146-1968

MORE WATTS PER VERTICAL INCH

Load up on the NEW SERIES EL ELECTRONIC LOADS from Kepco

Model EL 2K-200-200
Single Channel Unit

Model EL 1K-200-100D
Dual Channel Unit

- 1KW - 5KW Modules
- 4U Height
- Parallel Operation
- Up to 600 Volts DC
- Up to 600 Amperes/Module
- Constant E, I, P, I/E, E/I
- Air Cooled
- Local, Remote Analog Control and USB Standard
- GPIB and Ethernet Optional

AN ISO 9001 COMPANY

KEPCO®

THE POWER SUPPLIER™

SINCE 1946

THE NEW KEPCO SERIES EL ELECTRONIC LOADS

The EL Series is a line of modular air-cooled, DC electronic loads used to test power sources such as batteries, power supplies, generators, chargers, fuel cells, etc. Power ratings start at 1KW; standard models have maximum test capabilities of 50, 200, 400 and 600 volts. High current and power operation are achieved via parallel connection in a master/slave configuration. Individual modules are capable of up to 5KW and 600 amperes (see chart).

The EL Series offers unique Functional Modularity. Functional Modularity allows the load to be retrofitted to increase load power/current as required for undefined future applications. Purchase the capability needed today with assurance of future power/current upgrades. The result is an Electronic Load maximizing the most important specification:

VALUE = $/Watt

When the requirements increase, the load may be upgraded.

All EL loads operate as master or slave and come with or without front panel control and readouts. Up to 15 additional loads can be driven with one acting as a master.

INDIVIDUAL LOAD CHARACTERISTICS

- Base Unit - Includes front panel controls and indicators for Amps, Volts and KW
- Computer operated LabVIEW™ capable
- Constant current, voltage, power, resistance, conductance and short circuit modes
- Readback voltage, current, power and load status
- USB and RS-232 are standard
- GPIB and Ethernet Control via single optional interface card
- Comprehensive SCPI command set
- Monitor load current via computer or analog output
- Use unique test patterns from an Arbitrary Waveform Generator via the external analog input
- Remote voltage sense eliminates error caused by voltage drop in test leads

SYSTEM INTEGRATION IS SIMPLE

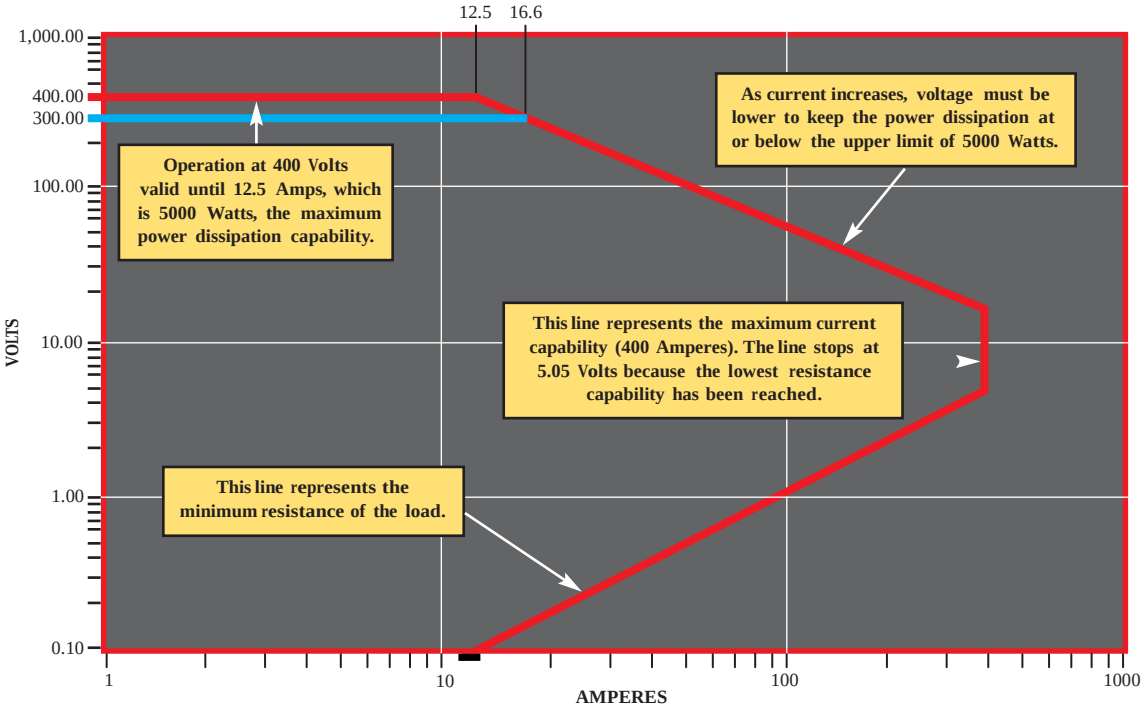
- Up to 60KW into one 8 ft. rack
- Control up to 15 slaves with one master (75KW)
- Computer controlled and/or front panel operation with display for voltage, current, power and status
- Simple operation - no deep menus to contend with

