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## Test & Measurement

- sales
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- calibration
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## Complimentary Reference Material

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Call TMG if you need to organise repair and/or calibrate your unit.

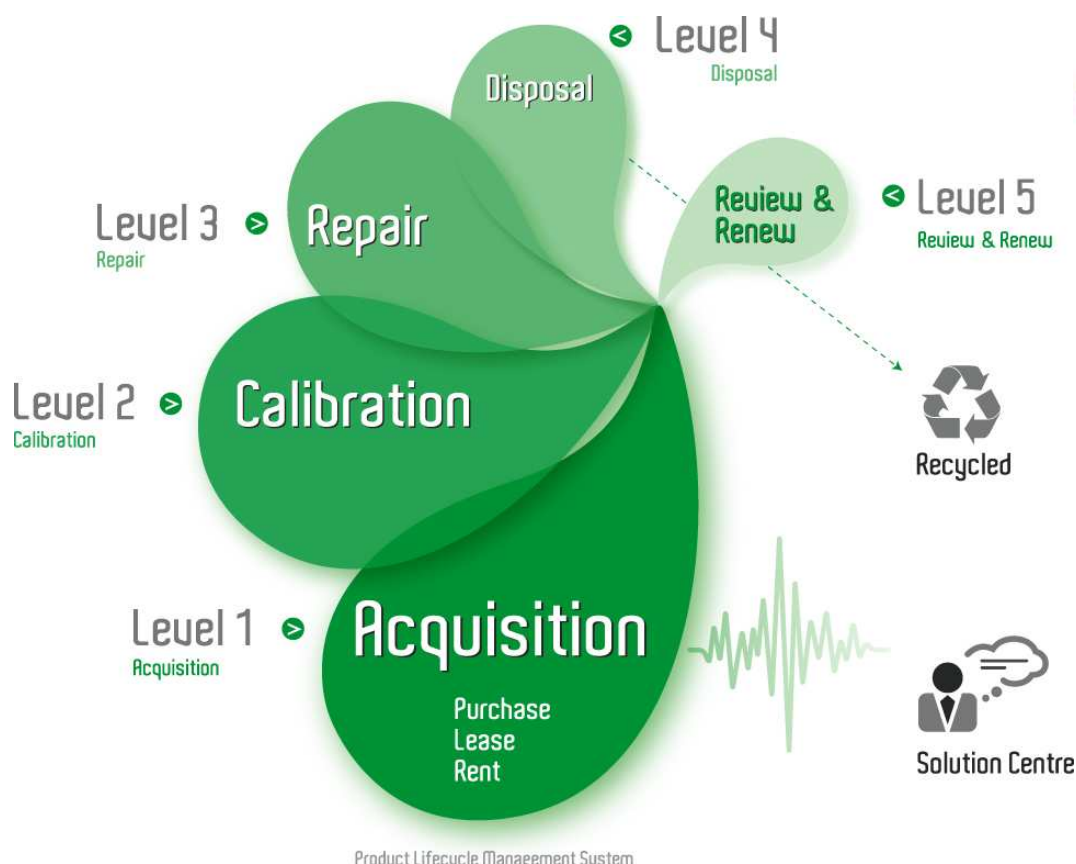
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## KEPCO'S HIGH VOLTAGE BHK-MG SERIES



# FULL HALF



**No matter how you rack it, we deliver the power.**



AN ISO 9001 COMPANY

**KEPCO**®

THE POWER SUPPLIER™  
SINCE 1946



# 40 Watt Power Supplies

# HALF RACK



# 200 Watt Power Supplies

# FULL RACK

BHK-MG models are designed for bench or rack mount use with both front and rear output terminals. Two operating modes are available: conventionally filtered (slow mode) for use as a fixed or slowly varied voltage source. In this mode, the output capacitor provides excellent energy storage to support transient loads. A fast mode is also available. In fast mode, the output capacitor is disconnected and the power supply depends on its fast-responding feedback loop to suppress ripple and noise. Fast mode is ideal for operation as a current source or as

a rapidly programmed voltage source where the energy storage of a conventional output capacitor would inhibit the output voltage's agility.

Control is either analog or digital. Analog control is based on the idea of an operational amplifier in which the power supply output is programmable from zero to maximum with a 0-10V signal. Digital control is IEEE 488.2 using a built-in interface that supports SCPI. Resolution is 12 bits and controls both voltage and current. A front panel keypad provides local

control. Both digital control (local or remote) and analog control can be inputted simultaneously.

