

You have purchased a UPS that will provide you with many years of service, protecting your equipment from surges, sags, and blackouts. This product incorporates the highest quality standards in both manufacturing and testing, and carries a limited 1 year warranty against defects in material and workmanship. This product is backed by over 60 years of pride and integrity. We are sure that you will agree, there is no substitute for a Sola.

Did you know that Sola also makes:

- UPS systems to beyond 15 KVA (including three-phase)
- Electronic Power Conditioners to 100 KVA
- Plug-in Power Conditioners to 3 KVA
- Hard-wired power conditioners to 15 KVA
- Constant voltage transformers
- Three-phase power conditioners
- Power line monitors
- Off the shelf and custom OEM switching and linear power supplies

Sola products are available through an extensive distribution network. These distributors offer literature, technical assistance, and a wide array of off-the-shelf products for fastest possible delivery.

In addition, Sola field sales offices are conveniently located to provide prompt attention to customer needs. Call Sola direct to find the closest authorized distributor.

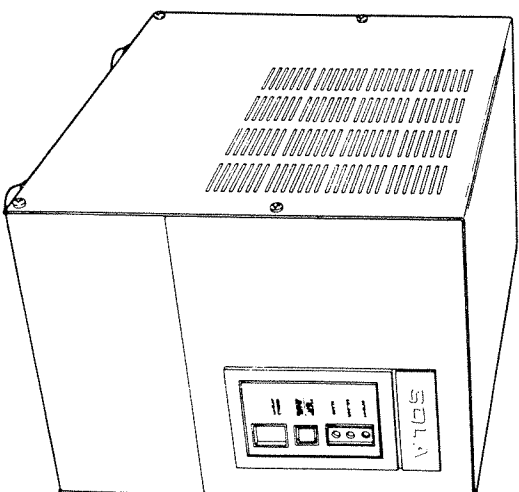
SOLA — THE LEADER IN POWER CONDITIONING SINCE 1930



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P/N 272-36950-04
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SOLA UPS SYSTEMS 900 VA 1300 VA 1800 VA



INSTALLATION AND OPERATION MANUAL

A UNIT OF GENERAL SIGNAL 

SOLA

FCC NOTICE

This equipment generates and uses radio frequency energy; and, if installed in a residential environment, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a class A device in accordance with the specifications in Subpart J of part 15 of FCC rules. These limits provide reasonable protection against interference in a business environment. Should the unit be installed in a residential environment, it is the user's responsibility to remedy potential television and/or radio interference. The following FCC booklet may be helpful in resolving interference:

"How to identify and Resolve Radio-TV Interference Problems"

This booklet is available from the US Government Printing Office, Washington, DC 20402, stock number 004-00-00345-4.

DEPARTMENT OF COMMUNICATIONS NOTICE

This digital apparatus does not exceed the class A limits for radio noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

AVIS DU MINISTERE DES COMMUNICATIONS

Les émissions de bruit radioélectrique produites par ce dispositif numérique respectant les normes de Classe A afférentes aux dispositifs numériques énoncées dans le Règlement relatif au brouillage radioélectrique du ministère canadien des Communications.



The input cord is the main disconnect.
Der Netzkabel ist der Netztrennung.

The socket-outlet must be installed near the equipment and must be easily accessible.
Die Steckdose soll nahe des Gerätes eingebaut werden und leichter Zugang haben.

No user-serviceable parts inside.
Kein gebrauchte Zugang noetig.

Battery replacement by qualified personnel only.
Batterieaustausch nur vom qualifizierten Wartungspersonal durchgeführt werden.

SAFETY NOTICE

These units are capable of supplying AC voltage even if there is no input present. Although the Output Enable Switch is protected from accidental activation, do not allow the unit to become unexpectedly enabled.

ZUR BEACHTUNG

Hiermit wird bescheinigt, daß die Geräte :

Sola 900/056-00301-0100-99

Sola 1300/056-00303-0100-99

in Übereinstimmung mit den Bestimmungen der Vfg 1046/1984 funktionsstör sind.