RELIABLE AND RUGGED

- High power semiconductors are heat sinked for cool operation
- Very low internal resistance ensures fast and clean switching operation
- Power devices individually fused for complete protection
- Internal thermal sensors ensure uniform power distribution for long reliability
- Isolated test bus allows a wide range of source (DUT) configurations

LabVIEW is a trademark of National Instruments Corp.

EXAMPLE OF SAFE OPERATING AREA FOR EL 5K-400-420



The load may be operated at any given input condition that is within the red line boundary.

For example:
If a 300 Volt source is to be tested, select the 300 Volt line (blue) and note the range of current allowable along that line.

In this example, the load may be operated at currents from near zero to a maximum of 16.6 Amperes @300V.

Refer to www.kepcopower.com/el-opcurve.pdf for operating curves of all EL models.

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Model EL 2K-200-200

Model EL 1K-200-100D

SERIES EL MODEL TABLE

MODEL NUMBER (1)	OPERATING LIMITS			OVERLOAD PROTECTION (2)			MINIMUM ON RESISTANCE ALL MODES Ohms
	RATED POWER Watts	RATED VOLTAGE Volts	RATED CURRENT ALL MODES Amps	POWER (3) Watts	VOLTAGE (4) Volts	CURRENT (5) Amps	
EL 1K-50-100	1000	50	100	1050	52.5	105	0.008
EL 1K-200-100	1000	200	100	1050	210	105	0.014
EL 1K-400-70	1000	400	70	1050	420	73.5	0.046
EL 1K-600-30	1000	600	30	1050	630	31.5	0.017
EL 1K-50-100D	1000 (6)	50 (6)	100 (6)	1050 (6)	52.5 (6)	105 (6)	0.008 (6)
EL 1K-200-100D	1000 (6)	200 (6)	100 (6)	1050 (6)	210 (6)	105 (6)	0.014 (6)
EL 1K-400-70D	1000 (6)	400 (6)	70 (6)	1050 (6)	420 (6)	73.5 (6)	0.046 (6)
EL 1K-600-30D	1000 (6)	600 (6)	30 (6)	1050 (6)	630 (6)	31.5 (6)	0.017 (6)
EL 2K-50-200	2000	50	200	2100	52.5	210	0.004
EL 2K-200-200	2000	200	200	2100	210	210	0.007
EL 2K-400-140	2000	400	140	2100	420	147	0.023
EL 2K-600-60	2000	600	60	2100	630	63	0.083
EL 3K-50-300	3000	50	300	3150	52.5	315	0.005
EL 3K-200-300	3000	200	300	3150	210	315	0.005
EL 3K-400-210	3000	400	210	3150	420	220.5	0.015
EL 3K-600-90	3000	600	90	3150	630	94.5	0.056
EL 4K-50-500	4000	50	500	525	52.5	525	0.002
EL 4K-200-500	4000	200	500	2100	210	525	0.003
EL 4K-400-350	4000	400	350	4200	420	367.5	0.009
EL 4K-600-150	4000	600	150	4200	630	157.5	0.333
EL 5K-50-600	5000	50	600	5250	52.5	630	0.002
EL 5K-200-600	5000	200	600	5250	210	630	0.002
EL 5K-400-420	5000	400	420	5250	420	441	0.008
EL 5K-600-200	5000	600	200	5250	630	210	0.028

