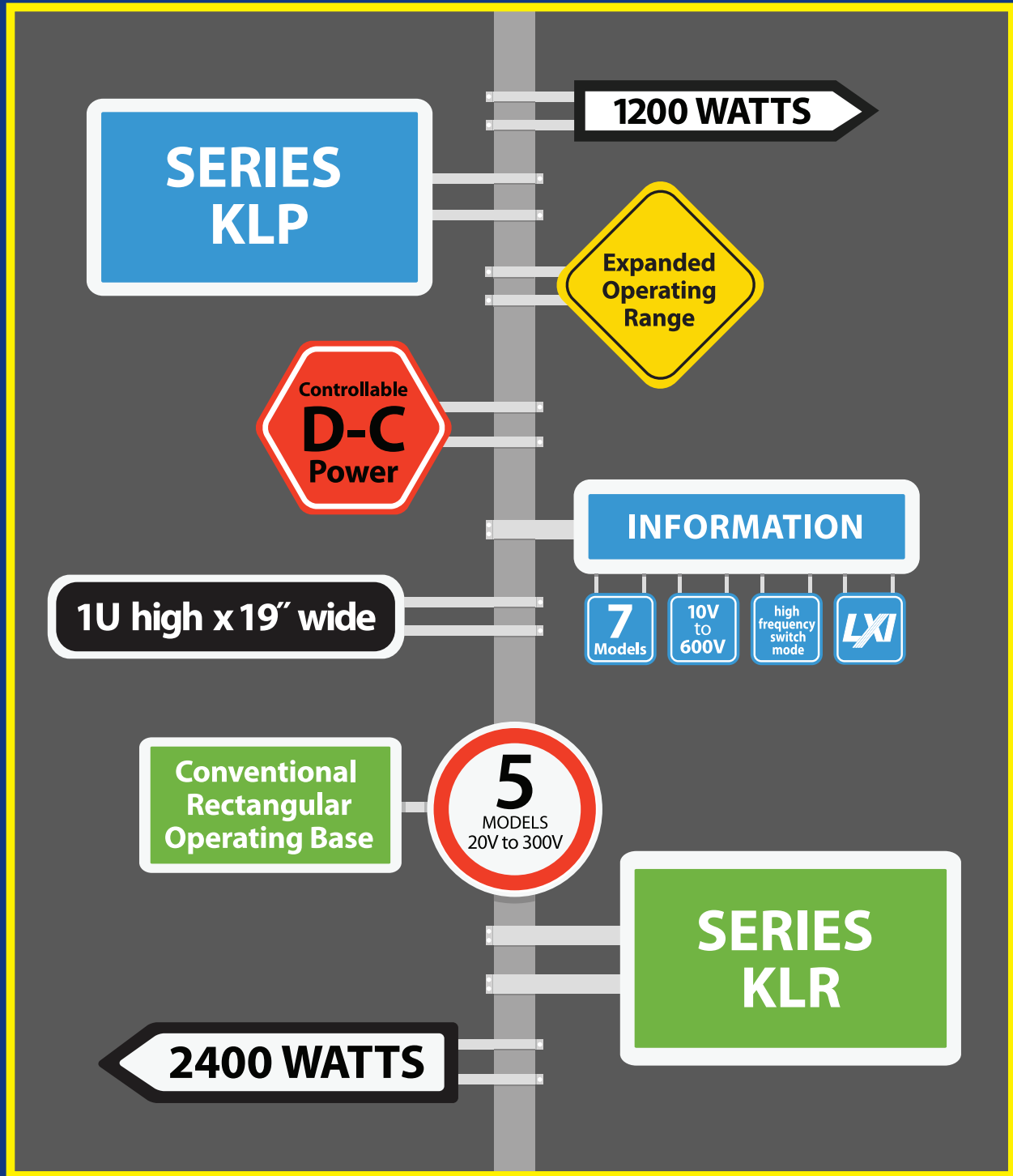


Looking For A High Power, Low Profile Power Supply?

