

## SECTION 1

### GENERAL

#### 1.0 GENERAL

#### 1.1 SCOPE

The purpose of this document is to describe installation and operation of the HE-Series Power Source.

The Models 310-HE and 110-HE are described by this manual. Section 2 lists the electrical, mechanical and environmental specifications of the equipment. Section 3 describes the installation of an HE System while Section 4 describes operation. Section 5 thru 7 provide maintenance, service and calibration instructions.

#### 1.2 GENERAL DESCRIPTION

The HE-Series equipment is high performance solid-state power conversion equipment. The equipment utilizes advanced direct coupled linear techniques which allow the HE equipment to be compact and lightweight without sacrificing performance. The HE-Series equipment also includes Pacific's field proven fail-safe technology. This along with a conservative design philosophy insures long term reliability.

The HE-Series presently consists of two models, the Model 310-HE and Model 110-HE. Both are rated for 1kVA continuous output. The Model 310-HE is configured for three phase output while the Model 110-HE is configured for single phase output. Both models feature the IEEE-488 interface and are completely programmable.

This manual is an operator's manual. Service, maintenance and calibration requirements of this equipment are covered by this this document. The service instructions described in Section 5 provide instruction relative to isolating a defective PCB Assembly.

## SECTION 2

### SPECIFICATIONS

#### 2.0 SPECIFICATIONS

The following specifications apply to the Models 110-HE and 310-HE. Each specification is assumed to apply to both models unless noted otherwise.

#### 2.1 ELECTRICAL SPECIFICATIONS

##### 2.1.1 INPUT PERFORMANCE SPECIFICATIONS

###### INPUT VOLTAGE:

110-132 VAC      47-63 Hz      Single Phase

OR

200-240 VAC      47-63 Hz      Single Phase

- - - C A U T I O N - - -

DO NOT APPLY EXCESSIVE INPUT VOLTAGE  
MACHINE DAMAGE WILL RESULT

- - - C A U T I O N - - -

## SECTION 2 SPECIFICATIONS

### 2.1.2 OUTPUT PERFORMANCE SPECIFICATIONS

#### OUTPUT VOLTAGE RANGE:

Model 110-HE	0-136.5 VAC
Model 310-HE	0-136.5/236 VAC Adjustable in 0.1V steps.

#### OUTPUT CURRENT:

Model 110-HE	8.3 Amps RMS 18 Amps peak available at crest of sine wave to drive peak type loads such as DC power supplies.
Model 310-HE	3 Amps RMS per phase 9 Amps peak per phase available at crest of sine wave to drive peak type loads such as DC power supplies.

#### OUTPUT POWER FACTOR:

Model 110-HE	Full rated kVA $\pm$ 0.5 to 1.0pf derates to 85% @ $\pm$ 0.0pf
Model 310-HE	Full rated kVA at all power factors.

#### OUTPUT FREQUENCY:

Variable, Autoranging

20.00 to 49.99 Hz	in 0.01 Hz steps
50.0 to 499.9 Hz	in 0.1 Hz steps
500 to 2000 Hz	in 1.0 Hz steps

#### CURRENT LIMIT:

Model 110-HE	12.0 Amps Maximum Adjustable in 0.1 Amp steps
Model 310-HE	6.0 Amps per phase Maximum Adjustable in 0.1 Amp steps

#### PHASE SEPARATION: (Model 310-HE only)

Phase A:	0° (Reference Phase)
Phase B:	Adjustable 0-360° in 1 degree steps
Phase C:	Adjustable 0-360° in 1 degree steps

## SECTION 2 SPECIFICATIONS

### 2.1.2 OUTPUT PERFORMANCE SPECIFICATIONS (CON'T)

#### INPUT LINE REGULATION:

$\pm 0.1\%$ , Maximum for a  $\pm 10\%$  line change

#### OUTPUT VOLTAGE REGULATION:

Less than 0.5% (0.1% Typical)

#### OUTPUT DISTORTION:

Less than 1.0% THD (0.50% THD Typical)

#### OUTPUT MODULATION:

Less than 0.8Vp-p @ 120 VAC RMS Output

#### SMALL SIGNAL BANDWIDTH:

20 TO 20,000 Hz

#### TRANSIENT RESPONSE TIME:

Less than 50 microseconds for a no load to full step transient.