(1) For GPIB and Ethernet Interface, add suffix "G" to the model number.
(2) Temperature protection: Per FET safe junction temperature.
(3) Maximum operating power and/or current may be reduced if operating conditions (ambient temperature, available air flow, etc.) cause internal load temperature to exceed safe operating conditions for FETs (TEMP FAULT).
(4) Maximum operating power and/or current may be reduced when ambient temperature exceeds 25°C depending on air flow, duty cycle of load operation and other situational specific conditions.
(5) Individually fused FETs allow continued operation with device failure.
(6) Per channel.

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SERIES EL SPECIFICATIONS

SPECIFICATION		RATING/DESCRIPTION (1)	CONDITION
MODE CHARACTERISTICS			
Linearity vs. Programming Command			5-100% of Full Scale
Constant Current		±0.25%	
Constant Power		±2%	
Constant Voltage		±0.25%	
Constant Resistance		±1%	
Constant Conductance		±1%	
Regulation Constant			
Current Constant		±0.25%	
Power Constant		±1%	
Voltage Constant		±0.25%	
Resistance Constant		±1%	
Conductance		±1%	
Resolution (Via Computer Control)		14 Bits	
Current Readback (Current Mode)	Computer Accuracy	±0.25%	
	Computer Resolution	±15 Bits	
Parameter Readback (Current and Voltage)	Accuracy	±0.25%	
	Resolution	±15 Bits	
CONTROL CHARACTERISTICS			
USB Interface		Uses IEEE 488.2 and SCPI commands and queries	Requires no cost downloadable driver
RS 232 Interface		Uses IEEE 488.2 and SCPI commands and queries	Baud rate: 38400 Parity: None Data Bits: 8 Stop Bits: 1 Echo: OFF
GPIB Interface Ethernet Interface		Uses IEEE 488.2 and SCPI commands and queries	Optional card provides access to both interfaces. Add suffix "G" to model number when ordering.
GENERAL CHARACTERISTICS			
a-c Line Power Input		120V a-c ±10%, 50-60 Hz or 240V a-c ±10%, 50-60 Hz	120V is factory default, 240V requires internal configuration
Operating Temperature		0°C to 40°C	
Dimensions (Load)		19"W x 7"H x24.5"D	
Weight (Load)		88 lbs.	
Storage Requirements		-20 to +60°C, 15 to 80% RH	Relatively dust free environment

(1) Specifications measured @23°C ambient.

NOTES:
1. Regulation specified after 15 minutes of operation at set power level.
2. Individually fused FETs allow continued operation with device failure.
3. Maximum operating power and current may be reduced if operating conditions (ambient temperature, available air flow, etc.) cause internal load temperature to exceed safe operating conditions for FETs (TEMP FAULT).
4. Maximum operating power and/or current may be reduced when ambient temperature exceeds 25°C depending on air flow, duty cycle of load operation and other conditions.