# KEPCO

Has More Than One Way To Help Make Your Decision Easier!





## KEPCO SERIES KLP

Using high-frequency switch-mode topology for high efficiency and small size, the KLP provides 1200 watts of well-regulated, controllable d-c power in a 1U (1.75 inch high) by 19 inch rack-mountable package. KLP replaces the need for multiple power supplies by expanding the operating region. The breakthrough of a hyperbolic power limit delivers a full 1200 Watts over an expanded operating range, not just the conventional rectangular operating area.

[www.kepcopower.com/klp.htm](http://www.kepcopower.com/klp.htm)



**KLP MODEL TABLE**

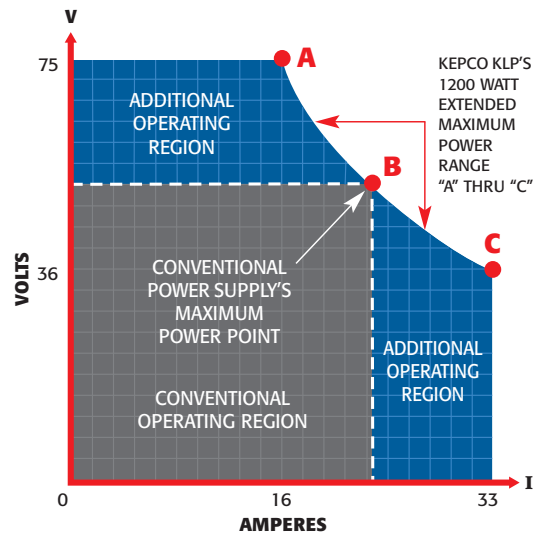
| MODEL (3)  | RATED VOLTAGE RANGE (1) | MAXIMUM CURRENT FOR RATED VOLTAGE | MINIMUM PROGRAMMABLE CURRENT | RATED CURRENT RANGE (1) | MAXIMUM VOLTAGE FOR RATED CURRENT | RIPPLE AND NOISE (2) p-p | EFFICIENCY @ 115V a-c |
|------------|-------------------------|-----------------------------------|------------------------------|-------------------------|-----------------------------------|--------------------------|-----------------------|
| KLP 10-150 | 0-10V                   | 120A@10V                          | 1.9A                         | 0-150A                  | 8V@150A                           | 60 mV                    | 80%                   |
| KLP 20-120 | 0-20V                   | 60A@20V                           | 1.5A                         | 0-120A                  | 10V@120A                          | 60 mV                    | 82%                   |
| KLP 36-60  | 0-36V                   | 33.3A@36V                         | 0.8A                         | 0-60A                   | 20V@60A                           | 60 mV                    | 83%                   |
| KLP 75-33  | 0-75V                   | 16A@75V                           | 0.4A                         | 0-33.3A                 | 36V@33.3A                         | 60 mV                    | 84%                   |
| KLP 150-16 | 0-150V                  | 8A@150V                           | 0.2A                         | 0-16A                   | 75V@16A                           | 125 mV                   | 86%                   |
| KLP 300-8  | 0-300V                  | 4A@300V                           | 0.1A                         | 0-8A                    | 150V@8A                           | 150 mV                   | 87%                   |
| KLP 600-4  | 0-600V                  | 2A@600V                           | 0.05A                        | 0-4A                    | 300V@4A                           | 150 mV                   | 88%                   |

(1) The maximum current and voltage are constrained by the 1200 watt power limitation.

(2) Bandwidth: 20MHz; low frequency ripple may be higher at loads less than 30 Watts.

(3) Standard models (no suffix) include built-in GPIB and RS-232 interfaces.

E-series models (Suffix E) include built-in GPIB and LAN interfaces.



