HOËR KRAG

جهد عالي

ONAAK BIDUOTH

ВИСОКО НАПРЕЖЕНИЕ

VISOKI NAPON

VYSOKÉ NAPĚTÍ

HOOGSPANNING

MATAAS NA BOLTAHE

HAUTE TENSION

HOCHSPANNUNG

υψηλή τάση

מתח גבוה

MAGAS ÁRAM

ARDVOLTAS

ALTA TENSIONE

高圧

고전압

AUKŠTA ĮTAMPA

ВИСОКИ НАПОН

STERK STRØM

ÎNALTĂ TENSIUNE

ВЫСОКОЕ НАПРЯЖЕНИЕ

HIGH VOLTAGE

VISOKA NAPETOST

ALTO VOLTAJE

HÖGSPÄNNING

YÜKSEK VOLTAJ

ĐIỆN CAO THẾ

ВІСОКА НАПРУГА

VYSOKÉ NAPÄTIE

Spellman®
High Voltage Electronics Corporation

2010/2011
VOL 10 NO 1

POWER SUPPLY SELECTION GUIDE

SETTING THE STANDARD IN
HIGH VOLTAGE POWER CONVERSION

www.spellmanhv.com

YOUR PARTNER IN POWER

Spellman High Voltage Electronics

Setting the Standard

When manufacturers around the world require high-precision, well-regulated power, one name most often comes to mind: Spellman High Voltage. Over the past 60 years, Spellman has helped innovative system developers succeed by custom designing and manufacturing the best high voltage DC power supplies for their unique requirements.

Spellman's global direct sales and technical support professionals, and our specialized sales representatives, focus on adding value over the long term. They amplify our customers' voices within Spellman, ensuring that the right people are aware, the right resources are allocated and the right response is generated.

THE POWER IN YOUR SYSTEM

You can rely on the world's largest and most experienced high voltage engineering staff to design the best solutions for your system requirements. World-class project teams, experienced in specific applications and technologies, are dedicated not only to new designs but also to sustaining engineering throughout the life of each product.

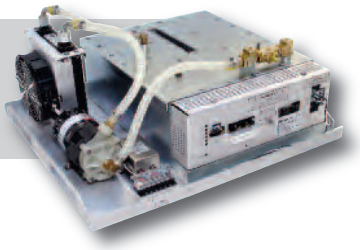
BROAD PRODUCT RANGE

We offer power converters with well regulated outputs from <62V to 500kV, and from <200mW to >200kW. High stability, extremely low ripple and low partial discharge features are available.

Our broad portfolio of field-validated designs may be used as is, or as platforms for custom designs, reducing cost and time to market.

INNOVATIVE DESIGNS

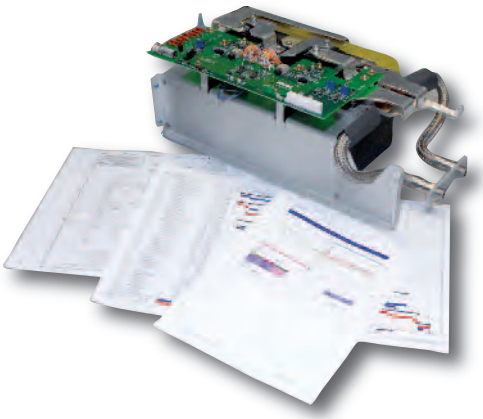
Our innovative circuit designs, proprietary processes and custom components are used to improve reliability, increase power density, reduce footprint and lower cost.



- Spellman holds important power conversion and control system patents.
- Extensive digital capabilities offer industry-leading control and communication protocols.
- Advanced insulation (RTV, epoxy, oil and air) and thermal management techniques allow for compact physical configurations while ensuring reliable performance.

SYSTEMATIC PROJECT MANAGEMENT

Consistent communication and disciplined adherence to project plans ensures that milestones are met and customers have the information they need to best manage their system development.



- Internal research and development programs achieve groundbreaking technical advances – without slowing down current development projects.
- State-of-the-art simulation and design software, engineering laboratories, and vertically integrated manufacturing resources, facilitate concurrent engineering and efficient and rapid completion of design projects.
- Extensive in-house testing, including HALT and HASS, verifies that our products meet or exceed customers' requirements for field reliability. Self-certification for CE and participation in UL's Client Test Data Program, provides a rapid and cost-effective path to regulatory compliance.
- Manufacturing and quality engineers, as well as supply chain representatives, participate in the Design for Excellence process (DFX). A disciplined manufacturing release process, beginning during the prototype and pre-production phases, creates efficient and clear work instructions facilitating transfer to low cost manufacturing centers as production ramps.
- Product specialists monitor in process and field performance to ensure continual improvement during the life of the product.

A POWERFUL LINK IN YOUR SUPPLY CHAIN

GLOBAL REACH

With the broadest range of products in our market and over 1000 employees located in North America, Europe and Asia, choosing Spellman makes it possible for many customers to reduce their vendor base. Our seven integrated manufacturing facilities permit us to locate production to minimize cost and support individual customer needs.

- Low-cost manufacturing centers in Mexico and China provide high quality products at competitive prices.
- Spellman's purchasing power and global supply chain alliances with superior vendors enables us to negotiate competitive pricing stocking and delivery programs.
- C-TPAT certification reduces international shipment transit times, as well as the risk of lengthy delays due to sudden increases in border security.

AGILITY

To service our high mix, build to order market, we have designed manufacturing processes that can respond quickly to changing customer demands.

- Lean manufacturing techniques such as value stream mapping, focused factories, mixed and single model cells, and visual control systems are some of the tools used to reduce cost and lead time.
- In-house expertise in sub-assembly manufacturing processes - including sheet metal fabrication, machining, welding and finishing, high voltage coil winding, printed circuit board assembly (surface mount and thru-hole) and encapsulation - increase control of quality, reduce time-to-market and permit quick reaction to design or market changes.

GENERATING
CONTINUOUS IMPROVEMENT

Spellman's quality system focuses on understanding and providing what our customers value. Lean and Six Sigma initiatives empower individuals and teams to conduct systematic root cause analyses, and implement effective corrective prevention measures.

- In 1994, Spellman demonstrated its long-standing commitment to rigorous standards of quality by becoming the first high voltage company to achieve ISO 9001 certification.

GLOBAL SERVICE CENTERS

Service centers in New York, Mexico, United Kingdom, China and Japan, provide local technical expertise and rapid response capability. Product specialists are always ready to visit our customers' sites.

ENVIRONMENTAL STEWARDSHIP

Spellman is committed to environmentally sustainable operations and compliance with international standards such as RoHS, WEEE and ISO14001.

BUSINESS CONTINUITY

Spellman's steady growth over 60 years has been built upon prudent financial and business risk management.

- Diversified clients and markets, manufacturing facilities in multiple locations with overlapping capabilities, a robust supply chain and corporate focus on business continuity planning, provide confidence that Spellman will remain a reliable, strategic business partner.

APPLICATIONS

MEDICAL

- Bone Densitometry
- CT Imaging
- Electroporation
- Gamma Cameras
- Immunocytology
- Lithotripsy
- Mammography
- PET Imaging
- Radiotherapy
- X-Ray Image Intensifiers

INDUSTRIAL & COMMERCIAL

- Cable Testing
- Capacitor Charging
- EB/IB Deposition
- Electron Beam Lithography
- Electrostatic Spraying
- Electrostatic Chucks
- Electrostatic Lenses
- Focused Electron Beam
- Focused Ion Beam
- Ion Beam Implantation
- Lasers
- Microwave Heating
- Printing
- Telecommunications Power Feed
- UV Curing
- Vacuum Deposition
- Vacuum Ion Pumps
- Wireline Logging

X-RAY ANALYSIS

- Baggage Screening
- Explosive Detection
- Food Inspection
- NDT
- Product Inspection
- Thickness Gauging
- X-Ray Diffraction
- X-Ray Fluorescence

BIOTECHNOLOGY

- Capillary Electrophoresis
- GC Mass Spectrometry
- Gel Electrophoresis
- ICP Mass Spectrometry
- LC Mass Spectrometry
- Photomultipliers
- Scanning Electron Microscopy
- TOF Mass Spectrometry
- UV Sterilization

Photo provided courtesy of Applied Biosystems.

All of our product families have configurable options and can be customized to suit your requirements.

- Modular supplies offer a single output up to 1200W in diverse form factors, and are designed to be integrated into systems, with either analog or digital control.
- Rack Mounted supplies, from 1U to 6U, provide single or multiple outputs and either full featured front panel controls, or a blank front with digital interfaces for integration in OEM systems.
- X-Ray Generators consist of integrated high voltage and filament power supplies and emission loop control circuitry. They may be modular or rack mounted. Monoblock® X-Ray Sources integrate an X-Ray tube with the generator and meet stringent radiation leakage requirements.
- Application specific products are designed to support the requirements of particular loads or systems.

PRODUCT INDEX

- ***OUTPUTS UP TO 15KV AT 1.5W OR 2.5W***
- ***COMPACT SIZE***
- ***LOW COST***
- ***ARC AND SHORT-CIRCUIT PROTECTION***
- ***POSITIVE OR NEGATIVE OUTPUTS***
- ***OUTPUT VOLTAGE PROPORTIONAL TO INPUT VOLTAGE***
- ***REVERSIBLE POLARITY MODULES AVAILABLE***
- ***ARC FLASHOVER PROTECTION***
- ***PCB MOUNTING***
- ***OEM CUSTOMIZATION AVAILABLE***

Spellman's MM Series of high voltage power supplies are low cost, general purpose, dc to dc converters with output voltages up to 15kV.

They are designed for direct PCB mounting. High reliability is incorporated into these compact and lightweight modular blocks intended for customer designed products at power levels up to 2.5W. The modules are fully encapsulated in an ABS box and may be wave soldered.

The MM Series can be used with an external resistor feedback loop to provide regulated outputs. See the following pages for application diagrams illustrating a range of voltage regulated circuits using the MM high voltage power supplies.

TYPICAL APPLICATIONS

Photomultiplier Tubes
Solid State Detectors
Flow Sensors
Analytical Instruments
Spectral Source Lamps
Ink Jet Printers
Gas Chromatography

OPTIONS

1.5W & 2.5W Modules

I	Input to Output Isolation
S	Screened Box
C	Continuous Short Circuit protection

1.5W Reversible Module

S	Screened Box
C	Continuous Short Circuit protection

Customer Special Versions

- Other input and output voltage modules can be supplied.
- Mechanical dimensions to meet customer requirements are always considered where standard modules are not suitable.
- Please call us to discuss your custom design requirements.

SPECIFICATIONS

Input Voltage:
9Vdc, 12Vdc, or 24Vdc. Other input voltages (6Vdc to 28Vdc) available upon special order.

Input Current:
Typically less than 1A at full output.

Output Voltage:
Maximum voltages between 300V and 15kV are available (see tables). Output voltage is proportional to the input voltage over the range 10% to 100%. Optionally, multiple outputs can also be supplied.

Output Power:
1.5W continuous; 3W peak
2.5W continuous; 5W peak

Output Ripple:
Less than 0.2% p-p

Load Regulation:
10% maximum.

Module Efficiency:
55% to 70%

Operating Frequency:
100kHz to 400kHz dependent on module type.

Dimensions:
Case Size A and E:
0.79″H x 1.57″W x 1.57″D (20mm x 40mm x 40mm).
Case Size B and F:
1.18″H x 1.97″W x 1.97″D (30mm x 50mm x 50mm).
Case Size C:
1.38″H x 1.97″W x 2.99″D (35mm x 50mm x 76mm).
Case Size D and G:
1.65″H x 2.99″W x 3.98″D (42mm x 76mm x 101mm).

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128019-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

MM 1.5W SELECTION TABLE

Model Number	Output V Vdc Max	Full Load I mA Average	Ripple(max) Vp-p	Case Size
MM0.3*1.5W	300	5.0	0.6	A
MM0.5*1.5W	500	3.0	1.0	A
MM1*1.5W	1,000	1.5	2.0	A
MM1.5*1.5W	1,500	1.0	3.0	A
MM2*1.5W	2,000	0.75	4.0	A
MM3*1.5W	3,000	0.5	6.0	A
MM5*1.5W	5,000	0.3	10.0	B
MM10*1.5W	10,000	0.15	20.0	C

*Specify "P" for positive polarity or "N" for negative polarity

MM 2.5W SELECTION TABLE

Model Number	Output V Vdc Max	Full Load I mA Average	Ripple(max) Vp-p	Case Size
MM0.5*2.5W	500	5.0	1.0	B
MM1*2.5W	1,000	2.5	2.0	B
MM2*2.5W	2,000	1.25	4.0	B
MM3*2.5W	3,000	0.83	6.0	B
MM5*2.5W	5,000	0.5	10.0	C
MM10*2.5W	10,000	0.25	20.0	D
MM15*2.5W	15,000	0.17	30.0	D

*Specify "P" for positive polarity or "N" for negative polarity

MM 1.5W REVERSIBLE SELECTION TABLE

Model Number	Output V Vdc Max	Full Load I mA Average	Ripple(max) Vp-p	Case Size
MM0.5PN	500	3.0	1.0	E
MM1PN	1,000	1.5	2.0	E
MM1.5PN	1,500	1.0	3.0	E
MM2PN	2,000	0.75	4.0	F
MM3PN	3,000	0.5	6.0	F
MM5PN	5,000	0.3	10.0	F
MM10PN	10,000	0.1	20.0	G

Note: Polarity is achieved by grounding the opposite output pin.

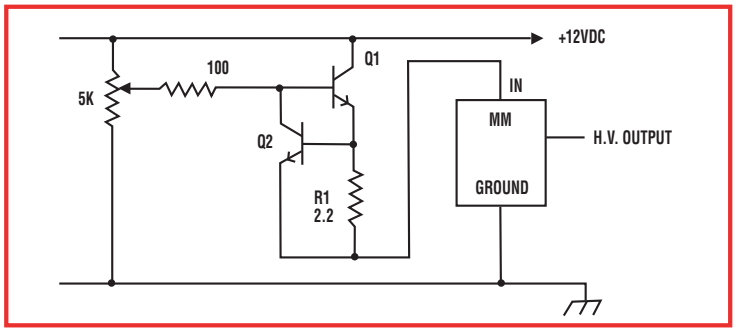
Shown here are some dc drive circuit ideas to regulate the high voltage output. It is always a good idea to incorporate current limiting as shown to allow for the occurrence of a continuous high voltage short circuit. This is sensed by R1 in the sample circuits.

NOTES

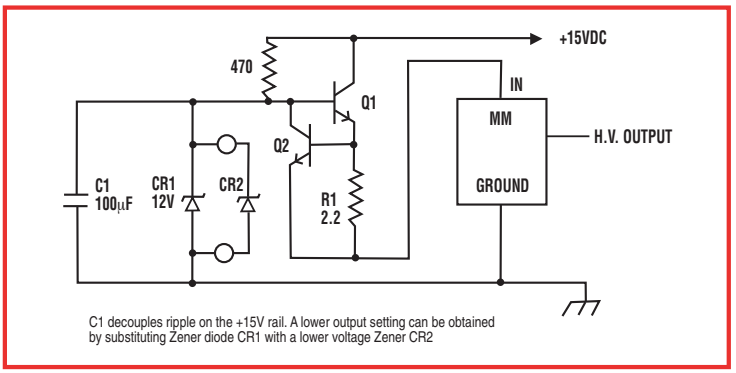
- The 1.5W MM module at full power draws a maximum of 250mA at 12V input (typically 180mA).
- The 2.5W MM module at full power draws a maximum of 380mA at 12V input (typically) 340mA).
- Output voltage is approximately proportional to the dc input voltage—allow for 1 to 2 volt drop across Q1.
- Transistor Q1 may need a heat sink
- The circuit shown in Circuit 3 is for positive output. Negative can be achieved with minimal changes in the circuit configuration.
- Please note that these circuits are suggestions only

APPLICATION NOTES

Circuit 1 This circuit allows control of the output voltage over its complete range and relies on a well regulated 12VDC Supply.

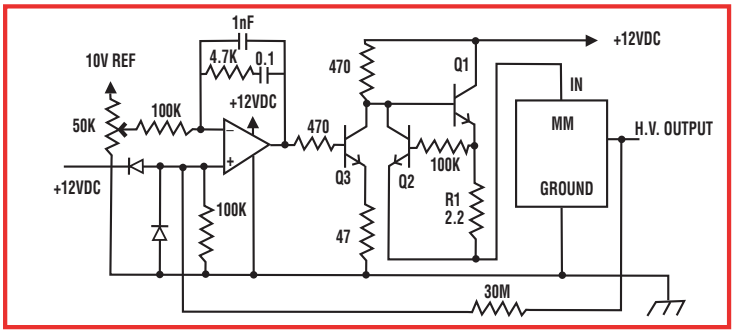


Circuit 2 This circuit is designed for fixed output voltages below the normal output voltage and has a line regulation of 5%/V (typical) change depending on the zener.

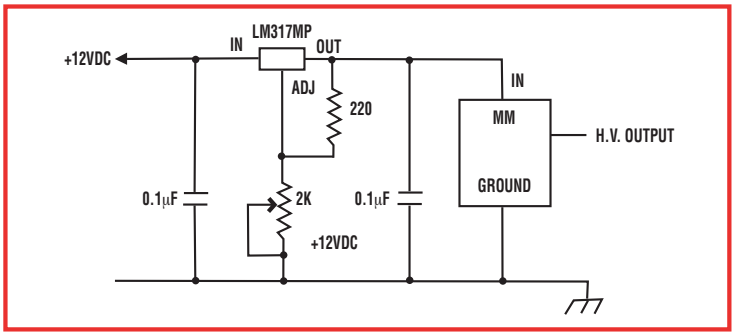


C1 decouples ripple on the +15V rail. A lower output setting can be obtained by substituting Zener diode CR1 with a lower voltage Zener CR2

Circuit 3 This circuit achieves a load regulation of 0.01% (typical) and a line regulation of 0.01% (typical) controlled over the complete range. (N.E. -positive output shown -see notes)

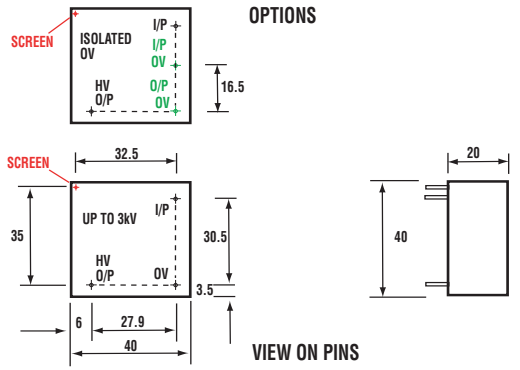


Circuit 4 This circuit allows for a full variable output voltage with a built-in current limit and achieves a line regulation of 0.05% (typical)

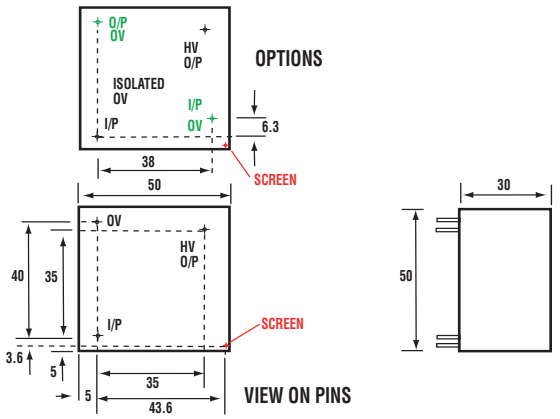


MODULES

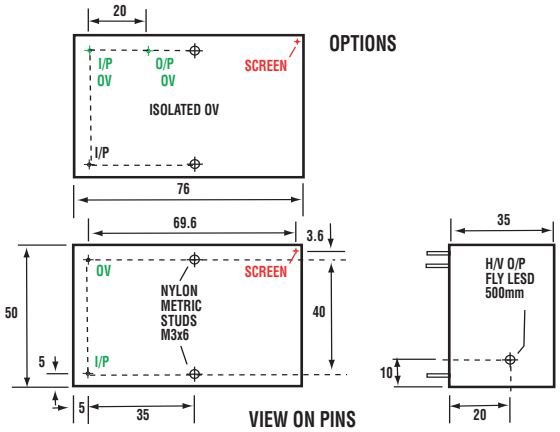
A



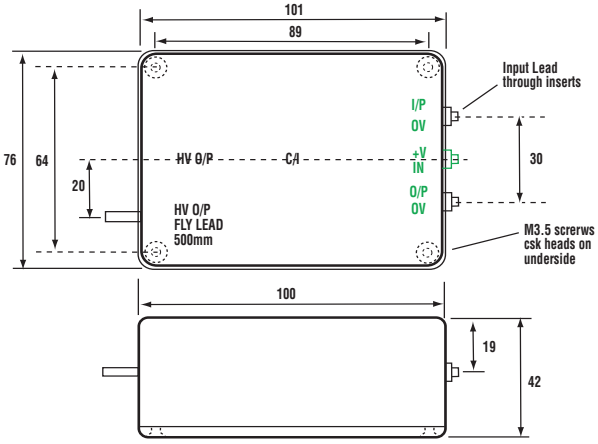
B



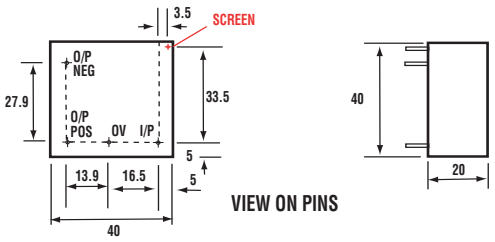
C



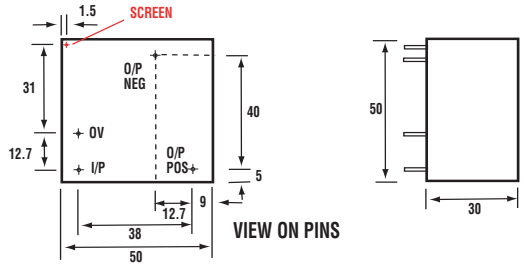
D



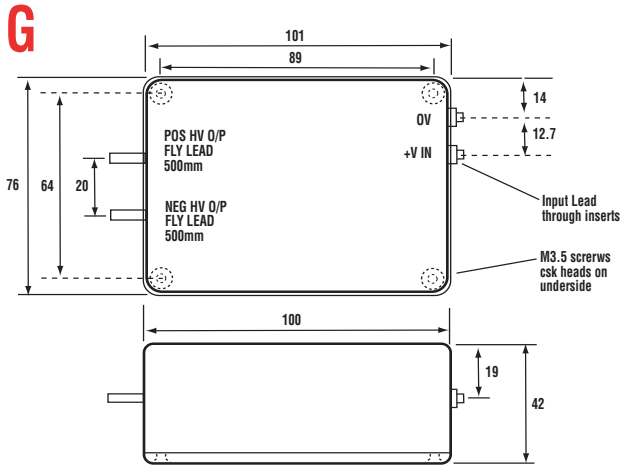
E



F



G



Standard configurations of housings for the MM Series modules.
Refer to case size reference in specifications on page 1.
Available options are shown in color; RED= Screen GREEN= Isolated I/P to O/P
Recommended hole size for pins- 1mm (case size A, B, E, F) 1.4mm (case size C.)

CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com

128019-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***LOW COST***
- ***OUTPUT VOLTAGES UP TO 3KV***
- ***3 WATTS POWER RATING***
- ***REMOTE CONTROL***
- ***POSITIVE OR NEGATIVE POLARITY***
- ***ARC AND CONTINUOUS SHORT-CIRCUIT PROTECTED***
- ***LOW STORED ENERGY***
- ***HIGH RELIABILITY***
- ***INTERNAL 5V REFERENCE AVAILABLE***
- ***OEM CUSTOMIZATION AVAILABLE***

Spellman's MS Modules have been designed for printed circuit board mounting with high reliability, small size and light weight. Each module provides 3W of output power to 3kV with well regulated low ripple, high stability and high voltage in a versatile, compact cost-effective design. The modules incorporate remote control and arc & short-circuit protection. Radiated pickup is eliminated by sealing each module in an aluminum enclosure.

TYPICAL APPLICATIONS

Photomultiplier Tubes
Precision Lenses
Image Intensifiers
Nuclear Instruments
Spectroscopy

OPTIONS

P Preset Output Voltage
C External Programming
I Isolated Input to Output
Isolation Voltage: 40V for units up to 1kV
100V for units >1kV

SPECIFICATIONS

Input Voltage:
+12Vdc ±1V. Other input voltages also available.

Input Current:
< 0.56A at full output.

Output Voltage:
Continuously adjustable over each entire range
Models available in either positive or negative polarity.
See table for voltage ranges.

Line Regulation:
< 0.005% for input change of 1 volt.

Load Regulation:
< 0.05% for 100µA to full load change. (at max. voltage)

Output Voltage Control:
Option to be set at factory. Either:
1) Preset output voltage
2) External control:
External potentiometer (5Kohm)
Remote voltage programming 0-5V gives 0 to full output

Output Power: 3W continuous.

Voltage Regulation:
Line: 0.005% for input change of 1 Volt.
Load: 0.05% for 100µA to full load change at maximum voltage.

Ripple: < 0.01% p-p of full output voltage.

Temperature:
Operating: 0°C to +50°C.
Storage: -35°C to +85°C.

Temperature Coefficient: 50ppm/°C typical.

Stability:
< 0.05%/8 hrs at constant operating conditions after one hour warm-up.

Humidity: 0 to 90% non-condensing.

Dimensions:
Up to 1000Vdc:
.87"H x 2.1"W x 3.1"D (23mm x 53mm x 78mm).
1000V to 3000Vdc:
1.1"H x 2.36"W x 4.2"D (28mm x 60mm x 106mm).

Weight:
Up to 1000V: 0.2lb (80g).
Over 1000V: 0.4lb (160g).

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

MS SELECTION TABLE

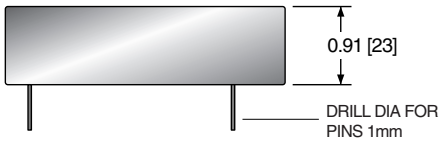
OUTPUT VOLTAGE (V)	OUTPUT CURRENT (mA)	RIPPLE V (p-p)	MODEL
300	10	0.03	MS0.3*
500	6	0.05	MS0.5*
750	4	0.075	MS0.75*
1000	3	0.10	MS1*
1500	2	0.15	MS1.5*
2000	1.5	0.20	MS2*
2500	1.2	0.25	MS2.5*
3000	1	0.30	MS3*

*Specify "P" for positive polarity or "N" for negative polarity.

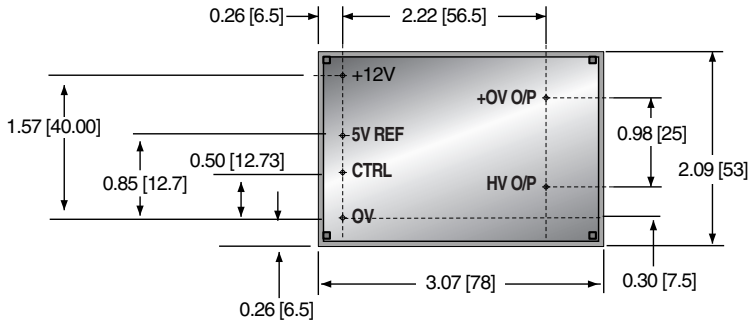
DIMENSIONS: in.[mm]

UNIT UP TO 1000V

SIDE VIEW

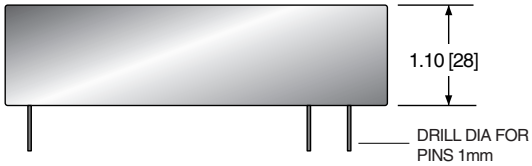


BOTTOM VIEW

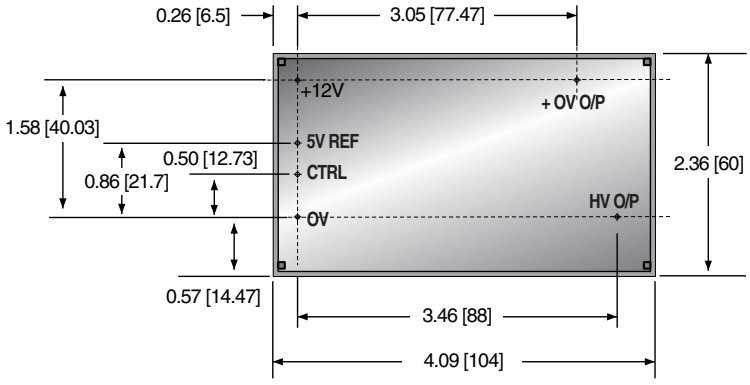


UNIT > 1000V UP TO 3000V

SIDE VIEW



BOTTOM VIEW



View on pins.
Recommended hole size
for terminals 1mm.

CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128018-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

MODULES

- ***500V TO 7.5KV @ 1.9 TO 4 WATTS***
- ***LOW COST MODULAR DESIGN***
- ***EXCELLENT STABILITY & REGULATION***
- ***LOW NOISE & RIPPLE***
- ***ARC & SHORT CIRCUIT PROTECTED***
- ***CE LISTED, UL RECOGNIZED AND RoHS COMPLIANT***

Spellman's Bertan brand of PMT modular high voltage power supplies offer well regulated, fixed polarity outputs up to 7.5kV, which operate off a low voltage DC input voltage. These fully enclosed modules are specifically designed with proprietary linear power conversion techniques to provide exceptionally low ripple and noise. The PMT is ideal for precision applications including: photomultiplier tubes, solid state detectors and ultrasonic transducers.

The output voltage can be controlled by either a local internal potentiometer or by a customer provided ground referenced signal for remote operation. Additionally a ground referenced output voltage monitor signal is provided. The PMT can be powered from either a single positive voltage source or a split ± voltage source, providing application flexibility.

TYPICAL APPLICATIONS

Photomultiplier tubes
Ultrasonic transducers
Solid state detectors

SPECIFICATIONS

Input Voltage:
Option 1: +24Vdc to +30Vdc @ 400mA
Option 3: ±12Vdc to ±18Vdc @ 400mA
specify "-1" (option 1) or "-3" (option 3) when ordering

Efficiency:
≈50%, typical

Output Polarity:
Positive or negative, specify at time of order

Output Voltage:
See "model selection" table

Output Current:
See "model selection" table

Output Power:
1.875W, 2W, 2.5W, 3W, 4W

Voltage Regulation:
Line: ±0.001% of rated output voltage for a +1% input line change
Load: ±0.001% of rated output voltage for a full load change

Ripple:
See "model selection" table

Stability:
≤0.005% per hour, 0.02% per 8 hours, after a 1/2 hour warm up

Accuracy:
Remote Programming ±(2% of setting, +0.5% of maximum)
Voltage Monitor ±2%

Temperature Coefficient:
≤50ppm/°C

Arc/Short Circuit:
All units are fully arc and short circuit protected and will limit continuous short circuit output current to less than 150% of maximum rated output current.

Operating Temperature
0°C to +50°C

Storage Temperature:
-40°C to +85°C

Humidity:
20% to 85% RH, non-condensing

Interface Connector:
12 position card edge connector, mate provided with unit

Output Connector:
A captive 24˝ (610mm) of RG-59B/U shielded cable, unterminated is provided

Cooling:
Convection cooled.

Dimensions:
3.875˝W X 1.25˝H X 6.3125˝D (98mm x32mm x 160mm)

Weight:
≤2.0 pounds (0.9kg)

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive. UL/CUL recognized, File E137710. Compliant to 2002/95/EC, RoHS

MODEL SELECTION TABLE

Model	Output Voltage	Output Current	Ripple (Vpp)
PMT-05C-P,N	0 to 500V	0 to 8mA	5mV
PMT-10C-P,N	0 to 1kV	0 to 4mA	4mV
PMT-20C-P,N	0 to 2kV	0 to 2mA	2mV
PMT-30C-P,N	0 to 3kV	0 to 1mA	6mV
PMT-50C-P,N	0 to 5kV	0 to 0.5mA	10mV
PMT-75C-P,N	0 to 7.5kV	0 to 0.25mA	100mV

Specify "P" for positive polarity or "N" for negative polarity

INTERFACE CONNECTOR

Signal	Parameters	Option 1 Pin Number	Option 3 Pin Number
+ Power Input	+24Vdc to +30Vdc or +12Vdc to +18Vdc	3&4	3 & 4 & 5
- Power Input	-12Vdc to -18Vdc	n/a	2 & 6
Ground	Ground	1 & 12	1 & 12
Voltage Monitor	See Voltage Monitor Table	11	11
+9Vdc Reference	+9.0Vdc, 10mA maximum	10	10
Voltage Program Input	0 to 9Vdc = 0 to 100% rated output, 100kΩ Zin	8	8
Local Voltage Program	Internal program potentiometer wiper, 0 to 9Vdc	9	9

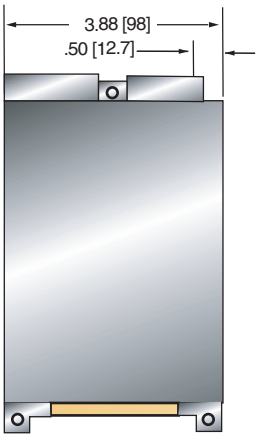
VOLTAGE MONITOR TABLE

Model	Signal Voltage	Signal Impedance
PMT-05C-P,N	0 to 5 volts	50k ohms
PMT-10C-P,N	0 to 1 volts	10k ohms
PMT-20C-P,N	0 to 2 volts	25k ohms
PMT-30C-P,N	0 to 3 volts	30k ohms
PMT-50C-P,N	0 to 5 volts	100k ohms
PMT-75C-P,N	0 to 7.5 volts	200k ohms

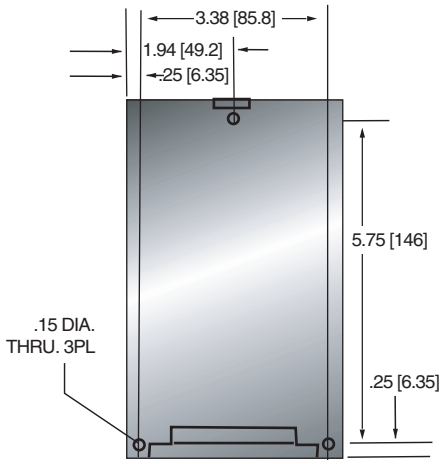
Note: The Voltage Monitor polarity matches the high voltage output polarity

DIMENSIONS: in.[mm]

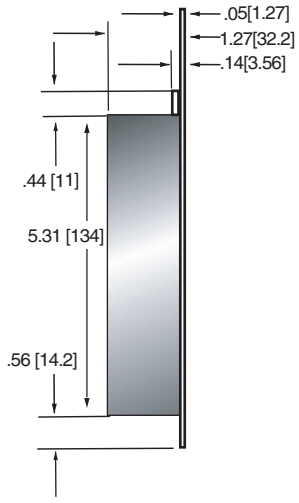
TOP VIEW



BOTTOM VIEW



FRONT VIEW



Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128040-001 REV. N
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- **8 VOLTAGE RANGES FROM 62.5V TO 6KV, FIXED NEGATIVE OR POSITIVE POLARITY**
- **AVAILABLE OUTPUT POWER INCREMENTS OF 4, 20 AND 30 WATTS**
- **VOLTAGE/CURRENT REGULATION WITH AUTOMATIC CROSSOVER CONTROL**
- **VOLTAGE AND CURRENT MONITOR SIGNALS**
- **FULLY ARC AND SHORT CIRCUIT PROTECTED**
- **PRECISION +5V REFERENCE OUTPUT**
- **COMPREHENSIVE STANDARD INTERFACE**
- **CE LISTED AND RoHS COMPLIANT**

www.spellmanhv.com/manuals/UM

Form, Fit and Function Design:
Spellman's UM Series of printed circuit board mountable, high voltage modules offer a form, fit and function replacement for presently available commercially made units, while providing additional features and benefits at competitive pricing. Utilizing proprietary power conversion technology and Spellman's six decades of high voltage experience, these SMT based high voltage modules provide improved performance/reliability and easier system integration at a lower cost when compared to the competition.

Advanced Power Conversion Topology:
UM converters use a proprietary zero voltage switching power conversion topology providing exceptional efficiency and inherent low noise and ripple. Radiated emissions are reduced compared to conventional switching topologies, minimizing or even eliminating the need to shield the unit from adjacent circuitry.

The high voltage output is generated using a ferrite core high voltage step up transformer which feeds the output circuitry. Units at 1kV or higher utilize an arrangement of half wave Cockcroft-Walton voltage multiplier stages to obtain the specified high voltage output, while lower voltage units use a robust rectification and filter circuit.

Due to the fixed, high frequency conversion rate the output capacitance is small resulting in minimal stored energy. Through the use of generously rated surge limiting resistors and a fast acting current loop, all units are fully arc and short circuit protected.

Control and Regulation:
The actual output voltage generated is sampled via a high impedance divider to create a voltage feedback signal. A current feedback signal is created via a current sense resistor in the low end return of the high voltage output circuitry. These two accurate ground referenced feedback signals are used to precisely regulate and control the units in addition to external monitoring purposes.

Due to the UM's unique converter topology it can provide full current into low impedance loads or even a short circuit. Standard units limit at 103% of maximum rated output current.

Standard Interface:
The Spellman UM Series interface provides current programming capability and positive polarity, buffered, low output impedance voltage and current monitor signals (zero to +4.64Vdc equals zero to full scale rated). A voltage programming input is provided where 0 to +4.64Vdc equals 0 to 100% of rated voltage.

Current programmability allows the user to set where the unit will current limit, anywhere from 0 to 100% of maximum rated current. This feature is beneficial where less than full output current is desired, like in the case of protecting a sensitive load.

The buffered low impedance voltage and current monitor signals can drive external circuitry directly, while minimizing loading and pickup effects. These features save the user the expense and implementation of external interface buffering circuitry while improving overall signal integrity.

This standard interface is made available via a row of 13 pins with 0.1″ pin spacing. A legacy interface (7 pins on a 0.2″ spacing) that is compatible with presently available commercially made units can be provided by ordering the "L" option.

Mechanical and Environmental Considerations:
The UM Series are solid encapsulated, printed circuit board mountable, plastic cased converters measuring only 2.97″ X 1.5″ X 0.83″ (75.4mm X 38.1mm X 21.1mm). All units are encapsulated using a silicon based potting material which is considerably lighter in weight than epoxy. Two isolated, non grounded 2-56 machine screws thread into the module to securely mount it to the printed circuit board, relieving any stress on the interface pins. Mounting plates, brackets and flanged mounting options are also available.

SPECIFICATIONS

Input Voltage:
12Vdc for 4W, 24Vdc for 20W and 30W

Nominal Voltage Range:
11Vdc to 30Vdc for 4W, 23Vdc to 30Vdc for 20W and 30W

Input Current: (typical)
Disabled: 30mA
No load: 90mA
Full load:
4 watt units: 0.5A
20 watt units: 1.0A
30 watt units: 1.5A

Efficiency:
80-85%, typical

Voltage Regulation:
Line: <0.01%
Load: <0.01%

Current Regulation:
Line: <0.01%
Load: <0.01%

Stability:
0.01% per 8 hours, 0.02% per day after 30 min. warmup

Accuracy:
2% on all programming and monitoring, except I Sense 10%

Temperature Coefficient: (typical)
Standard: 100ppm/°C
Optional: 25ppm/°C (T Option)

Environmental:
Temperature Range:
Operating: -40˚C to 65˚C case temperature
Storage: -55˚C to 105˚C, non operational
Humidity:
10% to 90%, non-condensing.

Dimensions:
2.96˝ L X 1.49˝ W X 0.81˝ H
(75.2mm X 37.9mm X 20.6mm)

Weight:
4 oz. (113g), typical

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive. UL/CUL recognized, File E227588. Compliant to 2002/95/EC, RoHS

UM 4W SELECTION TABLE

Model Number	Output V	Output Current	Low Freq. Ripple %Vp-p @ 1Hz-1kHz	High Freq. Ripple %Vp-p @ 1kHz-1MHz	Output Capacitance	Arc Limiting Resistance	I Sense Scaling Full Scale Signal	High Voltage Divider Resistance
UM0.062*4	0 to 62.5V	64mA	0.030	0.028	8.8µF	1Ω	1.5V	0.5MΩ
UM0.125*4	0 to 125V	32mA	0.045	0.014	8.8µF	4.4Ω	2.75V	0.88MΩ
UM0.25*4	0 to 250V	16mA	0.034	0.017	2.2µF	20Ω	4.9V	1.50MΩ
UM0.5*4	0 to 500V	8mA	0.036	0.040	0.8µF	94Ω	10.1V	2.65MΩ
UM1*4	0 to 1KV	4mA	0.025	0.015	0.2µF	470Ω	10.75V	20MΩ
UM2*4	0 to 2kV	2mA	0.022	0.015	0.097µF	1.0KΩ	10.4V	30MΩ
UM4*4	0 to 4kV	1mA	0.019	0.017	0.012µF	9.4KΩ	11.1V	100MΩ
UM6*4	0 to 6kV	0.67mA	0.016	0.015	0.007µF	20KΩ	9.9V	150MΩ

UM 20W SELECTION TABLE

Model Number	Output V	Output Current	Low Freq. Ripple %Vp-p @ 1Hz-1kHz	High Freq. Ripple %Vp-p @ 1kHz-1MHz	Output Capacitance	Arc Limiting Resistance	I Sense Scaling Full Scale Signal	High Voltage Divider Resistance
UM0.062*20	0 to 62.5V	320mA	0.060	0.088	8.8µF	1Ω	330mV	0.5MΩ
UM0.125*20	0 to 125V	160mA	0.067	0.044	8.8µF	4.4Ω	675mV	0.88MΩ
UM0.25*20	0 to 250V	80mA	0.035	0.019	2.2µF	20Ω	1.135V	1.50MΩ
UM0.5*20	0 to 500V	40mA	0.041	0.040	0.8µF	94Ω	2.25V	2.65MΩ
UM1*20	0 to 1KV	20mA	0.039	0.095	0.2µF	470Ω	4.35V	20MΩ
UM2*20	0 to 2kV	10mA	0.026	0.016	0.097µF	1.0KΩ	6.6V	30MΩ
UM4*20	0 to 4kV	5mA	0.023	0.028	0.012µF	9.4KΩ	6.65V	100MΩ
UM6*20	0 to 6kV	3.3mA	0.017	0.018	0.007µF	20KΩ	6.74V	150MΩ

UM 30W SELECTION TABLE

Model Number	Output V	Output Current	Low Freq. Ripple %Vp-p @ 1Hz-1kHz	High Freq. Ripple %Vp-p @ 1kHz-1MHz	Output Capacitance	Arc Limiting Resistance	I Sense Scaling Full Scale Signal	High Voltage Divider Resistance
UM0.062*30	0 to 62.5V	480mA	0.075	0.112	8.8µF	1Ω	500mV	0.5MΩ
UM0.125*30	0 to 125V	240mA	0.075	0.056	8.8µF	4.4Ω	930mV	0.88MΩ
UM0.25*30	0 to 250V	120mA	0.055	0.031	2.2µF	20Ω	1.65V	1.50MΩ
UM0.5*30	0 to 500V	60mA	0.085	0.041	0.8µF	94Ω	3.4V	2.65MΩ
UM1*30	0 to 1KV	30mA	0.032	0.171	0.2µF	220Ω	6.5V	20MΩ
UM2*30	0 to 2kV	15mA	0.031	0.112	0.097µF	470Ω	9.85V	30MΩ
UM4*30	0 to 4kV	7.5mA	0.028	0.071	0.012µF	4.4KΩ	9.85V	100MΩ
UM6*30	0 to 6kV	5mA	0.020	0.051	0.007µF	9.4KΩ	10.0V	150MΩ

Note: Total ripple is the sum of the low frequency and high frequency ripple. Grayed text indicates Legacy interface signals.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128068-001 REV. G
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

STANDARD INTERFACE

PIN	SIGNAL	PARAMETERS
1	Power Ground Return	+12Vdc or +24Vdc power return/HV return
1A	Signature Resistor	Unique Identifying resistor connected to ground
2	+ Power Input	+12Vdc or +24Vdc power input
2A	N/C	
3	I Sense	See I Sense text and tables
3A	I Mon	0 to 4.64Vdc = 0 to 100% rated output. Zout < 10kΩ
4	Enable Input	Low (<0.7V, Isink@1mA)=HV OFF, High (open or >2V)=HV ON
4A	V Mon	0 to 4.64Vdc = 0 to 100% rated output. Zout < 10kΩ
5	Signal Ground	Signal Ground
5A	I Pgm	0 to 4.64Vdc = 0 to 100% rated output. Zin > 47kΩ Leave open for preset current limit @103% of rated output current
6	Remote Adjust	Positive Polarity Unit: 0 to +4.64VDC = 0 to 100% rated voltage, Zin >1MΩ Negative Polarity Unit: +5VDC to 0.36V = 0 to 100% rated voltage, Zin >100kΩ Leave open if pin 6A (VPgm) is used for programming
6A	V Pgm	0 to 4.64Vdc = 0 to 100% rated voltage. Zin > 100kΩ Leave open if pin 6 (remote adjust) is used for programming
7	+5V Reference Output	+5Vdc ±1%, 25ppm/°C. Zout =475Ω
8	HV Ground Return	HV Ground Return
9	E Out Monitor	10:1 ratio for models below 1kV, 100:1 ratio for models 1kV and above. Polarity of Voltage Monitor signal equals polarity of unit. Accuracy is ±2%, 100ppm/°C. Calibrated with DVM with 10MΩ input impedance
10	HV Output	HV Output
11	HV Output	HV Output

Grayed out signals are provided for backward legacy compatability and their use is not required

Power Ground Return, Signal Ground and HV Ground Return are connected internally. For best performance they should not be connected externally.

LEGACY INTERFACE (L OPTION)

PIN	SIGNAL	PARAMETERS
1	Power Ground Return	+12Vdc or +24Vdc power return/HV return
2	+ Power Input	+12Vdc or +24Vdc power input
3	I Sense	See I Sense text and tables for details
4	Enable Input	Low (<0.7V, Isink@1mA)=HV OFF, High (open or >2V)=HV ON
5	Signal Ground	Signal Ground
6	Remote Adjust	Positive Polarity Unit: 0 to +4.64VDC = 0 to 100% rated voltage, Zin >1MΩ Negative Polarity Unit: +5VDC to 0.36V = 0 to 100% rated voltage, Zin >100kΩ
7	+5V Reference Output	+5Vdc ±1%, 25ppm/°C. Zout =475Ω
8	HV Ground Return	HV Ground Return
9	E Out Monitor	10:1 ratio for models below 1kV, 100:1 ratio for models 1kV and above. Polarity of Voltage Monitor signal equals polarity of unit. Accuracy is ±2%, 100ppm/°C. Calibrated with DVM with 10MΩ input impedance
10	HV Output	HV Output
11	HV Output	HV Output

Power Ground Return, Signal Ground and HV Ground Return are connected internally. For best performance they should not be connected externally.

Standard Interface Connections

Seventeen (17) gold plated 0.025˝ (0.64mm) square pins suitable for direct PCB mounting. See mechanical drawing for location and spacing details.

Programming and Monitor Signals

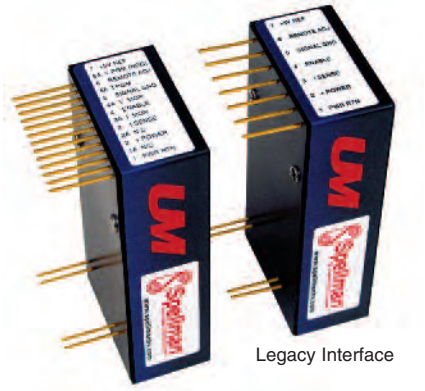
Voltage and current programming is done via positive polarity, high input impedance, 0 to 4.64Vdc signals. Voltage and current monitors are positive polarity, buffered low output impedance 0 to 4.64Vdc signals.

I Mon

The I Mon signal is a true output current monitoring signal. All internal offsets due to feedback divider currents have been compensated for.

Signature Resistor

A unique identifying signature resistor for each type of unit is connected from Pin 1A to ground. Details if desired are available upon request.



Legacy Interface

Standard Interface

Legacy Interface Connections

Eleven (11) gold plated 0.025˝ (0.64mm) square pins suitable for direct PCB mounting. See mechanical drawing for location and spacing details.

I Sense Signal

The polarity of the I Sense signal is opposite of the polarity of the output voltage of the unit that generated it. So a positive output polarity unit creates a negative polarity current monitor signal; while a negative output polarity unit creates a positive polarity current monitoring signal. This signal is clamped to ground internally via a bidirectional transient protection device and the signal is made available via a series connected 15kΩ isolation resistor. Internal HV dividers create a small, linear offset voltage on this current monitor signal that can be compensated for.

UM OPTIONS

C Option

Fast Rise Time Applications-

If applications demand a power supply that is optimized for fast rise time/low overshoot requirements, then the C Option should be considered. A Hysteretic control circuit is employed providing improved performance in these unique applications with higher ripple observed (1% Vpp typical). If used for capacitor charging, a Spellman Capacitor Charging Questionnaire should be filled out to assure all aspects of the intended usage is understood assuring the appropriate unit is provided. Speak to a Spellman sales person for more details.

T Option

Low Temperature Coefficient-

The T Option offers the UM with an improved temperature coefficient. The standard voltage feedback divider is replaced with one having a superior temperature coefficient, resulting in a unit with 25ppm/C° (typical) temperature coefficient.

Maximum short circuit discharge rate:

$$\frac{CV^2}{2}(f) < 1 \text{ watt}$$

C	= Output capacitance of unit
C ext	= External capacitance
V	= Maximum rated voltage
f	= Frequency of discharge
T	= Nominal output current
t_R	= Rise time

Typical Rise Time:

$$t_R = \frac{C + C\ ext}{I}(V)$$

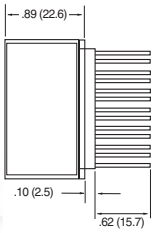
Minimum rise time is 3mS

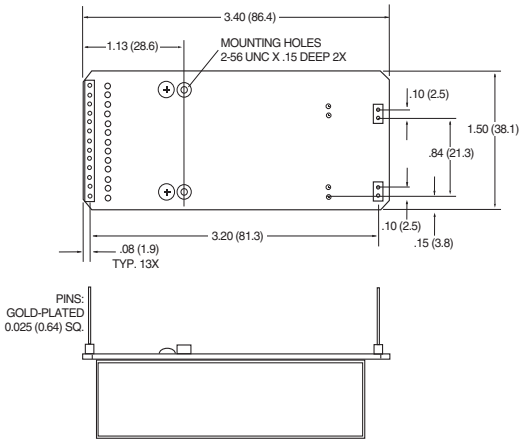
PHYSICAL INTERFACING

A Option

Adapter Board-

Spellman's UM module can be fitted with an adapter board that will allow a drop in replacement for other commercially available modules of a physically larger size, while providing identical functionality with superior performance.

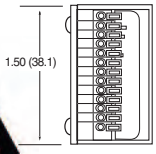


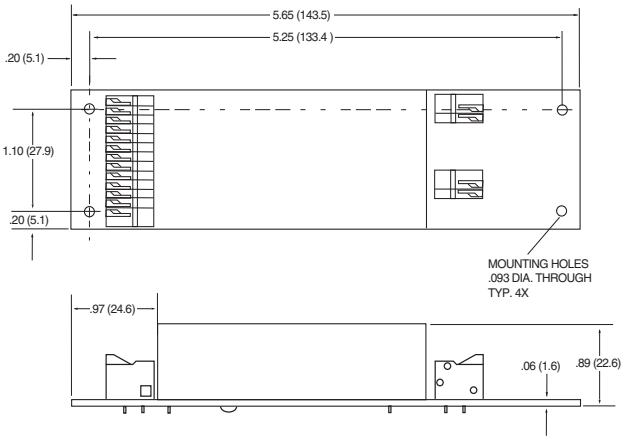


B Option

Terminal Block-

The B Option provides terminal block connections for both the customer interface and high voltage output/return. This feature can be helpful in situations where frequent wiring changes are anticipated, as in a testing or prototype environment.





SHIELDING

M Option

Mu Metal Shield-

UM modules can be fitted with an adhesive backed Mu Metal foil shield to help protect sensitive adjacent circuitry.

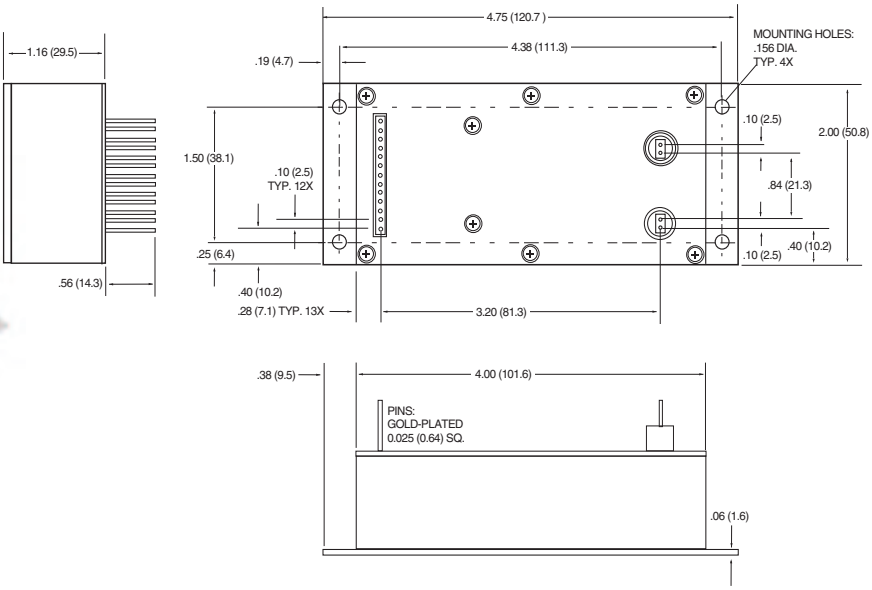
Same as standard unit.
See page 6 of 6 for dimensional drawings

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128068-001 REV. G
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

SHIELDING continued

S Option

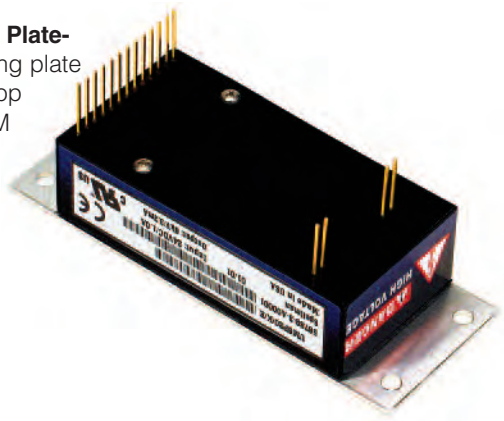
RF Tight Shielded Can-
The S Option mounts the UM module inside of a flanged RF tight aluminum can.

