



SMALLEST FRONT PANEL HEIGHT PER VA OF ANY PRECISION AC POWER SOURCE

- Greatly Reduced Heat Dissipation
- Full Output Power from 0 to Unity Power Factor
- 1500VA in 5-1/4 Inch Height
- 4500VA in 10.5 Inch Height

INTRODUCTION

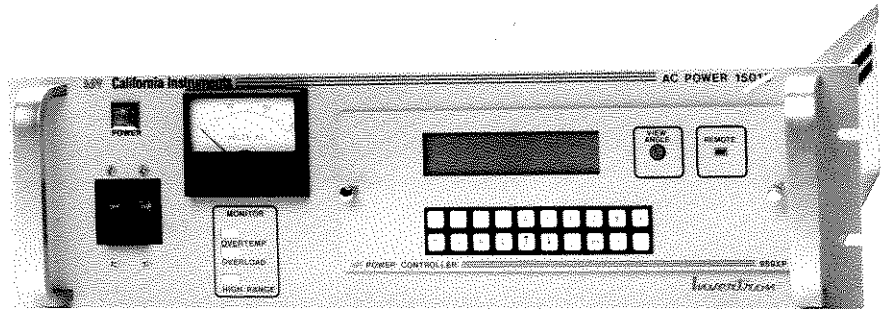
California Instruments presents the most compact and versatile series of AC Power Sources in the testing industry. Some of the many advantages offered by the L-Series are:

- Smaller size per VA output
- High efficiency
- More power/inch
- Automatic remote calibration
- MATE Configuration Optional
- Display/Bus reporting of load parameters (with programmable controller)
 - Volts RMS - Phase Angles
 - Amps RMS - VA
 - Watts - Power Factor
 - Frequency
- Complete self test with module status on faults (with programmable controller)

GENERAL DESCRIPTION

The L-Series is a self-contained unit with an imbedded oscillator/controller, factory configured to your specific requirements. Control of the precise output parameters is via the IEEE-488 bus, VXI bus or front panel. Standard programming languages are CIL and California Instruments' APE (Abbreviated Plain English).

For Avionics applications, the 3-phase models can be configured with 26V and 5V auxiliary outputs. Other L-Series applications are DC power supply testing, production test, quality assurance verification, engineering and ATE applications where small size, low heat dissipation and light weight are important.



EXCLUSIVE FEATURES:

DRIVE LINEAR LOADS WITHOUT DERATING

- Full output power - zero to unity power factor

HIGH FREQUENCY POWER AVAILABLE

- Output frequency range - 45Hz to 5000Hz

SAVE UP TO 50% RACK SPACE

- Smallest front panel height per power level - Saves Rack Space

MUCH LESS HEAT DISSIPATED

- Efficiency - Greater than 80% typical

VERSATILITY FOR YOUR APPLICATIONS

- 4500VA three-phase models can be programmed for single-phase output with Model 4503L-4154

DRIVE OFF LINE SWITCHERS

- Crest factor of 2.5

TEST FOR RIDE-THROUGH

- Programmable dropout feature

L-SERIES—A NEW GENERATION OF AC POWER PRODUCTS

CHARACTERISTICS:

- Manual or Programmable Control
- Standard output ranges of 135V/270V RMS L-N
- Optional clock and lock for master/slave configuration
- Front Panel or Programmable Output Voltage Range Control
- Stack three units for 13.5kVA single-phase or three-phase power in 31.5 inches of panel height.

System Specification: (with Programmable Controller)

