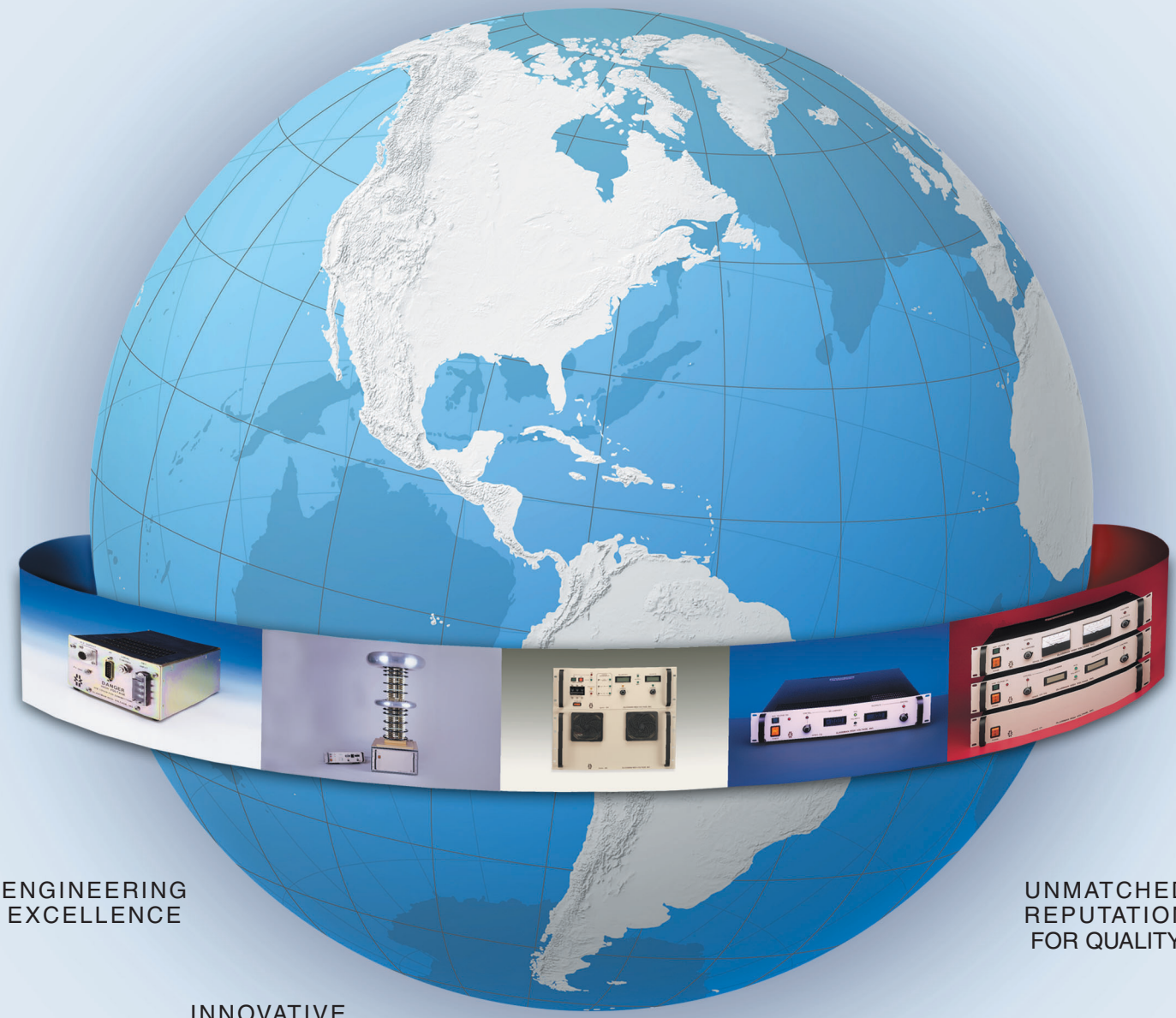
Regulated High Voltage DC Power Supplies

GLASSMAN HIGH VOLTAGE INC.

Designing Solutions for High Voltage Power Supply Applications



ENGINEERING EXCELLENCE

UNMATCHED REPUTATION FOR QUALITY

INNOVATIVE TECHNOLOGY

CUSTOMIZED SOLUTIONS

GUARANTEED PERFORMANCE

HIGH VOLTAGE LEADERSHIP

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www.glassmanhv.com *Please visit our newly expanded website at www.glassmanhv.com to learn more about our product offerings and technology. We are constantly updating the site with new products, product updates, company news and technical information that will be of interest for high voltage users. We also provide contact information in order to reach our application design team for special requirements.*

The site is simple to navigate with a product locator on the homepage that queries by desired voltage or power level in order to choose the "right solution" for your high voltage needs.

The Company

Since 1977, Glassman High Voltage has been committed to producing the finest High Voltage DC power supplies at affordable prices. More than a standard design facility, Glassman has established an enviable reputation for developing High Voltage Solutions to meet specific customer needs, by employing a combination of innovative design technology and manufacturing flexibility. For example, Glassman pioneered the use of air as the primary dielectric for power supply high voltage assemblies, eliminating the weight and serviceability problems of other dielectric medium as well as reliability constraints of solid dielectrics. Today the Glassman name is synonymous for high quality and technical innovation in the High Voltage Industry. Glassman's service and support of it's domestic and International customers' is second to none in their industry, and no one offers a more thorough or extensive warranty on their products.

The industry's primary resource for high voltage power supplies, Glassman provides a full-range of high voltage regulated DC switching power supplies for medical, industrial, and scientific application. Models range from 0 to 500 kV DC, 15W to 40 kW. and are utilized in a broad range of commercial and research settings with leading OEM's, National laboratories and Major Universities.

Glassman High Voltage DC Power Supplies… better by design!

The proper selection of a high voltage power supply for a particular application is a more difficult task than the selection of a low voltage supply. For one thing, today's high voltage regulated power supplies are often more complex than their low voltage counterparts. The selection of high voltage supplies also requires extra attention to the design features and construction techniques that contribute to safety and protection against failures.

Any high voltage DC power supply must fulfill certain basic requirements. It must meet maximum output voltage and current needs, provide ripple suppression, static line regulation, and static load regulation that is adequate for the application, and it must operate with the available AC input line voltage and frequency. Other considerations, however, may be even more important in certain applications.

1 Basic Circuit Design- High Frequency Switchmode

- Glassman's power supply design topologies are based upon switchmode power conversion technology, while operating at frequencies approaching 60kHz. The "switcher" is the design of choice for many industrial and medical applications because of a desirable combination of high efficiency, small size, low weight and in the case of high voltages, increased safety.

2 Power Factor

- Power factor (PF) is the ratio of real power to a load, as measured in watts, to the apparent power measured in volt-amperes. For sinusoidal voltages and currents, PF equals the cosine of the phase angle between the voltage applied to a load and the current passing through the load. In an ideal case, when the voltage and current are exactly in phase, the power factor is unity.

3 ArcQuench/ Arc Sensing Circuitry

- Included as a standard feature on many Glassman power supplies, proprietary arc sensing and quench circuitry will suppress arcing conditions that can occur regularly in high voltage applications and provide maximum safety and protection for both the power supply and customer load during processing related applications, including Magnetron sputtering, Electron-beam evaporation, and Ion-beam deposition to name a few. These products are also highly utilized in the research market, as a general purpose laboratory power source.

4 Air Insulation

- Glassman supplies are unique in that they use air as the primary dielectric medium. Many competitive supplies use oil or solid encapsulation. The use of air insulation has considerable advantages. Reduced weight is one. More importantly, air insulation leads to improved serviceability. Individual components can be replaced, if necessary, without the need to scrap an entire assembly.

5 Manufacturing

- We manufacture many different series of regulated high voltage power supplies and within each series there are many standard models. Such a large array of models would be a manufacturing nightmare without the use of modular construction. Many standard or modified modules are common to different models and series. This commonality provides the cost and time savings associated with volume production while still allowing the scheduling flexibility of custom assembly.

6 Warranty

- Glassman High Voltage, Inc. warrants standard power supplies to be free from defects in materials and workmanship for three years from date of shipment. OEM and modified standard power supplies are warranted for one year from date of shipment. A formal warranty is available.

Welcome to Glassman High Voltage

Hello, I'm Sandy Glassman.

Allow me to introduce you to our company, our products, and most importantly, our people.

Beginning with it's inception in 1977, Glassman High Voltage has become the premier worldwide supplier of high voltage power supply technology to original equipment manufacturers and a very diverse group of research facilities. Glassman products feature our proprietary, air-insulation technology and inverter circuit designs that ensure long-term stability and reliability.

Our people have the talent, ingenuity, and dedication to meet, and exceed, your most demanding requirements. Because of our experience and creativity with high voltage technology, we are uniquely qualified to lead design and development projects for specialized equipment. You will discover that working with our sales and engineering staffs, is more like a true partnership than a vendor/customer relationship.

If the models on the following pages do not meet your requirements, please don't hesitate to contact us so that we may offer modifications or new designs. It is our commitment to excellence and innovation that has fueled our growth and customer loyalty.

If there is anything I can personally do to enhance your experience with our company, call me directly at 908-638-3800, or Email to Sglassman@GlassmanHV.com.

Yours truly,

Sandy Glassman

Sandy Glassman
President

Designing Solutions for High Voltage Power Supply Applications

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Power Supply Selection Chart

	SERIES	STYLE	VOLTAGES	POWER
	**RS-232**		Digital Interface Option	
	**MJ**	Module	3 kV to 30 kV Models	15 W
	**MK**	Module	1 kV to 60 kV Models	75 W
	**MR**	Module	1 kV to 5 kV Models	300 W
	**ML**	Module	8 kV to 60 kV Models	300 W
	**EL**	2U Rack	1 kV to 60 kV Models	45 W
	**EH**	2U Rack	1 kV to 60 kV Models	100 W
	**FC**	1U Rack	1 kV to 60 kV Models	120 W
	**WR**	3U Rack	85 kV to 125 kV Models	250 W
	**ER**	2U Rack	1 kV to 75 kV Models	300 W
	**FX**	1U Rack	1 kV to 60 kV Models	300 W
	**EW**	2U Rack	1 kV to 60 kV Models	500 W
	**WK**	3U Rack	80 kV to125 kV Models	500 W
	**EK**	2U Rack	1 kV to 60 kV Models	600 W
	**PG-LR**	3U Rack + Open Stacks	100 kV to 400 kV Models	250 W/500 W

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	SERIES	STYLE	VOLTAGES	POWER
	PG	3U Rack + Open Stacks(s)	100 kV to 400 kV Models	500 W/1000 W
	WX	3U Rack	1 kV to 75 kV Models	1 kW
	LX	5U Rack	1 kV to 150 kV Models	1 kW
	EQ	2U Rack	1 kV to 60 kV Models	1.2 kW
	LT	5U Rack	1 kV to 150 kV Models	2 kW
	OS	3U Rack + Open Stack	200 kV to 450 kV Models	2 kW
	KL	4U Rack	1 kV to 30 kV Models	3 kW
	LK	5U Rack	40 kV to 100 kV Models	3 kW
	LH	6U Rack	1 kV to 100 kV Models	5 kW
	PK	6/12U Rack	3 kV to 75 kV Models	4/8 kW
	PK	9/18U Rack	80 kV to 125 kV Models	4/8 kW
	PK	3U Rack + Open Stack(s)	150 kV to 400 kV Models	4/8 kW
	SH	10/20U Rack	1 kV to 100 kV Models	8/16 kW

Note: Panel Height U = 1-3/4"

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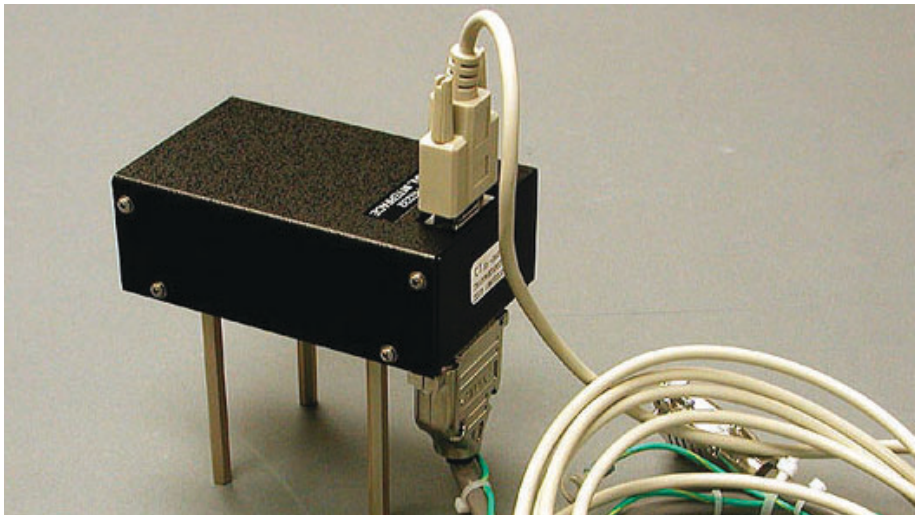
RS-232 Intelligent Power Supply Serial Interface Option

This microcontroller interface is offered as an option for Glassman High Voltage power supplies.

Its purpose is to provide remote control capability of analog program signals, analog monitor signals, and HV enable using standard RS-232 interface computer control. (Additional status indicators are provided on supplies which normally have these signals available externally.)



Modules are 5"L x 3" W x 5" H

Specifications

INPUT:

Power is provided by the HVPS through the "D" connector interconnection between the controller and the HVPS for all model applications except for the MJ, MK, and FC series. These models require an external power source of +20 to 30 VDC at 200 mA minimum.

RESOLUTION:

0.1%, 10 bit A/D and 12 bit D/A. The accuracy of the HV output and monitors are determined by the HVPS specifications.

PROTOCOL:

RS-232C is used with single-ended transmission over relatively short lines. This standard defines the electrical characteristics for the interfacing of Data Terminal Equipment (DTE) and Data Communications Equipment (DCE). For our case the host computer is the DTE and the Glassman HV Power Supply equipment is the DCE.

The power supply Interface acts strictly as a slave device. It will not transmit any messages over the data link unless it is first queried by the host computer.

The data are conveyed using ASCII encoded character strings. Scale factors are applied to the analog data by the host computer. The instruction manual provides signal information and configuration details.

The functions that can be controlled and monitored are dependent upon the functions provided for each HVPS series.

COMPUTER INTERFACE CONNECTOR

Female 9 Pin "D" connector (RS-232 port). Instructions for wiring the mating connector for "null modem" operation are detailed in the instruction manual provided.