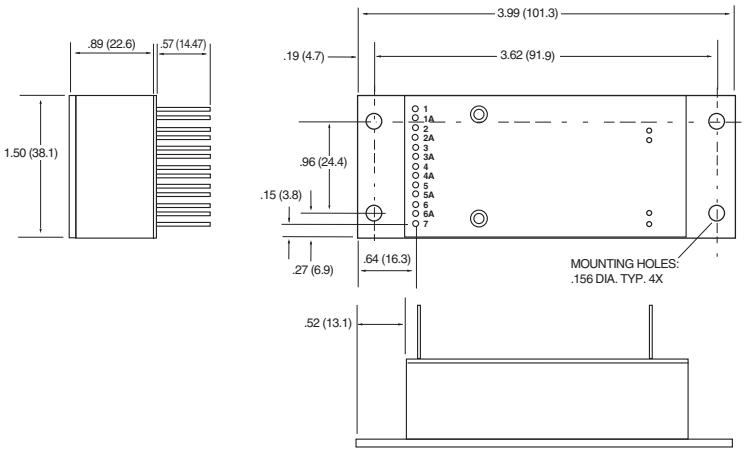


CHASSIS MOUNTING

E Option

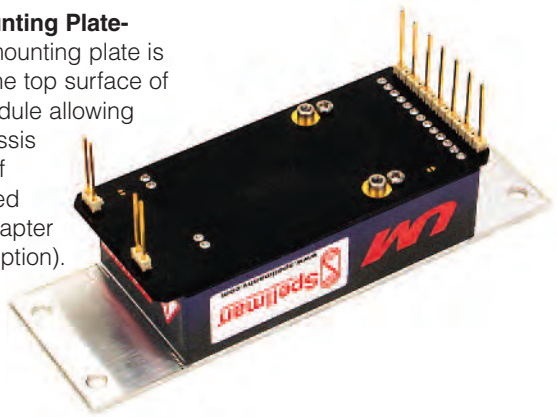
Eared Mounting Plate-
An eared mounting plate is affixed to the top surface of the UM module allowing simple chassis mounting of unit.

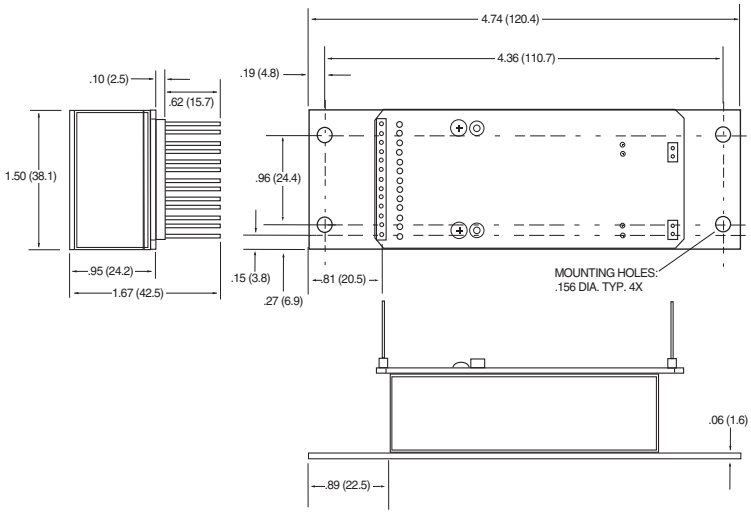




E2 Option

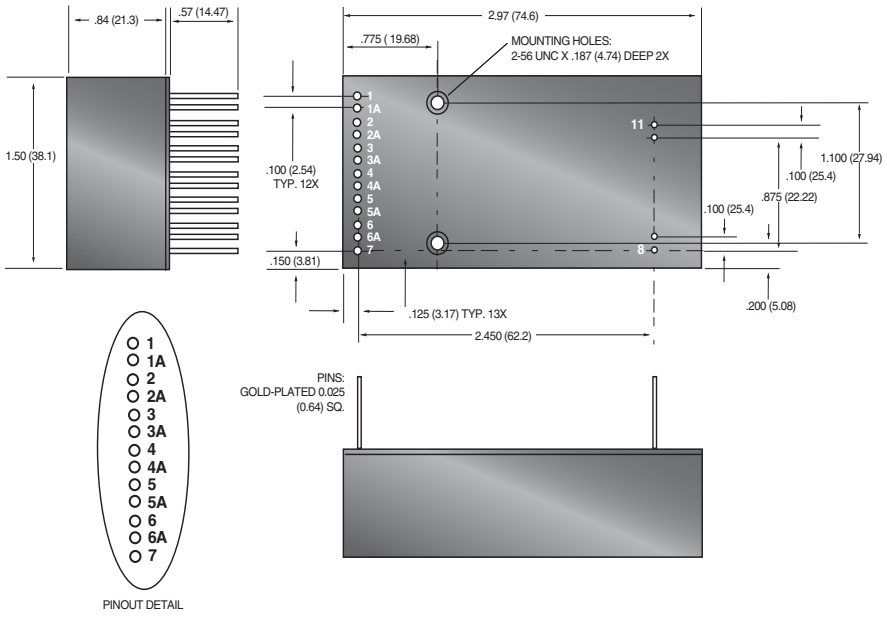
Eared Mounting Plate-
An eared mounting plate is affixed to the top surface of the UM module allowing simple chassis mounting of units ordered with the Adapter Board (A Option).



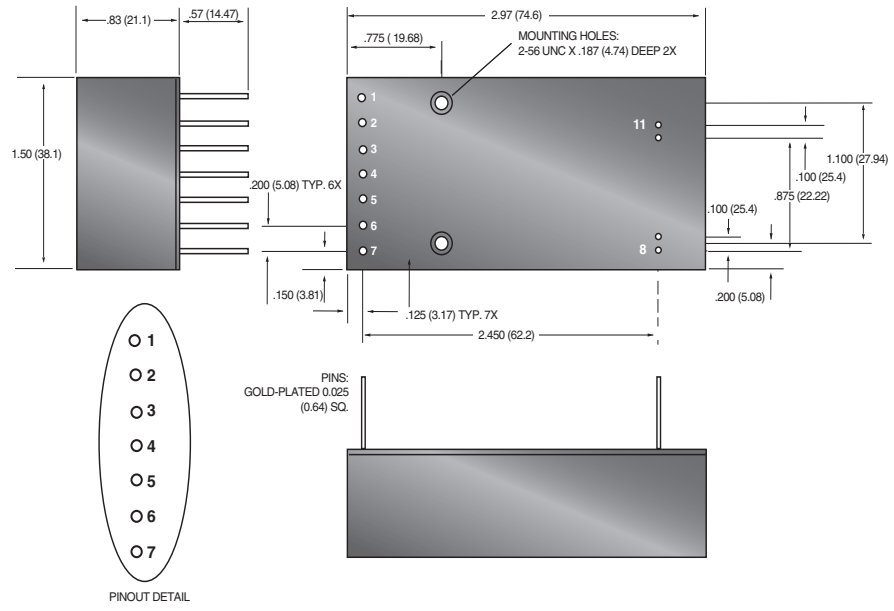


DIMENSIONS: in.[mm]

17 PIN - Standard Interface



11 PIN - Legacy Interface



ORDERING INFORMATION

Voltage	0 to 62.5Vdc	0.062
	0 to 125Vdc	0.125
	0 to 250Vdc	0.25
	0 to 500Vdc	0.5
	0 to 1000Vdc	1
	0 to 2000Vdc	2
	0 to 4000Vdc	4
	0 to 6000Vdc	6
Polarity	Positive	P
	Negative	N
Power	Watts Output	4
	Watts Output	20
	Watts Output	30

STANDARD UNIT ORDERING EXAMPLE

UM1N20

Model
Voltage
Polarity
Power

OPTION ORDERING INFORMATION

OPTION	OPTION CODE
Legacy Interface	L
Fast Rise Time	C
Low Temperature Coefficient	T
Adapter Board	A
Terminal Block	B
Mu Metal Shield	M
RF Tight Shielded Can	S
Eared Mounting Plate	E
Eared Mounting Plate/Adapter Board	E2

OPTION ORDERING EXAMPLE

UM4P30/L/E

Model
Voltage
Polarity
Power
Option
Option

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128068-001 REV. G
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- **6 VOLTAGE RANGES FROM 15KV TO 40KV, FIXED NEGATIVE OR POSITIVE POLARITY**
- **AVAILABLE OUTPUT POWER INCREMENTS OF 4, 15 AND 30 WATTS**
- **VOLTAGE/CURRENT REGULATION WITH AUTOMATIC CROSSOVER CONTROL**
- **VOLTAGE AND CURRENT MONITOR SIGNALS**
- **FULLY ARC AND SHORT CIRCUIT PROTECTED**
- **PRECISION +5V REFERENCE OUTPUT**
- **COMPREHENSIVE STANDARD INTERFACE**
- **CE LISTED AND RoHS COMPLIANT**

www.spellmanhv.com/manuals/UM15-40

Form, Fit and Function Design:
Spellman's UM Series of printed circuit board mountable, high voltage modules offer a form, fit and function replacement for presently available commercially made units, while providing additional features and benefits at competitive pricing. Utilizing proprietary power conversion technology and Spellman's six decades of high voltage experience, these SMT based high voltage modules provide improved performance/reliability and easier system integration at a lower cost when compared to the competition.

Advanced Power Conversion Topology:
UM converters use a proprietary zero voltage switching power conversion topology providing exceptional efficiency and inherent low noise and ripple. Radiated emissions are reduced compared to conventional switching topologies, minimizing or even eliminating the need to shield the unit from adjacent circuitry.

The high voltage output is generated using a ferrite core high voltage step up transformer which feeds a half wave Cockcroft-Walton voltage multiplier to obtain the specified high voltage output.

Due to the fixed, high frequency conversion rate the output capacitance is small resulting in minimal stored energy. Through the use of generously rated surge limiting resistors and a fast acting current loop, all units are fully arc and short circuit protected.

Control and Regulation:
The actual output voltage generated is sampled via a high impedance divider to create a voltage feedback signal. A current feedback signal is created via a current sense resistor in the low end return of the high voltage output circuitry. These two accurate ground referenced feedback signals are used to precisely regulate and control the units in addition to external monitoring purposes.

Due to the UM's unique converter topology it can provide full current into low impedance loads or even a short circuit. Standard units limit at 103% of maximum rated output current.

Standard Interface:
The Spellman UM Series interface provides current programming capability and positive polarity, buffered, low output impedance voltage and current monitor signals (zero to +4.64Vdc equals zero to full scale rated). A voltage programming input is provided where 0 to +4.64Vdc equals 0 to 100% of rated voltage.

Current programmability allows the user to set where the unit will current limit, anywhere from 0 to 100% of maximum rated current. This feature is beneficial where less than full output current is desired, like in the case of protecting a sensitive load.

The buffered low impedance voltage and current monitor signals can drive external circuitry directly, while minimizing loading and pickup effects. These features save the user the expense and implementation of external interface buffering circuitry while improving overall signal integrity.

This standard interface is made available via a row of 13 pins with 0.1″ pin spacing. A legacy interface (7 pins on a 0.2″ spacing) that is compatible with presently available commercially made units can be provided by ordering the "L" option.

Mechanical and Environmental Considerations:
The UM Series are solid encapsulated, printed circuit board mountable, plastic cased converters. All units are encapsulated using a silicon based potting material which is considerably lighter in weight than epoxy. Four isolated, non grounded 2-56 machine screws thread into the module to securely mount it to the printed circuit board, relieving any stress on the interface pins. Mounting plates, brackets and flanged mounting options are also available. High voltage output is provided via a 36″ (914.4mm) minimum length of appropriately rated high voltage wire.

SPECIFICATIONS

Input Voltage:
12Vdc for 4W, 24Vdc for 15W and 30W

Nominal Voltage Range:
11Vdc to 30Vdc for 4W, 23Vdc to 30Vdc for 15W and 30W
4W units can operate at 24Vdc input with no deratings or damage to unit

Input Current: (typical)
Disabled: 10mA @ 24Vdc
Full output, no load: 160mA @ 24Vdc, 300mA @ 12Vdc
Full output, full load:
4 watt units: 330mA @ 24Vdc, 640mA @ 12Vdc
15 watt units: 850mA @ 24Vdc
30 watt units: 1590mA @ 24Vdc

Voltage Regulation:
Line: <0.01%
Load: <0.01%

Current Regulation:
Line: <0.01%
Load: <0.01%

Stability:
0.01% per 8 hours, 0.02% per day after 30 min. warmup

Accuracy:
2% on all programming and monitoring, except I Sense 10%

Temperature Coefficient: (typical)
Standard: 100ppm/°C
Optional: 25ppm/°C (T Option)

Environmental:
Temperature Range:
Operating: -40°C to 65°C case temperature
Storage: -55°C to 105°C, non operational
Humidity:
10% to 90%, non-condensing.

Cooling:
Convection cooled, typical. 30 watt units operating at full power might require forced air cooling to maintain case temperature below 65°C

Dimensions:
15kV-20kV:
4.700˝L X 1.500˝W X 0.990˝H (119.38mm X 38.10mm X 25.03mm)
25kV-40kV:
6.960˝L X 1.600˝W X 1.14˝H (176.78mm X 40.84mm X 28.87mm)

Weight:
13.1 oz. (371g), typical

Output Cable:
UM15: TV20
UM20, UM25: TV30
UM30, UM35, UM40: TV40

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive. Compliant to 2002/95/EC, RoHS

UM 4W, 15kV TO 40kV SELECTION TABLE

Model Number	Output V	Output Current	Ripple(max) %Vp-p	Output Capacitance	Arc Limiting Resistance	I Sense Scaling Full Scale Signal	High Voltage Divider Resistance
UM15*4	0 to 15kV	0.266mA	0.05	3220pF	100kΩ	1.69V	400MΩ
UM20*4	0 to 20kV	0.2mA	0.05	2310pF	100kΩ	1.316V	550MΩ
UM25*4	0 to 25kV	0.16mA	0.05	1540pF	100kΩ	1.1V	800MΩ
UM30*4	0 to 30kV	0.133mA	0.05	1370pF	120kΩ	0.95V	900MΩ
UM35*4	0 to 35kV	0.115mA	0.05	1370pF	140kΩ	0.72V	900MΩ
UM40*4	0 to 40kV	0.1mA	0.05	1370pF	140kΩ	1.3V	900MΩ

UM 15W, 15kV TO 40kV SELECTION TABLE

Model Number	Output V	Output Current	Ripple(max) %Vp-p	Output Capacitance	Arc Limiting Resistance	I Sense Scaling Full Scale Signal	High Voltage Divider Resistance
UM15*15	0 to 15kV	1mA	0.05	3220pF	100kΩ	5.53V	400MΩ
UM20*15	0 to 20kV	0.75mA	0.05	2310pF	100kΩ	4.21V	550MΩ
UM25*15	0 to 25kV	0.6mA	0.05	1540pF	100kΩ	3.42V	800MΩ
UM30*15	0 to 30kV	0.5mA	0.05	1370pF	120kΩ	2.89V	900MΩ
UM35*15	0 to 35kV	0.429mA	0.05	1370pF	140kΩ	2.39V	900MΩ
UM40*15	0 to 40kV	0.375mA	0.05	1370pF	140kΩ	4.21V	900MΩ

UM 30W, 15kV TO 40kV SELECTION TABLE

Model Number	Output V	Output Current	Ripple(max) %Vp-p	Output Capacitance	Arc Limiting Resistance	I Sense Scaling Full Scale Signal	High Voltage Divider Resistance
UM15*30	0 to 15kV	2mA	0.06	3220pF	100kΩ	5.29V	400MΩ
UM20*30	0 to 20kV	1.5mA	0.06	2310pF	100kΩ	8.15V	550MΩ
UM25*30	0 to 25kV	1.2mA	0.06	1540pF	100kΩ	6.56V	800MΩ
UM30*30	0 to 30kV	1mA	0.06	1370pF	120kΩ	5.52V	900MΩ
UM35*30	0 to 35kV	0.857mA	0.05	1370pF	140kΩ	4.66V	900MΩ
UM40*30	0 to 40kV	0.75mA	0.05	1370pF	140kΩ	8.15V	900MΩ

Grayed text indicates Legacy interface signals.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128074-001 REV. C
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

STANDARD INTERFACE

PIN	SIGNAL	PARAMETERS
1	Power Ground Return	+12Vdc or +24Vdc power return/HV return
1A	Signature Resistor	Unique Identifying resistor connected to ground
2	+ Power Input	+12Vdc or +24Vdc power input
2A	N/C	
3	I Sense	See I Sense Monitor text and tables
3A	I Mon	0 to 4.64Vdc = 0 to 100% rated output. Zout < 10kΩ
4	Enable Input	Low (<0.7V, Isink@1mA)=HV OFF, High (open or >2V)=HV ON
4A	V Mon	0 to 4.64Vdc = 0 to 100% rated output. Zout < 10kΩ
5	Signal Ground	Signal Ground
5A	I Pgm	0 to 4.64Vdc = 0 to 100% rated output. Zin > 47kΩ Leave open for preset current limit @103% of rated output current
6	Remote Adjust	Positive Polarity Unit: 0 to +4.64VDC = 0 to 100% rated voltage, Zin >1MΩ Negative Polarity Unit: +5VDC to 0.36V = 0 to 100% rated voltage, Zin >100kΩ Leave open if pin 6A (VPgm) is used for programming
6A	V Pgm	0 to 4.64Vdc = 0 to 100% rated voltage. Zin > 100kΩ Leave open if pin 6 (remote adjust) is used for programming
7	+5V Reference Output	+5Vdc ±1%, 25ppm/°C. Zout =475Ω
8	HV Ground Return	HV Ground Return
9	E Out Monitor	1000:1 ratio. Polarity of Voltage Monitor signal equals polarity of unit. Accuracy is ±2%, 100ppm/°C. Calibrated with DVM with 10MΩ input impedance

Grayed out signals are provided for backward legacy compatability and their use is not required

Power Ground Return, Signal Ground and HV Ground Return are connected internally. For best performance they should not be connected externally.

LEGACY INTERFACE (L OPTION)

PIN	SIGNAL	PARAMETERS
1	Power Ground Return	+12Vdc or +24Vdc power return
2	+ Power Input	+12Vdc or +24Vdc power input
3	I Sense	See I Sense text and tables for details
4	Enable Input	Low (<0.7V, Isink@1mA)=HV OFF, High (open or >2V)=HV ON
5	Signal Ground	Signal Ground
6	Remote Adjust	Positive Polarity Unit: 0 to +4.64VDC = 0 to 100% rated voltage, Zin >1MΩ Negative Polarity Unit: +5VDC to 0.36V = 0 to 100% rated voltage, Zin >100kΩ
7	+5V Reference Output	+5Vdc ±1%, 25ppm/°C. Zout =475Ω
8	HV Ground Return	HV Ground Return
9	E Out Monitor	1000:1 ratio. Polarity of Voltage Monitor signal equals polarity of unit. Accuracy is ±2%, 100ppm/°C. Calibrated with DVM with 10MΩ input impedance

Power Ground Return, Signal Ground and HV Ground Return are connected internally. For best performance they should not be connected externally.

Standard Interface Connections

Fifteen (15) gold plated 0.025˝ (0.64mm) square pins suitable for direct PCB mounting. See mechanical drawing for location and spacing details.

Programming and Monitor Signals

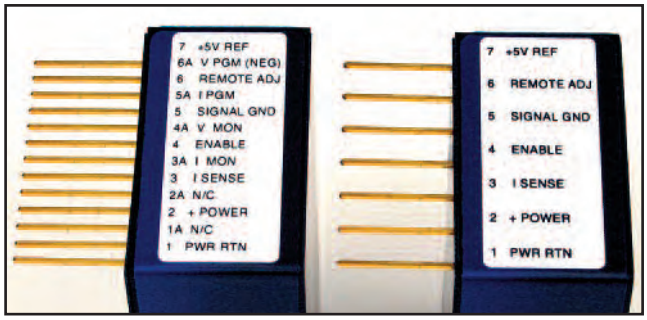
Voltage and current programming is done via positive polarity, high input impedance, 0 to 4.64Vdc signals. Voltage and current monitors are positive polarity, buffered low output impedance 0 to 4.64Vdc signals.

I Mon

The I Mon signal is a true output current monitoring signal. All internal offsets due to feedback divider currents have been compensated for.

Signature Resistor

A unique identifying signature resistor for each type of unit is connected from Pin 1A to ground. Details if desired are available upon request.



Standard Interface Legacy Interface

Legacy Interface Connections

Nine (9) gold plated 0.025˝ (0.64mm) square pins suitable for direct PCB mounting. See mechanical drawing for location and spacing details.

I Sense Signal

The polarity of the I Sense signal is opposite of the polarity of the output voltage of the unit that generated it. So a positive output polarity unit creates a negative polarity current monitor signal; while a negative output polarity unit creates a positive polarity current monitoring signal. This signal is clamped to ground internally via a bidirectional transient protection device and the signal is made available via a series connected 47kΩ isolation resistor. Internal HV dividers create a small, linear offset voltage on this current monitor signal that can be compensated for.

UM15-40 OPTIONS

C Option

Fast Rise Time Applications-

If applications demand a power supply that is optimized for fast rise time/low overshoot requirements, then the C Option should be considered. A Hysteretic control circuit is employed providing improved performance in these unique applications with higher ripple observed (1% Vpp typical). If used for capacitor charging, a Spellman Capacitor Charging Questionnaire should be filled out to assure all aspects of the intended usage is understood assuring the appropriate unit is provided. Speak to a Spellman sales person for more details.

T Option

Low Temperature Coefficient-

The T Option offers the UM with an improved temperature coefficient. The standard voltage feedback divider is replaced with one having a superior temperature coefficient, resulting in a unit with 25ppm/C° (typical) temperature coefficient.

Maximum short circuit discharge rate:

$$\frac{CV^2}{2}(f) < 1 \text{ watt}$$

C	= Output capacitance of unit
C ext	= External capacitance
V	= Maximum rated voltage
f	= Frequency of discharge
T	= Nominal output current
t_R	= Rise time

Typical Rise Time:

$$t_R = \frac{C + C\,ext}{I}(V)$$

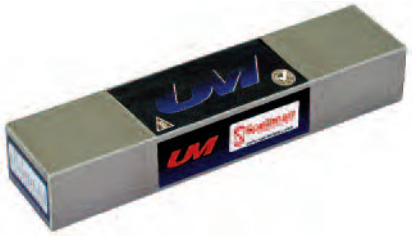
Minimum rise time is 3mS

SHIELDING OPTIONS

M Option

Mu Metal Shield-

UM modules can be fitted with an adhesive backed Mu Metal foil shield to help protect sensitive adjacent circuitry.

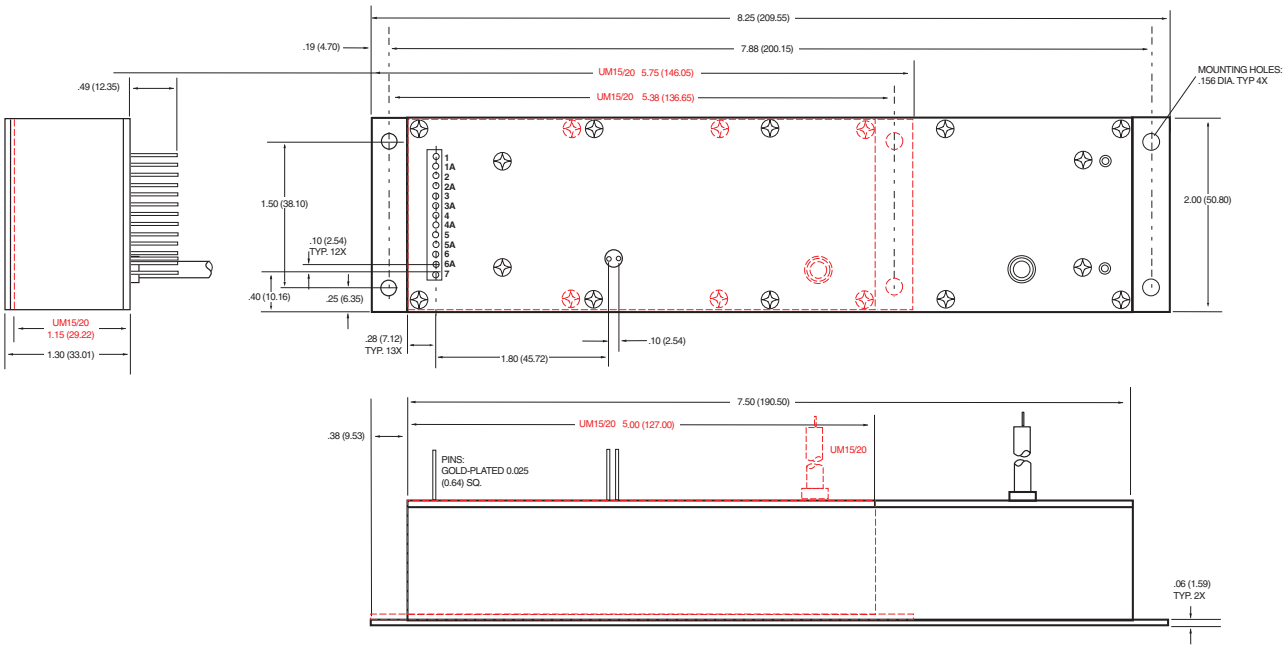


Same as standard unit.
See page 6 of 6 for dimensional drawings

S Option

RF Tight Shielded Can-

The S Option mounts the UM module inside of a flanged RF tight aluminum can.



Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128074-001 REV. C
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

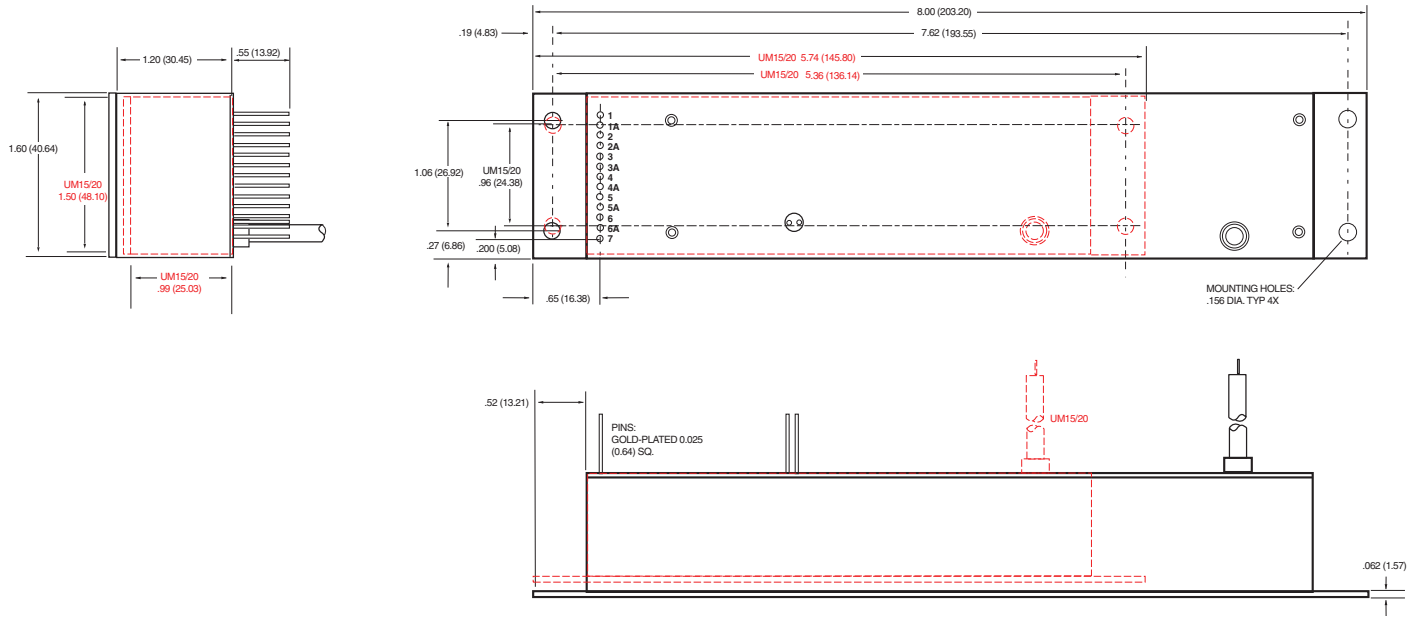
MODULES

CHASSIS MOUNTING OPTION

E Option

Eared Mounting Plate-

An eared mounting plate is affixed to the top surface of the UM module allowing simple chassis mounting of unit.



ORDERING INFORMATION

Voltage	0 to 15kV	15
	0 to 20kV	20
	0 to 25kV	25
	0 to 30kV	30
	0 to 35kV	35
	0 to 40kV	40
Polarity	Positive	P
	Negative	N
Power	Watts Output	4
	Watts Output	15
	Watts Output	30

OPTION ORDERING INFORMATION

OPTION	OPTION CODE
Legacy Interface	L
Fast Rise Time	C
Low Temperature Coefficient	T
Mu Metal Shield	M
RF Tight Shielded Can	S
Eared Mounting Plate	E

STANDARD UNIT ORDERING EXAMPLE

UM30N30

Model
Voltage
Polarity
Power

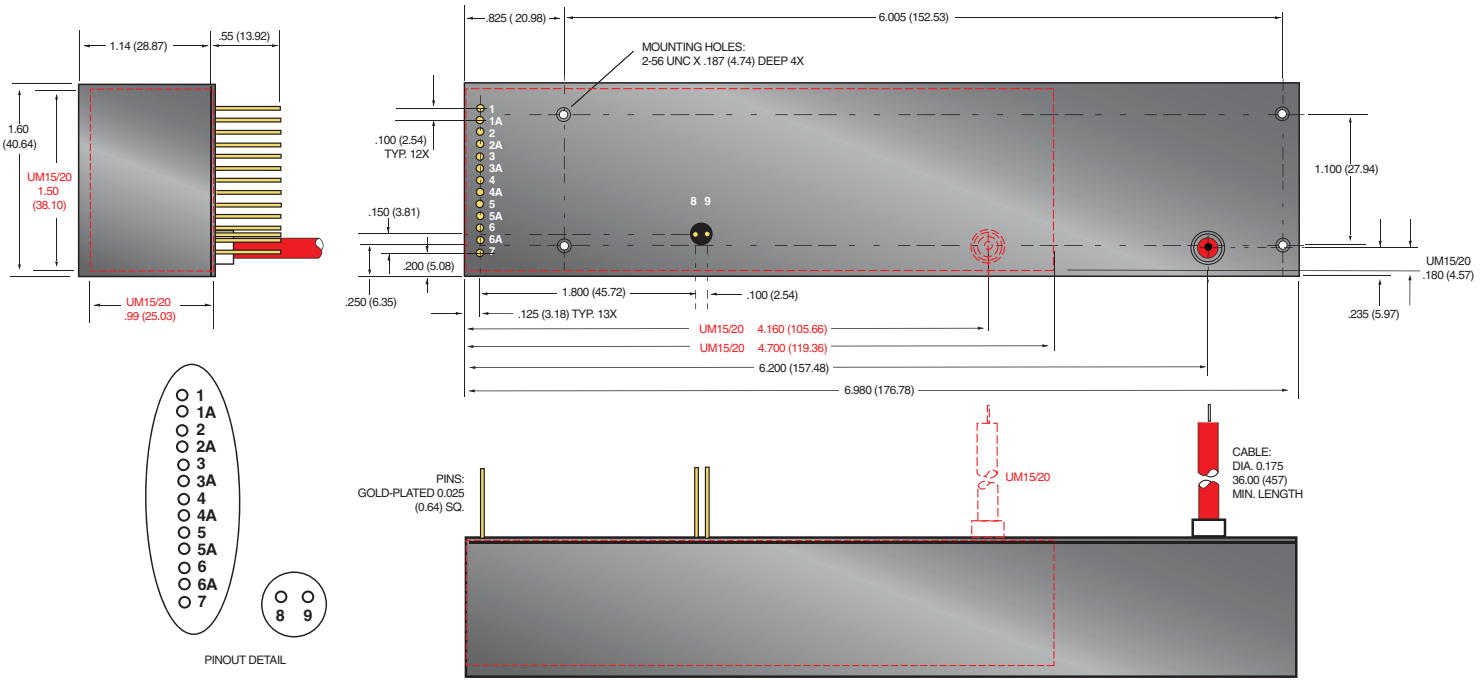
OPTION ORDERING EXAMPLE

UM25P15/L/E

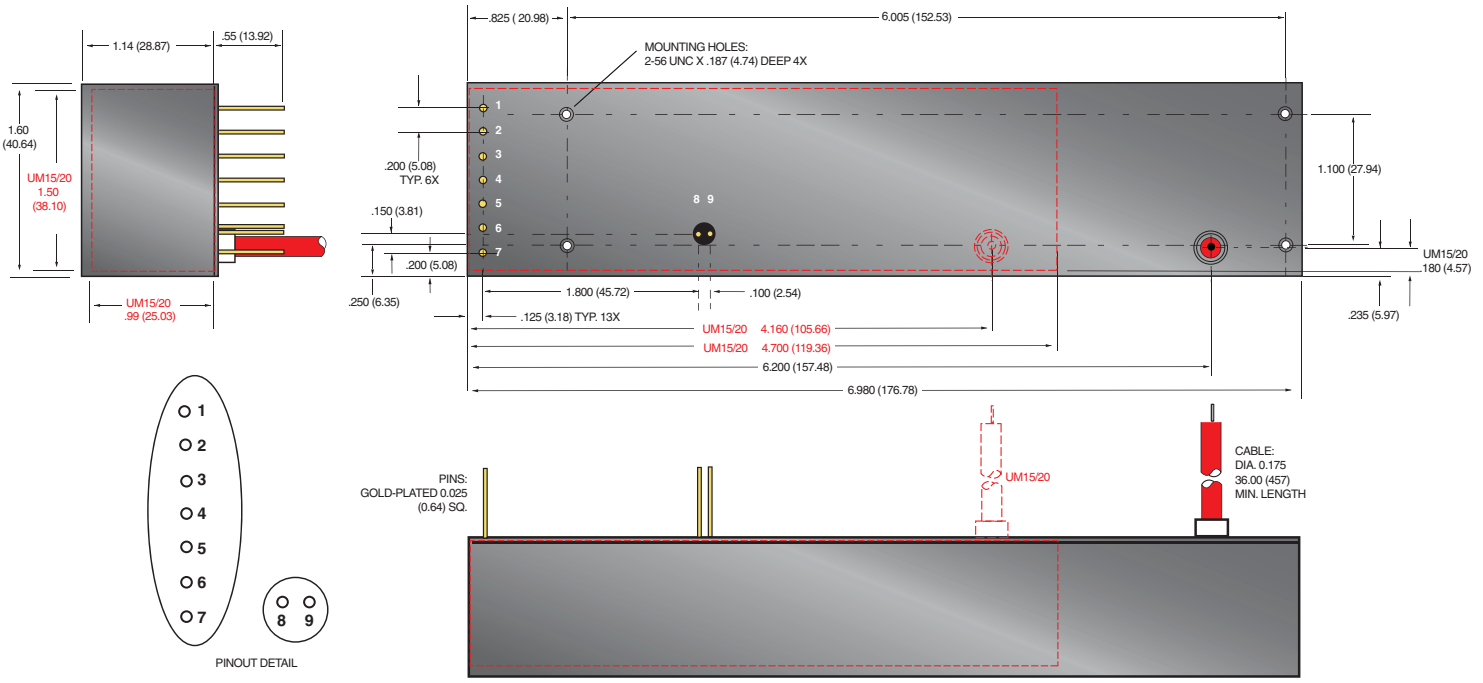
Model
Voltage
Polarity
Power
Option
Option

DIMENSIONS: in.[mm]

15 PIN - Standard Interface



9 PIN - Legacy Interface



Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com

128074-001 REV. C

Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***1-20KV @ 6-9 WATTS***
- ***DC INPUT MODULAR POWER SUPPLY***
- ***EXCELLENT REGULATION***
- ***VERY LOW RIPPLE***
- ***ARC/SHORT CIRCUIT PROTECTED***

www.spellmanhv.com/manuals/600

Spellman's Bertan brand of 605C modular high voltage power supplies offer well regulated, fixed polarity outputs up to 20kV, which operate off a +28Vdc input (+24Vdc optional). These fully enclosed modules are designed for bench top or OEM applications like spectrometers, detectors, imaging and electron beam usage.

The output voltage can be controlled by either a local internal potentiometer or by a customer provided ground referenced signal for remote operation. Additionally ground referenced output voltage and current monitor signals are provided. A high voltage enable signal input allows remote control of the supply.

TYPICAL APPLICATIONS

Spectrometers
Detectors

SPECIFICATIONS

Input Voltage:
+28Vdc, ±10%, @ 0.75 amp
+24Vdc, ±10%, @ 1 amp (24V Option)

Output Polarity:
Positive or negative, specify at time of order

Output Voltage:
See "model ratings" table

Output Current:
See "model ratings" table

Voltage Regulation:
Line: ±0.001% of rated output voltage over specified input voltage range
Load: ±0.002% of rated output voltage for a full load change

Ripple:
See "model ratings" table

Stability:
≤0.01% per hour, after a 1/2 hour warm up

Accuracy:
Local control ±0.2%
Remote Programming ±(0.1% of setting + 0.1% of maximum)
Voltage Monitor ±(0.1% of reading + 0.1% of maximum)
Current Monitor ±(2% of reading + 1% of maximum)

Temperature Coefficient:
≤50ppm/°C

Arc/Short Circuit:
All units are fully arc and short circuit protected and will limit continuous short circuit output current to less than 110% of maximum rated output current.

Operating Temperature:
0°C to +50°C

Storage Temperature:
-40°C to +85°C

Humidity:
20% to 85% RH, non-condensing

Interface Connector:
9 pin Molex connector, mating connector and pins provided

Output Connector:
59˝ (1.5 meter) detachable HV cable is provided

Cooling:
Convection cooled

Dimensions:
5.0˝H X 2.75˝W X 4.75˝D (128mm x 70mm x 121mm)

Weight:
≤3.2 pounds (1.45kg)

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

MODEL RATINGS TABLE

Model	Output Voltage	Output Current	Ripple (Vpp)
605C-10P,N	0 to 1kV	0 to 9mA	15mV
605C-15P,N	0 to 1.5kV	0 to 6mA	15mV
605C-30P,N	0 to 3kV	0 to 3mA	30mV
605C-50P,N	0 to 5kV	0 to 1.5mA	50mV
605C-100P,N	0 to 10kV	0 to 0.75mA	200mV
605C-150P,N	0 to 15kV	0 to 0.4mA	450mV
605C-200P,N	0 to 20kV	0 to 0.25mA	750mV

Specify “P” for positive polarity or “N” for negative polarity

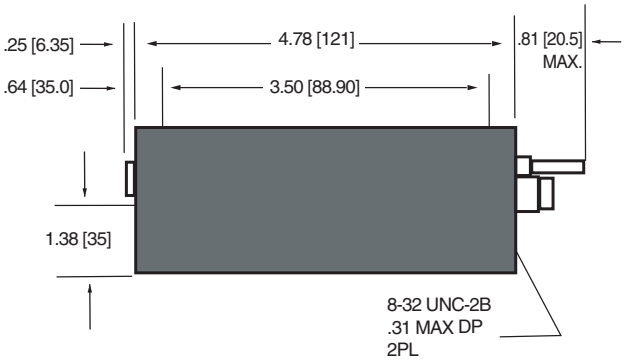
INTERFACE CONNECTOR-P2

PIN	SIGNAL	SIGNAL PARAMETERS
1	Power Ground	Power Ground
2	Power Input	+28Vdc Power Input (+24Vdc optional)
3	Signal Ground	Signal Ground
4	Voltage Program	0 to 5Vdc = 0 to 100% rated output, 1MΩ Zin
5	+5.0Vdc Reference	+5.0Vdc, 10mA maximum
6	kV Monitor	0 to 5Vdc = 0 to 100% rated output, 10KΩ Zout
7	mA Monitor	0 to 5Vdc = 0 to 100% rated output, 10KΩ Zout
8	Trip Input	Connect to ground to trip unit off
9	Local Voltage Program	Internal program potentiometer wiper, 0 to 5Vdc

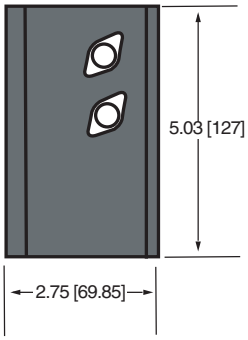
DIMENSIONS: in.[mm]

TOP VIEW

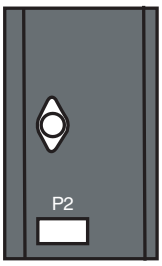
BOTTOM VIEW



FRONT VIEW



REAR VIEW



CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128043-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

V-PAK 10W HIGH VOLTAGE POWER SUPPLY

- ULTRA COMPACT FOOTPRINT
- DIFFERENTIAL INPUT FOR OUTPUT VOLTAGE PROGRAM
- 10 WATT OUTPUT POWER
- OUTPUT VOLTAGE CONTROL
- OUTPUT VOLTAGE AND CURRENT MONITOR
- HIGH STABILITY WITH ULTRA LOW RIPPLE AND NOISE
- 10V PRECISION REFERENCE
- SHUTDOWN MONITOR AND CONTROL
- 120% OUTPUT CURRENT LIMIT

MODULES

Spellman's V-Pak series are high performance 10W high voltage power supplies offering a variable output voltage up to 10kV. These small modules achieve extreme ruggedness and reliability with excellent long term stability with low ripple and noise characteristics. Additionally, the V-Pak features a differential amplifier input for the voltage programming signal to improve immunity from external system noise and addresses any offset issues. A fully featured analog user interface is provided via a 9-pin D-type connector. Spellman's proprietary HV technology coupled with SMT circuitry results in a small compact and lightweight module that is available in either a positive or negative polarity output.

TYPICAL APPLICATIONS

Photomultiplier Tubes
Electrostatics
Ion Guns
Spectroscopy
Precision Lenses
Electron Beam
Electrophoresis
Image Intensifiers

SPECIFICATIONS

Input:
+24VDC ± 0.5VDC

Input Current:
≤1 Amp

Output Voltage:
Up to 10kV

Output Polarity:
Positive or Negative, specify at time of order

Output Power:
10W

Voltage Regulation:
Line: ≤0.001% of rated output voltage over specified input voltage
Load: ≤0.001% of rated output voltage for full load change

Ripple:
See model selection table

Stability:
≤0.01% per hour, 0.02% per 8 hours after 1.0 hour warmup period

Precision Reference:
+10V ±1%, 10ppm °C^{-1}. Drift <15ppm per 1000 hours

Transient Response:
0.5% maximum recovering to 0.1% in <100ms for a step change of 10% to 90% to 10% of rated load.

Protection:
Output:
Arc and short circuit protection
Output Voltage limited to <120% of nominal maximum
Output current limited to <110% of nominal maximum
Soft starting current and voltage
Thermal protection shutdown

Input:
Over and under voltage protection.
Low input current protection

Temperature Coefficient:
≤25ppm/°C.

Operating Temperature:
0 to 45°C operating

Storage Temperature:
-35 to +85°C storage

Humidity:
10% to 90% RH, non-condensing

Cooling:
Additional heat sinking required to achieve continuous operation at full power

Dimensions:
0.79"H x 2.75"W x 2.75"D (20mm x 70mm x 70mm)

Weight:
<1.1 pounds (0.5kg)

Interface Connector:
9-pin D-type connector

Output Connector:
A captive 39.4˝ (1m) screened flying lead

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

V-PAK MODEL SELECTION TABLE

V-PAK Series	Voltage	Current	Ripple (Vpp)
VP1*10/24	0 to 1kV	10.00mA	<10mV
VP2*10/24	0 to 2kV	5.00mA	<20mV
VP3*10/24	0 to 3kV	3.33mA	<30mV
VP5*10/24	0 to 5kV	2.00mA	<50mV
VP10*10/24	0 to 10kV	1mA	<100mV

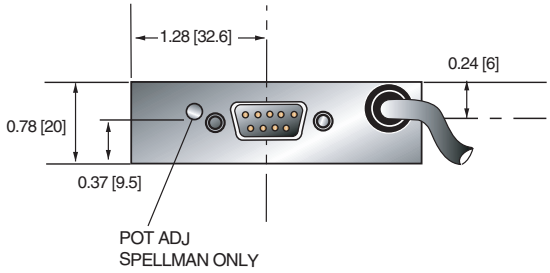
Specify “P” for positive polarity or “N” for negative polarity

V-PAK ANALOG INTERFACE— 9 PIN MALE D CONNECTOR

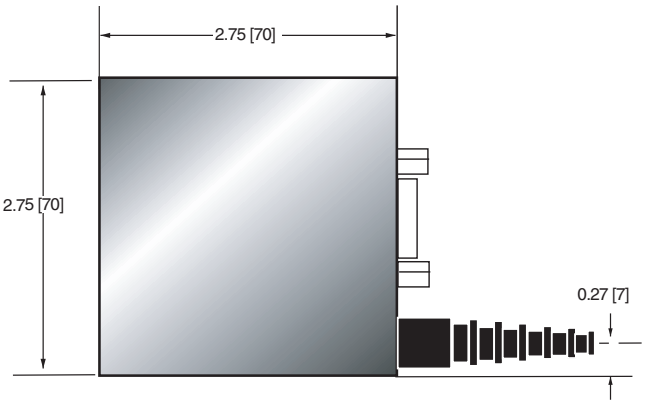
PIN	SIGNAL	SIGNAL PARAMETERS
1	Power Input Ground	0V
2	Reference Output	+10VDC
3	Voltage Control Input +	0 to +10VDC with respect to pin 4
4	Voltage Control Input -	0 to -10VDC with respect to pin 3
5	Shutdown	Bi-directional; input >5V forces shutdown Output >5V indicates shutdown condition
6	Power Input +	24VDC
7	Ground (signal)	0V
8	Proportional I Monitor Output	0 to 10V ±5%, Z=1kΩ
9	Proportional V Monitor Output	0 to 10V ±5%, Z=1kΩ

DIMENSIONS: in.[mm]

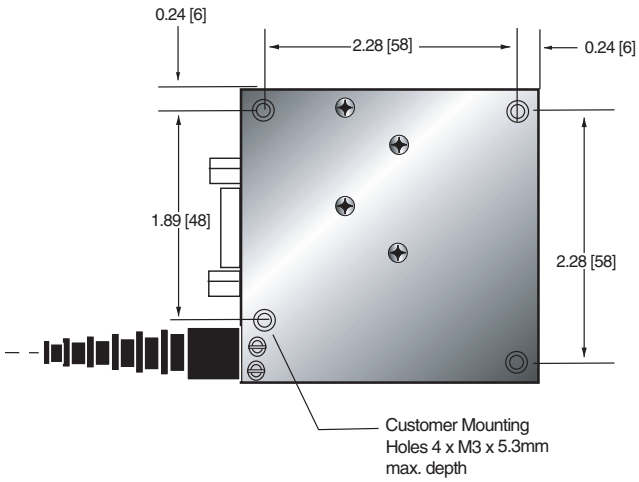
FRONT VIEW



TOP VIEW



BOTTOM VIEW



SIDE VIEW

CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128063-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***DIFFERENTIAL INPUT FOR VOLTAGE PROGRAM***
- ***OPTIONAL RS232/RS485 CONTROL***
- ***10 WATTS OUTPUT POWER***
- ***VOLTAGE AND CURRENT MONITORS AND CONTROLS***
- ***HIGH STABILITY***
- ***ULTRA LOW RIPPLE AND NOISE***
- ***CE MARKED AND UL61010A-1 CERTIFIED***

www.spellmanhv.com/manuals/MPS	Operators Manual
www.spellmanhv.com/MPS/faq	FAQ's
www.spellmanhv.com/MPS/dcc	Digital Interface

Spellman's new MPS series are a family of high voltage 10 Watt modules that provide output voltages ranging from 1kV to 20kV.

The MPS series are high performance products designed with Spellman's hybrid topology of linear and switch mode power conversion techniques delivering lower noise with higher efficiency. The MPS series produces excellent ripple and stability performance specifications from a compact footprint. Additionally the MPS series features, as standard, a differential amplifier input for the voltage programming signal to improve immunity from external system noise and addressing any offset issues. Alternatively the output voltage may be pre-set by an internal potentiometer.

A fully featured remote user interface is provided via 15-pin D-type connector as standard and an optional RS232 or RS485 serial interface is also available.

Spellman's proprietary HV technology coupled with SMT circuitry results in an ultra compact and lightweight module that is available as either a positive or negative supply that is ideal for OEM applications.

TYPICAL APPLICATIONS

Photomultiplier Tubes
Electron and Ion Beams
Electronmultiplier Detectors
Microchannel Plate Detectors
Nuclear Instruments
Electrostatic Printing
Scintillators
Mass Spectrometry
Electrostatic Lenses

OPTIONS

VCC Variable Current Control
HS High Stability
DCC RS232 or RS485 Control

Note: It is not possible to supply the unit with both full HS and DCC options

SPECIFICATIONS

Input Voltage:
+24 Vdc, ±2Vdc

Input Current:
≤1 amp maximum

Output Voltage:
8 models available from 1kV to 20kV

Output Polarity:
Positive or negative, specify at time of order

Power:
10 watts, maximum

Voltage Regulation:
Line: ≤0.001% of rated output voltage over specified input voltage
Load: ≤0.001% of rated output voltage for full load change

Current Regulation (Vcc Option):
Line: ≤0.01% for 1V input voltage change under any load conditions
Load: ≤0.01% for full load to short circuit

Ripple:
See "model selection" table

Stability:
≤0.01% per hour, 0.02% per 8 hours after 1.0 hour warm up period.
≤0.05% per 1000 hours after 1.0 hour warm up period (HS option)

Temperature Coefficient:
≤25ppm per degree C
≤10ppm per degree C (HS option)

Environmental:
Temperature Range:
Operating: 0˚C to 50˚C
Storage: -35˚C to 85˚C
Humidity:
20% to 85% RH, non-condensing

Cooling:
Convection cooled

Dimensions:
1-10kV: 1.18˝ H X 2.75˝ W X 5.12˝ D (30mm x 70mm x 130mm)
15-20kV: 1.18˝ H X 2.75˝ W X 6.49˝ D (30mm x 70mm x 165mm)

Weight:
1-3kV: 9.88 oz. (280g)
5-10kV: 14.82 oz. (420g)
15-20kV: 22.92 oz. (650g)

Interface Connector:
15 pin male D connector

Output Connector:
A captive 39.4˝ (1 meter) long shielded HV cable is provided

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive. UL/CUL recognized, File E227588.

MPS ANALOG INTERFACE— 15 PIN D CONNECTOR (NON-DCC UNITS)

PIN	SIGNAL	SIGNAL PARAMETERS
1	Power/Signal Ground	Ground
2	+24Vdc Input	+24Vdc @ 1 amp maximum
3	Voltage Monitor Output	0 to 10Vdc=0 to 100% Rated Output, Zout =10kΩ
4	Local Programming Potentiometer Wiper Output	Potentiometer connected to +10Vdc and Ground, 0 to 10Vdc adjustable wiper output provided
5	Voltage Program Input	0 to 10Vdc=0 to 100% Rated Output, Zin=10MΩ
6	Voltage Program Differential Amplifier Output	0 to 10Vdc=0 to 100% Rated Output, Zout =10kΩ
7	Voltage Program Differential Amplifier Input—Positive	0 to 10Vdc differential between pin 7 and pin 9 = 0 to 100% of rated output, diode clamped to ground, Zin =38kΩ
8	Current Monitor Output	0 to 10Vdc = 0 to 100% Rated Output, Zout =10kΩ
9	Voltage Program Differential Amplifier Input—Negative	0 to 10Vdc differential between pin 7 and pin 9 = 0 to 100% of Rated Output, diode clamped to ground, Zin =38kΩ
10	No Connection	No Connection
11	Current Program Input	Standard: Internally connected to provide 110% fixed current limit VCC Option: 0 to 10Vdc=0 to 100% Rated Output, Zin=1MΩ
12	Enable Input	Low = Enable, TTL, CMOS, Open Collector Compliant
13	Internal Connection	No Connection
14	Vref (/HS unit only)	+10V ultra high stability reference output. On standard units the reference voltage is available on pin 4
15	Analog Signal Ground (15kV to 20kV units)	Analog Signal Ground (No connection for (1kV to 10kV units)

MPS ANALOG INTERFACE— 15 PIN D CONNECTOR (DCC UNITS)

PIN	SIGNAL	SIGNAL PARAMETERS
1	Power/Signal Ground	Ground
2	+24Vdc Input	+24Vdc @ 1 amp maximum
3	No Connection	No Connection
4	Local Programming Potentiometer Wiper Output	Potentiometer connected to +10Vdc and Ground, 0 to 10Vdc adjustable wiper output provided
5	No Connection	No Connection
6	No Connection	No Connection
7	No Connection	No Connection
8	No Connection	No Connection
9	No Connection	No Connection
10	No Connection	No Connection
11	No Connection	No Connection
12	Enable Input	Low = Enable, TTL, CMOS, open collector compliant
13	No Connection	No Connection
14	TxD	Transmit data (output) with respect to ground (pin 1)
15	RxD	Receive data (input) with respect to ground (pin 1)

Notes: 1.) The DCC option operated via a simple ASCII protocol. Contact us for more information.
2.) The HS and DCC option cannot be offered together

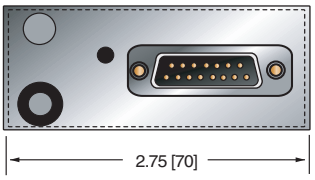
MPS SELECTION TABLE

Model	Output Voltage	Output Current	Ripple (Vpp)
MPS1*10/24	1kV	10mA	<10mV
MPS2*10/24	2kV	5.00 mA	<20mV
MPS2.5*10/24	2.5kV	4.00 mA	<25mV
MPS3*10/24	3kV	3.3mA	<25mV
MPS5*10/24	5kV	2mA	<30mV
MPS10*10/24	10kV	1mA	<50mV
MPS15*10/24	15kV	0.66mA	<100mV
MPS20*10/24	20kV	0.5mA	<150mV

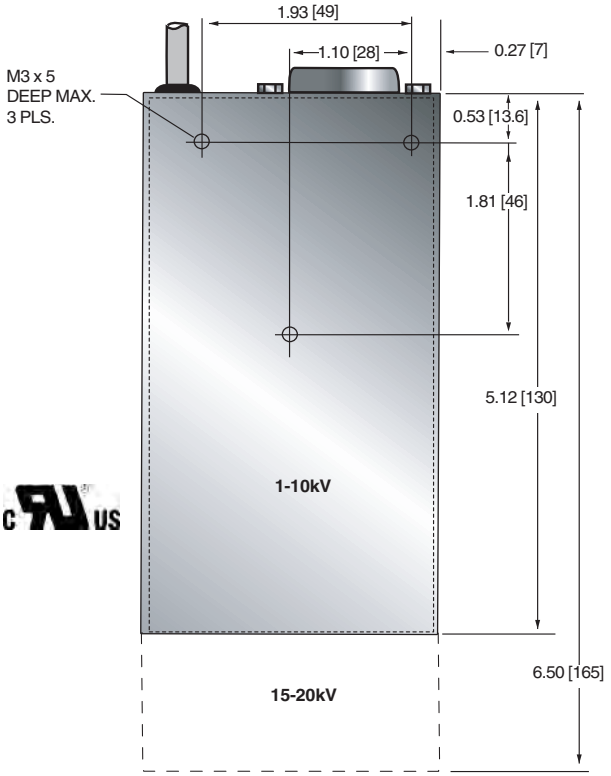
*Specify "P" for positive polarity or "N" for negative polarity.
Custom units available.

DIMENSIONS: in.[mm]

FRONT VIEW



BOTTOM VIEW



SIDE VIEW

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128033-001 REV.G
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***ARC AND SHORT-CIRCUIT PROTECTION***
- ***LOW OUTPUT RIPPLE - 0.001% P-P***
- ***LOCAL AND REMOTE VOLTAGE PROGRAMMING***
- ***10V REFERENCE OUTPUT FOR EXTERNAL CONTROL***
- ***HIGH STABILITY 0.001% LINE AND LOAD REGULATION***
- ***MODELS UP TO 40KV OUTPUT***
- ***CE MARK FOR EMC DIRECTIVE***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/MP

The MP Series has been designed as high performance dc to dc converters with output voltages up to 40kV.

Each module provides well regulated, low ripple and high stability high voltage in a highly versatile compact design, combining linear and switched mode techniques to minimize internal dissipation and generated EMI/RFI interference. The higher voltage modules are vacuum encapsulated to ensure corona free operation.