## KEPCO SERIES KLR

Kepco introduces Series KLR, offering 2400 Watts of stable, controllable d-c power in the industry standard 1U package. Five models from 20 Volts to 300 Volts are available with a conventional rectangular operating area. Input is 180-264V a-c, single phase. GPIB, RS232 and isolated analog programming are all standard.

[www.kepcopower.com/klr.htm](http://www.kepcopower.com/klr.htm)



**KLR MODEL TABLE**

| MODEL (1)  | RATED VOLTAGE RANGE | MINIMUM PROGRAMMABLE CURRENT | RATED CURRENT RANGE | RIPPLE AND NOISE (2) p-p | EFFICIENCY @ 230V a-c |
|------------|---------------------|------------------------------|---------------------|--------------------------|-----------------------|
| KLR 20-120 | 0-20V               | 1.5A                         | 0-120A              | 100 mV                   | 87%                   |
| KLR 40-60  | 0-40V               | 0.8A                         | 0-60A               | 80 mV                    | 88%                   |
| KLR 75-32  | 0-75V               | 0.4A                         | 0-32A               | 80 mV                    | 87%                   |
| KLR 150-16 | 0-150V              | 0.2A                         | 0-16A               | 100 mV                   | 88%                   |
| KLR 300-8  | 0-300V              | 0.1A                         | 0-8A                | 150 mV                   | 89%                   |

(1) Standard models (no suffix) include built-in GPIB and RS-232 interfaces.

E-series models (Suffix E) include built-in GPIB and LAN interfaces.

(2) Bandwidth: 20MHz; low frequency ripple may be higher at loads less than 30 Watts.



## FEATURES

**KLP:** Provides 1200W output power over a hyperbolic output power envelope, resulting in full output power availability over the range of 8V, 150A to 600V, 2A

**KLR:** Provides up to 2400W output power via a conventional rectangular output power envelope, resulting in full output power at model limits only

Switch mode topology for cool, efficient operation

GPIB and isolated analog programming included on all models

Standard models have an RS-232 interface

E-Series models replace the RS-232 interface with an Ethernet (RJ-45) connector supporting LAN (LXI certified for KLP)

**KLP:** 1U panel height at 1200 watts

**KLR:** 1U panel height at 2400 watts

Front to back air flow allows full power operation without spacers between supplies

**KLP:** Operates over universal a-c mains voltage range of 90 - 264V a-c with PFC

**KLR:** Operates over a-c mains voltage range of 180 - 264V a-c with PFC

**KLP:** Stud-style output power terminals for LV models (10V, 20V, 36V), and Euroblock output power terminals for HV models (75V, 150V, 300V, 600V)

**KLR:** Stud-style output power terminals for LV models (20V, 40V), and Euroblock output power terminals for HV models (75V, 150V, 300V)



## MARKETS AND APPLICATIONS

- Aerospace and Satellite Test
- Telecom and IT Industry
- Automated Test Equipment
- Factory Automation
- QC Testing
- Burn-in
- Solar
- Water Purification
- Thermal Process Control
- Chemical Processing
- Semiconductor Manufacturing
- Battery Charging and Testing
- Electroplating, Sputtering and Coating
- New Energy R&D

