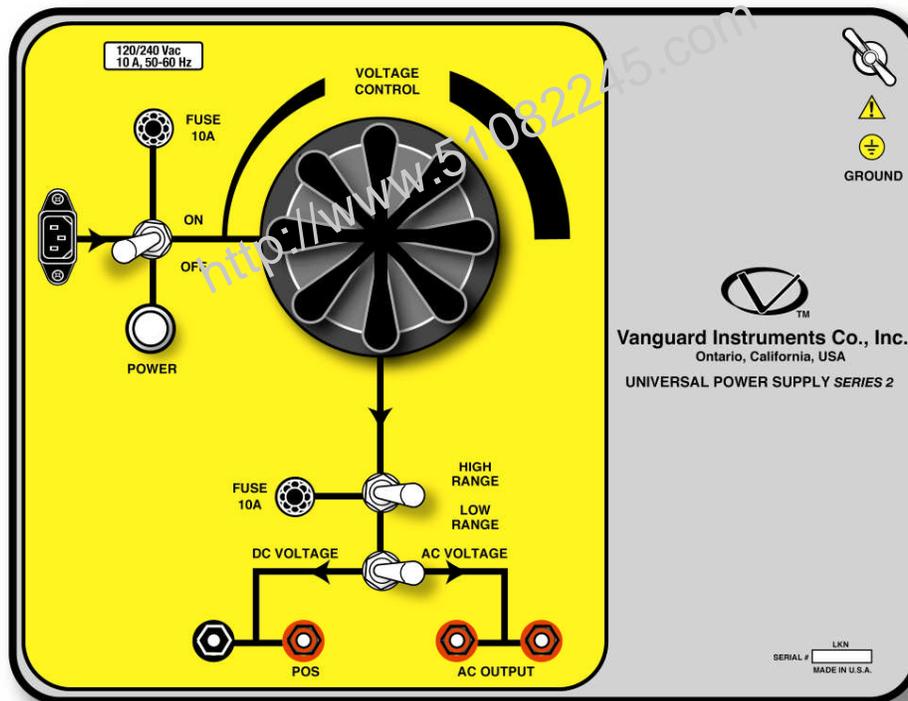


---

**OPERATING PROCEDURES**  
for the  
**UPS-S2™**  
**Universal Power Supply Series 2**



060620A623



**Vanguard Instruments Co., Inc.**  
1520 S. Hellman Ave.  
Ontario, California 91761

---

TEL: 909-923-9390  
FAX: 909-923-9391

August 2006  
REV. 1

<http://www.51082245.com>

## SAFETY SUMMARY

### **Follow Exact Operating Procedures**

Any deviation from the procedures described in this operator's manual may create one or more safety hazards and damage the UPS-S2. Vanguard Instruments Co., Inc. assumes no liability for unsafe or improper use of the UPS-S2.

The following safety precautions must be observed during all phases of test set-up, test hookups, testing, and test-lead disconnection.

### **SAFETY WARNINGS AND CAUTIONS**

This device shall be used only by trained operators.

**Always ground the UPS-S2™ to a substation ground.**

### **Precaution with High Test Voltage**

The UPS-S2 can produce a voltage greater than 300Vac which can cause severe injury, death, and/or equipment damage.

### **Do Not Modify Test Equipment**

Because of the risk of introducing unknown hazards, do not install substitute parts or perform any unauthorized modification to any Model UPS-S2 unit. To ensure that all designed safety features are maintained, it is recommended that repairs be performed only by Vanguard Instruments Co. factory personnel or by an authorized repair service. Unauthorized modifications can cause serious safety hazards and will nullify the manufacturer's warranty.