Specialist cell manufacture of the MP Series ensures prompt delivery.

TYPICAL APPLICATIONS

Photomultiplier Tubes
Scintillators
Electron Guns
Ion Guns
Nuclear Instruments
Electrostatic lenses
Spectroscopy
Microchannel Plates

OPTIONS

F	Flange Mounting
P	Positive Output Polarity
N	Negative Output Polarity
LL	Optional Lead Length

SPECIFICATIONS

Input Voltage:
+24Vdc±2V. Other input voltages available on special order.

Input Current:
Less than 1A at full output.

Output Voltage:
Continuously adjustable over entire output range. Available in either positive or negative output polarity. See table for voltage ranges.

Output Voltage Control: Controlled by either:
1) Internal ten-turn potentiometer
2) External potentiometer 5k to 100k (set internal pot. to max.)
3) Remote differential voltage programming (0 to +10V gives 0 to full output).
Accuracy 0.1%.

Remote Control:
Remote programming Common Mode Range: -5VDC to +15VDC

Line Regulation:
0.001% for input change of 1V.

Load Regulation:
0.001% for 100µA to full load change (at maximum voltage).

Temperature Coefficient:
Better than 25ppm/°C.

Stability:
<0.007%/hr at constant operating conditions after 1 hour warm-up.

Output Voltage and Current Monitors:
Voltage: 0 to +10V represents zero to full output ±1%.
Current: 0 to +10V represents zero to full output ±2%.

Temperature:
Operating: 0°C to +50°C.
Storage: -35°C to +85°C.

Connectors:
Input: 10 pin connector (mating connector supplied).
Output: Output voltage 1-20kV: 500mm screened cable URM76
Output voltage 30kV: 500mm screened cable RG59
Output voltage 40kV: 500mm silicone rubber cable

Dimensions:
Stud mounted case
MP1 to MP5: 1.65"H x 3.86"W x 5.83"D (42mm x 98mm x 148mm)
MP10 to MP15: 1.65"H x 3.86"W x 7.48"D (42mm x 98mm x 190mm)
MP20 to MP30: 1.65"H x 3.86"W x 9.45"D (42mm x 98mm x 240mm)

Two M3 metric studs on case as standard (mating hardware supplied)

Flange case

MP1 to MP5: 1.65"H x 3.86"W x 6.61" (42mm x 98mm x 168mm)
Fixing center: 6.14" (156mm)
MP10 to MP15: 1.65"H x 3.86"W x 8.27" (42mm x 98mm x 210mm)
Fixing center: 7.80" (198mm)
MP20 to MP30: 1.65"H x 3.86"W x 10.2" (42mm x 98mm x 260mm)
Fixing center: 9.77" (248mm)
MP40: 1.81"H x 3.86"W x 13.0" (46mm x 98mm x 330mm)
Fixing center: 12.5" (318mm) (4 x 3.3mm mounting holes)

Weight:

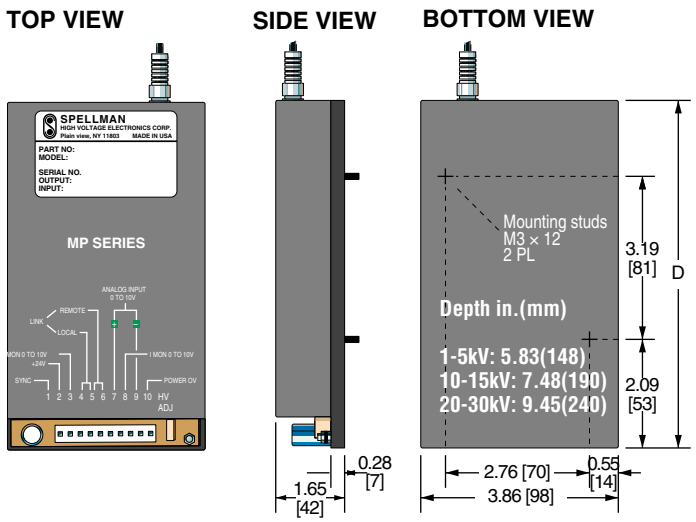
MP1 to MP5: 21.18 oz. (600g)
MP10 to MP15: 35.3 oz. (1000g)
MP20 to MP30: 51.18 oz. (1450g)
MP40: 76.24 oz. (2160g)

Regulatory Approvals:

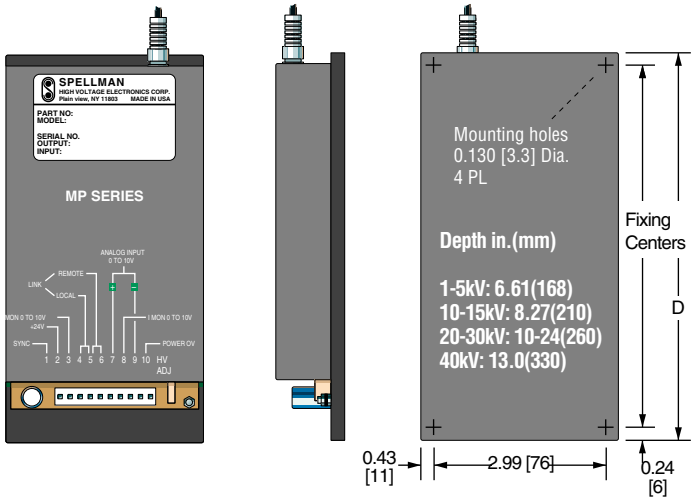
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

DIMENSIONS: in.[mm]

STUD MOUNTING (standard)



FLANGE MOUNTING (optional)



MP SELECTION TABLE

OUTPUT VOLTAGE kV	MAX. CURRENT mA	RIPPLE (full load) mV	MODEL
0 to 1	10	10mV p-p	MP1*
0 to 1.5	6	10mV p-p	MP1.5*
0 to 2	5	10mV p-p	MP2*
0 to 2.5	4	10mV p-p	MP2.5*
0 to 3	3	10mV p-p	MP3*
0 to 5	2	20mV p-p	MP5*
0 to 10	1	100mV p-p	MP10*
0 to 15	0.60	150mV p-p	MP15*
0 to 20	0.50	200mV p-p	MP20*
0 to 30	0.33	300mV p-p	MP30*
0 to 40	0.2	400mV p-p	MP40*

*Specify "P" for positive polarity or "N" for negative polarity.

MP CONNECTOR 10 PIN

TB1	SIGNAL	TB1	SIGNAL
1	Synchronization	6	Remote Control
2	+24V Input	7	Vprog+
3	Voltage Monitor	8	Current Monitor
4	Local Control	9	Vprog-
5	Remote / Local Link	10	Power Ground

CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128005-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***MODULAR BENCH TOP DESIGN***
- ***LOW RIPPLE AND NOISE***
- ***3.5 DIGIT FRONT PANEL DIGITAL METERING***
- ***REVERSIBLE OUTPUT POLARITY***

www.spellmanhv.com/manuals/230

MODULES

Spellman's Bertan brand of 230 Series high voltage power supplies provide regulated high voltage outputs from 1 to 30kV. The low noise, linear topology employed results in extremely low output ripple specifications. These 12 to 15 watt units are inherently reversible by design, providing either positive or negative output polarity. The 230 Series is fully arc and short circuit protected. Excellent regulation specifications are featured along with outstanding stability performance.

TYPICAL APPLICATIONS

HiPot Testing
Electrostatics
General Laboratory Usage

SPECIFICATIONS

Input Voltage:
115Vac, ±10%, 50/60 Hertz @ 0.5 amp
230Vac, ±10%, 50/60 Hertz @ 0.25 amps
Input voltage is switch selectable

Output Voltage:
See "model selection" table

Output Polarity:
All units are reversible polarity by design

Output Current:
See "model selection" table

Voltage Regulation:
Line: ≤0.002% of rated output voltage over specified input voltage range
Load: ≤0.005% of rated output voltage for a full load change

Current Regulation:
Internally set to limit at less than 125% of rated current.
A rear panel switch allows limiting at 25% of rated full current.

Ripple:
See "model selection" table

Temperature Coefficient:
≤100ppm/°C

Stability:
≤0.01%/hour, 0.02% per 8 hours after a 1/2 hour warm up

Accuracy:
Front panel control: ±(0.2% of setting + 0.2% of maximum)
Front panel Meter: Voltage ±(0.5% of setting + 0.5% of maximum), Current ±(2% of setting + 0.5% of maximum)
Remote Programming: ±(0.1% of setting + 0.1% of maximum)
Voltage Monitor: ±(0.1% of reading + 0.1% of maximum)
Current Monitor: ±(2% of reading + 1% of maximum)

Front Panel Metering and Controls:
Power ON/OFF switch
3.5 digit metering for voltage and current, switch selectable
Polarity indicator
10 turn locking potentiometer to set output voltage
HV output connector
Ground stud

Operating Temperature
0°C to +50°C

Storage Temperature:
-40°C to +85°C

Humidity:
20% to 85% RH, non-condensing

Input Line Connector:
IEC320 EMI filter/input connector, a detachable line cord is provided

Interface Connector:
9 pin "D" connector, a mating connector is provided

Output Connector:
A detachable 10 foot (3 meter) HV cable is provided for units up to 5kV; 10kV through 20kV: 59" (1.5 meter); 30kV: 10 foot (3 meter)

Cooling:
Convection cooled

Dimensions
7.63"W X 5.03"H X 8.91"D
(194mm X 128mm X 226mm)

Weight:
≤10 pounds (4.5kg)

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

MODEL SELECTION TABLE

230 Series	Voltage	Current	Ripple
230-01R	0 to 1kV	0 to 15mA	10mV
230-03R	0 to 3kV	0 to 5mA	30mV
230-05R	0 to 5kV	0 to 3mA	50mV
230-10R	0 to 10kV	0 to 1.5mA	500mV
230-20R	0 to 20kV	0 to 0.5mA	2 volts
230-30R	0 to 30kV	0 to 0.4mA	5 volts

INTERFACE CONNECTOR

PIN	SIGNAL	PARAMETERS
1	Voltage Monitor	0 to 5Vdc = 0 to 100% rated voltage, Zout = 10KΩ
2	n/c	none
3	Enable	TTL "0" disables HV, TTL "1" or open enables HV
4	+5Vdc Reference	+5.0Vdc @ 10mA, maximum
5	Current Monitor	0 to 5Vdc = 0 to 100% rated current, Zout = 10KΩ
6	Voltage Program Input	0 to 5Vdc = 0 to 100% rated voltage, Zin = 1MΩ
7	Analog Ground	Ground
8	Digital Ground	Ground
9	Polarity Indicator	Open collector, 30V @ 25mA, positive = ON

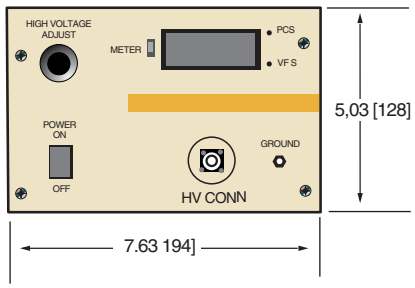
OPTIONS:

Isolated (Floating) Output-Option F

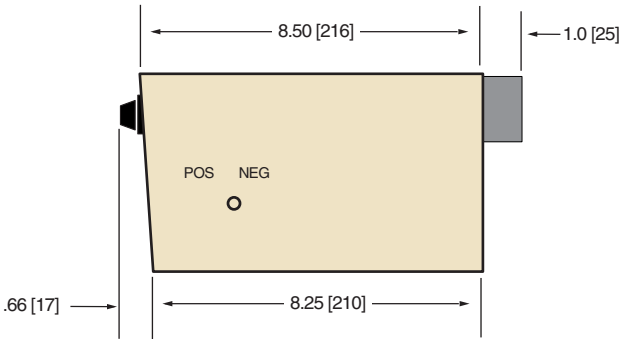
Units up to and including 5kV can be provided with differential outputs capable of floating up to ±2kV from ground. Voltage programming and monitoring functions normally referenced to ground. Current monitoring and metering is eliminated. Replace "R" suffix with "F" for this option.

DIMENSIONS: in.[mm]

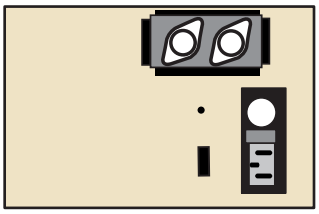
FRONT VIEW



SIDE VIEW



BACK VIEW



CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128051-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***1-20KV @ 10-15 WATTS***
- ***AC INPUT MODULAR POWER SUPPLY***
- ***115/230 VAC SELECTABLE***
- ***EXCELLENT REGULATION***
- ***VERY LOW RIPPLE***
- ***ARC/SHORT CIRCUIT PROTECTED***

www.spellmanhv.com/manuals/600

Spellman's Bertan brand of 602C modular high voltage power supplies offer well regulated, fixed polarity outputs up to 20kV, that operate off a standard switch selectable 115/230Vac input. These fully enclosed modules are designed for bench top or OEM applications like spectrometers, detectors, imaging and electron beam usage.

The output voltage can be controlled by either a local internal potentiometer or by a customer provided ground referenced signal for remote operation. Additionally ground referenced output voltage and current monitor signals are provided. A high voltage enable signal input allows remote control of the supply.

TYPICAL APPLICATIONS

Spectrometers
Detectors

SPECIFICATIONS

Input Voltage:
115Vac, ±10%, 50/60 Hertz @ 0.5 amp
230Vac, ±10%, 50/60 Hertz @ 0.25 amp
Input voltage is fused and switch selectable

Output Polarity:
Positive or negative, specify at time of order

Output Voltage:
See "model ratings" table

Output Current:
See "model ratings" table

Voltage Regulation:
Line - ±0.001% of rated output voltage over specified input voltage range
Load - ±0.002% of rated output voltage for a full load change

Ripple:
See "model ratings" table

Stability:
≤0.01% per hour, after a 1/2 hour warm up

Accuracy:
Local control ±0.2%
Remote Programming ±(0.1% of setting + 0.1% of maximum)
Voltage Monitor ±(0.1% of reading + 0.1% of maximum)
Current Monitor ±(2% of reading + 1% of maximum)

Temperature Coefficient:
≤50ppm/°C

Arc/Short Circuit:
All units are fully arc and short circuit protected and will limit continuous short circuit output current to less than 110% of maximum rated output current.

Operating Temperature:
0°C to +50°C

Storage Temperature:
-40°C to +85°C

Humidity:
20% to 85% RH, non-condensing

Interface Connector:
9 pin Molex connector, mating connector and pins provided

AC Input Line Connector:
3 position terminal block

Output Connector:
10´ (3 meter) detachable HV cable is provided for units up to 5kV; 10kV through 20kV: 59˝ (1.5 meter) cable.

Cooling:
Convection cooled.

Dimensions:
5.0˝H X 3.1˝W X 8.7˝D (128mm x 78mm x 220mm)

Weight:
≤6.75 pounds (3.1kg)

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive. UL/CUL recognized, File E137710.

MODEL RATINGS TABLE

Model	Output Voltage	Output Current	Ripple (Vpp)
602C-10P,N	0 to 1kV	0 to 15mA	15mV
602C-15P,N	0 to 1.5kV	0 to 10mA	15mV
602C-30P,N	0 to 3kV	0 to 5mA	30mV
602C-50P,N	0 to 5kV	0 to 2mA	50mV
602C-100P,N	0 to 10kV	0 to 1mA	200mV
602C-150P,N	0 to 15kV	0 to 0.6mA	450mV
602C-200P,N	0 to 20kV	0 to 0.5mA	800mV

Specify “P” for positive polarity or “N” for negative polarity

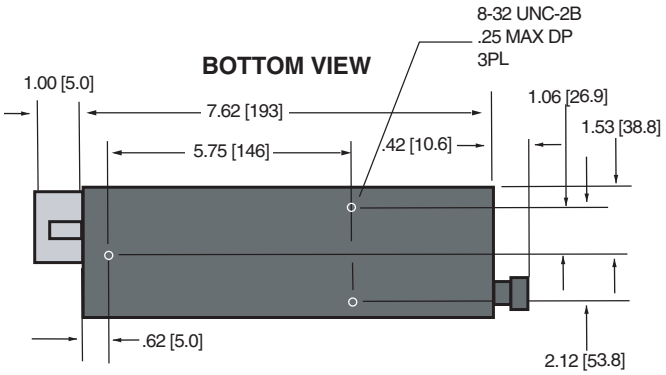
DIMENSIONS: in.[mm]

TOP VIEW

INTERFACE CONNECTOR-P2

PIN	SIGNAL	SIGNAL PARAMETERS
1	n/c	None
2	n/c	None
3	Signal Ground	Ground
4	Voltage Program	0 to 5Vdc = 0 to 100% rated output, 1MΩ Zin
5	+5.0Vdc Reference	+5.0Vdc, 10mA maximum
6	kV Monitor	0 to 5Vdc = 0 to 100% rated output, 10KΩ Zout
7	mA Monitor	0 to 5Vdc = 0 to 100% rated output, 10KΩ Zout
8	Trip Input	Connect to ground to trip unit off
9	Local Voltage Program	Internal program potentiometer wiper, 0 to 5Vdc

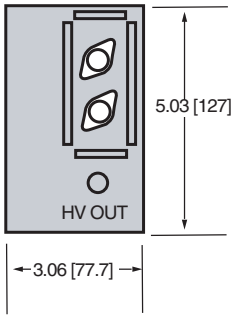
BOTTOM VIEW



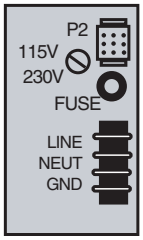
AC INPUT TERMINAL BLOCK

Terminal	Function
1	115/230 Vac Input
2	Neutral
3	Ground

FRONT VIEW



REAR VIEW



Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128041-001 REV.F
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***DIFFERENTIAL INPUT FOR VOLTAGE PROGRAM***
- ***20 WATTS OUTPUT POWER***
- ***VOLTAGE AND CURRENT CONTROLS***
- ***VOLTAGE AND CURRENT MONITORS***
- ***HIGH STABILITY***
- ***ULTRA LOW RIPPLE AND NOISE***
- ***HIGH VOLTAGE ENABLE CONTROL***

Spellman's new MPS20W series are a family of high voltage 20 Watt modules that provide output voltages ranging from 1kV to 10kV.

The MPS20W series are high performance products designed with Spellman's hybrid topology of linear and switch mode power conversion techniques delivering lower noise with higher efficiency. The MPS20W series produces excellent ripple and stability performance specifications from a compact footprint. Additionally the MPS20W series features, as standard, a differential amplifier input for the voltage programming signal to improve immunity from external system noise and addressing any offset issues. Alternatively the output voltage may be pre-set by an internal potentiometer. A fully featured remote user interface is provided via 15-pin D-type connector as standard. The output voltage is arc and short circuit protected and the power input has a current limiter fitted.

Spellman's proprietary HV technology coupled with SMT circuitry results in an ultra compact and lightweight module that is available as either a positive or negative supply that is ideal for OEM applications.

TYPICAL APPLICATIONS

Photomultiplier Tubes
Microchannel Plate Detectors
Scintillators
Mass Spectrometry
Electron and Ion Beams
Electrostatic Lenses
Nuclear Instruments
Electrostatic Printing

OPTIONS

VCC Variable Current Control

SPECIFICATIONS

Input Voltage:
+24 Vdc, ±2Vdc

Input Current:
≤1.5 amps

Output Voltage:
5 models available from 1kV to 10kV

Output Polarity:
Positive or negative, specify at time of order

Power:
≤20 watts

Voltage Regulation:
Line: ≤0.001% of rated output voltage over specified input voltage
Load: ≤0.001% of rated output voltage for full load change

Current Regulation (Vcc Option):
Line: ≤0.01% for 1V input voltage change under any load conditions
Load: ≤0.001% for 0 to full load

Ripple:
See "model selection" table

Stability:
≤0.01% per hour, 0.02% per 8 hours after 1.0 hour warm up period.

Temperature Coefficient:
≤25ppm per degree C

Environmental:
Temperature Range:
Operating: 0˚C to 50˚C
Storage: -35˚C to 85˚C
Humidity:
20% to 85% RH, non-condensing

Cooling:
Convection cooled

Dimensions:
1.31˝ H X 3.74˝ W X 5.91˝ D (33.5mm x 95mm x 150mm)

Weight:
1-2kV: 15.17 oz. (430g)
3-10kV: 25.76 oz. (730g)

Interface Connector:
15 pin male D connector

Output Connector:
A captive 39.4˝ (1 meter) long shielded HV cable is provided

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

MPS20W SELECTION TABLE

Model	Output Voltage	Output Current	Ripple (Vpp)
MPS1*20/24	0-1kV	20mA	<25mV
MPS2*20/24	0-2kV	10 mA	<50mV
MPS3*20/24	0-3kV	6.67mA	<75mV
MPS5*20/24	0-5kV	4mA	<125mV
MPS10*20/24	0-10kV	2mA	<250mV

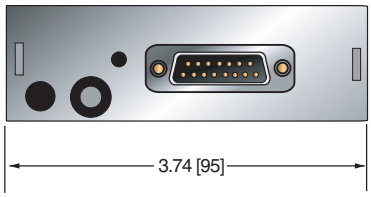
*Specify "P" for positive polarity or "N" for negative polarity.
Custom units available.

MPS20W ANALOG INTERFACE— 15 PIN D CONNECTOR

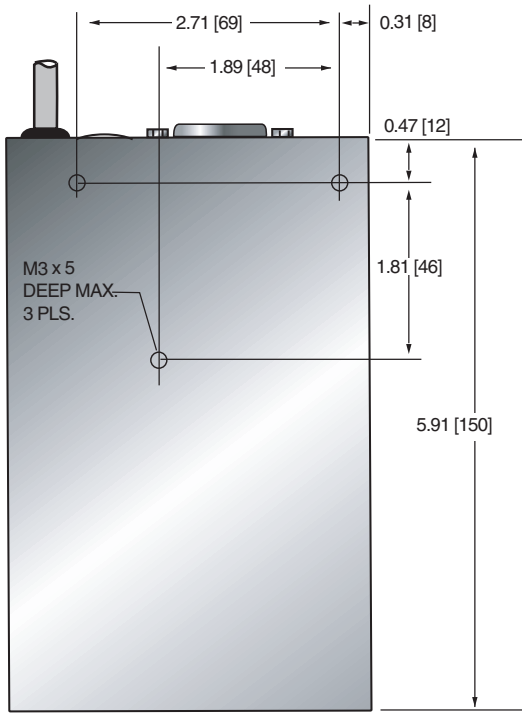
PIN	SIGNAL	SIGNAL PARAMETERS
1	Power/Signal Ground	Ground
2	+24Vdc Input	+24Vdc @ 1.5 amp maximum
3	Voltage Monitor Output	0 to 10Vdc=0 to 100% Rated Output, Zout =2.2kΩ
4	Local Programming Potentiometer Wiper Output	Potentiometer connected to +10Vdc and Ground, 0 to 10Vdc adjustable wiper output provided
5	Voltage Program Input	0 to 10Vdc=0 to 100% Rated Output, Zin=10MΩ
6	Voltage Program Differential Amplifier Output	0 to 10Vdc=0 to 100% Rated Output, Zout =2.2kΩ
7	Voltage Program Differential Amplifier Input—Positive	0 to 10Vdc differential between pin 7 and pin 9 = 0 to 100% of rated output, diode clamped to ground, Zin =38kΩ
8	Current Monitor Output	0 to 10Vdc = 0 to 100% Rated Output, Zout =2.2kΩ
9	Voltage Program Differential Amplifier Input—Negative	0 to 10Vdc differential between pin 7 and pin 9 = 0 to 100% of Rated Output, diode clamped to ground, Zin =38kΩ
10	No Connection	No Connection
11	Current Program Input	Standard: Internally connected to provide 110% fixed current limit VCC Option: 0 to 10Vdc=0 to 100% Rated Output, Zin=1MΩ
12	Enable Input	Low = Enable, TTL, CMOS, Open Collector Compliant
13	Internal Connection	No Connection
14	No Connection	No Connection
15	Analog Signal Ground	Analog Signal Ground

DIMENSIONS: in.[mm]

FRONT VIEW



BOTTOM VIEW



SIDE VIEW

CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128064-001 REV.B
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***1-30KV @ 12-30 WATTS***
- ***AC INPUT MODULAR POWER SUPPLY***
- ***115/230 VAC SELECTABLE***
- ***EXCELLENT REGULATION***
- ***VERY LOW RIPPLE***
- ***ARC AND SHORT CIRCUIT PROTECTED***

www.spellmanhv.com/manuals/600

Spellman's Bertan brand of 603C modular high voltage power supplies offer well regulated, fixed polarity outputs up to 30kV, that operate off a standard switch selectable 115/230Vac input. These fully enclosed modules are designed for bench top or OEM applications like spectrometers, detectors, imaging and electron beam usage.

The output voltage can be controlled by either a local internal potentiometer or by a customer provided ground referenced signal for remote operation. Additionally ground referenced output voltage and current monitor signals are provided. A high voltage enable signal input allows remote control of the supply.

TYPICAL APPLICATIONS

Spectrometers
Detectors

SPECIFICATIONS

Input Voltage:
115Vac, ±10%, 50/60 Hertz @ 1.0 amp
230Vac, ±10%, 50/60 Hertz @ 0.5 amp
Input voltage is fused and switch selectable

Output Polarity:
Positive or negative, specify at time of order

Output Voltage:
See "model ratings" table

Output Current:
See "model ratings" table

Voltage Regulation::
Line: ±0.001% of rated output voltage over specified input voltage range
Load: ±0.002% of rated output voltage for a full load change

Ripple:
See "model ratings" table

Stability:
≤0.01% per hour, after a 1/2 hour warm up

Accuracy:
Local Control ±0.2%
Remote Programming ±(0.1% of setting + 0.1% of maximum)
Voltage Monitor ±(0.1% of reading + 0.1% of maximum)
Current Monitor ±(2% of reading + 1% of maximum)

Temperature Coefficient:
≤50ppm/°C

Arc/Short Circuit:
All units are fully arc and short circuit protected and will limit continuous short circuit output current to less than 110% of maximum rated output current.

Operating Temperature:
0°C to +50°C

Storage Temperature:
-40°C to +85°C

Humidity:
20% to 85% RH, non-condensing

Interface Connector:
9 pin Molex connector, mating connector and pins provided

AC Input Line Connector:
3 position terminal block

Output Connector:
10´ (3 meter) detachable HV cable is provided for units up to 5kV; 10kV through 20kV: 59˝ (1.5 meter) cable, 30kV: 78˝ (2 meter) cable

Cooling:
Convection cooled

Dimensions:
5.0´H X 5.5´W X 8.5´D (127mm x 140mm x 216mm)

Weight:
≤8.0 pounds (3.64kg)

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive. UL/CUL recognized, File E137710.

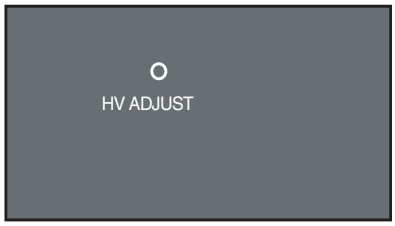
MODEL RATINGS TABLE

Model	Output Voltage	Output Current	Ripple (Vpp)
603C-10P,N	0 to 1kV	0 to 30mA	15mV
603C-15P,N	0 to 1.5kV	0 to 20mA	15mV
603C-30P,N	0 to 3kV	0 to 10mA	30mV
603C-50P,N	0 to 5kV	0 to 5mA	50mV
603C-100P,N	0 to 10kV	0 to 2mA	200mV
603C-150P,N	0 to 15kV	0 to 1.5mA	450mV
603C-200P,N	0 to 20kV	0 to 1.0mA	800mV
603C-300P,N	0 to 30kV	0 to 0.4mA	6 volts

Specify “P” for positive polarity or “N” for negative polarity

DIMENSIONS: in.[mm]

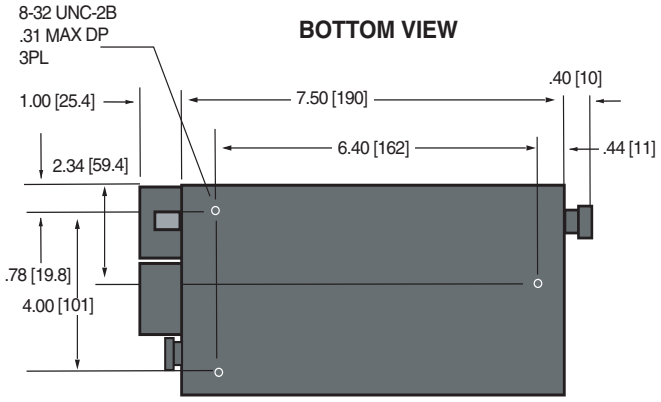
TOP VIEW



INTERFACE CONNECTOR-P2

PIN	SIGNAL	SIGNAL PARAMETERS
1	n/c	None
2	n/c	None
3	Signal Ground	Ground
4	Voltage Program	0 to 5Vdc = 0 to 100% rated output, 1MΩ Zin
5	+5.0Vdc Reference	+5.0Vdc, 10mA maximum
6	kV Monitor	0 to 5Vdc = 0 to 100% rated output, 10KΩ Zout
7	mA Monitor	0 to 5Vdc = 0 to 100% rated output, 10KΩ Zout
8	Trip Input	Connect to ground to trip unit off
9	Local Voltage Program	Internal program potentiometer wiper, 0 to 5Vdc

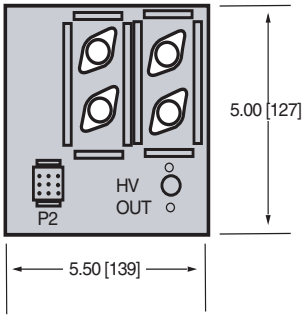
BOTTOM VIEW



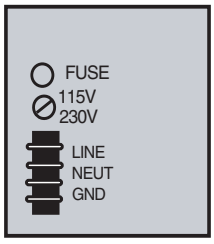
AC INPUT TERMINAL BLOCK

Terminal	Function
1	115/230 Vac Input
2	Neutral
3	Ground

FRONT VIEW



REAR VIEW



Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128042-001 REV.G
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

EPM 30W POWER SUPPLY

- ***COMPACT PACKAGE***
- ***VOLTAGE AND CURRENT PROGRAMMING FROM ZERO TO RATED OUTPUT***
- ***TEST POINTS FOR OUTPUT CURRENT AND VOLTAGE***
- ***OVERVOLTAGE PROTECTION***
- ***CONTROL OF OUTPUT VIA ENABLE/INHIBIT SIGNAL***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/EPM

The EPM Series of power supplies utilize proprietary circuitry which yields full output current from near zero to maximum output voltage. Current regulation is standard on all models and is particularly valuable in applications that require a current source into the load.

TYPICAL APPLICATIONS

Electrophoresis
Electron Beam
Ion Source
Photomultipliers
Laboratory Applications

SPECIFICATIONS

Input:
+24Vdc ±10%

Output:
8 models from 1kV to 30kV. Each model is available in positive or negative polarity outputs.

Voltage Regulation:
Load:
Static: 0.02% of output voltage for a full load change.
Dynamic: 10V/100µA.
Line: 0.01% for ±10% change in input voltage.

Current Regulation:
Load: 0.01% of output current from 0 to rated voltage.
Line: 0.01% of rated current over specified input range.

Ripple:
0.1% p-p of output voltage.

Dimensions:
2"H x 5.7"W x 5.7"D (5.1cm x 14.5cm x 14.5cm)

Input Connector:
9 pin AMP Metri-Mate. Mating connector and pins supplied.

Output Cable:
18" ±1" (45.7cm) of UL® listed high voltage wire.

Voltage Stability:
0.02% per 8 hours (after 1/2 hour warm-up).

Voltage Temperature Coefficient:
0.01% per °C.

Voltage Test Point:
10V±2% = Max. rated output.

Current Test Point:
10V±2% = Max. rated output.

Remote Enable:
>3.4V= HV ON.
<1.0V or open= HV OFF.

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

EPM SELECTION TABLE

Maximum Rating					
kV	mA	Model Number	kV	mA	Model Number
1	30	EPM 1*30	15	2	EPM 15*30
3	10	EPM 3*30	20	1.5	EPM 20*30
5	6	EPM 5*30	25	1.2	EPM 25*30
10	3	EPM 10*30	30	1	EPM 30*30

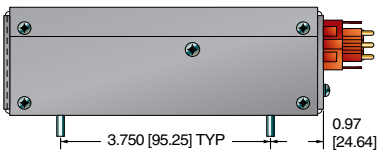
*Specify "P" for positive polarity or "N" for negative polarity.

EPM CONNECTOR 9 PIN

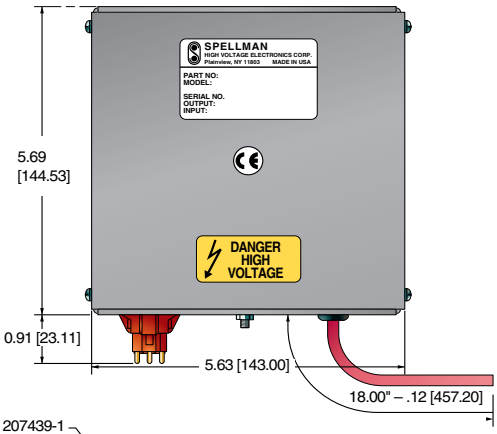
J1	SIGNAL	J1	SIGNAL
1	Ground	6	Voltage Programming
2	+24Vdc	7	Current Programming
3	High Voltage Enable/Inhibit	8	+10Vdc Reference
4	Voltage Test Point	9	Program and Test Point Return
5	Current Test Point		

DIMENSIONS: in.[mm]

SIDE VIEW

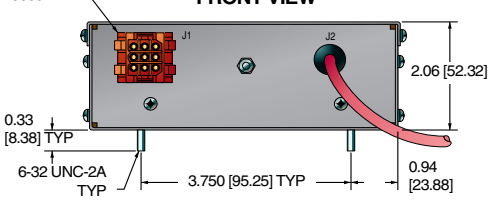


TOP VIEW



AMP CONNECTOR 207439-1
WITH MALE PIN 66591-1

FRONT VIEW



CE

- ***1-30KV @ 12-30 WATTS***
- ***DC INPUT MODULAR POWER SUPPLY***
- ***EXCELLENT REGULATION***
- ***VERY LOW RIPPLE***
- ***ARC SHORT CIRCUIT PROTECTED***

www.spellmanhv.com/manuals/600

Spellman's Bertan brand of 606C modular high voltage power supplies offer well regulated, fix polarity outputs up to 30kV, which operate off a +28Vdc input (+24Vdc optional). These fully enclosed modules are designed for bench top or OEM applications like spectrometers, detectors, imaging and electron beam usage.

The output voltage can be controlled by either a local internal potentiometer or by a customer provided ground referenced signal for remote operation. Additionally ground referenced output voltage and current monitor signals are provided. A high voltage enable signal input allows remote control of the supply.

TYPICAL APPLICATIONS

Spectrometers
Detectors

SPECIFICATIONS

Input Voltage:
+28Vdc, ±10%, @ 2.25 amps
+24Vdc, ±10%, @ 2.5 amps (24V Option)

Output Polarity:
Positive or negative, specify at time of order

Output Voltage:
See "model ratings" table

Output Current:
See "model ratings" table

Voltage Regulation
Line: ±0.001% of rated output voltage over specified input voltage range
Load: ±0.002% of rated output voltage for a full load change

Ripple:
See "model ratings" table

Stability:
≤0.01% per hour, after a 1/2 hour warm up

Accuracy:
Local control ±0.2%
Remote Programming ±(0.1% of setting + 0.1% of maximum)
Voltage Monitor ±(0.1% of reading + 0.1% of maximum)
Current Monitor ±(2% of reading + 1% of maximum)

Temperature Coefficient:
≤50ppm/°C

Arc/Short Circuit:
All units are fully arc and short circuit protected and will limit continuous short circuit output current to less than 110% of maximum rated output current.

Operating Temperature:
0°C to +50°C

Storage Temperature:
-40°C to +85°C

Humidity:
20% to 85% RH, non-condensing

Interface Connector:
9 pin Molex, mating connector and pins provided

Output Connector:
10´ (3 meter) detachable HV cable is provided for units up to 5kV; 10kV through 20kV: 59˝ (1.5 meter) cable; 30kV: 78˝ (2 meter) cable

Cooling:
Convection cooled

Dimensions:
5.0´H X 5.50´W X 4.75´D (128mm x 140mm x 121mm)

Weight:
≤3.2 pounds (1.45kg)

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128044-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

MODEL RATINGS TABLE

Model	Output Voltage	Output Current	Ripple (Vpp)
606C-10P,N	0 to 1kV	0 to 30mA	15mV
606C-15P,N	0 to 1.5kV	0 to 20mA	15mV
606C-30P,N	0 to 3kV	0 to 10mA	30mV
606C-50P,N	0 to 5kV	0 to 5mA	50mV
606C-100P,N	0 to 10kV	0 to 2mA	200mV
606C-150P,N	0 to 15kV	0 to 1.5mA	450mV
606C-200P,N	0 to 20kV	0 to 1.0mA	800mV
606C-300P,N	0 to 30kV	0 to 0.4mA	6 volts

Specify “P” for positive polarity or “N” for negative polarity

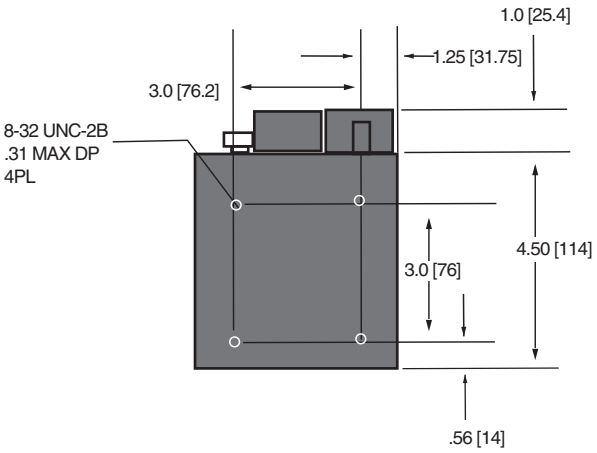
INTERFACE CONNECTOR-P2

PIN	SIGNAL	SIGNAL PARAMETERS
1	Power Ground	Power Ground
2	Power Input	+28Vdc Power Input (+24Vdc optional)
3	Signal Ground	Signal Ground
4	Voltage Program	0 to 5Vdc = 0 to 100% rated output, 1MΩ Zin
5	+5.0Vdc Reference	+5.0Vdc, 10mA maximum
6	kV Monitor	0 to 5Vdc = 0 to 100% rated output, 10KΩ Zout
7	mA Monitor	0 to 5Vdc = 0 to 100% rated output, 10KΩ Zout
8	Trip Input	Connect to ground to trip unit off
9	Local Voltage Program	Internal program potentiometer wiper, 0 to 5Vdc

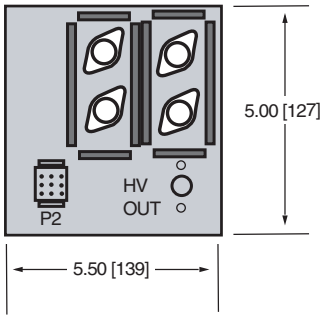
DIMENSIONS: in.[mm]

TOP VIEW

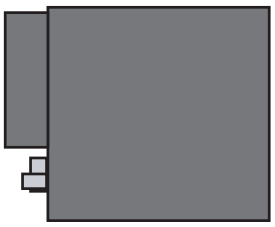
BOTTOM VIEW



FRONT VIEW



REAR VIEW



CE

SMS 60W POWER SUPPLY

- ***OUTPUT VOLTAGES FROM 1KV TO 60KV***
- ***LOW STORED ENERGY***
- ***TEST POINTS FOR OUTPUT CURRENT AND VOLTAGE***
- ***INHIBIT CONTROL OF OUTPUT VIA TTL SIGNAL***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/SMS

Spellman's SMS Series is based on a resonant flyback circuit that provides over 80% efficiency and high pulse current capability. Featuring voltage and current regulation with automatic crossover, The SMS is arc and short circuit protected making it ideal for a variety of applications.

TYPICAL APPLICATIONS

CRT Testing
Detector Arrays
Electrophoresis
X-ray Analysis
Cable Testing

SPECIFICATIONS

Input:
+24Vdc ±10%

Output:
10 models from 1kV to 60kV. Positive or negative polarity outputs.

Voltage Regulation:
Load:
Static: 0.01% of output voltage no load to full load.
Dynamic: 10V/100µA
Line: ±0.01% for ±10% change in input voltage.

Current Regulation:
Load: 0.1% of output current from 0 to rated voltage.
Line: 0.05% of rated current over specified input range.

Ripple:
0.1% p-p of maximum output voltage.

Dimensions:
3˝H x 5˝W x 9˝D (7.6cm x 12.7cm x 23.0cm).

Input Connector:
12 pin AMP Metri-Mate

Output Cable:
18˝±1˝ (45.7cm) of UL® approved high voltage wire.

Voltage Stability:
0.02% per 8 hours.

Voltage Temperature Coefficient:
0.01% per °C, voltage or current regulated.

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

CONNECTOR 12 PIN

J1	SIGNAL
1	Ground
2	+24Vdc
3	High Voltage Enable/Inhibit
4	Voltage Test Point: 10V±2%=0 to Rated Output
5	Current Test Point: 10V±2%=0 to Rated Output
6	Voltage Programming
7	Current Programming
8	+10Vdc Reference
9	Program and Test Point Return
10-12	Spare

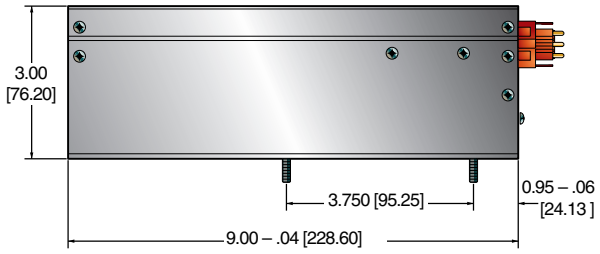
SMS SELECTION TABLE

Maximum Rating kV	Maximum Rating mA	Model Number
1	60	SMS 1*60
3	20	SMS 3*60
5	12	SMS 5*60
10	6	SMS 10*60
15	4	SMS 15*60
20	3	SMS 20*60
30	2	SMS 30*60
40	1.5	SMS 40*60
50	1.2	SMS 50*60
60	1.0	SMS 60*60

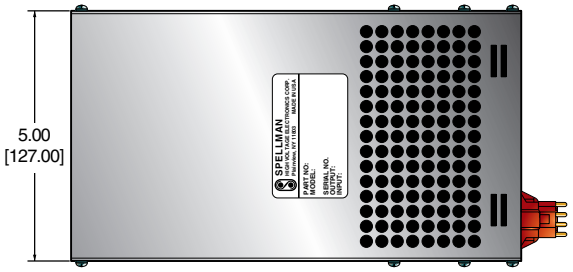
*Specify "P" for positive polarity or "N" for negative polarity.

DIMENSIONS: in.[mm]

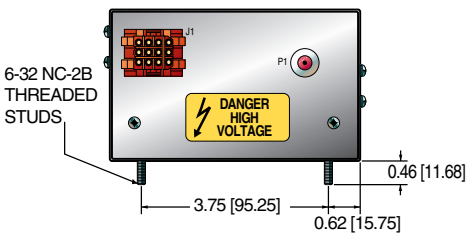
SIDE VIEW



TOP VIEW



BACK VIEW



CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com

128015-001 REV.G
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- **5 VOLTAGE RANGES FROM 8KV TO 20KV, FIXED NEGATIVE OR POSITIVE POLARITY**
- **AVAILABLE OUTPUT POWER INCREMENTS OF 60 AND 125 WATTS**
- **VOLTAGE/CURRENT REGULATION WITH AUTOMATIC CROSSOVER CONTROL**
- **VOLTAGE AND CURRENT MONITOR SIGNALS**
- **FULLY ARC AND SHORT CIRCUIT PROTECTED**
- **PRECISION +5V REFERENCE OUTPUT**
- **CE LISTED AND RoHS COMPLIANT**

www.spellmanhv.com/manuals/UMW

Form, Fit and Function Usability:
Spellman's UMW Series of high voltage modules provides users with a form, fit and function replacement for presently available commercially made units, while providing superior features and benefits at competitive pricing. Utilizing proprietary power conversion technology, unique high voltage packaging, and Spellman's unmatched encapsulation techniques, these SMT based high voltage modules provide improved performance and easier system integration at a lower cost when compared to the competition.

Advanced Power Conversion Topology:
UMW converters use a proprietary resonant power conversion topology providing exceptional efficiency and inherent low noise and ripple outputs. Radiated emissions are dramatically reduced compared to conventional switching topologies, effectively minimizing or even eliminating the need to shield the unit from adjacent circuitry.

The high voltage output is generated through the use of a ferrite core high voltage step up transformer which feeds the high voltage output circuitry. Units utilize an appropriate arrangement of low capacitance Cockcroft-Walton voltage multiplier stages to obtain the specified high voltage output.

Due to the fixed, high frequency conversion rate of the converter, the output capacitance is small resulting in minimal stored energy and fast rise times. Through the use of generously rated surge limiting resistors and a fast acting current loop, all units are fully arc and short circuit protected.

Control and Regulation:
The actual output voltage generated is sampled via a high impedance divider to create a voltage feedback signal. A current feedback signal is created via a current sense resistor being placed in the low end return of the high voltage output circuitry. These two accurate ground referenced feedback signals are used to precisely regulate and control the units output. These accurate and calibrated signals are also used for external monitoring purposes.

Due to the UMW's unique converter topology it can provide full current into low impedance loads or even a short circuit. Standard units limit at 103% of maximum rated output current.

Standard User Interface:
The Spellman UMW Series offers a standard customer interface that provides current programming capability and positive polarity, buffered, low output impedance voltage and current monitor signals (zero to +4.64Vdc equals zero to full scale rated). A voltage programming input is provided where 0 to +4.64Vdc equals 0 to 100% of rated voltage.

Current programmability allows the user to set where the unit will current limit, anywhere from 0 to 100% of maximum rated current. This feature is beneficial where less than full output current is desired, like in the case of protecting a sensitive load.

The buffered low impedance voltage and current monitor signals can drive external circuitry directly, while minimizing loading and pickup effects. These feature save the user the expense and implementation of external interface buffering circuitry while improving overall signal integrity.

Mechanical and Environmental Considerations:
The UMW Series are modular sheet metal enclosed converters measuring 8.00˝ X 4.50˝ X 1.075˝ (203mm X 114mm X 27mm). All units are encapsulated using a propriety silicon based potting material which is considerably lighter in weight than epoxy encapsulation techniques. Physical mounting of the unit is accomplished via the use of bottom mounted studs or threaded blind inserts, dependent upon model ordered.

SPECIFICATIONS

Input Voltage:
24Vdc

Normal Voltage Range:
23Vdc to 30Vdc

Derated Voltage Range:
11Vdc to 30Vdc

Input Current: (typical)
Disabled: <40mA
No load: <600mA
Full load:
60 watt units: 3 amps
125 watt units: 6.2 amps

Voltage Regulation:
Line: <0.01%
Load: <0.01%

Current Regulation:
Line: <0.01%
Load: <0.01%

Stability:
0.01% per 8 hours, 0.02% per day after 30 min. warmup

Accuracy:
2% on all programming and monitoring, except I Sense 10%

Temperature Coefficient: (typical)
100ppm/°C

Overshoot:
<0.1% Vp

Environmental:
Temperature Range:
Operating: -40˚C to 65˚C case temperature
Storage: -55˚C to 105˚C, non operational
Humidity:
10% to 90%, non-condensing

Dimensions:
8.00˝L X 4.50˝W X 1.075˝H
(203mm X 114mm X 27mm)

Weight:
1.75 lbs. (0.79kg)

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive. Compliant to 2002/95/EC, RoHS

UMW 60W SELECTION TABLE

Model Number	Output V	Output Current	Ripple(max) %Vp-p	Output Capacitance	Arc Limiting Resistance	I Sense Scaling Full Scale Signal
UMW8*60	0 to 8kV	7.5mA	<1.0 (C load ≥0.05µF)	3553pF	14.1kΩ	1.6V
UMW10*60	0 to 10kV	6mA	<1.0 (C load ≥0.05µF)	3553pF	14.1kΩ	1.47V
UMW12*60	0 to 12kV	5mA	<1.0 (C load ≥0.05µF)	2870pF	30kΩ	1.24V
UMW15*60	0 to 15kV	4mA	<1.0 (C load ≥0.05µF)	2460pF	30kΩ	1.0V
UMW20*60	0 to 20kV	3mA	<1.0 (C load ≥0.01µF)	2460pF	45kΩ	4.61V

UMW 125W SELECTION TABLE

Model Number	Output V	Output Current	Ripple(max) %Vp-p	Output Capacitance	Arc Limiting Resistance	I Sense Scaling Full Scale Signal
UMW8*125	0 to 8kV	15.5mA	<1.0 (C load ≥0.05µF)	7106pF	3kΩ	1.1V
UMW10*125	0 to 10kV	12.5mA	<1.0 (C load ≥0.05µF)	7106pF	3kΩ	1.15V
UMW12*125	0 to 12kV	10.5mA	<1.0 (C load ≥0.05µF)	5740pF	6.6kΩ	1.40V
UMW15*125	0 to 15kV	8.3mA	<1.0 (C load ≥0.05µF)	4920pF	6.6kΩ	1.1V
UMW20*125	0 to 20kV	6.25mA	<1.0 (C load ≥0.01µF)	4920pF	14.1kΩ	9.57V

Grayed text indicates Legacy interface signals.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128070-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

STANDARD INTERFACE

PIN	SIGNAL	PARAMETERS
1	Power Ground Return	+24Vdc power ground return
2	+ Power Input	+24Vdc power input
3	I Sense	See I Sense text and tables for details
4	Enable Input	Low (<0.7V, Isink@1mA)=HV OFF, High (open or >2V)=HV ON
5	Signal Ground	Signal Ground
6	Remote V Adjust	0 to +4.64Vdc = 0 to 100%, Zin >1MΩ
7	+5V Reference Output	+5Vdc ±2%. Zout = 475Ω
8	Power Ground Return	+24Vdc Power Ground Return
9	+ Power Input	+24Vdc Power Input
10	Signature Resistor	Unique identifying resistor connected to ground
11	Remote I Adjust	0 to +4.64Vdc = 0 to 100%, Zin >1MΩ Leave open for preset current limit @103% of rated output current
12	I Monitor	0 to +5Vdc = 0 to 107.5%, Zout <10kΩ
13	V Monitor	0 to +5Vdc = 0 to 107.5%, Zout <10kΩ
14	E Out Monitor	1.00 Volt, 1GΩ/1.1MΩ divider with 10MΩ meter

Interface Connections

Fourteen (14) gold plated 0.025˝ (0.63mm) square pins that will mate with AMP Mod-U connectors. See mechanical drawing for location and spacing details.

Programming and Monitor Signals

Voltage and current programming is done via positive polarity, high input impedance, 0 to 4.64Vdc signals. Voltage and current monitors are positive polarity, buffered low output impedance 0 to 4.64Vdc signals.

Signature Resistor

A unique identifying signature resistor for each type of unit is connected from Pin 10 to Ground. Details if desired are available upon request.

LEGACY INTERFACE (L OPTION)

PIN	SIGNAL	PARAMETERS
1	Power Ground Return	+24Vdc power ground return
2	+ Power Input	+24Vdc power input
3	I Sense	See I Sense text and tables for details
4	Enable Input	Low (<0.7V, Isink@1mA)=HV OFF, High (open or >2V)=HV ON
5	Signal Ground	Signal Ground
6	Remote Adjust	Positive Polarity Unit: 0 to +4.64Vdc = 0 to 100% rated voltage Zin>1MΩ Negative Polarity Unit: +5Vdc to 0.36Vdc = 0 to 100% rated voltage Zin>1MΩ
7	+5V Reference Output	+5Vdc ±2%. Zout = 475Ω
8	Power Ground Return	+24Vdc Power Ground Return
9	+ Power Input	+24Vdc Power Input
10	Signature Resistor	Unique identifying resistor connected to ground
11	N/C	
12	N/C	
13	N/C	
14	E Out Monitor	1.00 volt/kV, 1GΩ/1.1MΩ divider with 10MΩ meter

I Sense Signal

The polarity of the current monitor signal is opposite of the polarity of the output voltage of the unit that generated it. So a positive output polarity unit creates a negative polarity current monitor signal; while a negative output polarity unit creates a positive polarity current monitoring signal. This signal is clamped to ground internally via a bidirectional 18 volt transient protection device and the signal is made available via a series connected 47kΩ isolation resistor. Internal HV dividers create a small, linear offset voltage on this current monitor signal that can be compenstated for.

HIGH VOLTAGE MATING CONNECTOR

KV	CONNECTOR
8 10 12 15	LGH1 SHV P.N. 304781-001
20	LGH1L SHV P.N. 304781-101

Low Voltage Interface Connector

A mating AMP Mod-U interface connector will be provided.

High Voltage Output Mating Connector

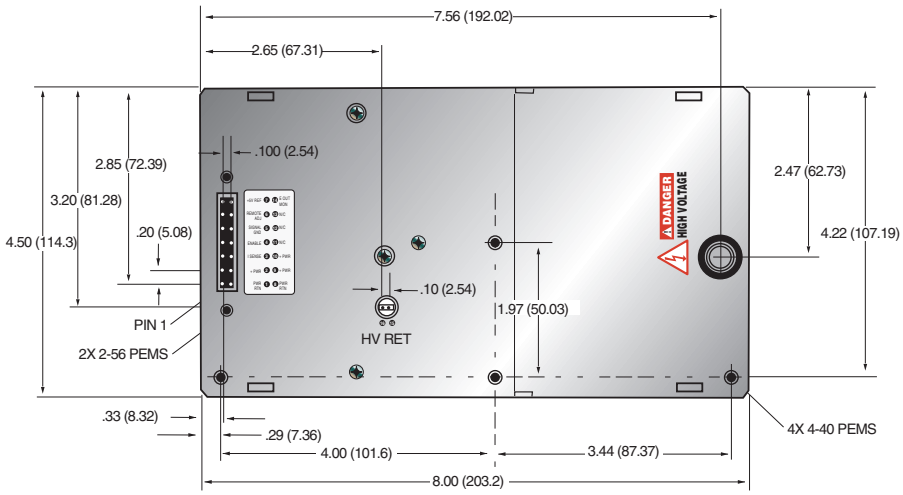
An appropriate mating LGH high voltage connector (36˝ long) will be required. Please see table to left for specific part number.

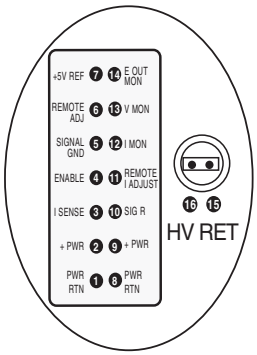
High Voltage Return

Two gold plated 0.025˝ (0.63mm) square pins (15 and 16) are provided. These are connected to Power Ground Return.