### KLP/KLR INPUT SPECIFICATIONS

| SPECIFICATION         |                 | RATING/DESCRIPTION     |                         | CONDITION                               |
|-----------------------|-----------------|------------------------|-------------------------|---|
|                       |                 | SERIES KLP             | SERIES KLR              |   |
| a-c Voltage           | Nominal         | 100-240V a-c           | 200-240V a-c            | Single phase                            |
|                       | Range           | 90-265V a-c            | 180-265V a-c            | Wide range                              |
| Input Frequency       | Nominal Range   | 50-60 Hz               | 50-60 Hz                |   |
|                       | Maximum         | 45-440 Hz              | 45-440 Hz               | Increased leakage above 66 Hz           |
| Power Factor (PF)     | Typical         | 0.99                   | 0.99                    | Meets EN 61000-3-2                      |
| Maximum Input Current | 120V a-c        | 13A rms                | N/A                     | Rated load (1200W)                      |
|                       | 240V a-c        | 6.5A rms               | N/A                     | Rated load (1200W)                      |
|                       | 230V a-c        | N/A                    | 12A rms                 | Rated load (2400W)                      |
| Inrush Current        | 265V a-c        | 40A                    | 40A                     | Peak                                    |
|                       | 132V a-c        | 20A                    | N/A                     | Peak                                    |
| Input Fusing          |                 | Circuit breaker        | Circuit breaker         | 2-line                                  |
| Low a-c Protection    |                 | 87V a-c self protected | 175V a-c self protected | User-selectable recovery <sup>(1)</sup> |
| Output Holdup         | Typical         | 10 milliseconds        | 5 milliseconds          | Ride through                            |
| Leakage Current       | 115V a-c, 60 Hz | 1.2mA max              | N/A                     |   |
|                       | 230V a-c, 50 Hz | 2.3mA max              | 2.3mA max               |   |

(1) Either PROTECTED (output disabled and locked until source power recycled) or SAFE (output disabled with unit programmed to last setting; power recycling not needed for recovery) or AUTO (when fault clears, unit automatically recovers to programming setpoints and output state (enabled/disabled) as before fault was detected.

NOTE: Contact Kepco Applications Engineering for d-c input.

| KLP/KLR OUTPUT CHARACTERISTICS     |                                |   |   |  |                                     |
|------------------------------------|--------------------------------|---|---|--|-------------------------------------|
| SPECIFICATION                      |                                | RATING/DESCRIPTION  | CONDITION                               |  |                                     |
| Stabilizer Type                    |                                | CV/CC   | Voltage/Current                         |  |                                     |
| Adjustment Range                   | Voltage                        | 0-100% of rated voltage   | No minimum load required                |  |                                     |
|                                    | Current                        | min-100% of rated current <sup>(1)</sup>  |   |  |                                     |
| Source Effect                      | Voltage                        | 0.01% $E_{max}$   | Over full source range                  |  |                                     |
|                                    | Current                        | 0.01% $I_{max}$   |   |  |                                     |
| Load Effect                        | Voltage                        | 0.02% $E_{max}$   | Over full rated load                    |  |                                     |
|                                    | Current                        | 0.05% $I_{max}$   |   |  |                                     |
| Temperature Effect                 | Voltage                        | 0.01%/°C  | 0-50°C                                  |  |                                     |
|                                    | Current                        | 0.01%/°C  |   |  |                                     |
| Time Effect (drift)                | Voltage                        | 0.02%/24hr  | After 30 minute warmup                  |  |                                     |
|                                    | Current                        | 0.02%/24hr  |   |  |                                     |
| Error Sensing                      |                                | 0.25 volts per wire   | Above rated output                      |  |                                     |
| Isolation Voltage                  |                                | 10-40V: 100V d-c or peak<br>75-600V: 600V d-c or peak   | Either output terminal to ground        |  |                                     |
| Transient Recovery for Load Change | Excursion                      | 1% of $E_{max}$   | 50% load step 2A/microsecond max        |  |                                     |
|                                    | Recovery                       | 2 msec  | 10% min load, Return to 0.1% of setting |  |                                     |
| Turnon/turnoff Overshoot           |                                | 2% max  | Rated output, any load                  |  |                                     |
| Rise Time                          | Voltage                        | 10 - 40V: 30 msec<br>75V: 40 msec<br>150V: 50 msec<br>300V: 60 msec<br>600V: 75 msec  | 0- $E_{max}$ rated load (resistive)     |  |                                     |
|                                    | Current                        | 10 - 40V: 30 msec<br>75V: 40 msec<br>150V: 50 msec<br>300V: 60 msec<br>600V: 75 msec  | 0- $I_{max}$ rated load (resistive)     |  |                                     |
| Fall Time                          | Voltage No Load <sup>(2)</sup> | 10V: 475 msec<br>20V: 525 msec<br>36V: 825 msec<br>40V: 975 msec<br>75V: 2820 msec<br>150V: 4850 msec<br>300V: 4400 msec<br>600V: 3150 msec | $E_{max}$ -0, no load (open circuit)    |  |                                     |
|                                    |                                | Voltage Rated Load  |   | 10 - 40V: 30 msec<br>75V: 40 msec<br>150V: 50 msec<br>300V: 60 msec<br>600V: 75 msec | $E_{max}$ -0 rated load (resistive) |
|                                    |                                | Current   |   | 10 - 40V: 30 msec<br>75V: 40 msec<br>150V: 50 msec<br>300V: 60 msec<br>600V: 75 msec | $I_{max}$ -0 rated load (resistive) |
| Overvoltage Protection             |                                | Programmable 20-120% of $E_{max}$   | User selectable recovery <sup>(3)</sup> |  |                                     |
| Overcurrent Protection             |                                | Programmable 72-120% of $I_{max}$   | User selectable recovery <sup>(3)</sup> |  |                                     |
| Output Load Wire Protection        |                                | Shutdown  | User selectable recovery <sup>(3)</sup> |  |                                     |
| Parallel Operation                 |                                | Active load sharing within 5% of $I_o$ rated  | Up to 5 units maximum <sup>(4)</sup>    |  |                                     |