CONTROLLERS SYSTEM SPECIFICATIONS

	STANDARD PROGRAMMABLE (1P OR 3P)	PT PROGRAMMABLE (1PT OR 3PT)	MANUAL CONTROL (1M OR 3M)
VOLTAGE RANGES:	Standard: 0-135V or 0-270V. All voltages are L-N. Programmable range change included. Program different amplitudes each phase.	Standard: 0-135V or 0-270V L-N. Programmable range change included. All phases have the same amplitude.	<ul style="list-style-type: none"> Variable Control from 0 to F.S. Optional: 0 to F.S. based on 0-10VDC input.
VOLTAGE ACCURACY:	TRMS Sense: $\pm 0.135V$ from 5V to 135V. $\pm 0.54V$ from 135V to 270V. All at 25°C $\pm 1^\circ C$ (based on TRMS reading).	45Hz to 550Hz: $\pm 0.7\%$ of full scale from 5% of full scale to full scale. Constant line, load and temperature at 25°C $\pm 1^\circ C$.	<ul style="list-style-type: none"> Variable Control Manual setting of Current Limit
LOAD REGULATION:	TRMS Sense: $\pm 0.05\%$ full-scale no load to full load.	$\pm 2\%$, 45Hz to 550Hz	$\pm 1.5\%$, 45Hz to 5kHz (see note below)
LINE REGULATION:	$\pm 0.02\%$ of full-scale for $\pm 10\%$ line change.	$\pm 3.5\%$ of full output for a $\pm 10\%$ line change	$\pm 3\%$ of full output for a $\pm 10\%$ line change (see note below)
STABILITY (Amplitude):	$\pm 0.05V$ per 1000 hr. at 25°C $\pm 5^\circ C$ at constant line and load.	$\pm 0.25\%$ over 24 hours at constant line, load and ambient temperature.	$\pm 0.25\%$ over 24 hours at constant line, load and ambient temperature.
DEFAULT VOLTAGE:	5.0 Volts	0 Volts	N/A
FREQUENCY RANGE:	Same as Amplifier	45Hz to 550Hz	45Hz to 5.00kHz
FREQUENCY RESOLUTION:	0.01 Hz from 45Hz to 99.99 Hz 0.1Hz from 100Hz to 999.9Hz 1Hz from 1000Hz to 5000Hz	0.01Hz from 45Hz to 99.99Hz 0.1Hz from 100Hz to 550Hz	3 Digit Resolution
FREQUENCY ACCURACY (25°C $\pm 1^\circ C$):	$\pm 0.001\%$ of programmed value	$\pm 0.001\%$ of programmed value	$\pm 0.005\%$
DEFAULT FREQUENCY (Initial Value):	Any (within range)	Any (within range)	N/A
EXTERNAL SYNC INPUT:	TTL Level	TTL Level	N/A
EXTERNAL MODULATION:	N/A	0 to 5V RMS signal generates 0 to 11% amplitude modulation of output voltage.	0 to 5V RMS signal generates 0 to 11% amplitude modulation of output voltage.
PHASE ANGLE PROGRAMMING:	Phases B and/or C relative to Phase A: 0 to ± 360.0 degrees in 0.1 degree increments.	Phases B and/or C relative to Phase A: 0 to ± 360.0 degrees in 0.1 degree increments.	N/A
PHASE ACCURACY:	$\pm 2^\circ$ (add 0.5°/kHz above 2kHz)	$\pm 2^\circ$	$\pm 2.5^\circ$
DISTORTION PROGRAMMING (45Hz - 550Hz):	N/A	0 to 20% THD with sine waveform and resolution of 1%	N/A

Note: Line and load regulation is $\pm 0.1\%$ when remote sense is connected.

MAJOR PROGRAMMABLE FUNCTIONS:

The L-Series is unsurpassed in total control of AC power functions. Use the local keypad or IEEE-488 to:

- Set the voltage with .1 volt resolution.
- Set the frequency with 4 digit resolution.
- Select the output voltage range.
- Set different voltage levels on each phase.
- Program Current Limit default values.
- Select internal or external sync.
- Set the phase angles of B and C with respect to A with .1 degree programming.
- Set the starting point of the sine wave anywhere from 0 to 360 degrees with .1 degree programming.
- Calibrate the output and measurement functions.
- Set a power blackout starting at any phase angle from .001 sec duration to 2 hours duration.
- Set voltage surge starting at any phase angle from .001 sec duration to 2 hours duration.
- Set sweeps of voltage and/or frequency/phase angles.
- Function strobe output with any change of state.
- Pre-program 16 memory registers to loop all functions continuously.

Specifications:

GENERAL AMPLIFIER SPECIFICATION:

Output Voltage Ranges:

Standard:	0 to 135V RMS 0 to 270V RMS
-HV Option:	0 to 156V RMS 0 to 312V RMS
-AX Option*:	26V/5V regulated output
-LV Option**:	0 to 67.5V RMS 0 to 135V RMS

(*)-AX Option not available on Model 1501L

(**)-LV Option not available on Model 4503L

Note: Output Voltage is L-N

REGULATION:

Load: $\pm 0.05\%$ F.S. No Load to Full Load with Programmable Controller.
Line: $\pm 0.02\%$ F.S. for $\pm 10\%$ line change with Programmable Controller.

Note: See Load and Line Regulation Specifications for Manual Controller.

Total Harmonic Distortion:

Less than 1%, 45Hz to 2kHz
Less than 2%, 2kHz to 5kHz
(All with Linear Load)

Stability (Amplitude):

$\pm 0.25\%$ over 24 hours at constant line, load and ambient temperature.