<http://www.51082245.com>

**TABLE OF CONTENTS**

Safety Summary

1.0 INTRODUCTION..... 2

    1.1.General Description ..... 2

    1.4 Furnished Test Accessories..... 2

2.0 UPS-S2™ Specifications ..... 3

3.0 CONTROLS AND INDICATORS..... 4

    3.1 UPS-S2 Controls & Indicators ..... 4

4.0 PRETEST SETUP ..... 6

    4.1 Operating Voltages ..... 6

    4.2 UPS-S2 output voltage..... 6

5.0 UPS-S2 CABLE CONNECTIONS ..... 7

6.0 UPS-S2 Operational procedures ..... 7

    6.1 UPS-S2 DC Supply Setting ..... 7

    6.2 UPS-S2 AC Supply Setting ..... 8

Appendix A EZCT™ Troubleshooting Guide

**LIST OF TABLES**

Table 1 UPS-S2™ Specifications..... 3

Table 3 UPS-S2 Output Voltage with 120Vac input ..... 6

Table 4 UPS-S2 Output Voltage with 240Vac input..... 6

**LIST OF FIGURES**

Figure 1 UPS-S2™ Control Panel (Controls and Indicators) ..... 4

Figure 3 Variac Terminals ..... 6

Figure 3 Typical UPS-S2 Cable Connection ..... 7

## 1.0 INTRODUCTION

### 1.1. General Description

The Vanguard Universal Power Supply Series 2 (UPS-S2) is designed and produced to meet a utility company's substation need for an independent AC/DC power source. Both the AC and DC voltage sources are capable of supplying 10 amperes continuously.

The variable output DC power supply (1-300Vdc) is ideal for use as a substitute primary power source when station batteries are not available. It is ideal for operating Circuit Breakers, powering substation relays, or for unregulated charging of substation batteries.

The AC power supply is a variable (1-240Vac) isolated power source that can be used to power other equipment in the substation.

Main features of the Universal Power Supply are:

1. All output power sources are isolated from the primary power input by an isolation transformer.
2. Voltage outputs are continuously variable (auto-transformer) with a Front Panel control knob.
3. The Universal Power Supply's primary power input is user selectable to be either 120Vac or 240Vac.
4. All voltage outputs are capable of supplying a continuous 10 ampere load
5. The power output routing path is clearly outlined on the Control Panel, which allows users to intuitively make the appropriate control function selections for the desired operating configuration.

The UPS-S2 is contained in a heavy duty, impact resistance plastic case. Each Universal Power Supply is warranted by Vanguard Instruments Incorporated for one year and covers parts and labor for failures resulting under normal use.

### 1.4 Furnished Test Accessories

The UPS-S2 is supplied with a power cord, one ground cable, two 10-foot test lead sets with alligator clips.

## 2.0 UPS-S2™ SPECIFICATIONS

**Table 1 UPS-S2™ Specifications**

---

<b>MODEL</b> .....	UPS-S2™
<b>TYPE</b> .....	Special-purpose test equipment, Universal AC/DC power supply
<b>POWER</b> .....	85 to 132Vac or 200-240Vac (factory preset), 50/60 Hz
<b>SIZE</b> (inches) .....	21"W by 17"H by 9"D (53cm x 43cm x 24cm)
<b>WEIGHT</b> .....	52lbs
<b>AC OUTPUT VOLTAGE</b> .....	0 to 240Vac @ 10A max.
<b>DC OUTPUT VOLTAGE</b> .....	0 to 300Vdc @ 10A max
<b>ENVIRONMENT</b> .....	Operating: 0°C to 55°C; Storage: -40°C to 65°C
<b>FURNISHED</b> .....	One power cord, two 10-ft test lead sets, One ground cable,
<b>WARRANTY</b> .....	One-year warranty on parts and labor; post warranty service contracts available

**NOTE:**

- THE ABOVE SPECIFICATIONS ARE VALID AT NOMINAL OPERATING VOLTAGE AND AT A TEMPERATURE OF 25°C (77°F)
- UPS-S2™ SPECIFICATIONS MAY BE UPGRADED AND CHANGED WITHOUT PRIOR NOTICE.