#### OUTPUT DC OFFSET:

Less than 10mVDC

#### OUTPUT ISOLATION:

Output is completely isolated from chassis ground and the input. Any one leg may be grounded to provide local reference.

#### METERING:

##### OUTPUT VOLTAGES:

Model 110-HE: Output voltage is displayed on front panel LCD display.

Resolution: 0.1 VAC

Accuracy:  $1\% \pm 1$  count

Model 310-HE: Output line to neutral voltages displayed simultaneously on front panel LCD.

Resolution: 0.1 VAC

Accuracy:  $1\% \pm 1$  count

## SECTION 2 SPECIFICATIONS

### 2.1.2 OUTPUT PERFORMANCE SPECIFICATIONS (CON'T)

#### METERING: (con't)

#### OUTPUT FREQUENCY:

Output frequency is displayed on front panel display.

Resolution: 0.1 Hz

Accuracy: 1%  $\pm$  1 count

#### OUTPUT CURRENT:

Model 110-HE: Output current displayed on front panel LCD.

Resolution: 0.1 AAC

Accuracy: 1%  $\pm$  1 count

Model 310-HE: Each phase output displayed on front panel LCD.

Resolution: 0.1 AAC

Accuracy: 1%  $\pm$  1 count

#### FAULT INDICATORS:

- A) Overtemp
- B) Output device failure. (Failsafe circuit allows power source to continue operation at reduced output capability).
- C) Overload. If unit is in current limit for more than 30 seconds, a overload message is displayed.

#### PROGRAMMABLE INTERFACE:

The HE equipment is supplied with the IEEE-488 instrumentation interface. The bus is capable of controlling amplitude frequency, phase displacement, current limit and the output contactor.

The HE Power Source can be addressed as a listener and a talker. Output frequency, voltages and currents are transmitted back to the IEEE controller upon command.

#### Programming Accuracy:

Frequency:	$\pm$ 0.01%
Voltage:	$\pm$ 0.1% $\pm$ 1 count @ 120 VAC output
Phase Displacement:	$\pm$ 0.1 $^{\circ}$
Current Limit:	$\pm$ 0.1% $\pm$ 1 count @ full scale

## SECTION 2 SPECIFICATIONS

### 2.2 MECHANICAL SPECIFICATIONS

Height:		5.25 inches
Width:	Front Panel	19.00 inches
	Chassis	16.75 inches
Depth:		23.00 inches
Weight:		65 pounds

Refer to Figure 2.2.1.

#### INPUT CONNECTION:

The HE is supplied with an input power cord. A NEMA Type 5-15P plug is attached to the end of the power cord when ordered with the 115 VAC input form.

#### OUTPUT CONNECTION:

Output is taken from the HE equipment via a single row terminal strip supplied with #6-32 binding head screws.

#### CHASSIS SLIDES:

The chassis of the HE-Series equipment has been designed to accept the following chassis slides:

P/N 310-22 as manufactured by  
Jonathan Manufacturing Company  
Fullerton, California.

## SECTION 2 SPECIFICATIONS

### 2.3 ENVIRONMENTAL SPECIFICATIONS

#### POWER DISSIPATION:

Power dissipation is directly proportional to the output power produced. Worst case dissipation is at full rated output load and high line input, approximately 500 watts.

#### AMBIENT TEMPERATURE:

The HE-Series equipment is designed to operate in ambient temperatures of 0-55 degrees Celsius.

#### VENTILATION REQUIREMENTS:

The HE-Series equipment contains 2 each 70 CFM fans. Air intake is along the sides. Exhaust is through the rear panel.

#### AUDIBLE NOISE:

Audible noise generated by the HE-Series is less than 50 dbA when measured 1 meter from the front panel.