

Uninterruptible Power Supply Instruction Manual

SDU AC - A Series



SDU500A, SDU850A SDU500A-5, SDU850A-5



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.

- UPSMON 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 AC - 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 AC - A Series COMM Cards Manual)



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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.

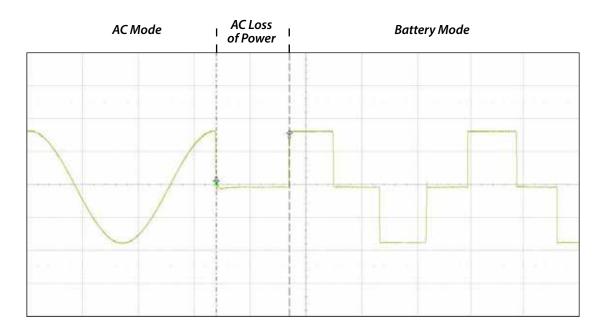


Figure 1: Transition to Back-Up Mode Due to Power Outage

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, Div 2, Groups A, B, C, D, T3. When installed in a hazardous location, adhere to the following:
- Cet équipement est adapté pour une utilisation dans la Classe I, la Division 2, les groupes A, B, C, D, T3. Lorsqu'il est installé dans un endroit dangereux, respecter les points suivants:
 - WARNING EXPLOSION HAZARD Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.
 - AVERTISSEMENT RISQUE D'EXPLOSION Ne pas débrancher l'équipement sauf si l'alimentation a été retirée ou si la zone est reconnue comme non dangereuse.
 - WARNING EXPLOSION HAZARD Batteries must only be replaced in an area known to be non-hazardous.
 - AVERTISSEMENT RISQUE D'EXPLOSION Les piles ne doivent être remplacées que dans une zone connue comme non dangereuse.
 - WARNING EXPLOSION HAZARD Do not reset circuit breaker unless power has been removed from the equipment or the area is free of ignitible concentrations.
 - **AVERTISSEMENT RISQUE D'EXPLOSION** Ne pas réinitialiser le disjoncteur sauf si l'alimentation a été retirée de l'équipement ou si la zone est exempte de concentrations inflammables.

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

CAUTION - 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.

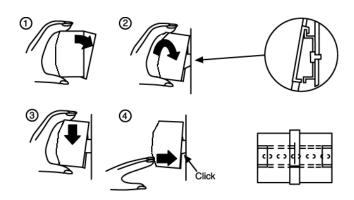


Figure 3: Mounting the UPS DIN Rail

- 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.



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

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**.

Wire Gauge	10-18 AWG	
Screw Torque	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			
Description	SDU 500A	SDU 850A	SDU 500A-5	SDU 850A-5
INPUT				
Capacity VA/Watts	500/300	850/510	500/300	850/510
Voltage Vac	120 V + 10	0%, -20%	230 V +	-/ -15%
Frequency		50 or 60 Hz, +/ -10	0% (auto-sensing)	
Harmonic Distortion		THD: 42.1%; maximum single	harmonic distortion of: 25.6%	
OUTPUT (Back-Up Mode)				
VoltageVag		Simulated	sine wave	
Voltage Vac	120 V -	+/-5%	230 V +/-5%	
Frequency		50 or 60 Hz, +/-0	.5% auto-sensing	
Transfer Time		Typica	I <8 ms	
PROTECTION				
Unit Input (internal)	10)A	5	A
Overload Protection	UPS shutdown if o	verload exceeds 105% of nomi	nal at 20s, 120% at 10s, 130% a	t 3s; auto-recovery
Short Circuit		UPS shutdown	, auto-recovery	
BATTERY				
Туре		Sealed, maintenance-f	ree, lead acid batteries	
Typical Recharge Time		8 ho	ours	
Back-Up Time (at full load)	4 min.	2 min.	4 min.	2 min.
ALARM				
ON Battery		Slow beeping 6	every 4 seconds	
Battery Low	Rapid beeping every second			
Overload		Continuous b	eeping sound	
ENVIRONMENT				
Ambient Operation	C)–95% humidity, non-condensi	ng. 50 °C up to 6,600 ft. (2000m)
Audible Noise		<40 dBA (1 m	from surface)	
Vibration		Operating - IEC60068-2-6, Sine Wave: 10Hz to 500Hz @19.6m/S², displacement of 0.35mm, 60 min per axis for all X, Y, Z direction.		
	Non-operating	- IEC60068-2-6, Random : 5hz t	o 500Hz (2.09Grms); 20 min per	axis for all X,Y,Z
Shock	Operating - IEC600	068-2-27, Half Sine Wave: 10G fo	or a duration of 11ms, shock for	1 direction (X axis)
SHOCK	Non-operating - IEC60068-2-27, Half Sine Wave : 30G for duration of 11ms, 3 shocks for all 3 axes			
WEIGHT & DIMENSIONS				
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 (1	23.7 x 281.9 x 122.3)	
CERTIFICATIONS				
Safety	C \$\int\cup \subset{\text{US}}: 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 C \$\int\cup \subset{\text{US}}: \text{US}: ISA 12.12.01/CSA 213 Class I, Div 2, Groups A, B, C, D, T3			
FMC	CE; Low Voltage Directive - EN62040-1			
EMC	FCC Part 15, Subpart B; EN62040-2; EN55032; EN55024 - Class A			

