California Instruments L Series

Precision AC power in single, split or three phase

- Single phase, three phase and split phase configurations
- Mode option allows switching between single and three phase output
- Output frequency range up to 5000 Hz.
- Full output VA with 0 to 1 power factor
- High peak current capability with up to 9:1 crest factor
- Efficiency 75% typical or better. Generates less heat and consumes less power

2000–18000 VA

135–400 V

0–132 A

≋	187-252	208-252	342-456
∼	115	230	

GPIB

Now you can test any product that operates from AC power with the most compact, versatile power source in the test industry. The L-Series' small size provides more power per inch than most other AC supplies. Highly efficient, these products dissipate less heat than previous generation systems and allow up to an additional 10 % output power. With a programmable controller, L-Series models provide the most comprehensive set of programmable functions in the industry. Automatic remote calibration and comprehensive self-tests simplify maintainability.

All L Series units are completely self-contained. Control is through an embedded oscillator, factory configured to your specific requirements. Output parameters are controlled via the front panel or the IEEE-488 bus. Bus programming, standard with -P, -PT, allows programming and measurement function readback compatible with a number of other standards including VXI, MXI and RS232 via recommended translators. To simplify programming, the standard unit supports both Abbreviated Plain English programming and an ATLAS-based control language.

For avionics applications, any 3-phase model can be configured with 26 V and 5 V auxiliary outputs. (AX option)

The L Series is ideal for applications where small size, low heat dissipation and light weight are important. These include DC power supply testing, production test, quality assurance verification, engineering and ATE.

L Series : Product Specifications

Overview

Model	Power at 35° C[1]	Phase[2]	Current in 135 V range			Current / phase 3ø mode
			A rms	A peak[3]	A peak[4]	
1503L	1667 VA	3	4.1 / ø	9.3 / ø	10 / ø	4.1 / ø
2001L	2000 VA	1	14.8	55.6	60	n/a
2750L	3000 VA	1 or 3	22.2	83.3	90	7.4
4500L	5000 VA	1 or 3	37	83.3	90	12.3
6000L	6000 VA	1 or 3	44.4	157.4	170	14.8
9000L	10000 VA	1 or 3	74	166.7	180	24.7
12000L	12000 VA	1 or 3	90	314.8	340	30.0
13500L	15000 VA	1 or 3	111.2	250.0	270	37.0
18000L	18000 VA	1 or 3	133.2	472.0	510	44.4

Notes: 1. Derate power by 10% for operation at 50° C ambient or when using the -UP option
2. 1 or 3 phase systems are factory configured unless the "MODE" option is specified
3. Repetitive peak current capability
4. Non repetitive peak inrush current

Physical

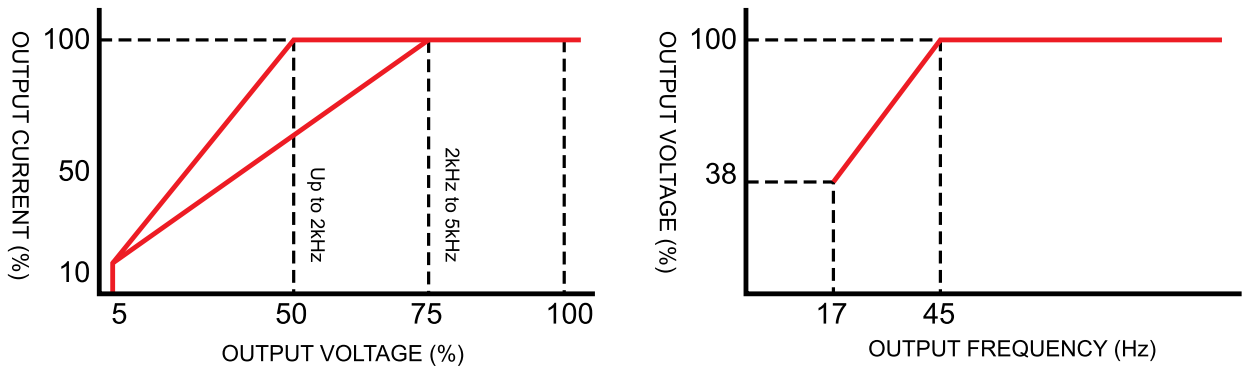
Model	Size (H x W x D)	Weight
1503L	5.25" x 19" x 23" 133 x 483 x 584 mm	85 lb 38.3 Kg
2001L	5.25" x 19" x 23" 133 x 483 x 584 mm	85 lb 38.3 Kg
2750L	10.5" x 19" x 23" 267 x 483 x 584 mm	175 lb 97.2 Kg
4500L	10.5" x 19" x 23" 267 x 483 x 584 mm	175 lb 97.2 Kg
6000L	10.5" x 19" x 23" 267 x 483 x 584 mm	175 lb 97.2 Kg
9000L	21" x 19" x 23" 533 x 483 x 584 mm	350 lb 158 Kg
12000L	21" x 19" x 23" 533 x 483 x 584 mm	350 lb 158 Kg
13500L	31.5" x 19" x 23" 800 x 483 x 584 mm	525 lb 238 Kg
18000L	31.5" x 19" x 23" 800 x 483 x 584 mm	525 lb 238 Kg