The display is an alphanumeric two-line LCD which provides both setting values and actual voltage and current readings.

BHK-MG use a solid state FET-based high voltage output stage.

BHK-MG comply with EN61010-1 safety standard for measurement control and laboratory use equipment and carry the CE mark.

**BHK-MG MODEL TABLE**

MODEL	d-c OUTPUT RANGE		MAXIMUM OUTPUT POWER (WATTS)	OUTPUT IMPEDANCE SLOW MODE STRAPPING				OUTPUT IMPEDANCE FAST MODE STRAPPING			
	VOLTS	mA (1)		VOLTAGE MODE		CURRENT MODE		VOLTAGE MODE		CURRENT MODE	
				SERIES R	SERIES L	SHUNT R	SHUNT C	SERIES R	SERIES L	SHUNT R	SHUNT C
40 WATT HALF RACK											
BHK 300-130MG	0-300	0-130	39	0.115Ω	1.5mH	15.4MΩ	6.6μF	0.115Ω	2mH	15.4MΩ	9nF
BHK 500-80MG	0-500	0-80	40	0.313Ω	2.5mH	41.7MΩ	3μF	0.313Ω	3.6mH	41.7MΩ	8nF
BHK 1000-40MG	0-1000	0-40	40	1.25Ω	5mH	166MΩ	.94μF	1.25Ω	6mH	166MΩ	2nF
BHK 2000-20MG	0-2000	0-20	40	5Ω	32mH	666.7MΩ	0.2μF	5Ω	35mH	666.7MΩ	1nF
200 WATT FULL RACK											
BHK 300-0.6MG	0-300	0-600	180	0.025Ω	1.2mH	3.33MΩ	20μF	0.025Ω	2mH	3.33MΩ	.013μF
		0-60	18			33.3MΩ				33.3MΩ	.008μF
BHK 500-0.4MG	0-500	0-400	200	0.0625Ω	2mH	8.3MΩ	10μF	0.0625Ω	3.6mH	8.3MΩ	.012μF
		0-40	20			83MΩ				83MΩ	.007μF
BHK 1000-0.2MG	0-1000	0-200	200	0.25Ω	4mH	33MΩ	4μF	0.25Ω	6mH	33MΩ	.005μF
		0-20	20			333MΩ				333MΩ	.003μF
BHK 2000-0.1MG	0-2000	0-100	200	1Ω	30mH	133MΩ	2μF	1Ω	35mH	133MΩ	.002μF
		0-10	20			1333MΩ				1333MΩ	.001μF

(1) The full rack BHK-MG have 10:1 current ranging. By command selection from the keypad or GPIB, the full 12-bit control resolution is available across 0-10% of the current rating.

Kepco's BHK-MG are high voltage linear voltage-current stabilizers offered in two sizes: a 40 watt half-rack design and a 200 watt full-rack power supply. Outputs range from 0-300 volts to 0-2000 volts. Both digital and analog programming control is featured.

## FEATURES

- Two sizes: half-rack 40 watts, full-rack 200 watts.
- FET output stage.
- Conventional filtering or fast response.
- Fast analog programming mode.
- Rapid recovery current mode in fast mode.
- Local control from panel-mounted keypad.
- Built-in GPIB, IEEE 488.2, 12 bits.
- Support for SCPI language.
- 2-line 16 character LCD display.
- Full read back of voltage and current on the bus.
- Increased resolution and accuracy (x10) for reading small current.
- Versatile output on/off port (40W only).
- Extensive protection circuitry.



BHK-MG are CE marked per the Low Voltage Directive (LVD), EN61010-1 and the EMC Directives.

## BHK-MG INPUT CHARACTERISTICS

SPECIFICATIONS		RATING/DESCRIPTION		CONDITION
		40W	200W	
a-c Voltage	nominal	115/230V a-c		Single phase, switch selectable
	range	105-125/210-250V a-c		
Frequency	nominal	50/60Hz		
	range	47-63Hz		
Current	115V a-c	1A	<4.0A a-c	At nominal output power
	230V a-c	0.6A	<2.1A a-c	
Withstand Voltage	(All models)	1350V a-c/1 min.		Between shorted inputs and chassis
	300V models	1950V d-c/1 min.		Between shorted outputs and chassis
	500V models	2250V d-c/1 min.		
	1000V models	2800V d-c/1 min.		
	2000V models			
Chassis Connection to Ground Resistance		100 mohms max.		Between ground input connection and chassis @ 30A
Leakage Current		25 $\mu$ A rms/100 $\mu$ A p-p, for 115V a-c input voltage(chassis to earth-ground)		