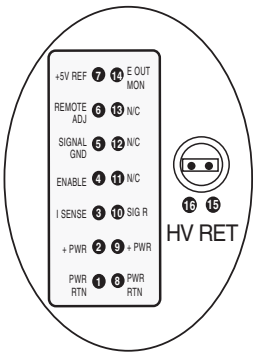
DIMENSIONS: in.[mm]

TOP VIEW



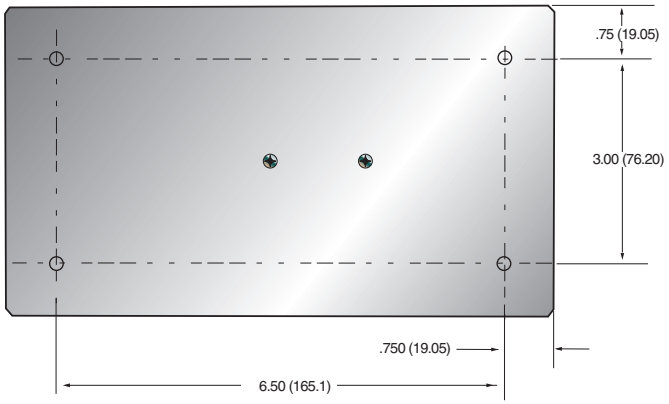


CLOSE UP SHOWING PIN CONFIGURATION. STANDARD INTERFACE SHOWN

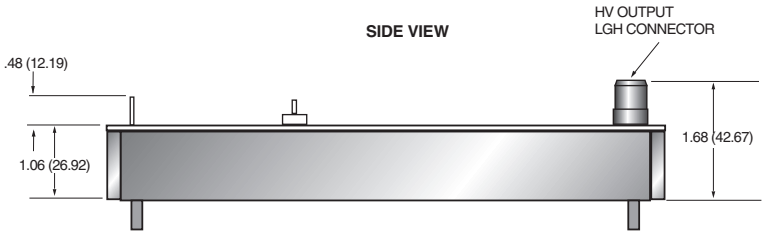


CLOSE UP SHOWING PIN CONFIGURATION. LEGACY INTERFACE SHOWN

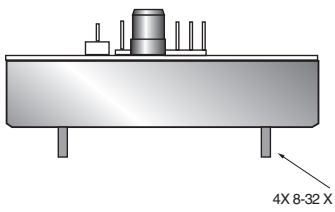
BOTTOM VIEW



SIDE VIEW



FRONT VIEW



ORDERING INFORMATION

Voltage	0 to 8kV	8
	0 to 10kV	10
	0 to 12kV	12
	0 to 15kV	15
	0 to 20kV	20
Polarity	Positive	P
	Negative	N
Power	60Watts	60
	125Watts	125
Legacy Interface	Legacy Interface	L

If a high voltage mating connector is required it should be included at time of order. See page 3 for details

ORDERING EXAMPLE

UMW15P125L

Model
Voltage
Polarity
Power
Option

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com

128070-001 REV.D

Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

PCM 120W POWER SUPPLY

- **OUTPUT VOLTAGE FROM 1KV TO 70KV**
- **UNIVERSAL INPUT, POWER FACTOR CORRECTED**
- **TEST POINTS FOR OUTPUT CURRENT AND VOLTAGE**
- **POWER ON, INTERLOCK CLOSED AND FAULT INDICATORS**

www.spellmanhv.com/manuals/PCM

Spellman's PCM Series of high voltage power supplies are well regulated with output voltages from 1kV to 70kV. These supplies feature universal AC input (85-265Vac) and power factor correction. They are designed with a resonant circuit that provides high efficiency and high pulse current capability up to 400W peak. The PCM Series incorporates local and remote programming, monitoring and fault indicators with safety interlock, and short-circuit and overload protection.

TYPICAL APPLICATIONS

Electrophoresis
X-ray Inspection
Detector Arrays
Capacitor Charging

SPECIFICATIONS

Input:
85-265Vac, 47-63Hz, power factor corrected.
UL® rated for 85-250Vac input for 1kV to 5kV models.

Power Factor (Typical):
FL: 0.99
NL: 0.98

Output:
11 models from 1kV to 70kV. Positive or negative polarity outputs.

Voltage Regulation:
Load: 0.01% of output voltage, no load to full load.
Line: ±0.01% for ±10% change in input voltage.

Current Regulation:
Load: 0.01% of output current from 0 to rated voltage.
Line: 0.01% of rated current over specified input range.

Ripple:
0.1% p-p of maximum output voltage.

Voltage Stability:
0.02% per 8 hours.

Voltage Temperature Coefficient:
100ppm per °C, voltage or current regulated.

Dimensions:
1kV to 50kV: 3.65"H x 5"W x 9"D (9.27cm x 12.7cm x 22.9cm).
60, 70kV: 3.65"H x 5"W x 11"D (9.27cm x 12.7cm x 27.9cm).

Connectors:
AC Input: IEC320 with mating cable.
Signal: 15pin D connector.

HV Output Cable:
Spellman Delrin type connector with 36" (91.4cm) shielded cable.

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.
UL/CUL recognized, File E148969 (up to 60kV only).

PCM SELECTION TABLE

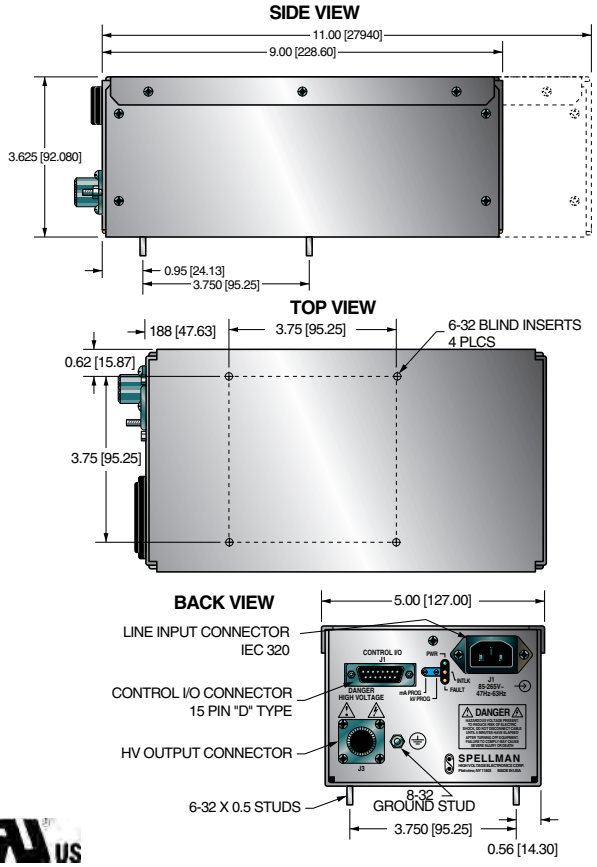
Maximum Rating kV	mA	Model Number	Maximum Rating kV	mA	Model Number
1	120	PCM 1*120	30	4	PCM 30*120
3	40	PCM 3*120	40	3	PCM 40*120
5	24	PCM 5*120	50	2.4	PCM 50*120
10	12	PCM 10*120	60	2	PCM 60*120
15	8	PCM 15*120	70	1.7	PCM 70*120
20	6	PCM 20*120			

*Specify "P" for positive polarity or "N" for negative polarity.

PCM D CONNECTOR 15 PIN

J1	SIGNAL	J1	SIGNAL
1	Remote mA Program	9	Power Supply Fault
2	Remote kV Program	10	+10V Reference
3	Enable (L)/Disable(H)	11	Signal Return
4	mA Monitor	12	Spare
5	Interlock Return	13	Spare
6	Interlock	14	Spare
7	kV Monitor	15	Local mA Program
8	Local kV Program		

DIMENSIONS: in.[mm]



- ***OUTPUT VOLTAGE FROM 1KV TO 70KV***
- ***OVERVOLTAGE AND SHORT-CIRCUIT PROTECTION***
- ***EMI/RFI INPUT FILTER***
- ***TEST POINTS FOR OUTPUT VOLTAGE AND CURRENT***
- ***INTERNAL 10V REFERENCE***
- ***OUTPUT INHIBIT CONTROL VIA TTL SIGNAL***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/PTV

Spellman's PTV Series of modular high voltage power supplies deliver up to 350W of continuous power. A quasi-resonant inverter design provides over 80% efficiency with very fast dynamic response. PTV power supplies incorporate extensive standard features in two power output ranges (200W and 350W) with a wide range of output voltages operating to the most exacting specifications.

TYPICAL APPLICATIONS

Projection Television
X-ray Systems
E-beam Systems
Capacitor Charging systems
CPT/CRT Testing

OPTIONS

FG	Floating Ground (50V max)
BPM/S	Bipolar Master/Slave
NSS	No Slow Start
TP(x)	Alternate Test Point Scaling

SPECIFICATIONS

Input:
115Vac±10%, 50/60Hz.
220Vac±10%, 50/60Hz.
Optional: 100Vac±10%, 50/60Hz.
Specify at time of ordering.

Output:
Models from 1kV to 70kV, 200W or 350W. Each model is available in positive or negative polarity outputs.

Voltage Regulation:
Load: 0.01% of output voltage no load to full load.
Line: ±0.01% for a ±10% change in input voltage.

Current Regulation:
Load: 0.01% of output current from 0 to rated voltage.
Line: 0.01% of rated current over specified input range.

Efficiency:
80%, typical.

Ripple:
PTV200: 0.1% p-p of output voltage.
PTV350: 0.2% p-p of output voltage.

Switching Frequency:
45-65kHz, nominal

Temperature:
Operating: 0°C to +40°C.
Storage: -40°C to +85°C.

Voltage Temperature Coefficient:
0.01%/°C

Stability (voltage & current):
0.01%/hr after 1/2 hour warm-up.
0.02% per 8 hours.

Cooling:
200W: Convection cooled.
350W: Fan cooled, rear air intake.

Dimensions:
1-40kV: $3^{3}/_{16}$"H x $10^{3}/_{4}$"W x 10"D
(8.1cm x 27.3cm x 25.4cm).
50-70kV: $4^{3}/_{16}$"H x $10^{7}/_{8}$"W x $11^{13}/_{16}$"D
(10.65cm x 27.6cm x 35.1cm).

HV Output:
Flying lead 18"±1"(45.7cm) UL listed.
AMP LGHI connector available for 40kV only.

Power Input Connector:
IEC320.

AC Line Voltage Input Cable:
Length: 8' (2.4m).

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.
UL/CUL recognized, File E148969 (up to 5kV only).

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128007-001 REV.F
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

PTV SELECTION TABLE

200 Watt Model PTV200			350 Watt Model PTV350		
kV	mA	Model Number	kV	mA	Model Number
1	200	PTV1*200	1	350	PTV1*350
3	70	PTV3*200	3	117	PTV3*350
5	40	PTV5*200	5	70	PTV5*350
10	20	PTV10*200	10	35	PTV10*350
15	14	PTV15*200	15	23	PTV15*350
20	10	PTV20*200	20	18	PTV20*350
25	8	PTV25*200	25	14	PTV25*350
30	7	PTV30*200	30	12	PTV30*350
40	5	PTV40*200	40	9	PTV40*350
50	4	PTV50*200	50	7	PTV50*350
60	3.3	PTV60*200	60	5.8	PTV60*350
70	2.85	PTV70*200	70	5.0	PTV70*350

*Specify “P” for positive polarity or “N” for negative polarity.

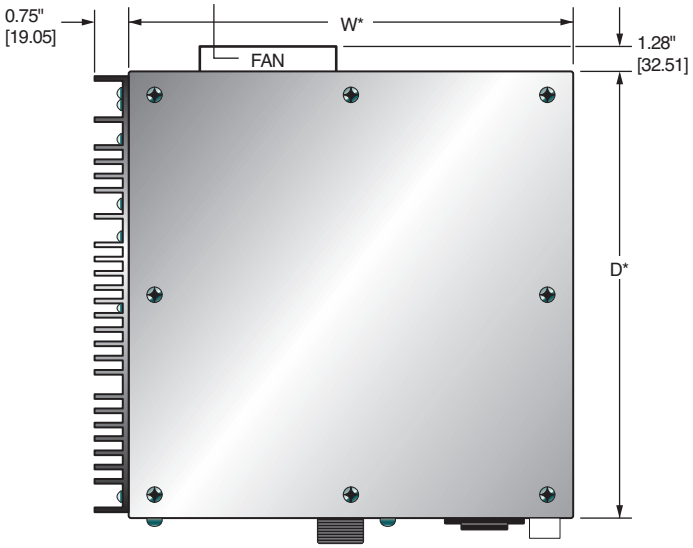
INTERFACE CONNECTOR 9 PIN

J2	SIGNAL	PARAMETERS
1	+10Vdc Reference	+10Vdc @ 1mA, maximum
2	Current Program	0 to 10Vdc = 0 to 100% rated output, Zin = 10MΩ
3	Voltage Monitor	0 to 10Vdc = 0 to 100% rated output, Zout = 10kΩ
4	Voltage Program	0 to 10Vdc = 0 to 100% rated output, Zin = 10MΩ
5	Common Ground	Power Ground
6	Current Monitor	0 to 10Vdc = 0 to 100% rated output, Zout = 10kΩ
7	Enable/Inhibit	Ground = Inhibit, Open = HV ON
8	OVP Indicator	Collector w/1kΩ pull up to +5Vdc, transistor on =OVP
9	Signal Return	Signal Return

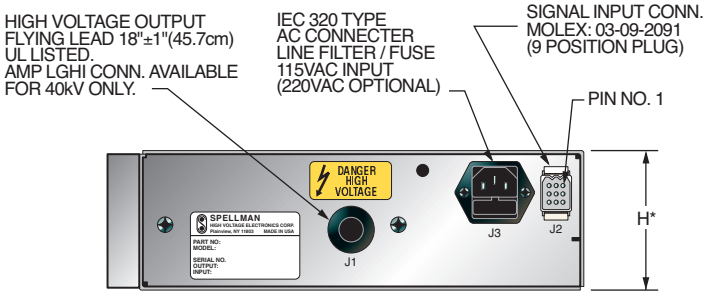
DIMENSIONS: in.[mm]

TOP VIEW

FOR 350W UNIT ONLY

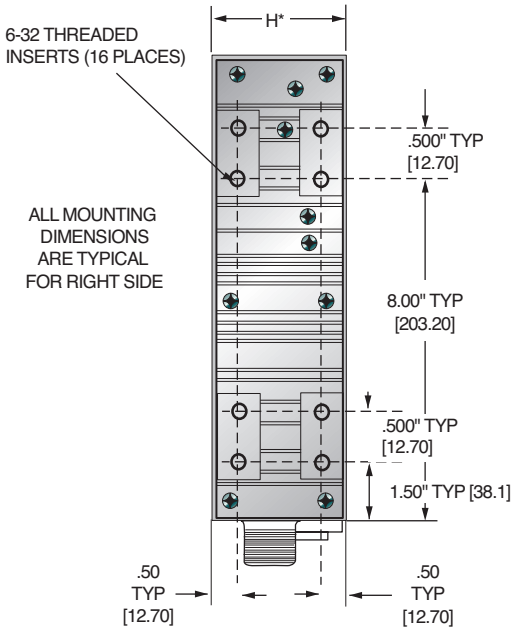


BACK VIEW



*See Specification for H, W, D Dimensions.

SIDE VIEW



MODULES

1200W

300W-600W

- ***COMPACT & LIGHTWEIGHT***
- ***MODELS FROM 1KV-70KV, 300W, 600W AND 1200W***
- ***UNIVERSAL INPUT, POWER FACTOR CORRECTED***
- ***LOW COST MODULAR DESIGN***
- ***STANDARD DIGITAL INTERFACES: USB, ETHERNET AND RS-232***

www.spellmanhv.com/manuals/SLM

Spellman's SLM Series of high voltage modules are designed for OEM applications up to 70kV at 1200 watts. Its universal input, small package size and choice of three standard digital interfaces simplifies integrating the SLM into your system design. Models are available in either positive or negative polarity. The SLM is fully arc and short protected. Excellent regulation specifications are provided along with outstanding stability performance.

TYPICAL APPLICATIONS

Capacitor Charging
HiPot Testing
CRT Testing
Electrostatics
E Beam Systems
CW Lasers

FIRMWARE CONFIGURATIONS

STANDARD BASED FEATURES

AOL	Adjustable Overload Trip
AT	Arc Trip
NAD	No Arc Detect
NSS	No Slow Start
PSS	Programmable Slow Start
RFR	Remote Fault Reset
RMI	Remote Mode Indicators
ROV	Remote Overvoltage Adjust

SPECIFICATIONS

Input Voltage:
Power factor corrected input, ≥0.98
90-264Vac, 47-63 Hertz, for 300 watt units
180-264Vac, 47-63 Hertz for 600 and 1200 watt units

Output Voltage:
11 models—1kV to 70kV

Output Polarity:
Negative or positive, specify at time of order

Local Indicators:
Arc, HV On, Temp Error, OVP, I Mode
Power On, OC, Reg Error

Power:
3 power ranges available—300, 600 and 1200 watts.
Other power levels available on special order.

Voltage Regulation:
≤0.01% of rated output voltage over specified input voltage range
≤0.01% of rated output voltage for a full load change

Current Regulation:
≤0.01% of rated output current over specified input voltage range
≤0.01% of rated output current for a ±100µA for a full voltage change

Ripple:
≤0.2% rms of maximum rated voltage, measured with a 10 foot long HV cable

Stability:
≤50ppm/hr after a 2 hour warm up

Temperature Coefficient:
≤100ppm per degree C

Environmental:
Temperature Range:
Operating: 0˚C to 40˚C
Storage: -40˚C to 85˚C
Humidity:
20% to 85% RH, non-condensing.

Control Interface

Local Interface:
Potentiometers are provided to adjust voltage and current.

Remote Interface: USB, Ethernet and RS232 are standard, implemented with 12 bits of resolution.
All digital monitors have an accuracy specification of 2%.

Control Software: A VB GUI will be provided for RS-232/USB, the Ethernet interface will have an embedded applet for control.

HV Control Enable/Interlock:
A dry contact, hardware based interlock is provided for remote mode. In local mode this I/O is the enable.

Monitor Signals:
Voltage and current monitor signals are scaled 0-10Vdc equals 0-100% of full scale, accuracy is 1%.

Cooling:
Forced air

Dimensions:
300/600 watts:
4.75˝ H X 6˝ W X 12˝ D (120.65mm x 152.4mm x 304.8mm)
1200 watts:
4.75˝ H X 12˝ W X 12˝ D (120.65mm x 304.8mm x 304.8mm)

Weight:
300/600 watts: 14 pounds (6.35kg)
1200 watts: 26 pounds (11.8kg)

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128035-001 REV.H
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

Input Line Connector:
IEC320 cord set with integrated EMI filter

Output Cable:
A detachable 10' (3.3m) long shielded HV cable is provided

Regulatory Approvals:
Compliant to 204/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive. UL/CUL recognized, File 227588; 300W and 600W only.

SLM SELECTION TABLE- 300W

300 Watt		
kV	mA	Model
1	300	SLM1*300
3	100	SLM3*300
5	60	SLM5*300
10	30	SLM10*300
15	20	SLM15*300
20	15	SLM20*300
30	10	SLM30*300
40	7.5	SLM40*300
50	6	SLM50*300
60	5	SLM60*300
70	4.28	SLM70*300

*Specify "P" for positive polarity or "N" for negative polarity

SLM SELECTION TABLE- 600W

600 Watt		
kV	mA	Model
1	600	SLM1*600
3	200	SLM3*600
5	120	SLM5*600
10	60	SLM10*600
15	40	SLM15*600
20	30	SLM20*600
30	20	SLM30*600
40	15	SLM40*600
50	12	SLM50*600
60	10	SLM60*600
70	8.56	SLM70*600

*Specify "P" for positive polarity or "N" for negative polarity

SLM SELECTION TABLE- 1200W

1200 Watt		
kV	mA	Model
1	1200	SLM1*1200
3	400	SLM3*1200
5	240	SLM5*1200
10	120	SLM10*1200
15	80	SLM15*1200
20	60	SLM20*1200
30	40	SLM30*1200
40	30	SLM40*1200
50	24	SLM50*1200
60	20	SLM60*1200
70	17.14	SLM70*1200

*Specify "P" for positive polarity or "N" for negative polarity

SLM ANALOG INTERFACE— J2 15 PIN MALE D CONNECTOR

PIN	SIGNAL	SIGNAL PARAMETERS
1	Power Supply Fault	Open Collector, 35V @ 10mA Maximum
2	Current Program In	0 to 10V=0 to 100% Rated Output, Zin=10MΩ
3	Voltage Program In	0 to 10V=0 to 100% Rated Output, Zin=10MΩ
4	NC	No Connection
5	Local Voltage Prog.	Multi-turn front panel potentiometer
6	NC	No Connection
7	Local Current Prog.	Multi-turn front panel potentiometer
8	Voltage Monitor	0 to 10V=0 to 100% Rated Output, Zout =4.99k, 1%
9	Signal Ground	Ground
10	Current Monitor	0 to 10V=0 to 100% Rated Output, Zout =4.99k, 1%
11	HV Enable Input	Connect to Pin 12 to HV Enable Supply
12	HV Enable Output	+15V @ Open, ≤15mA @ Closed
13	NC	No Connection
14	HV On Output Signal	Open Collector, 35V @10mA Maximum
15	Spare	No Connection

RS-232 DIGITAL INTERFACE— J3 9 PIN FEMALE D CONNECTOR

PIN	SIGNAL	SIGNAL PARAMETERS
1	NC	No Connection
2	TX out	Transmit Data
3	RX in	Receive Data
4	NC	No Connection
5	SGND	Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection

USB DIGITAL INTERFACE— J4 4 PIN USB "B" CONNECTOR

PIN	SIGNAL	SIGNAL PARAMETERS
1	VBUS	+5 Vdc
2	D-	Data -
3	D+	Data +
4	GND	Ground

ETHERNET DIGITAL INTERFACE— J5 8 PIN RJ45 CONNECTOR

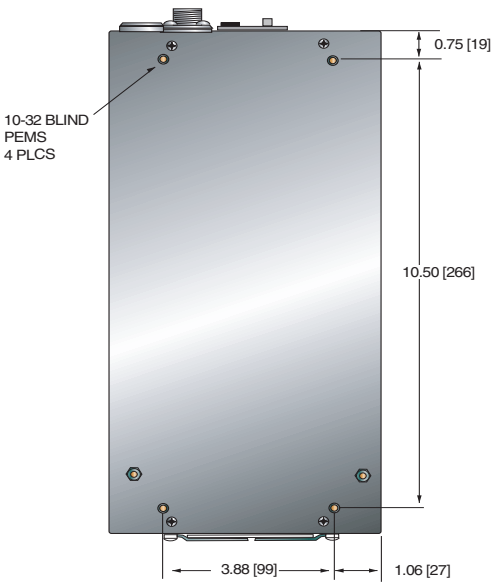
PIN	SIGNAL	SIGNAL PARAMETERS
1	TX+	Transmit Data +
2	TX-	Transmit Data -
3	RX+	Receive Data +
4	NC	No Connection
5	NC	No Connection
6	RX-	Receive Data -
7	NC	No Connection
8	NC	No Connection

MODULES

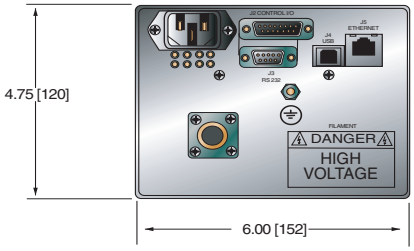
DIMENSIONS: in.[mm]

300/600 Watt

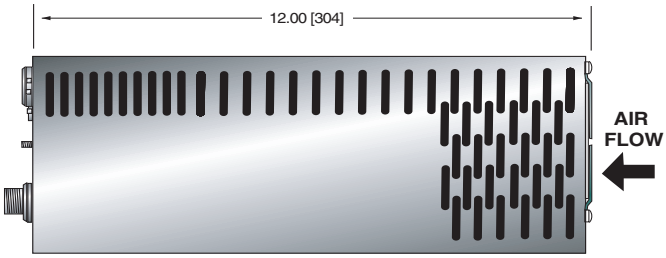
BOTTOM VIEW



FRONT VIEW

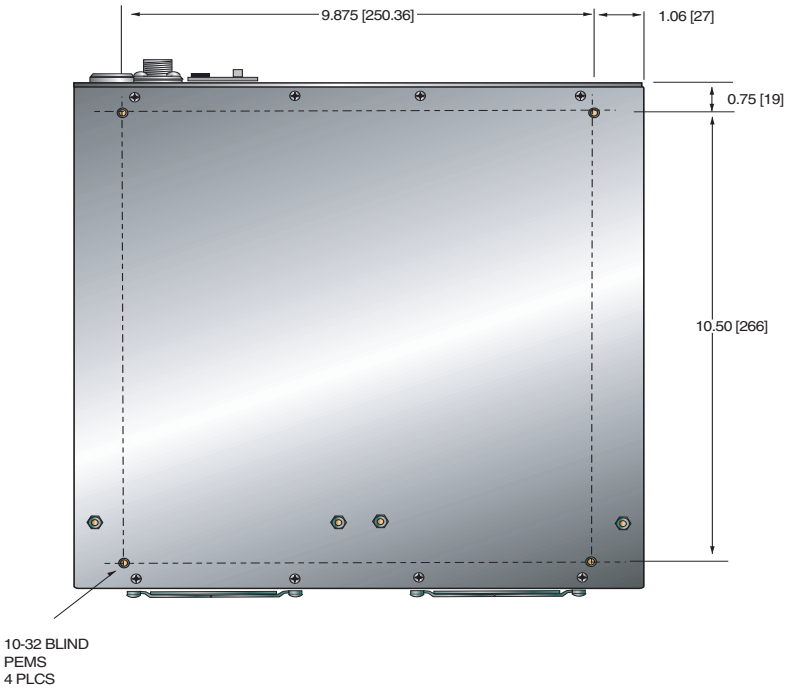


SIDE VIEW

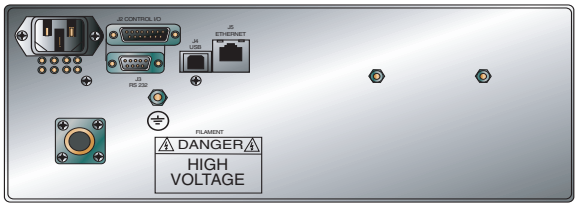


1200 Watt

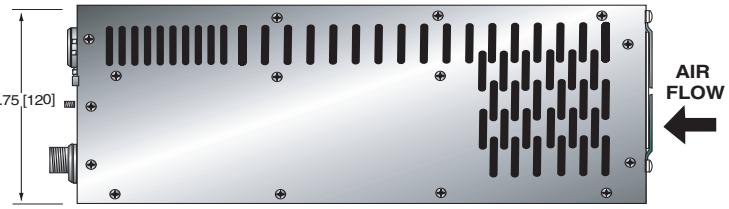
BOTTOM VIEW



FRONT VIEW



SIDE VIEW



CE cULus

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com

128035-001 REV.H
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***VERY COMPACT AND LIGHTWEIGHT***
- ***LOW EMI AND RFI***
- ***VOLTAGE RANGE FROM 1KV TO 130KV***
- ***REVERSIBLE POLARITY STANDARD UP TO 6KV***
- ***SYSTEM STATUS INDICATORS***
- ***EXTENSIVE ANALOG AND DIGITAL INTERFACE***
- ***ARC QUENCH/ARC COUNT/ARC TRIP***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/SL

RACK MOUNTED

Spellman's SL Series of high voltage power supplies are designed to meet uncompromising performance standards in a minimum of space. Their circuitry includes a resonant high frequency inverter with proprietary control which provides fault-free operation in extreme transient and arcing environments with greater than 85% efficiency. These full featured supplies are available in a wide range of outputs with many options.

TYPICAL APPLICATIONS

Analytical X-ray	Capacitor Charging
CPT/CRT Testing	Hipot Testing
Electrostatics	General Laboratory
E-Beam Systems	CW Lasers

OPTIONS

See page 4 for options and descriptions

SPECIFICATIONS

Status Indicators:
Voltage and Current Control Mode, Interlock Open and Closed, High Voltage Inhibit, Overcurrent and Overvoltage, Arc, Regulation Error, Overtemperature, Over Power (Optional).

Input:
115Vac or 220Vac±10%, 50/60Hz. Specify with order. 1200W model available in 200/220Vac only.

Output:
Models available from 1kV to 130kV. Each model is available in positive, negative or reversible polarity output.

Front Panel Controls:
Voltage and current are continuously adjustable by ten-turn potentiometers with lockable counting dials, ON/OFF circuit breaker/lamp, high voltage ON switch/indicator and high voltage OFF switch/indicator.

Voltage Regulation:
Load: 0.005% of maximum voltage +500mV for full load change.
Line: ±0.005% of full voltage +500mV over specified input range

Current Regulation:
Load: 0.01% of maximum current ±100μA for full voltage change.
Line: ±0.005% of maximum current for a ±10% input line change.

Ripple:
0.1% p-p +1Vrms.

Temperature Coefficient:
100ppm/°C voltage or current regulated. Higher stability is available on special order.

Environmental:
Temperature Range:
Operating: 0°C to 50°C.
Storage: -40°C to 85°C.
Humidity:
10 to 90% relative humidity, non-condensing

Stability:
100ppm/hour after 1/2 hour warm-up for both voltage and current regulation.

Metering:
Digital voltage and current meters, $3^1/_2$ digit ±1 least significant digit.

Output Cable:
10' (3.05m) of shielded high voltage cable removable at the rear panel.

AC Line Input Cable:
10 to 300W: IEC320 Cord Set, 6' (1.83m)
600 to 1200W: 3-conductor, 12AWG, 6' (1.83m) cable permanently attached to unit.

Dimensions:
10W – 300W: $1^3/_4$"H(1U) x 19"W x 19"D**
(4.45cm x 48.3cm x 48.3cm).
600W – 1200W: $3^1/_2$"H(2U) x 19"W x 19"D**
(8.9cm x 48.3cm x 48.3cm).
**Depth becomes 24" (60.7cm) for 80 to 130kV ranges.

Weight:
17 to 30lbs (7.7 to 14kg) depending on model.

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

SL SELECTION TABLE- 10W, 30W, 60W — 1.75" (1U)

kV	10 Watt mA	10 Watt Model	30 Watt mA	30 Watt Model	60 Watt mA	60 Watt Model
1	10	SL1PN10	30	SL1PN30	60	SL1PN60
2	5	SL2PN10	15	SL2PN30	30	SL2PN60
3	3.3	SL3PN10	10	SL3PN30	20	SL3PN60
6	1.7	SL6PN10	5	SL6PN30	10	SL6PN60
8	1.25	SL8PN10	3.75	SL8PN30	7.5	SL8PN60
10	1.0	SL10*10	3	SL10*30	6	SL10*60
15	0.67	SL15*10	2	SL15*30	4	SL15*60
20	0.50	SL20*10	1.5	SL20*30	3	SL20*60
30	0.33	SL30*10	1.0	SL30*30	2	SL30*60
40	0.25	SL40*10	0.75	SL40*30	1.5	SL40*60
50	0.20	SL50*10	0.60	SL50*30	1.2	SL50*60
60	0.17	SL60*10	0.50	SL60*30	1.0	SL60*60
70	0.14	SL70*10	0.43	SL70*30	0.85	SL70*60
80	0.13	SL80*10	0.38	SL80*30	0.75	SL80*60
100	0.10	SL100*10	0.30	SL100*30	0.60	SL100*60
120	0.10	SL120*10	0.25	SL120*30	0.50	SL120*60
130	0.10	SL130*10	0.25	SL130*30	0.46	SL130*60

*Specify "P" for positive, "N" for negative, or "PN" for reversible polarity.
Higher voltage models available on special order.

SL SELECTION TABLE- 150W, 300W — 1.75" (1U)

kV	150 Watt mA	150 Watt Model	300 Watt mA	300 Watt Model
1	150	SL1PN150	300	SL1PN300
2	75	SL2PN150	150	SL2PN300
3	50	SL3PN150	100	SL3PN300
6	25	SL6PN150	50	SL6PN300
8	18.75	SL8PN150	37.5	SL8PN300
10	15	SL10*150	30	SL10*300
15	10	SL15*150	20	SL15*300
20	7.5	SL20*150	15	SL20*300
30	5.0	SL30*150	10	SL30*300
40	3.75	SL40*150	7.5	SL40*300
50	3.00	SL50*150	6.0	SL50*300
60	2.50	SL60*150	5.0	SL60*300
70	2.1	SL70*150	4.28	SL70*300
80	1.90	SL80*150	3.75	SL80*300
100	1.50	SL100*150	3.00	SL100*300
120	1.25	SL120*150	2.50	SL120*300
130	1.15	SL130*150	2.30	SL130*300

*Specify "P" for positive, "N" for negative, or "PN" for reversible polarity. Higher voltage models available on special order.

SL SELECTION TABLE- 600W, 1200W — 3.50" (2U)

kV	600 Watt mA	600 Watt Model	1200 Watt mA	1200 Watt Model
1	600	SL1PN600	1200	SL1PN1200
2	300	SL2PN600	600	SL2PN1200
3	200	SL3PN600	400	SL3PN1200
6	100	SL6PN600	200	SL6PN1200
8	75	SL8PN600	150	SL8PN1200
10	60	SL10*600	120	SL10*1200
15	40	SL15*600	80	SL15*1200
20	30	SL20*600	60	SL20*1200
30	20	SL30*600	40	SL30*1200
40	15	SL40*600	30	SL40*1200
50	12	SL50*600	24	SL50*1200
60	10	SL60*600	20	SL60*1200
70	8.6	SL70*600	17	SL70*1200
80	7.5	SL80*600	15	SL80*1200
100	6.0	SL100*600	12	SL100*1200
120	5.0	SL120*600	10	SL120*1200
130	4.6	SL130*600	9.2	SL130*1200

*Specify "P" for positive, "N" for negative, or "PN" for reversible polarity. Higher voltage models available on special order.

SL TERMINAL BLOCK 26 PIN

TB1	SIGNAL	SIGNAL PARAMETERS
1	Power Supply Common	Signal Ground
2	External Inhibit	Ground=Inhibit, Open=HV On
3	External Interlock	+15V at Open, <15mA at Closed
4	External Interlock Return	Return for Interlock
5	Current Monitor	0 to 10V=0 to 100% Rated Output
6	kV Test Point	0 to 10V=0 to 100% Rated Output
7	+10Vdc Reference	+10Vdc, 1mA Max
8	Remote Current Program In	0 to 10V=0 to 100% Rated Output
9	Local Current Program Out	Front Panel Program Voltage
10	Remote Voltage Program In	0 to 10V=0 to 100% Rated Output
11	Local Voltage Program Out	Front Panel Program Voltage
12	Power Monitor	0 to 10V=0 to 100% Rated Output
13	Remote Power Program In	(Optional)
14	Local HV Off Out	+15V at Open, <25mA at Closed
15	HV Off	Connect to HV OFF for FP Operation
16	Remote HV On	+15V, 10mA Max=HV Off
17	Remote HV Off Indicator	0=HV On, +15V, 10mA Max=HV Off
18	Remote HV On Indicator	0=HV Off, +15V, 10mA Max=HV On
19	Remote Voltage Mode	Open Collector 35V Max, 10mA Max
20	Remote Current Mode	On=Active
21	Remote Power Mode	
22	Remote PS Fault	0=Fault, +15V, 0.1mA Max=No Fault
23	+15V Output	+15V, 100mA Max
24	Power Supply Common	Signal Ground
25	Spare	Spare
26	Shield Return	Chassis Ground

How To Order:

Sample model number: SL80PN1200/NSS/DPM4

SL series unit, 80kV maximum output voltage, reversible polarity output, 1200 watts, no slow start, 4.5 digit panel meters

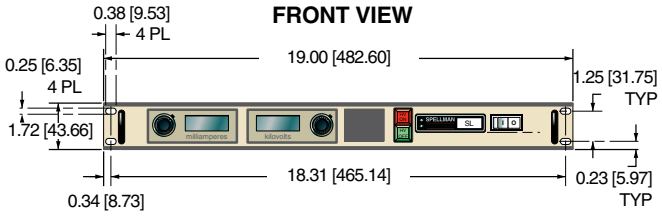
There may be some restrictions on multiple option combinations. Please contact our Sales department for more details.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128009-001 REV.W
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

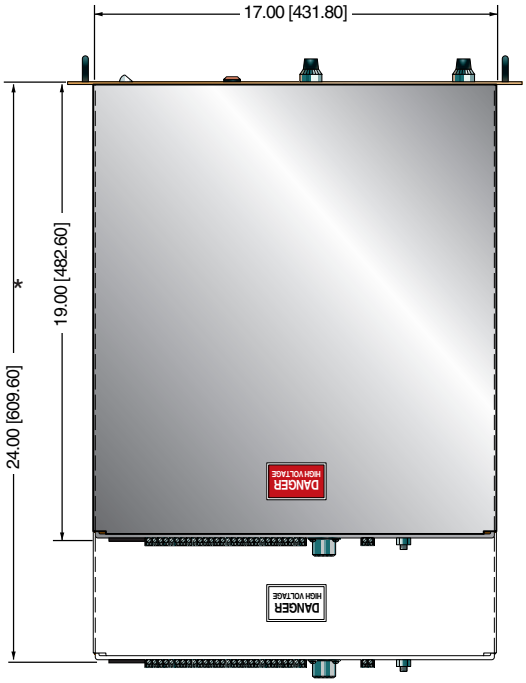
DIMENSIONS: in.[mm]

10W-300W

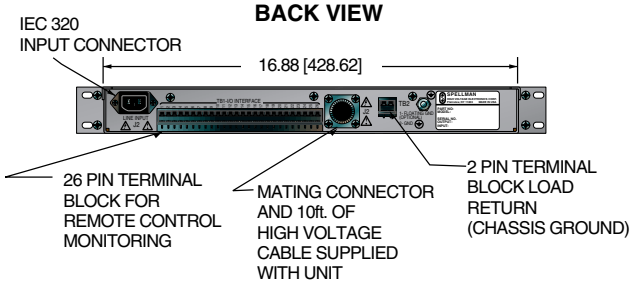
FRONT VIEW



TOP VIEW

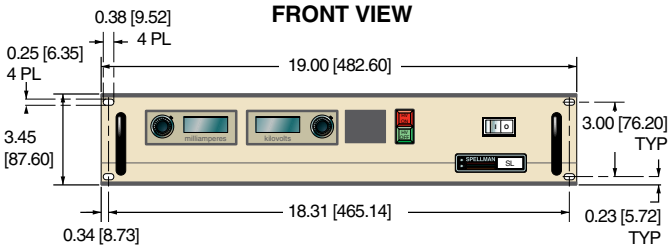


BACK VIEW

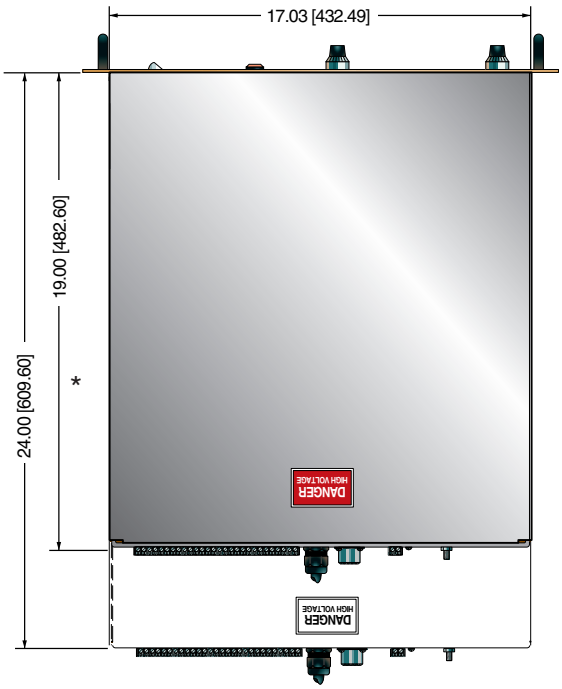


600W-1200W

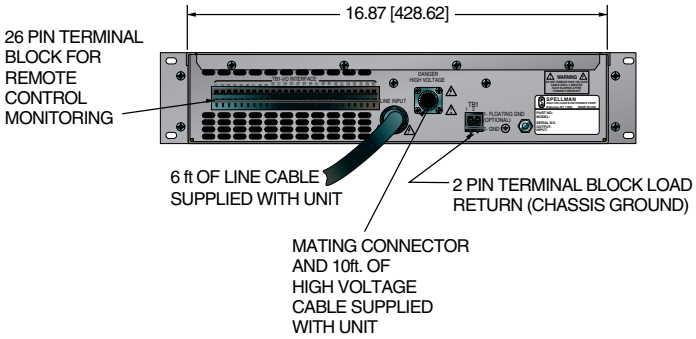
FRONT VIEW



TOP VIEW



BACK VIEW



*** Depth becomes 24" [609.60] for 80kV to 130kV range.**

CE

RACK MOUNTED

SL SERIES OPTIONS

AOL *Adjustable Overload Trip*
A control board jumper is moved to make the power supply shut down if it ever operates in current mode. This allows the user to set the current programming level as a trip point that will turn the power supply off with an Over Current fault if it ever tries to operate in Current Mode.

APT *Adjustable Power Trip*
A third control loop is installed in the power supply, a power loop. This power loop uses an analog multiplier chip to multiply the voltage and current feedback signals to create a power feedback signal. Programming and feedback scaling is 0-10Vdc = 0-100% of rated power. The circuit is configured to trip the power supply off with an Over Power fault if the power loop ever tries to regulate.

AT *Arc Trip*
A control board jumper is moved such that the first arc sensed will shut the power supply off with an ARC fault.

BPM *Bipolar Master*

BPS *Bipolar Slave*
This option configures two identical but opposite polarity units to function as a single tracking bipolar supply. The voltage feedback of the master (positive unit) is provided to the voltage programming input of the slave (negative unit).

CMS *Current Mode Select*
A front panel switch is provided to allow the power supply to either regulate in current mode or create an over current fault when operated in current mode, which will shut down the supply. This is basically a switch selectable AOL option.

CPC *Constant Power Control*
Identical to the APT Option with the exception the power supply will run and regulate when the power loop becomes active.

DPM4 *Digital Panel Meter, 4.5 digits*
The standard 3.5 digit front panel meters are replaced with 4.5 digit panel meters.

EFR *External Fault Relay*
A set of relay contacts are provided via the rear panel interface that will change state if the power supply shuts down due to a fault condition.

FCV *Fine Control Voltage*
This option adds a second potentiometer to the front panel of the unit. This allows for a finer local adjustment of the output voltage setting.

FG *Floating Ground*
All the analog returns inside the power supply are isolated from chassis and brought to one point on the rear panel. Any current that flows out of the power supply via the HV cable/connecter on the high side must return back to the multiplier via the load return on the low side. With only one path to flow through on the low side, a current meter can be inserted in series and a safe ground referenced measurement can be made of the actual high voltage output current.

FGLL *Floating Ground Low Leakage*
Identical functionality as the FG Option but a shield is placed around the high voltage multiplier to capture any leakage current inside the power supply and return it to the top of the current sense resistor. This negates any internal leakage currents from effecting measurements being made.

IO *Instant On*
A jumper is placed between TB1-15 and TB1-16 on the rear panel, causing the power supply to automatically toggle into HV ON when ever the line voltage is applied.

LL(X) *Lead Length*
Extra long high voltage output cable. 20, 40, 60 and 100 feet are standard lengths. Non standard lengths can be custom ordered.

LR *Low Ripple*
Done on a case by case basis, the standard unit is evaluated and modifications are done to improve the output ripple to 0.05% peak to peak. The operating frequency might be increased, or additional filtering may be added to the HV multiplier.

NAD *No Arc Detect*
This option removes the arc intervention circuitry from the power supply. Care must be exercised when using this option as damage to the HV multiplier could occur.

NSS *No Slow Start*
The standard 6 second long linear ramp of output voltage is removed allowing the high voltage to "step" to its set point when enabled.

PN *Positive/Negative*
Reversible polarity option. Units that are not inherently reversible by design (10kV to 130kV) can have their output polarity reversed by the process of exchanging the high voltage multiplier section.

RFR *Remote Fault Reset*
This option provides the ability to reset any power supply faults that might occur via toggling a signal on the rear panel interface.

ROV *Remote Over Voltage*
The programming signal for the over voltage comparator circuit is made available to the customer remotely, allowing the power supply to be set to trip the OVP circuit anywhere from 0 -110% of rated output voltage.

SL *Slides*
Industry standard rack mounted slides are installed on the power supply.

SS(X) *Slow Start(X)*
The standard slow start is modified to provide a time of (X) seconds. Time frames of 0.1 seconds to 120 seconds can be accommodated.

There may be some restrictions on multiple option combinations. Please contact our Sales department for more details.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128009-001 REV.W
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***1-50KV @ 15-30 WATTS***
- ***STANDARD RACK MOUNTED DESIGN***
- ***LOW RIPPLE AND NOISE***
- ***DIGITAL METERING***
- ***REVERSIBLE OUTPUT POLARITY***

www.spellmanhv.com/manuals/205B

RACK MOUNTED

Spellman's Bertan brand of 205B Series high voltage power supplies provide regulated high voltage outputs from 1 to 50kV. The low noise, linear topology employed results in extremely low output ripple specifications. These 15 to 30 watt units are inherently reversible by design, providing either positive or negative output polarity. The 205B is fully arc and short circuit protected. Excellent regulation specifications are featured along with outstanding stability performance.

TYPICAL APPLICATIONS

HiPot Testing
CRT Testing
Electrostatics
E Beam Systems
General Laboratory Usage

SPECIFICATIONS

Input Voltage:
115Vac, ±10%, 50/60 Hertz @ 1 amp
230Vac, ±10%, 50/60 Hertz @ 0.5 amps
Input voltage is switch selectable

Output Voltage:
See "model selection" table

Output Polarity:
All units are reversible polarity by design

Output Current:
See "model selection" table

Voltage Regulation:
Line: ≤50ppm/0.001% of rated output voltage over specified input voltage range
Load: ≤0.005% of rated output voltage for a full load change

Current Regulation:
Internally set to limit at 105% of rated current at full output voltage. Maximum output current at any other voltage setting must be derated linearly down to 30% of maximum at zero output voltage.

Ripple:
See "model selection" table

Temperature Coefficient:
≤50ppm/°C

Stability:
≤0.01%/hour, 0.02% per 8 hours after a 1/2 hour warm up

Accuracy:
Current Monitor: ±(0.5% of reading + 0.25% of maximum)
Remote Programming: ±(0.1% of setting + 0.1% of maximum)
Voltage Monitor: ±(0.1% of reading + 0.1% of maximum)
Front Panel Meter: Voltage ±(0.1% of setting + 0.1% of maximum)
Current: ±(0.25% of setting + 0.25% of maximum)
Front Panel Control: ±(0.25% of setting + 0.05% of maximum)

Operating Temperature:
0°C to +50°C

Storage Temperature:
-40°C to +85°C

Humidity:
20% to 85%RH, non-condensing

Input Line Connector:
IEC320 EMI filter/ input connecter, a detachable line cord is provided

Interface Connector:
9 pin "D" connector, a mating connector is provided

Output Connector:
A detachable 10 foot (3 meter) long HV cable is provided

Cooling:
Convection cooled

Dimensions:
1-20kV:19.0″ W X 3.5″ H X 9.625″ D
(483mm X 89mm X 244mm)
30-50kV:19.0″ W X 5.25″ H X 16.0″ D
(483mm X 133mm X 406mm)

Weight:
≤20 pounds (9.1kg) up to and including 20kV units,
≤35 pounds (15.9kg) for 30kV and 50kV units

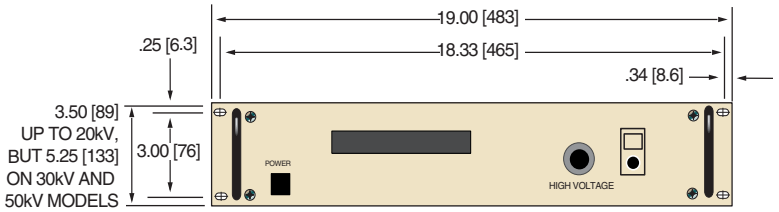
Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

MODEL SELECTION TABLE

205B Series	Voltage	Current	Ripple
205B-01R	0 to 1kV	0 to 30mA	10mV
205B-03R	0 to 3kV	0 to 10mA	30mV
205B-05R	0 to 5kV	0 to 5mA	50mV
205B-10R	0 to 10kV	0 to 2.5mA	100mV
205B-20R	0 to 20kV	0 to 1mA	300mV
205B-30R	0 to 30kV	0 to 0.5mA	400mV
205B-50R	0 to 50kV	0 to 0.3mA	2 volts

DIMENSIONS: in.[mm]

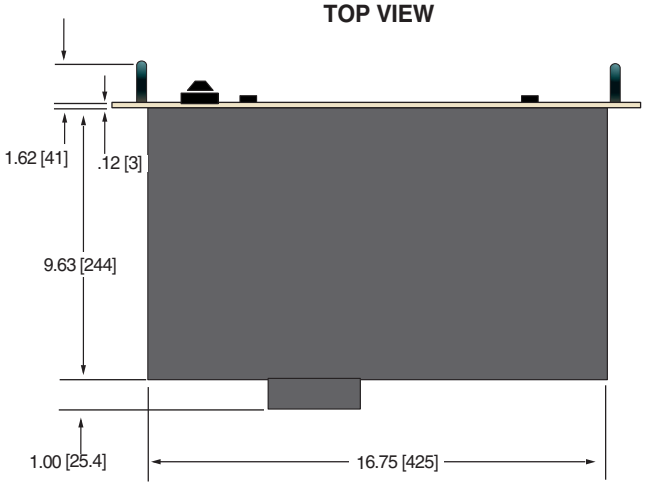
FRONT VIEW



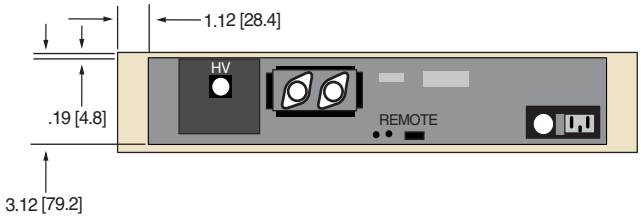
INTERFACE CONNECTOR

PIN	SIGNAL	PARAMETERS
1	Voltage Monitor	0 to 5Vdc = 0 to 100% rated voltage, Zout = 10KΩ
2	n/c	none
3	Enable	TTL "0" disables HV, TTL "1" or open enables HV
4	+5Vdc Reference	+5.0Vdc @ 10mA, maximum
5	Current Monitor	0 to 5Vdc = 0 to 100% rated current, Zout = 10KΩ
6	Voltage Program Input	0 to 5Vdc = 0 to 100% rated voltage, Zin = 1MΩ
7	Analog Ground	Ground
8	Digital Ground	Ground (for use only with 200-C488, sold separately)
9	Polarity Indicator	Open collector, 30V @ 25mA, positive = ON

TOP VIEW



BACK VIEW



CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128046-001 REV.F
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***STANDARD RACK MOUNTED DESIGN***
- ***LOW RIPPLE AND NOISE***
- ***5.5 DIGIT FRONT PANEL DIGITAL METERING***
- ***REVERSIBLE OUTPUT POLARITY***
- ***IEEE-488 INTERFACE***

www.spellmanhv.com/manuals/225

Spellman's Bertan brand of 225 Series high voltage power supplies provide regulated high voltage outputs from 500V to 50kV. An advanced IEEE-488 digital interface, allowing comprehensive power supply control capability is included. The low noise, linear topology employed results in extremely low output ripple specifications. These 15 to 30 watt units are inherently reversible by design, providing either positive or negative output polarity. The 225 is fully arc and short circuit protected. Excellent regulation specifications are featured along with outstanding stability performance.

TYPICAL APPLICATIONS

HiPot Testing
CRT Testing
Electrostatics
E Beam Systems
General Laboratory Usage

SPECIFICATIONS

Input Voltage:
115Vac, ±10%, 50/60 Hertz @ 2 amps
230Vac, ±10%, 50/60 Hertz @ 1 amp
Input voltage is switch selectable

Output Voltage:
See "model selection" table

Output Polarity:
All units are reversible polarity by design

Output Current:
See "model selection" table

Voltage Regulation:
Line: ≤0.001% of rated output voltage over specified input voltage range
Load: ≤0.005% of rated output voltage for a full load change

Current Regulation:
Internally set to limit at 105% of rated current at full output voltage. Maximum output current at any other voltage setting must be derated linearly down to 30% of maximum at zero output voltage

Ripple:
See "model selection" table

Temperature Coefficient:
≤50ppm/°C

Stability:
≤0.01%/hour, 0.02% per 8 hours after a 1/2 hour warm up

Accuracy:
Current Monitor: ±(0.5% of reading + 0.25% of maximum)
Remote Programming: ±(0.1% of setting + 0.05% of maximum)
Voltage Monitor: ±(0.1% of reading + 0.05% of maximum)
Front Panel Meter: Voltage ±(0.1% of setting + 0.1% of maximum)
Current: ±(0.1% of setting + 0.1% of maximum)
Front Panel Control: ±(0.1% of setting + 0.05% of maximum)

Front Panel Metering and Controls:
5.5 digit metering for voltage and current
Power ON/OFF switch
High Voltage ON/OFF switch
Velocity proportional digital potentiometer and pushbuttons for inputting operational parameters

IEEE-488 Interface:
Controllable parameters:
Voltage program, voltage limit, current limit, overload response mode and SRQ mode

Reportable Parameters:
Voltage monitor, current monitor, limit settings, mode settings, polarity and status information

Operating Temperature
0°C to +50°C

Storage Temperature:
-40°C to +85°C

Humidity:
20% to 85% RH, non-condensing

Input Line Connector:
IEC320 EMI filter/input connector, a detachable line cord is provided

Interface Connector:
9 pin "D" connector, a mating connector is provided

GPIB Connector:
IEEE-488

Output Connector:
A detachable 10 foot (3 meter) long HV cable is provided

RACK MOUNTED

Cooling:
Convection cooled

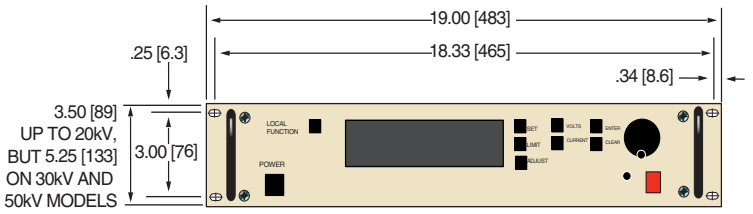
Dimensions
1-20kV: 19.0″W X 3.5″H X 9.625″D
(483mm X 89mm X 244mm)
30-50kV: 19.0″W X 5.25″H X 16.0″D
(483mm X 133mm X 406mm)

Weight:
≤20 pounds (9.1kg) up to and including 20kV units,
≤35 pounds (15.9kg) for 30kV and 50kV units

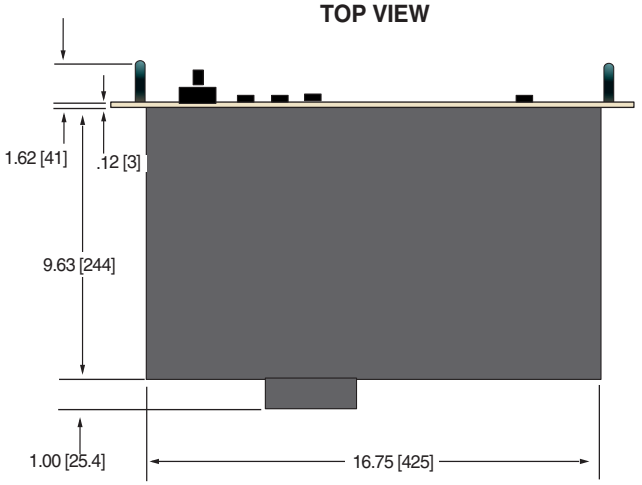
Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

DIMENSIONS: in.[mm]

FRONT VIEW



TOP VIEW



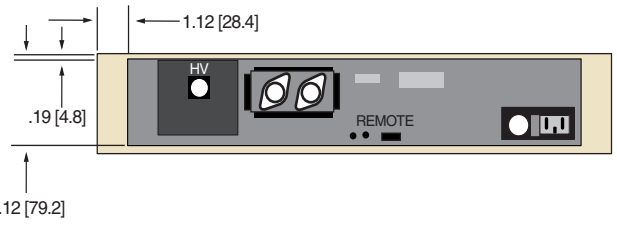
MODEL SELECTION TABLE

225 Series	Voltage	Current	Ripple	Voltage Resolution	Current Resolution
225-0.5R	0 to 500V	0 to 60mA	10mV	100mV	1uA
225-01R	0 to1kV	0 to 30mA	10mV	100mV	1uA
225-03R	0 to 3kV	0 to 10mA	30mV	100mV	1uA
225-05R	0 to 5kV	0 to 5mA	50mV	100mV	0.1uA
225-10R	0 to 10kV	0 to 2.5mA	100mV	1 volt	0.1uA
225-20R	0 to 20kV	0 to 1mA	300mV	1 volt	0.1uA
225-30R	0 to 30kV	0 to 0.5mA	400mV	1 volt	0.01uA
225-50R	0 to 50kV	0 to 0.3mA	2 volts	1 volt	0.01uA

INTERFACE CONNECTOR

PIN	SIGNAL	PARAMETERS
1	Voltage Monitor	0 to 5Vdc = 0 to 100% rated voltage, Zout = 10KΩ
2	n/c	none
3	Enable	TTL “0” disables HV, TTL “1” or open enables HV
4	+5Vdc Reference	+5.0Vdc @ 10mA, maximum
5	Current Monitor	0 to 5Vdc = 0 to 100% rated current, Zout = 10KΩ
6	Voltage Program Input	0 to 5Vdc = 0 to 100% rated voltage, Zin = 1MΩ
7	Analog Ground	Ground
8	Digital Ground	Ground
9	Polarity Indicator	Open collector, 30V @ 25mA, positive = ON

BACK VIEW



CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128047-001 REV.G
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***STANDARD RACK MOUNTED DESIGN***
- ***LOW RIPPLE AND NOISE***
- ***REVERSIBLE OUTPUT POLARITY***

www.spellmanhv.com/manuals/210

Spellman's Bertan brand of 210 Series of 125 to 225 watt high voltage power supplies provide regulated high voltage outputs from 1 to 50kV. The low noise, linear topology employed results in extremely low output ripple specifications. Units are inherently reversible by design, providing either positive or negative output polarity. The 210 is fully arc and short circuit protected. Excellent regulation specifications are featured along with outstanding stability performance.