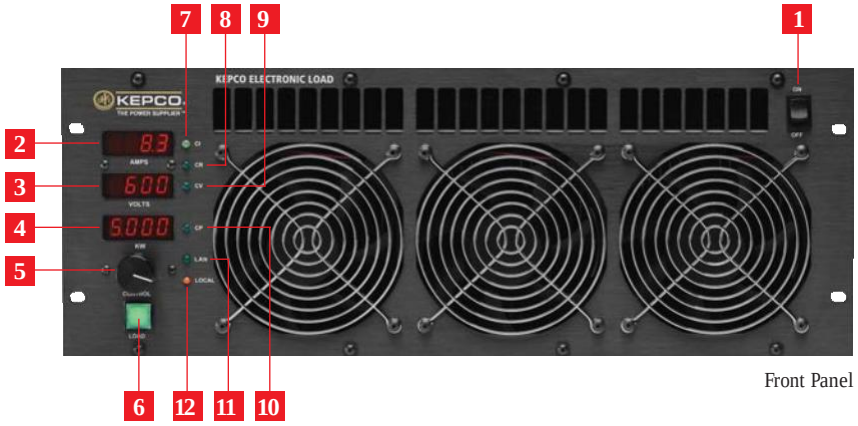
CE PENDING

APPLICATIONS

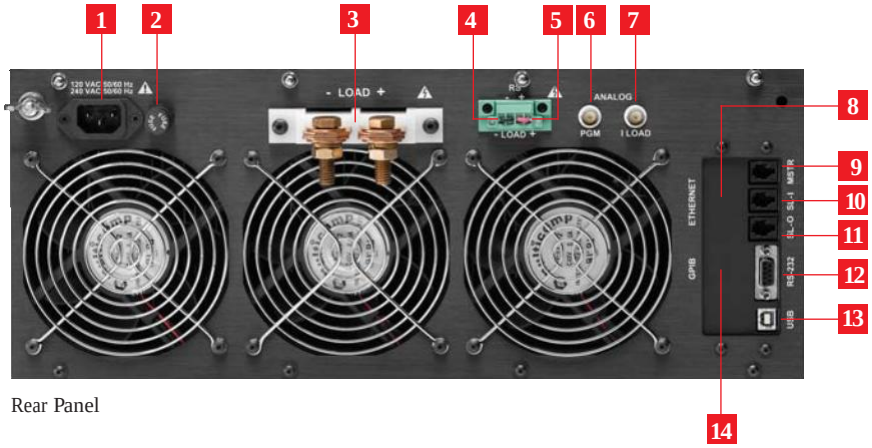
AUTOMOTIVE - LIFE-CYCLE TESTING OF HYBRID CONTROL MODULES • FUEL CELL TEST
WINDMILL CHARACTERIZATION AND PERFORMANCE TESTING • WEAPONS BATTERY TESTS
HELICOPTER POWER GENERATOR FLIGHT LINE TEST
POWER SUPPLY TESTING • HIGH PERFORMANCE BATTERY TEST