Der Deutschen Bundespost wurde das Inverkehrbringen dieser Geräte angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmung eingeräumt.

Sola Electric
1717 Busse Road
Elk Grove Village, IL 60007 USA

NOTE

We hereby certify that the above units comply with the RFI suppression requirements of Vfg 1046/1984. The German Postal Service was notified that equipment is being marketed. The German Postal Service has the right to re-test the equipment and verify compliance.

SOLA UPS MANUAL

INTRODUCTION

Congratulations on your purchase of the Sola UPS system. We know that you will find it to be a good "working partner" for your connected equipment for years to come.

PRODUCT FEATURES

Sola has always been the leader in UPS innovation since its introduction of the "Mini-UPS" several years ago. This product is the result of Sola's continuous product improvements. Here is a list of some of them:

- 1. The UPS can power any type of load up to its rated capacity without derating, including switching power supplies.
- 2. It can handle momentary overloads even while on inverter.
- 3. The Sola UPS contains sophisticated power management that recharges the battery quickly and more completely, yet extends battery life.
- 4. Transfer time has been reduced to less than 4 milliseconds. We know of no quality equipment that can be affected by this transfer (which is always in-phase).
- 5. The Sola UPS has easily accessible diagnostics via a front panel, with load monitoring and a TEST switch.
- 6. A relay/voltage level interface is standard, which can be connected via (optional) cabling and/or software to networks or multuser systems for shutdown signalling.
- 7. A wide range of models are available, including models that can be used around the world.

RECEIPT AND UNPACKAGING

Inspect the unit container immediately upon receipt. Open the box and remove the unit and its associated materials. If you find any damage, contact the carrier *IMMEDIATELY* for further instructions.

We recommend that you retain the packaging for storage/and or reshipment purposes.

INITIAL TESTING AND RECHARGING

Your unit was shipped from the factory in a fully charged state. When you receive it, it will probably need recharging.

If you have a model designed for multiple voltage input/output, you **MUST** use the Voltage Select switch (at the rear of the unit) to tell the UPS what the nominal line voltage is at your location. *This switch must be moved to the proper position BEFORE plugging the unit in or turning it on.*

Move the unit to a nearby outlet and plug it into the wall. Leave it in this state for about 16 hours before proceeding. It is not necessary to turn the unit output ON (1). **IT IS IMPORTANT TO DO THIS BEFORE TESTING OR INSTALLING THE UNIT.**

INSTALLATION

Now that the unit is fully charged, install it in its permanent location. This location must be near the equipment to be protected and near a wall outlet (do not run the UPS on extension cords of any kind). The location should be reasonably well-ventilated (at least 3" on sides and back), and within the temperature and humidity ranges noted in the Specifications section of this manual.

Plug the smallest (lightest current draw) load you need to protect into any of the outlets on the back of the UPS. Turn the **UPS OUTPUT ON (1)** by enabling the front panel switch. This switch is recessed into the panel so that it cannot accidentally be switched. The output light will turn ON.

LOAD TESTING

This unit has a special Load Testing feature. With the **SYSTEM TEST/ALARM SILENCE** switch on the front panel, you can both test the

operation of the UPS by simulating a power failure and also determine what capacity of the UPS you are presently using.

To perform such a test, press the **SYSTEM TEST/ALARM SILENCE** switch. The UPS will switch to battery (inverter) mode and the AC FAIL light will turn ON. Your equipment should not be disturbed by the transfer. Additionally, you can get an idea of how much of the UPS capacity you are using by counting the number of flashes of the OUTPUT lamp. The audible alarm will sound along with the flashing of the lamp for easier recognition.

- 0 - 20% load 1 Flash
- 20 - 40% load 2 Flashes
- 40 - 60% load 3 Flashes
- 60 - 80% load 4 Flashes
- 80 - 100% load 5 Flashes

Continue adding more of your equipment to be protected to the UPS and retest the unit, noting the increasing load. After the test is performed, the first (green) lamp may flash for a while, indicating that you have taken some small amount of charge from the battery.