5.0 General Description

SOLA SDUCFRELAYCARD SOLA STREET SALES LU PRODE ON ANTERIOR SALES LU PRODE ON ANTERI

Communication Card Options

SDUENETIPCARD

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):

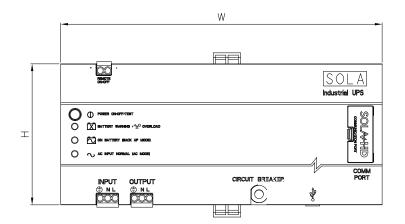
The LED **flashes** when the battery needs to be recharged and tested.

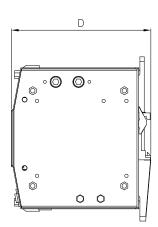
The LED will **illuminate** when the unit is subjected to an overload condition.

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.





Catalog Number	Dimensions in Inches (Millimeters)		
Catalog Number	Н	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

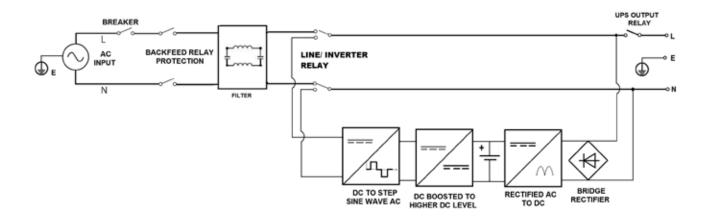


Figure 6: SDU AC - A Series UPS System Block Diagram

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.

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 selftest, 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 "3 beeps" are heard	
Disabled press POWER ON/OFF/TEST button and release until the "2 beeps" 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.

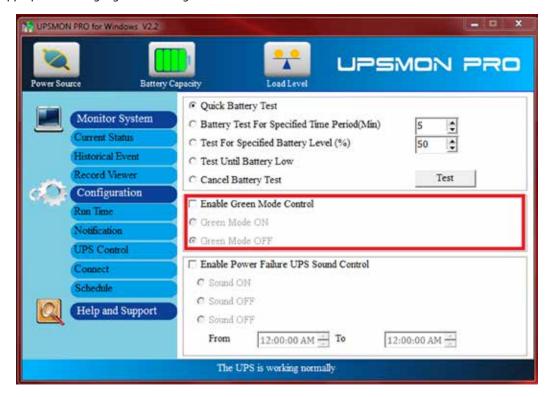


Figure 7: UPS Control Panel, Configuration

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 ON / OFF

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

8.0 Diagnostics

Condition	Description	LED Diagnostics	Alarm
BACK-UP MODE	UPS in on back-up mode due to AC Loss	YELLOW	Slow beeping. UPS sounds until AC utility power recovers.
AC MODE	Normal condition source supplied by AC Mains	GREEN	No Alarm
	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.
AC MODE OVERLOAD	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.
BACK-UP MODE OVERLOAD	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.
LOW BATTERY		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.
GREEN MODE ENABLED	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

A CAUTIONCall SolaHD Technical S

Call SolaHD Technical Support for further instructions.

Do not attempt to open the UPS or replace the battery.

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.

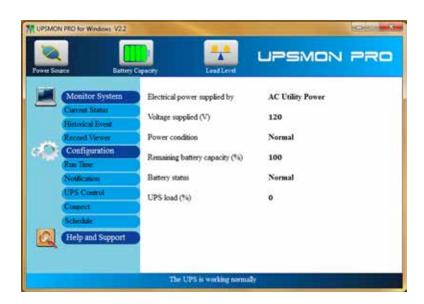


Figure 9: UPSMON Control Panel, Monitor System

11.0 Storage

Ambient temperature range is -15 $^{\circ}$ C to +45 $^{\circ}$ C (5 $^{\circ}$ F to 113 $^{\circ}$ 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.

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SDU AC - A SERIES INSTRUCTION MANUAL

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