POWER SUPPLY INTERFACE CONNECTOR:

Female 25 Pin "D" connector. The signal connections vary as a function of the HVPS model.

ACCESSORIES:

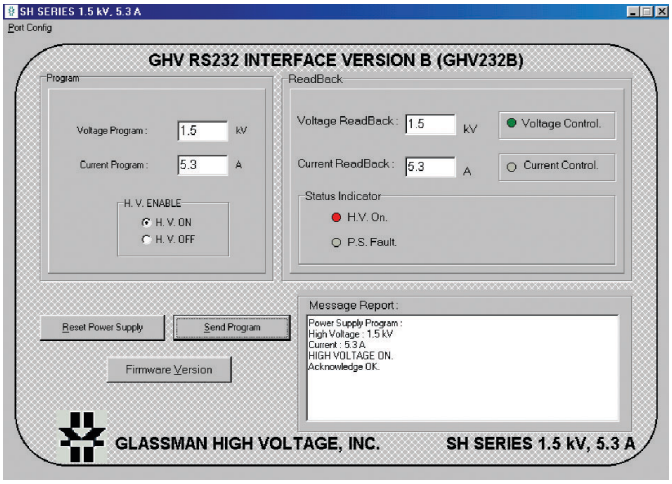
3 foot shielded HVPS to controller interface cable including chassis return ground wire, 10 foot RS-232 "null modem" controller to host computer cable, Windows PC control software.

CONTROL SOFTWARE:

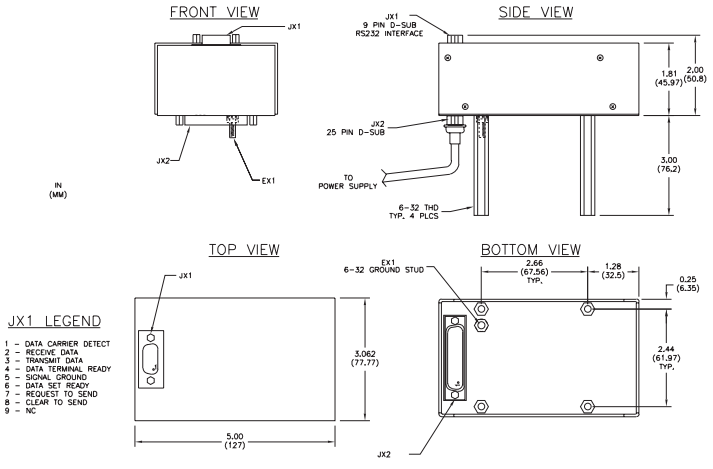
Software is provided on a 3½" floppy diskette which allows the user to remotely operate the HVPS from a PC with MS Windows 98 or 2000 operating systems. The program consists of a main window and a pull down configuration menu. The main window allows programming and readback of the control signals, operation of the digital interface functions and reporting, and displays messages indicating the status of the HVPS and to report any errors.

Note: This option must be ordered with the power supply. It cannot be added to an existing supply by the user. Contact your Glassman representative for factory upgrade availability.

Program Screen



Outline



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MJ Series 15 Watt Regulated High Voltage DC Modules

Premium Performance... Small Size and Weight... Low Cost

The MJ Series provides premium 15 W performance at low cost in a small and lightweight package. This series, with air insulation for easy serviceability, should not be confused with competitive encapsulated units that must be discarded if faulty. Voltage ranges, depending on model, are from 0 to 3 kV through 0 to 30 kV.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
105-125V RMS or 210-250V RMS (must be specified when ordering), single-phase, 48-420 Hz, <0.25 A. 3-position terminal block with cover.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometer, or case-mounted 10-turn potentiometer with 0.05% resolution. Accuracy, 1% rated +1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
<200 millijoules, 15 kV model;
<400 millijoules, 30 kV model.

VOLTAGE REGULATION:
Better than 0.005% from no-load to full load and over specified input range.

RIPPLE:
<0.05% RMS of rated voltage at full load. Ripple proportional to load, decreasing to approximately 0.01% at no load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading +1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical (100 ms max.) with a 50% resistive load using either TTL on/off or remote control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +60 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive or negative with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
DB15S D-subminiature with mating plug is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Output Voltage	Output Current	Output Cable	Case Size
MJ3P5000	MJ3N5000	0-3 kV	0-5 mA	RG-8U	A
MJ5P3000	MJ5N3000	0-5 kV	0-3 mA	RG-8U	A
MJ10P1500	MJ10N1500	0-10 kV	0-1.5 mA	RG-8U	A
MJ15P1000	MJ15N1000	0-15 kV	0-1 mA	RG-8U	A
MJ20P700	MJ20N700	0-20 kV	0-0.7 mA	RG-8U	B
MJ30P400	MJ30N400	0-30 kV	0-0.4 mA	RG-8U	B

Case Size A: 3.25 x 5.25 x 11.5", 6.5 lbs. Case Size B: 3.25 x 5.25 x 13.75", 7.5 lbs.

MK Series 75 Watt Regulated High Voltage DC Modules

High Power... Premium Performance... Low Cost

The MK Series offers premium 75 W performance at low cost. Like their lower power brothers, the MJ Series, they are air-insulated and should not be compared with "throw-away" supplies. MK Series feature easy serviceability. Voltage ranges, depending on model, are from 0 to 1 kV through 0 to 60 kV.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
105-125V RMS or 210-250V RMS (must be specified when ordering) standard, single-phase, 48-420 Hz, <1.5 A. Connector per IEC 320/C14 with mating line cord.

EFFICIENCY:
Better than 75% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometer, or case-mounted 10-turn potentiometer with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
200 millijoules, 10 kV model;
1 Joule, 50 kV model.

VOLTAGE REGULATION:
Better than 0.005% RMS +1 mV/mA from no-load to full load and over specified input range.

RIPPLE:
<0.03% RMS of rated voltage + 0.5 V at full load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical (100 ms max.) with a 75% resistive load using either TTL on/off or remote control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +60 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive or negative with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
DB25S D-subminiature with mating plug is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on.

TTL ENABLE/DISABLE:
0-1.5V off, 2.5-15 V on.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Output Voltage	Output Current	Output Cable	Case Size
MK1P75L	MK1N75L	0-1 kV	0-75 mA	RG-59	A
MK1.5P50L	MK1.5N50L	0-1.5 kV	0-50 mA	RG-59	A
MK2P37.5L	MK2N37.5L	0-2 kV	0-37.5 mA	RG-59	A
MK3P25L	MK3N25L	0-3 kV	0-25 mA	RG-59	A
MK5P15L	MK5N15L	0-5 kV	0-15 mA	RG-59	A
MK10P7.5	MK10N7.5	0-10 kV	0-7.5 mA	RG-8U	A
MK15P5	MK15N5	0-15 kV	0-5 mA	RG-8U	A
MK20P3.7	MK20N3.7	0-20 kV	0-3.7 mA	RG-8U	A
MK25P3	MK25N3	0-25 kV	0-3 mA	RG-8U	A
MK30P2.5	MK30N2.5	0-30 kV	0-2.5 mA	RG-8U	A
MK35P2	MK35N2	0-35 kV	0-2 mA	RG-8U	A
MK40P1.8	MK40N1.8	0-40 kV	0-1.8 mA	RG-8U	A
MK50P1.5	MK50N1.5	0-50 kV	0-1.5 mA	RG-8U	A
MK60P1.2	MK60N1.2	0-60 kV	0-1.2 mA	RG-8U	A

Case Size A: 4.75 x 5.19 x 11", 11 lbs.

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MR Series 300 Watt Regulated High Voltage DC Modules

Complies With IEC & CSA 950 And UL 1950 Standards As A Power Supply Component

The MR Series, with outputs from 0 to 1 kV through 0 to 5 kV, is designed to meet international safety approvals. It is packaged as a space-saving module that avoids the cost of expensive panels and displays. However, no compromises in performance and operating features have been made. The result is a power supply that offers outstanding value for a wide range of demanding applications.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
103-132V RMS or 198-264V RMS (must be specified when ordering), single-phase, 48-63 Hz, <6 A. Connector per IEC 320/V1 with mating line cord.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage and current through a combination of mounted 10-turn potentiometer, with 0.05% resolution external 0 to 10 V, or external potentiometers. Repeatability, <0.1% fs. Accuracy, 0.25% of rated + 1% of setting.

STORED ENERGY:
<0.5 joules.

VOLTAGE REGULATION:
<0.005% for line variations. For load variations, add 1 mV/mA.

RIPPLE:
<0.02% RMS of rated voltage + 300 mV RMS

CURRENT REGULATION:
<0.1% of rated current from short circuit to rated voltage at any set current.

Modules are 3.38" H x 7.25" W x 16" D, weight less than 11 lbs. SHV version shown on left, Alden connector on right

VOLTAGE MONITOR:
0 to 10 V for zero rated voltage. Accuracy, 1% reading + 0.25% of rated voltage.

CURRENT MONITOR:
0 to 10 V for zero to rated current. Accuracy, 1% reading + 0.05% of rated current.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

OUTPUT VOLTAGE TIME CONSTANT:
Typically 50 ms rise or decay time constant using TTL on/off or remote voltage control with a minimum of 15% resistive load.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive or negative with respect to chassis ground.

PROTECTION:
User-selected automatic current regulation or current trip protects against all overloads, including arcs and short circuits. Fuses, surge-limiting resistors, and low-energy components provide ultimate protection.

ACCESSORIES:
Detachable 8-foot HV cable (see Models chart for choice of output connector and wire type) and 6-foot detachable line cord provided.

REMOTE CONNECTIONS:
Common, +10 V reference, interlock, current program, current monitor, voltage program, voltage monitor, TTL HV enable, current regulation/trip, and chassis ground.

EXTERNAL INTERLOCK:
Open off, closed on.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models (Alden connector)

Positive Polarity	Negative Polarity	Output Voltage	Output Current	Output Cable
MR1P300	MR1N300	0-1 kV	0-300 mA	Silicone wire
MR1.5P200	MR1.5N200	0-1.5 kV	0-200 mA	
MR2P150	MR2N150	0-2 kV	0-150 mA	
MR3P100	MR3N100	0-3 kV	0-100 mA	
MR5P60	MR5N60	0-5 kV	0-60 mA	

Models (SHV connector)

Positive Polarity	Negative Polarity	Output Voltage	Output Current	Output Cable
MR1P300L	MR1N300L	0-1 kV	0-300 mA	RG - 59
MR1.5P200L	MR1.5N200L	0-1.5 kV	0-200 mA	
MR2P150L	MR2N150L	0-2 kV	0-150 mA	
MR3P100L	MR3N100L	0-3 kV	0-100 mA	
MR5P60L	MR5N60L	0-5 kV	0-60 mA	

ML Series 300 Watt Regulated High Voltage DC Modules

Medium Power Premium Performance... Low Cost

The ML Series is a family of sophisticated, medium power, high voltage power supplies that complies with current international safety and EMI directives. The ML series provides well-regulated output voltages with models ranging from 8-60kVDC.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
90-132VAC single-phase, 48-420Hz, 600VA maximum. Connector per IEC 320 with mating line cord terminated with NEMA 5-15 plug.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment, from 0 to rated voltage or current by panel mounted 10-turn potentiometer with 0.05% resolution, or by external 0 to 10 V signals is provided. Linearity is < 1% of rated. Accuracy is 0.1% of rated + 0.5% of setting. Repeatability is < 0.1% of rated.

CURRENT LIMITING/CURRENT TRIP:
User selectable at interface control connector for either "trip" operation or normal current limiting. If "trip" operation is selected the power supply will latch off in the event the load current exceeds the current "set" point.

STATIC VOLTAGE REGULATION:
Better than 0.005% for specified line and load variations.

DYNAMIC VOLTAGE REGULATION:
For load transients from 10% to 99% and 99% to 10%, typical deviation is 2% of output voltage with recovery to within 1% in 1ms, and to 0.1% in 2ms.

CURRENT REGULATION:
Better than 0.1% of rated current from short circuit to rated voltage at any load condition.

RIPPLE:
<0.05% rms of rated voltage at full load.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 0.5% of reading + 0.1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% of reading + 0.1% rated.

STABILITY:
0.01% per hour after 1/2 hour warm-up, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
400ms typical with a 5% resistive load using either the HIGH VOLTAGE ENABLE input or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per °C.

AMBIENT TEMPERATURE:
-20 to +50°C, operating;
-40 to +85°C, storage.

POLARITY:
Output polarity is available as either positive or negative with respect to chassis ground.

PROTECTION:
User selected automatic current regulation or current trip protects against all overloads, including arcs and short circuits. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

INTERFACE CONTROL CONNECTOR:
Twenty-five pin "D" sub-miniature connector. As standard, all ML Series supplies provide output VOLTAGE AND CURRENT PROGRAM/MONITOR (0-+10 V = 0-fs), HIGH VOLTAGE ENABLE (0-1.5V off, 2.5 -15V on), HIGH VOLTAGE STATUS (high = HV on, low = HV off), SAFETY INTERLOCK (open = off, closed = on), CURRENT TRIP/ LIMIT select, +10 VOLT REFERENCE source, V/I MODE STATUS (high = voltage mode, low = current mode), LOCAL CONTROL, COMMON and CHASSIS GROUND

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Output Voltage	Output Current	Stored Energy	Output Cable	Case Size
ML08P37.0	ML08N37.0	0 - 8 kV	0 - 37 mA	0.38	RG-8U	A
ML10P30.0	ML10N30.0	0 - 10 kV	0 - 30 mA	0.44	RG-8U	A
ML12P25.0	ML12N25.0	0 - 12 kV	0 - 25 mA	0.52	RG-8U	A
ML15P20.0	ML15N20.0	0 - 15 kV	0 - 20 mA	0.68	RG-8U	A
ML20P15.0	ML20N15.0	0 - 20 kV	0 - 15 mA	0.66	RG-8U	A
ML25P12.0	ML25N12.0	0 - 25 kV	0 - 12 mA	0.72	RG-8U	A
ML30P10.0	ML30N10.0	0 - 30 kV	0 - 10 mA	1.00	RG-8U	A
ML40P07.5	ML40N07.5	0 - 40 kV	0 - 7.5 mA	1.44	RG-8U	A
ML50P06.0	ML50N06.0	0 - 50 kV	0 - 6 mA	1.88	RG-8U	B
ML60P05.0	ML60N05.0	0 - 60 kV	0 - 5 mA	2.34	RG-8U	B

Case Size A: 4.75"H x 7.25"W x 14.75"L, 14 lbs. Case Size B: 4.75"H x 7.25"W x 20.50"L, 19 lbs.