Full Power Frequency Range:

See Physical Description (below)

Frequency Response:

± 0.5 Db over full power frequency range.

AC Noise Level:

55 dB RMS below full output

Fault Protection (Overcurrent, Short-Circuit, Overpower):

Programmable Controller shuts down system.

Manual Controller illuminates front panel OVERLOAD indicator. Output voltage is clipped and system automatically recovers.

Output Relay (for system shutdown):

Bus control or remote contact closure

Thermal Protection:

Illuminates OVERTEMP indicator. System automatically recovers.

AC Mains Input:

Frequency: 47Hz to 440Hz
Voltage: Models 1501L and 1503L; 115V or 230V $\pm 10\%$ single phase. Model 4503L; 187V to 252V three-phase L-L.
-UP Option (Model 4503L only): 187V to 456V L-L.

Operating Temperature Range:

0°C to 55°C

Storage Temperature Range:

-40°C to +85°C

Connectors:

Input provided on rear terminal block (TB-3). Output provided on rear mount terminal block (TB-1).

Note: Remote Sense Mating Connectors are provided.

Front Panel Indicators

- POWER
- OVERLOAD
- OVERTEMP
- HIGH RANGE
- INPUT CIRCUIT BREAKER
- ANALOG VOLT METER

PHYSICAL DESCRIPTION:

SINGLE-PHASE MODELS

MODEL NO.	RATED PWR (VA)	FREQUENCY RANGE	HEIGHT ¹ IN (cm)	WEIGHT LBS (kg)
1501L-1	1,500	45Hz to 5kHz	5.25 (13.3)	80 (35.6)
4503L-1-4132	4,500	45Hz to 600Hz	10.5 (26.7)	175 (79.2)
9003L/2-1-4132	9,000	45Hz to 600Hz	21 (53.3)	350 (158)
13503L/3-1-4132	13,500	45Hz to 600Hz	31.5 (80)	525 (238)

THREE-PHASE MODELS

MODEL NO.	RATED PWR VA/PHASE	FREQUENCY RANGE	HEIGHT IN (cm)	WEIGHT LBS (kg)
1503L-3-4044	500	45Hz to 5kHz	5.25 (13.3)	85 (38.3)
4503L-3-4132	1,500	45Hz to 1kHz	10.5 (26.7)	175 (79.2)
9003L/2-3-4132	3,000	45Hz to 600Hz	21 (53.3)	350 (158)
13503L/3-3-4132	4,500	45Hz to 600Hz	31.5 (80)	525 (238)

NOTES:

¹ All models are 23 inches (58.4 cm) deep and 19 inches (48.3 cm) wide

² 1500VA/Ø with UP Option

³ 4500VA with UP Option

PROGRAMMABLE SINGLE-PHASE / THREE PHASE

MODEL NO.	RATED POWER	FREQUENCY RANGE	HEIGHT IN (cm)	WEIGHT LBS (kg)	OUTPUT VOLTAGE RANGE	OPERATING TEMP.
4503L-3PT-4154	1700VA/Ø ² in 3Ø operation or 5100VA ³ in 1Ø operation Programmable	45Hz to 550Hz	10.5 (26.7)	175 (79.2)	145V/290V, L-N	35°C

MEASUREMENTS - VISUAL DISPLAY AND BUS REPORTING WITH PROGRAMMABLE CONTROLLER

Volts:

Range: 0.0 to Full Scale Output Volts
 Resolution: 0.1 Volt
 Accuracy: $\pm(0.2\% \text{ RDG} + 3 \text{ digits})$
 Temperature Coefficient: ± 0.05
 Volts per degree C.

Current (Crest Factor to 2.5 at 10 or 100 Amps):

Range: 10.0 and 100.0 Amps
 Resolution: 0.01 Amp or 0.1 Amp
 Accuracy: $\pm(0.3\% \text{ RDG} + 3 \text{ digits})$
 Temperature Coefficient: $\pm 0.016\%$ of full scale current per degree C.

Power:

Range: 0.0 to 4.000kW or 40.00kW
 Resolution: 0.001kW or 0.01kW
 Accuracy: $\pm(0.5\% \text{ RDG} + 3 \text{ digits})$
 Temperature Coefficient: $\pm 0.06\%$ of Full Scale per degree C.