L Series : Product Specifications

2000–18000 VA

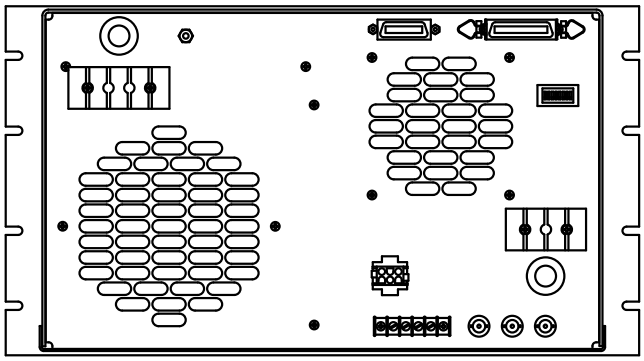
Output	
Output Voltage : Standard	0-135 V, L-N, 0-270 V, L-N
Output Voltage : -HV Option	0-156 V, L-N, 0-312 V, L-N
Output Voltage : -LV Option	0-67.5 V, L-N, 0-135 V, L-N
Output Voltage : -EHV Option	0-200 V, L-N, 0-400 V, L-N
Output Frequency	
Models 1503L, 2001L, 2750L-3, 4500L-3 and 6000L-3	17 Hz to 5 kHz
Models 2750L-1, 4500L-1, 9000L and 13500L	17 Hz to 2 kHz
Models 6000L-1, 12000L and 18000L	17 Hz to 440 Hz
All models with -PT controller	17 Hz to 550 Hz except 6000L, 12000L and 18000L
Input	
Models 1503L, 2001L	115 V or 230 V single phase 47 Hz to 440 Hz
Models 2750L, 4500L, 9000L, 13500L	187 V - 252 V, L-L, 3 phase / (230 V single phase for model 2750L only) 342 V - 456 V, L-L, 3 phase with -UP option
Models 6000L, 1200L, 18000L	208 V - 252 V, L-L, 3 phase
Model 2750L	1 or 3 phase input 187 - 252 V
Common	
Total Harmonic Distortion	45 Hz to 2 kHz: 1 percent To 5 kHz: 2 percent 50/60 Hz: 0.5 percent typical
AC Noise Level	160 mV rms typical
Connectors	• Input provided on rear terminal block • Output provided on rear terminal block (Remote sense mating connectors are provided)
Protection	• Overcurrent • Overpower • Short circuit • Overtemperature • Current limit trip standard with programmable units. All units have adjustable current limit.