EL Series 40/45 Watt Regulated High Voltage DC Power Supplies

Laboratory Performance... Economical Price

The EL Series was designed for the user who requires premium performance without the costly features normally associated with a laboratory-grade power supply. The result…high voltage power supplies of superior quality at an affordable price. Except for variations in input voltage and available digital meters, there are no options, no hidden extras.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
105-125 V RMS standard, single-phase, 48-420 Hz, <1 A. Connector per IEC 320/C14 with mating line cord.

EFFICIENCY:
Better than 75% at full load.

OUTPUT:
Continuous, stable adjustment, from 0 to rated voltage by means of front panel 10-turn potentiometer. Linear to within 1% of rated. Repeatability, better than 0.1% of rated. Accuracy, 1% of rated +1% of setting. Resolution is <0.05%.

STORED ENERGY:
200 millijoules, 10 kV model; 1 Joule, 50 kV model.

VOLTAGE REGULATION:
Better than 0.005% +1 mV/mA from no-load to full load and over specified input range.

RIPPLE:
<0.03% RMS of rated voltage + 0.5 V at full load.

Dimensions: 3.5"H x 16.375"D x 19" Rack, 12 Lbs.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +60 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive, negative, or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current limiting protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

FRONT PANEL ELEMENTS:

- **AC Power:** ON/OFF rocker switch with indicator.
- **Output Kilovolt Meter:** 2% full scale accuracy.
- **Output Milliamp Meter:** 2% full scale accuracy.
- **Voltage Control:** 10-turn with locking vernier readout.

ACCESSORIES:
Detachable 8-foot cable (see models chart for cable type) and 6 foot detachable line cord are provided.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
EL3P15L	EL3N15L	EL3R15L	0-3 kV	15 mA	RG-59	3.5 in.
EL5P8L	EL5N8L	EL5R8L	0-5 kV	8 mA	RG-59	3.5 in.
EL10P4	EL10N4	EL10R4	0-10 kV	4 mA	RG-8U	3.5 in.
EL15P3	EL15N3	EL15R3	0-15 kV	3 mA	RG-8U	3.5 in.
EL20P2	EL20N2	EL20R2	0-20 kV	2 mA	RG-8U	3.5 in.
EL30P1.5	EL30N1.5	EL30R1.5	0-30 kV	1.5 mA	RG-8U	3.5 in.
EL40P1	EL40N1	EL40R1	0-40 kV	1 mA	RG-8U	3.5 in.
EL50P0.8	EL50N0.8	EL50R0.8	0-50 kV	0.8 mA	RG-8U	3.5 in.
EL60P0.6	EL60N0.6	EL60R0.6	0-60 kV	0.6 mA	RG-8U	3.5 in.

USA (908) 638-3800 • FAX (908) 638-3700
sales@glassmanhv.com

EH Series 100 Watt Regulated High Voltage DC Power Supplies

Laboratory Performance... Enhanced Features... Economical Price

The EH Series combines the performance of a laboratory-grade power supply with the added flexibility of remote programming and monitoring capabilities. Voltage ranges are from 0 to 1 kV through 0 to 60 kV. Panel height is 3.5 inches and maximum weight is 13 lbs.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
105-125 V RMS standard, single-phase, 48-420 Hz, <1.5 A. Connector per IEC 320/C14 with mating line cord.

EFFICIENCY:
Better than 75% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
200 millijoules, 10 kV model; 1 Joule, 50 kV model.

VOLTAGE REGULATION:
Better than 0.005% +1 mV/mA from no-load to full load and over specified input range.

RIPPLE:
<0.03% RMS of rated voltage + 0.5 V at full load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Dimensions: 3.5"H x 16.375"D x 19" Rack, 13 Lbs.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated. Reversible models 1% of reading +0.1% of rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
60 ms typical (100 ms max.) with a 75% resistive load using either TTL on/off or remote control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +60 degree C, operating; -40 to +85 degree C, storage.

POLARITY:
Available either positive, negative, or reversible with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
Terminal block provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
EH1P100L	EH1N100L	EH1R100L	0-1 kV	0-100 mA	RG-59	3.5 in.
EH1.5P65L	EH1.5N65L	EH1.5R65L	0-1.5 kV	0-65 mA	RG-59	3.5 in.
EH2P50L	EH2N50L	EH2R50L	0-2 kV	0-50 mA	RG-59	3.5 in.
EH3P33L	EH3N33L	EH3R33L	0-3 kV	0-33 mA	RG-59	3.5 in.
EH5P20L	EH5N20L	EH5R20L	0-5 kV	0-20 mA	RG-59	3.5 in.
EH10P10	EH10N10	EH10R10	0-10 kV	0-10 mA	RG-8U	3.5 in.
EH15P6	EH15N6	EH15R6	0-15 kV	0-6 mA	RG-8U	3.5 in.
EH20P5	EH20N5	EH20R5	0-20 kV	0-5 mA	RG-8U	3.5 in.
EH25P4	EH25N4	EH25R4	0-25 kV	0-4 mA	RG-8U	3.5 in.
EH30P3	EH30N3	EH30R3	0-30 kV	0-3 mA	RG-8U	3.5 in.
EH40P2.5	EH40N2.5	EH40R2.5	0-40 kV	0-2.5 mA	RG-8U	3.5 in.
EH50P2	EH50N2	EH50R2	0-50 kV	0-2 mA	RG-8U	3.5 in.
EH60P1.5	EH60N1.5	EH60R1.5	0-60 kV	0-1.5 mA	RG-8U	3.5 in.

FC Series 120 Watt Regulated High Voltage DC Power Supplies

1 to 60 kV, 1.75" Panel CE Compliant

The FC Series are sophisticated, 120 Watt, high voltage power supplies in a small and lightweight package. They are air insulated, fast response units, with tight regulation.

The FC Series are fully compliant with the European Harmonized EMI Directive EN50082-2 including standards EN55011 (Group 1, Class B), ENV50140, ENV50141, ENV50204, EN61000-4-2, and EN61000-4-4. The series are also designed to meet all applicable standards of the proposed European Low Voltage Safety Directive, 73/23/EEC, based on IEC 1010-1.

Dimensions: 1.75"H x 20.25"D x 19" Rack, 12 Lbs.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
103-132V RMS standard, single-phase, 48-420 Hz, <2.5A at 105V. Connector per IEC 320/VI with mating line cord terminated with NEMA 5-15 plug.

EFFICIENCY:
Typically 80% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 0.1% rated + 0.5% setting. Repeatability better than 0.1% of rated.

STORED ENERGY:
See Models chart.

STATIC VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.005% + 0.5 mV/mA for load variations.

DYNAMIC VOLTAGE REGULATION
For load transients from 10% to 100% and 100% to 10%, typical deviation is 2% of output voltage with recovery to within 1% in 500 µs and to 0.1% in 1 ms.

RIPPLE:
<0.02% of rated voltage + 300 mV RMS at full load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 0.1% reading + 0.5% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 0.1% of reading +0.5% rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
400 ms typical with a 10% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +50 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available with either positive, negative, or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors,and low energy components provide ultimate protection.

REMOTE CONTROLS:
A five position terminal block and a 15 Pin "D" connector are provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, HV enable, ground, and local control. A rear panel toggle switch selects either local or remote operation.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

REMOTE HV ENABLE:
0-1.5V off, 2.5-15V on.

ACCESSORIES:
Detachable 8 foot shielded high voltage coaxial cable (see models chart for wire type), 6 foot detachable line cord and mating 15 Pin "D" connector and shell are provided.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy	Output Cable
FC1P120	FC1N120	FC1R120	0-1kV	0-120mA	0.2J	RG-58
FC1.5P80	FC1.5N80	FC1.5R80	0-1.5kV	0-80mA	0.45J	RG-58
FC2P60	FC2N60	FC2R60	0-2kV	0-60mA	0.1J	RG-58
FC3P40	FC3N40	FC3R40	0-3kV	0-40mA	0.2J	RG-58
FC5P24	FC5N24	FC5R24	0-5kV	0-24mA	0.3J	RG-58
FC6P20	FC6N20	FC6R20	0-6kV	0-20mA	0.25J	RG-8U
FC8P15	FC8N15	FC8R15	0-8kV	0-15mA	0.3J	RG-8U
FC10P12	FC10N12	FC10R12	0-10kV	0-12mA	0.4J	RG-8U
FC12P10	FC12N10	FC12R10	0-12kV	0-10mA	0.7J	RG-8U
FC15P8	FC15N8	FC15R8	0-15kV	0-8mA	1.1J	RG-8U
FC20P6	FC20N6	FC20R6	0-20kV	0-6mA	0.85J	RG-8U
FC25P4.8	FC25N4.8	FC25R4.8	0-25kV	0-4.8mA	1J	RG-8U
FC30P4	FC30N4	FC30R4	0-30kV	0-4mA	1J	RG-8U
FC40P3	FC40N3	FC40R3	0-40kV	0-3mA	1.5J	RG-8U
FC50P2.4	FC50N2.4	FC50R2.4	0-50kV	0-2.4mA	2J	RG-8U
FC60P2	FC60N2	FC60R2	0-60kV	0-2mA	2.4J	RG-8U

WR Series 250 Watt Regulated High Voltage DC Power Supplies

Up to 125 kV, 5.25 Inch Panel Height... Laboratory Performance... Enhanced Features

The WR Series provides voltage ranges from 0 to 85 kV through 0 to 125 kV. It is available with dual analog voltage and current meters, dual digital meters, or with a blank panel for OEM/system applications. Panel height is only 5.25 inches and maximum weight is less than 40 pounds.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
105-125 V RMS standard, single-phase, 48-63 Hz, <6 A. Connector per IEC 320/C14 with mating line cord.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
11 Joules, maximum.

VOLTAGE REGULATION:
Better than 0.005% from no-load to full load and over specified input range.

RIPPLE:
<0.05% RMS of rated voltage at full load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

Dimensions: 5.25"H x 20.0"D x 19" Rack, 30 lbs.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
400 ms typical with a 25% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating; -40 to +85 degree C, storage.

POLARITY:
Available either positive, negative, or reversible with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

ACCESSORIES:
Detachable 8-foot shielded HV Coaxial cable (see Model Chart for cable type) and 6-foot detachable line cord provided.

REMOTE CONTROLS:
Terminal block provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
WR85P3.5	WR85N3.5	WR85R3.5	0-85 kV	0-3.5 mA	DS2121	5.25 in.
WR100P2.5	WR100N2.5	WR100R2.5	0-100 kV	0-2.5 mA	DS2121	5.25 in.
WR125P2	WR125N2	WR125R2	0-125 kV	0-2 mA	DS212I	5.25 in.

ER Series 300 Watt Regulated High Voltage DC Power Supplies

Laboratory Performance... High Power Density... Enhanced Features

The ER Series is a sophisticated, medium power, high voltage power supply. With a choice of three panel configurations…dual analog voltage and current meters, dual digital meters, or a blank panel for OEM/system applications …it is adaptable to most environments. Voltage ranges are 0 to 1 kV through 0 to 75 kV. Panel height is 3.5 inches and maximum weight is 18 pounds.

Dimensions: 3.5"H x 16.375"D x 19" Rack, 18 Lbs.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
105-125 V RMS standard, single-phase, 48-63 Hz, <6 A. Connector per IEC 320/C14 with mating line cord.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
1.5 Joules, 20 kV model; <4 Joules, 60 kV model.

VOLTAGE REGULATION:
Better than 0.005% +1 mV/mA from no-load to full load and over specified input range.

RIPPLE:
<0.02% RMS of rated voltage + 0.5 V at full load; models 1.5 kV and lower, 400 mV (500 mV, Japan.)

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% of reading + 0.1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 mS typical (300 ms for 75 kV model) with a 75% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating; -40 to +85 degree C, storage.

POLARITY:
Available either positive, negative, or reversible with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
Terminal block provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

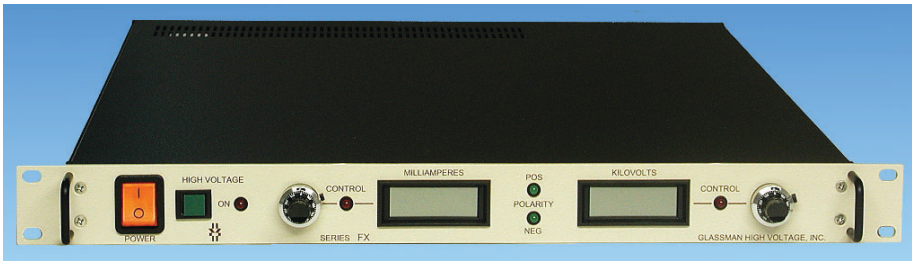
CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		ER1R300	0-1 kV	0-300 mA	RG-59	3.5 in.
		ER1.5R200	0-1.5 kV	0-200 mA	RG-59	3.5 in.
		ER2R150	0-2 kV	0-150 mA	RG-59	3.5 in.
		ER3R100	0-3 kV	0-100 mA	RG-59	3.5 in.
		ER5R60	0-5 kV	0-60 mA	RG-59	3.5 in.
		ER6R50	0-6 kV	0-50 mA	RG-58	3.5 in.
ER10P30	ER10N30	ER10R30	0-10 kV	0-30 mA	RG-8U	3.5 in.
ER15P20	ER15N20	ER15R20	0-15 kV	0-20 mA	RG-8U	3.5 in.
ER20P15	ER20N15	ER20R15	0-20 kV	0-15 mA	RG-8U	3.5 in.
ER30P10	ER30N10	ER30R10	0-30 kV	0-10 mA	RG-8U	3.5 in.
ER40P7.5	ER40N7.5	ER40R7.5	0-40 kV	0-7.5 mA	RG-8U	3.5 in.
ER50P6	ER50N6	ER50R6	0-50 kV	0-6 mA	RG-8U	3.5 in.
ER60P5	ER60N5	ER60R5	0-60 kV	0-5 mA	RG-8U	3.5 in.
ER75P4	ER75N4	ER75R4	0-75 kV	0-4 mA	DS2124	3.5 in.

FX Series
300 Watt Regulated High Voltage DC Power Supplies

1 to 60kV, 1.75" Panel
CE Compliant



Dimensions: 1.75"H x 20.25"D x 19" Rack, 14 Lbs.

The FX Series are sophisticated, 300 Watt, high voltage power supplies in a small and lightweight package. They are air insulated, fast response units with tight regulation. ArcQuench and Arc sensing ensures smooth performance in dynamic load environments. Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
102-132V RMS, single-phase, 48-400 Hz, <6 A. Connector per IEC 320 with mating line cord terminated with NEMA 5-15 plug.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment, from 0 to rated voltage or current by panel mounted 10-turn potentiometers with 0.05% resolution, or by external 0 to 10 V signals is provided. Linearity is <0.1% of rated. Voltage Accuracy is 0.5% of setting + 0.2% rated Repeatability is <0.1% of rated.