- (1) See Model Table for minimum programmable current.  
(2) For improved fall time performance consult factory for "R" (Rapid Output Discharge) option.  
(3) Either PROTECTED (output disabled and locked until source power recycled) or SAFE (output disabled with unit programmed to last setting; power recycling not needed for recovery).  
(4) E-series are not Master/Slave capable.

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| KLP/KLR GENERAL SPECIFICATIONS |                |   |   |
|--------------------------------|----------------|---|---|
| SPECIFICATION                  |                | RATING/DESCRIPTION  | CONDITION   |
| Temperature                    | Operating      | -10 to +50°C  | Rated load  |
|                                |                | +50 to +70°C  | Derate current 3% per °C over 50°C                              |
|                                | Storage        | -40 to +85°C  |   |
| Cooling                        |                | 3 internal d-c fans                                       | Exhaust to the rear   |
| Humidity                       |                | 10 to 95% RH  | Non-condensing  |
| Shock                          |                | 20g, 11msec ± 50% half sine                               | Non-operating   |
| Vibration                      | 5-10Hz         | 10mm double amplitude                                     | 3-axes, non-operating   |
|                                | 10-55 Hz       | 2g  | 3-axes, non-operating   |
| Altitude                       |                | sea level to 10,000 ft.                                   | 0-3,000 ft: 100%, linear derating to 70% of power at 10,000 ft. |
| Loss of Source Power           |                | Shutdown  | User selectable recovery (1)                                    |
| Overtemperature Protection     |                | Shutdown  | User selectable recovery (1)                                    |
| Fan Failure                    |                | Shutdown  | Recovery requires power recycling                               |
| Withstand Voltage              | Input-Chassis  | 2121V d-c (all models)                                    | 25°C, 65% RH  |
|                                | Output-Chassis | 1250V d-c (10V-40V models)<br>2121V d-c (75V-600V models) |   |
|                                | Input-Output   | 2500V d-c (10V-40V models)<br>4242V d-c (75V-600V models) |   |

- (1) Either PROTECTED (output disabled and locked until source power recycled) or SAFE (output disabled with unit programmed to last setting; power recycling not needed for recovery) or AUTO (when fault clears, unit automatically recovers to programming setpoints and output state (enabled/disabled) as before fault was detected).