## 3.0 CONTROLS AND INDICATORS

### 3.1 UPS-S2 Controls & Indicators

The UPS-S2 controls and indicators are shown in a panel illustration (see Figure 1). Pointing leader lines reference each item in the figure with an index number. Each index number is cross-referenced to a functional description in Table 2.0, which describes the purpose of each item on the control panel. Although the purpose of these controls and the display may seem obvious, users should become familiar with them before attempting to use the UPS-S2. Accidental misuse of the controls will usually cause no serious equipment damage. First-time users should review and become familiar with the Safety Summary located in the front section of this manual.

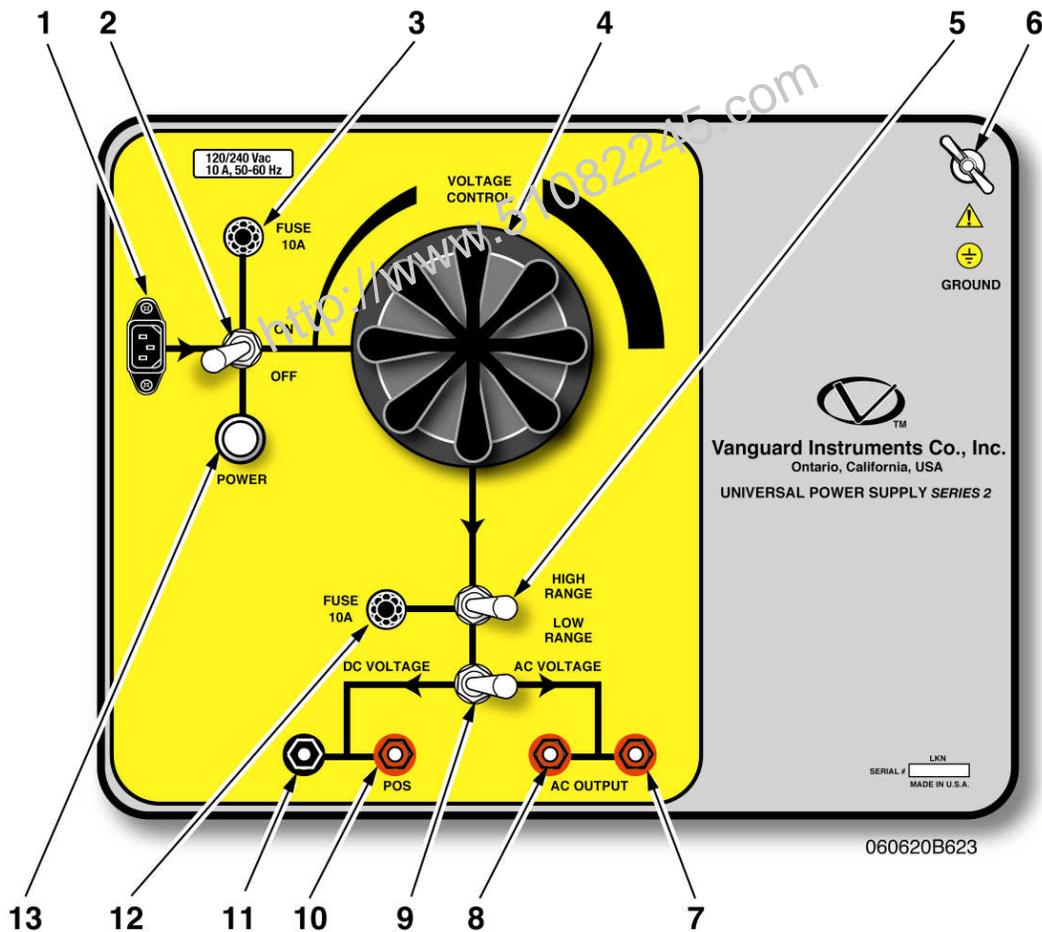


Figure 1 UPS-S2™ Control Panel (Controls and Indicators)