An overload is indicated by a fast flashing of the OUTPUT LED (4-5 flashes per second) accompanied with the audible alarm for the duration of the test. The load indication is calibrated for typical switching power supply loads with a power factor of 0.75, so "linear" loads like incandescent lamps are actually heavier loads than this test might indicate.

If you should overload the unit as described above, no harm is done. Simply lighten the load to the UPS, and retest. By performing these steps, you ensure that your UPS will power your equipment during an actual power failure.

POWER FAILURES

During a real power failure, the UPS will automatically transfer to battery (inverter) operation, and the ALARM beeper will beep once at 10 second intervals. You can silence the alarm by pressing the **SYSTEM TEST/ALARM SILENCE** switch.

When there are about two minutes (at full load) left of battery run time, the alarm will beep three times at 10 second intervals (even if the ALARM had been disabled), indicating that power loss is imminent.

RECHARGING

Recharging of the battery after a power failure is automatic.

CARE AND MAINTENANCE

This unit requires no preventative maintenance. However, it should be inspected occasionally to see that its vents are not blocked. Cords and receptacles should be occasionally inspected for physical damage. If damage is found, the unit should be immediately taken out of service and repairs should be performed.

If you wish to clean the unit, you can clean it with a damp (*NOT SOAKING*) cloth moistened with *WATER ONLY*. Of course, turn the unit output **OFF** (0) and disconnect it from the outlet first). Allow some time for the unit to dry before returning it to service.

This unit contains no user-serviceable parts. Repair should be performed by trained personnel only.

BATTERY

The battery in this unit has been carefully selected by Sola to give years of trouble-free service. However, like all batteries, it will eventually need to be replaced. It is very difficult to estimate battery lifetime, because of the variables of temperature, number and depth of charge/discharge cycles, and so on, but we can say that you should expect several years of service from your new battery.

You can tell that the battery needs replacing when the run time that your equipment has (on inverter) is only 60% as much as it was when the battery was new.

The battery in this unit can be replaced by the factory or factory-trained personnel only.

STORAGE

Although the electronics of the UPS can be stored at -20 to 50 degrees C, the battery lifetime will be shortened by lengthy storage at the extremes of this range. Storage of the unit at 18 to 28 degrees C is strongly recommended. If the unit is to be stored, the output switch must be **OFF** (0).

If the unit is to be stored for long periods of time, it **MUST** be put on charge every six (6) months, or the battery could become permanently damaged. If you will be storing the unit for long periods of time, simply plug the unit into an outlet for 12 hours or so every 6 months.

TROUBLESHOOTING

DIAGNOSTIC CODES

If the unit is operating properly, the (bottom red) **ALARM** lamp should never light. If it lights, it will flash a sequence that represents a **DIAGNOSTIC CODE**. X number of flashes, where X is the code, are displayed at 5-second intervals, accompanied by the audible alarm. After finding the cause of the problem, the **ALARM** lamp can be reset by turning the unit output **OFF** (0), then **ON** (1).

Here is the list of diagnostic codes and their remedies:

BATTERY NOT CHARGING- 1 FLASH

If the battery has shown no sign of recharging in the previous 20 hours, this diagnostic code will be shown, indicating either that the unit's internal battery charger has failed or that the battery needs replacement. The unit will require service.

NO PHASE LOCK - 2 FLASHES

You should never see this diagnostic code unless you are running the unit from a frequency-unstable source of electricity, such as a generator. What this means is that the unit cannot go back to **LINE** after a **POWER FAILURE**, because the frequency of the line is not within tolerances.

You should check your generator or power source for proper operation.

INVERTER OVERLOAD-CONTINUOUS

This means that you have exceeded the output rating of the unit. Reduce the load (the amount of the connected equipment) to the UPS, and see that the problem is corrected. Run a **LOAD TEST** (page 2) to determine UPS loading.

NETWORK INTERFACE

Two relays are provided for signalling a remote system that 1) the input AC has failed (the inverter is operating) and 2) the battery has less than two minutes left with full load. The relays have Form C contacts and are rated for 0.5 Amps and 28 volts.