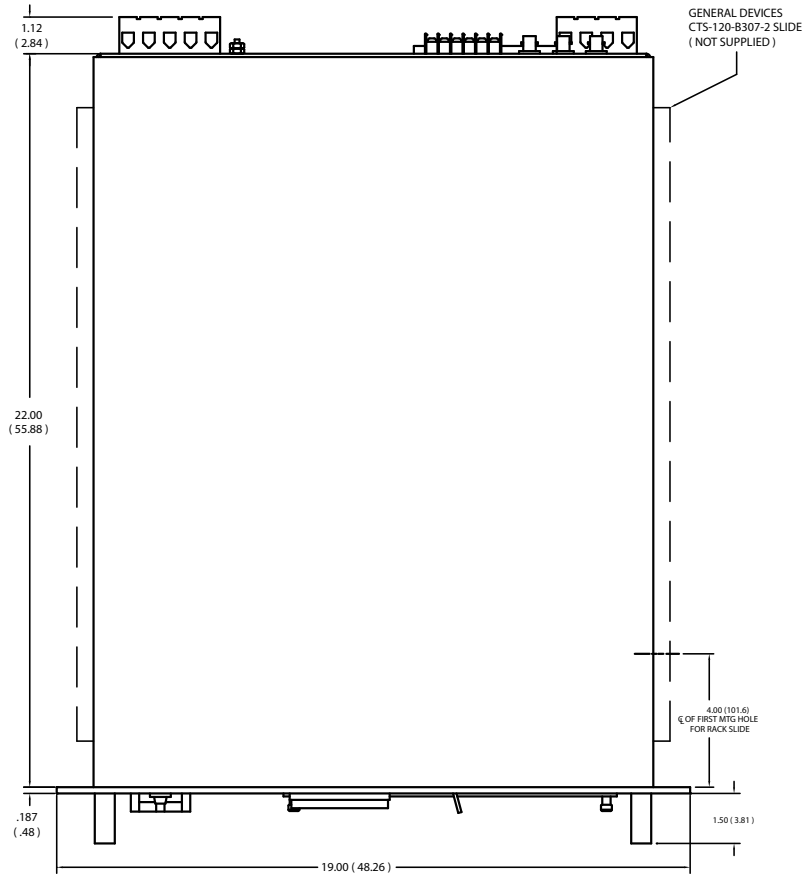
Rating Curves

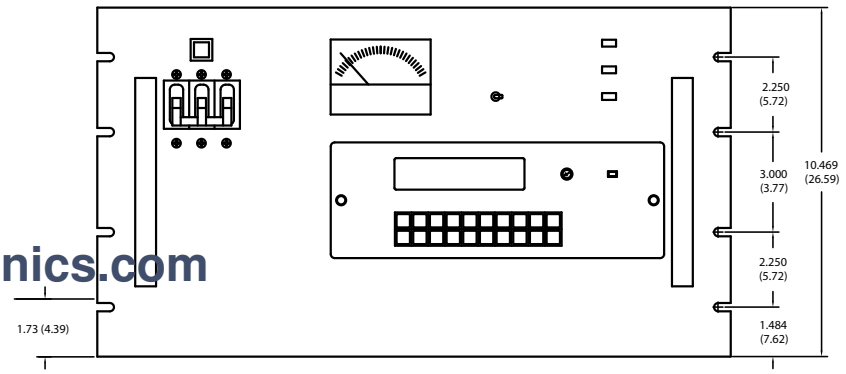


L Series : Product Specifications

Specification	Programmable -P	Programmable -PT
Controller Type	Programmable controller	Fast Transient controller
Voltage		
Range	0 - 135 V / 0 - 270 V L-N Programmable range change Individual phase programming	0 - 135 V / 0 - 270 V L-N Programmable range change Individual phase programming
Accuracy	± 0.135V from 5 V to 135 V ± 0.54 V from 135 V to 270 V @ 25° C ± 1° C	± 0.7 % FS from 5 % to FS Constant line, load and temperature @ 25° C ± 1° C
Load Regulation	TRMS Sense: ± 0.05 % FS no load to full load	- 0.5 % FS from 45 Hz to 100 Hz - 2 % FS from 100 Hz to 550 Hz
Line Regulation	± 0.02 % FS for ± 10 % line change	± 2 % of full output for a ± 10 % line change
Stability	± 0.015 % FS over 24 hours at constant line, load and temperature	± 0.25 % FS over 24 hours at constant line, load and temperature
Initial value	0.0 or 5.0 Vrms field selectable	0 Vrms
Settling time	16 msec, no-load from 5 V to within 2 % of final value; 16 msec, full load from 5 V to within 15 % of final value	0.5 msec
Programmable THD	N/A	0 - 20 % THD clipped sine 1 % resolution
Amplitude Modulation	N/A	0 to 5 V RMS generates 0 to 11 % amplitude modulation of output voltage. 45 Hz to 5 kHz input
Frequency		
Range	2750L-1P, 4500L-1P and all multibox systems: 45 Hz to 2 kHz -3P and 751L - 2001L: 45 Hz to 5 kHz 6000L, 12000L and 18000L: 45 Hz to 440 Hz	6000L, 12000L and 18000L: 45 to 440 Hz All other models: 45 Hz to 550 Hz
Resolution	0.01 Hz; 45.00 Hz to 99.99 Hz 0.1 Hz; 100.0 Hz to 999.9 Hz 1 Hz; 1000 Hz to 5000 Hz	0.01 Hz; 45.00 Hz to 99.99 Hz 0.1 Hz; 100.0 Hz to 550.0 Hz
Accuracy	± 0.001 % of programmed value	± 0.001 % of programmed value
Initial value	Any within range	Any within range
External Sync Input	TTL level	TTL level
Phase		
Range	Phase B and/or C relative to phase A: 0 to ± 360° in 0.1° increments	Phase B and/or C relative to phase A: 0 to ± 360° in 0.1° increments
Accuracy	± 2 °	± 2 °
Current		
Programmable Limit	Adjustable trip	Adjustable trip
Remote Inhibit	Contact closure turns output off	Contact closure trips unit off. Sets defaults.
Measurements		
Voltage	resolution 0.1 Volt, accuracy ± 10 digits	
Current	resolution 0.01 Amp or 0.1 Amp, accuracy ± 10 digits	
Power	resolution 1 W or 0.01 kW, accuracy ± 10 digits	
Phase angle	resolution 0.1°, accuracy ± 2° to 2 kHz, ± 3° to 5 kHz	
Power Factor	range 0.000 to 0.001	
Frequency	resolution four decades, accuracy ± 0,02 Hz to 99.99 Hz, ± 0.2 Hz to 500.0 Hz, ± 0.5 Hz to 999.9 Hz, ± 10 Hz to 5 kHz	
Apparent Power	resolution 1 VA or 0.01 kVA, accuracy ± 10 digits	