CONFIGURING AND OPERATING YOUR EL ELECTRONIC LOAD

The front and rear panels below show a typical single channel model



Front Panel



Rear Panel

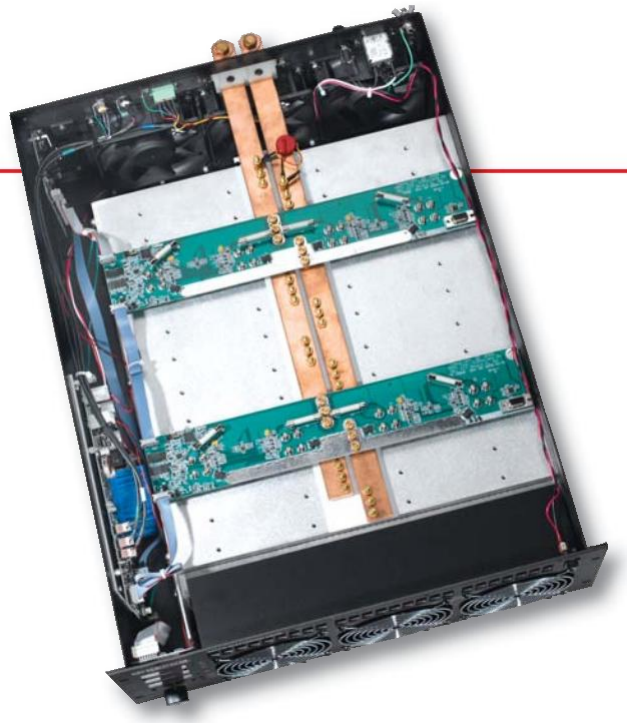
FRONT PANEL CONTROLS AND INDICATORS

1. Power Switch
2. Current Display (Autorange)
3. Voltage Display (Autorange)
4. Power Display (Autorange)
5. Multifunction Control Knob
   Press to Select Mode
   Turn for Set Point
6. LOAD - Green for Standby
   Amber for Engaged
   Press to Engage/Disengage
   Flashing Red for Fault
7. LED Constant Current Mode (CI)
8. LED Constant Resistance Mode (CR)
   Blinks for Constant Conductance Mode (CS)
9. LED Constant Voltage Mode (CV)
10. LED Constant Power Mode (CP)
11. LED LAN (Lit When LAN Connected)
12. LED Local

All Mode LEDs Blinking ON - Short
All Mode LEDs Blinking OFF - Mode Off

REAR PANEL LAYOUT AND CONNECTIONS

1. a-c Input
2. Fuse
3. Laminated Copper Buss
   LOAD Connection
4. Remote Sense –, Rear Terminal –
5. Remote Sense +, Rear Terminal +
6. External Analog Control
7. Current Monitor Analog Output
8. Ethernet Option (Not Shown)
9. Master (Out to Slave)
10. Slave Input
11. Slave Output
12. RS-232 Interface
13. USB Port
14. GPIB Option (Not Shown)



UPGRADABLE AND DYNAMICALLY CONFIGURABLE

- Expand capability by adding Power FET modules
- Upgradable due to load's modular nature
- Interface enables field retrofits of firmware upgrades ensuring system is up-to-date
- Ethernet option facilitates remote access

Model EL 2K-200-200/Single Channel Unit
This unit shows two FET modules in place. There is room for three more modules to be added expanding the capability of the load.

TABLE OF SAMPLE SOFTWARE COMMANDS FROM OVER 1000 IN YOUR SYSTEM

FUNCTION	PURPOSE	COMMAND EXAMPLE
OPERATION MANAGEMENT		
Mode	Selection of operating mode	MODE CURRent, MODE VOLTage, MODE POWer, MODE RESistance, MODE CONDuctance, MODE SHORt, MODE OFF
Load ON/Load OFF	Engage/Disengage load with device under test	INPut 1=ON, INPut 0=OFF CURRent xxxx,
Set Parameter Value	Set current, voltage, power, resistance, conductance values	POWer xxxx MEASure:CURRent?,
Measure	Measure Voltage, Current, Power	MEASure:VOLTage?
Protection	Allows setting maximum parameter values to protect the device under test as needed as well as minimum voltage	VOLTage:PROTection:UNDer xxxx VOLTage:PROTection:over xxxx
Damping Selection	12 different damping settings to allow optimizing the user's test	SYSTem:PFModule:DAMPing x, SYSTem:DAMPing x Where x is a number from 0 to 5 (min - max)
Front Panel Lock	Locks or unlocks the front panel controls. Allows three settings for Off, Lock or Emergency (Emergency allows front panel LOAD button to disengage the load)	LOCK<state> where state is OFF; EMERgency; or LOCKed
SYSTEM MANAGEMENT		
Serial Number	Display EL serial number	SYSTem:SERN?
Version	Display Master control board information	SYSTem:VERSion?
Power FET Modules Installed	List power FET modules installed in EL Display FET	SYSTem:PFModule:LIST?
Display Power FET Status	temperatures, currents and fuse status Turn	SYSTem:PFModule:STATus?
External Analog Control On/Off	external analog input ON/OFF	SYSTem:EXTernal <bool>

NOTE: System responds to short forms of all commands and queries. See instruction manual for details.

3/4 View Single Channel Unit

3/4 View Dual Channel Unit

A 60KW configuration. Consists of one 5kW master and 11 5kW slaves.

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