STATIC VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.005% + 0.5 mV/mA for load variations.

DYNAMIC VOLTAGE REGULATION:
For load transients from 10% to 100% and 100% to 10%, typical deviation is 2% of output voltage with recovery to within 1% in 500 µs and to 0.1% in 1 ms.

RIPPLE:
<0.02% of rated voltage plus 500mV RMS at full load.

CURRENT REGULATION:
Better than 0.1% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 0.5% of reading +0.2% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% of reading +0.05% rated except reversible models: 1% of reading + 0.1% of rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical with a 50% resistive load using either HV on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degrees C, operating;
-40 to +85 degrees C, storage.

POLARITY:
Available with either positive, negative, or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

ARC QUENCH:
An arc quench feature provides sensing of each load arc and quickly inhibits the HV output for approximately 20 ms after each arc. Standard on 8 - 60 kV models; optional on 1-6 kV models.

ARC COUNT:
Internal circuitry senses the number of arcs caused by external load discharges. If the rate of consecutive arcs exceeds approximately one arc per second for five seconds, the supply will turn off for approximately 5 seconds to allow clearance of the fault. Standard on 8 - 60 kV models; optional on 1-6 kV models.

REMOTE CONTROLS:
A three position terminal block and a 15 Pin "D" connector are provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, HV enable, ground, and local control. A rear panel toggle switch selects either local or remote operation

EXTERNAL INTERLOCK:
Open off, closed on.

REMOTE HV ENABLE:
0-1.5 V off, 2.5-15 V on.

ACCESSORIES:
Detachable 8 foot shielded high voltage coaxial cable (see Models chart for cable type), 6 foot detachable line cord, and mating 15 Pin "D" connector

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy	Output Cable
FX1P300	FX1N300	FX1R300	0 - 1 kV	0 - 300 mA	0.35J	RG-58
FX1.5P200	FX1.5N200	FX1.5R200	0 - 1.5 kV	0 - 200 mA	0.5J	RG-58
FX2P150	FX2N150	FX2R150	0 - 2 kV	0 - 150 mA	0.3J	RG-58
FX3P100	FX3N100	FX3R100	0 - 3 kV	0 - 100 mA	0.7J	RG-58
FX5P60	FX5N60	FX5R60	0 - 5 kV	0 - 60 mA	0.4J	RG-58
FX6P50	FX6N50	FX6R50	0 - 6 kV	0 - 50 mA	0.55J	RG-8U
FX8P37	FX8N37	FX8R37	0 - 8 kV	0 - 37 mA	0.4J	RG-8U
FX10P30	FX10N30	FX10R30	0 - 10 kV	0 - 30 mA	0.8J	RG-8U
FX12P25	FX12N25	FX12R25	0 - 12 kV	0 - 25 mA	0.85J	RG-8U
FX15P20	FX15N20	FX15R20	0 - 15 kV	0 - 20 mA	0.75J	RG-8U
FX20P15	FX20N15	FX20R15	0 - 20 kV	0 - 15 mA	1.2J	RG-8U
FX25P12	FX25N12	FX25R12	0 - 25 kV	0 - 12 mA	1.3J	RG-8U
FX30P10	FX30N10	FX30R10	0 - 30 kV	0 - 10 mA	1.8J	RG-8U
FX40P7.5	FX40N7.5	FX40R7.5	0 - 40 kV	0 - 7.5 mA	2.4J	RG-8U
FX50P6	FX50N6	FX50R6	0 - 50 kV	0 - 6 mA	3.0J	RG-8U
FX60P5	FX60N5	FX60R5	0 - 60 kV	0 - 5 mA	3.5J	RG-8U

EW Series Extended Current 500 Watt Regulated High Voltage DC Power Supplies

Up to 60 kV, 3.5 Inch Panel Height... Laboratory Performance... Enhanced Features

The EW Series is a 500 watt regulated high voltage DC power supply with an important difference…maximum current ratings are equivalent to a 600 W supply! This maximum current, which is available for all output voltages up to 84% of rated voltage, should be of significant interest for many applications. Voltage ranges are 0 to 1 kV through 0 to 60 kV.

Dimensions: 3.5"H x 16.375"D x 19" Rack, 18 Lbs.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
102-132 V RMS standard, single-phase, 48-63 Hz, <10 A. Connector per IEC 320/C14 with mating line cord, terminated with NEMA 5-15 plug.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
<1.5 Joules, 20 kV; <4 Joules, 60 kV.

VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.005% + 1 mV/mA for load variations.

RIPPLE:
<0.02% of rated voltage + 0.5 V RMS at full load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated for single polarity, 1% reading + 0.1% rated for reversible polarity.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical with a 30% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating; -40 to +85 degree C, storage.

POLARITY:
Available either positive, negative, or reversible with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
Terminal block provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		EW1R600	0-1 kV	0-600 mA	RG-59	3.5 in.
		EW1.5R400	0-1.5 kV	0-400 mA	RG-59	3.5 in.
		EW2R300	0-2 kV	0-300 mA	RG-59	3.5 in.
		EW3R200	0-3 kV	0-200 mA	RG-59	3.5 in.
		EW5R120	0-5 kV	0-120 mA	RG-59	3.5 in.
EW7P85	EW7N85	EW7R85	0-7 kV	0-85 mA	RG-8U	3.5 in.
EW10P60	EW10N60	EW10R60	0-10 kV	0-60 mA	RG-8U	3.5 in.
EW15P40	EW15N40	EW15R40	0-15 kV	0-40 mA	RG-8U	3.5 in.
EW20P30	EW20N30	EW20R30	0-20 kV	0-30 mA	RG-8U	3.5 in.
EW25P24	EW25N24	EW25R24	0-25 kV	0-24 mA	RG-8U	3.5 in.
EW30P20	EW30N20	EW30R20	0-30 kV	0-20 mA	RG-8U	3.5 in.
EW40P15	EW40N15	EW40R15	0-40 kV	0-15 mA	RG-8U	3.5 in.
EW50P12	EW50N12	EW50R12	0-50 kV	0-12 mA	RG-8U	3.5 in.
EW60P10	EW60N10	EW60R10	0-60 kV	0-10 mA	RG-8U	3.5 in.

Note: Product of voltage and current automatically limited to 500 W maximum.

WK Series Extended Current 500 Watt Regulated High Voltage DC Power Supplies

Up To 125 kV... 5.25 Inch Panel Height... Laboratory Performance... Enhanced Features

The WK Series is a 500 watt regulated DC power supply offering output voltage ranges from 80 kV to 125 kV and an interesting "plus." Maximum current ratings are equivalent to a 600 W supply up to 84% of rated voltage! Panel height is only 5.25 inches and weight is less than 30 pounds. The WK Series is available with dual analog output meters or, optionally, with digital meters or a blank panel for OEM/ system applications.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
102-132V RMS, 48-63 Hz single phase, <10 A. Connector per IEC 320/VI with mating line cord and NEMA 5-15 plug.

EFFICIENCY:
Typically 83% at full load.

OUTPUT:
Continuous, stable adjustment from zero to rated voltage and current via 10-turn potentiometers, with 0.05% resolution, external 0 to 10 V, or external potentiometers. Linearity, <1% fs. Repeatability, <0.1% fs. Accuracy, 0.25% of rated + 1% of setting.

STORED ENERGY:
9 J, 80 kV; 11 J, 100 kV; 14.5 J, 125 kV.

VOLTAGE REGULATION:
<0.005%, line or load.

RIPPLE:
<0.1% RMS of rated voltage at full load.

CURRENT REGULATION:
<0.1% of full scale from short circuit to rated voltage.

Dimensions: 5.25"H x 20"D x 19" Rack, 30 lbs.

VOLTAGE MONITOR:
0 to +10 V DC for zero to rated voltage. Accuracy, 1% of reading + 1% of rated voltage.

CURRENT MONITOR:
0 to +10 V DC for zero to rated current. Accuracy, 1% of reading + 0.05% (0.1% for reversible model) of rated current.

STABILITY:
0.01% per hour after 1/2 hour warmup. 0.05% per 8 hours.

OUTPUT VOLTAGE TIME CONSTANT:
Typically 400 ms rise or decay time constant for 125 kV model, using TTL on/off or remote voltage control, with 15% resistive load.

TEMPERATURE COEFFICIENT:
0.01%/degree C.

AMBIENT TEMPERATURE:
-20 to +40 degrees C, operating; -40 to +85 degrees C, storage.

POLARITY:
Positive, negative, or reversible with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low-energy components provide ultimate protection.

ACCESSORIES:
Detachable 8-foot shielded HV coaxial cable (see Model Chart for cable type) and 6-foot detachable line cord provided.

REMOTE CONTROLS:
Terminal block provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except on blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable
WK80P7.5	WK80N7.5	WK80R7.5	0-80 kV	0-7.5 mA	DS2121
WK100P6	WK100N6	WK100R6	0-100 kV	0-6 mA	DS2121
WK125P5	WK125N5	WK125R5	0-125 kV	0-5 mA	DS2121

Note: Product of voltage and current automatically limited to 500 W maximum.

EK Series 600W Regulated High Voltage DC Power Supplies

1 kV to 60 kV Rack Mount 3.5 Inch Panel Height… Laboratory Performance… CE and Semi S2-93 Compliant

Dimensions: 3.5"H x 20.5"D x 19" Rack, 20 lbs.

The EK family of power supplies are sophisticated, 600 watt high voltage power supplies with low ripple and noise. They are air insulated, fast response units, with tight regulation and extremely low arc discharge currents. ArcQuench and Arc Sensing features make this model ideal for vacuum processing related applications to ensure smooth system performance and safety.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
102 - 132 V RMS, single-phase, 48-63 Hz, 1200 VA maximum at full load. Connector per IEC 320/VI with mating line cord, terminated with NEMA 5-15 plug.

EFFICIENCY:
Typically greater than 85% at full load.

OUTPUT:
Continuous, stable, adjustment from 0 to rated voltage or current by panel mounted 10-turn potentiometers with 0.05% resolution, or by external 0 to 10 V signals is provided. Voltage Accuracy is 0.5% of setting + 0.2% rated

STATIC VOLTAGE REGULATION:
Better than ±0.005% for specified line variations and 0.005% + 0.5 mV/mA for no load to full load variations.

DYNAMIC VOLTAGE REGULATION:
For load transients from 10% to 99% and 99% to 10%, typical deviation is less than 2% of rated output voltage with recovery to within 1% in 500 ms and recovery to within 0.1% in 1 ms.

RIPPLE:
Better than 0.025% of rated voltage + 0.5 V RMS at full load.

CURRENT REGULATION:
When in current regulation mode, better than 0.1% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 0.5% reading + 0.2% rated. Impedance is 10 K Ohm.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated for fixed polarity, 1% reading + 0.1% rated for reversible polarity. Impedance is 10 K Ohm.

STABILITY:
0.01% per hour after 1/2 hour warm-up, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
The voltage rise time constant is 50 ms typical for all models using either HV enable or remote programming control. The voltage decay time constant is 50 ms with a 30% resistive load for 8 kV to 60 kV models and 50 ms with a 11% resistive load for 1 kV to 6 kV models.

TEMPERATURE COEFFICIENT:
0.01% /°C.

AMBIENT TEMPERATURE:
-20 to +40° C, operating;
-40 to +85° C, storage.

POLARITY:
Available with either positive, negative or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and short circuits. Thermal switches and RPM sensing fans protect against thermal overload. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

continued on next page

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy (J)	Cable Output
Reversible Only		EK1R600	0 - 1 kV	0 - 600 mA	0.06	RG-58U
		EK1.5R400	0 - 1.5 kV	0 - 400 mA	0.1	RG-58U
		EK2R300	0 - 2 kV	0 - 300 mA	0.1	RG-58U
		EK3R200	0 - 3 kV	0 - 200 mA	0.2	RG-58U
		EK5R120	0 - 5 kV	0 - 120 mA	1.2	RG-58U
		EK6R100	0 - 6 kV	0 - 100 mA	1.6	RG-58U
EK8P75	EK8N75	EK8R75	0 - 8 kV	0 - 75 mA	0.9	RG-8U
EK10P60	EK10N60	EK10R60	0 - 10 kV	0 - 60 mA	1.1	RG-8U
EK12P50	EK12N50	EK12R50	0 - 12 kV	0 - 50 mA	1.6	RG-8U
EK15P40	EK15N40	EK15R40	0 - 15 kV	0 - 40 mA	1.7	RG-8U
EK20P30	EK20N30	EK20R30	0 - 20 kV	0 - 30 mA	1.9	RG-8U
EK25P24	EK25N24	EK25R24	0 - 25 kV	0 - 24 mA	1.4	RG-8U
EK30P20	EK30N20	EK30R20	0 - 30 kV	0 - 20 mA	2	RG-8U
EK40P15	EK40N15	EK40R15	0 - 40 kV	0 - 15 mA	2.7	RG-8U
EK50P12	EK50N12	EK50R12	0 - 50 kV	0 - 12 mA	3.4	RG-8U
EK60P10	EK60N10	EK60R10	0 - 60 kV	0 - 10 mA	4	RG-8U

ARC QUENCH:
An arc quench feature provides sensing of each load arc and quickly inhibits the HV output for approximately 20 ms after each arc. Standard on 8 - 60 kV models; optional on 1- 6 kV models.

ARC COUNT:
Internal circuitry senses the number of arcs caused by external load discharges. If the rate of consecutive arcs exceeds approximately one arc per second for five arcs, the supply will turn off for approximately 5 seconds to allow clearance of the fault. After this period the supply will automatically return to the programmed kV value with the rise time constant indicated. If the load fault still exists the above cycle will repeat. Standard on 8 - 60 kV models; optional on 1 - 6 kV models.

EXTERNAL INTERLOCK:
Open = off, closed = on. Normally latching except for blank front panel version where it is non-latching.

FRONT PANEL ELEMENTS:
The front panel contains all local control functions. These control functions are: AC power on/off switch and pilot light, separate 10-turn controls with locking vernier dials used to set voltage and current levels, and a high voltage ON switch. LED's indicate when high voltage is on, output polarity, and whether the supply is operating in a voltage or current regulating mode. Output levels are indicated by voltage and current digital meters.

REAR PANEL ELEMENTS:
AC power entry connector, fuses, power on indicator, ground stud, HV output connector, and remote interface terminal strip.