L Series

Plug-in Controller Concept Provides Choice of Features	
Type -P,	the standard programmable controller, uses True RMS sensing, providing the most accurate output voltage regulation. Output settling times for the -P controller are longer than the -PT controller due to the RMS sense response time. With Type -P, transients are programmable over time or cycles.
Type -PT	uses a fast real-time servo, instantly creating exact waveform definitions ideal for applications such as switching DC power supplies where real-time feedback and fast output settling times are critical. The -PT controller is recommended for applications
Type -M,	the manual controller, is ideal for portable or benchtop applications where local control is sufficient. An optional remote programmable voltage input can be added to allow amplitude control using a DC input signal.
Single and Three Phase Versions	All controllers are available in either single or three phase versions. For special applications, two phase or split phase configurations can be ordered as well. For three phase -P and -PT controllers, a phase mode option can be added which allows switching between both single and three phase output modes without the need to rewire the output terminals.
Measurements	Both -P and -PT controllers provide a full range of output readback measurements , either via front-panel display or over the standard IEEE-488 bus. Measurements provided are Volt RMS, Current RMS, Power, Apparent Power, Power Factor, Frequency and Phase.
Controller and Amplifier Options	The L Series is highly configurable using a wide array of options for both the amplifier and the controller. This makes the L Series one of the most versatile AC power solutions on the market. If your application requirements can not be met using any of the options listed here, contact the factory for configuration assistance.
Controller Options Provide Capability for Specialized Testing	
-MODE	Allows certain L-Series models to be IEEE-programmed or switch configured for single-phase or three phase output.
-MT	Primarily for military applications, where CIIL and full confidence test is required. Not available on 751L.
-RPV	Allows amplitude of any L-Series unit, when using a manual oscillator, to be programmed with an external 0 - 10 VDC input.
-SQW	Allows square wave capability with programmable controller. Not available on 2750L-1, 4500L-1, 6000L or any multi-box system.
-704	MIL-STD-704 test. These test routines are embedded in the -P and -PT controller along with the standard APE language.
-160	RTCA/DO-160 test. These test routines are embedded in the -PT controller along with the standard APE language. (not available on -P controller)
L-Series Amplifier Options Provide Additional Flexibility	
One of the following may be specified	
-HV	High voltage. Changes output transformer to 156 V/ 312 V, L-N.
-EHV	Extra high voltage. Changes output transformer to 200 V/ 400 V, L-N (45 Hz to 1000 Hz frequencies only).
-LV	Low voltage. Changes output transformer to 67.5 V/ 135 V, L-N. Especially useful when 115 V, L-L is required.
Any of the following may be specified	
-AX	Provides separate isolated 26 VAC regulated and 5 VAC unregulated outputs. The 26 V is normally used for servo-synchro excitation, and the 5 V for lamp power. Available on Models 2750L, 4500L, 1503L only. 26 Volt - Accuracy: ±2%. Current Capacity: 3 ARMS. Frequency: 360/440 Hz. Regulation: ±0.05% 5 Volt - Accuracy: ±5%. Current Capacity: 5 ARMS.
-UP	Allows any system configured from Model 4500L and up to accept 3-phase L-L voltage from 342 V to 456 V, L-L.
-LKM	Clock/Lock Master Unit. Installs necessary hardware to adapt to one slave unit.
-LKS	Clock/Lock Slave Unit. Installs necessary hardware to accept Clock/Lock inputs from LKM unit. Only one slave unit may be driven from a master unit.
210960	Rack slides. Required for mounting in 19" (483 mm) instrument rack