A **REMOTE OFF** function is also provided with this interface. When the inverter is turned off with the **REMOTE OFF** signal, the unit will remain off until the AC line returns.

Positive (+ V) and negative (-V) voltage sources capable of sourcing (sinking) up to 10 mA are provided with the interface to allow the driving of RS-232 handshaking lines. The voltages provided meet RS-232 specifications, and range from approximately 9 to 12 volts + or -.

The following is a description of the pins on the DB-9 connector at the back of the unit:

- **Pin 1 REMOTE OFF** - Normally connected to -V. Connecting this pin to a positive RS-232 voltage level when the inverter is ON will turn the inverter OFF.
- **Pin 2 AC FAIL SIGNAL** - normally at -V, this signal is connected to +V when the inverter is running.
- **Pin 3 AC FAIL RELAY CONTACT** - normally open. This pin is connected to pin 4 upon AC FAIL.
- **Pin 4 RELAY COMMON** - Common connection for all interface relay contacts (pins 3,5,6, and 7)
- **Pin 5 LOW BATTERY RELAY CONTACT** - normally open. This pin is shorted to pin 4 upon low battery (2 minute warning)
- **Pin 6 AC FAIL RELAY CONTACT** - Normally closed. This pin is disconnected from pin 4 upon AC FAIL.
- **Pin 7 LOW BATTERY RELAY CONTACT** - Normally closed. This pin is disconnected from pin 4 upon low battery (2 minute warning)
- **Pin 8 LOW BATTERY SIGNAL** - Normally connected to +V. This pin goes to -V upon low battery (2 minute warning)
- **Pin 9 GROUND** return for the signals on pins 1, 2, and 8. Normally connected to chassis ground.

SOLA UPS MANUAL

SPECIFICATIONS

ELECTRICAL SPECIFICATIONS

Primary Input Ratings

Voltage Rating:

110 V
120 V
220 V
230 V
240 V (depending on model)

Voltage Range:

+ 12.5, -15% without transfer to inverter

Primary AC Line Failure:

Primary AC voltage below -15% or above + 12.5% of nominal.

Primary AC Line Restoration:

Primary AC voltage above -8% or below 7% of nominal after a failure.

Inverter Specifications

Power:

900 VA
1300 VA
1800 VA (depending on model)

Load Power Factor:

0 to 1 leading or lagging (any power factor)

Frequency:

60 Hz +/-0.1 Hz
50 Hz +/-0.1 Hz (depending on model)

Total Harmonic Distortion:

less than 3% with full load resistive

Overload:

The peak output current is limited to a value no less than 2.5 times the nominal output RMS current.
At 100% load (resistive), the ALARM LED will give an inverter overload indication.

At 110% load (resistive), the inverter is allowed to run for 1/10th of a second after which time the in-

verter will be turned off. If the inverter is started into an overload of greater than 110%, it will latch off, and the front panel switch must be toggled off and on to restart normal operation.

Voltage Regulation: + /-3% maximum deviation from rated output voltage with full load resistive.

Transfer from Inverter to Primary AC Power Line: Transfer occurs after restoration of primary AC line to greater than 92% or less than 108% of nominal. Inverter output phase locks with the primary AC line prior to transfer of power. Transfer time is be 4 milliseconds, maximum. Transfer is delayed by a minimum of 2 seconds after restoration of the primary AC power line.

Transfer from Primary AC Power Line to Inverter: Transfer from primary AC line to inverter occurs when the primary AC line is less than 85% or greater than 112.5% of nominal. Transfer time is 4 milliseconds maximum. The phase of the inverter voltage will be no more than 5 degrees different than the input line voltage.

Battery Specifications

Type: Maintenance-free lead acid battery.