| KLP/KLR PHYSICAL SPECIFICATIONS |                |   |  |
|---------------------------------|----------------|---|--|
| SPECIFICATION                   |                | RATING/DESCRIPTION  | CONDITION                                      |
| Weight                          | English        | 15 lbs  | Shipping: 20 lbs                               |
|                                 | Metric         | 6.82 Kg   | Shipping: 9.07 Kg                              |
| Dimensions W x H x D            | English        | 19" x 1.735" x 17.5"  | Depth excluding connectors and terminal blocks |
|                                 | Metric         | 482.6mm x 44.45mm x 443.7mm   |  |
| Source Power Connector          |                | IEC 320-C19 appliance inlet   | 250V a-c, 16A (VDE)<br>125V a-c, 20A (UL)      |
| Load Connections                | 10-40V models  | Nickel-plated copper busbar with integral threaded stud (1/4-20-1/2in.)           | Provision for safety covers                    |
|                                 | 75-600V models | Shock-safe Euroblock, single conductor size: 20-10 AWG (0.5-5.0 mm <sup>2</sup> ) |  |
| Analog Programming Port         |                | 15 pin D-sub  |  |
| Digital Programming Ports       | Primary        | Standard GPIB connector   | IEEE 488.2 (GPIB)                              |
|                                 | Secondary      | 9 pin D-sub   | RS 232 (standard models only)                  |
|                                 | Secondary      | RJ45  | LAN (E-Series models only)                     |
| Feedback/Control Input          |                | 5 position low profile Euroblocks   |  |

## KLP/KLR PROGRAMMING CHARACTERISTICS - LOCAL

| SPECIFICATION            |             | RATING/DESCRIPTION    | CONDITION   |
|--------------------------|-------------|-----------------------|---|
| Local Control            |             | Rotary encoders       | Panel mounted   |
| Local Control Resolution | Coarse      | ~100 LSB/step         | Depress control for fine resolution   |
|                          | Fine        | 1 LSB/step            |   |
| Setting Range            |             | 0-100% of rating      | KLP will automatically adjust limit to maintain 1200W maximum   |
| Power Up Settings        | Voltage     | Defaults to zero      | Last setpoint values may be saved for voltage and current prior to unit shutdown, and recall them when unit is next turned on |
|                          | Current     | Defaults to min value |   |
| Protection Limits        | Overvoltage | 20-120% of $E_{max}$  | Programmable; accessed via front panel protect switch or SCPI command over digital bus  |
|                          | Overcurrent | 72-120% of $I_{max}$  |   |

## KLP/KLR PROGRAMMING CHARACTERISTICS - DIGITAL

| SPECIFICATION          |                      | RATING/DESCRIPTION   | CONDITION                                     |
|------------------------|----------------------|--|---|
| Supported Interfaces   | Standard Models      | GPIB and RS 232  | Supports SCPI command set for GPIB and RS 232 |
|                        | E-Series Models      | GPIB and LAN<br>Support four interfaces for LAN:<br>Web interface, port 80<br>SCPI Telnet, port 5024<br>SCPI Sockets, port 5025<br>VXI 11, port 1024 | Support SCPI command set for GPIB and LAN     |
| GPIB                   |                      | GPIB address range: 1 to 30  | Factory default is 6                          |
| RS 232                 | Standard Models Only | Baud rate range: 2400, 4800, 9600, 19,200 or 38,400  | Factory default is 38,400                     |
| Digital Remote Control | Isolation            | Safety Extra Low Voltage (SELV)  | W98 SE and later operating systems            |
|                        | Format               | Compatible with SCPI protocols   |   |
| Programming Resolution |                      | 0.024% of $E_{max}$ and $I_{max}$  |   |
| Programming Accuracy   |                      | 0.05% of $E_{max}$ and $I_{max}$   |   |
| Readback Resolution    |                      | 0.024% of $E_{max}$ and $I_{max}$  |   |
| Readback Accuracy      |                      | 0.1% of $E_{max}$ and $I_{max}$  |   |
| Status Reporting       |                      | OVP, OCP, OTP, Output Lead Fault (OLF), fan failure, source power loss   |   |