Phase Angles (at full scale voltage):

Range: 0 to 360 degrees
 Resolution: 0.1 degree
 Accuracy: ± 1 degree to 2kHz,
 ± 1.5 degree to 5kHz

Power Factor:

Range: 0.000 to 1.000

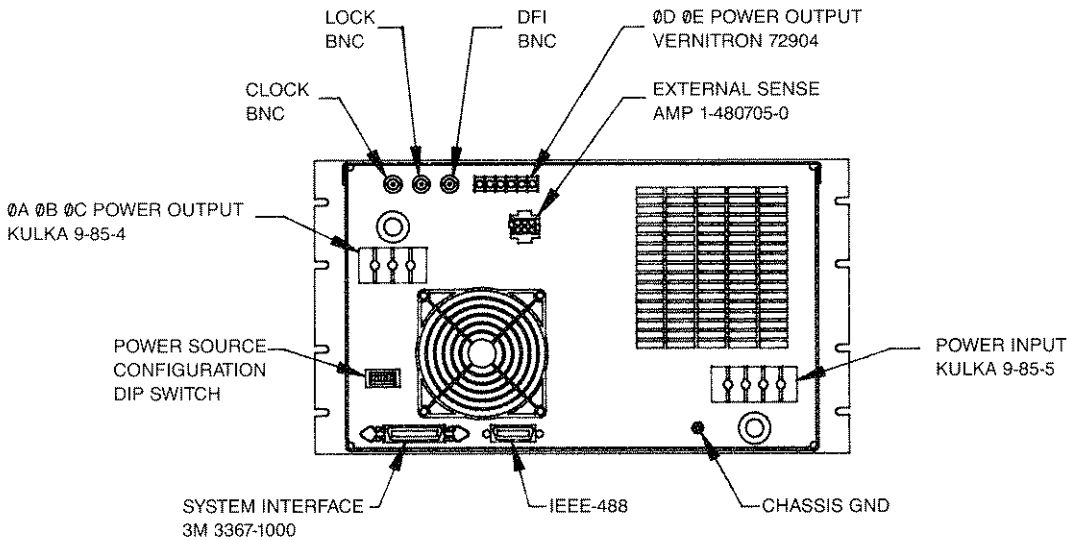
Frequency:

Range: 45 to 5000Hz
 Resolution: Four decades
 Accuracy: $\pm 0.02\text{Hz}$ to 99.99Hz
 $\pm 0.2\text{Hz}$ to 500.0Hz
 $\pm 0.5\text{Hz}$ to 999.9Hz
 $\pm 10\text{Hz}$ to 5000Hz

Apparent Power:

Range: 0 to 4000VA or 40.0kVA
 Resolution: 1VA or 0.01kVA
 Accuracy: $\pm(0.5\% \text{ RDG} + 6 \text{ digits})$

MODEL 4503L REAR PANEL



OPTIONS

- MT MATE Configuration (includes DF1 Connector, Confidence Load, Output Relay, CIIL Language).
- LV Low Output Voltage Ranges (0.675V/0-135V) (Not available for Model 4503L).
- HV High Output Voltage Ranges (0.156V/0-312V L-N).
- LK Slave Operation with Clock/Lock (cannot be used with -AX)
- AX Auxiliary 26V/5V Regulated Outputs (cannot be used with -LK)
- UP Input Voltage for 4503L Series (187-456V L-L).

Note:

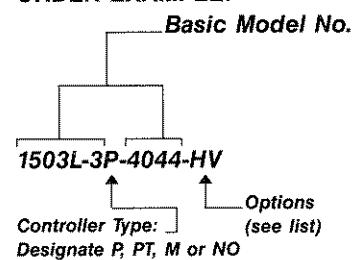
- When ordering, please specify:
- Output default frequency (60Hz if not specified)
 - Output voltage range initialization (specify 135V or 270V)
 - Input voltage with Models 1501L and 1503L.

ORDERING INFORMATION:

TERMS: Net 30 days
DELIVERY: Within 30 days ARO
F.O.B.: Factory, San Diego, CA.
SHIPMENT: Freight Collect

CALL TOLL FREE:
800-4AC-POWER

ORDER EXAMPLE:



Default Frequency - 400Hz
 Output Voltage Range Initialization - 135V or 270V
 Input Voltage - 115V (Models 1501L and 1503L only)

LSDS 12/91 Printed in U.S.A.
 Subject to Change Without Notice.

California Instruments Corp.

9025 Balboa Avenue
 San Diego, CA 92123
 (619) 279-8620

FAX 619-279-8139
 Telex 695047
 CallToll Free 800 4AC POWER