

# **Uninterruptable Power Supply Model UPS-1**

## **— Instruction Book —**

**This instruction book contains documentation for the  
model UPS-1 Uninterruptable Power Supply, Version  
1.00.**

**SINE SYSTEMS**

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## Section 3 — Specifications:

<b>General:</b>	Uninterruptable Power Supply for Sine Systems model RFC-1/B Remote Facilities Controller
<b>Reserve Capacity:</b>	1.3 amperehours (sufficient to power RFC-1/B for 5 to 10 hours)
<b>Indicators:</b>	Charging (green LED)
<b>Test Point:</b>	Battery voltage test point
<b>Charge Rate:</b>	0 to 50 milliamperes depending on battery voltage
<b>Fuses:</b>	1. AC supply (3/4 ampere) 2. Battery (3/4 ampere)
<b>AC Input:</b>	14 volts AC from supplied wall plug transformer
<b>DC Output:</b>	approximately 17 volts DC, unregulated

## **Section 4 — Equipment Description:**

The Sine Systems model UPS-1 Uninterruptable Power Supply is designed to provide uninterruptable power to the Sine Systems model RFC-1/B Remote Facilities Controller. The UPS-1 contains internal batteries which are capable of powering an RFC-1/B for approximately 5 to 10 hours, depending on use. When external power is available, the internal batteries are automatically recharged.

The UPS-1 is contained in a small "modem-sized" case (6" x 8.5" x 1.75") and can be mounted in any convenient location such as on a wall, inside an equipment rack, or it may be rack mounted with the optional RK-3 rack kit. A 14 volt AC "wall plug" transformer (supplied) is connected to the UPS-1 and provides power to it and the associated RFC-1/B. AC input and DC output connections are made on a "pluggable" screw-terminal connector on the front panel.

A green "Charging" LED is provided to indicate that the internal batteries are being charged. If the battery is significantly depleted, the LED will glow a bright green. As the battery charges the intensity of the LED will diminish in brightness until it extinguishes completely as it nears a full charge and transfers to the "float charge" mode.

## Section 5 — Installation:



### **WARNING!**

Installation of the UPS-1 Uninterruptable Power Supply should be performed only by a qualified technician. Installation is not difficult; however, an attempted installation by a person who is not technically qualified could result in danger to operating or maintenance personnel, or damage to the unit.

### **Unpacking:**

When the UPS-1 is unpacked, it should be inspected for obvious signs of mechanical damage or loose parts. Loose parts should be tightened before installation. If damage is found, save the packing material and report it to the shipping company and the dealer from which it was purchased. Do not install the unit.

### **Mechanical:**

The UPS-1 generates little heat and can be mounted in just about any convenient location. It can be mounted in the bottom of an equipment rack, it can be wall mounted, or it can be rack mounted with the optional RK-3 rack mount kit.



### **WARNING!**

If the UPS-1 is mounted in an RK-3 rack kit, care should be exercised in not overstressing the mounting screws. The UPS-1 is heavy and the screws which hold it to the rack panel will be supporting a considerable force. Do not apply downward pressure on the UPS-1 when it is rack mounted. Remove the UPS-1 from the rack panel if it is necessary to ship the unit.

### **Electrical:**

Electrical connections are made to the UPS-1 through a screw-terminal connector located on the front panel. Note that this connector can be removed from the panel by pulling it straight out. This makes wiring the connector easier.

### **AC Input Connection:**

Power to operate the UPS-1 is supplied by a 14 volt AC "wall plug" transformer supplied with the UPS-1. Do not interchange this transformer with one used for the Sine Systems model RFC-1 remote control. Connect a length of two conductor wire (not supplied) from the two terminals on the wall plug transformer to the two terminals on the UPS-1 labeled "14VAC."

**DC Output Connection:**

If the associated RFC-1/B was previously powered directly from the wall plug transformer that came with it, unplug the transformer and disconnect the transformer leads from the "12 VAC" terminals on the RP-8 panel. Then, using a length of two conductor wire (not supplied), make a connection from the terminals on the front of the UPS-1 labeled "- OUT +" to the terminals on the RP-8 panel labeled "12 VAC." The polarity of the connection does not matter as there is a bridge rectifier in the RFC-1/B.

**Test Point:**

If desired, the internal battery voltage can be directly measured by connecting the positive lead of a voltmeter to the terminal marked "TP" on the front panel of the UPS-1 and the negative lead to the terminal marked "-". The battery voltage should be in the range of 18.0 to 20.5 volts depending on battery condition. The battery voltage may be telemetered remotely by connecting two 47K ohm resistors to the UPS-1, one to the "-" terminal and one to the "TP" terminal. The other ends of the resistors should be connected to the telemetry input terminals on one channel of an RP-8 panel. The lead from the resistor connected to the "TP" terminal should connect to the "+" terminal on the RP-8 panel.

## Section 6 — Circuit Description:



### **WARNING!**

When servicing the UPS-1, be very careful with the leads associated with the three batteries. These batteries are the gelled electrolyte lead-acid type and can produce very high short circuit currents. This can result in a potential fire hazard. Be very careful not to inadvertently short the bottom of the PC board with a metal object or lay the PC board down on a metal work surface. If the batteries ever become loose or dislodged from their normal locations, they should be remounted or repaired immediately or a short circuit could result.

AC power is supplied to the unit through F1 and is applied to bridge rectifier BR1. Raw DC is developed across C1. Q1 and Q2 form a constant current regulator which supplies charging current to the battery. Zener diodes D1 and D2 limit the maximum battery charging voltage to approximately 21.0 volts. Diodes D4 and D5 supply output voltage when AC power is available and diode D6 brings the battery on line when AC power fails. Diodes D7 and D8 drop the output voltage to the value needed by the RFC-1.

## **Section 7 — Illustrations and Diagrams:**

- 7.2 Schematic Diagram; UPS-1
- 7.3 Component Location Diagram; UPS-1



## Section 8 — Parts List:

### Parts List; UPS-1 Uninterruptable Power Supply, Version 1.00

B1, 2, 3	battery, sealed lead-acid, 6 volt, 1.3 amp-hour; Panasonic LCR6V1.3P
BR1	bridge rectifier, 200 volt, 1 ampere
C1	capacitor, aluminum electrolytic, radial, 2200 $\mu$ F, 25V
D4, 5, 6, 7, 8	diode, 1N4005
D1	zener diode, 1N4740A, 10 volt, 1 watt
D2	zener diode, 1N4741A, 11 volt, 1 watt
D3	LED, green
F1, 2	fuse, 2AG, fast blow, 3/4 ampere
Q1, 2	transistor, PN2222A
R3	resistor, carbon film, 1/4W, 5%, 22 $\Omega$
R2	resistor, carbon film, 1/4W, 5%, 100 $\Omega$
R4	resistor, carbon film, 1/4W, 5%, 2.2 K $\Omega$
R1	resistor, carbon film, 1/4W, 5%, 3.3 K $\Omega$
VR2	varistor, 14 volts AC
	transformer, wall plug, 14VAC, 1.4 amperes; Ault 308-2014-000E