TYPICAL APPLICATIONS

HiPot Testing
CRT Testing
Electrostatics
E Beam Systems
General Laboratory Usage

SPECIFICATIONS

Input Voltage:
115Vac, ±10%, 50/60 Hertz @ 5 amps
230Vac, ±10%, 50/60 Hertz @ 2.5 amps
Input voltage is switch selectable

Output Voltage:
See "model selection" table

Output Polarity:
1kV to 50kV units are inherently reversible by design

Output Current:
See "model selection" table

Voltage Regulation:
Line: ≤0.001% of rated output voltage over specified input voltage range
Load: ≤0.005% of rated output voltage for a full load change

Current Regulation:
Internally set to limit at 105% of rated current at full output voltage. Maximum output current at any other voltage setting must be derated linearly down to 30% of maximum at zero output voltage

Ripple:
See "model selection" table

Temperature Coefficient:
≤50ppm/°C

Stability:
≤0.01%/hour, 0.02% per 8 hours after a 1/2 hour warm up

Accuracy:
Voltage Monitor: ±(0.25% of reading + 0.25% of maximum)
Current Monitor: ±(0.5% of reading + 0.25% of maximum)
Remote Programming; ±(0.25% of setting + 0.05% of maximum) for 1kV to 30kV ±(0.5% of setting + 0.25% of maximum) for 50kV
Front Panel Control: ±(0.25% of setting + 0.05% of maximum) for 1kV to 30kV ±(0.5% of setting + 0.25% of maximum) for 50kV
Front Panel Meter: ±2% of full scale

Operating Temperature
0°C to +50°C

Storage Temperature:
-40°C to +85°C

Humidity:
20% to 85% RH, non-condensing

Input Line Connector:
A captive 3 conductor line cord and NEMA plug is provided

Interface Connector:
7 pin Amphenol 126-198, mating connecter and pins provided

Output Connector:
A detachable 10 foot (3 meter) long HV cable is provided

Cooling:
Internal fan, forced-air cooling

Dimensions
1-5kV: 19.0˝W X 5.25˝H X 11.0˝D (483mm X 133mm X 279mm)
10-50kV: 19.0˝W X 5.25˝H X 16.0˝D (483mm X 133mm X 406mm)

Weight:
≤40 pounds (18.1kg) up to and including 30kV units
≤50 pounds (22.7kg) for 50kV unit

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

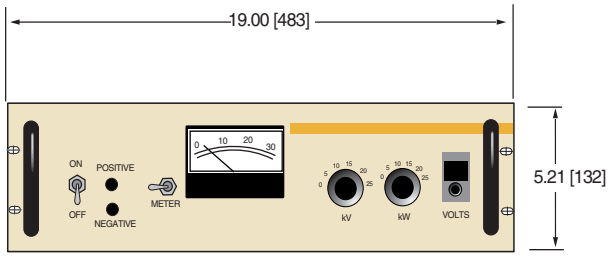
RACK MOUNTED

MODEL SELECTION TABLE

210 Series	Voltage	Current	Ripple
210-01R	0 to 1kV	0 to 225mA	50mV
210-1.5R	0 to 1.5kV	0 to 130mA	100mV
210-02R	0 to 2kV	0 to 100mA	100mV
210-03R	0 to 3kV	0 to 75mA	100mV
210-05R	0 to 5kV	0 to 40mA	200mV
210-10R	0 to 10kV	0 to 15mA	500mV
210-20R	0 to 20kV	0 to 7mA	1 volt
210-30R	0 to 30kV	0 to 4.5mA	1.5 volts
210-50R	0 to 50kV	0 to 2.5mA	5 volts

DIMENSIONS: in.[mm]

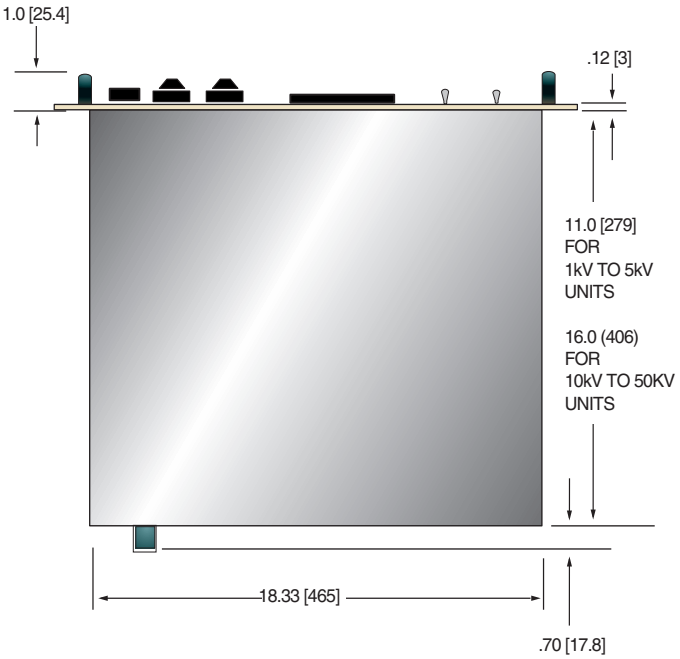
FRONT VIEW



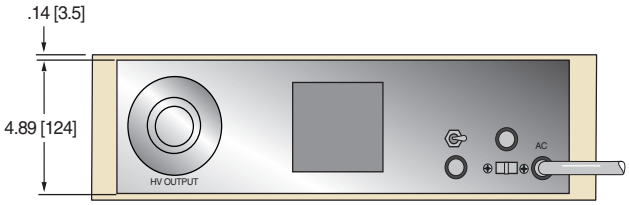
INTERFACE CONNECTOR

PIN	SIGNAL	PARAMETERS
A	-5Vdc Reference	-5.0Vdc @ 5mA, maximum
B	Voltage Program Input	0 to -5Vdc = 0 to 100% rated voltage, Zout = 10KΩ
C	Analog Ground	Ground
D	Current Monitor	0 to 5Vdc = 0 to 100% rated current, Zout = 10KΩ
E	Voltage Monitor	0 to 5Vdc = 0 to 100% rated voltage, Zout = 10KΩ
F	Polarity Indicator	Open collector output, ON = Positive Polarity
G	n/c	none

TOP VIEW



BACK VIEW



CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128050-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

SL150kV 1200W POWER SUPPLY

- ***CABLE CONNECTED 150kV @ 1200W POWER SUPPLY***
- ***REQUIRES ONLY 8.75˝(5U) PANEL HEIGHT***
- ***EXTENSIVE ANALOG INTERFACE***
- ***ARC QUENCH/ARC COUNT/ARC TRIP***
- ***COMPREHENSIVE DIGITAL FAULT DIAGNOSTICS***

www.spellmanhv.com/manuals/SL150KV

Spellman's SL150kV rack mount high voltage power supply is designed for scientific and industrial OEM applications requiring 150kV at 1200 watts in a compact cable connected standard sized rack. Models are available in positive, negative or reversible polarity. The SL150kV is fully arc and short circuit protected. Excellent regulation specifications are provided along with outstanding stability performance. The vacuum encapsulated high voltage output section assures reliable corona free operation by eliminating any concerns due to environmental factors.

TYPICAL APPLICATIONS

Electrostatics
HiPot Testing
Semiconductor Processing
Capacitor Charging

OPTIONS

200	200Vac Input Voltage
AOL	Adjustable Overload Trip
APT	Adjustable Power Trip
AT	Arc Trip
BFP	Blank Front Panel
CPC	Constant Power Control
DPM4	4.5 Digit Panel Meters
EFR	External Fault Relay
LL(X)	Non-Standard HV Cable Length (10 standard)
NAD	No Arc Detect
NSS	No Slow Start
RFR	Remote Fault Reset
SS(X)	Non-Standard Slow Start (6 seconds standard)

SPECIFICATIONS

Front Panel Controls:
Front Panel Controls Power ON/OFF switch, HV ON Switch, HV OFF Switch with preset feature, 3.5 digit backlight digital meters for display of output voltage and output current,10 turn locking potentiometers with counting dials for adjustment of both output voltage and output current.

Front Panel Indicators:

HV ON	High Voltage Inhibit
HV OFF	Over Current
Voltage Control Mode	Over Voltage
Current Control Mode	Arc
Interlock Open	Regulation Error
Interlock Closed	Overtemperature

Input:
220Vac ±10%, 50/60 Hertz

Output Voltage:
0 to 150kV

Output Polarity:
Positive, negative or reversible specify at time of order

Output Current:
8mA

Output Power:
1200W

Voltage Regulation:
Load: 0.01% of rated voltage for a full load change
Line: ±0.01% of rated current over specified input voltage range

Current Regulation:
Load: 0.01% of rated current ±100µA for full voltage change.
Line: ±0.01% of rated current over specified input voltage range

Ripple:
0.1% peak to peak of maximum output

Temperature Coefficient:
100ppm/°C.

Stability:
100ppm/hr after a 2 hour warm up, for both voltage and current regulation

RACK MOUNTED

Operating Temperature:
0 to 40°C operating

Storage Temperature:
-40 to +85°C storage

Humidity:
20% to 85%, non-condensing

Input Line Connector:
3 conductor 12 AWG 6 ft (1.83m) cable, permanently attached

Output Connector:
A detachable 10 ft (3.05m) shielded HV cable is provided

Cooling:
Forced Air

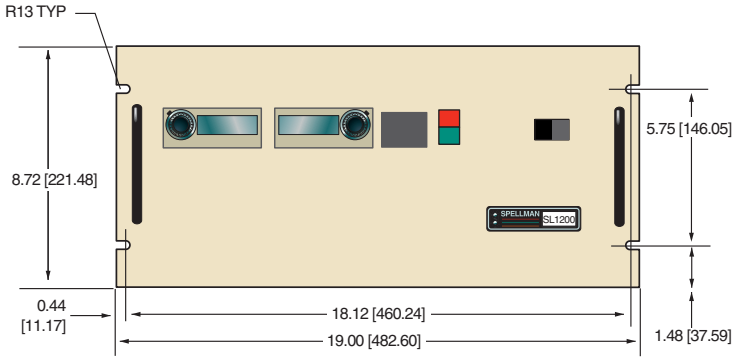
Dimensions:
8.75"H x 19"W x 22"D rack mount.
(22.23cm x 48.26cm x 55.88cm)

Weight:
89 pounds (40.4kg)

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

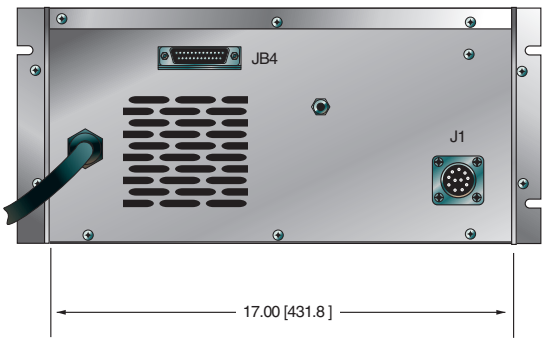
DIMENSIONS: in.[mm]

FRONT VIEW



TOP VIEW

BACK VIEW



CE

SL150 ANALOG INTERFACE— JB4 25 PIN MALE D CONNECTOR

PIN	SIGNAL	PARAMETERS
1	Power Supply Common	Signal Ground
2	External Inhibit	Ground = Inhibit, Open = HV ON
3	External Interlock	+15Vdc @ open, ≤ 5mA @ closed
4	External Interlock Return	Connect to pin 3 to enable supply
5	Current Monitor	0 to 10Vdc = 0 to 100% rated voltage, Zout =10kΩ
6	Voltage Monitor	0 to 10Vdc = 0 to 100% rated voltage, Zout =10kΩ
7	+10Vdc Reference	+10Vdc @ 1mA, maximum
8	Remote Current Program Input	0 to 10Vdc = 0 to 100% rated voltage, Zout =10kΩ
9	Local Current Program Output	Multi-turn front panel pot for local control capability
10	Remote Voltage Program Input	0 to 10Vdc = 0 to 100% rated voltage, Zout =10kΩ
11	Local Voltage Program Output	Multi-turn front panel pot for local control capability
12	EFR (Common)	External Fault Relay (Optional)
13	EFR (Normally Open)	External Fault Relay (Optional)
14	Local HV OFF OUT	+15Vdc @ open, <25mA @ closed, connect to HV OFF for front panel operation
15	HV OFF	Connect to HV OFF OUT for front panel operation
16	Remote HV ON	+15Vdc @ 10mA maximum = HV OFF
17	Remote HV OFF Indicator	0 = HV ON, +15Vdc @ 10mA maximum = HV OFF
18	Remote HV ON Indicator	0 = HV OFF, +15Vdc @ 10mA maximum = HV ON
19	Remote Voltage Mode	Open collector 50Vdc @ 10mA maximum, ON = Active
20	Remote Current Mode	Open collector 50Vdc @ 10mA maximum, ON = Active
21	Remote Power Mode	Open collector 50Vdc @ 10mA maximum, ON = Active
22	Power Supply Fault	Open collector, 50Vdc @ 10mA maximum
23	+15Vdc Output	+15Vdc @ 100mA, maximum
24	Power Supply Ground	Signal Ground
25	Shield Return	Chassis Ground

Specify "P" for positive polarity or "N" for negative polarity, and PN = reversible as illustrated below.

Sample Model Number: SL150P1200/BFP/LL(20)
Where SL = power supply series, 150 = maximum output voltage in kV, P = positive output polarity, 1200 = maximum output power (watts), BFP = Blank Front Panel, LL(20) = 20 foot HV cable.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128062-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***VERY COMPACT AND LIGHTWEIGHT***
- ***LOW EMI AND RFI***
- ***VOLTAGE RANGE FROM 500V TO 50KV***
- ***REVERSIBLE POLARITY STANDARD UP TO 8KV***
- ***SYSTEM STATUS INDICATORS***
- ***EXTENSIVE ANALOG AND DIGITAL INTERFACE***
- ***ARC QUENCH/ARC COUNT/ARC TRIP***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/SL2KW

RACK MOUNTED

Spellman's SL2KW Series of 2kW high voltage power supplies are designed to meet uncompromising performance standards in a minimum of space. Their circuitry includes a resonant high frequency inverter with proprietary control which provides fault-free operation in extreme transient and arcing environments with greater than 85% efficiency. These full featured supplies are available in a wide range of outputs with many options.

TYPICAL APPLICATIONS

Semiconductor Manufacturing
Electrostatics
E-Beam Systems
Capacitor Charging
CPT/CRT Testing
Hipot Testing
General Laboratory
CW Lasers

OPTIONS

See page 3 for options and descriptions

SPECIFICATIONS

Status Indicators:
Voltage and Current Control Mode, Interlock Open and Closed, High Voltage Inhibit, Overcurrent and Overvoltage, Arc, Regulation Error, Overtemperature.

Input:
Standard: 208Vac ±10%, 50/60Hz., three phase
Optional: 220Vac ±10%, 50/60Hz., single phase

Output:
Models available from 0.5kV to 50kV. Each model is available in positive, negative or reversible polarity output.

Front Panel Controls:
Voltage and current are continuously adjustable by ten-turn potentiometers with lockable counting dials, ON/OFF circuit breaker/lamp, high voltage ON switch/indicator and high voltage OFF switch/indicator.

Voltage Regulation:
Load: 0.005% of maximum voltage +500mV for full load change.
Line: ±0.005% of full voltage +500mV over specified input range

Current Regulation:
Load: 0.01% of maximum current ±100µA for full voltage change.
Line: ±0.005% of maximum current for a ±10% input line change.

Ripple:
0.1% p-p +1Vrms, three phase line input
0.3% p-p +1Vrms, single phase line input

Temperature Coefficient:
100ppm/°C voltage or current regulated. Higher stability is available on special order.

Environmental:
Temperature Range:
Operating: 0°C to 50°C.
Storage: -40°C to 85°C.
Humidity:
10 to 90% relative humidity, non-condensing

Stability:
100ppm/hour after 1/2 hour warm-up for both voltage and current regulation.

Metering:
Digital voltage and current meters, 3½ digit ±1 least significant digit.

Output Cable:
10' (3.3m) of shielded high voltage cable removable at the rear panel.

AC Line Input Cable:
3-conductor, 12AWG, 6' (1.83m) cable permanently attached to unit.

Dimensions:
3½"H(2U) x 19"W x 19"D (8.9cm x 48.3cm x 48.3cm).

Weight:
17 to 26lbs (7.7 to 11.8kg) depending on model.

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

SL2KW SELECTION TABLE

MAXIMUM RATING kV	MAXIMUM RATING mA	MODEL NUMBER
0.5	4000	SL0.5PN2000
1	2000	SL1PN2000
2	1000	SL2PN2000
3	666	SL3PN2000
6	333	SL6PN2000
8	250	SL8PN2000
10	200	SL10*2000
15	133	SL15*2000
20	100	SL20*2000
30	66.6	SL30*2000
40	50	SL40*2000
50	40	SL50*2000

*Specify "P" for positive polarity or "N" for negative polarity or "PN" for reversible polarity

SL2KW 25 PIN D CONNECTOR

TB1	SIGNAL	SIGNAL PARAMETERS
1	Power Supply Common	Signal Ground
2	External Inhibit	Ground=Inhibit, Open=HV On
3	External Interlock	+15V at Open, <15mA at Closed
4	External Interlock Return	Return for Interlock
5	Current Monitor	0 to 10V=0 to 100% Rated Output
6	kV Test Point	0 to 10V=0 to 100% Rated Output
7	+10Vdc Reference	+10Vdc, 1mA Max
8	Remote Current Program In	0 to 10V=0 to 100% Rated Output
9	Local Current Program Out	Front Panel Program Voltage
10	Remote Voltage Program In	0 to 10V=0 to 100% Rated Output
11	Local Voltage Program Out	Front Panel Program Voltage
12	EFR Common	External Fault Relay
13	EFR-NC	30V @ 2A Maximum
14	Local HV Off Out	+15V at Open, <25mA at Closed
15	HV Off	Connect to HV OFF for FP Operation
16	Remote HV On	+15V, 10mA Max=HV Off
17	Remote HV Off Indicator	0=HV On, +15V, 10mA Max=HV Off
18	Remote HV On Indicator	0=HV Off, +15V, 10mA Max=HV On
19	Remote Voltage Mode	
20	Remote Current Mode	Open Collector 50V Max, 10mA Max
21	Remote Power Mode	On=Active
22	Remote PS Fault	0=Fault, +15V, 0.1mA Max=No Fault
23	+15V Output	+15V, 100mA Max
24	Power Supply Common	Signal Ground
25	Shield Return	Chassis Ground

How To Order:

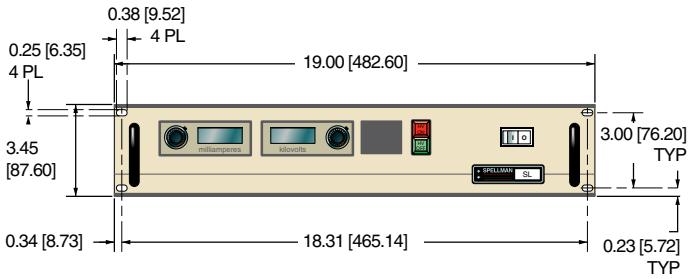
Sample model number: SL20PN2000/NSS/DPM4

SL2KW Series unit, 20kV maximum output voltage, reversible polarity output, 2000 watts, no slow start, 4.5 digit panel meters

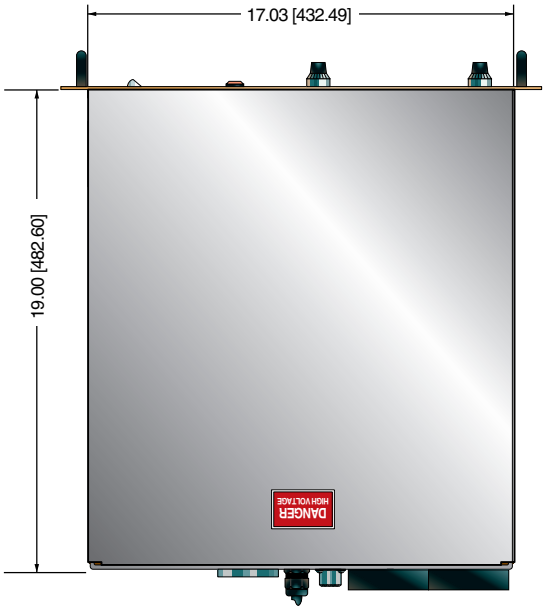
There may be some restrictions on multiple option combinations. Please contact our Sales department for more details.

DIMENSIONS: in.[mm]

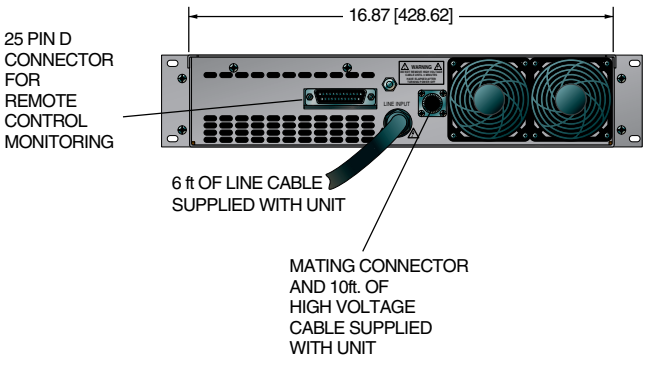
FRONT VIEW



TOP VIEW



BACK VIEW



CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128071-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

SL2KW SERIES OPTIONS

AOL *Adjustable Overload Trip*
A control board jumper is moved to make the power supply shut down if it ever operates in current mode. This allows the user to set the current programming level as a trip point that will turn the power supply off with an Over Current fault if it ever tries to operate in Current Mode.

AT *Arc Trip*
A control board jumper is moved such that the first arc sensed will shut the power supply off with an ARC fault.

BPM *Bipolar Master*

BPS *Bipolar Slave*
This option configures two identical but opposite polarity units to function as a single tracking bipolar supply. The voltage feedback of the master (positive unit) is provided to the voltage programming input of the slave (negative unit).

CMS *Current Mode Select*
A front panel switch is provided to allow the power supply to either regulate in current mode or create an over current fault when operated in current mode, which will shut down the supply. This is basically a switch selectable AOL option.

DPM4 *Digital Panel Meter, 4.5 digits*
The standard 3.5 digit front panel meters are replaced with 4.5 digit panel meters.

FCV *Fine Control Voltage*
This option adds a second potentiometer to the front panel of the unit. This allows for a finer local adjustment of the output voltage setting.

IO *Instant On*
A jumper is placed between TB1-15 and TB1-16 on the rear panel, causing the power supply to automatically toggle into HV ON when ever the line voltage is applied.

LL(X) *Lead Length*
Extra long high voltage output cable. 20, 40, 60 and 100 feet are standard lengths. Non standard lengths can be custom ordered.

NAD *No Arc Detect*
This option removes the arc intervention circuitry from the power supply. Care must be exercised when using this option as damage to the HV multiplier could occur.

NSS *No Slow Start*
The standard 6 second long linear ramp of output voltage is removed allowing the high voltage to "step" to its set point when enabled.

PN *Positive/Negative*
Reversible polarity option. Units that are not inherently reversible by design (10kV to 50kV) can have their output polarity reversed by the process of exchanging the high voltage multiplier section.

RFR *Remote Fault Reset*
This option provides the ability to reset any power supply faults that might occur via toggling a signal on the rear panel interface.

ROV *Remote Over Voltage*
The programming signal for the over voltage comparator circuit is made available to the customer remotely, allowing the power supply to be set to trip the OVP circuit anywhere from 0 -110% of rated output voltage.

SL *Slides*
Industry standard rack mounted slides are installed on the power supply.

SS(X) *Slow Start(X)*
The standard slow start is modified to provide a time of (X) seconds. Time frames of 0.1 seconds to 120 seconds can be accommodated.

There may be some restrictions on multiple option combinations. Please contact our Sales department for more details.

- ***160KV - 360KV OUTPUTS***
- ***LOW RIPPLE***
- ***HIGH STABILITY***
- ***OVERCURRENT, OVERVOLTAGE AND ARC PROTECTION***
- ***ARC DETECT***
- ***LIGHTWEIGHT, COMPACT SIZE***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/SLS

The SLS series of high voltage power supplies provide up to 2000 watts of power with voltage outputs ranging from 160kV to 360kV. These power supplies utilize high frequency resonant inverters with proprietary controls for reliable operation in extreme environments. The high voltage multiplier unit is built with a hybrid design of solid encapsulation and air, thus reducing its overall size. Comprised of 20kV interlocking wafers, the multiplier unit offers flexible building blocks for many different output configurations.

TYPICAL APPLICATIONS

Ion Implantation Particle Accelerators
Electron Guns

SPECIFICATIONS

Input Voltage:
220Vac±10%, three phase, 50/60Hz. (200Vac±10% optional).

Output Voltage Range:
Models available from 160kV to 360kV and up to 2000W. Each model is available with positive or negative polarity outputs.

Voltage Regulation:
Better than 0.05% for specified line variations and load variations.

Ripple:
0.1% p-p of maximum output voltage.

Remote Voltage Control:
0 to +10V for 0 to maximum voltage. Accuracy and repeatability: 1% of maximum rating.

Remote Current Control:
0 to +10V for 0 to maximum voltage. Accuracy and repeatability: 1% of maximum rating.

Voltage Monitor:
0 to 10V equivalent to rated voltage. Accuracy, 1% reading.

Current Monitor:
0 to 10V equivalent to rated current. Accuracy, 1% reading.

Stability:
0.05% per hour after 1/2 hour warm-up.
0.05% per 8 hours.

Slow Start:
Slow start times: 6 seconds standard.

Temperature Coefficient:
0.01% per degrees C.

Protection:
Overcurrent, Overvoltage, Arc protection, Overtemperature.

Arc Detect:
If 8 arcs occur in a 10 second, non-synchronous time window, the supply reverts to the Power Down Mode with an ARC fault displayed on the front panel default diagnostic display.

Environmental:
Temperature Range:
Operating: 0˚C to 40˚C
Storage: -20˚C to 85˚C
Humidity:
10% to 70%, non-condensing.

Dimensions:
Inverter Driver Chassis:
3.50"(2U)H x 19.0"W x 19.0"D (8.9cm x 48.3cm x 48.3cm)
Multiplier Unit:
Depends on model specified.

Distance from Stack to Driver:
2.5 meters ±0.1 meter maximum.

Signal Connector:
25 pin, male D connector, J3.

Metering:
Front panel, 3.5 digit, digital voltage and current meters.

Front Panel Controls:
Voltage and current are continuously adjustable by ten-turn potentiometers with lockable counting dials, ON/OFF circuit breaker/lamp, high voltage ON switch/indicator and high voltage OFF switch/indicator.

Front Panel Status Indicators:

Voltage Control Mode	Overcurrent
Current Control Mode	Overvoltage
Interlock Open	Arc
Interlock Closed	Regulation Error
High Voltage Inhibit	Overtemperature
Overpower (optional)	

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128016-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

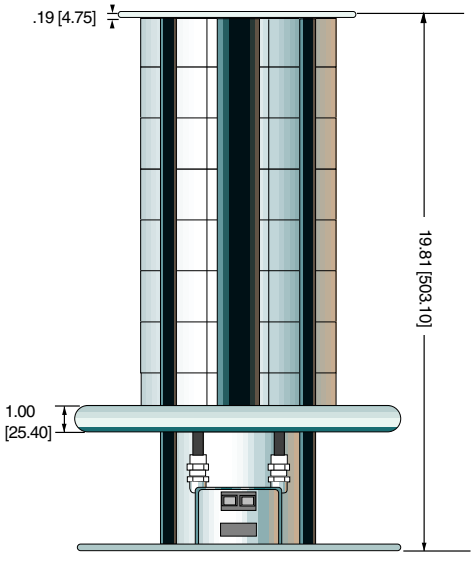
SLS SELECTION TABLE

MAXIMUM RATING kV	mA	MODEL NUMBER
160	12.5	SLS160*2000
200	10.0	SLS200*2000
260	7.7	SLS260*2000
300	6.6	SLS300*2000
360	5.5	SLS360*2000

*Specify "P" for positive polarity or "N" for negative polarity
Other combinations of voltage and current are available.

SLS I/O INTERFACE CONNECTOR 25 PIN

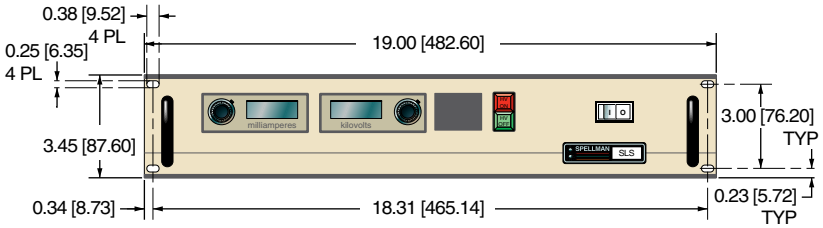
J3	SIGNAL
1	Power Supply Common
2	External Inhibit
3	External Interlock
4	External Interlock Return
5	Current Monitor
6	Voltage Monitor
7	+10V Reference
8	Remote Current Program In
9	Local Current Program Out
10	Remote Voltage Program In
11	Local Voltage Program Out
12	EFR (common)
13	EFR (normally closed)
14	Local HV OFF Out
15	HV OFF
16	Remote HV ON
17	Remote HV OFF Indicator
18	Remote HV ON Indicator
19	Remote Voltage Mode
20	Remote Current Mode
21	Spare
22	Remote PS Fault
23	+15V Output
24	Power Supply Common
25	Shield Return



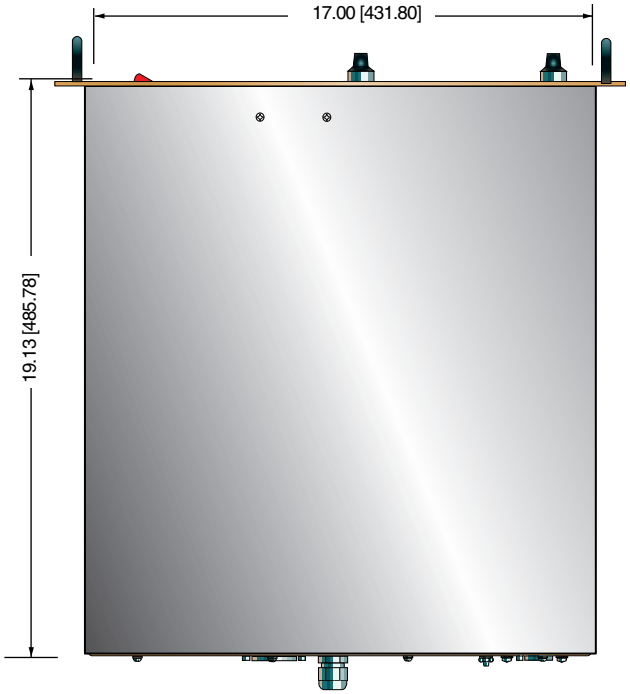
160kV Model

DIMENSIONS: in.[mm]

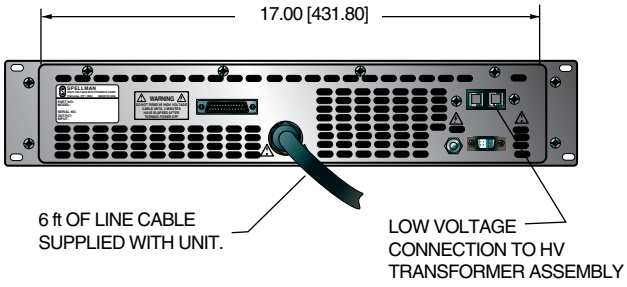
FRONT VIEW



TOP VIEW



BACK VIEW



CE

RACK MOUNTED

- ***COMPACT DESIGN AND LIGHTWEIGHT***
- ***LOW COST PER WATT***
- ***LOW EMI AND RFI***
- ***CONSTANT VOLTAGE/CONSTANT CURRENT OPERATION WITH AUTOMATIC CROSSOVER***
- ***ARC DETECT, ARC QUENCH AND ARC COUNT***
- ***SYSTEM STATUS INDICATORS***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/SA

SA power supplies are available in 13 models with voltage outputs ranging from 1kV to 70kV. Similar to the SR power supplies, they incorporate series resonant inverter technology with a patented control circuit. This enables the supplies to operate without damage or interruption in rugged environments that frequently pose threats to conventional high voltage power supplies. In addition, the SA Series protect your load from excessive peak current when an arcover condition is sensed. Parallel operation options to increase power and current capabilities are available for SA models with power outputs of 8kW, 12kW and higher.

TYPICAL APPLICATIONS

Sputtering	CW Lasers
Analytical X-ray	Ion Implantation
Electron Beam Systems	Capacitor Charging
Radar Modulators	

OPTIONS

200-1P	200Vac Single Phase Input
200-3P	200Vac Three Phase Input
220-1P	220Vac Single Phase Input
AOL	Adjustable Overload Trip
FG	Floating Ground
CPC	Constant Power Control
APT	Adjustable Power Trip
RMI	Remote Mode Indicators
ROA	Remote Overvoltage Adjust
NSS	No Slow Start
SS(x)	Nonstandard Slow Start
SL	Mounting Slides
BFP	Blank Front Panel

SPECIFICATIONS

Input:
208Vac±10%, 50 or 60Hz, three phase.

Output:
13 models from 1kV to 70kV. Each model is available with positive, negative or reversible polarity outputs.

Output Controls:
Voltage and current are continuously adjustable over entire range via ten-turn potentiometers with lockable counting dials.

Voltage Regulation:
Load: 0.005% of full voltage +500mV for full load change.
Line: ±0.005% of full voltage +500mV over specified input range.

Current Regulation:
Load: 0.05% of full current ±100µA for any voltage change.
Line: ±0.05% of full current over specified input range.

Ripple:
0.1% +1Vrms for three phase models only.
0.3% +1Vrms for single phase models only.

Temperature Coefficient:
100ppm/°C. Higher Stability (50ppm/°C) available on special order.

Stability:
0.01%hr. after 1/2 hour warm-up, 0.02% per 8 hrs. (typical).

Metering:
Digital voltage and current meters, 1% accuracy.

System Status Display:
"Dead Front" type indicators provide status of up to 14 system operations including voltage and current regulation, fault conditions and circuit control.

Output Cable:
10 ft. (3.05m) shielded high voltage cable, removable at rear panel.

Dimensions:
5¼"H (3U) x 19"W x 22"D rack mount.
(13.3cm x 48.3cm x 55.9cm)

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128008-001 REV.F
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

SA SELECTION TABLE

MAXIMUM RATING kV	MAXIMUM RATING mA	MODEL NUMBER
1	4000	SA1PN4
2	2000	SA2PN4
3	1330	SA3PN4
4	1000	SA4PN4
6	667	SA6PN4
10	400	SA10*4
15	267	SA15*4
20	200	SA20*4
30	133	SA30*4
40	100	SA40*4
50	80	SA50*4
60	67	SA60*4
70	57	SA70*4

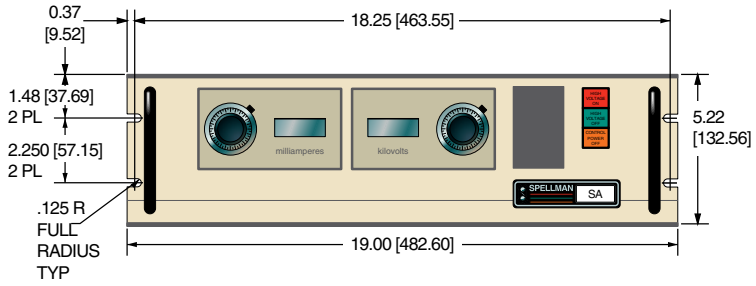
*Specify “P” for positive, “N” for negative, or “PN” for reversible polarity. Higher voltage or intermediate voltage models available on special order. From 1kV to 6kV, reversible polarity is accomplished by an internal wiring change. From 10kV to 70kV, polarity is reversed by exchanging internal high voltage assemblies.

SA TERMINAL BLOCK 18 PIN

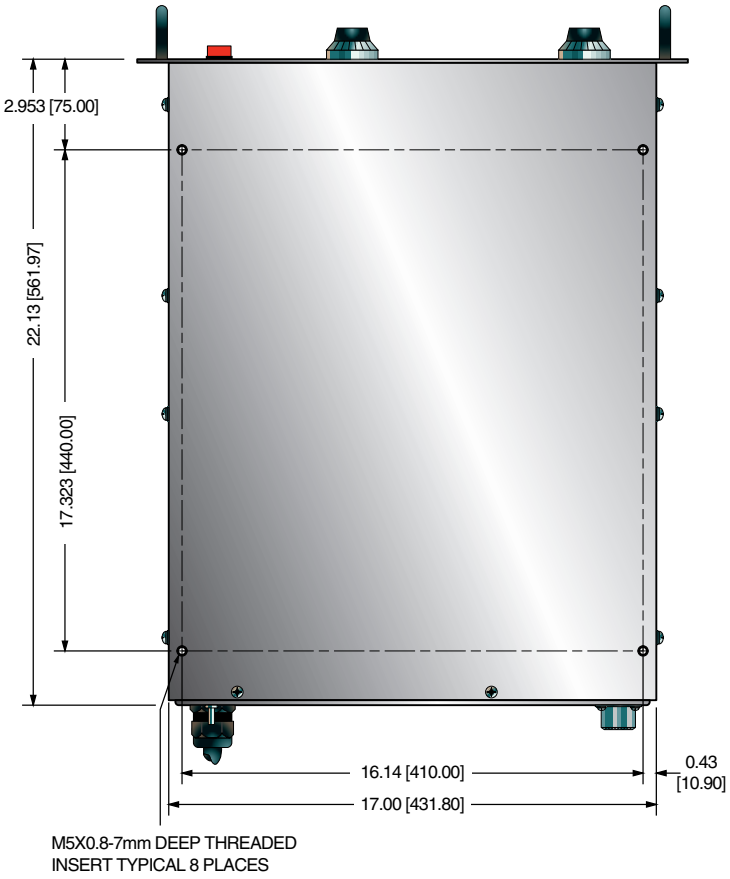
TB1	SIGNAL
1	P.S. Common
2	Inhibit
3	External Interlock In
4	External Interlock Out
5	mA Test point Out
6	kV Test point Out
7	+10Vdc Reference
8	mA Program In
9	Local mA Program Out
10	kV Program In
11	Local kV Program Out
12	Remote Pwr On In
13	Remote Pwr On Out
14	Remote HV Off
15	Remote HV Off/On Common
16	Remote HV On
17	HV Off Indicator
18	HV On Indicator

DIMENSIONS: in.[mm]

FRONT VIEW

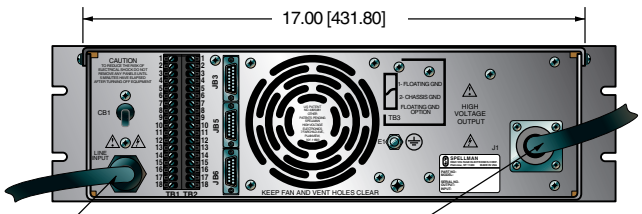


TOP VIEW



M5X0.8-7mm DEEP THREADED
INSERT TYPICAL 8 PLACES

BACK VIEW



6 ft OF LINE CABLE
SUPPLIED WITH UNIT.

MATING CONNECTOR AND 10ft OF HIGH VOLTAGE
CABLE SUPPLIED WITH UNIT.

CE

RACK MOUNTED

- ***COMPACT DESIGN AND LIGHTWEIGHT***
- ***LOW COST PER WATT***
- ***LOW EMI AND RFI***
- ***CONSTANT VOLTAGE/CONSTANT CURRENT OPERATION WITH AUTOMATIC CROSSOVER***
- ***ARC DETECT, ARC QUENCH AND ARC COUNT***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/SR

SR power supplies are available in 18 models with voltage outputs ranging from 1kV to 120kV. Similar to the SA power supplies, they incorporate series resonant inverter technology with a patented control circuit. This enables the supplies to operate without damage or interruption in rugged environments that frequently pose threats to conventional high voltage power supplies. In addition, the SR Series protects your load from excessive peak currents by instantaneously limiting the output current when an arcover condition is sensed. Parallel operation options to increase power and current capabilities are available for SR models with power outputs of 12kW, 18kW and higher.

TYPICAL APPLICATIONS

Sputtering
Analytical X-ray
Electron Beam Systems
Radar Modulators
CW Lasers
Ion Implantation
Capacitor Charging

OPTIONS

200-1P	200Vac Single Phase Input
200-3P	200Vac Three Phase Input
220-1P	220Vac Single Phase Input
AOL	Adjustable Overload Trip
FG	Floating Ground
CPC	Constant Power Control
APT	Adjustable Power Trip
RMI	Remote Mode Indicators
ROA	Remote Overvoltage Adjust
NSS	No Slow Start
SS(x)	Nonstandard Slow Start
SL	Mounting Slides
BFP	Blank Front Panel
EFR	External Fault Relay

SPECIFICATIONS

Input:
208Vac±10%, 50 or 60Hz, three phase.

Output:
18 models from 1kV to 120kV. Each model is available with positive, negative or reversible polarity outputs.

Output Controls:
Voltage and current are continuously adjustable over entire range via ten-turn potentiometers with lockable counting dials.

Voltage Regulation:
Load: 0.005% of full voltage +500mV for full load change.
Line: ±0.005% of full voltage +500mV over specified input range.

Current Regulation:
Load: 0.05% of full current ±100µA for any voltage change.
Line: ±0.05% of full current over specified input range.

Ripple:
0.1% p-p +1Vrms for three phase models only.
0.1%rms +1Vrms for single phase models only.

Temperature Coefficient:
100ppm/°C. Higher Stability (50ppm/°C) available on special order.

Stability:
0.01%hr. after 1/2 hour warm-up, 0.02% per 8 hrs. (typical).

Operating Temperature:
0°C to +40°C

Storage Temperature:
-40°C to +85°C

Humidity:
10% to 90% RH, non-condensing

Metering:
Digital voltage and current meters, 1% accuracy.

System Status Display:
"Dead Front" type indicators provide status of up to 14 system operations including voltage and current regulation, fault conditions and circuit control.

Output Cable:
10 ft (3.05m) shielded high voltage cable, removable at rear panel.

Dimensions:
10½"(6U)H x 19"W x 19"D rack mount, 1kV to 70kV. (26.7cm x 48.3cm x 48.3cm)
10½"(6U)H x 19"W x 24"D rack mount, 80kV to 120kV. (26.7cm x 48.3cm x 61.0cm)

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128010-001 REV.F
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

SR SELECTION TABLE

MAXIMUM RATING kV	MAXIMUM RATING mA	MODEL NUMBER
1	6000	SR1PN6
2	3000	SR2PN6
3	2000	SR3PN6
6	1000	SR6PN6
8	750	SR8*6
10	600	SR10*6
12	500	SR12*6
15	400	SR15*6
20	300	SR20*6
30	200	SR30*6
40	150	SR40*6
50	120	SR50*6
60	100	SR60*6
70	85	SR70*6
80	75	SR80*6
100	60	SR100*6
110	55	SR110*6
120	50	SR120*6

*Specify “P” for positive, “N” for negative, or “PN” for reversible polarity. Higher voltage or intermediate voltage models available on special order. From 1kV to 6kV, reversible polarity is accomplished by changing a rear panel link. From 8kV to 120kV, polarity is reversed by exchanging internal high voltage assemblies.

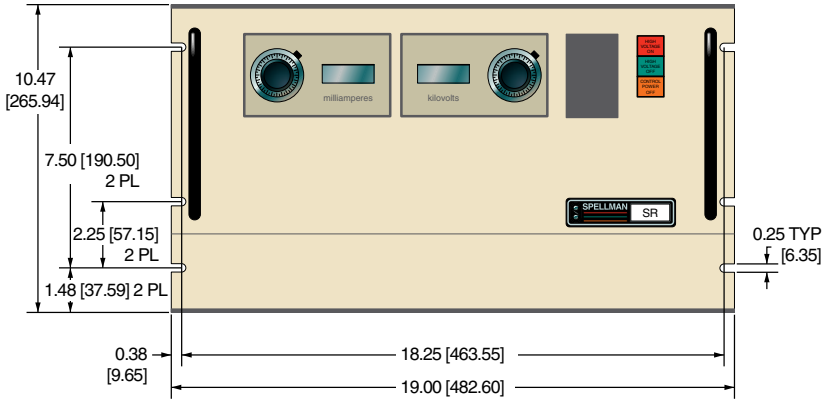
SR TERMINAL BLOCK 18 PIN

TB1	SIGNAL
1	P.S. Common
2	Inhibit
3	External Interlock In
4	External Interlock Out
5	mA Test point Out
6	kV Test point Out
7	+10Vdc Reference
8	mA Program In
9	Local mA Program Out
10	kV Program In
11	Local kV Program Out
12	Remote Pwr On In
13	Remote Pwr On Out
14	Remote HV Off
15	Remote HV Off/On Common
16	Remote HV On
17	HV Off Indicator
18	HV On Indicator

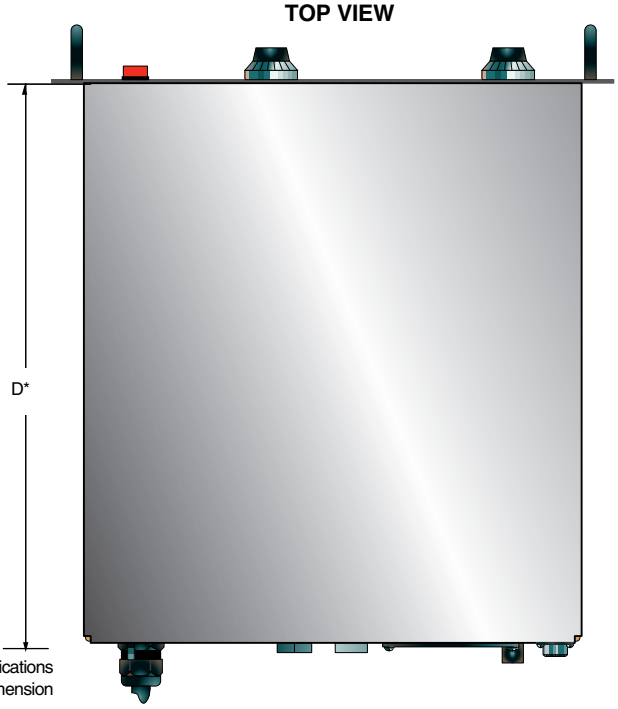
CE

DIMENSIONS: in.[mm]

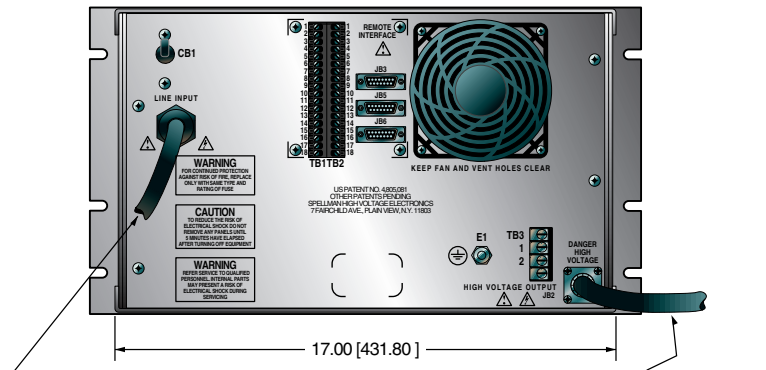
FRONT VIEW



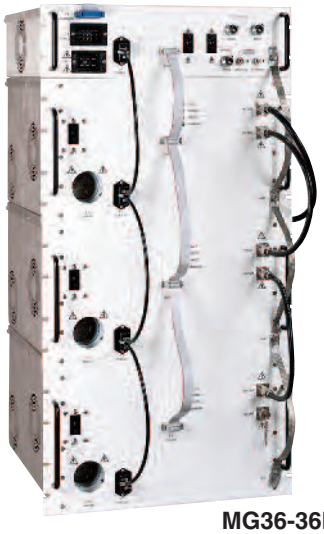
TOP VIEW



BACK VIEW



RACK MOUNTED



- ***CURRENT OUTPUT SOURCE***
- ***LOW STORED ENERGY***
- ***FAST FAULT SHUTDOWN (<30 SEC)***
- ***PROVISION TO LIMIT MICROWAVE REFLECTED POWER***
- ***PROGRAMMABLE FILAMENT SUPPLY***
- ***OVERVOLTAGE, OVERCURRENT, ARC, AND SHORT CIRCUIT PROTECTION***
- ***LOW COST***
- ***LIGHTWEIGHT***
- ***OEM CUSTOMIZATION AVAILABLE***

MG10/MG12-10kW/12kW Supply

MG36-36kW Supply

Spellman's MG Series of magnetron HV power supplies are rugged, high frequency, high efficiency units designed specifically to power CW magnetrons ranging from 10kW to 120kW. They contain filament and optional magnet control supplies to provide a complete drive system.

TYPICAL APPLICATIONS

Industrial Cooking
Powder Drying
Rubber Vulcanization
Sintering of Ceramics
Processing of Radioactive Waste
Plasma Generation

MG120-120kW Supply

SPECIFICATIONS

Input:
480Vac±10%, 3 phase, 50/60Hz. 400Vac and 440Vac optional. Specify with order.

Output Voltage:
See Table.

Output Current:
See Table.

Output Power:
See Table.

Voltage Regulation:
Load: 0.5% for 0 to 100% change in output current.
Line: ±0.1% for ±10% change in line voltage.

Current Regulation:
Load: 0.5% of rated current for any voltage change.
Line: ±0.1% of rated current over the specified input range.

Current Ripple: 5% rms.
Lower ripple available on special order.

Temperature Range:
Operating: 0°C to +40°C.
Storage: -40°C to +85°C.

Front Panel Metering:
Voltage and current meters optional.

Voltage and Current Programming:
10V = full output, Z in ≥1 megohm

Voltage Monitor:
0 to 10V = 0 to full output kV, Z out = 1Kohm.

Current Monitor:
0 to 10V = 0 to full output current, Z out = 1Kohm.

Filament Supply:
The power supply provides a regulated filament current at the secondary of an external filament isolation transformer supplied with each unit.

Magnet Power Supply:
See Table.

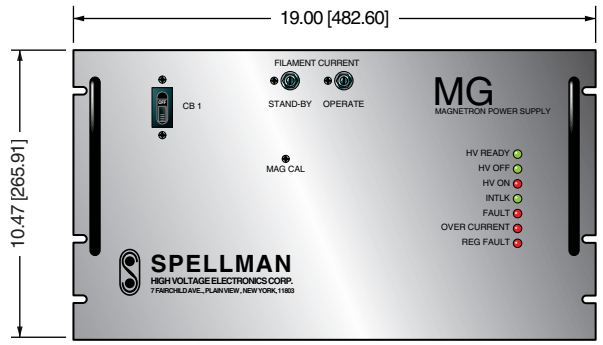
Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128004-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

MG SELECTION TABLE

	MODEL	MG10/MG12	MG36	MG72	MG120
RF Power max	kW	6/8.5	20	60	100
DC Power max	kW	10/12.5	36	72	120
V max	-kV	8	15	17	20
I max	A	1.25/1.7	2.5	5	6
V Fil Preheat	V	5	10	12.6	14
I Fil Preheat	A	33/52	50	115	115
Time Preheat	Sec	10	180	180	180
I Fil @ I max	A	0/40	20	86	74
I Magnet	A	3	5	5	5
V Magnet	V	16	50	50	50
Height	in(mm)	10.5 (26.7)	36.75(93.4)	72(183)	63(160)
Width & Depth	19" x 19" (48.26 x 48.26cm)				2 x19"x19"
Weight	lb(kg)	55 (25)	275(125)	310(141.2)	600(275)

DIMENSIONS: in.[mm]



Model MG10/MG12-10kW/12kW Supply

ANALOG CONTROL INTERFACE

P4	SIGNAL	P4	SIGNAL
1	Return	14	I Program
2	Return	15	I Anode Monitor
3	Return	16	V Cathode Monitor
4	Return	17	Magnet Program
5	Return	18	Magnet Monitor
6	Return	19	Filament Program
7	Return	20	I Filament Monitor
8	Return	21	Control Fault
9	Return	22	+10V Reference
10	Return	23	RF Arc
11	Spare	24	Spare
12	Spare	25	Spare
13	Spare		

DIGITAL INTERFACE & AUX. POWER

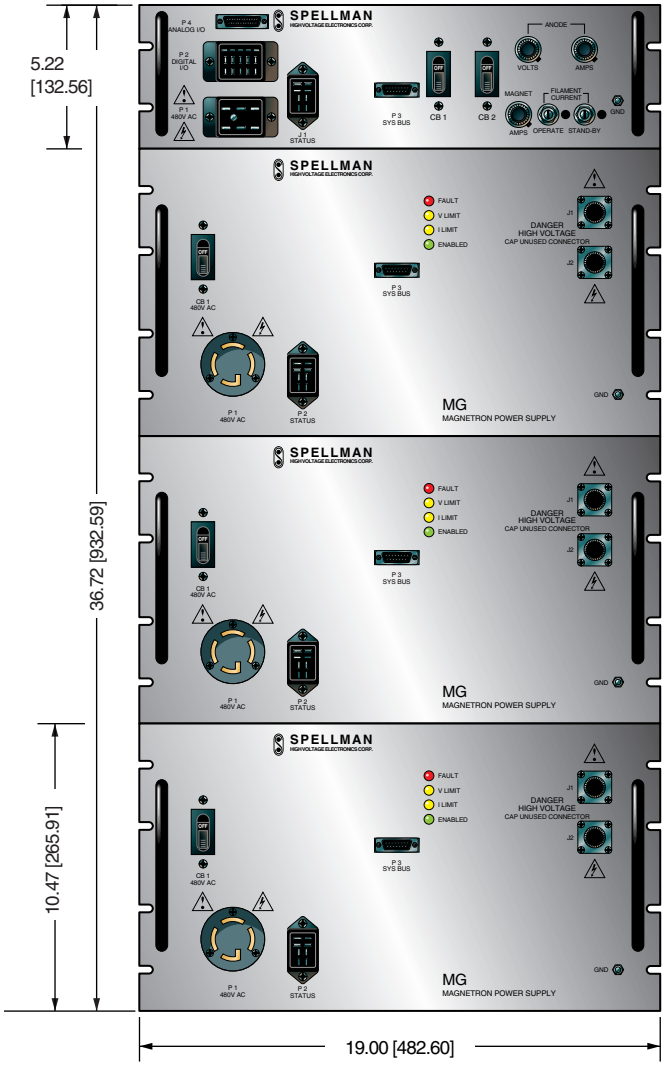
P2	SIGNAL	P2	SIGNAL
1	110Vac Input	9	Arc Detect
2	110Vac Return	10	Control Fault
3	HV Enable	11	Breakers Healthy
4	HV On	12	Temp Warning
5	Power On	13	Fault 1
6	Filament Warmup	14	Fault 2
7	Filament Ready	15	Fault 3
8	HV On Indicator		

POWER, FILAMENT & MAGNET CONNECTIONS

P1	SIGNAL	P1	SIGNAL
7	480Vac (Phase A)	10	Filament Out-A
8	480Vac (Phase B)	11	Mag. Output +
9	Filament Out-B	12	Mag. Output Rtn.