Table 2 EZCT™ Controls and Indicators

<b>Fig. 1 Index</b>	<b>PANEL MARKING</b>	<b>FUNCTIONAL DESCRIPTION</b>
<b>1</b>	(No Marking)	Input power connector with third wire safety ground.
<b>2</b>	(no marking)	Power Switch
<b>3</b>	<b>FUSE 10A</b>	Main input power protection fuse. 250 Vac/10 Ampere slow-blow.
<b>4</b>	<b>VOLTAGE CONTROL</b>	Test voltage control knob
<b>5</b>	<b>HIGH RANGE LOW RANGE</b>	Output voltage range selection.
<b>6</b>	<b>GROUND</b>	Ground Stud
<b>7 &amp; 8</b>	<b>AC OUTPUT</b>	AC output connectors (2).
<b>9</b>	<b>DC VOLTAGE AC VOLTAGE</b>	AC or DC voltage selector switch
<b>10 &amp; 11</b>	<b>POS</b>	DC output connectors (2).
<b>12</b>	<b>FUSE 10A</b>	Output voltage protection fuse. 250 Vac/10 Ampere slow-blow
<b>13</b>	<b>POWER</b>	Power on indicator

## 4.0 PRETEST SETUP

### 4.1 Operating Voltages

The UPS-S2™ operating voltages are pre-set for 90-130Vac, 50/60Hz or 210-240Vac, 50/60Hz. at the factory.

To set the UPS-S2 for 120Vac operation, the High Range jumper is connected to terminal 7 of the variac.

To set the UPS-S2 for 240Vac operation, the high Range jumper is connected to terminal 6 of the variac.



**Figure 3 Variac Terminals**

### 4.2 UPS-S2 output voltage

The UPS-S2 output voltage is shown in table below:

**Table 3 UPS-S2 Output Voltage with 120Vac input**

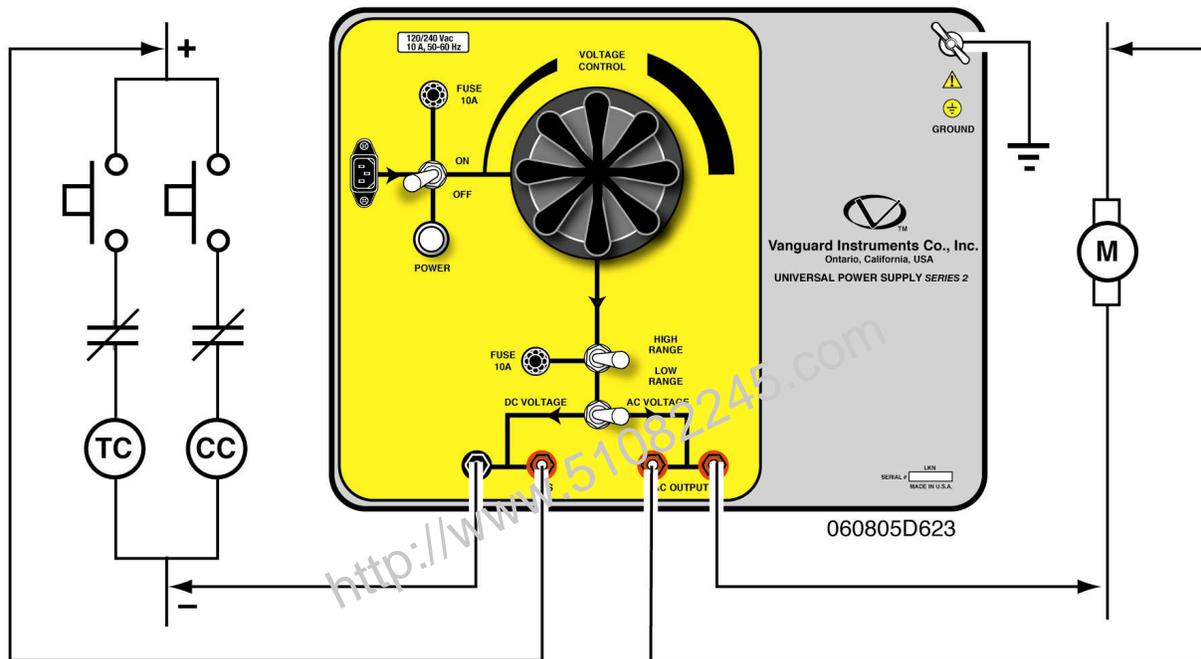
RANGE SETTING	HIGH RANGE	LOW RANGE
AC VOLTAGE OUTPUT	0-270Vac	0-120Vac
DC VOLTAGE OUTPUT	0-360Vdc	0-150Vdc