The signals provided on the remote interface terminal strip are as follows:

- **Inputs:** Safety interlock, output voltage and current program signals, and high voltage enable.
- **Outputs:** Output voltage and current monitor signals, and a +10 V reference source.

Signal common and ground reference terminals are also provided.

- **Remote HV Enable/Disable:** 0 - 1.5 V = OFF, 2.5 - 15 V = ON.

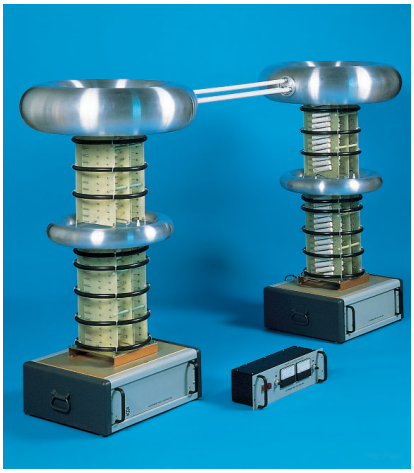
ACCESSORIES:
Detachable, 8 foot, shielded high voltage coaxial cable (see models chart for cable type) and 6 foot detachable line cord are provided.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

PG Series 500/1000 Watt Regulated High Voltage DC Power Supplies

PG-LR Series 250/500 Watt Low Ripple Regulated High Voltage DC Power Supplies

100 kV to 400 kV...



The PG Series is available in two configurations ... as a standard PG Series or as an ultra-low ripple PG-LR Series for demanding applications, such as particle accelerators. Shown is the dual-stack PG-LR Series with remote control unit. One stack serves as a high voltage multiplier while the second stack provides an additional lowpass ripple filter. The standard PG Series is supplied with only the multiplier stack and remote control unit.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
105-125 V RMS, single-phase, 48-63 Hz, <15 A. Series PG-LR: 208 V RMS +/- 10%, 3-phase, 48-63 Hz, <5 A.

EFFICIENCY:
Typically 75% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage and current by means of front panel 10-turn potentiometers, external zero to +10 V signals, or external potentiometers. Linearity to within 1% of full scale.

VOLTAGE REGULATION:
Better than 0.005% + 1 V, line or load.

RIPPLE:
Better than 0.1% of rated voltage at full load. Series PG-LR: See models chart.

CURRENT REGULATION:
Better than 100 µA from short circuit to rated voltage for any load condition; 0.005% + 1 µA for line variations.

VOLTAGE/CURRENT MONITOR:
Zero to +10 V signal for zero to rated voltage/current.

STABILITY:
0.01% + 1 V per hour after 1/2 hour warmup, 0.05% + 2 V per 8 hours.

TEMPERATURE COEFFICIENT:
0.01% per degree C + 1 V.

AMBIENT TEMPERATURE:
-20 to +60 degree C, operating;
-40 to +85 degree C, non-operating.

POLARITY:
Available with either positive, negative, or reversible (PG only) polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects the power supply against all overload conditions, including arcs and short circuits. Fuses, surge-limiting resistors, and low energy components provide the ultimate protection.

EXTERNAL INTERLOCK:
Open off, closed on.

PG Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Panel Height	Stack Height
PG100P5	PG100N5	PG100R5	0-100 kV	0-5 mA	5.25 in	22.75 in
PG100P10	PG100N10	PG100R10	0-100 kV	0-10 mA	5.25 in	22.75 in
PG150P3	PG150N3	PG150R3	0-150 kV	0-3 mA	5.25 in	29.75 in
PG150P6	PG150N6	PG150R6	0-150 kV	0-6 mA	5.25 in	29.75 in
PG200P2.5	PG200N2.5	PG200R2.5	0-200 kV	0-2.5 mA	5.25 in	34.75 in
PG200P5	PG200N5	PG200R5	0-200 kV	0-5 mA	5.25 in	34.75 in
PG250P1	PG250N1	PG250R1	0-250 kV	0-1 mA	5.25 in	40.50 in
PG250P2	PG250N2	PG250R2	0-250 kV	0-2 mA	5.25 in	40.50 in
PG300P1	PG300N1	PG300R1	0-300 kV	0-1 mA	5.25 in	50.88 in
PG300P2	PG300N2	PG300R2	0-300 kV	0-2 mA	5.25 in	50.88 in
PG400P1	PG400N1	PG400R1	0-400 kV	0-1 mA	5.25 in	63.25 in

PG-LR Models (same panel and stack heights as above)

Positive Polarity	Negative Polarity	Output Voltage	Output Current	Ripple (V p-p)	
				Typ.	Max.
PG100P2.5-LR	PG100N2.5-LR	0-100 kV	0-2.5 mA	2	4.5
PG100P5-LR	PG100N5-LR	0-100 kV	0-5 mA	4	7
PG150P2-LR	PG150N2-LR	0-150 kV	0-2 mA	3	5
PG150P3-LR	PG150N3-LR	0-150 kV	0-3 mA	6	9
PG200P1-LR	PG200N1-LR	0-200 kV	0-1 mA	3.5	5
PG200P2-LR	PG200N2-LR	0-200 kV	0-2 mA	7	10
PG250P1-LR	PG250N1-LR	0-250 kV	0-1 mA	4.5	6.5
PG250P2-LR	PG250N2-LR	0-250 kV	0-2 mA	8.5	12.5
PG300P1-LR	PG300N1-LR	0-300 kV	0-1 mA	5	7.5
PG300P2-LR	PG300N2-LR	0-300 kV	0-2 mA	10	15
PG400P1-LR	PG400N1-LR	0-400 kV	0-1 mA	7	10

USA (908) 638-3800 • FAX (908) 638-3700
sales@glassmanhv.com

WX Series 1000 Watt Regulated High Voltage DC Power Supplies

Up to 75 kV, 5.25 Inch Panel Height... Laboratory Performance... Enhanced Features

The WX Series provides 1000 watts of output power with voltage ranges from 0 to 1 kV through 0 to 75 kV in a rack-panel height of only 5.25 inches. Standard models have dual analog voltage and current meters. As an option, WX is available with dual digital meters or with a blank panel for OEM/system applications. Local front panel and full remote controls are standard. Maximum weight is 30 lbs.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
198-242 V RMS standard, single-phase, 48-63 Hz, <9.5 A. Connector per IEC 320/C14 with mating line cord, terminated with NEMA 6-15 plug.

EFFICIENCY:
Typically 83% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
6 Joules, maximum, up to 50 kV;
9 Joules, maximum, 60 and 75 kV.

VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.01% + 1 mV/mA for load variations.

RIPPLE:
<0.05% of rated voltage + 0.5 V RMS at full load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

Dimensions: 5.25"H x 20.0"D x 14" Rack, 30 lbs.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hour.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical with a 50% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +45 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive, negative, or reversible with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads. including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
Terminal blocks provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		WX1R1000	0-1 kV	0-1000 mA	RG-59	5.25 in.
		WX1.5R700	0-1.5 kV	0-700 mA	RG-59	5.25 in.
		WX2R500	0-2 kV	0-500 mA	RG-59	5.25 in.
		WX3R350	0-3 kV	0-350 mA	RG-59	5.25 in.
		WX5R200	0-5 kV	0-200 mA	RG-59	5.25 in.
WX10P100	WX10N100	WX10R100	0-10 kV	0-100 mA	RG-8U	5.25 in.
WX15P70	WX15N70	WX15R70	0-15 kV	0-70 mA	RG-8U	5.25 in.
WX20P50	WX20N50	WX20R50	0-20 kV	0-50 mA	RG-8U	5.25 in.
WX30P35	WX30N35	WX30R35	0-30 kV	0-35 mA	RG-8U	5.25 in.
WX40P25	WX40N25	WX40R25	0-40 kV	0-25 mA	RG-8U	5.25 in.
WX50P20	WX50N20	WX50R20	0-50 kV	0-20 mA	RG-8U	5.25 in.
WX60P15	WX60N15	WX60R15	0-60 kV	0-15 mA	RG-8U	5.25 in.
WX75P12	WX75N12	WX75R12	0-75 kV	0-12 mA	DS2124	5.25 in.

LX Series Extended Current 1000 Watt Regulated High Voltage DC Power Supplies

Up To 150 kV... 8.75 Inch Panel Height

Dimensions: 8.75"H x 20.0"D (24.0" for 150kV units) x 19" Rack, 47 lbs.

The LX Series is a 1000 watt regulated high voltage DC power supply with an important difference…maximum current ratings are equivalent to a 2000 W supply! This maximum current, which is available for all output voltages up to 50% of rated voltage, should be of significant interest for many applications. Weight is less than 47 pounds.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
102-132 V RMS standard, single-phase, 48-63 Hz, <20 A. 3-position terminal block with protective cover.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
<15 Joules, 60 kV; <30 Joules, 125 kV.

VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.005% + 1 mV/mA for load variations.

RIPPLE:
<0.03% of rated voltage + 1 V RMS at full load, 0.1% (150 kV).

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.1% rated for single polarity, 1% reading + 0.15 % rated for reversible polarity.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical to 60 kV (400 ms for higher voltages) with a 30% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available with either positive, negative, or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

ACCESSORY:
Detachable 8-foot HV cable. See models chart for cable type

REMOTE CONTROLS:
Terminal block is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		LX1R2000	0-1 kV	0-2000 mA	RG-59	8.75 in.
		LX1.5R1300	0-1.5 kV	0-1300 mA	RG-59	8.75 in.
		LX2R1000	0-2 kV	0-1000 mA	RG-59	8.75 in.
		LX3R660	0-3 kV	0-660 mA	RG-59	8.75 in.
		LX5R400	0-5 kV	0-400 mA	RG-59	8.75 in.
		LX6R330	0-6 kV	0-330 mA	RG-58	8.75 in.
LX8P250	LX8N250	LX8R250	0-8 kV	0-250 mA	RG-8U	8.75 in.
LX10P200	LX10N200	LX10R200	0-10 kV	0-200 mA	RG-8U	8.75 in.
LX12P165	LX12N165	LX12R165	0-12 kV	0-165 mA	RG-8U	8.75 in.
LX15P132	LX15N132	LX15R132	0-15 kV	0-132 mA	RG-8U	8.75 in.
LX20P100	LX20N100	LX20R100	0-20 kV	0-100 mA	RG-8U	8.75 in.
LX30P66	LX30N66	LX30R66	0-30 kV	0-66 mA	RG-8U	8.75 in.
LX40P50	LX40N50	LX40R50	0-40 kV	0-50 mA	RG-8U	8.75 in.
LX50P40	LX50N40	LX50R40	0-50 kV	0-40 mA	RG-8U	8.75 in.
LX60P33	LX60N33	LX60R33	0-60 kV	0-33 mA	RG-8U	8.75 in.
LX80P25	LX80N25	LX80R25	0-80 kV	0-25 mA	DS 2124	8.75 in.
LX100P20	LX100N20	LX100R20	0-100 kV	0-20 mA	DS 2124	8.75 in.
LX125P16	LX125N16	LX125R16	0-125 kV	0-16 mA	DS 2121	8.75 in.
LX150P6	LX150N6	LX150R6	0-150 kV	0-6 mA	DS 2121	8.75 in.

Note: Product of voltage and current automatically limited to 1000 W maximum.

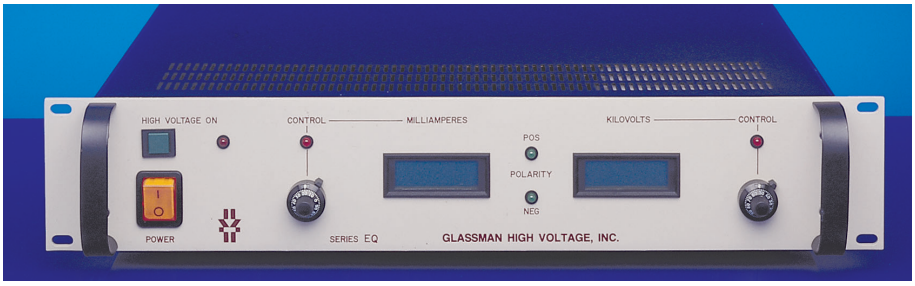
EQ Series 1.2 kW Regulated High Voltage DC Power Supplies

1 to 60 kV, 3.5" Panel

Single-phase 198-264 V Input, 1420 VA

Power Factor Corrected to >0.995. Harmonics Well Below IEC 555-2 Specs

The EQ Series are sophisticated, 1.2 kW, high voltage power supplies in a small and lightweight package. They are designed to meet the growing demands from both users and electric utilities for switching power supplies with excellent input power factors that draw harmonic currents below those specified in EN61000-3-2



Dimensions: 3.5"H x 20.5"D x 19" Rack, 22 lbs.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
198-264 V RMS standard, single-phase, 48-63 Hz, 1420 VA maximum. <7 A at 220 V. Connector per IEC 320/VI with mating line cord terminated with NEMA 6-15 plug.

EFFICIENCY:
Typically 85% at full load. Power factor >0.995.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 0.25% rated + 0.25% setting. Repeatability better than 0.1% of setting.

STATIC VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.005% + 0.5 mV/mA for load variations.

DYNAMIC VOLTAGE REGULATION:
For load transients from 10% to 100% and 100% to 10%, typical deviation is 2% of output voltage with recovery to within 1% in 500 µs and to 0.1% in 1 ms.

RIPPLE:
<0.02% of rated voltage + 300 mV RMS at full load.

CURRENT REGULATION:
Better than 0.05% + 100 µA from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 0.25% reading + 0.25% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated for single polarity, 1% reading + 0.1% rated for reversible polarity

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical with a 10% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available with either positive, negative, or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection,.

ARC COUNT:
Internal circuitry senses the number of arcs caused by flawed external load characteristics. If the rate of consecutive arcs exceeds approximately 2 per second, the supply will turn off for approximately 2 seconds to allow clearance of the fault and then automatically resume normal operation. Custom modifications of this feature are available. Consult the factory.