CE

FRONT VIEW



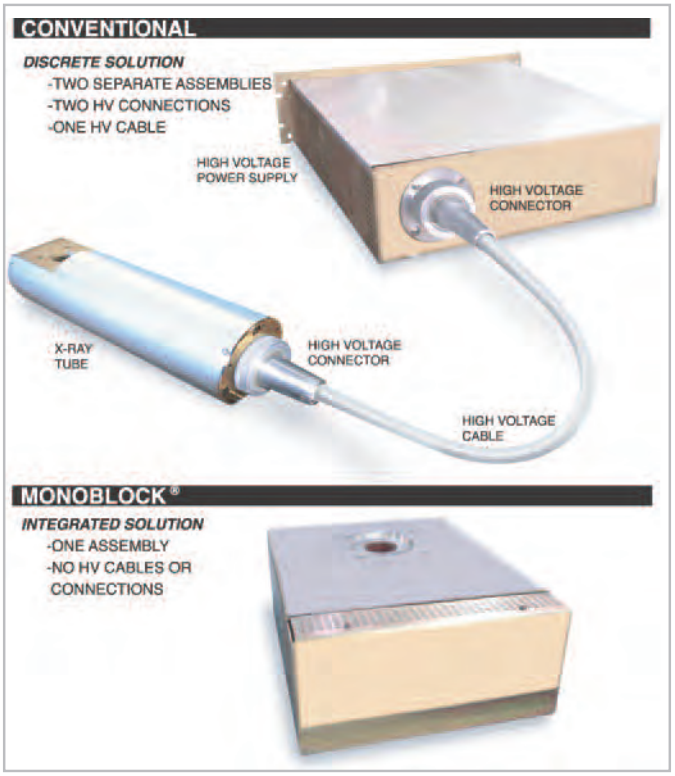
Model MG36-36kW Supply

RACK MOUNTED

- ***INCLUDES POWER SUPPLY & X-RAY TUBE IN AN INTEGRATED SUBSYSTEM***
- ***TUBE SELECTION PER OEM REQUIREMENTS***
- ***FLEXIBLE MECHANICAL CONFIGURATION***
- ***FULL REMOTE CONTROL OF KV & EMISSION CURRENT***
- ***LINEAR RANGE OF KV & MA***
- ***HIGH STABILITY***

Spellman has set the standard in development of integrated X-Ray sources with its Monoblock® series of X-Ray sources. Our custom OEM designs are used in a variety of applications like baggage screening, explosive detection, medical imaging, food inspection and non-destructive testing.

A Monoblock® is typically a single assembly housing both high voltage generation components and an X-Ray tube. The physical compactness and inherent elimination of cabling, reduces cost and the risk of breakdown, thus making these products extremely reliable. Monoblock® can be designed in a wide variety of geometries, with beam shape, focal spot size and other critical parameters customized for the application. Digital control via RS232, Ethernet or USB is available.



TYPICAL APPLICATIONS

Security/EDS
Food/Fill Level Inspection
CT-Medical
NDT
Bone Densitometry

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com

Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

TYPICAL SPECIFICATIONS

X-Ray Tube Models:
A wide variety of X-Ray tubes from all major tube vendors

Beam Parameters:
Cone beam: up to 40°
Fan beam: up to 110° x 10°

Target Angle:
12° to 45°

Focal Spot:
35 micron to 3mm x 3mm

KV Range:
10kV to 200kV

Emission Current Range:
Up to 10mA

Duty Cycle:
Pulse and Continuous mode

Line Regulation (KV):
0.1%

Line Regulation:
(Emission Current) 0.1%

Load Regulation (KV):
0.1%

Load Regulation:
(Emission Current) 0.1%

Ripple:
0.2% to 1%

Temperature Stability:
25ppm to 200ppm

Rise Time:
100mSec to 1 minute

Regulatory and Safety Standards:
UL, CSA, VDE to EN60601, EN60950, EN61010

Mechanical:
Each monoblock is developed per custom OEM requirements.

Insulation Media:
Oil and Solid encapsulation

Operating Temperature:
0°C to 50°C

Long Term Storage Temp:
-20°C to 70°C

Humidity, Operating and Storage:
10-95%, non-condensing

- ***OUTPUT VOLTAGES TO 130KV***
- ***INTEGRATED GROUND REFERENCED FILAMENT SUPPLY***
- ***LOW RIPPLE***
- ***"HOT ANODE"***
- ***POSITIVE POLARITY***
- ***LOCAL & REMOTE PROGRAMMING***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/XLG

Spellman's XLG Series of X-ray generators are well regulated high voltage power supplies with output voltages to 130kV and very low ripple achieved through the use of advanced resonant conversion techniques. Extremely stable voltage and emission current outputs result in significant performance improvements over previously available technology. The XLG Series provides all the power, control and support functions required for X-ray applications including a regulated dc filament supply. These units incorporate local and remote programming, monitoring, safety interlock, short-circuit and overload protection.

TYPICAL APPLICATIONS

Plating Measurement
Mineral Analysis
X-ray Fluorescence

OPTIONS

APT	Adjustable Power Trip
AT	Arc Trip
SS(x)	Non-Standard Slow Start
NSS	No Slow Start
IO	Instant ON
LL(x)	Extra Length HV Cable
SL	Slides

SPECIFICATIONS

Input Voltage:
115Vac±10%, 50-60Hz single phase or
220Vac±10%, 50-60Hz single phase.

Voltage and Current Control:
Local: continuously adjustable from zero to maximum rating via a ten-turn potentiometer with a lockable counting dial.
Remote: 0 to +10Vdc proportional from 0 to full output.
Accuracy: ±1%. Input Impedance: 10Mohm.

Filament:
Specify at time of order:
FH: 9A, 3V.
FL: 3A, 3V.
Preheat level is 0.45 amps in standby

Voltage Regulation:
Load: 0.005% of full output voltage no load to full load.
LIne: 0.005% for input voltage range change.

Current Regulation:
Load: 0.05% of full current ±100µA from 0 to full voltage.
Line: 0.05% of rated current over specified input range.

Ripple:
0.03% rms below 1kHz.
0.75% rms above 1kHz.

Temperature Coefficient:
100ppm/°C.

Stability:
0.01%/8 hrs after 1/2 hour warm-up.
0.02% per 8 hours (typical).

Cooling:
Free air convection.

Metering:
Digital voltage and current meters (3.5 digits), 1% accuracy.

HV Output Cable:
10' (3.3m) of shielded HV cable removable at rear.

I/O Connectors:
25 pin D-type for control interface with mating connector provided.

Dimensions:
30 to 60kV:
3.5"H x 19"W x 19"D (8.9cm x 48.3cm x 48.3cm).
80 to 130kV:
3.5"H x 19"W x 24"D (8.9cm x 48.3cm x 61.0cm).

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

FRONT PANEL STATUS INDICATORS:

Overvoltage	Voltage Control Mode
Overtemperature	Current Control Mode
Regulation Error	Interlock Open
Arc	Interlock Closed
HV ON: Red	HV OFF: Green

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128012-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

XLG SELECTION TABLE 0.1mA, 0.2mA , 0.5mA

kV	0.1mA	0.2mA	.5mA
30	XLG30P3*	XLG30P6*	XLG30P15*
35	XLG35P3.5*	XLG35P7*	XLG35P17.5*
40	XLG40P4*	XLG40P8*	XLG40P20*
50	XLG50P5*	XLG50P10*	XLG50P25*
60	XLG60P6*	XLG60P12*	XLG60P30*
80	XLG80P8*	XLG80P16*	XLG80P40*
100	XLG100P10*	XLG100P20*	XLG100P50*
120	XLG120P12*	XLG120P24*	XLG120P60*
130	XLG130P13*	XLG130P26*	XLG130P65*

*Specify FH for High power (27W) filament, FL for Low power (9W) filament.

XLG SELECTION TABLE 1.0mA, 2.0mA, 3.0mA

kV	1.0mA	2.0mA	3.0mA
30	XLG30P30*	XLG30P60*	XLG30P90*
35	XLG35P35*	XLG35P70*	XLG35P105*
40	XLG40P40*	XLG40P80*	XLG40P120*
50	XLG50P50*	XLG50P100*	XLG50P150*
60	XLG60P60*	XLG60P120*	XLG60P180*
80	XLG80P80*	XLG80P160*	---
100	XLG100P100*	XLG100P200*	---
120	XLG120P120*	XLG120P240*	---
130	XLG130P130*	XLG130P260*	---

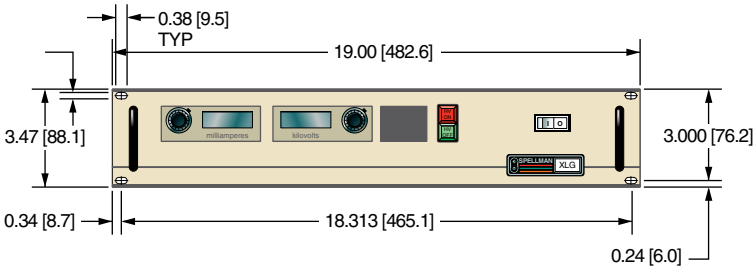
*Specify FH for High power (27W) filament, FL for Low power (9W) filament.

XLG CONNECTOR 25 PIN

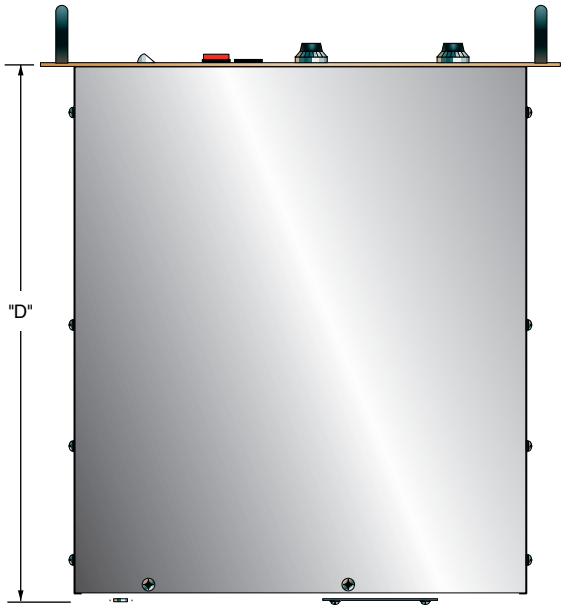
JB1	SIGNAL	SIGNAL PARAMETERS
1	Power Supply Common	Signal Ground
2	External Inhibit	Ground=Inhibit, Open=HV On
3	External Interlock	+15V at Open, <15mA at Closed
4	External Interlock Return	Return for Interlock
5	Current Monitor	0 to 10V=0 to 100% Rated Output
6	kV Test Point	0 to 10V=0 to 100% Rated Output
7	+10V Reference	+10V, 1mA Max
8	Remote Current Program In	0 to 10V=0 to 100% Rated Output
9	Local Current Program Out	Front Panel Program Voltage
10	Remote Voltage Program In	0 to 10V=0 to 100% Rated Output
11	Local Voltage Program Out	Front Panel Program Voltage
12	Power Monitor	0 to 10V=0 to 100% Rated Output
13	Remote Power Program In	(Optional)
14	Local HV Off Out	+15V at Open, <25mA at Closed
15	HV Off	Connect to HV OFF for Fp Operation
16	Remote HV On	+15V, 10mA Max=HV Off
17	Remote HV Off Indicator	0=HV On, +15V, 10mA Max=HV Off
18	Remote HV On Indicator	0=HV Off, +15V, 10mA Max=HV On
19	Remote Voltage Mode	Open Collector 50V Max, 10mA Max
20	Remote Current Mode	On=Active
21	Remote Power Mode	
22	Remote PS Fault	0=Fault, +15V, 0.1mA Max=No Fault
23	+15V Output	+15V, 100mA Max
24	Power Supply Common	Signal Ground
25	Shield Return	Shield Return

DIMENSIONS: in.[mm]

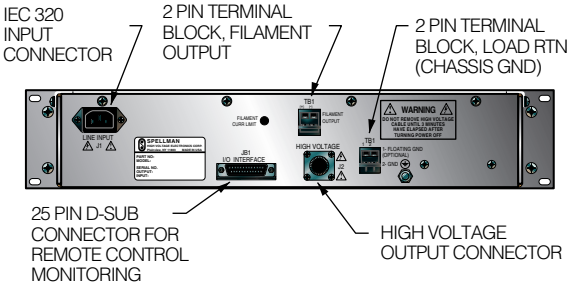
FRONT VIEW



TOP VIEW



BACK VIEW



CE

X-RAY

- ***OUTPUT VOLTAGES FROM 25KV TO 65KV***
- ***ADJUSTABLE INTEGRATED FILAMENT SUPPLY***
- ***OVERVOLTAGE & SHORT CIRCUIT PROTECTION***
- ***VOLTAGE & CURRENT PROGRAMMING***
- ***LOCAL AND REMOTE EMISSION CONTROL***
- ***SAFETY INTERLOCK***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/XRM

Spellman's XRM Series of regulated X-ray power supplies offer output voltages to 65kV and incorporate a filament supply which provides regulated dc current adjustable between 0.3A and 3.5A at 5.5V. High voltage and filament current can be linearly ramped up. The XRM incorporates local and remote programming, monitoring, safety interlock, short-circuit and overload protection.

TYPICAL APPLICATIONS

Powering grounded cathode X-ray tubes from Kevex, Oxford, RTW, Superior, Varian and Trufocus.

OPTIONS

AC	AC Filament
CPC	Constant Power
BIAS	Bias Supply
TP(x)	Alternate Test Point Scaling

SPECIFICATIONS

Input:
+24Vdc±10%, 4.25A maximum.

Output:
4 models with positive output polarity and adjustable voltages from zero to maximum voltage and current.

Voltage Control:
Local: Internal multi-turn potentiometer to set voltage from 0 to full output voltage.
Remote: 0 to +10Vdc proportional from 0 to full output voltage. Accuracy: ±1%. Z_{IN}: 10Mohm.

Emission Control:
Local: Internal potentiometer to set beam current between 0 and full output.
Remote: 0 to +10Vdc proportional from 0 to full output current. Accuracy : ±1%. Z_{IN}: 10Mohm.

DC Filament Supply:
Current: 3.5A, adjustable
Voltage: 5.5V

Voltage Regulation:
Load: 0.01% of output voltage no load to full load.
Line: ±0.01% for ±10% change in input voltage.

Current Regulation:
Load: 0.01% of output current from 0 to rated voltage.
Line: 0.01% of rated current over specified input range.

Ripple:
0.25% p-p of output voltage.

Temperature Range:
0°C to +50°C operational

Temperature Coefficient:
0.01% per °C, voltage or current regulated.

Stability:
0.05% per 8 hours after 1/2 hour warm-up.

Voltage and Current Monitors:
0 to +10Vdc proportional from 0 to rated output. Accuracy ±1%.

Dimensions:
6.3"H x 3.937"W x 10"D (16cm x 10cm x 25.4cm).

Connectors:
HV Output Connector: Delrin type connector, recessed. Cable assembly with mating connector 39.4in (1m).
I/O Connectors: 9 pin mini D-type Phoenix connector for power, filament and monitor connections.

Remote Programming:
(P/O 9 pin "D" analog control interface) Permits remote adjustment of the output voltage and current via an external potentiometer and the internal +10V reference. By adjusting the potentiometer from minimum to maximum, the desired output may be selected.

Remote Monitor:
Test points are made available at J4 for monitoring voltage and current outputs. The output polarity is positive from 0 to 10V equal to 0 to 100% of the output.

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128014-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

XRM SELECTION TABLE

Maximum Rating		Model Number
kV	mA	
25	2.0	XRM25P50
30	1.67	XRM30P50
50	1.00	XRM50P50
65	0.77	XRM65P50

J2 POWER CONNECTOR—2 PIN PHOENIX

PIN	SIGNAL	PARAMETERS
1	+24 Vdc Input	+24Vdc @ 4.25 Amps Input
2	+24 Vdc Return	Power Return

J3 FILAMENT CONNECTOR—3 PIN PHOENIX

PIN	SIGNAL	PARAMETERS
1	Filament Output	0 to 3.5 Amps @ 5.5 volt compliance, Output
2	Filament Return	Filament Return
3	Spare	N/C

J4 MONITOR CONNECTOR—4 PIN

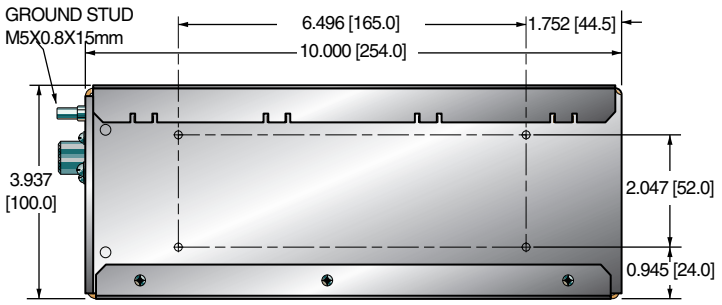
PIN	SIGNAL	PARAMETERS
1	Monitor Return	Signal Ground
2	kV Monitor	0 to 10Vdc = 0 to 100% of rated output, Zout =1kΩ
3	mA Monitor	0 to 10Vdc = 0 to 100% of rated output, Zout =1kΩ
4	Interlock Enable	Connect to ground through 12Vdc bulb (0.5 to 2W) to close interlock

J5 CONTROL INTERFACE—9 PIN MINI D CONNECTOR

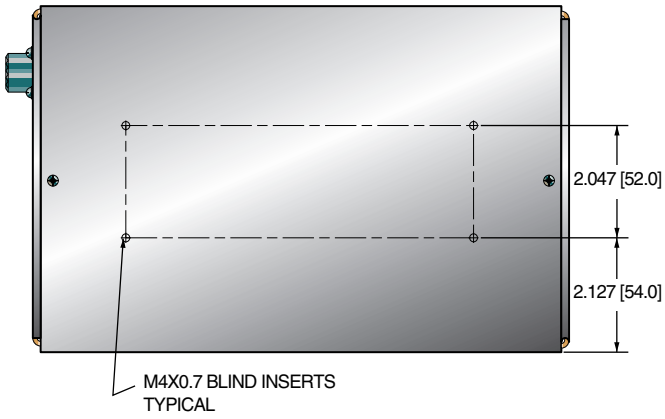
PIN	SIGNAL	PARAMETERS
1	+10Vdc Reference	+10Vdc @ 1mA
2	Spare	N/C
3	kV Program Input	0 to 10Vdc = 0 to 100% of rated output, Zin =10MΩ
4	Local kV Program	0 to 10Vdc = 0 to 100% of rated output, local 25kΩ multi-turn pot
5	Spare	N/C
6	mA Program Input	0 to 10Vdc = 0 to 100% of rated output, Zin =10MΩ
7	Local mA Program	0 to 10Vdc = 0 to 100% of rated output, local 25kΩ multi-turn pot
8	Spare	N/C
9	Ground	Signal Ground

DIMENSIONS: in.[mm]

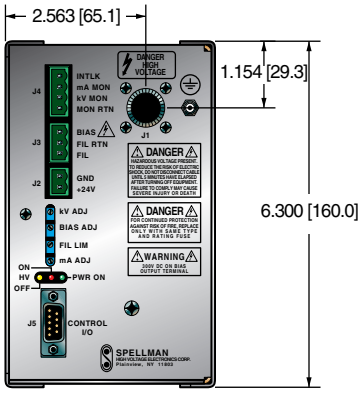
SIDE VIEW



TOP VIEW



BACK VIEW



CE

X-RAY

Unit shown has XCC and SIC options installed

- ***50KV AT 2 MA. 50 OR 75 WATTS MAX.***
- ***ADJUSTABLE INTEGRATED FILAMENT SUPPLY***
- ***OVERVOLTAGE & SHORT CIRCUIT PROTECTION***
- ***VOLTAGE & CURRENT PROGRAMMING***
- ***LOCAL AND REMOTE EMISSION CONTROL***
- ***SAFETY INTERLOCK***
- ***OEM CUSTOMIZATION AVAILABLE***
- ***CE MARKED***
- ***UL RECOGNIZED***

www.spellmanhv.com/manuals/MNX

The MNX Series is the result of Spellman's exceptional high voltage packaging and surface mount fabrication techniques, coupled with its proprietary encapsulation technology producing this ultra compact-sized OEM 50 Watt X-ray generator module.

The MNX Series is designed to power grounded cathode X-ray tubes from a variety of well known manufacturers. It features a 0 to 50kV high voltage output, and up to 2mA of emission current limited to 50 or 75 Watts, operating from a +24Vdc input. The MNX utilizes a closed loop filamentry beam control circuit to provide a highly regulated beam current. The ground referenced low noise dc filament supply operates between 0.3 and 3.5 amps. Offering tight regulation, high stability and low ripple, the MNX provides users both local and remote analog control to set beam voltage, emission current and filament current limit. An optional USB, RS232 or ethernet interface is available.

TYPICAL APPLICATIONS

Powering grounded cathode X-ray tubes from Kevex, Oxford, RTW, Superior, Varian and Trufocus.

OPTIONS

XCC	XRM Compatible HV Cable
SIC	Standard Interface Controller (Ethernet, USB & RS232)
5VPM	0 to 5 Volt Programming and Monitor Scaling
GB	Grid Bias Option

SPECIFICATIONS

Input:
+24Vdc±10%, 5.0A maximum for either 50 Watts or 75 Watts.

Efficiency:
80-85%, typical

Output:
0 to 50 kV at 0 to 2 mA, limited to a maximum of 50 watts or 75 Watts.

Voltage Control:
Local: Internal multi-turn potentiometer to set voltage from 0 to full output voltage.
Remote: 0 to +10Vdc proportional from 0 to full output voltage. Accuracy: ±1%. Z_{IN}: 10Mohm.

Emission Control:
Local: Internal potentiometer to set beam current between 0 and full output current.
Remote: 0 to +10Vdc proportional from 0 to full output current. Accuracy : ±1%. Z_{IN}: 10Mohm. Filament limit and filament preheat control capability is also provided.

DC Filament Supply:
Current: 3.5A, adjustable limit
Voltage: 5.0 volt limit

Voltage Regulation:
Load: 0.01% of output voltage no load to full load.
Line: ±0.01% for ±10% change in input voltage.

Current Regulation:
Load: 0.01% of output current from 0 to rated voltage.
Line: ±0.01% for ±10% change in input voltage.

Ripple:
0.1% p-p of maximum rated output voltage.

Environmental:
Operational: 0°C to +50°C
Storage: -40°C to +85°C
Humidity: 0% to 90%, non-condensing

Temperature Coefficient:
0.01% per °C, voltage and current.

Stability:
0.05% per 8 hours after 1/2 hour warm-up.

Voltage and Current Monitors:
0 to +10Vdc proportional from 0 to rated output. Accuracy ±1%.

Dimensions:
Standard Unit: 5.00"H x 2.87"W x 8"D (127.00mm x 72.90mm x 203.25mm).
XCC Option: 5.00"H x 2.87"W x 9"D (127.00mm x 72.90mm x 228.65mm).
SIC Option: 5.75"H x 2.87"W x 8"D (146.05mm x 72.90mm x 203.25mm).

Weight:
6.5 lbs. (2.9kg)

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive. UL/CUL recognized, File E227588.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128023-001 REV.J
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

MNX POWER INPUT CONNECTOR

J2	SIGNAL	PARAMETER
1	+24V Input	+24 volts @ 5A, max.
2	24V Return (Gnd.)	Power Ground

MNX FILAMENT CONNECTOR

J3	SIGNAL	PARAMETER
1	Filament Out	0.3A to 3.5A, 5 volt, max.
2	Filament Return	Filament Ground

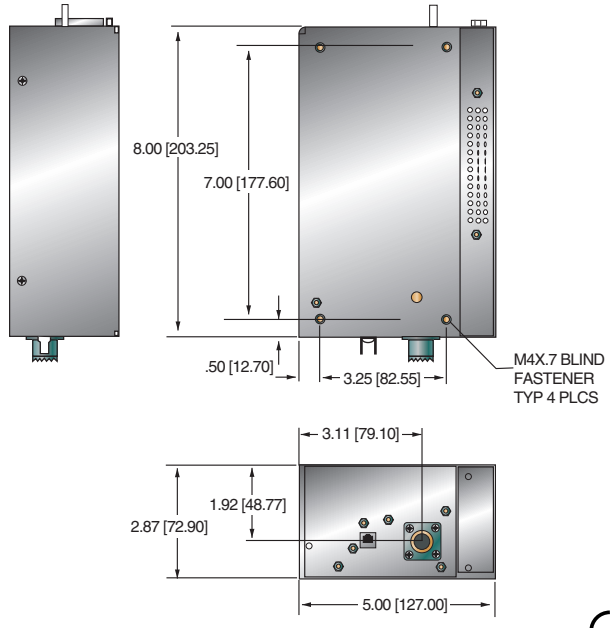
ANALOG INTERFACE CONNECTOR MALE 15 PIN MINI "D"

J4	SIGNAL	PARAMETER
1	Monitor Return	Signal Ground
2	Voltage Monitor	0-10 volts = 0 to full scale, Zout=1KΩ
3	Current Monitor	0-10 volts = 0 to full scale, Zout=1KΩ
4	Interlock Output	Connect 12V HVON bulb to pin 15 to enable
5	+10 Volt Reference	+10 Volts at 1mA, maximum
6	Filament Monitor	1 volt = 1 amp, Zout=1KΩ
7	Voltage Program Input	0-10 volts = 0 to full scale, Zin=10MΩ
8	Local Voltage Program*	0-10 volts, screwdriver adjust
9	Filament Limit Setpoint*	1 volt = 1 amp, screwdriver adjust
10	Current Program Input	0-10 volts = 0 to full scale, Zin=10MΩ
11	Local Current Program*	10 turn pot, screwdriver adjust
12	Not used (+24V Out for Interlock)	(Optional Interlock configuration)
13	Not used (Interlock Coil)	(Optional Interlock configuration)
14	Filament Preheat Setpoint*	1 volt = 1 amp, screwdriver adjust
15	Interlock Return	Interlock Ground

*Denotes 10 turn potentiometer located on front panel

DIMENSIONS: in.[mm]

STANDARD



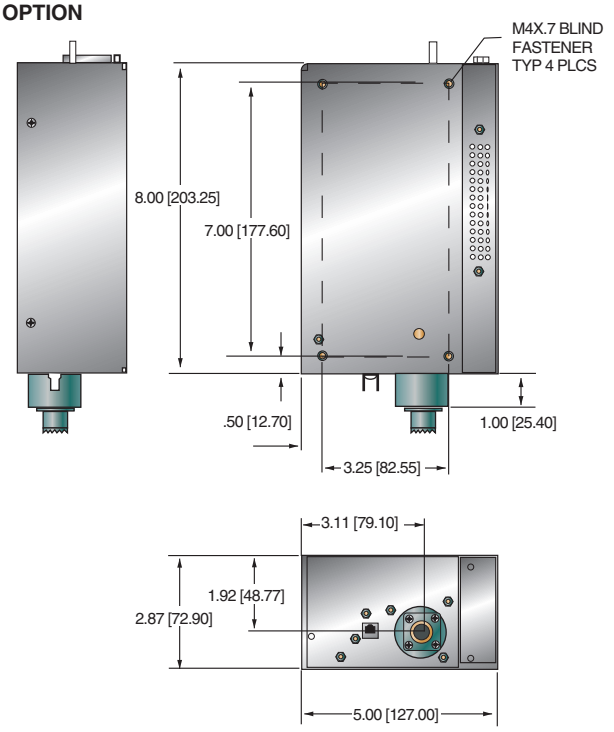
MNX HIGH VOLTAGE OUTPUT CONNECTOR

J1

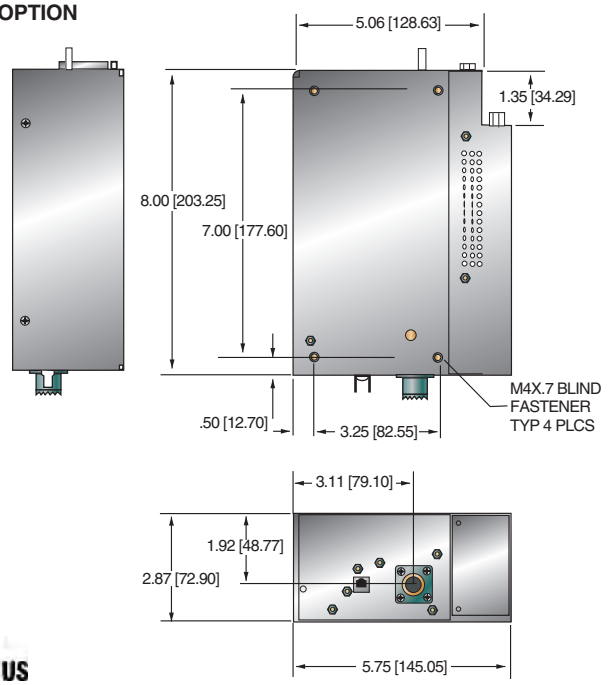
Spellman designed drywell type detachable connector. A one meter (39.4") long mating high voltage cable is provided.

DIMENSIONS: in.[mm]

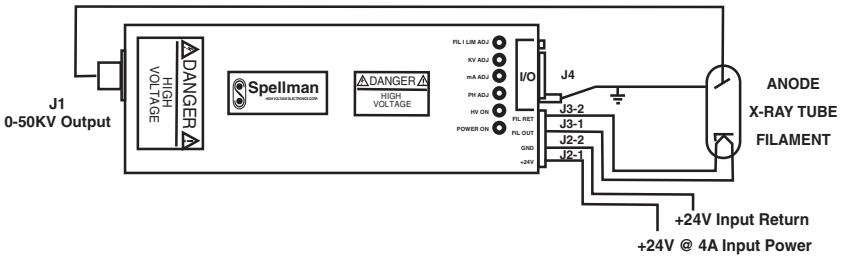
XCC OPTION



SIC OPTION

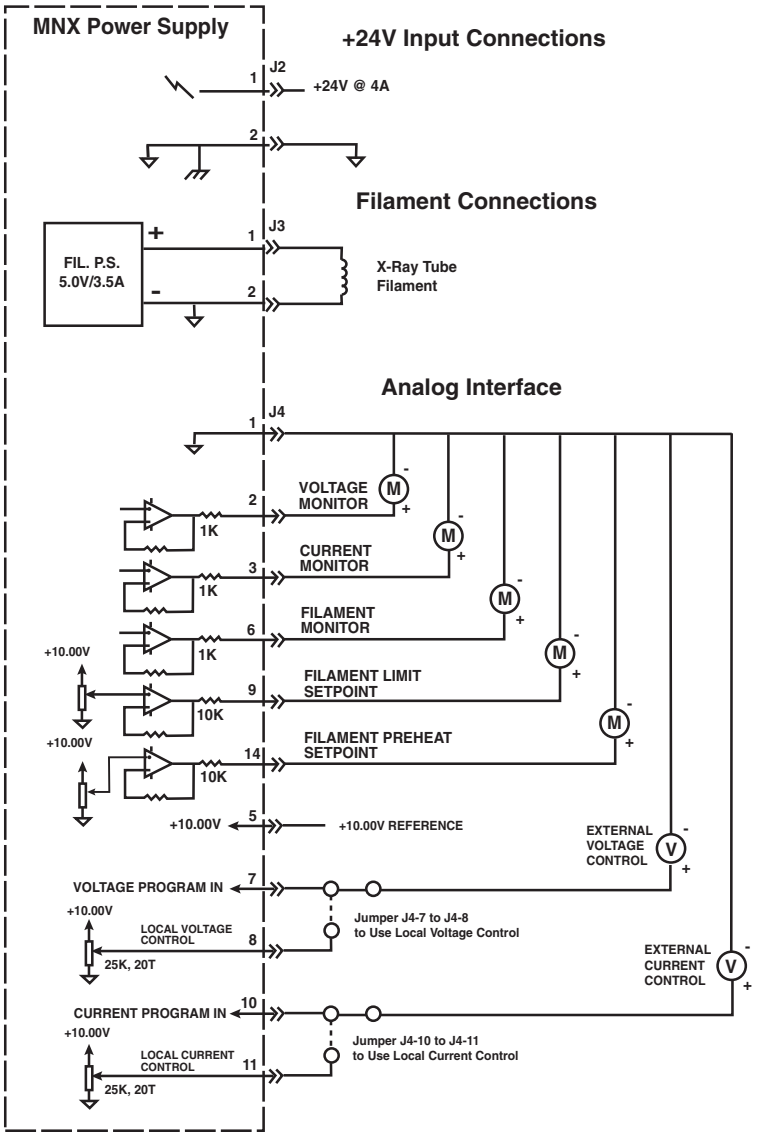


X-RAY

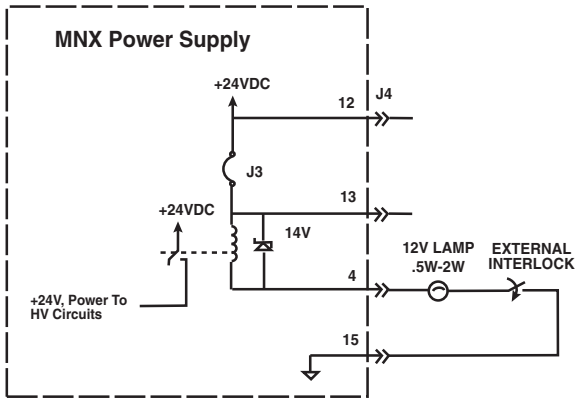


Typical MNX Operating Setup

See Wiring Diagrams for Recommended Analog Interface Connections

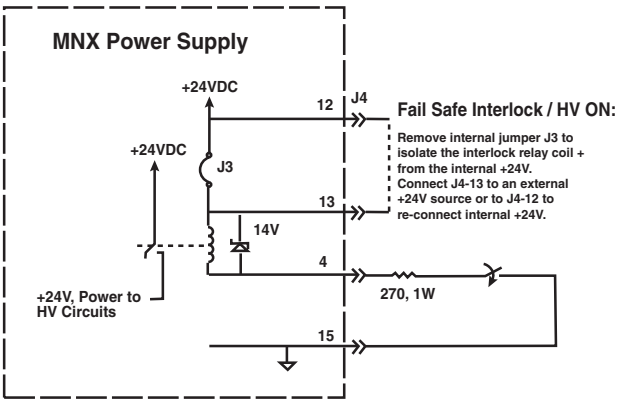


Analog Interface (continued)

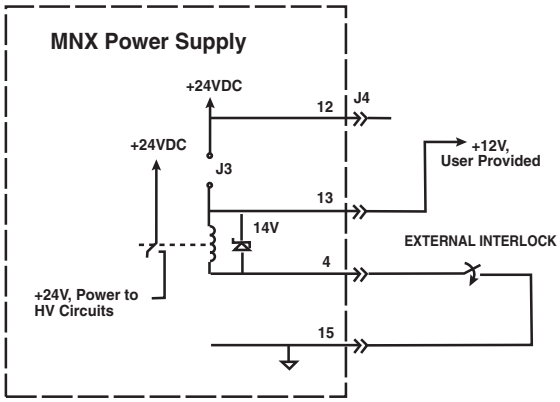


Fail Safe Interlock / HV ON Connections:
See accompanying drawings
for alternate configurations

Alternate Interlock Configurations



Alternate Interlock Configuration:
Fail Safe Lamp Replaced With a
270 Ohm Resistor



Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128023-001 REV.J
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

Grid Bias Option (GB):
Plug-n-Play compatibility for Grid Bias X-Ray Tubes

Spellman 's Grid Bias Option for the MNX Series is specifically designed for popular commercially available grid bias X-Ray tubes. The Grid Bias voltage is developed via the use of separate integrated high frequency switching circuit, providing maximum flexibility and control. The Grid Bias output is a voltage regulated, current compliant topology ideally suited for Wehnelt electrode applications. Arc and short circuit protection of the Grid Bias output prevents any damage due to transient events or installation errors.

Tracking Mode Operation
Functioning in tracking mode the voltage monitor (0-10Vdc= 0 to 50kV) of the main high voltage output is internally connected to the Grid Bias programming input (0-10Vdc = 0 to -300Vdc of Grid Bias). Connected in this manner the Grid Bias output will track in a linearly pro-portional fashion the setting of the main kV output.

A front panel accessible multiturn potentiometer limits the maximum magnitude of Grid Bias output applied to the X-Ray tube, providing unparalleled flexibility.

The output of the Grid Bias option is provided via an auxiliary two position Phoenix Contact terminal block, the mating connecter is provided.

SPECIFICATIONS

Output Voltage:
0 to -300Vdc

Output Current:
0.25mA, maximum

Load Regulation:
1% of output voltage, no load to full load

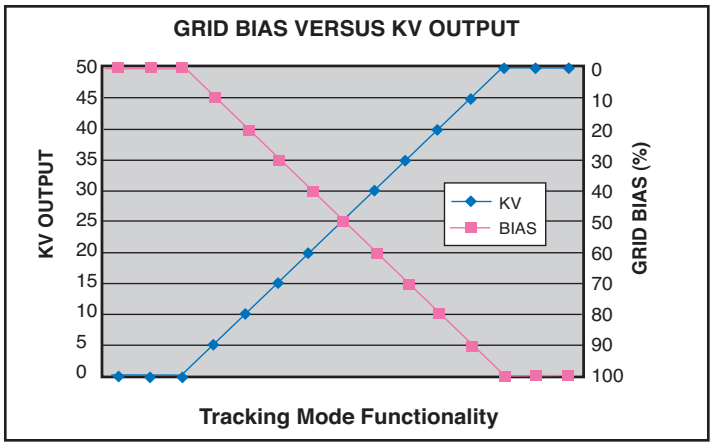
Line Regulation:
1% for a ±10% change in input voltage

Ripple:
1% of maximum rated voltage

How To Order:

Sample model number:
50 Watt unit: MNX50P50
75 Watt unit: MNX50P75

Options are added to the model number as follows:
MNX50P50/XCC or MNX50P75/SIC



GRID BIAS CONNECTOR
2 PIN PHOENIX CONTACT

J5	SIGNAL	PARAMETER
1	Ground	Chassis Ground
2	Grid Bias	0 to -300Vdc

MNX with Grid Bias option

X-RAY

- ***160KV OUTPUT VOLTAGE***
- ***RACK-MOUNTABLE***
- ***FLOATING FILAMENT***
- ***INTERNAL GRID POWER SUPPLY (80W MODEL)***
- ***POWER FACTOR CORRECTION***
- ***CLOSED-LOOP EMISSION CONTROL***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/XRF

Spellman's XRF Series allow for a wide range of input voltages and supply either 80W, 320W or 640W of output power at up to 160kVdc. These lightweight rack-mountable X-ray generators house a miniaturized high voltage system in a solid encapsulated, oil-free design. The XRF Series is designed with a power factor corrected input circuit which reduces harmonic emissions and noise normally associated with other high frequency switching power supplies. The XRF Series incorporates an internal floating filament and a closed-loop emission control circuit for precise regulation of emission current. Remote monitoring and control of voltage, current and filament current is also provided.

TYPICAL APPLICATIONS

X-ray Inspection
Non-Destructive Testing

OPTIONS

AOL	Adjustable Overload	**DF**	Dual Filament
GS	Grid Supply	**SL**	Slides
PC	Power Control	**APT**	Adjustable Power Trip
AT	Arc Trip	**IO**	Instant ON

SS(X) Non Standard Slow Start

SPECIFICATIONS

Input Voltage:
80W: 90-125 and 180-264Vac at 48-62Hz.
320W: 180-264Vac at 48-62Hz.
640W: 180-264Vac at 48-62Hz.

Power Factor:
0.9 or better.

High Voltage Supply:

Output Voltage:
0-160kV, negative polarity.

Output Current:
80W: 0.5mA max.
320W: 2.0mA at 160kV; 3.0mA at 100kV.
640W: 4.0mA.

Output Voltage Stability:
Within 0.1% of set value after warm-up period at full load.

Output Voltage Ripple:
80W & 320W: <0.1%, or 160V p-p for high freq. and line freq. at full load.
640W: 0.03% rms <1kHz, 0.75% rms above 1kHz.

Beam Current Stability:
80W: Within 0.1% of set value after 1/2 hour warm-up at constant output setting of 30-160kV and line voltage of 90-125 & 180-264Vac.
320W & 640W: Same as 80W except line voltage of 180-264Vac.

Filament Supply: Constant current DC filament supply with closed-loop current feedback.
Filament Voltage: 7V rms (high frequency) max.
Filament Current: 5A max., adjustable 0-5.0A by external Filament Limit Programming input.

Floating Grid Power Supply (80W Unit Only):
Grid Supply: The grid supply controls tube beam current in a closed-loop regulation design.
Grid Voltage: 0 to 1200Vdc.
Grid Voltage Ripple: Less than 1.0V rms at any frequency.
Grid Supply Response: Less than 0.5mA in less than 10ms.

Control and Monitoring:
Analog Control Inputs: Three inputs have internal load resistance greater than 330kohms.

Voltage Programming:
80W & 640W: 0 to +10Vdc, where 10.0Vdc = 160kV output.
320W: 0 to +10Vdc, where 8.0Vdc = 160kV output.

Beam Tube Current Control:
80W: 0 to +10Vdc, where 10.0Vdc = 0.5mA tube current.
320W: 0 to +6Vdc, where 6.0Vdc = 3.0mA tube current.
640W: 0 to +10Vdc, where 10.0Vdc = 4.0mA tube current.

Filament Current Control:
0 to +10Vdc, where 5.0Vdc = 5.0A filament current.

Analog Monitor Outputs:(See Tables For Details)
80W, 320W, 640W: High Voltage and Beam Current Monitoring.
80W: Filament Current Monitoring.
320W & 640W: Internal filament current monitor test point not connected to the interface connector.

Digital Control Inputs:(See Tables For Details)
80W, 320W, 640W: Interlock Enable.
80W, 320W, 640W: HV Enable.
80W: Grid Inhibit.
640W: Filament Select.

Digital Outputs:(See Tables For Details)
HV ON.
Voltage Mode.
Current Mode.

Connections:
Output Connector: 160kV European Conical connector with 2-ring and center pin end.
Input Power Connector: 5-pin male MS-type, Amphenol P/N 97-3102A-18-20P
Control Connections: 25-pin "D" connector, male, chassis-mounted.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128013-001 REV.F
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

Environmental:
0 to +50°C at 10-95% RH, non-condensing.
Forced convection cooling.

Dimensions:
7"H x 19"W x 22"D. (17.8cm x 48.3cm x 55.9cm).

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive.

160kV XRF SELECTION TABLE

OUTPUT VOLTAGE kV	OUTPUT CURRENT mA	OUTPUT POWER W	MODEL NUMBER XRFxxx
160	0.5	80	XRF160N80
160	2.0	320	XRF160N320
160	4.0	640	XRF160N640

J2—AC INPUT CONNECTOR WIRING

5 Pin MS Type	7 Pin UTG Type	CONNECTION
A	1	Auxiliary (Logic) Line
B	2	Auxiliary (Logic) Neutral
C	3	Ground
D	4	Main (Inverter) Line
E	5	Main (Inverter) Neutral

160kV XRF 80W, 320W, 640W, 25 PIN

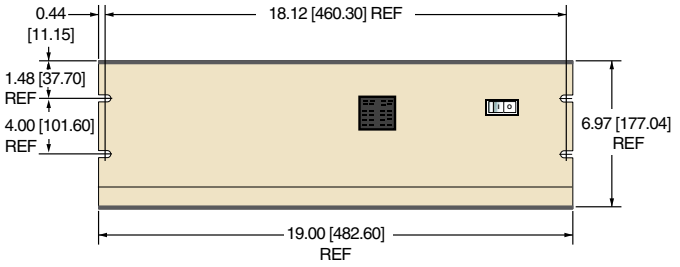
JB1	SIGNAL	SIGNAL PARAMETERS
1	Filament Limit	0-5V=0-5A Filament Limit
2	High Voltage on Control	+12VDC IN = HV ON
3	N/C	
4	N/C	
5	High Voltage On Status	Open=HV ON for 320W, Low=HV ON for 80W
6	A-Ground	Ground
7	kV Monitor	0-8V=0-160kV for 320W, 0-10V=0-160kV for 80W
8	Interlock Control	+12VDC IN = Interlock Closed
9	N/C	
10	mA Demand	0-6V=0-3mA for 320W, 0-10V=0-0.5mA for 80W
11	N/C	
12	N/C	
13	D-Ground	Ground
14	Fil. Monitor	0-5V=0-5A rms
15	N/C	
16	N/C	
17	N/C	
18	N/C	
19	mA Monitor	0-6V=0-3mA for 320W, 0-10V=0-0.5mA for 80W
20	N/C	
21	+12VDC Out	
22	kV Demand	0-8V=0-160kV for 320W, 0-10V=0-160kV for 80W
23	Grid Inhibit/Fil. Select	(Low=Grid Inhibit), Low=small spot size
24	N/C	
25	Chassis Gnd (I/O Shield)	Chassis Gnd.

160kV XRF 80W, 320W, 640W TERMINAL BLOCK 10 PIN

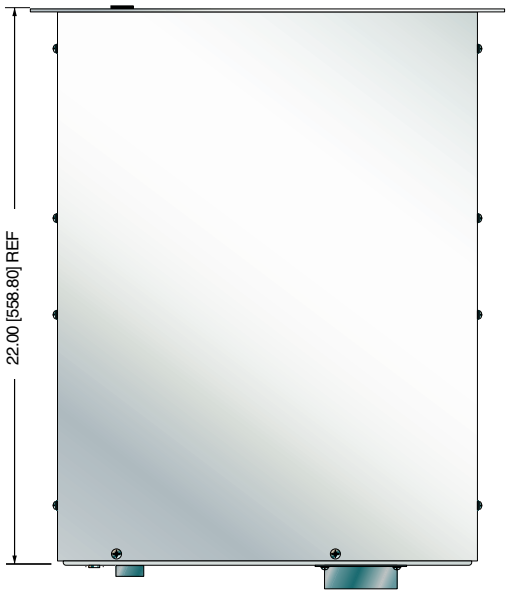
TB1	SIGNAL	SIGNAL PARAMETERS
1	Interlock	Jumper to TB2 to close interlock
2	Interlock Return	
3	kV Monitor	0-8V=0-160kV for 320W, 0-10V=0-160kV for 80W
4	mA Monitor	0-6V=0-3mA for 320W, 0-10V=0-0.5mA for 80W
5	Filament Monitor	0-5V=0-5A rms
6	Bias Monitor	Status Only. No Scale Factor(optional)
7	HV ON Indicator	+15V=HV ON
8	Voltage Mode Indicator	Low=Voltage Mode.
9	Current Mode Indicator	Low=Current Mode.
10	GND	Ground

DIMENSIONS: in.[mm]

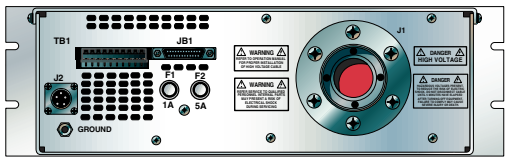
FRONT VIEW



TOP VIEW



BACK VIEW



CE

X-RAY

- ***INTEGRATED HV SUPPLY, FILAMENT SUPPLY, X-RAY TUBE, BEAM PORT AND CONTROL ELECTRONICS***
- ***COMPACT & LIGHTWEIGHT***
- ***UNIVERSAL INPUT, POWER FACTOR CORRECTED WITH INTERNAL EMI FILTER***
- ***CAN BE MOUNTED IN ANY PHYSICAL ORIENTATION***
- ***ANALOG CONTROL INTERFACE AND STANDARD RS-232 DIGITAL INTERFACE***

www.spellmanhv.com/manuals/XRB

Spellman's new XRB Series of Monoblock® X-Ray sources are designed for OEM applications powering its internal X-Ray tube up to 80kV at 100 watts. Features like universal input, small package size and a standard analog and RS-232 digital interface simplify integrating the XRB into your X-Ray analysis system. Standard models are available either with fan shaped or cone shaped beam geometries. Proprietary emission control circuitry provides excellent regulation of X-Ray tube current, along with outstanding stability performance.

TYPICAL APPLICATIONS

Plating Measurement, Food Inspection, Fill Level Confirmation and Security Applications

SPECIFICATIONS

Input Voltage:
Power factor corrected input >0.98, 90-264Vac, 47-63 Hertz, 2 Amps, maximum

X-Ray Tube Voltage:
Nominal X-ray tube voltage is adjustable between 20kV to 80kV

X-Ray Tube Current:
150uA to 1.25mA over specified tube voltage range

X-Ray Tube Power:
100 watts, maximum

Voltage Regulation:
Line: ≤0.05% of maximum output voltage over a ±10% change of nominal input line voltage
Load: ≤0.1% of maximum rated voltage for 150uA to 1.25mA load change

Voltage Accuracy:
Voltage measured across the X-Ray tube is within ±2% of the programmed value

Voltage Risetime:
Standard: Ramp time shall be ≤500mS from 10% to 90% of maximum rated output voltage
Optional: 5 seconds. Specify at time of order

Voltage Overshoot:
≤5% of maximum voltage, to return within 2.5% of maximum voltage in less than 100mS

Voltage Ripple:
≤1% peak to peak of maximum voltage for frequencies ≤1 kHz

Voltage Temperature Coefficient:
≤100ppm/°C

Emission Current Parameters
Current Regulation:
Line: ≤0.05% of rated output current over a ±10% change of nominal input line voltage
Load: ≤0.1% of rated output current for a change from 50% to 100% of rated output voltage

Current Accuracy:
Current measured through the X-Ray tube is within ±2% of the programmed value

Current Risetime:
Standard: Ramp time shall be ≤500mS from 10% to 90% of maximum rated current
Optional: 5 seconds. Specify at time of order

Current Temperature Coefficient:
≤100ppm/°C

Arc Intervention:
Standard: 3 arcs in 10 seconds with a 200mS quench = Shutdown
Optional: 1 arc = Shutdown. Specify at time of order

Filament Configuration:
High frequency AC filament drive; referenced to cathode potential of the X-Ray tube. Closed loop filamentary emission control circuit regulates filament current to provide desired X-Ray tube emission current.

X-Ray Tube:
Focal Spot:
Standard: 1.5mm (IEC 336) SHV part number 105739-043
Optional: 0.8mm (IEC 336) SHV part number 105739-045 Specify at time of order
Beam Filter: Ultem: 3.30mm ±0.15mm
Oil: 8mm ±0.1mm
Glass: 1mm ±0.25mm
Standard: Fan Beam. The beam angular coverage will be 75 degrees with the beam plane perpendicular to the X-Ray tube axis and 13 degrees wide.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128065-001 REV.G
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

Analog Interface:
Ground referenced 0 to 9Vdc for all programming and monitoring signals. Relay contacts and open collector signals for other signals. See analog interface connector pin out table.

Digital Interface:
Jumpers are needed to be configured and the digital interface cable installed to enable the RS232 interface.

Control Software:
A demo GUI will be provided for the RS-232 digital interface.

Interlock/Signals:
A hardware interlock functions in both analog and digital programming modes. The hardware X-Ray Enable signal only functions in analog programming mode.

Operating Temperature:
0°C to +40°C

Storage Temperature:
-40°C to +70°C

Humidity:
10% to 95% relative humidity, non-condensing

Cooling:
Natural convection augmented by customer provided 100CFM external cooling fan as required.

Input Line Connector:
3 pin, Phoenix Contact 1829167, SHV part number 105725-219. Mating connector Phoenix Contact #1805990, SHV part number 105808-475 provided with unit.

Analog Interface Connector:
15 pin D connector, male

Digital Interface Connector:
9 pin D connector, female

Grounding Point:
8-32 ground stud provided on chassis

Dimensions:
9.6˝L X 7.6˝W X 7.0˝H
(243.8mm x 193.0mm x 177.8mm)

Weight:
≤32 pounds (14.5 kg)

Orientation:
Can be mounted in any orientation.