## BHK-MG GENERAL (ENVIRONMENTAL) SPECIFICATIONS

SPECIFICATIONS		RATING/DESCRIPTION		CONDITION	
Temperature	Operating	0° to +50°C			
	Storage	-20° to +75°C			
Humidity		0 to 95% RH		Non condensing operating & storage	
Shock		20g, 11msec ±50% half sine		Non operating, 3-axes 3 shocks each axis	
Vibration		5-10Hz 10mm double amplitude		Non operating, 3-axes 1 hour each axis	
Cooling		Built-in fan, exhaust air to rear			
Remote Error Sensing (Default state is local sensing)		Provisions for 4-terminal (Kelvin) connections to load			

## BHK-MG PHYSICAL CHARACTERISTICS

SPECIFICATIONS		RATING/DESCRIPTION		CONDITION
		40W	200W	
Dimensions	English	5.22" x 8.35" x 15.9"	5.22" x 19" x 15"	Excludes handles, feet and connectors
	Metric	133 x 212 x 404mm	133 x 482.6 x 381mm	
Weight	English	26 lbs.	45 lbs.	Unpacked
	Metric	12 Kg	20 Kg	
a-c source connections	Front	Circuit breaker, 2-pole		Interlock switch (200W)/proximity detector (40W) protects rear connections
	Rear	Detachable IEC 3-wire type connector interlock switch (200W only)		
d-c output terminals	Front	Jacks (2)		±Output
	Rear	Terminal blocks (11 positions)		±Output, ±sense, ground, grounding network, internal capacitor (-)
Control	Local	Digital control using front panel keypad		
	Remote	Digital control using rear panel IEEE 488 bus (24 pin female connector). Analog control using two rear panel terminal strips (10 positions each) for voltage and current.		
Digital display front panel		Voltage, current, mode, status, menu, program		2 x 16 character alphanumeric LCD, LED backlight
Output display		Output voltage is displayed with two decimals for 300 and 500V models and one decimal for 1000 and 2000V models. Output current for 200W (high current scale) and 40W (300V model) is displayed with two decimals. 200W (low current scale) and all other 40W models are displayed with three decimals.		