REMOTE CONTROLS:
Terminal block is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, HV enable, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

REMOTE HV ENABLE:
0-1.5 V off, 2.5-15 V on.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy (J)	Output Cable
Reversible Only		EQ1R1200	0-1kV	0-1200mA	1.0	RG-58
		EQ1.5R800	0-1.5kV	0-800mA	1.1	RG-58
		EQ2R600	0-2kV	0-600mA	1.0	RG-58
		EQ3R400	0-3kV	0-400mA	1.1	RG-58
		EQ5R240	0-5kV	0-240mA	1.2	RG-58
		EQ6R200	0-6kV	0-200mA	1.4	RG-58
EQ8P150	EQ8N150	EQ8R150	0-8kV	0-150mA	1.3	RG-8U
EQ10P120	EQ10N120	EQ10R120	0-10kV	0-120mA	1.6	RG-8U
EQ12P100	EQ12N100	EQ12R100	0-12kV	0-100mA	2.0	RG-8U
EQ15P80	EQ15N80	EQ15R80	0-15kV	0-80mA	1.6	RG-8U
EQ20P60	EQ20N60	EQ20R60	0-20kV	0-60mA	2.0	RG-8U
EQ30P40	EQ30N40	EQ30R40	0-30kV	0-40mA	2.1	RG-8U
EQ40P30	EQ40N30	EQ40R30	0-40kV	0-30mA	2.8	RG-8U
EQ50P24	EQ50N24	EQ50R24	0-50kV	0-24mA	3.4	RG-8U
EQ60P20	EQ60N20	EQ60R20	0-60kV	0-20mA	4.1	RG-8U

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LT Series 2000 Watt Regulated High Voltage DC Power Supplies

Up To 150 kV... 8.75 Inch Panel Height Laboratory Performance Enhanced Features

Dimensions: 8.75"H x 20.0"D (24.0" for 150kV units) x 19" Rack, 47 lbs.

The LT Series is a 2000 watt regulated high voltage DC power supply with voltage ranges from 0 to 1 kV through 0 to 150 kV. Rack-panel height is only 8.75 inches. The LT is offered with dual analog voltage and current meters or, optionally, with dual digital meters or a blank panel for OEM/ systems applications. Weight is less than 47 pounds.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
198-264 V RMS standard, single-phase, 48-63 Hz, <20 A. 3-position terminal block with protective cover.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
<15 Joules, 60 kV; <30 Joules, 125 kV.

VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.005% + 1 mV/mA for load variations.

RIPPLE:
<0.03% of rated voltage + 1 V RMS at full load, 0.1% (150 kV).

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.1% rated for single polarity, 1% reading + 0.15% rated for reversible polarity.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical to 60 kV (400 ms for higher voltages) with a 30% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available with either positive, negative, or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

ACCESSORY:
Detachable 8-foot HV cable. See models chart for cable type

REMOTE CONTROLS:
Terminal block is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/ monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		LT1R2000	0-1 kV	0-2000 mA	RG-59	8.75 in.
		LT1.5R1300	0-1.5 kV	0-1300 mA	RG-59	8.75 in.
		LT2R1000	0-2 kV	0-1000 mA	RG-59	8.75 in.
		LT3R660	0-3 kV	0-660 mA	RG-59	8.75 in.
		LT5R400	0-5 kV	0-400 mA	RG-59	8.75 in.
		LT6R330	0-6 kV	0-330 mA	RG-58	8.75 in.
LT8P250	LT8N250	LT8R250	0-8 kV	0-250 mA	RG-8U	8.75 in.
LT10P200	LT10N200	LT10R200	0-10 kV	0-200 mA	RG-8U	8.75 in.
LT12P165	LT12N165	LT12R165	0-12 kV	0-165 mA	RG-8U	8.75 in.
LT15P132	LT15N132	LT15R132	0-15 kV	0-132 mA	RG-8U	8.75 in.
LT20P100	LT20N100	LT20R100	0-20 kV	0-100 mA	RG-8U	8.75 in.
LT30P66	LT30N66	LT30R66	0-30 kV	0-66 mA	RG-8U	8.75 in.
LT40P50	LT40N50	LT40R50	0-40 kV	0-50 mA	RG-8U	8.75 in.
LT50P40	LT50N40	LT50R40	0-50 kV	0-40 mA	RG-8U	8.75 in.
LT60P33	LT60N33	LT60R33	0-60 kV	0-33 mA	RG-8U	8.75 in.
LT80P25	LT80N25	LT80R25	0-80 kV	0-25 mA	DS 2124	8.75 in.
LT100P20	LT100N20	LT100R20	0-100 kV	0-20 mA	DS 2124	8.75 in.
LT125P16	LT125N16	LT125R16	0-125 kV	0-16 mA	DS 2121	8.75 in.
LT150P10	LT150N10	LT150R10	0-150 kV	0-10 mA	DS 2121	8.75 in.

OS Series
2 kW Regulated
High Voltage
DC Power Supplies

200 kV to 450 kV, Open Stack CE Compliant Power Factor Corrected to > .995 Harmonics Well Below EN61000-3-2

The OS family of power supplies are sophisticated 2 kW, open stack, power supplies with extremely low ripple and noise. They are air insulated fast response units with tight regulation. They are designed to meet the growing demands from both users and electric utilities for switching supplies with excellent input power factors that draw harmonic currents below those specified in EN61000-3-2.

OS series models consist of a rack style driver chassis, a high voltage stack assembly, and a remote control unit. The driver chassis is provided in a cabinet which is 8.43" H X 22.56" D, onto which the high voltage stack is mounted. The dimensions of the stack vary with the output voltage rating and are given in the specifications. The rack mountable remote control provides all interface functions and is connected to the driver chassis with the 25' long cables provided. The remote control unit is 5.25" H X 5.0" D.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
198-264 V RMS single phase, 48-63 Hz, 2500 VA maximum at full load. A 3 position terminal block with protective cover is provided on the rear panel of the driver chassis.

EFFICIENCY:
Typically 80% at full load. Power factor >0.995.

OUTPUT:
Continuous stable adjustment from 0 to rated voltage or current by panel mounted 10-turn potentiometers with 0.05% resolution, or by external 0 to 10 V signals is provided. Repeatability better than 0.1% of setting. Accuracy is 0.1% of rated + 0.5% of setting.

VOLTAGE REGULATION:
Better than +/- 0.005% for specified line variations and 0.005% for no load to full load variations.

CURRENT REGULATION:
Better than +/- 0.005% for specified line variations and 0.1% from short circuit to rated voltage at any load condition, when in current regulation mode. When in current trip mode the HV output will disable and latch off when the load current reaches the programmed current level.

VOLTAGE MONITOR:
0 to 10 V equivalent to 0 to rated voltage. Accuracy, 0.5% of reading + 0.1% of rated. Impedance is 10 K Ohm.

CURRENT MONITOR:
0 to 10 V equivalent to 0 to rated current. Accuracy, 1% of reading + 0.1% of rated. Impedance is 10 K Ohm.

STORED ENERGY:
Stored energy varies with output voltage and is tabulated in the models chart.

RIPPLE:
Ripple consists of two major components, inverter switching frequency components and line frequency related components. The inverter frequency component is dependent on the amount of load current drawn. The line frequency related component is determined by the amount of power delivered to the load. The maximum values for both components are specified in the models chart.

STABILITY:
0.01% per hour after 1/2 hour warm-up, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
400 ms typical using either the HV ON switch or remote programming with a minimum 1.7 mA resistive load.

TEMPERATURE COEFFICIENT:
0.01%/°C.

AMBIENT TEMPERATURE:
-20 to +40° C, operating,
-40 to +85° C storage.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and short circuits. Thermal switches protect against thermal overload. Fuses, surge-limiting resistors and low energy components provide ultimate protection.

ARC QUENCH:
An arc quench feature provides sensing of each load arc and quickly inhibits the HV output for approximately 0.25 seconds after each arc.

ARC SENSING:
Internal circuitry senses the number of arcs caused by external load discharges. If the rate of consecutive arcs exceeds approximately one arc per second for 5 arcs, the supply will turn off for approximately 5 seconds to allow clearance of the fault. After this period the supply will automatically return to the programmed kV value with the rise time constant indicated. If the load fault still exists the above cycle will repeat.

REMOTE CONTROL UNIT:
A separate control panel chassis is provided which contains all the control functions. The front panel of this assembly contains: separate 10-turn controls with locking vernier dials used to set the voltage and current levels, High Voltage ON switch, High voltage OFF/Reset switch and an AC power on/off switch and indicator. LED's indicate when the high voltage is on, output polarity, interlock status and whether the supply is operating in a voltage or current regulating mode. Output levels are indicated by voltage and current digital meters. The rear panel of this assembly contains: AC power on indicator, ground stud, driver/control chassis interface connectors, current limit/current trip selector switch, and remote user interface terminal strip. The signals provided on the remote user interface terminal strip are as follows:

- **Inputs:** Output voltage and current program signals, and high voltage enable.
- **Outputs:** Output voltage and current monitor signals, a +10 V reference source, and a high voltage status signal.

Signal common and ground reference terminals are also provided.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy (Joules)	High Freq Ripple) (P-P)	Line Freq Ripple) (P-P)
OS200P10	OS200N10	OS200R10	0 - 200 kV	0 - 10 mA	70	100V	10V
OS250P8	OS250N8	OS250R8	0 - 250 kV	0 - 8 mA	81	125V	12.5V
OS300P6	OS300N6	OS300R6	0 - 300 kV	0 - 6 mA	100	150V	15V
OS350P4.5	OS350N4.5	OS350R4.5	0 - 350 kV	0 - 4.5 mA	112	175V	17.5V
OS400P3.5	OS400N3.5	OS400R3.5	0 - 400 kV	0 - 3.5 mA	131	200V	20V
OS450P3	OS450N3	OS450R3	0 - 450 kV	0 - 3 mA	150	225V	22.5V

KL Series 3 kW Regulated High Voltage DC Power Supplies

Power Factor Corrected to >0.99… Well within IEC 555-2 Specifications

High Speed Dynamic Voltage Regulation

Single-phase, 198-264 V Input, 3600 VA

The KL Series is designed to meet the growing demands from both users and electric utilities for switching power supplies that exhibit improved input power factors. Power factor is defined as the ratio of real power (measured in watts) to apparent power (measured in volt-amperes.) A power factor near unity means that the user's supply can develop the maximum possible DC output power from an AC line of a given current rating. A power factor near unity also means that the supply does not distort the AC line voltage to a point where it could affect other equipment on the same line.

Models are available from 0 to 1 kV through 0 to 30 kV. Panel height is 7 inches and weight is less than 50 lbs.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
198-264V RMS standard, single-phase, 48-63Hz, 3500VA maximum, <16A at 220V. 3-position terminal block with protective cover.

EFFICIENCY:
Typically 87% at full load. Power factor >0.99.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signals, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% of rating.

STORED ENERGY
See Models chart.

STATIC VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.01% + 0.2 volts per ampere for load variations.

Dimensions: 7.0"H x 20.0"D x 19" Rack, 50 lbs.

DYNAMIC VOLTAGE REGULATION:
For load transients from 10% to 100% and 100% to 10%, typical deviation is 2% of output voltage with recovery to within 1% in 500 µs and to 0.1% in 1 ms.

RIPPLE:
<0.02% of rated voltage + 500 mV RMS.

CURRENT REGULATION:
Better than 0.05% + 50 µA from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 0.5% reading + 0.5% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated for single polarity, 1% reading + 0.1% rated for reversible polarity.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical with a 10% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available with either positive, negative, or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
Terminal block is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy	Output Cable
Reversible Only		KL1R3000	0-1 kV	0-3000 mA	2.3 J	RG-58
		KL1.5R2000	0-1.5 kV	0-2000 mA	3.4 J	RG-58
		KL2R1500	0-2 kV	0-1500 mA	2.7 J	RG-58
		KL3R1000	0-3 kV	0-1000 mA	2.0 J	RG-58
		KL5R600	0-5 kV	0-600 mA	2.5 J	RG-58
		KL6R500	0-6 kV	0-500 mA	3.6 J	RG-58
KL8P375	KL8N375	KL8R375	0-8 kV	0-375 mA	3.1 J	RG-8U
KL10P300	KL10N300	KL10R300	0-10 kV	0-300 mA	2.9 J	RG-8U
KL12P250	KL12N250	KL12R250	0-12 kV	0-250 mA	4.2 J	RG-8U
KL15P200	KL15N200	KL15R200	0-15 kV	0-200 mA	3.8 J	RG-8U
KL20P150	KL20N150	KL20R150	0-20 kV	0-150 mA	4.2 J	RG-8U
KL30P100	KL30N100	KL30R100	0-30 kV	0-100 mA	4.9 J	RG-8U

LK Series
3 kW Regulated High Voltage DC Power Supplies

40 kV to 100 kV
Rack Mount CE Compliant
Power Factor Corrected to >.995
Harmonics Well Below
EN61000-3-2
Semi S2-93 Compliant

Dimensions: 8.75"H x 24.0"D x 19" Rack, 55 lbs.

The LK family of power supplies are sophisticated, 3 kW, high voltage power supplies with low ripple and noise. They are air insulated, fast response units, with tight regulation and low-stored energy making them ideal for both OEM and Laboratory use. They are designed to meet the growing demands from both users and electric utilities for switching supplies with excellent input power factors that draw harmonic currents well below those specified in EN61000-3-2.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:
198-264 V RMS, single-phase, 48-63 Hz, 3500 VA maximum at full load. Less than 16 A at 220 VAC. A 3-position rear terminal block with protective cover is provided.

EFFICIENCY:
Typically greater than 85% at full load. Power factor >0.995.

OUTPUT:
Continuous, stable, adjustment from 0 to rated voltage or current by panel mounted 10-turn potentiometers with 0.05% resolution, or by external 0 to 10 V signals is provided. Linearity is < 1% of rated. Accuracy is 0.2% of rated + 0.5% of setting for voltage program and 0.2% of rated + 1% of setting for current program.

STATIC VOLTAGE REGULATION:
Better than ±0.005% for specified line variations and 0.01% for no load to full load variations.

DYNAMIC VOLTAGE REGULATION:
For load transients from 10% to 99% and 99% to 10%, typical deviation is less than 2% of rated output voltage with recovery to within 1% in 500 µs and recovery to within 0.1% in 1 ms.

RIPPLE:
Better than 0.025% RMS of rated voltage at full load.

CURRENT REGULATION:
When in current regulation mode, better than 0.1% from short circuit to rated voltage at any load condition. When in current trip mode the HV output will disable and latch off when current program level is reached.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 0.5% reading + 0.2% rated. Impedance is 10 K Ohm.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.2% rated. Impedance is 10 K Ohm.

STABILITY:
0.01% per hour after 1/2 hour warm-up, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
200 ms typical with a 7% resistive load using either HV enable or remote programming control.

TEMPERATURE COEFFICIENT:
0.01%/°C.

AMBIENT TEMPERATURE:
-20 to +40°C, operating;
-40 to +85°C, storage.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and short circuits. Thermal switches and RPM sensing fans protect against thermal overload. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

ARC QUENCH:
An arc quench feature provides sensing of each load arc and quickly inhibits the HV output for approximately 20 ms after each arc.

ARC COUNT:
Internal circuitry senses the number of arcs caused by external load discharges. If the rate of consecutive arcs exceeds approximately one arc per second for five arcs, the supply will turn off for approximately 5 seconds to allow clearance of the fault.

