



SECTION I GENERAL DESCRIPTION

1-1. INTRODUCTION

1-2. This instruction manual contains operating and maintenance instructions for the Model 503 and Model 1503 AC Power Sources manufactured by Elgar Corporation in San Diego, California. This manual includes all information necessary for installation, operation, and maintenance of the AC Power Source. The theory of operation description, schematics and parts lists are included as an aid in maintaining the AC Power Source at optimum performance.

1-3. PURPOSE OF EQUIPMENT

1-4. The Models 503 and 1503 provide three phase AC power output at adjustable amplitude and precise frequencies for use in test purposes, motor operation, and frequency conversion. The amplitude is adjustable from 0 to 130 VAC. The frequency range of both AC power sources is 45 Hz to 5 KHz. The output frequency is controlled by an Elgar three-phase plug-in oscillator, which is available in either variable frequency or fixed frequencies with accuracies up to .0001%.

1-5. These AC Power sources consist of two DC power supplies providing operating voltages and three power amplifiers whose separately phased inputs are amplified and used to drive the tapped output transformer to provide nominal output voltages up to 130 VAC line to neutral or 130 VAC line to line.

1-6. The input power to Model 1503 is determined by the selected tap connections to the primary of the three

phase input power transformer. The 1503 accommodates any combination 115 or 230 VAC line to line or line to neutral 3-phase, 47-63 Hz input power. The 503 has a split primary single phase input power transformer for either 115 or 230 VAC 47-63 Hz. 400 Hz input power for either unit is available on special order.

1-7. DESCRIPTION

1-8. A general block diagram for the Model 503 and 1503 is shown in Figure 1-2. The AC Power Source functionally consists of two DC power supplies, three power amplifiers with associated control circuitry and a three-phase output power transformer. The DC supplies are obtained from a full wave bridge rectifier on the secondary of the input power transformer. These supplies are a nominal plus and minus 45V DC. They are used as the operating and bias voltages in the three amplifiers. The three power amplifiers are mounted on heatsink assemblies whose inputs are controlled by three plug-in amplifier circuit boards. The Elgar plug-in oscillator signals are AC coupled to the inputs of the circuit boards and determine the A, B, and C phase outputs. The amplitude of the three power amplifier signals is varied simultaneously by the front panel amplitude control potentiometer. The amplified A, B, and C phase signals are applied to the output transformer, whose secondaries are connected to the front panel binding posts and the rear panel output power terminal block.

1-9. Each power amplifier is protected against an overload or short circuit on the output. Current limit transistors clamp the input drive signals when the power ampli-

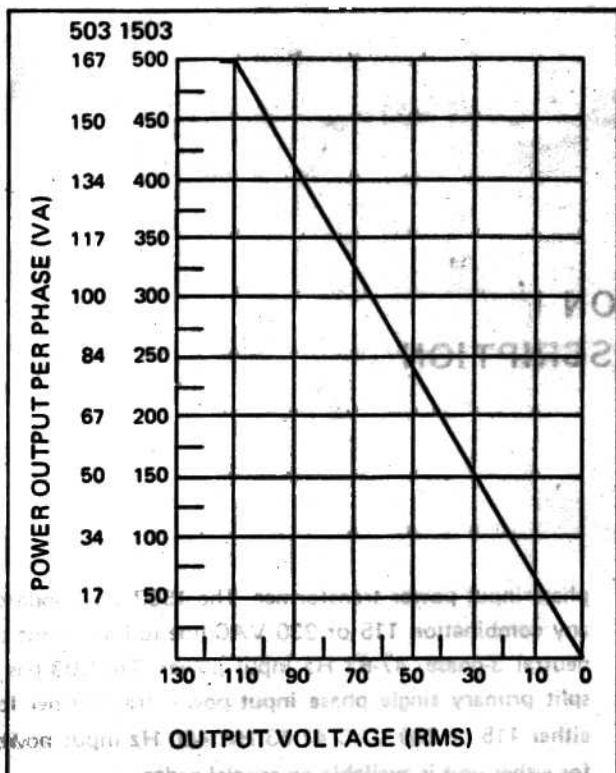


Figure 1-1. Power Output Derating vs Output Voltage

fier currents exceed their rated level. The power amplifier recovers immediately when the short or overload is removed. Regulation circuitry consisting of AC feedback and frequency compensation is employed to provide reg-

ulation of the output signals. A thermostat located on the power amplifier heatsink assembly removes drive signal to the amplifier(s) in the event unsafe operating temperatures are incurred.

1-10. The Models 503 and 1503 AC power sources are front panel mounting units designed for installation in standard 19 inch instrument racks.

1-11. The Elgar plug-in oscillator module (supplied separately) mounts directly above the output voltage terminals on the front panel. Cooling air is drawn through a front-panel grill and exhausted at the rear of the enclosure. The fan(s) used for circulating the cooling air are located on the rear panel. An input power terminal block (Model 1503) or line cord (Model 503) and the output power terminal block are also located on the rear panel. A 12-pin JONES connector next to the terminal blocks provides for interfacing external signal and amplitude control of the AC power source.

1-12. The top and bottom covers of the power sources are removable for access to the electronics housed by the enclosure. Test points, adjustment controls, and component locations are shown in Figure 1-3.

1-13. SPECIFICATIONS

1-14. Specifications for the Model 503 and 1503 AC Power Sources are provided in Table 1-1.

Table 1-1. Specifications

Output Power Per Phase	503 0-167	1503 0-500
Power Factor	Unity to $\pm .7$	
Output Voltage (adjustable)	0-130 VAC line to neutral and 0-130 VAC line to line simultaneously	
Output Configuration	4 wire wye, isolated from ground. Any one phase or neutral can be grounded.	
Output Frequency Range	45 Hz - 5 KHz at rated power	
Distortion	Less than .9% (45 Hz - 5 KHz) Less than .5% (400 Hz - 1 KHz)	
Load Regulation (Regulation may be adjusted thru zero for specific loads and frequencies)	Line to Neutral: Less than 1% Line to Line Balanced Load: Less than 1% (45 Hz to 800 Hz) Less than 3% (800 Hz to 5 KHz)	
Line Regulation	$\pm .25\%$ for 10% input line change	
Hum and Noise	-70 db below full output	
Input Power	1503: 115 or 230V line to neutral or line to line; 3-phase 47-63 Hz, 3 KVA maximum input power 503: 115 or 230V, single phase 47-63 Hz, 1.5 KVA maximum input power	
Operating Temperature Range	0-50°C	
Weight	503 - 105 lbs. approximately 1503 - 225 lbs. approximately	