X-Ray Leakage:
Not to be greater than 0.5mR/hr at 5cm outside the external surface per FDA 21 CFR 1020.40 and OSHA 29 CFR 1020.96

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive, UL/CUL recognized file E148969

AC LINE POWER CONNECTOR— J1 THREE POSITION PHOENIX CONTACT

PIN	SIGNAL
1	Earth Ground
2	Line
3	Neutral

Mating connector provided with unit

RS-232 DIGITAL INTERFACE— J3 9 PIN FEMALE D CONNECTOR

PIN	SIGNAL	PARAMETERS
1	N/C	No Connection
2	TD	Transmit Data
3	RD	Receive Data
4	N/C	No Connection
5	SGND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection

XRB ANALOG INTERFACE— J2 15 PIN MALE D CONNECTOR

PIN	SIGNAL	PARAMETERS
1	Power Supply Fault Output	Open collector, 35 volts @ 10mA max. high = no fault
2	mA Program Input	0 to 9.00Vdc = 0 to 100% rated output, Zin =10MΩ
3	kV Program Input	0 to 9.00Vdc = 0 to 100% rated output, Zin =10MΩ
4	X-Ray On Lamp Relay Output	Common, dry contacts, 30Vdc @ 1 amp, max.
5	X-Ray On Lamp Relay Output	Normally open, X-Ray ON = closed
6	mA Monitor Output	0 to 9Vdc = 0 to 100% rated output, Zout =10kΩ
7	X-Ray On Lamp Relay Output	Normally closed, X-Ray ON = open
8	kV Monitor Output	0 to 9.00Vdc = 0 to 100% rated output, Zout =10kΩ
9	Signal Ground	Ground
10	Signal Ground	Ground
11	HV Interlock Return Input	Connect to Pin 12 to close HV interlock
12	HV Interlock Output	+15Vdc @ open, ≤5mA when connected to pin 11
13	X-Ray Enable Output	+15Vdc @ open, ≤5mA when connected to pin 15
14	X-Ray Status Output	Open collector, 35 volts @ 10mA max. high = X-Ray OFF
15	X-Ray Enable Return Input	Connect to pin 13 to enable X-Ray generation

LED INDICATORS

INDICATOR	SIGNAL NAME	CONDITION Illuminated When...
LED 1	OV	High kV occurs
LED 2	UV	Low kV occurs
LED 3	UC	Low mA occurs
LED 4	OC	High mA occurs
LED 5	ARC FLT	Arc fault occurs
LED 6	OT	Over temperature occurs
LED 7	X-RAY ON	X-Rays are enabled
LED 8	PWR	Power is ON

OPTIONS

RT	5 second Risetime for both voltage and current
ARC	1 arc = Shutdown
CB	Cone Beam
0.8mm	0.8mm focal spot SHV part number 105739-045

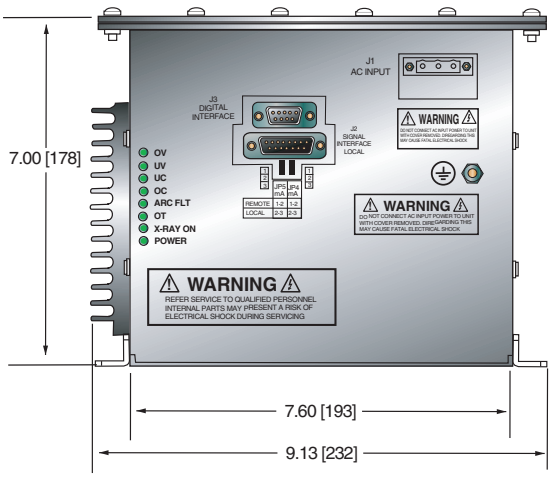
How to Order:

Standard: PART NO.: XRB80N100

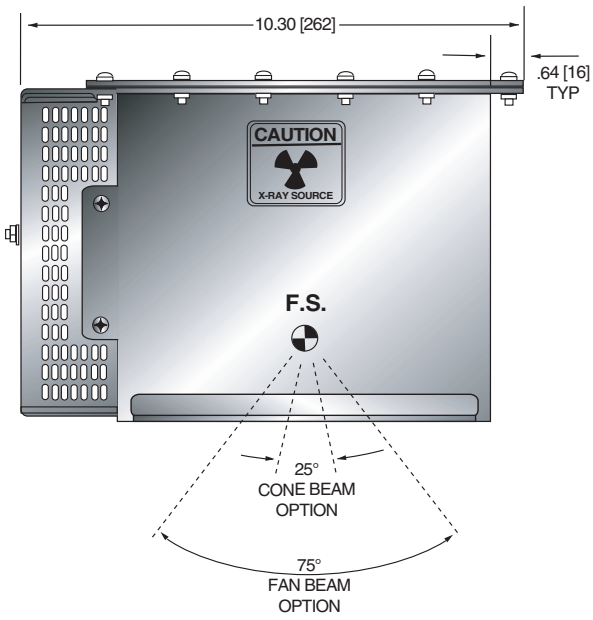
Risetime and Cone Beam Options:
PART NO.: XRB80N100/RT/CB

DIMENSIONS: in.[mm]

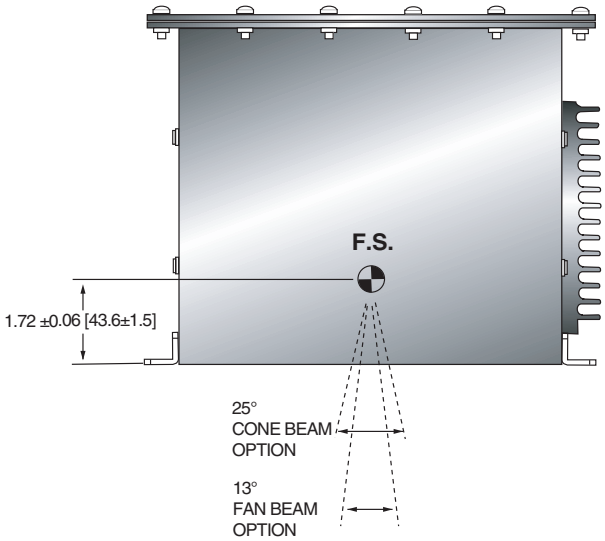
FRONT VIEW



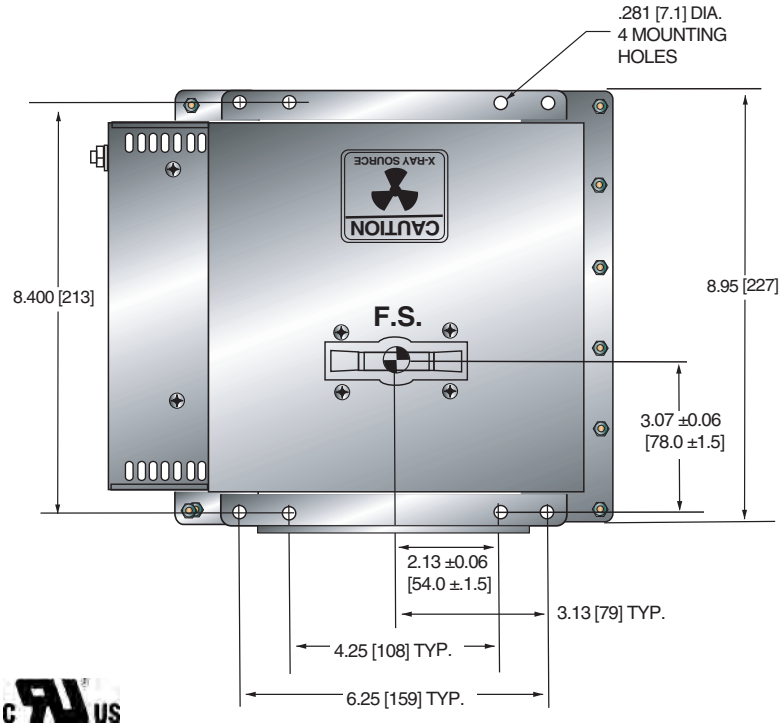
SIDE VIEW



BACK VIEW



BOTTOM VIEW



Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128065-001 REV.G
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

XRB100 100KV MONOBLOCK® X-RAY SOURCE

- ***INTEGRATED HV SUPPLY, FILAMENT SUPPLY, X-RAY TUBE, BEAM PORT AND CONTROL ELECTRONICS***
- ***COMPACT & LIGHTWEIGHT***
- ***UNIVERSAL INPUT, POWER FACTOR CORRECTED WITH INTERNAL EMI FILTER***
- ***CAN BE MOUNTED IN ANY PHYSICAL ORIENTATION***
- ***ANALOG CONTROL INTERFACE AND STANDARD RS-232 DIGITAL INTERFACE***

www.spellmanhv.com/manuals/XRB100

Spellman's new XRB100 Series of Monoblock® X-Ray sources are designed for OEM applications powering its internal X-Ray tube up to 100kV at 100 watts. Features like universal input, small package size and a standard analog and RS-232 digital interface simplify integrating the XRB100 into your X-Ray analysis system. Proprietary emission control circuitry provides excellent regulation of X-Ray tube current, along with outstanding stability performance.

TYPICAL APPLICATIONS

Plating Measurement, Food Inspection, Fill Level Confirmation and Security Applications

SPECIFICATIONS

Input Voltage:
Power factor corrected input >0.98, 90-264Vac, 46-63 Hertz, 2 Amps, maximum

X-Ray Tube Voltage:
Nominal X-ray tube voltage is adjustable between 40kV to 100kV

X-Ray Tube Current:
100uA to 1mA over specified tube voltage range

X-Ray Tube Power:
100 watts, maximum

Voltage Regulation:
Line: ≤±0.1% of maximum output voltage over a ±10% change of nominal input line voltage
Load: ≤±0.1% of maximum rated voltage for 100uA to 1mA load change

Voltage Accuracy:
Voltage measured across the X-Ray tube is within ±2% of the programmed value

Voltage Risetime:
Standard: Ramp time shall be 1 second from 10% to 90% of maximum rated output voltage

Voltage Overshoot:
≤5% of maximum voltage, to return within 2.5% of maximum voltage in less than 50mS

Voltage Ripple:
≤0.5% peak to peak of maximum voltage for frequencies ≤1 kHz

Voltage Temperature Coefficient:
±150ppm/°C

Emission Current Parameters
Current Regulation:
Line: ≤0.5% of rated output current over a ±10% change of nominal input line voltage
Load: ≤0.5% of rated output current for a change from 50% to 100% of rated output voltage

Current Accuracy:
Current measured through the X-Ray tube is within ±1% of the programmed value

Current Risetime:
Standard: Ramp time shall be 1 second from 10% to 90% of maximum rated current

Current Temperature Coefficient:
≤100ppm/°C

Arc Intervention:
3 arcs in 10 seconds with a 200mS quench = Shutdown

Filament Configuration:
High frequency AC filament drive; referenced to cathode potential of the X-Ray tube. Closed loop filamentary emission control circuit regulates filament current to provide desired X-Ray tube emission current.

X-Ray Tube:
Type: Stationary anode, tungsten target
Focal Spot: 0.8 x 0.8mm (IEC 336)
Beam Filter: Lexan: 3.2mm
Oil: 10mm ±0.1mm
Glass: 1.8mm max.
Beam: Fan Beam. The beam angular coverage will be 74 degrees with the beam plane perpendicular to the X-Ray tube axis and 10 degrees wide ±1%.
Anode Angle: 30 degrees

Analog Interface:
Ground referenced 0 to 9Vdc for all programming and monitoring signals. Relay contacts and open collector signals for other signals. See analog interface connector pin out table.

Digital Interface:
Jumpers are needed to be configured and the digital interface cable installed to enable the RS232 interface.

Control Software:
A demo GUI will be provided for the RS-232 digital interface.

Interlock/Signals:
A hardware interlock functions in both analog and digital programming modes. The hardware X-Ray Enable signal only functions in analog programming mode.

Operating Temperature:
0°C to +40°C

Storage Temperature:
-40°C to +70°C

Humidity:
10% to 95% relative humidity, non-condensing

Cooling:
Forced air and natural convection augmented by customer provided external cooling fan to maintain a tank temperature below 55°C.

Input Line Connector:
3 pin, Phoenix Contact 1829167, SHV part number 105725-219. Mating connector Phoenix Contact #1805990, SHV part number 105808-475 provided with unit.

Analog Interface Connector:
15 pin D connector, male

Digital Interface Connector:
9 pin D connector, female

Grounding Point:
8-32 ground stud provided on chassis

Dimensions:
See page 3 of 3

Weight:
<55 pounds (25 kg)

Orientation:
Can be mounted in any orientation.

X-Ray Leakage:
Not to be greater than 0.5mR/hr at 5cm outside the external surface per FDA 21 CFR 1020.40 and OSHA 29 CFR 1020.96

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

AC LINE POWER CONNECTOR— J1 THREE POSITION PHOENIX CONTACT

PIN	SIGNAL
1	Earth Ground
2	Line
3	Neutral

Mating connector provided with unit

RS-232 DIGITAL INTERFACE— J3 9 PIN FEMALE D CONNECTOR

PIN	SIGNAL	PARAMETERS
1	N/C	No Connection
2	TD	Transmit Data
3	RD	Receive Data
4	N/C	No Connection
5	SGND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection

XRB ANALOG INTERFACE— J2 15 PIN MALE D CONNECTOR

PIN	SIGNAL	PARAMETERS
1	Power Supply Fault Output	Open collector, 35 volts @ 10mA max. high = no fault
2	mA Program Input	0 to 9.00Vdc = 0 to 100% rated output, Zin =10MΩ
3	kV Program Input	0 to 9.00Vdc = 0 to 100% rated output, Zin =10MΩ
4	X-Ray On Lamp Relay Output	Common, dry contacts, 30Vdc @ 1 amp, max.
5	X-Ray On Lamp Relay Output	Normally open, X-Ray ON = closed
6	mA Monitor Output	0 to 9Vdc = 0 to 100% rated output, Zout =10kΩ
7	X-Ray On Lamp Relay Output	Normally closed, X-Ray ON = open
8	kV Monitor Output	0 to 9.00Vdc = 0 to 100% rated output, Zout =10kΩ
9	Signal Ground	Ground
10	Signal Ground	Ground
11	HV Interlock Return Input	Connect to Pin 12 to close HV interlock
12	HV Interlock Output	+15Vdc @ open, ≤5mA when connected to pin 11
13	X-Ray Enable Output	+15Vdc @ open, ≤5mA when connected to pin 15
14	X-Ray Status Output	Open collector, 35 volts @ 10mA max. high = X-Ray OFF
15	X-Ray Enable Return Input	Connect to pin 13 to enable X-Ray generation

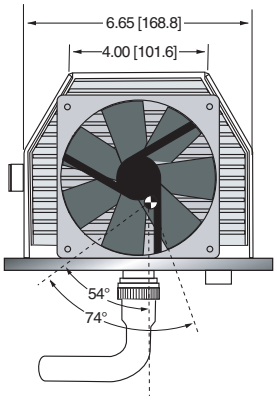
LED INDICATORS

INDICATOR	SIGNAL NAME	CONDITION Illuminated When...
LED 1	OV	High kV occurs
LED 2	UV	Low kV occurs
LED 3	UC	Low mA occurs
LED 4	OC	High mA occurs
LED 5	ARC FLT	Arc fault occurs
LED 6	OT	Over temperature occurs
LED 7	X-RAY ON	X-Rays are enabled
LED 8	PWR	Power is ON

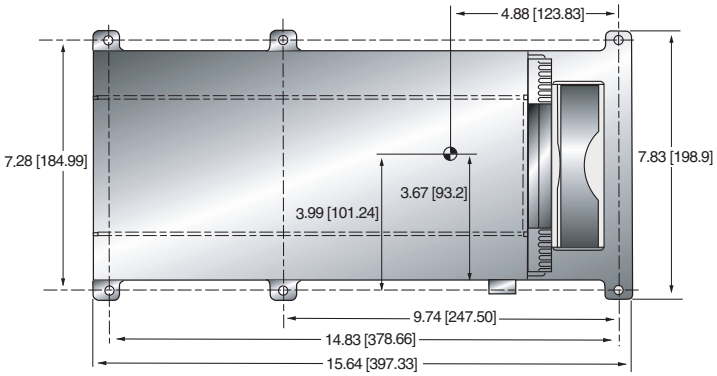
Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128072-001 REV.C
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

DIMENSIONS: in.[mm]

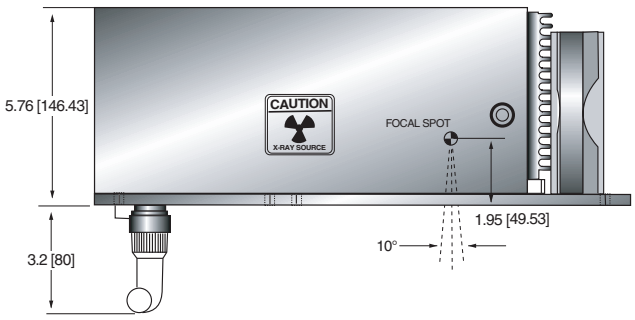
X-RAY GENERATOR
FRONT VIEW



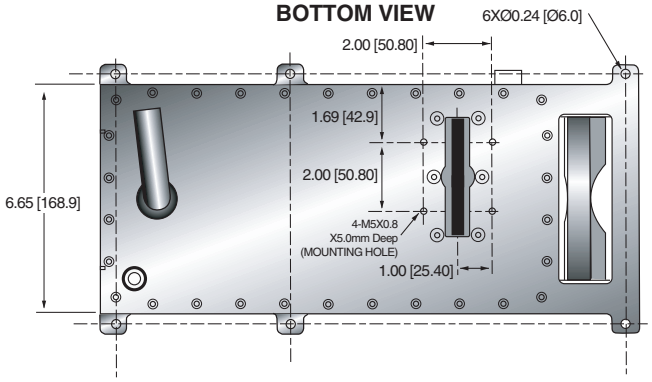
TOP VIEW



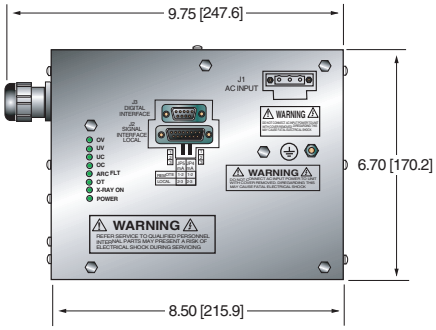
SIDE VIEW



BOTTOM VIEW

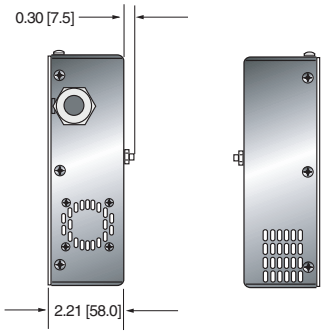


CONTROL UNIT
FRONT VIEW

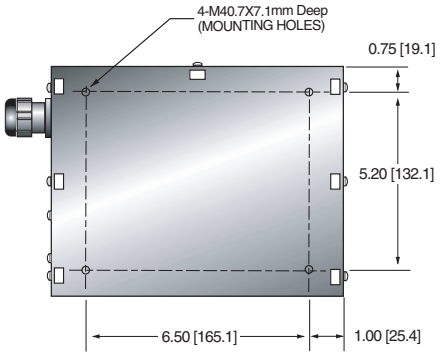


TOP VIEW

SIDE VIEW



BOTTOM VIEW



CE

X-RAY

- ***COMPACT & LIGHTWEIGHT***
- ***MODELS FROM 20KV-70KV, 300W, 600W AND 1200W***
- ***UNIVERSAL INPUT, POWER FACTOR CORRECTED***
- ***HOT ANODE OR HOT CATHODE X-RAY TUBE CAPABLE***
- ***STANDARD DIGITAL INTERFACES: USB, ETHERNET AND RS-232***
- ***CE COMPLIANT***

www.spellmanhv.com/manuals/DXM

Spellman's new DXM Series of X-Ray generator modules are designed for OEM applications up to 70kV at 1200 watts. Its universal input, small package size and choice of three standard digital interfaces simplifies integrating the DXM into your X-Ray analysis system. Models are available to operate either floating filament (negative HV polarity) or ground referenced filament (positive HV polarity), X-Ray tube designs. DSP based emission control circuitry provides excellent regulation of emission current, along with outstanding stability performance.

TYPICAL APPLICATIONS

Plastics Sorting
Crystal Inspection
Plating Measurement
Diamond Inspection
Mineral Analysis
X-Ray Fluorescence
X-Ray Diffraction

SPECIFICATIONS

Input Voltage:
Power factor corrected input
90-264Vac, 47-63 Hertz, for 300 watt units
180-264Vac, 47-63 Hertz for 600 and 1200 watt units

Output Voltage:
6 models—20kV, 30kV, 40kV, 50kV, 60kV and 70kV

Output Polarity:
Negative-for floating filament X-ray tubes
Positive-for ground referenced filament X-ray tubes

Power:
3 power ranges available—300 watts, 600 watts and 1200 watts
Other power levels available on special order.

Output Voltage Regulation:
≤0.01% of rated output voltage over specified input voltage range
≤0.01% of rated output voltage for a full load change

Emission Current Regulation:
≤0.01% of rated output current over specified input voltage range
≤0.01% of rated output current for a change from 30% to 100% of rated output voltage
Filament is disabled when kV is <30% of full scale output

Ripple:
≤1%rms at >20 kHz, 0.1%rms below 20 kHz

Stability:
≤25ppm/hr after a 2 hour warm up

Temperature Coefficient:
≤50ppm per degree C

Environmental:
Temperature Range:
Operating: 0˚C to 40˚C
Storage: -40˚C to 85˚C
Humidity:
20% to 85% RH, non-condensing.

Filament Configuration:
Closed loop emission control regulates filament setting to provide desired Xray tube emission current.
Two types are available: Floating Filament (ac output referenced to negative output voltage) and Ground Referenced Filament (dc output referenced to ground).

Output: 0-5 amps at a compliance of 10 volts, maximum.
The filament loop is disabled when the kV output is less than 30% of full scale output to protect the X-Ray tube.
Other filament levels available on special order.

Control Interface

Local Interface:
Potentiometers are provided to adjust filament limit and preheat levels

Remote Interface: USB, Ethernet and RS232 are standard. All digital monitors have an accuracy specification of 2%

Control Software: A Windows graphical user interface example is provided. Built-in diagnostics can be performed over Ethernet via a Java applet and any standard web browser

High Voltage Enable: A hardware based, dry contact closure will enable the power supply into the high voltage on mode

Monitor Signals: Voltage and current monitor signals are scaled 0-10Vdc equals 0-100% of full scale, accuracy is 1%

Cooling:
Forced air

Dimensions:
300/600 Watts: 4.75˝H X 6˝W X 12˝D
(120.65mm x 152.4mm x 304.8mm)
1200 Watts: 4.75˝H X 12˝W X 12˝D
(120.65mm x 304.8mm x 304.8mm)

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128034-001 REV.J
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

Weight:
300/600 Watts: 14 pounds (6.35kg)
1200 Watts: 26 pounds (11.8kg)

Input Line Connector:
IEC320 with EMI filter

Output Connector:
Depends upon polarity selected. See table and drawing.
Other connectors and pinouts available on special order.

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive, UL/CUL recognized file E227588

DXM SELECTION TABLE— 300W, 600W, 1200W

300 Watt			600 Watt		1200 Watt	
kV	mA	Model	mA	Model	mA	Model
20	15	DXM20*300	30	DXM20*600	60	DXM20*1200
30	10	DXM30*300	20	DXM30*	40	DXM30*1200
40	7.5	DXM40*300	15	DXM40*600	30	DXM40*1200
50	6	DXM50*300	12	DXM50*600	24	DXM50*1200
60	5	DXM60*300	10	DXM60*600	20	DXM60*1200
70	4.28	DXM70*300	8.56	DXM70*600	17.12	DXM70*1200

*Specify "P" for positive polarity or "N" for negative polarity

DXM ANALOG INTERFACE— J2 15 PIN MALE D CONNECTOR

PIN	SIGNAL	SIGNAL PARAMETERS
1	Power Supply Fault	Open Collector, 35V @ 10mA Maximum
2	Current Program In	0 to 10V=0 to 100% Rated Output, Zin=10MΩ
3	Voltage Program In	0 to 10V=0 to 100% Rated Output, Zin=10MΩ
4	Filament Limit Input	0 to 10V=0 to 100% Rated Output, Zin=10MΩ
5	Local Filament Limit	Multi-turn front panel potentiometer
6	Filament Preheat Input	0 to 10V=0 to 100% Rated Output, Zin=10MΩ
7	Local Filament Preheat	Multi-turn front panel potentiometer
8	Voltage Monitor	0 to 10V=0 to 100% Rated Output, Zout =4.99k, 1%
9	Signal Ground	Ground
10	Current Monitor	0 to 10V=0 to 100% Rated Output, Zout =4.99k, 1%
11	X-ray Enable Input	Connect to Pin 12 to HV Enable Supply
12	X-ray Enable Output	+15V @ Open, ≤15mA @ Closed
13	Filament Monitor	1 Volt=1 Amp, Zout=10kΩ
14	X-ray On Output Signal	Open Collector, 35V @10mA Maximum
15	Spare	n/c

RS-232 DIGITAL INTERFACE— J3 9 PIN FEMALE D CONNECTOR

PIN	SIGNAL	SIGNAL PARAMETERS
1	NC	No Connection
2	TX out	Transmit Data
3	RX in	Receive Data
4	NC	No Connection
5	SGND	Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection

USB DIGITAL INTERFACE— J4 4 PIN USB "B" CONNECTOR

PIN	SIGNAL	SIGNAL PARAMETERS
1	VBUS	+5 Vdc
2	D-	Data -
3	D+	Data +
4	GND	Ground

FILAMENT TERMINAL BLOCK— TB1 TWO POSITION TERMINAL BLOCK

POSITION	SIGNAL	SIGNAL PARAMETERS
1	Filament Output	0-5 amps, 10Vdc Maximum
2	Filament Return	Filament Return

For positive polarity/ground referenced filament units

ETHERNET DIGITAL INTERFACE— J5 8 PIN RJ45 CONNECTOR

PIN	SIGNAL	SIGNAL PARAMETERS
1	TX+	Transmit Data +
2	TX-	Transmit Data -
3	RX+	Receive Data +
4	NC	No Connection
5	NC	No Connection
6	RX-	Receive Data -
7	NC	No Connection
8	NC	No Connection

HIGH VOLTAGE OUTPUT CONNECTOR— J6: FLOATING FILAMENT

Negative Polarity: Claymount Mini Federal Standard X-ray connector

HIGH VOLTAGE OUTPUT CONNECTOR— J6: GROUND FILAMENT

Positive Polarity: Spellman High Voltage Delrin Drywell connector. 4 foot (1.21m) long high voltage cable provided

For positive polarity units a ground referenced filament output is provided on a two position terminal TB1. See table

CLAYMOUNT HV CONNECTOR PINOUT

PIN	OUTPUT CONNECTION
C (common)	High Voltage Output
S (small)	High Voltage Output
L (large)	Filament Output
G (grid)	Filament Output

Note: No high voltage cable is provided

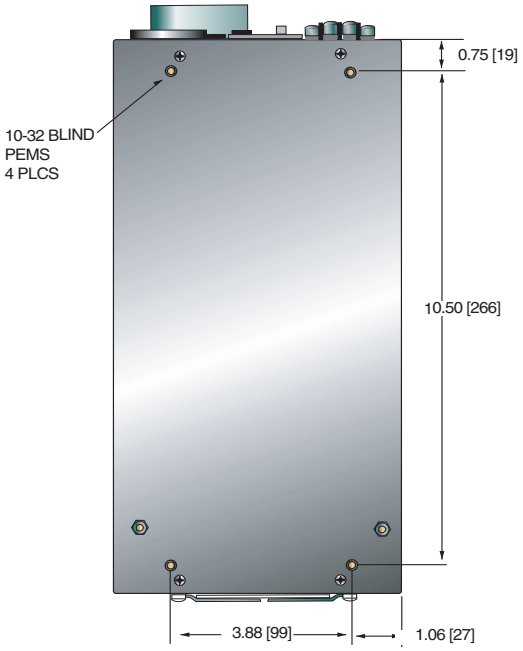
Recommended Cable:
Claymount part number: 12096
Cable assembly, L3 CA11, CA11, 10F, CS=Bare 10 foot, Mini Federal Connectors on both ends, "C" and "S" are both connected to the bare shield wire

X-RAY

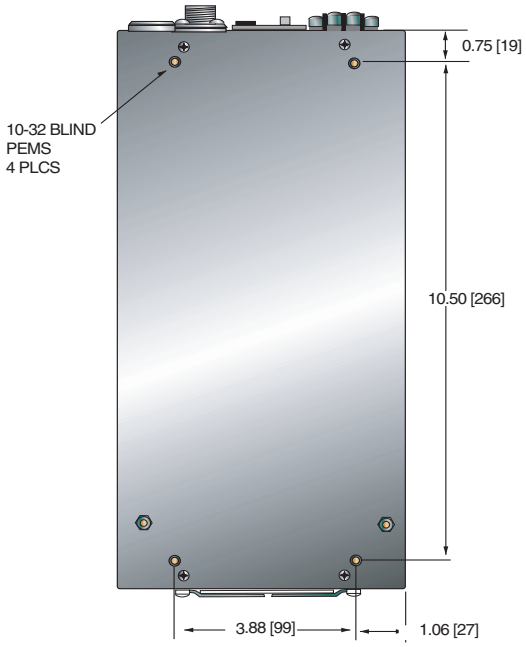
DIMENSIONS: in.[mm]

300/600 Watt

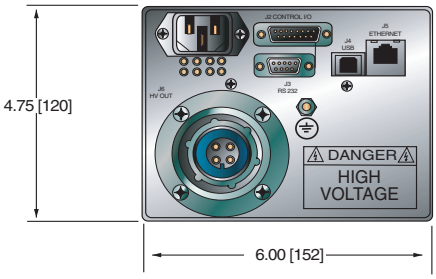
BOTTOM VIEW



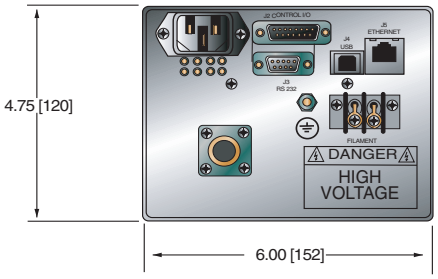
BOTTOM VIEW



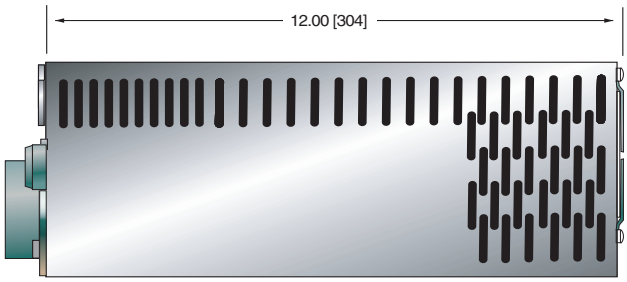
FRONT VIEW



FRONT VIEW

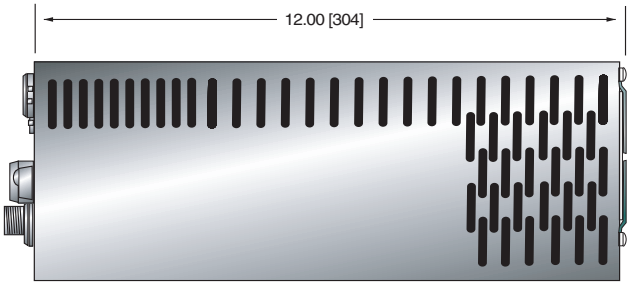


SIDE VIEW



Negative Polarity - Floating Filament

SIDE VIEW



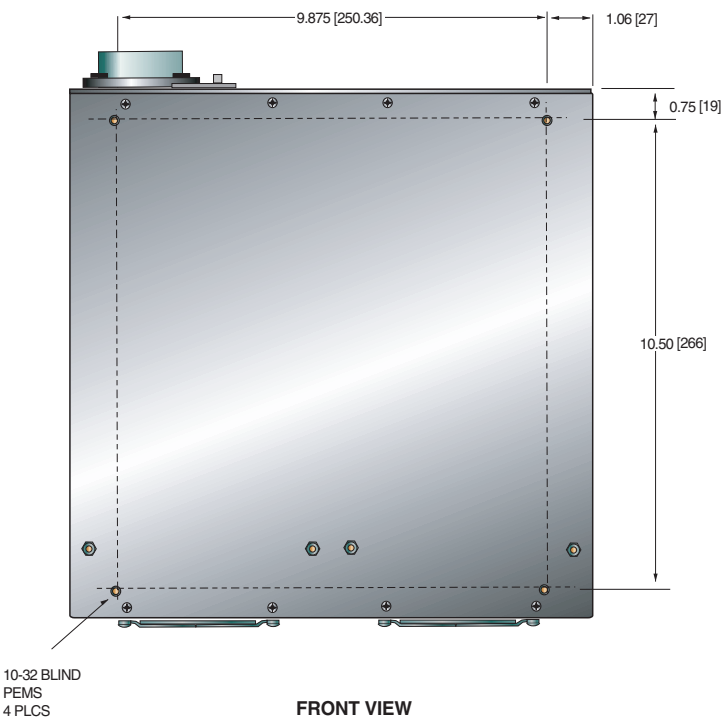
Positive Polarity - Ground Filament

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128034-001 REV.J
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

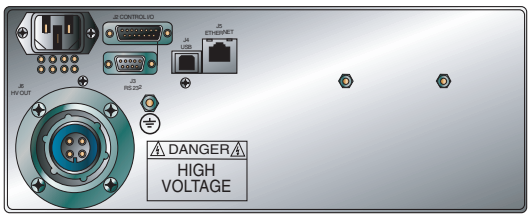
DIMENSIONS: in.[mm]

1200 Watt

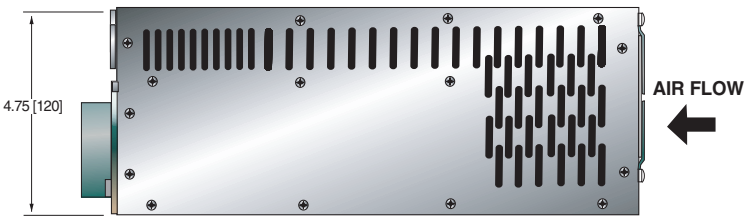
BOTTOM VIEW



FRONT VIEW

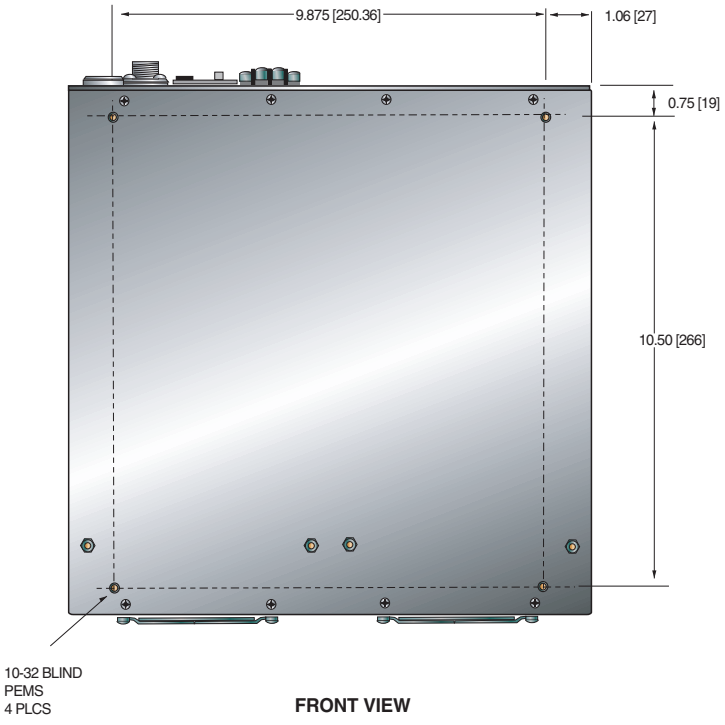


SIDE VIEW

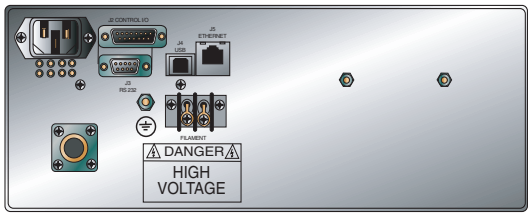


Negative Polarity - Floating Filament

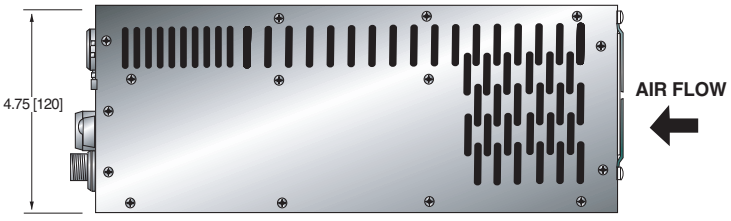
BOTTOM VIEW



FRONT VIEW



SIDE VIEW



Positive Polarity - Ground Filament

X-RAY

- ***OUTPUT VOLTAGES TO 60KV***
- ***INTEGRATED FLOATING FILAMENT SUPPLY***
- ***LOW RIPPLE***
- ***"HOT CATHODE"***
- ***NEGATIVE POLARITY***
- ***LOCAL & REMOTE PROGRAMMING***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/XLF

Spellman's XLF Series of X-ray generators are well regulated high voltage power supplies with output voltages to 60kV and very low ripple achieved through the use of advanced resonant conversion techniques. Extremely stable voltage and emission current outputs result in significant performance improvements over previously available technology. The XLF Series provides power, control and support functions required for X-ray applications including a regulated ac filament supply referenced to the cathode. These units also incorporate local and remote programming, monitoring, safety interlock, short-circuit and overload protection.

TYPICAL APPLICATIONS

Plastics Sorting
Crystal Inspection
Diamond Inspection

OPTIONS

APT	Adjustable Power Trip
AT	Arc Trip
SS(x)	Non-Standard Slow Start
NSS	No Slow Start
IO	Instant ON
SL	Slides

SPECIFICATIONS

Input Voltage:

XLF 600W:
115Vac±10%, 50-60Hz single phase or
220Vac±10%, 50-60Hz single phase.

XLF 1200W:
220Vac±10%, 50-60Hz single phase only.

Voltage and Current Control:
Local: continuously adjustable from zero to maximum rating via a ten-turn potentiometer.
Remote: 0 to +10Vdc proportional from 0 to full output.
Accuracy: ±1%.
Input Impedance: 10Mohm.

Filament:
12 volts @ 5 amps, preheat level is 0.45 amps in standby.

Voltage Regulation:
Load: 0.005% of full output voltage no load to full load.
LIne: 0.005% for input voltage range change.

Current Regulation:
Load: 0.05% of full current ±100µA from 0 to full voltage.
Line: 0.05% of rated current over specified input range.

Ripple:
0.03% rms below 1kHz.
0.75% rms above 1kHz.

Temperature Coefficient:
100ppm/°C.

Stability:
0.01%/8 hrs after 1/2 hour warm-up.
0.02% per 8 hours (typical).

Cooling:
Fan cooled.

Metering:
Digital voltage and current meters (3.5 digits), 1% accuracy.

Voltage and Current Monitors:
0 to +10Vdc proportional to rated output.

HV Output:
75kV, 3 conductor Federal Standard X-ray connector.

I/O Connectors:
25 pin D-type for control interface with mating connector provided.

Dimensions:
3.5"H x 19"W x 20"D (8.9cm x 48.3cm x 50.8cm).

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

FRONT PANEL STATUS INDICATORS:

Overvoltage	Voltage Control Mode
Overtemperature	Current Control Mode
Regulation Error	Interlock Open
Arc	Interlock Closed
HV ON: Red	HV OFF: Green

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128011-001 REV.F
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

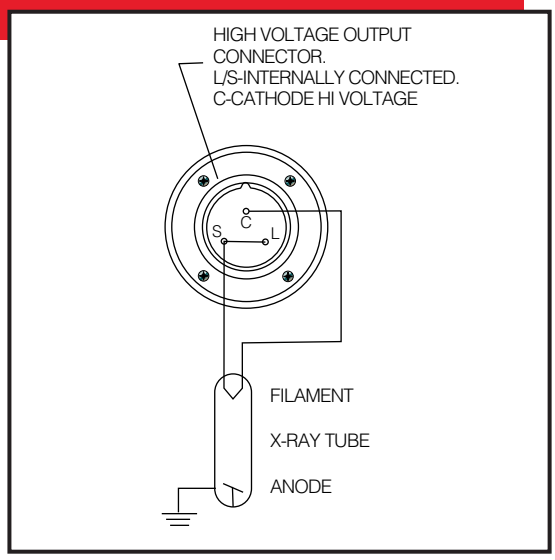
600W, 1200W XLF SELECTION TABLE

600 Watt			1200 Watt		
kV	mA	Model	kV	mA	Model
30	20	XLF30N600	30	40	XLF30N1200
40	15	XLF40N600	40	30	XLF40N1200
50	12	XLF50N600	50	24	XLF50N1200
60	10	XLF60N600	60	20	XLF60N1200

XLF CONNECTOR 25 PIN

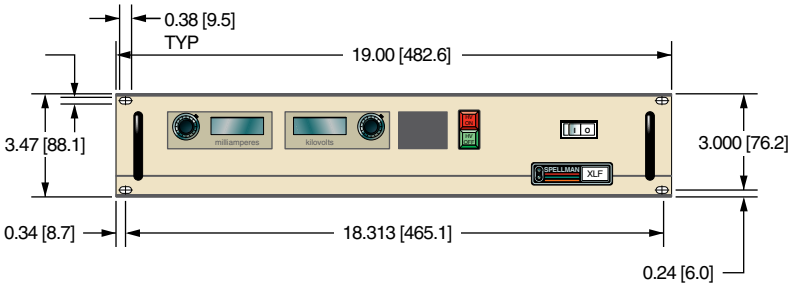
JB1	SIGNAL	SIGNAL PARAMETERS
1	Power Supply Common	Signal Ground
2	External Inhibit	Ground=Inhibit, Open=HV On
3	External Interlock	+15V at Open, <15mA at Closed
4	External Interlock Return	Return for Interlock
5	Current Monitor	0 to 10V=0 to 100% Rated Output
6	kV Test Point	0 to 10V=0 to 100% Rated Output
7	+10V Reference	+10Vdc @ 1mA Max
8	Remote Current Program In	0 to 10V=0 to 100% Rated Output
9	Local Current Program Out	Front Panel Program Voltage
10	Remote Voltage Program In	0 to 10V=0 to 100% Rated Output
11	Local Voltage Program Out	Front Panel Program Voltage
12	Power Monitor	0 to 10V=0 to 100% Rated Output
13	Remote Power Program In	(Optional)
14	Local HV Off Out	+15V at Open, <25mA at Closed
15	HV Off	Connect to HV OFF for Fp Operation
16	Remote HV On	+15V, 10mA Max=HV Off
17	Remote HV Off Indicator	0=HV On, +15V, 10mA Max=HV Off
18	Remote HV On Indicator	0=HV Off, +15V, 10mA Max=HV On
19	Remote Voltage Mode	Open Collector 50V Max, 10mA Max
20	Remote Current Mode	On=Active
21	Remote Power Mode	
22	Remote PS Fault	0=Fault, +15V, 0.1mA Max=No Fault
23	+15V Output	+15V, 100mA Max
24	Power Supply Common	Signal Ground
25	Shield Return	Shield Return

HIGH VOLTAGE CONNECTOR PINOUT

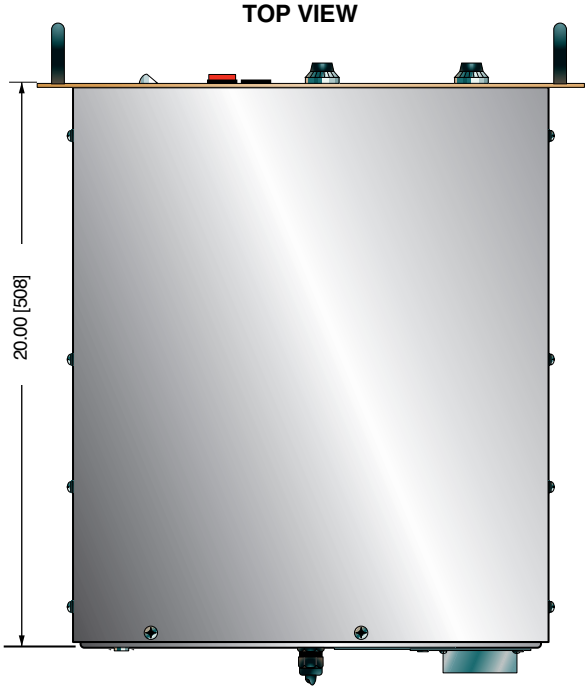


DIMENSIONS: in.[mm]

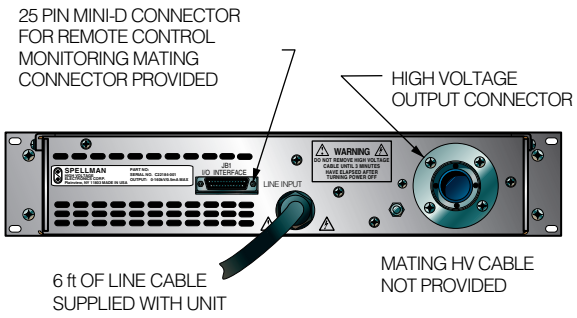
FRONT VIEW



TOP VIEW



BACK VIEW



CE

X-RAY

- ***IDEAL FOR COMMON XRD & XRF X-RAY TUBES***
- ***COMPACT SIZE, 5 1/4" (3U) HIGH CHASSIS***
- ***SOLID ENCAPSULANTION INSURES MAINTENANCE-FREE OPERATION***
- ***AUTO RAMP OF THE HV EMISSION CURRENT TO PRESET VALUES***
- ***OEM CUSTOMIZATION AVAILABLE***

www.spellmanhv.com/manuals/DFFF

Spellman's DF/FF Series of X-ray Generators feature our new inverter design which incorporates IGBTs for power switching and provides new levels of reliability. In addition, re-engineering of the DF/FF's internal filament power supply eliminates audio noise at normal operating levels by operating at a higher frequency. The DF/FF's utilize a sine wave current source, produced by phase shifting series resonant circuits at switching frequencies greater than 20kHz to generate high voltage dc. This technique eliminates undesirable electromagnetic radiation normally associated with switching and power control regulators. The high efficiency of these units allows for air cooling in a 5 1/4" (3U) high chassis.

TYPICAL APPLICATIONS

X-ray Diffraction (XRD)
X-ray Fluorescence (XRF)

ADDITIONAL FEATURES

Water Flow Switch:
A 24Vdc signal is available on the rear panel to turn on the cooling water to the X-ray tube. This signal can be enabled either when control power is on or when the high voltage is turned on. (Customer must specify).

Fail Safe Interlock:
A 24Vdc signal is available on the rear panel to energize an external X-ray on lamp. This signal is energized when the high voltage is turned on. High voltage will not enable if this circuit is open. (A 220Vac signal is optional).

Preheat and Ramp:
Automatic preheat and ramp control circuits are provided which ramp the kV and mA slowly to set levels. kV ramps in approximately 10 seconds while mA ramps in approximately 20 seconds.

Output Connector:
75kV, 3 conductor Federal Standard X-ray connector. -60kV is connected to terminal "C". Terminals "S" and "L" are jumped together. The filament output is connected between terminals "C" and "S". Other configurations are optional. (On the FF3, all output connections S, L, & C are connected together).

Remote Signal Connector:
Remote interface is available via a 50 pin mini D connector. Extensive remote programming and monitoring is provided.

OPTIONS

RS232	RS232 Interface
220FSI	220Vac Fail Safe Interlock
208-3P	208Vac Three Phase Input

SPECIFICATIONS

Input Voltage:
220Vac ±10%, 50 or 60 Hz, single phase
(three phase optional).

Output Voltage:
DF3: 0 to 60kV negative polarity.
FF3: 0 to 60kV positive polarity.
Other output voltages are available.

Output Current:
DF3: 0 to 80mA.
FF3: 0 to 100mA.
Other output currents are available.

Maximum Output Power:
3kW (4kW optional).

Output Voltage Regulation:
Load: 0.005% of rated output for full load change.
Line: 0.005% of rated output over specified input range.
Temperature Coefficient: 50 ppm/˚C (20 ppm/˚C optional).
Long Term Stability: 0.01%/8 hours.

Emission Current Regulation:
Load: 0.01% of rated output for a 10 to 60kV change.
Line: 0.005% of rated output over specified inputs.
Temperature Coefficient: 50 ppm/˚C
Long Term Stability: 0.01%/8 hours.

Ripple:
0.03% rms <1kHz, 0.75% rms above 1kHz.

Environmental:
Temperature Range:
Operating: 0˚C to 40˚C
Storage: -20˚C to 85˚C
Humidity:
10% to 90%, non-condensing.

Filament Voltage:
12Vac (dc filament optional).

Filament Current:
5A (up to 12A max available).

Dimensions:
5¼"(3U) H x 19" W x 22" D
(13.3cm x 48.3cm x 55.9cm).

Weight:
90 lbs (40kg).

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128001-001 REV.F
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

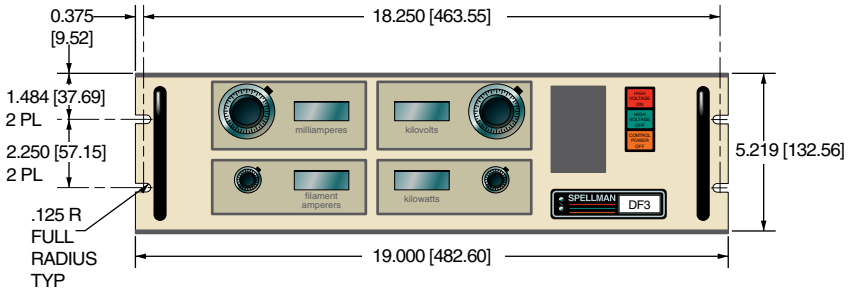
DF/FF MINI D CONNECTOR 50 PIN

JB1	SIGNAL
1	+5Vdc (or connect to pin-11)
2	Control Power On
3	Intlk
4	X-ray On
5	X-ray Off
6	Spare
7	Spare
8	Reset
9	Rmt/Lcl
10	24V Switched
11	+5Vcch
12	X-ray On Status
13	Overvoltage
14	kV Min
15	Overpower
16	Filament Current Limit
17	mA Current Limit
18	$\overline{\text{LCL}}$ Status
19	Power Supply Fault
20	Gnd
21	Spare
22	(DF) Remote X-ray On
23	(DF) Remote X-ray On Ret
24	Spare
25	Gnd
26	kV Ref
27	kV Com
28	mA Ref
29	mA Com
30	Spare
31	Spare
32	Spare
33	Pwr. Limit (OL Ref)
34	Pwr. Limit Com (OL Com)
35	Filament Current Limit
36	Filament Current Limit Com
37	Spare
38	kV Monitor
39	mA Monitor
40	Spare
41	Spare
42	kV Ref Mon
43	mA Ref Mon
44	Spare
45	Spare
46	Filament Monitor
47	Mon Common
48	Spare
49	Gnd
50	Spare

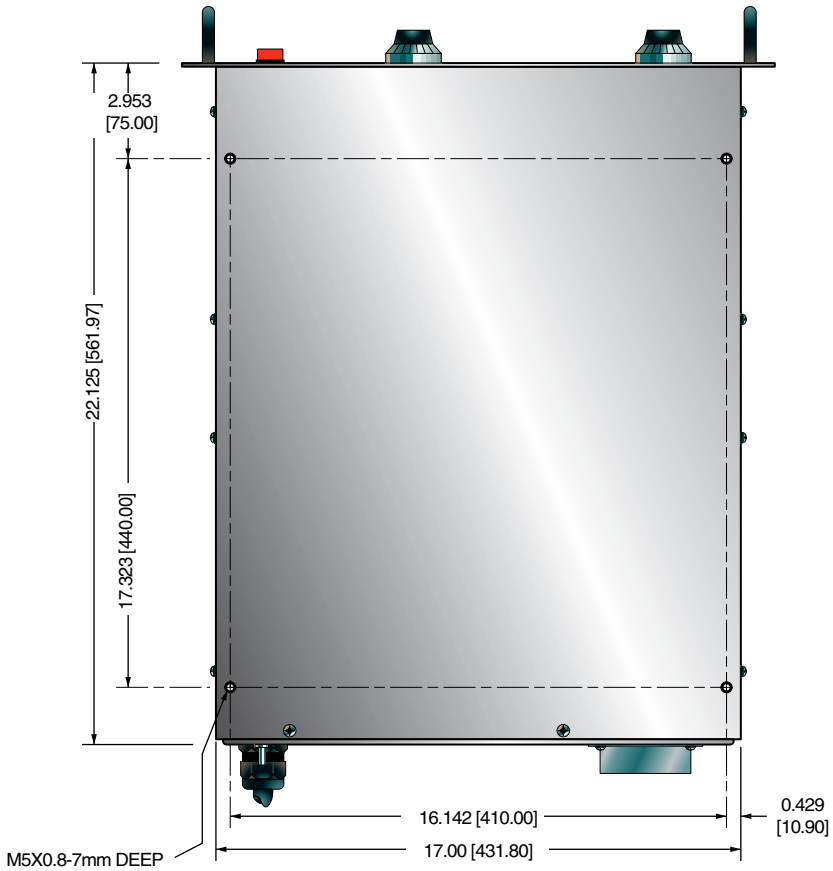
CE

DIMENSIONS: in.[mm]

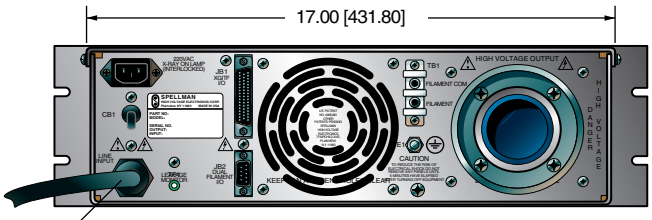
FRONT VIEW



TOP VIEW



BACK VIEW



6 ft OF LINE CABLE
SUPPLIED WITH UNIT.

X-RAY

- ***160KV, 225KV, 320KV AND 450KV MODELS***
- ***COMPLETE X-RAY GENERATOR PACKAGE***
- ***POWER FACTOR CORRECTED AC INPUT CIRCUITRY***
- ***INTEGRATED DUAL FILAMENT SUPPLIES***
- ***DIGITAL INTERFACE—USB, ETHERNET AND RS232***
- ***EXCELLENT STABILITY AND REGULATION***

www.spellmanhv.com/manuals/XRV

Spellman's XRV series of X-Ray high voltage power supplies sets the standard for compact 3.0kW to 4.5kW, high performance X-Ray inspection generators. Spanning an output voltage range of 160kV to 450kV in negative or bipolar output polarity configurations, there's a model available for virtually every application requirement.

Active power factor correction circuitry reduces input current requirements while minimizing line related EMI. Spellman's proprietary inverter topology allows for unprecedented efficiencies and power densities. A solid encapsulated high voltage section further reduces size and weight and provides reliable, maintenance free operation.

DSP based SMT control circuitry provides your choice of USB, Ethernet and RS-232 along with analog interfacing, simplifying OEM system integration. The two DC output, current regulated filament power supplies are controlled via sophisticated emission current regulation circuitry to provide accurate and stable X-Ray tube currents. Comprehensive fault diagnostic circuitry, and Arc Sense, Arc Quench and Arc Count functionality is also incorporated into this compact, space saving X-Ray generator.