**Table 4 UPS-S2 Output Voltage with 240Vac input**

RANGE SETTING	HIGH RANGE	LOW RANGE
AC VOLTAGE OUTPUT	0-320Vac	0-230Vac
DC VOLTAGE OUTPUT	0-400Vdc	0-290Vdc

## 5.0 UPS-S2 CABLE CONNECTIONS

Always connect the UPS-S2 to the substation ground before connecting any test cables. A typical connection is shown in figure 3



**Figure 3 Typical UPS-S2 Cable Connection**

## 6.0 UPS-S2 OPERATIONAL PROCEDURES

### 6.1 UPS-S2 DC Supply Setting

The following steps are recommended for a typical circuit breaker operation:

1. Ground the UPS-S2 to a substation safety ground.
2. Make sure the UPS-S2 power switch is in the off position.
3. Turn the Voltage Control knob to zero output.
4. Set the Voltage Range switch to "LOW RANGE".
5. Connect AC power to the UPS-S2.
6. Connect a DC volt-meter to the UPS-S2 DC output.
7. Select the DC voltage output on the UPS-S2.
8. Turn on the UPS-S2 power switch.
9. Turn the Voltage Control Knob to set the DC voltage.
10. Turn off the UPS-S2 power switch.
11. Connect the DC voltage leads to the circuit breaker control circuit.
12. Turn on the UPS-S2 power switch.

The UPS-S2 is now powering the circuit breaker DC control circuit.

## 6.2 UPS-S2 AC Supply Setting

The following steps are recommended for a typical circuit breaker operation:

1. Ground the UPS-S2 to a substation safety ground.
2. Make sure the UPS-S2 power switch is in the off position.
3. Turn the Voltage Control knob to zero output.
4. Set the Voltage Range switch to "LOW RANGE".
5. Connect AC power to the UPS-S2.
6. Connect an AC volt-meter to the UPS-S2 AC output.
7. Select the AC voltage output on the UPS-S2.
8. Turn on the UPS-S2 power switch.
9. Turn the Voltage Control Knob to set the AC voltage.
10. Turn off the UPS-S2 power switch.
11. Connect the AC voltage leads to the circuit breaker control circuit.
12. Turn on the UPS-S2 power switch.

The UPS-S2 is now powering the circuit breaker AC control circuit.

APPENDIX A

UPS-S2™ Troubleshooting Guide

Item	Symptom	Possible Problem	Solution
1	No output.	1. Power Switch is not on. 2. Voltage selection AC/DC in is the wrong position 3. Variac is not set. 4. Output fuse is blown	1. Check Power switch. 2. Check voltage selection switch. 3. Turn Variac to increase voltage. 4. Check output fuse.
2	Operating voltage is 120Vac. Cannot get output voltage above 120Vac	Output voltage range switch is probably in "LOW RANGE"	Set range switch to "HIGH RANGE"

<http://www.51082245.com>



**Vanguard Instruments  
Company, Inc.**

1520 S. Hellman Ave, Ontario, CA 91761, USA  
Phone: 909-923-9390      Fax: 909-923-9391  
[www.vanguard-instruments.com](http://www.vanguard-instruments.com)