## KLP/KLR PROGRAMMING CHARACTERISTICS - ANALOG

| SPECIFICATION             |           | RATING/DESCRIPTION  | CONDITION  |
|---------------------------|-----------|---|--|
| Analog Remote Control     | Selection | Activate with jumper at analog programming connector                                      | Recognized during power up   |
|                           | Isolation | Safety Extra Low Voltage (SELV)   |  |
| Analog Input Update Rate  |           | 2Hz (0.5 Second) applies to programming by voltage/resistance and readback specifications | Analog input voltage digitized (12-bit resolution), optically isolated, then processed by digital section                                |
| Programming By Voltage    | Voltage   | 0-10V   | Voltage equivalent to Full Scale can be reduced by the user  |
|                           | Current   | 0-10V   | See Model Table for minimum programmable current. Voltage equivalent to Full Scale can be reduced by the user                            |
| Programming By Resistance | Voltage   | 0-10K ohms  | Resistance equivalent to Full Scale can be reduced by the user   |
|                           | Current   | 0-10K ohms  | See Model Table for minimum programmable current. Resistance equivalent to Full Scale can be reduced by the user                         |
| Readback                  |           | 0-10V proportional signal   | Proportional to analog control voltage/resistance  |
| Remote inhibit            |           | TTL compatible  | Dual polarity, can be active (inhibit the output) for either a TTL high or low   |
| Composite Status Flag     |           | Isolated form C contacts  | Programmable. Flags system fault. Additional user selectable flag: a) transition from CV to CC mode or b) transition from CC to CV mode. |

## RODC

### Rapid Output Discharge Circuit Option

The Rapid Output Discharge Circuit (RODC) option (suffix R) is available on all KLP/KLR models. This circuit rapidly discharges the output capacitance, thus significantly reducing response time to reductions in output voltage.

The circuit consists of a voltage detector that compares the programmed and actual values of output voltage. The discharge circuit is activated only when the actual voltage exceeds the programmed value.

Without the RODC circuit, discharge of the total output capacitance (internal and external) is achieved through a combination of the external load resistance and an internal current sink. For high load resistance or open circuit conditions at the output, response time (fall time) can vary from hundreds of milliseconds to seconds depending upon the magnitude of the high-to-low voltage transition.

With the RODC option, output fall time is reduced to approximately the same value as rise time, even with external capacitance equal to 50% of the nominal internal output capacitance.

**Please see the website for details about this option.**

Visit [www.kepcopower.com/klp.htm](http://www.kepcopower.com/klp.htm) and [www.kepcopower.com/klr.htm](http://www.kepcopower.com/klr.htm) for more information

## Looking For More High Power, Low Profile Power Supplies?

### SERIES KLN

The Kepco Series KLN is a new family of automatic crossover, low-profile, high-performance, low-cost programmable power supplies. The KLN Series offers stable d-c power in a 1U high, half-rack package for 750W, a 1U high, full-rack package for 1500W and a 2U high, full-rack package for 3000W. A total of 39 voltage-current combinations are offered. Output voltages range from 0-6 Volts to 0-600 Volts and output currents range from 0-400 Amps down to 0-1.25 Amps. Speed-controlled fans limit acoustic noise for bench-top applications when full power is not needed.

Precise programming of voltage, current and their limits may be achieved from the front panel, or by analog means or by RS 485 digital control. GPIB or LAN interfaces are factory-installed options.



KLN Series Programmable Power Supply:  
750W 1U, Half-Rack (top), 1500W 1U, Full Rack (middle), 3000W 2U, Full Rack (bottom)

**For more information visit  
[www.kepcopower.com/kln.htm](http://www.kepcopower.com/kln.htm)**

