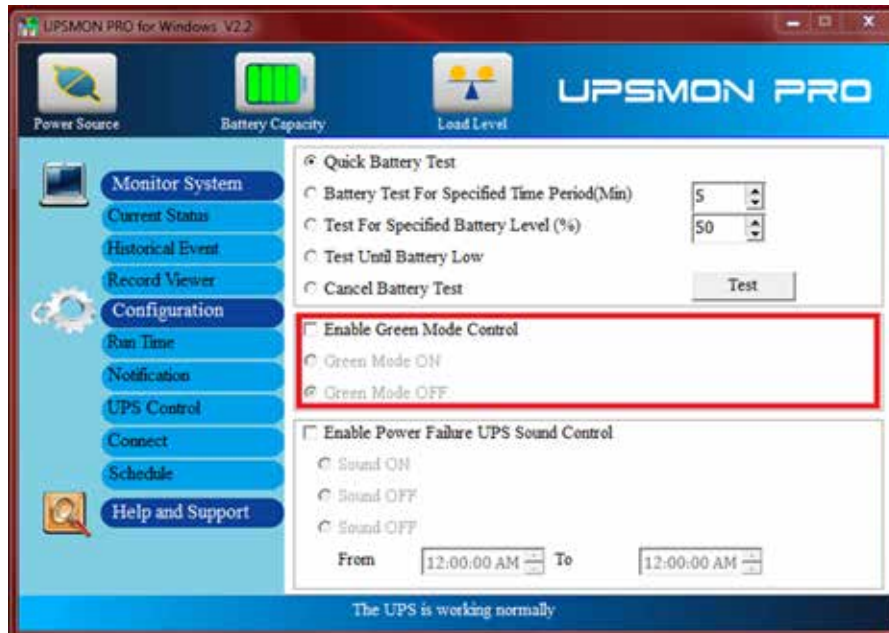
- Factory default setting is Green Mode disabled.
- Green Mode is a feature to reserve battery energy in low load conditions. In back-up mode and if the load level is less than approximately 2% ~ 4% (or 60W), the UPS will shutdown to save battery in 180 seconds. If power is restored within 180 seconds, the UPS will return to AC mode.
- Green Mode Enable/Disable:
- Green Mode can be ENABLED or DISABLED by pressing the POWER ON/OFF/TEST at start-up per TABLE 2:

Green Mode	Alarm Signal
Enabled	press POWER ON/OFF/TEST button and release until “ <b>3 beeps</b> ” are heard
Disabled	press POWER ON/OFF/TEST button and release until the “ <b>2 beeps</b> ” are heard

**Table 1. Green Mode Setting Table**

### 7.5 GREEN MODE (continued)

**UPSMON Software:** If UPS is connected to a computer with UPSMON software running, the user can change the Green Mode setting. On the UPSMON software screen, “UPS Control Panel” (see **Figure 7** below), you can to enable and disable Green Mode Control by clicking the appropriate box highlighted in the figure.



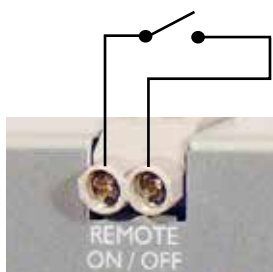
**Figure 7: UPS Control Panel, Configuration**

### 7.6 STANDBY MODE

This feature is only available during back-up mode. Standby mode can be executed remotely using the COMM CARDS. This feature puts the UPS on standby in 3 minutes and auto-recovers once AC power returns. This 3 minute window (or maximum run time depending on loading) allows the user to shut off or place equipment into safe mode.

### 7.7 REMOTE ON/OFF

- Allows the user to perform remote power ON/OFF functions using a switch on terminals (non-polarized) to toggle ON/OFF state.
- To Enable the UPS, close the switch that is connected to the terminals.
- To Disable the UPS, open the switch that is connected to the terminals.