EXTERNAL INTERLOCK:
Open = off, closed = on. Normally latching except for blank front panel version where it is non-latching.

FRONT PANEL ELEMENTS:
The front panel contains all local control functions. These control functions are: AC power on/off switch and pilot light, separate 10-turn controls with locking vernier dials used to set voltage and current levels, HIGH VOLTAGE ON switch, and HIGH VOLTAGE OFF/RESET switch. LED's indicate when high voltage is on, output polarity, and whether the supply is operating in a voltage or current regulating mode. Output levels are indicated by voltage and current digital meters.

REAR PANEL ELEMENTS:
AC power entry terminal strip, fuses, power on indicator, ground stud, HV output connector, current limit/current trip switch, and remote interface terminal strip.

The signals provided on the remote interface terminal strip are as follows:

- **Inputs:** Safety interlock, output voltage and current program signals, and high voltage enable.
- **Outputs:** Output voltage and current monitor signals, and a +10 V reference source.

Signal common and ground reference terminals are also provided.

REMOTE HV ENABLE/DISABLE:
0 - 1.5 V = OFF, 2.5 - 15 V = ON.

ACCESSORIES:
Detachable, 8 foot, shielded Dielectric Sciences DS2124 high voltage coaxial cable provided.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

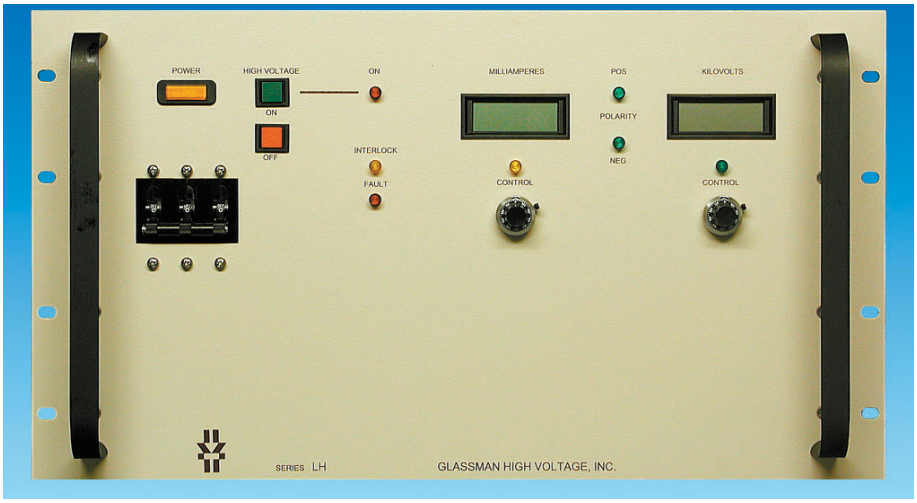
Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage (kV)	Output Current (mA)	Stored Energy (Joules)
LK40P75	LK40N75	LK40R75	0 - 40 kV	0 - 75 mA	8
LK50P60	LK50N60	LK50R60	0 - 50 kV	0 - 60 mA	10
LK60P50	LK60N50	LK60R50	0 - 60 kV	0 - 50 mA	12
LK70P43	LK70N43	LK70R43	0 - 70 kV	0 - 43 mA	14
LK80P37	LK80N37	LK80R37	0 - 80 kV	0 - 37.5 mA	16
LK100P30	LK100N30	LK100R30	0 - 100 kV	0 - 30 mA	20

LH Series
5 kW Regulated High Voltage DC Power Supplies
1 kV to 100 kV
Rack Mount
CE Compliant

The LH family of power supplies are sophisticated, 5 kW, high voltage power supplies with low ripple and noise. They are air insulated, fast response units, with tight regulation. ArcQuench and Arc Sense are features that make the LH series Ideal for Dynamic load environments.

The LH Series are fully compliant with the European Harmonized EMI Directive EN50082-2 and with the European Low Voltage (Safety) Directive, 73/23/EEC.



Dimensions: 10.5"H x 24.0"D x 19" Rack, 60 lbs.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

INPUT:

187-264V RMS, 3-phase, 48-63 Hz, 6500 VA maximum at full load. Less than 20 A/per phase. at 208 VAC. A five position rear terminal block with protective cover is provided.

EFFICIENCY:

Typically greater than 85% at full load.

OUTPUT:

Continuous, stable, adjustment from 0 to rated voltage or current by panel mounted 10-turn potentiometers with 0.05% resolution, or by external 0 to 10 V signals is provided. Linearity is < 1% of rated. Voltage Accuracy is 0.5% of setting + 0.2% rated.

STATIC VOLTAGE REGULATION:

Better than ±0.005% for specified line variations and 0.01% for no load to full load variations.

DYNAMIC VOLTAGE REGULATION:

For load transients from 10% to 99% and 99% to 10%, typical deviation is less than 2% of rated output voltage with recovery to within 1% in 500 µs and recovery to within 0.1% in 1 ms.

RIPPLE:

Better than 0.05% RMS of rated voltage at full load.

CURRENT REGULATION:

When in current regulation mode, better than 0.1%, with 8-100kV models better than 0.2%, from short circuit to rated voltage at any load condition. When in current trip mode the HV output will disable and latch off when the load current reaches the programmed current level. Reset is accomplished by either cycling the AC power or HV ON/OFF buttons, or by toggling the HV enable signal. A switch located on the rear panel allows the selection of current limit modes: constant current, or current trip.

VOLTAGE MONITOR:

0 to +10 V equivalent to 0 to rated voltage. Accuracy, 0.5% reading + 0.2% rated. Impedance is 10 K.

CURRENT MONITOR:

0 to +10 V equivalent to 0 to rated current. Accuracy: 1 kV to 6 kV: 1.5% of setting plus 0.5% of rated output.8 kV to 100 kV: 1% of setting plus 0.2% of rated output. Output impedance is 10K Ohm differentially coupled.

continued on next page

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy	Output Cable
Reversible Only		LH1R5.0	0 - 1kV	0 - 5.0A	3.5	RG-8U
		LH1.5R3.3	0 - 1.5kV	0 - 3.3A	5.5	RG-8U
		LH2R2.5	0 - 2kV	0 - 2.5A	3.8	RG-8U
		LH3R1.7	0 - 3kV	0 - 1.7A	5.5	RG-8U
		LH5R1.0	0 - 5kV	0 - 1.0A	3.5	RG-8U
		LH6R830	0 - 6kV	0 - 830mA	5	RG-8U
LH8P625	LH8N625	LH8R625	0 - 8kV	0 - 625mA	6	RG-8U
LH10P500	LH10N500	LH10R500	0 - 10kV	0 - 500mA	7.5	RG-8U
LH12P420	LH12N420	LH12R420	0 - 12kV	0 - 420mA	11	RG-8U
LH15P330	LH15N330	LH15R330	0 - 15kV	0 - 330mA	7	RG-8U
LH20P250	LH20N250	LH20R250	0 - 20kV	0 - 250mA	10	RG-8U
LH25P200	LH25N200	LH25R200	0 - 25kV	0 - 200mA	7	DS2124
LH30P170	LH30N170	LH30R170	0 - 30kV	0 - 170mA	11	DS2124
LH40P125	LH40N125	LH40R125	0 - 40kV	0 - 125mA	14	DS2124
LH50P100	LH50N100	LH50R100	0 - 50kV	0 - 100mA	18	DS2124
LH60P83	LH60N83	LH60R83	0 - 60kV	0 - 83mA	21	DS2124
LH70P72	LH70N72	LH70R72	0 - 70kV	0 - 72mA	25	DS2124
LH80P63	LH80N63	LH80R63	0 - 80kV	0 - 63mA	28	DS2124
LH100P50	LH100N50	LH100R50	0 - 100kV	0 - 50mA	35	DS2124

USA *(908) 638-3800 • FAX (908) 638-3700*
sales@glassmanhv.com

VOLTAGE RISE/DECAY TIME CONSTANT:
(Typical using either HV enable or remote programming control and a resistive load.)
1-6 kV: t = 50 ms with TBD% min. load.
8-20 kV: t = 50 ms with 9% min. load.
25-100 kV: t = 200 ms with 7% min load.

TEMPERATURE COEFFICIENT:
0.01%/ºC.

AMBIENT TEMPERATURE:
-20 to +40ºC,operating;
-40 to +85ºC, storage.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and short circuits. Thermal switches and RPM sensing fans protect against thermal overload. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

ARC QUENCH:
Optional on models 1 kV through 6 kV; standard on models 8 kV through 100 kV. An arc quench feature provides sensing of each load arc and quickly inhibits the HV output for approximately 20 ms after each arc.

ARC COUNT:
Optional on models 1 kV through 6 kV; standard on models 8 kV through 100 kV. Internal circuitry senses the number of arcs caused by external load discharges. If the rate of consecutive arcs exceeds approximately one arc per second for five arcs, the supply will turn off for approximately five seconds to allow clearance of the fault. After this period, the supply will return automatically to the programmed output voltage value with the voltage rise time constant indicated. If the load fault still exists, the above cycle will be repeated

EXTERNAL INTERLOCK:
Open = off, closed = on. Normally latching except for blank front panel version where it is non-latching.

FRONT PANEL ELEMENTS:
The front panel contains all local control functions. These control functions are: AC power on/off circuit breaker and indicator light, separate 10-turn controls with locking vernier dials used to set voltage and current levels, HIGH VOLTAGE ON switch, and HIGH VOLTAGE OFF/RESET switch. LED's indicate: when high voltage is on, output polarity, interlock, fault status, and whether the supply is operating in a voltage or current regulating mode. Output levels are indicated by voltage and current digital meters.

REAR PANEL ELEMENTS:
AC power entry terminal strip, power on indicator, ground stud, HV output connector current limit/current trip switch, remote interface terminal strip and connector.

PK Series 4/8/12/15 kW Regulated DC High Voltage Power Supplies

Models 8 kW and higher are obtained by paralleling 4 kW models in a "master/slave" configuration. Slave panels have separate AC power inputs and switches, and annunciators for power on, tracking, overvoltage, and bias. Models from 0 to 3 kV through 0 to 500 kV.

Specifications.

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

AC INPUT:
4,8 kW models: 3-phase 187-228V RMS , 48-63 Hz fused for 20 A (per 4 kilowatt module). Output power derated for line unbalance > 2%. 5-position terminal block (1 position not used) with protective cover. Fused for 20 A, phase or line. 8 kW and higher models have an additional terminal block for each slave unit.

DC OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by means of panel mounted 10–turn potentiometers with 0.05% resolution, or by external 0-10 V signals. Repeatability better than 0.1% of full scale. Accuracy is 1% of rated + 1% of setting

VOLTAGE/CURRENT OUTPUT METERS:
Dual 3-1/2 digit LCDs with on/off damping, accuracy 1% fs + 1% rdg.; dual 10-segment bar-graphs.

VOLTAGE REGULATION:
Load, better than 0.01% for no load to full load variations; Line, better than ±0.01% over specified input range.

RIPPLE:
Better than 0.1% RMS of rated voltage at full load for models to 125 kV, better than 0.05% for models 150 kV and higher.

CURRENT REGULATION:
Load, better than +/- 0.1% + 100 µA from short circuit to rated voltage at any rated load condition; line, better than +/- 0.01% over specified input range.

STABILITY:
0.01% per hour after 1/2 hour warmup; 0.05% per 8 hours.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +50 degrees C, operating;
-40 to +85 degrees C, storage.

PROTECTION:
Automatic current regulation protection reduces output voltage as required for all arc, overload, and short circuit conditions. Fuses, surge-limiting resistors, and low stored energy provide the ultimate protection.

ACCESSORIES:
Detachable 8-foot shielded high voltage coaxial cable provided for models up to 125 kV (See models chart for cable type.) 8 kW and higher models, up to 125 kV, are provided with an additional coaxial cable for each slave unit. Harness and/or interconnection cables supplied for multi-chassis supplies. 25-pin D-subminiature connector provided for customer interface.

ANALOG MONITORS:
Current and voltage, 0 to 10 V, directly proportional, 10 k ohms +/-1% source impedance.

DIGITAL MONITOR SIGNALS:
4 functions; Milliampere Control, Kilovolt Control, High Voltage Enable, and No Fault. High active, TTL or 5 V CMOS compatible. Source, 1.0 mA at 2.5 V; sink, 2.6 mA at 0.4 V.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

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Models, 4 kW, Fully Enclosed

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		PK3R1300	0-3 kV	0-1300 mA	RG-59U	10.5 in.
		PK6R650	0-6 kV	0-650 mA	RG-58U	10.5 in.
PK8P450	PK8N450	PK8R450	0-8 kV	0-450 mA	DS2124	10.5 in.
PK10P400	PK10N400	PK10R400	0-10 kV	0-400 mA	DS2124	10.5 in.
PK12P330	PK12N330	PK12R330	0-12 kV	0-330 mA	DS2124	10.5 in.
PK15P260	PK15N260	PK15R260	0-15 kV	0-260 mA	DS2124	10.5 in.
PK20P200	PK20N200	PK20R200	0-20 kV	0-200 mA	DS2124	10.5 in.
PK30P130	PK30N130	PK30R130	0-30 kV	0-130 mA	DS2124	10.5 in.
PK40P100	PK40N100	PK40R100	0-40 kV	0-100 mA	DS2124	10.5 in.
PK50P80	PK50N80	PK50R80	0-50 kV	0-80 mA	DS2124	10.5 in.
PK60P65	PK60N65	PK60R65	0-60 kV	0-65 mA	DS2124	10.5 in.
PK75P50	PK75N50	PK75R50	0-75 kV	0-50 mA	DS2124	10.5 in.
PK80P50	PK80N50	PK80R50	0-80 kV	0-50 mA	DS2121	15.75 in.
PK100P40	PK100N40	PK100R40	0-100 kV	0-40 mA	DS2121	15.75 in.
PK125P30	PK125N30	PK125R30	0-125 kV	0-30 mA	DS2121	15.75 in.

Maximum weight is 62 lbs.to 75 kV, 85 lbs. to 125 kV.

Specifications… *continued*

OPTO-ISOLATED OUTPUT:

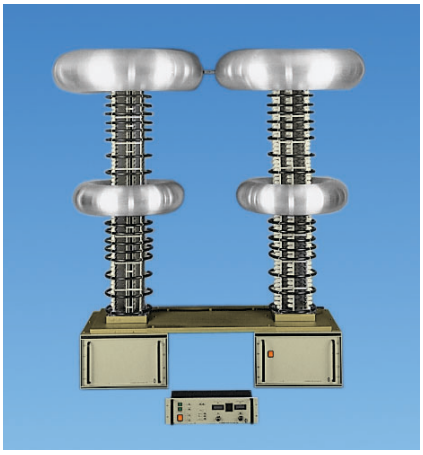
Opto-isolated NPN transistor output, controlled by any one of the digital monitor signals. Not to be used for high voltage isolation.