Nominal Open Circuit Voltage: 900VA: 48 Volts
1300VA: 48 Volts
1800VA: 60 Volts

Capacity: 6.5 AH (900 VA) 10.0 AH (1300, 1800 VA)

Reserve Time: Typical reserve time at load indicated and a fully-charged battery is:
900 VA, loaded to 600 W 8 minutes
1300 VA, loaded to 1000 W 8 minutes
1800 VA, loaded to 1400 W 6 minutes

Battery Recharge Time: 16 hours (12 hours, 1800 VA).

Agency Approvals

60 Hz only units are certified to meet UL 1012 and CSA C22-22-107. Other units are TUV approved to meet IEC 950. The units meet FCC emissions requirements in Docket 20780, Part 15, subpart J, Class A, as well as Canadian DOC and TUV class "A" specifications.

Noise Attenuation

Surge Voltage Protection Transients described by IEEE 587 Class A up to 6000 V are attenuated to less than 50 volts superimposed at the output of the UPS.

ENVIRONMENTAL SPECIFICATIONS

Ambient Temperature Range

Operating: 0 degrees C to 40 degrees C

Storage: -20 degrees C to + 50 degrees C (storage at the extremes of these temperatures will shorten battery life)

Relative Humidity: 0% to 95% (without condensation)

Altitude: 2,500 meters (8200 feet)

Cooling Forced air, operational only when inverter is on.

Diagnostics Provided on front panel for several conditions

MECHANICAL SPECIFICATIONS

Dimensions

900 VA and 1300 VA 12" x 8" x 13" (H x W x D)

1800 VA 13" X 8" X 21.5"

Input Fuse

900 VA 120 V - 12A Fuse
 900 VA 220 V - 6.3A Fuse
 900 VA 240 V - 6.3A Fuse
 1300 VA 120 V - 15A Fuse
 1300 VA 220 V - 8A Fuse
 1300 VA 240 V - 8A Fuse
 Fuse 1800 VA 220 V - 10A Fuse 1800 VA 240 V - 10A Fuse

CAUTION

Replace fuse with a fuse of the same type and rating.

Interfaces:

Relay/voltage level interface (-09 models)

Interface cables are available for the following:

Novell™ (SS card and mouse port)
 Sola / Novell™ interface card
 3COM™
 Banyan/Vines™
 Unix™
 Microsoft Lan Manager™

Unix is a registered trademark of AT&T.

LIMITED WARRANTY

Sola warrants this hardware product against defective material or workmanship for a period of one year from the date of purchase by the end-user.

Consumable and/or field-replaceable items such as fuses, lightbulbs and MOV assemblies are not warranted.

Sola will repair or replace the defective product at no charge to the buyer and will pay all reasonable domestic two-way freight charges. The warranty is void if Sola determines that the product was subjected to conditions outside the normal operating characteristics stated in the manual, or if there had been shipping damage. Any technical advice furnished before or after delivery in regards to the use or application of Sola products is furnished without charge and on the basis that it represents Sola's best judgment under the circumstances, but it is used at the recipient's sole risk.

Sola shall in no event be liable for other direct, special, incidental, consequential, indirect or penal charges.

THERE ARE NO OTHER WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE THEREOF.

WARRANTY ON REPAIRED PRODUCTS is for ninety days, on the repairs made, or the remainder of the warranty, whichever is greater.

RETURN POLICY

Most instances of initial failure to operate properly can be remedied through a telephone conversation between the user and Sola's Customer Service at (708) 439-1109.

If it is determined that a product must be returned, contact your local Sola Distributor for a Return Authorization. If the distributor is unknown, contact Sola Repair Service for instructions.

All returns to the Sola factory must have a Return Authorization number (RA#) Information required for a Return Authorization number:

1. Sola catalog number and/or model number.
2. Serial number.
3. Company name, address, phone number and contact person.
4. Proof of purchase from distributor.
5. Special instructions.
6. Description of problem.

Shipments must be made in the original packing container. Damage resulting from shipment in a non-original container will void this warranty.

For proper handling upon receipt at Sola, the RA# must be clearly placed in several locations on the outside of the package. Sola is not responsible for damage to returned goods not packaged properly or customer-abused units.