**Remote Enable/Disable of UPS**

SDU-A Remote ON/OFF Switch Wired	UPS Condition/State	Switch or Terminal Condition
UPS-A	ON	
UPS-A	OFF	

Remote ON/OFF Terminals : Shorted (closed) for ON, Open for OFF Non-Polarized terminals.  
No external voltage is required. We recommend using stranded UTP (Unshielded Twisted Pair) wire for connections.

## 8.0 Diagnostics

Condition	Description	LED Diagnostics	Alarm
<b>BACK-UP MODE</b>	UPS in on back-up mode due to AC Loss	YELLOW	Slow beeping. UPS sounds until AC utility power recovers.
<b>AC MODE</b>	Normal condition source supplied by AC Mains	GREEN	No Alarm
<b>AC MODE OVERLOAD</b>	Load around 110% of it's rated capacity	GREEN/RED	Alarm is ON for 4 seconds / OFF for 0.8 seconds, until load is removed. UPS will not shut down.
	Load > 120% of it's rated capacity	GREEN/RED	After continuous alarm for 30 seconds, the UPS will be on standby mode. Next, the alarm will sound for 2 minutes, and the UPS will shut down.
<b>BACK-UP MODE OVERLOAD</b>	Load around 105% of it's rated capacity	YELLOW/RED	After continuous alarm for 3 seconds, the UPS will be on standby mode. Next, the alarm will sound for 2 minutes, and the UPS will shut down.
	Load > 120% of it's rated capacity	YELLOW/RED	After continuous alarm for 3 seconds, the UPS will be on standby mode. Next, the alarm will sound for 2 minutes, and the UPS will shut down.
<b>LOW BATTERY</b>		YELLOW	During back-up mode when the battery charge runs low, the UPS beeps rapidly (ON 0.25 seconds, OFF 0.25 seconds) until the UPS shuts down or returns to AC Mode.
<b>GREEN MODE ENABLED</b>	If load < 60W or approximately 2% ~ 4% of the Wattage capacity of the UPS Unit will shutdown	Flashing GREEN LED, every 5 seconds	Alarm sounds every 30 seconds after UPS enters idle mode.

**Table 2: Diagnostics LED/Alarms**

## 9.0 Battery Back-Up Time

The UPS has an internal 12V sealed Valve Regulated Lead Acid (VRLA) rechargeable battery.

Models	SDU 500A, SDU 500A-5	SDU 850A, SDU 850A-5
VA/Watts	500/300	850/510
Battery	YUASA NPW36-12	YUASA NPW45-12
Load Level	Approximate Back-Up Time (Minutes)	Back-Up Time (Minutes)
10%	120	78
20%	51	34
30%	29.5	17
40%	19.5	11
50%	16	9
60%	11	6.5
70%	8	5
80%	6.5	3.5
90%	5	2.5
100%	4	2

**Table 3. Battery Back-Up Time Chart**

*Note: Run times in this table are approximate. They are based upon new, fully charged standard battery modules at a temperature of 25°C (77°F) with 100% resistive UPS loading. Run times listed above can vary due to manufacturing variances of the individual batteries.*

### **WARNING**

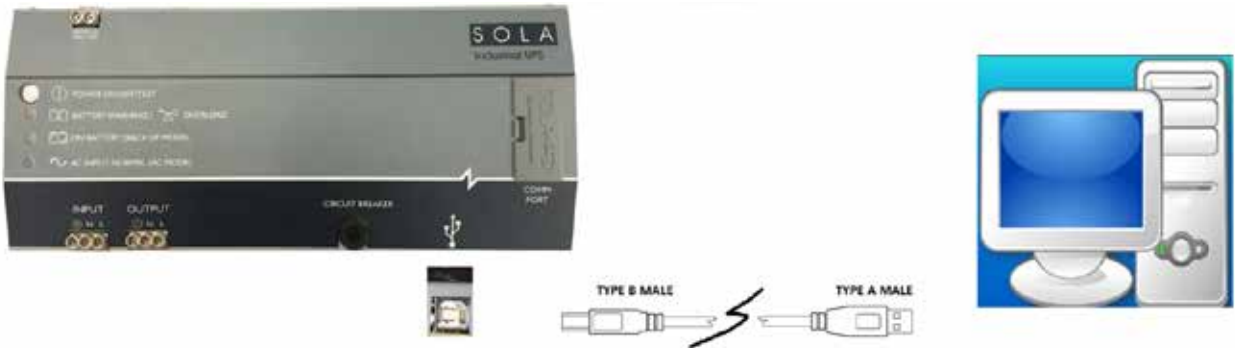
- Do not attempt to open the UPS or replace the battery.
  - Call SolaHD Technical Support for further instructions.
  - Do not mount the UPS in upside down orientation.
-