DIGITAL HV ON/OFF CONTROL:

2 inputs; Enable, to activate high voltage, switch selected, high on, low off and External, to disable high voltage, overrides local or remote enable, high for disable. External has 2 programmable modes, level-controlled interrupt or edge-triggered shutdown. Both inputs are TTL or 5 V CMOS compatible. Input active with 2-15 V signal. Impedance, 100 k ohms at 0-5 V, 10 k ohms at 15 V, approximate.

INTERLOCK:

Open off, closed on.



Typical Open Stack Configuration for Series PKCP and Series PK.

Models, 4 kW, Open Stack

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Panel Height	Stack Height
PK150P25	PK150N25	PK150R25	0-150 kV	0-25 mA	5.25 in.	35.1 in.
PK200P18	PK200N18	PK200R18	0-200 kV	0-18 mA	5.25 in.	40.1 in.
PK250P14	PK250N14	PK250R14	0-250 kV	0-14 mA	5.25 in.	45.9 in.
PK300P10	PK300N10	PK300R10	0-300 kV	0-10 mA	5.25 in.	60.2 in.
PK350P8	PK350N8	PK350R8	0-350 kV	0-8 mA	5.25 in.	68.6 in.
PK400P6	PK400N6	PK400R6	0-400 kV	0-6 mA	5.25 in.	68.6 in.

Maximum weight is 125 lbs.

Models, 8 kW, Fully Enclosed (for models to 15 kW, consult factory)

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		PK3R2600	0-3 kV	0-2600 mA	RG-59U	21 in.
		PK6R1300	0-6 kV	0-1300 mA	RG-58U	21 in.
PK8P900	PK8N900	PK8R900	0-8 kV	0-900 mA	DS2124	21 in.
PK10P800	PK10N800	PK10R800	0-10 kV	0-800 mA	DS2124	21 in.
PK12P660	PK12N660	PK12R660	0-12 kV	0-660 mA	DS2124	21 in.
PK15P520	PK15N520	PK15R520	0-15 kV	0-520 mA	DS2124	21 in.
PK20P400	PK20N400	PK20R400	0-20 kV	0-400 mA	DS2124	21 in.
PK30P260	PK30N260	PK30R260	0-30 kV	0-260 mA	DS2124	21 in.
PK40P200	PK40N200	PK40R200	0-40 kV	0-200 mA	DS2124	21 in.
PK50P160	PK50N160	PK50R160	0-50 kV	0-160 mA	DS2124	21 in.
PK60P130	PK60N130	PK60R130	0-60 kV	0-130 mA	DS2124	21 in.
PK75P100	PK75N100	PK75R100	0-75 kV	0-100 mA	DS2124	21 in.
PK80P100	PK80N100	PK80R100	0-80 kV	0-100 mA	DS2121	31.5 in.
PK100P80	PK100N80	PK100R80	0-100 kV	0-80 mA	DS2121	31.5 in.
PK125P60	PK125N60	PK125R60	0-125 kV	0-60 mA	DS2121	31.5 in.

Maximum weight is 125 lbs. to 75 kV, 170 lbs. to 125 kV.

Models, 8 kW, Open Stack

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Panel Height	Stack Height
PK150P50	PK150N50	PK150R50	0-150 kV	0-50 mA	5.25 in.	35.1 in.
PK200P36	PK200N36	PK200R36	0-200 kV	0-36 mA	5.25 in.	40.1 in.
PK250P28	PK250N28	PK250R28	0-250 kV	0-28 mA	5.25 in.	45.9 in.
PK300P20	PK300N20	PK300R20	0-300 kV	0-20 mA	5.25 in.	60.2 in.
PK350P16	PK350N16	PK350R16	0-350 kV	0-16 mA	5.25 in.	68.6 in.
PK400P12	PK400N12	PK400R12	0-400 kV	0-12 mA	5.25 in.	68.6 in.

Maximum weight is 200 lbs.

SH Series 8 kW to 40 kW Regulated High Voltage DC Power Supplies

1 kV to 100 kV

Rack Mount

CE and Semi S2-93 Compliant

The SH family of "Master/slave" power supplies are sophisticated, 8 kW through 40 kW, high voltage power supplies with low ripple and noise. They are air insulated fast response units with tight regulation and extremely low arc discharge currents. ArcQuench and Arc-sense features make the SH ideal for Vacuum processing related applications.

Dimensions: 8kW models are 17.5"H x 24.0"D, 110 lbs.

Specifications

(From 5% to 100% rated voltage. All units operate down to zero output with very slight degradation of performance.)

(For 16 kW power supplies, unless otherwise indicated, the performance specification limits could be increased by a factor of up to 30%. For power supplies over 16 kW consult the factory.)

INPUT:
187-228 V rms, three-phase, 48-63 Hz, 11,500 VA maximum at full load (less than 35 A per phase). Inrush current is less than 45 A with a nominal decay time constant of 60 ms. Four 10-32 studs for AC line connection with a safety cover and strain relief are provided. For systems 16 kW and greater, a separate AC input connection is required for each additional slave chassis. Mains service must be protected with fuses or circuit breakers with a maximum rating of 125 A and a minimum interrupting capacity of 50,000 A.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by means of panel-mounted 10-turn potentiometers (0.05% resolution), or external 0 to +10 V signals. Repeatability better than 0.1% of setting.

VOLTAGE PROGRAMMING ACCURACY:
0.5% of setting + 0.2% of rated output. Resolution is a function of the programming method used. External voltage programming is differentially coupled with a maximum common mode voltage of ±3 VDC.

VOLTAGE REGULATION:
Better than ±0.005% for specified line variations and 0.01% + 10 mV/A for no load to full load variations.

CURRENT REGULATION:
1-6kV: Better than 0.5%, 8-100kV: Better than 0.2%

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 0.5% of reading + 0.2% of rating. Output impedance is 10 K Ohm differentially coupled.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy: 1 kV to 6 kV: 1.5% of setting plus 0.5% of rated output. 8 kV to 100 kV: 1% of setting plus 0.2% of rated output. Output impedance is 10 K Ohm differentially coupled.

RIPPLE:
Better than 0.025% of rated voltage +1 V RMS at full load.

STABILITY:
0.01% per hour after 1/2 hour warm-up, 0.05% per 8 hours.

VOLTAGE RISE TIME CONSTANT:
200 ms for 8 kV to 100 kV models and 50 ms for 1 kV to 6 kV models typical, using either HV enable or remote programming control.

VOLTAGE DECAY TIME CONSTANT:
Decay time constant is a function of the applied load. The decay time constant will be equal to the rise time constant with a minimum load of 5% of rated maximum.

continued on next page

8kW Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy (J)	Cable Output
Reversible Only		SH1R8.0	0 - 1kV	0 - 8 A	8	RG-8U
		SH1.5R5.3	0 - 1.5kV	0 - 5.3 A	7.8	RG-8U
		SH2R4.0	0 - 2kV	0 - 4.0 A	7.5	RG-8U
		SH3R2.7	0 - 3kV	0 - 2.7 A	8	RG-8U
		SH5R1.6	0 - 5kV	0 - 1.6 A	7	RG-8U
		SH6R1.3	0 - 6kV	0 - 1.3 A	8	RG-8U
SH8P1.0	SH8N1.0	SH8R1.0	0 - 8kV	0 - 1.0 A	10	RG-8U
SH10P800	SH10N800	SH10R800	0 - 10kV	0 - 800 mA	12	RG-8U
SH12P670	SH12N670	SH12R670	0 - 12kV	0 - 670 mA	17	RG-8U
SH15P530	SH15N530	SH15R530	0 - 15kV	0 - 530 mA	10	RG-8U
SH20P400	SH20N400	SH20R400	0 - 20kV	0 - 400 mA	18	RG-8U
SH25P320	SH25N320	SH25R320	0 - 25kV	0 - 320 mA	13	RG-8U
SH30P270	SH30N270	SH30R270	0 - 30kV	0 - 270 mA	18	RG-8U
SH40P200	SH40N200	SH40R200	0 - 40kV	0 - 200 mA	16	RG-8U
SH50P160	SH50N160	SH50R160	0 - 50kV	0 - 160 mA	20	RG-8U
SH60P130	SH60N130	SH60R130	0 - 60kV	0 - 130 mA	24	DS2121
SH70P110	SH70N110	SH70R110	0 - 70kV	0 - 110 mA	28	DS2121
SH80P100	SH80N100	SH80R100	0 - 80kV	0 - 100 mA	32	DS2121
SH100P80	SH100N80	SH100R80	0 - 100kV	0 - 80 mA	40	DS2121

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TEMPERATURE COEFFICIENT:
0.01%/° C.

AMBIENT TEMPERATURE:
-20 to +40° C, operating;
-40 to +85° C, storage.

POLARITY:
Available with either Positive, Negative, or Reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and short circuits. Thermal switches and rpm sensing fans protect against thermal overload. Circuit breaker, fuses, surge-limiting resistors, and low energy components provide ultimate protection.

ARC QUENCH:
Optional on models 1 kV through 6 kV; standard on models 8 kV through 100 kV. An arc quench feature provides sensing of each load arc and quickly inhibits the HV output for approximately 20 ms after each arc.

ARC COUNT:
Optional on models 1 kV through 6 kV; standard on models 8 kV through 100 kV. Internal circuitry senses the number of arcs caused by external load discharges. If the rate of consecutive arcs exceeds approximately one arc per second for five arcs, the supply will turn off for approximately five seconds to allow clearance of the fault. After this period, the supply will return automatically to the programmed output voltage value with the voltage rise time constant indicated. If the load fault still exists, the above cycle will be repeated.

CURRENT LIMIT:
In current limit mode the power supply will regulate the load current at the programmed current level with automatic crossover between voltage and current regulating modes.

CURRENT TRIP:
A switch located on the rear of the control panel assembly allows the selection of current limit or current trip operation. When the switch is set to current trip mode, the HV output will disable and latch off when the load current reaches the programmed current level. Reset is accomplished by either cycling the AC power, toggling the HV enable signal, or by pushing the HV off/reset and then the HV on switches.

FRONT PANEL ELEMENTS:
The front panel contains all local control functions and remote/local selector switches. These control functions are: AC power on/off circuit breaker and indicator light, separate 10-turn controls with locking vernier dials used to set voltage and current levels, high voltage on switch, and high voltage off/reset switch. LED's indicate: when high voltage is on, output polarity, interlock, fault status, and whether the supply is operating in a voltage or current regulating mode. Output levels are indicated by voltage and current digital meters. Remote/local switches are provided for voltage and current programming and HV on/off functions.

SLAVE FRONT PANEL ELEMENTS:
(When applicable). AC power breaker/switch and indicator. Bias, tracking (overvoltage), and thermal overload/low fan speed indicators. Slave current and voltage service test points.

REMOTE CONTROL INTERFACE:
All standard SH family power supplies provide a user's remote interface. The signals provided are:

INPUTS:
Safety interlock, output voltage and current program signals, high voltage enable and connections for remote HV on and off pushbuttons.

OUTPUTS:
Output voltage and current monitor signals, HV enable status, I/V regulation mode status, fault status, and a +10 V reference source. Signal common and ground reference terminals are also provided.

Toggle switches on the rear of the control chassis select either current limit or current trip operation and local or remote HV enable.

EXTERNAL INTERLOCK:
Open = off, closed = on. Normally latching except for "NC" option supplies where it is non-latching. The interlock indicator LED is lit when the interlock is open.

HV ENABLE:
REMOTE MODE:
0 - 1.5 V = OFF, 2.5 - 15 V = ON.

LOCAL MODE:
The HV output is permanently enabled. HV Enable, Fault and I/V Regulation Status: Each are a set of form "C" relay contacts.

ACCESSORIES:
Detachable, 8 foot, shielded high voltage coaxial cable provided. Models 16 kW and above are provided with an additional HV cable per slave module. A 25 pin D-subminiature connector for customer interface is provided. All chassis interconnection cables are provided.

CE Fully compliant with the European harmonized EMI directive, EN50082-2, and with the low voltage (safety) directive, 73/23/EEC. Line harmonics are within the European harmonized standard, EN61000-3-2 specifications.

16kW Models (For Models Greater Than 16 kW, Please Consult Factory.)

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy (J)	Cable Output
Reversible Only		SH1R16.0	0 - 1kV	0 - 16.0	16	2X RG-8U
		SH1.5R10.6	0 - 1.5kV	0 - 10.6	15.6	2X RG-8U
		SH2R8.0	0 - 2kV	0 - 8.0 A	15	2X RG-8U
		SH3R5.4	0 - 3kV	0 - 5.4 A	16	2X RG-8U
		SH5R3.2	0 - 5kV	0 - 3.2 A	14	2X RG-8U
		SH6R2.6	0 - 6kV	0 - 2.6 A	16	2X RG-8U
SH8P2.0	SH8N2.0	SH8R2.0	0 - 8kV	0 - 2.0 A	20	2X RG-8U
SH10P1.6	SH10N1.6	SH10R1.6	0 - 10kV	0 - 1.6 A	24	2X RG-8U
SH12P1.3	SH12N1.3	SH12R1.3	0 - 12kV	0 - 1.3 A	34	2X RG-8U
SH15P1.06	SH15N1.06	SH15R1.06	0 - 15kV	0 - 1.06 A	20	2X RG-8U
SH20P800	SH20N800	SH20R800	0 - 20kV	0 - 800 mA	36	2X RG-8U
SH25P640	SH25N640	SH25R640	0 - 25kV	0 - 640 mA	26	2X RG-8U
SH30P540	SH30N540	SH30R540	0 - 30kV	0 - 540 mA	36	2X RG-8U
SH40P400	SH40N400	SH40R400	0 - 40kV	0 - 400 mA	32	2X RG-8U
SH50P320	SH50N320	SH50R320	0 - 50kV	0 - 320 mA	40	2X RG-8U
SH60P260	SH60N260	SH60R260	0 - 60kV	0 - 260 mA	48	2X RG-8U
SH70P220	SH70N220	SH70R220	0 - 70kV	0 - 220 mA	56	2X DS2121
SH80P200	SH80N200	SH80R200	0 - 80kV	0 - 200 mA	64	2X DS2121
SH100P160	SH100N160	SH100R160	0 - 100kV	0 - 160 mA	80	2XDS2121

Ordering Notes:

Series:	Model:	Page:	Options:

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