## BHK-MG OUTPUT CHARACTERISTICS

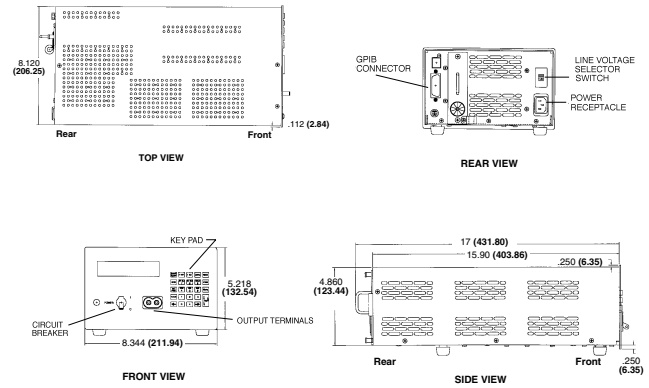
SPECIFICATIONS		RATING/DESCRIPTION	CONDITION
Type of Stabilizer		Linear/automatic crossover	Voltage/Current
Adjustment Range	Voltage	0 to 100% $E_o$ max	Analog or digital, 12 bit
	Current (Source)	0 to 100% $I_o$ max 0 to 10% $I_o$ max (200W models only)	Use menu program to change current scale
	Current (Sink)	50% $I_o$ max (200W) 100% $I_o$ max (40W)	Fixed value not calibrated
Programming Resolution	Voltage	0.025% $E_o$ max	Current measurement requires a calibrated shunt
	Current	0.025% $I_o$ max	
Programming Accuracy	Voltage	<0.025% $E_o$ max	Both current scales (200W models)
	Current	<0.05% $I_o$ max	
Data Readback Accuracy	Voltage	<0.05% $E_o$ max	Both current scales (200W models)
	Current	<0.05% $I_o$ max	
Source Effect	Voltage	<0.001% $E_o$ max	Input voltage 105-125/210-250V a-c
	Current	<0.002% $I_o$ max	
Load Effect	Voltage	<0.005% $E_o$ max	no load-full load short-full load
	Current	<0.015% $I_o$ max	
Temperature Effect	Voltage	<0.01% $E_o$ max	Per °C (0 to 50°C)
	Current	<0.02% $I_o$ max	
Time Effect	Voltage	<0.01% $E_o$ max	0.5-8.5 hours
	Current	<0.02% $I_o$ max (5)	
Ripple/Noise	Fast Mode	0.002% / 0.02% $E_o$ max	See Note 6
	Slow Mode	0.001% / 0.01% $E_o$ max	
Programming Rise/Fall Time (Fast mode)	Voltage	180 $\mu$ sec	See Note 1
	Current	200 $\mu$ sec	
Transient Voltage Recovery Time for Load Change	Fast Mode	1 msec	See Note 2
	Slow Mode	15 msec	
	Current Fast Mode	500 $\mu$ sec	
Small Signal 3dB Bandwidth	Voltage	2.5KHz	See Note 3
	Current	2.3KHz	See Note 4
Slew Rate of the Output Voltage (Fast mode)	Voltage	>0.015 x $E_o$ max V/ $\mu$ sec	High range
	Current	>0.03 x $E_o$ max V/ $\mu$ sec	
Overshoot		None	Turn ON/OFF
Remote Sensing Range		0.5V d-c per lead	
d-c Isolation Voltage	300V models	1KV d-c or p-p plus max. output voltage	Between each output terminal and chassis
	500V models		
	1000V models		
	2000V models	0.5KV d-c or p-p plus max. output voltage	See Note 7
Enable/Disable Output Power	Local	Front panel keypad	
	Remote	IEEE 488 (GPIB) bus	
Output Display		Local 2 x 16 character alphanumeric backlit LCD	
Series Connection		Automatic or master-slave operation, limited by the d-c isolation limit voltage	For slave unit, use analog programming only
Parallel Connection		Automatic or master-slave operation	For slave unit, use analog programming only

## OUTLINE DIMENSIONAL DRAWINGS

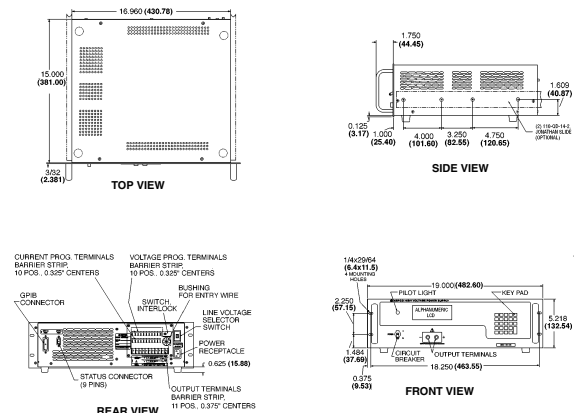
Fractional dimensions in light face type are in inches, dimensions in bold face type are in millimeters.

Tolerance:  $\pm 1/64"$  (0.4) between mounting holes,  $\pm 1/32"$  (0.8) other dimensions

### BHK-MG HALF-RACK MODELS



### BHK-MG FULL-RACK MODELS



- Note 1: Load =  $E_o$  max /  $I_o$  max.  $V_{out}$  between 0- $E_o$  max.  
The programming time is measured between 10% and 90% of  $E_o$  max or  $I_o$  max.
- Note 2: Voltage mode, load switched from open circuit to  $I_o$  max. at  $E_o$  = 200V. Current mode, load switched from short circuit to 200V at  $I_o$  max.
- Note 3: For maximum load ( $E_o$  max /  $I_o$  max) with a d-c bias of 200V set by the keypad and an analog input sinusoid = 0.2V rms measured at the analog input terminals.
- Note 4: For maximum load ( $E_o$  max /  $I_o$  max) with a d-c current bias = 200 x  $I_o$  max /  $E_o$  max set by the keypad and an analog input sinusoid = 0.2V rms measured at the analog input terminals.
- Note 5: 0.05% for BHK 300-0.6MG.
- Note 6: With minus terminal grounded, common mode current does not flow through either the load or the current sensing resistor.
- Note 7: 200W models: Acts on digital programming only; 40W models: Versatile output on/off port (digital/relay contacts) acts on both analog and digital programming.