# 10.0 Software and Interface

## Power Monitoring Software (UPSMON SOFTWARE)

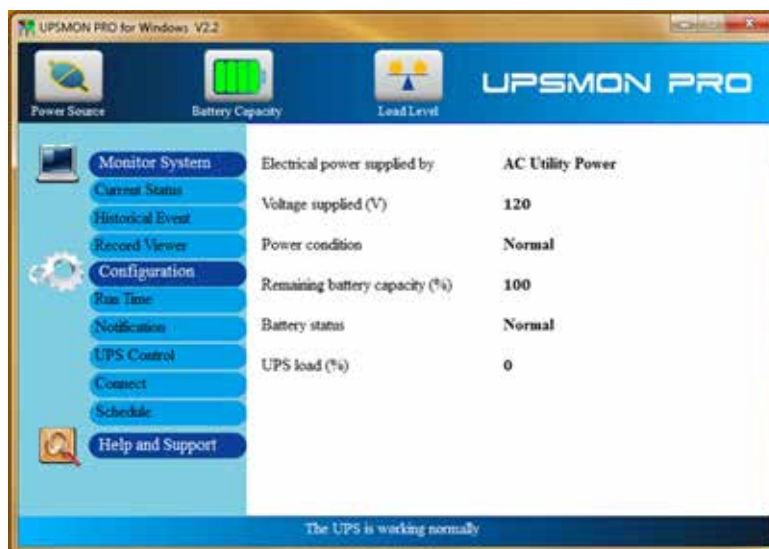
The CD that comes with the UPS contains the UPSMON monitoring/diagnostic software. Install the UPSMON software on your computer. Connect the UPS to your computer via the 2.0 Standard Type A-B USB cable provided.



**Figure 8: Connecting UPS to Computer**

With the UPSMON software, users can perform monitoring functions and an orderly shutdown of protected equipment in the event of power failure. UPSMON displays diagnostic information such as: voltage, frequency and battery levels. It also allows configuration of the UPS features

Additional details available by selecting the “Help and Support” button of the control panel, as shown in **Figure 9**.



**Figure 9: UPSMON Control Panel, Monitor System**

## 11.0 Storage

Ambient temperature range is -15 °C to +45 °C (5 °F to 113 °F). It is recommended to charge the UPS for at least 8 hours then store the UPS covered and upright in a cool, dry location. Remove accessories and disconnect cables connected to the UPS to avoid unnecessary draining of the battery.

### **Extended Storage**

During extended storage in environments where the ambient temperature is: -15 °C to +30 °C (+5 °F to +86 °F), charge the UPS battery every six months.

During extended storage in environments where the ambient temperature is: +30 °C to +45 °C (+86 °F to +113 °F), charge the UPS battery every three months.

The information in this manual is provided as a guide for installation, operation, and maintenance. It does not affect or exceed our obligations under the Terms and Conditions of Sale.

Note that unit specifications are subject to change without notice.

## Contact Information

Website: [www.solahd.com](http://www.solahd.com)

Technical Services E-Mail: [solahd.technicalservices@emerson.com](mailto:solahd.technicalservices@emerson.com)

## Warranty

Please see the “Terms & Conditions of Sale”.

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