SPECIFICATIONS

Input Voltage:
180-264Vac, 47-63 Hertz, power factor corrected input to ≥ 0.98

Input Current:
< 25 amps

Output Polarity:
See "model selection" table

Output Current:
See "model selection" table

Output Voltage:
Load: ±0.05% of rated output voltage for a full load change
Line: ±0.05% of rated output voltage over specified input voltage range
Ripple:
See "model selection" table
Accuracy:
0.25%
Stability:
≤0.1% per 8 hours, after 1 hour warm up
Temperature Coefficient:
50ppm/°C

Emission Current:
Load: ±0.05% of rated output current for a change from 30% to 100% of rated output voltage
Line: ±0.05% of rated output current over specified input voltage range
Accuracy:
0.25%
Stability:
100ppm/°C

Filament:
Output:
0-6 amps at a compliance of 10Vdc, maximum
Dual Focal Spot:
Small and large, selectable via interface signal
Configuration:
DC filament drive. Closed loop emission control regulates filament setting to provide desired X-ray tube emission current

Control Interface:
Remote Interface:
Analog, USB, Ethernet and RS-232 are standard
Control Software:
A VB GUI is provided for RS-232/USB, the Ethernet interface has an embedded applet for control
(see page 4)

Operating Temperature
0°C to +50°C

Storage Temperature:
-40°C to +85°C

Humidity:
20% to 85% RH, non-condensing

Mains Input Connector:
Type 97-3102A-24-11P

Interface Connectors:
Digital—Ethernet, RS-232 and USB
Analog—25 pin connector

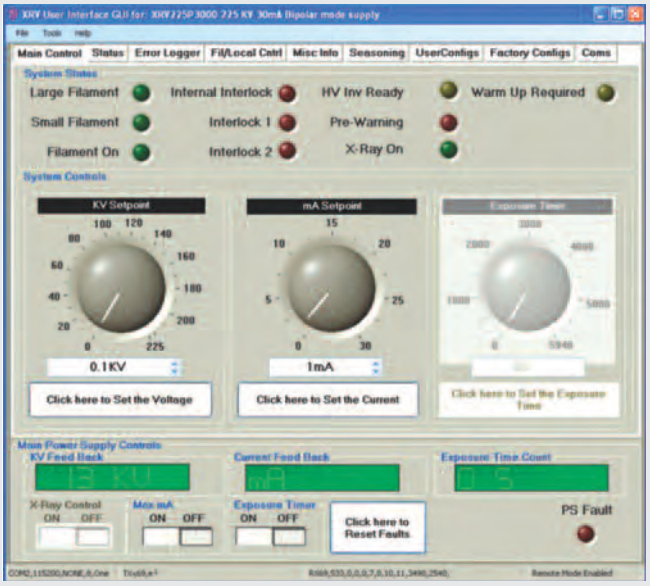
Output Connector:
See "model selection" table

Cooling:
Forced air

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128060-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

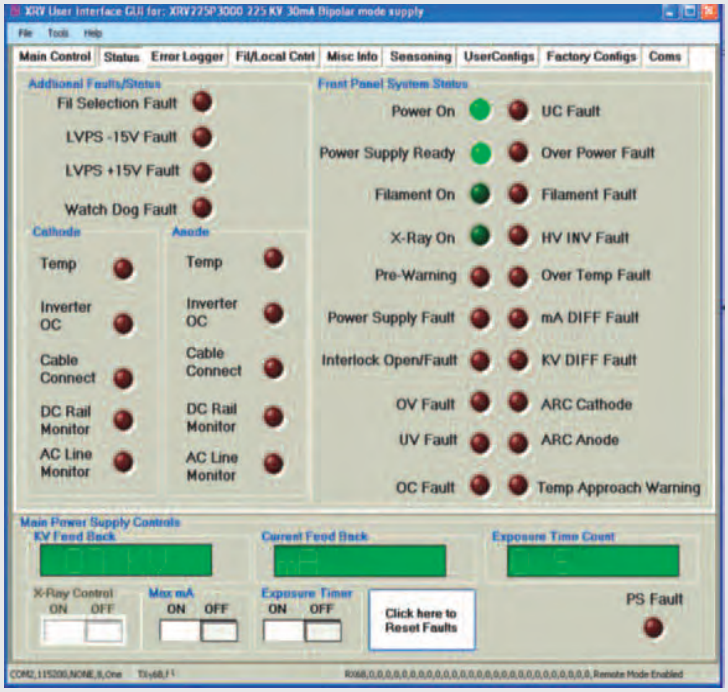
GUI CONTROL SOFTWARE FOR XRV



The GUI is specifically designed for controlling XRV series power supplies. As an alternative to the analog control, the GUI will allow the user to control all necessary functions of the HVPS from a user-friendly windows based menu. Additionally the GUI can be use as a diagnostic tool when the HVPS is controlled via the analog interface.

Features of the GUI control:

- ***Automatic warm-up X-ray tube***
- ***Max watts operation***
- ***Timed or Continuous Exposure modes***
- ***Configuration menu for user options setting of HVPS***
- ***Fault and status monitor***



XRV SPECIFICATIONS

	XRV160/3000	XRV160/4000	XRV225/3000	XRV225/4000	XRV320/4500	XRV450/4500
DC Output Voltage	0 to 160kV	0 to 160kV	0 to 225kV	0 to 225kV	0 to ±160kV	0 to ±225kV
Polarity	Neg/Pos	Neg/Pos	Neg/Pos	Neg/Pos	Bipolar	Bipolar
Output Rated Current	0-30mA	0-50mA	0-30mA	0-30mA	0-30mA	0-30mA
Output Power	3.0kW	4.0kW	3.0kW	4.0kW	4.5kW	4.5kW
Ripple/Noise (p-p)	<0.05%	<0.1%	<0.05%	<0.1%	<0.1%	<0.1%
Dimensions	10.5″H x 17″W x 24″D	10.5″H x 17″W x 24″D	16″H x 17″W x 31″D	16″H x 17″W x 31″D	2 x (10.5″H x 17″W x 24″D)	2 x (16″H x 17″W x 31″D)
Weight	150 lbs. (68kg)	150 lbs. (68kg)	240 lbs. (109kg)	240 lbs. (109kg)	300 lbs. (136 kg)	480 lbs. (218 kg)
Output Connector	R24	R24	R28	R28	Two R24	Two R28

X-RAY

J1 HV CONNECTOR—R24/R28

PIN	SIGNAL	PARAMETERS
C	HV Output	XRV160 and XRV320—R24 Connector XRV225 and XRV450—R28 Connector
S	Small Filament Output	0 to 6 amps @ 10Vdc
L	Large Filament Output	0 to 6 amps @ 10Vdc

J2 ANALOG INTERFACE—25 PIN D CONNECTOR

PIN	SIGNAL	PARAMETERS
1	Power Supply Fault	Low, sum of faults, HVPS detected a fault, open collector, 50V @ 10mA max
2	mA Program	0 to 10V FS Z in = 10M ohms
3	kV Program	0 to 10V FS Z in = 10M ohms
4	Filament Limit L/S Ref.*	0 to 10V FS Z in = 10M ohms
5	Filament Preheat L/S Ref.*	0 to 10V FS Z in = 10M ohms
6	kV Monitor	0 to 10V FS Z out = 4.99k ohms
7	mA Monitor	0 to 10V FS Z out = 4.99k ohms
8	Filament Current Monitor*	0 to 10V FS Z out = 4.99k ohms
9	Signal Ground	Ground
10	X-Ray Enable	+24Vdc = X-Ray ON, connect to pin 14 with dry contact relay
11	Filament ON*	Filament ON status, low, filament is ON open collector 50V, @ 10mA max
12	Interlock 1	Active low, interlock is closed, safe to enable HV
13	Interlock 2	Active low, interlock is closed, safe to enable HV
14	+24Vdc	+24Vdc @ 100mA, maximum
15	Filament Enable*	Active low, turn filament ON
16	Filament Control*	Active low, filament is regulated by ECR (HV must be ON). Not active, the filament is regulated by the preheat reference
17	Filament L/S Select	Filament selection large or small, low = small spot is selected
18	Filament L/S Confirm	Open collector, 50V @ 10mA max Filament selection confirm, low = small spot is selected
19	HVPS RDY	Low = HVPS ready, open collector, 50V @ 10mA max
20	X-Ray ON*	X-Ray ON status, low = X-Rays are ON open collector, 50V @ 10mA max
21	Interlock Status	Low, interlocks are closed, can enable HV open collector, 50V @ 10mA max
22	GND	Digital ground
23	X-Ray ON Pre-Warn	Pre-warning, low, before X-Ray ON open collector, 50V @ 10mA max
24	Reset	Active low, minimum 10mS transition
25	Arc fault	Low, arc fault, the HVPS has detected an arc open collector, 50V @ 10mA max

*Not active on positive unipolar models

RS-232 DIGITAL INTERFACE— J3 9 PIN FEMALE D CONNECTOR

PIN	SIGNAL	PARAMETERS
1	NC	No Connection
2	TX out	Receive Data
3	RX in	Transmit Data
4	NC	No Connection
5	SGND	Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection

ETHERNET DIGITAL INTERFACE— J4 8 PIN RJ45 CONNECTOR

PIN	SIGNAL	PARAMETERS
1	TX+	Transmit Data +
2	TX-	Transmit Data -
3	RX+	Receive Data +
4	NC	No Connection
5	NC	No Connection
6	RX-	Receive Data -
7	NC	No Connection
8	NC	No Connection

USB DIGITAL INTERFACE— J5 4 PIN USB "B" CONNECTOR

PIN	SIGNAL	PARAMETERS
1	VBUS	+5 Vdc
2	D-	Data -
3	D+	Data +
4	GND	Ground

JB1 MAIN AND AUXILIARY INPUT POWER— TYPE 97-3102A-24-11P

PIN	SIGNAL	PARAMETERS
A	Auxiliary AC Line Power	180-264Vac
B	Auxiliary Ground	Ground
C	Auxiliary AC Neutral	Neutral
D	Main AC Line Power	180-264Vac
E	Main Ground	Ground
F	Main AC Neutral	Neutral

MODEL SELECTION TABLE

MODEL	VOLTAGE	POWER	POLARITY
XRV160N/P3000	160kV	3.0kW	N or P
XRV160N/P4000	160kV	4.0kW	N or P
XRV225N/P3000	225kV	3.0kW	N or P
XRV225N/P4000	225kV	4.0kW	N or P
XRV320N/P4500	320kV	4.5kW	Bipolar
XRV450N/P4500	450kV	4.5kW	Bipolar

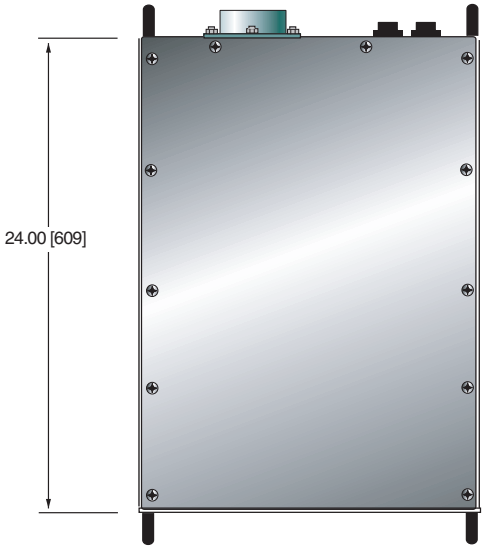
*Positive models do not have integrated filament power supplies
Call Spellman for custom kV and Power models

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128060-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

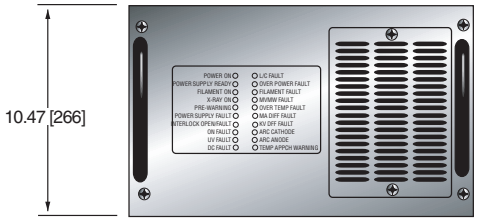
DIMENSIONS: in.[mm]

XRV160

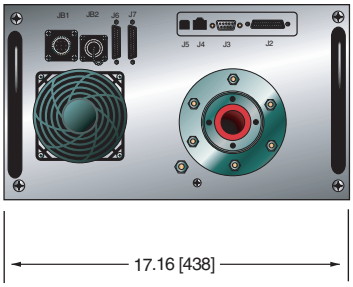
TOP VIEW



FRONT VIEW



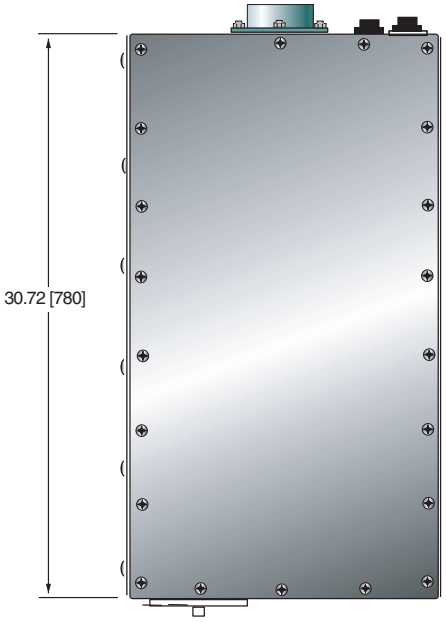
REAR VIEW



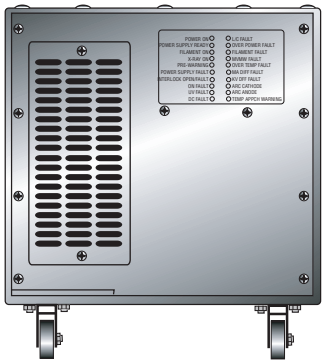
XRV320 is comprised of two XRV160 units configured in a bipolar arrangement

XRV225

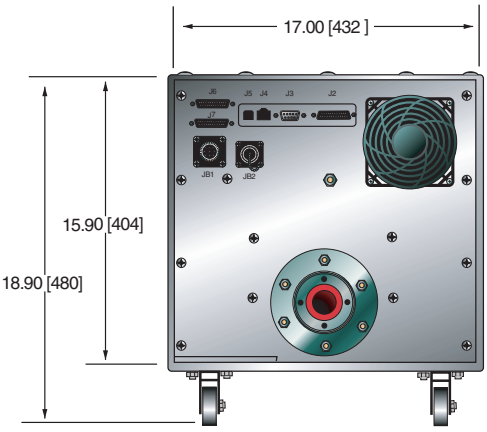
TOP VIEW



FRONT VIEW



REAR VIEW



XRV450 is comprised of two XRV225 units configured in a bipolar arrangement

X-RAY

- ***COMPLETE X-RAY GENERATOR PACKAGE***
- ***INTEGRATED HIGH VOLTAGE/FILAMENT/STATOR SUPPLY***
- ***DIGITAL INTERFACE—USB, ETHERNET AND RS232***
- ***EXCELLENT STABILITY AND REGULATION***

Spellman's new MAMX Series of X-Ray generators set the standard for compact, high performance Mammography applications. Microprocessor based SMT control circuitry provides your choice of USB, Ethernet or RS232 interfacing. Spellman's proprietary pulse width modulated inverter topology allows for unprecedented efficiencies and power densities. A solid encapsulated high voltage section further reduces size and provides reliable, maintenance free operation.

The internal DC output, current regulated filament supply is controlled via sophisticated emission current regulation circuitry to provide accurate and stable X-ray tube currents. A high speed starter complete with Boost and Brake functions is also incorporated into this efficient, space saving X-ray generator.

SPECIFICATIONS

Input Voltage:

Standard

Mains - 380 to 415Vac, 3 phase, ±10% 50/60Hertz

Auxiliary - 230Vac, single phase, ±10%, 50/60Hertz

Optional

Mains & Auxiliary - 180 to 264Vac, single phase, 50/60 Hertz

Output Voltage: 20kV to 40kV

Polarity:	Positive, for grounded cathode X-ray tube
Accuracy:	<1%
Reproducibility:	<0.5%
Settling Time:	≤50mS to within 95% of programmed voltage
Ripple:	≤1%rms >10 kHz, 0.1%rms below 10 kHz
Stability:	≤0.01% per 8 hours
Temperature Coefficient:	≤100ppm/°C

Emission Current: 50mA to 230mA

Power:	9kW peak, 1.17kW average (13% duty cycle)
Accuracy:	<1%
Reproducibility:	<0.5%
Settling Time:	≤70mS to within 95% of programmed current

Filament:

Configuration:	DC filament drive. Closed loop emission control regulates filament setting to provide desired Xray tube emission current.
Output:	0-6 amps at a compliance of 5.5 volts, maximum.
Dual Focal Spot:	Available as an option.

High Speed Starter:

Rotational Speed:	Anode rotation speed of at least 10,000 RPM
Functionality:	Boost and Brake capability provided

Control Interface:

Remote Interface:	USB, Ethernet and RS232 are standard.
Control Software:	A VB GUI will be provided for RS-232/USB, the Ethernet interface will have an embedded applet for control.

Environmental:

Operating Temperature:	0°C to +40°C
Storage Temperature:	-40°C to +85°C
Humidity:	20% to 85% RH, non-condensing

Input Connector:

4 position terminal bock (mains),
2 position terminal block (aux)

HV Output Connector:

60kV, Claymount CA-3 type

Stator/Filament Connector:

9 pin AMP 206708-1

Interface Connector:

25 pin D connector

Cooling:

Forced air

Dimensions:

7.87˝W X 3.93˝D X 27.62˝H
(200mm X 160mm X 701mm)

Weight:

50 lbs. (22.68 kg)

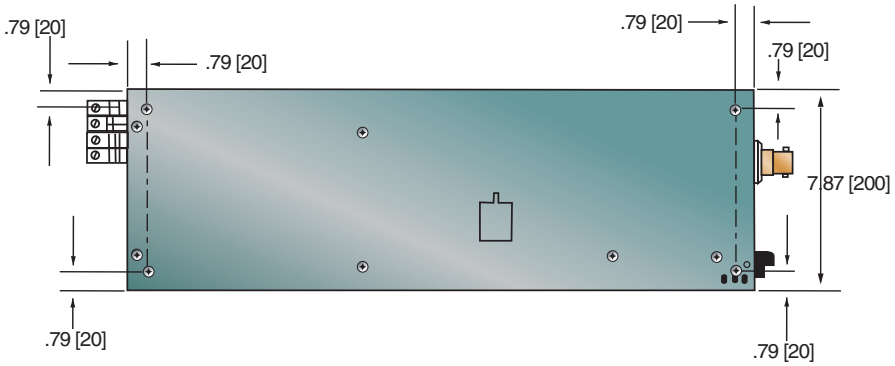
Regulatory Approvals:

Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

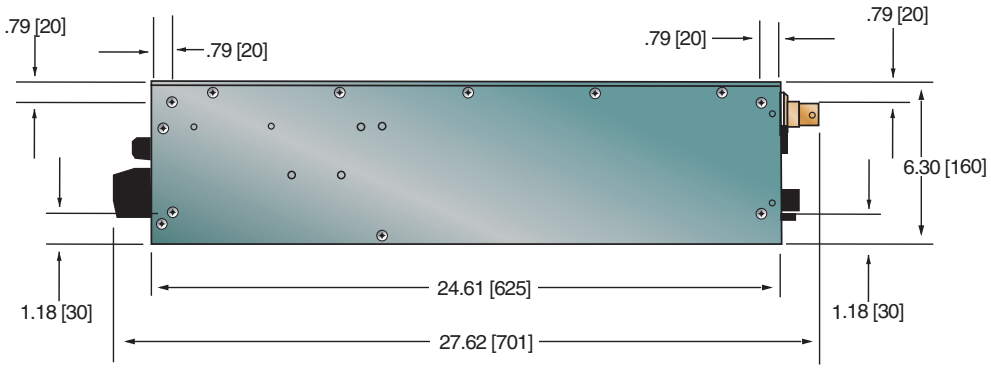
Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128038-001 REV.C
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

DIMENSIONS: in.[mm]

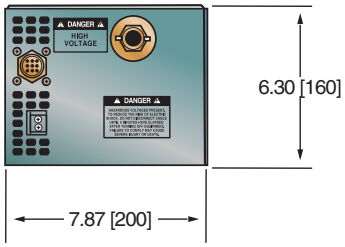
TOP VIEW



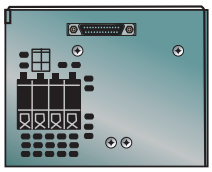
SIDE VIEW



FRONT VIEW



BACK VIEW



CE

X-RAY

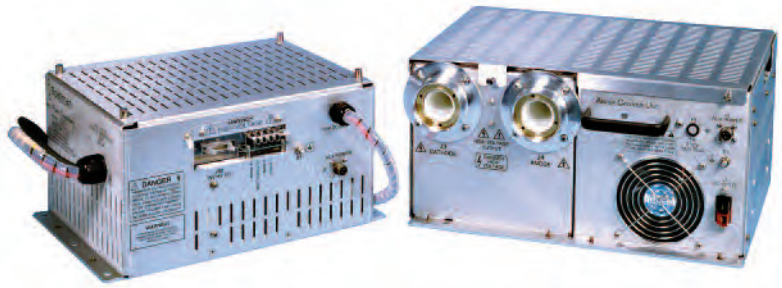
X-Ray Generators for Rotating CT Scanner Applications

- ***OUTPUT VOLTAGE: 0 TO 150KV (ANODE GROUNDED OR BIPOLAR)***
- ***EMISSION CURRENT: UP TO 1000MA***
- ***OUTPUT POWER: UP TO 120KW, PEAK***
- ***FILAMENT: 15V @ 6A, REFERENCED TO CATHODE***
- ***DUAL FOCAL SPOT***
- ***HIGH POWERED FILAMENT POWER SUPPLY OPTION***
- ***HIGH SPEED FLOATING GRID MODULATOR OPTION***
- ***HIGH SPEED STARTER OPTION***
- ***ANALOG AND DIGITAL CONTROL INTERFACE***
- ***DESIGNED FOR HIGH SPEED GANTRY ROTATION***

Spellman has produced CT Scanner X-ray generators for over 25 years and was the first supplier to provide generators for continuous rotation in a production system.

This expertise has made it possible to develop and produce highly reliable power supplies specifically designed to meet the exacting requirements for helical scanning. These units are designed for high speed gantry rotation and their fast rise time and low ripple outputs make enhanced image quality possible.

Various other power levels and configurations are available for OEM requirements. Contact our sales department for additional details.



Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com

Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***DUAL FOCAL SPOT***
- ***CONTROLS FOR KV, MA, FILAMENT CURRENT AND POWER LIMIT***
- ***DIGITAL METERING FOR KV, MA, FILAMENT CURRENT AND POWER***
- ***FEDERAL STANDARD 75KV CONNECTORS FOR ANODE AND CATHODE***
- ***OEM CUSTOMIZATION AVAILABLE***

The rugged Spellman 24kW X-ray Tube Test System provides anode and cathode voltage, filament power and extensive local and remote controls for integration into automatic Tube Test and Aging Systems.

SPECIFICATIONS

Output Voltage:
0 to ±75kV (150kV across the tube).

Emission Current:
0 to 200mA.

Output Power:
24kW continuous, 30kW peak output.
1 minute ON with a 25% duty cycle.

Slew Up:
0 to 75% in ≤ 10mS.

Slew Down:
100 to 25% in ≤ 50mS.

Filament:
5Vdc, 0 to 8A referenced to cathode.

Size:
52.5”H x 19”W x 36”D (133.4cm x 48.3cm x 91.4cm).

- ***COMPACT & LIGHTWEIGHT PACKAGE***
- ***POWER FACTOR CORRECTED INPUT***
- ***LOW COST MODULAR OEM PLATFORM***
- ***RUGGED IGBT INVERTER DESIGN***
- ***AUXILIARY +24VDC @ 2.2 AMP OUTPUT PROVIDED***

www.spellmanhv.com/manuals/CCM

Spellman's CCM capacitor charging module is designed to provide 3100 joules per second at an output voltage up to 4000 Volts. With a power density of 6.6 watts per cubic inch, the CCM packs more than 30% more power into the same volume when compared to other commercially available units. The power factor corrected AC input, small package size and comprehensive analog interface simplifies integrating the CCM into your OEM system design. Available in either positive or negative polarity, the CCM is fully arc, open and short circuit protected.

TYPICAL APPLICATIONS

UV light sources for curing and sterilization
Industrial and medical laser applications
ICP-MS applications

SPECIFICATIONS

Input Voltage:
180-264 Vac, 47-63 Hertz, power factor corrected input
≥0.98, fused via externally accessible fuses

Efficiency:
>85%

Output Power:
3100 Joules per second, average

Output Voltage:
4000 Volts, maximum

Output Polarity:
Positive or negative, specify at time of order

Pulse to Pulse Repeatability:
±0.6% up to 120 Hertz

Temperature Coefficient:
≤100ppm per degree C

Fault Diagnostic System:
Over Temperature, Over Voltage and Open Load sensing

Environmental:
Temperature Range:
Operating: 0˚C to 40˚C
Storage: -40˚C to 85˚C
Humidity:
10% to 90% RH, non-condensing

Cooling:
Forced air

Ground Stud:
M6 X10mm, M6 nut supplied

Input Line Connector:
2 position Phoenix HDFK4 connector

HV Output Connector:
Kings KV-79-19, Bulkhead mounted

+24Vdc Output Connector:
AMP #1-350942-0

Dimensions:
5.81˝ H X 5.8˝ W X 14˝ D (148mm x 147mm x 356mm)

Weight:
14.5lb. (6.6kgs)

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128054-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

AUXILIARY +24VDC CONNECTOR J2 2 POSITION AMP CONNECTOR

J2	SIGNAL	SIGNAL PARAMETERS
1	+24Vdc	+24Vdc @ 2.2 amps
2	Ground	Ground

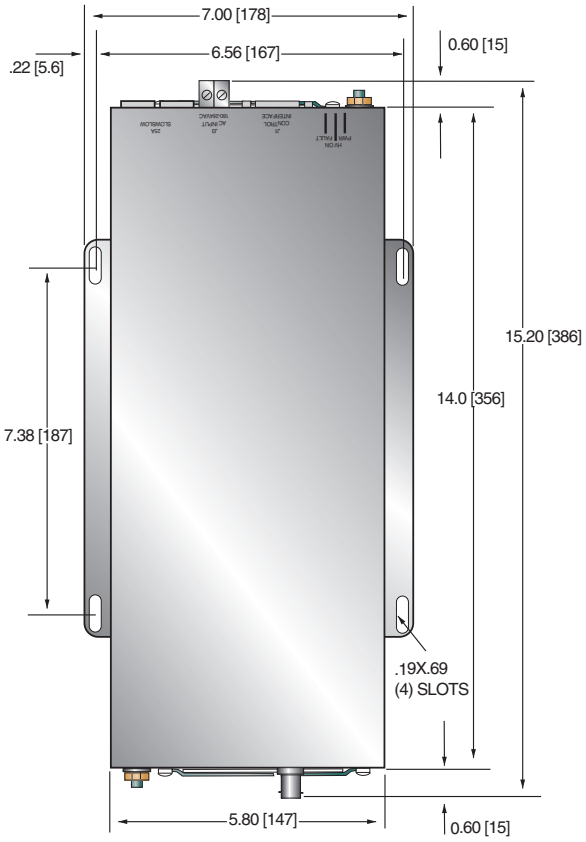
CCM ANALOG INTERFACE— J1 15 PIN FEMALE D CONNECTOR

PIN	SIGNAL	SIGNAL PARAMETERS
1	Inhibit	Ground = HV ON, High = HV OFF
2	Temperature Fault	Ground = No Fault, +15Vdc = Fault +15Vdc through 6.8kΩ
3	General Fault	Ground = No Fault, +15Vdc = Fault +15Vdc through 6.8kΩ
4	HV ON Indicator	Ground = HV ON, +15Vdc = HV OFF +15Vdc through 6.8kΩ
5	Voltage Program	0 to 10Vdc = 0 to 100% Rated Output
6	Open Circuit Detector	Ground = Open Circuit, +15Vdc = OK +15Vdc through 6.8kΩ
7	Peak Voltage Monitor	0 to 10Vdc = 0 to 100% Rated Output held for 10 seconds at peak level
8	Voltage Monitor	0 to 10Vdc = 0 to 100% Rated Output, Instantaneous output
9	+15Vdc Output	+15Vdc @ 150ma output, maximum
10	n/c	n/c
11	+15Vdc Output	+15Vdc @ 150ma output, maximum
12	+15Vdc Output	+15Vdc @ 150ma output, maximum
13	End of charge Indicator	Ground = End of Charge, High Impedance = Charging
14	Ground	Ground
15	Ground	Ground

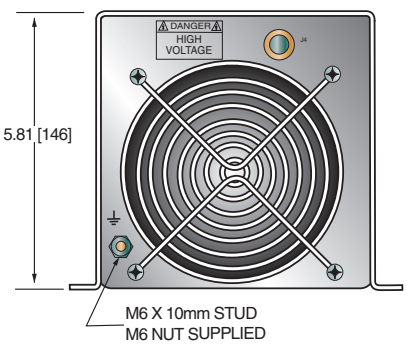
DIMENSIONS: in.[mm]

FRONT VIEW

TOP VIEW



BACK VIEW



CE

APPLICATION SPECIFIC

- ***TRIODE SUPPLY FOR ELECTRON BEAM COLUMNS***
- ***HIGH PRECISION, LOW NOISE, ULTRA STABLE***
- ***OVER CURRENT/VOLTAGE PROTECTION***
- ***ARC AND SHORT CIRCUIT PROTECTION***
- ***OEM CUSTOMIZATION AVAILABLE***
- ***UL, CE AND RoHS COMPLIANT***

The EBM powers E-Beam Columns in Scanning Electron Microscopes providing acceleration, bias and filament sources in a single compact package. Spellman's proprietary HV packaging and encapsulation technology gives dramatic improvements in size, cost and performance compared to other SEM power supply offerings. The EBM provides a highly regulated, low noise, ultra stable accelerator supply programmable from 0 to -30kV at 170uA. The EBM has floating bias and filament supplies referenced to the accelerator. Programming signals utilize differential analog inputs to minimize external noise and offset voltages effects. A ground referenced accelerator current monitor is provided. The EBM is arc and short circuit immune, along with over voltage and over current protection.

TYPICAL APPLICATIONS

Scanning Electron Microscope

SPECIFICATIONS

Input Voltage:
+24Vdc, ±5%

High Voltage Outputs:

ACCELERATOR:

Voltage:
0V to -30kV full load with respect to ground

Current:
170µA maximum, continuous from -300V t0 -3kV

Accuracy:
±2% or ±15V (whichever is greater)

Load Regulation:
<±100ppm

Line Regulation:
<±100ppm for 22.8V to 26.4V line change

Ripple:
<15ppm p-p at -30kV, 170µA,
maximum bias and filament output

Temperature Coefficient:
<100ppm/°C

Stability:
8ppm/3 minutes at 150µA load current after 1 hour warm up

BIAS:
(Referenced to Accelerator)

Voltage:
0 to +3.5kV (max allowable output limited to 2kV)

Current:
150µA maximum

Accuracy:
±5% of full scale

Line Regulation:
<±0.1% for 10% line change

Ripple:
<150mVp-p at 30kV, 150µA, max. bias and filament output

Temperature Coefficient:
<1000ppm/°C

Stability:
6V/10 minutes

FILAMENT:
(Referenced to Accelerator)

Power:
0 to 15W

Load Resistance:
1 ±5%

Accuracy:
±3% of FS or 0.1V, which ever is greater

Load Regulation:
<2% for 10% change in load resistance

Line Regulation:
<1% for 10% line change

Ripple:
<0.1% p-p max

Temperature Coefficient:
<300ppm/°C

Stability:
100ppm/10 minutes

INTERFACE:

Input:
Analog control for beam energy, filament and bias

Output:
Mini75 receptacle (Claymount CA11 or similar)

Temperature:
Operating: 0°C to +45°C
Storage: -20°C to +75°C

Humidity:
0 to 85% RH, non-condensing

Dimensions:
4.13˝H x 9.85˝W x 7.48˝D (105mm x 250mm x 190mm)
excluding any mounting brackets

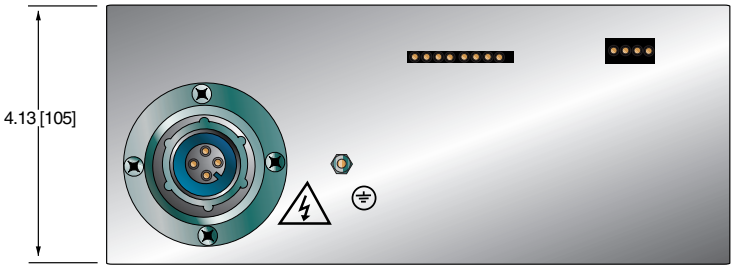
Weight:
<22 lbs. (10kg)

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive. UL/CUL recognized, File E227588. Compliant to 2002/95/EC, RoHS.

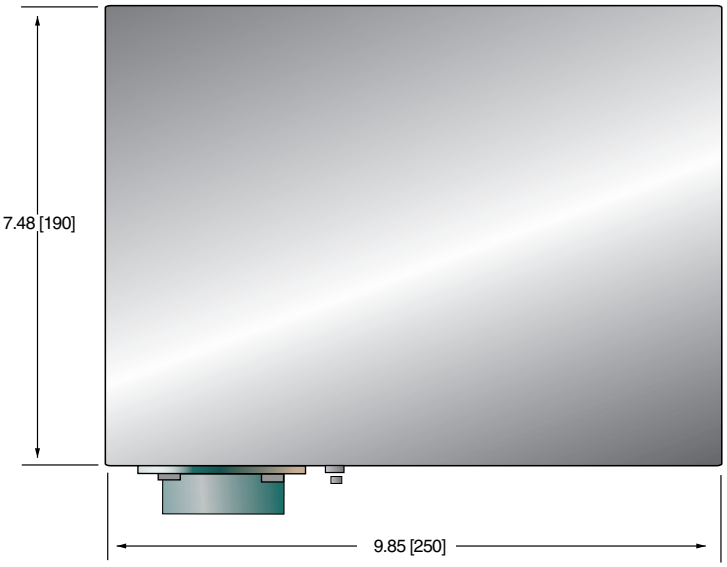
Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128031-001 REV.F
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

DIMENSIONS: in.[mm]

FRONT VIEW



TOP VIEW



SIDE VIEW

- ***LOCAL OR REMOTE CONTROL OF BEAM ENERGY, FILAMENT POWER AND EMISSION CURRENT***
- ***INTEGRATED FLOATING FILAMENT SUPPLY***
- ***ACTIVE BIAS SYSTEM***
- ***RS-232 CONTROL AND MONITORING INTERFACE***
- ***HIGH STABILITY LESS THAN 2.5 PPM***
- ***CUSTOM PRODUCTS AVAILABLE***

Spellman's precision Electron Gun Power Supply is designed to achieve extremely high stability and low ripple. The EGM 50 incorporates an integral floating filament supply and and active bias. Full control via RS232 interface reduces end-product development time and eases system integration. Safe, ground level local and remote control of beam energy, filament power and emission current provides optimum operational efficiency.

TYPICAL APPLICATIONS

Electron-Beam Lithography
Semiconductor Inspection
Scanning Electron Microscopes

SPECIFICATIONS

Input Voltage:
90-260Vac.

Input Current:
<1.1A @ 100Vac

Input Frequency:
47 to 63Hz.

Input Protection:
IEC inlet 3.15A "T" fuse.

Temperature Range:
Operating: 20˚C to 25˚C.
Storage: -10˚C to 70˚C.

Operating Humidity:
10 to 70% RH.

Connections and Cables:
9-pin "D" type: System Interlocks
25-pin "D" type: RS232
RJ485: Optional Ethernet
Optional HV Cable: 8m (XPVD-75-3Y) Hitachi
3-pin HV: 75kV DC Standard Federal Connector

Local Control:
Front panel push button for filament power and emission current increments.
Beam energy on and off.

Remote Control:
Via an RS-232C for Beam Energy, Filament Power, and Active Bias.

Monitoring:
Digital monitoring via RS232C.
Analog output monitoring provided via BNC connectors on the rear panel.

Front Panel Monitor:
Display 1: Beam energy or bias voltage
Display 2: Emission current
Display 3: Filament power

Dimensions:
2 x 3U 19" Rack Units

Weight:
Control Module 10kg (22lbs.)
HV Module 40kg (68lbs.)

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

BEAM ENERGY

Output Voltage:
-50kV fixed, adjustable ± 2% via remote control.
(Other output voltages available upon request)

Output Current:
500µA maximum.

Polarity:
Negative.

Line Regulation:
<10ppm for a 10% line change at 50kV 500µA

Load Regulation:
<10ppm for 100 to 500µA emission current change

Stability:
<2.0ppm/48hours/0.5°C

Warm Up Time:
5 hours for full stability.

Ripple and Noise:
<2.5ppm.

Overcurrent Protection:
Protected against overcurrent to 120% of the rated current. Unit will shutdown for over current condition greater than 100ms.

Arc Protection:
Included

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128017-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

FILAMENT POWER SUPPLY

Output Power:
10W max. (adjustable in 0.1W steps)
2A maximum current
8.4V maximum voltage

Regulation:
Constant with secondary side control

Line Regulation:
<10ppm for 10% line change

Load Regulation:
<5% change in power from 4W to 7W (1Ω to 7Ω)

Drift:
<50ppm/12 hours/0.5°C after warm-up

Warm Up:
<3 hours for full stability

Ripple and Noise:
<0.1% (operating frequency)
<50ppm (10Hz to 3 kHz)

Monitor:
+1.00V for 10W
100ppm Stability
0.5% accuracy

ACTIVE BIAS

Voltage Range:
Low: -200 to -1100V ref to filament center tap
High: -200 to -2000V ref to filament center tap
Low or high range selected via rear panel switch

Temperature Coefficient:
<100ppm/°C

Emission Control:
0 to 500µA adjustable in steps of 0.1µA

Emission Monitor:
+5V for 500µA output
100ppm stability
0.1% accuracy

INTERFACE CONNECTOR

PIN	SIGNAL	SIGNAL PARAMETERS
1	PSU on	Volt free contacts to indicate that there is power on the unit
2	N/C	No Connection
3	N/C	No Connection
4	N/C	No Connection
5	0V	No Connection
6	Interlock/HV Enable	Link to 0V to enable HV output
7	N/C	No Connection
8	N/C	No Connection
9	PSU on	Volt free contacts to indicate that there is power on the unit

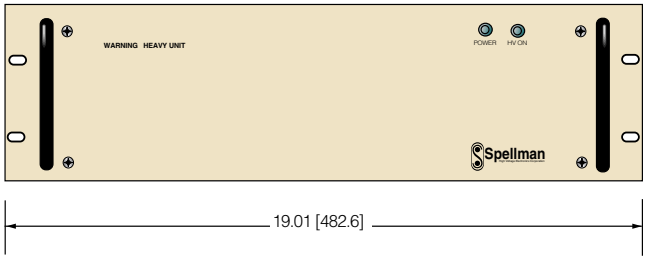
RS-232 DIGITAL INTERFACE—

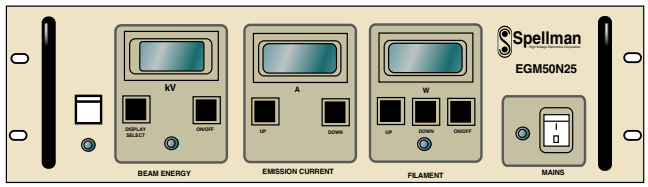
PIN	SIGNAL	SIGNAL PARAMETERS
1	N/C	No Connection
2	TX	PSU Transmit Data
3	RX	PSU Receive Data
4	RTS	Ready to Send
5	CTS	Clear to Send
6	N/C	No Connection
7	0V	
8	N/C	No Connection
9	N/C	+12Vdc up to 100mA, switchable
10	N/C	No Connection
11	N/C	No Connection
12	N/C	No Connection
13	N/C	No Connection
14	N/C	No Connection
15	N/C	No Connection
16	N/C	No Connection
17	N/C	No Connection
18	N/C	No Connection
19	N/C	No Connection
20	N/C	No Connection
21	N/C	No Connection
22	N/C	No Connection
23	N/C	No Connection
24	N/C	No Connection
25	N/C	No Connection

APPLICATION SPECIFIC

DIMENSIONS: in.[mm]

FRONT VIEW



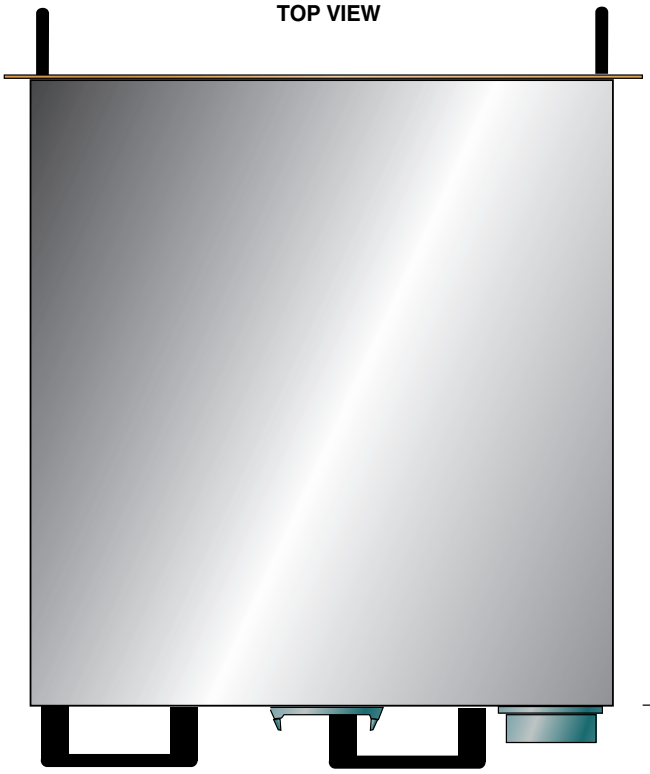


5.24 [133.0]

19.01 [482.6]

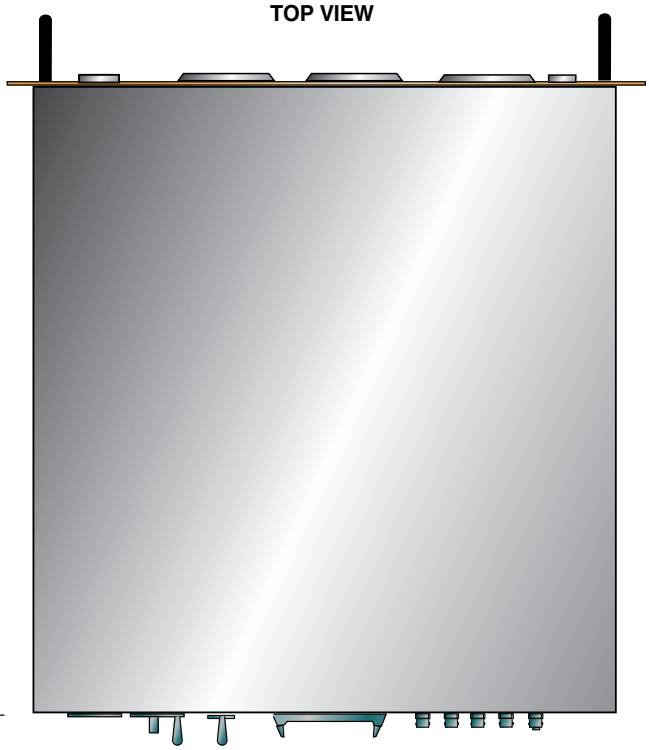
19.01 [482.6]

TOP VIEW

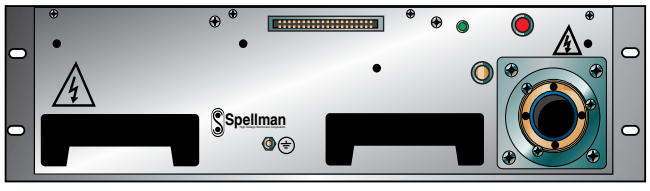


18.43 [468]

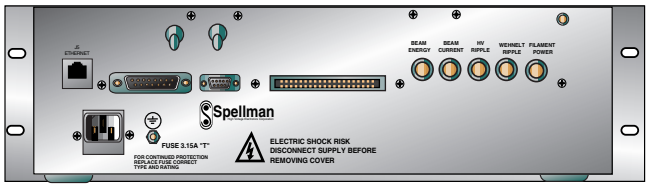
TOP VIEW



BACK VIEW



BACK VIEW



CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128017-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

FIBX CUSTOM MULTIPLE OUTPUT POWER SUPPLY FOR FOCUSED ION BEAM

- ***INTEGRATED SINGLE CHASSIS SOLUTION***
- ***HIGH STABILITY, VERY LOW RIPPLE***
- ***ENCAPSULATED HV SECTION***
- ***CORONA FREE OPERATION***
- ***OPTICALLY ISOLATED DIGITAL INTERFACE***
- ***CE MARKED & DESIGNED TO MEET SEMI S2***

Spellman's FIBX power supply is an integrated multiple output high voltage power supply specifically designed for focused ion beam. Typical applications include transmission and scanning electron microscopy; semiconductor analysis, milling and repair; disc drive head trimming, ion beam etching and focused ion-beam lithography.

A modular design approach allows individual subassemblies to be easily configured in a common rack mounted 6U chassis assembly. Interface, logic and control circuitry utilizes surface mount technology, minimizing cost and size. Spellman's leadership in patented power conversion technology and proprietary high voltage packaging and encapsulation techniques provides reliable and fault free operation in all FIB operating environments.

Individual supplies (Accelerator, Filament, Extractor, Suppressor or Lens) are designed to exacting application specific standards, with ultra low output ripple, excellent regulation, stability, temperature coefficient, drift and accuracy specifications. Isolation and control of the respective floating sources are provided via Spellman's proprietary high voltage isolation techniques.

Customer control of this integrated FIB power supply system is accomplished via a fiber optic isolated RS232 interface. All high voltage safety interlocks are of a fail-safe hardware based design. The FIBX is CE marked and is designed to be compliant with applicable IEC, UL and SEMI standards.

TYPICAL APPLICATIONS

Transmission scanning electron microscopy
Scanning electron microscopy
Semiconductor analysis, milling and repair
Ion beam etching
Focused ion-beam lithography

SPECIFICATIONS

Input Voltage:
105 to 240Vac, 47 to 63 Hz

ACCELERATOR SUPPLY Referenced to Ground

Output Voltage:	0 to +45 kV
Output Current:	30 µA
Ripple:	200 mV p-p, from 0.1 Hz to1 MHz
Line Regulation:	100 mV for +/-10% line change
Load Regulation:	±0.01% of maximum voltage for full load change
Stability:	1.5 volts/10 hours after 2 hour warm-up
Temperature Coefficient:	25 ppm/°C

FILAMENT SUPPLY Referenced to Accelerator

Output Voltage:	0 to 5 Vdc
Output Current:	0 to 5 A
Ripple:	10 mA p-p from 0.1 Hz to 1 MHz
Line Regulation:	5 mA for +/-10% line change
Load Regulation:	±0.1% of maximum voltage for full load change
Stability:	5 mA/10 minutes after 2 hour warm-up
Temperature Coefficient:	200 ppm /°C

APPLICATION SPECIFIC

SUPPRESSOR SUPPLY Referenced to Accelerator

Output Voltage:	-2 kV to +2 kV
Output Current:	30 µA
Ripple:	150 mV p-p from 0.1 Hz to 1 MHz
Line Regulation:	100 mV for +/-10% line change
Load Regulation:	±0.01% of maximum voltage for full load change
Stability:	500mV/10 hours after 2 hour warm-up
Temperature Coefficient:	25 ppm/°C

EXTRACTOR SUPPLY Referenced to Accelerator

Output Voltage:	0 to -15 kV
Output Current:	400 µA
Ripple:	100 mV p-p, from 0.1 Hz to 1 MHz at 30 µA and below
Line Regulation:	100 mV for +/-10% line change
Load Regulation:	±0.01% of maximum voltage for full load change
Stability:	500mV/10 hours after 2 hour warm-up
Temperature Coefficient:	25 ppm/°C

LENS 1 SUPPLY Referenced to Ground

Output Voltage:	0 to -40 kV
Output Current:	30 µA
Ripple:	150 mV p-p from 0.1 Hz to 1 MHz
Line Regulation:	100 mV for +/-10% line change
Load Regulation:	±0.01% of maximum voltage for full load change
Stability:	500 mV/10 hours after 2 hour warm-up
Temperature Coefficient:	25 ppm/°C

LENS 2 SUPPLY Referenced to Ground

Output Voltage:	0 to +25 kV
Output Current:	30 µA
Ripple:	150 mV p-p from 0.1 Hz to 1 MHz
Line Regulation:	100 mV for +/-10% line change
Load Regulation:	±0.005% of maximum voltage for full load change
Stability:	1.0 volts/10 hours after 2 hour warm-up
Temperature Coefficient:	25 ppm/°C

Remote Interface:

A fiber optic isolated RS232 interface is provide for remote digital control and monitoring of all power supplies and their functions.

Environmental:

Operating temperature:	10°C to 40°C
Storage temperature:	-30°C to 70°C
Humidity:	10% to 90%, non-condensing

Connectors:

Accelerator, Filament and Suppressor:	75kV, 3 conductor Federal Standard Xray connector
Extractor:	LGH 2I
Lens 1:	LGH 3I
Lens 2:	LGH 21

Input Voltage:

IEC320 EMI filtered input connector

Dimensions:

Industry standard 6U rack mounted chassis
10.5˝ High X 19˝ Wide X 21˝ Deep
26.7 cm X 48.3 cm X 53.34 cm

Weight:

Approximately 55 lbs (25 kg)

Regulatory Approvals:

Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive and designed to meet SEMI S2.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128029-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ELECTRON BEAM HIGH VOLTAGE POWER SUPPLY
- 100KV OUTPUT CAPABILITY
- LOW/HIGH 10µA/100µA OUTPUT CURRENT SELECTION
- LESS THAN 75 mV OF RIPPLE
- EXCELLENT REGULATION AND STABILITY PERFORMANCE
- OIL FREE/SOLID ENCAPSULATED DESIGN

The Bertan VS100 high voltage power supply was specifically designed for precision electron beam applications like semiconductor nano-lithography, micro-optics and development mask work. It's ultra low ripple and excellent stability specifications make it ideal for use in these demanding applications. A switch selectable low and high output current range is featured.

The solid encapsulated high voltage section eliminates any user maintenance issues, while isolating the components from environmental variables. The unit is fully overload, arc and short circuit protected. Remote control programming and monitoring capability is provided. A second high voltage monitor, separate from the control electronics is provided. This allows accurate passive measurement of the high voltage output.

TYPICAL APPLICATIONS

Micro-Optics
Semiconductor lithography
Development mask work

SPECIFICATIONS

Input Voltage:
220Vac, ±10%, single phase 50/60 Hertz

Output Voltage:
0 to 100kV, negative polarity. Externally switch selectable to 105kV, ±500 volts

Output Current:
0-10µA, low range
0-100µA, high range
Switch selectable

Line Regulation:
±0.001% of rated voltage over specified input voltage range

Load Regulation:
≤20V for a current change of 25µA to 60µA and 60µA to 25µA

Ripple:
≤75mV peak to peak

Partial High Voltage Discharge:
less than 200mV

Stability:
0.001% per 8 hours after a 6 hour warm up, for a temperature of 20°C ±0.2°C

Temperature Coefficient:
50ppm per degree C over a 10°C to 40°C range

Environmental:
Operating Temperature: 0 to 40 degrees C
Storage Temperature: -40 to 85 degrees C
Humidity: 10 to 90% RH, non condensing

Cooling:
Forced Air-control chassis;
Convection Cooled- high voltage chassis

Front Panel:
Power ON/OFF switch
HV ON/OFF switch
HV ON/OFF indicator
Analog output voltage meter

Dimensions:
Control Chassis: 5.25˝ H X 19˝ W X 15.3˝ D
(13.3cm X 48.3cm X 38.4cm)
HV Chassis: 10.25˝ H X 19˝ W X 27˝ D
(26.7cm X 48.3cm X 55.9 cm)

Weight:
Control Chassis: 20 pounds (9kg)
HV Chassis: 116 pounds (50kg)

Interface Connector:
19 pin Burndy GOB1619SNE
(mating connector provided)

AC Input Connector:
3 pin IEC320 input socket

Output HV Connector:
Claymount 2050-073

Output HV Cable:
Detachable at rear panel, cable not provided.

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

APPLICATION SPECIFIC

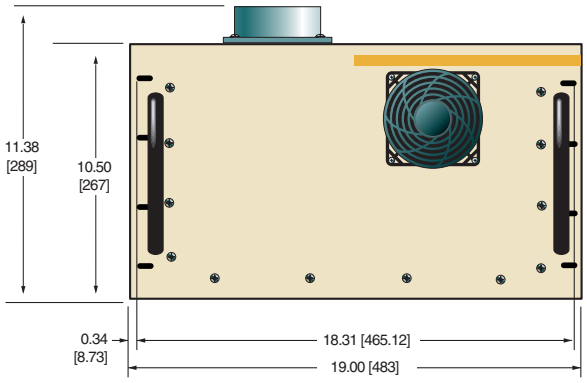
REMOTE INTERFACE CONNECTOR

PIN	SIGNAL	SIGNAL PARAMETERS
A	-5V Reference	-5.0 volts @ 10mA output
B	Voltage Programming	0 to -5v = 0 to 100% rated output, Zin = 100KΩ
C	Spare	n/c
D	Spare	n/c
E	Monitor Common	Ground
F	HV Status	TTL High = HV OFF, TTL Low = HV ON
G	+5V	5 volts @ 250mA output
H	Interlock	Ground or TTL low to enable interlock
J	Program Common	Ground
K	Spare	n/c
L	Spare	n/c
M	Spare	n/c
N	Spare	n/c
P	Voltage Monitor	0 to -5V = 0 to 100% rated output, Zout =10KΩ
R	Current Monitor	0 to -5V = 0 to 100% rated output, Zout =10KΩ
S	Spare	n/c
T	Spare	n/c
U	Spare	n/c
V	Spare	n/c

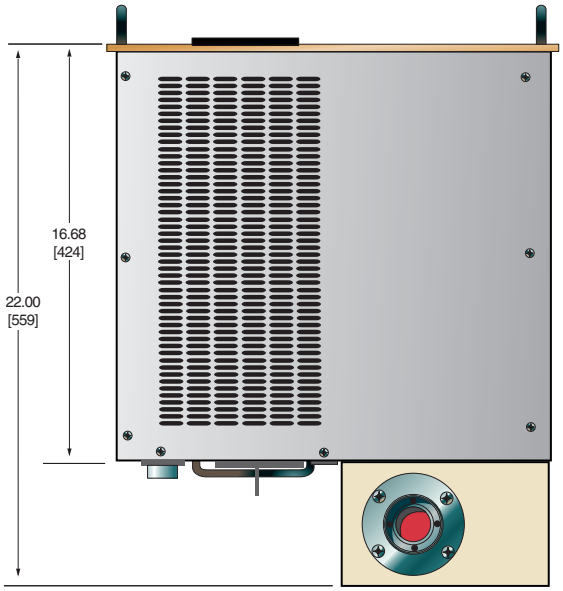
DIMENSIONS: in.[mm]

HV CHASSIS

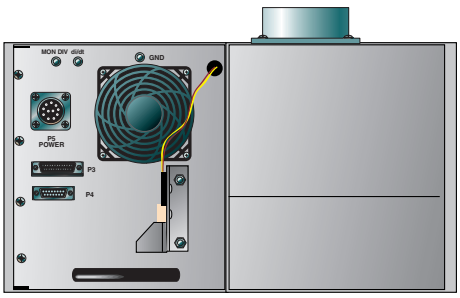
FRONT VIEW



TOP VIEW

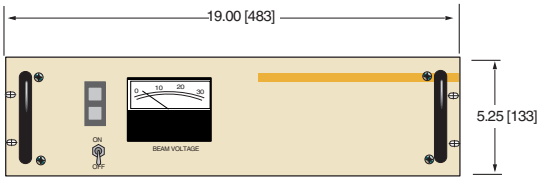


BACK VIEW

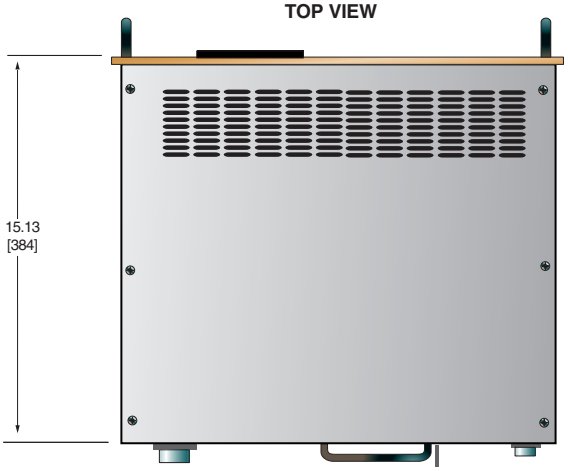


CONTROL CHASSIS

FRONT VIEW



TOP VIEW



BACK VIEW

CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128045-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

1.5kV TRUE FLOATING OUTPUT ELECTROSTATIC CHUCK POWER SUPPLY

Bi-polar E-chuck

- *30W TO 75W PER CHANNEL*
- *INPUT VOLTAGE: 48VDC OR 24VDC*
- *COMPLETE MONITORING OF OUTPUT VOLTAGE AND CURRENT*
- *REVERSIBLE POLARITY*
- *DUAL OUTPUT*
- *FLOATING OUTPUT VOLTAGE*
- *INTERLOCK CIRCUITRY & FAULT INDICATION*
- *COMPACT SIZE: 6.6"H X 2.25"W X 9.5"D (16.8CM X 5.7CM X 24.1CM)*

ESC Series electrostatic chuck power supplies provide steady and accurate bi-polar voltages required for electrostatic wafer processing applications. These well regulated supplies effectively secure the chuck during long hold cycles. Additional features include a true floating output with an independent center-tap point and an internal interlock circuit which shuts down power if faults occur. The ESC power supplies are housed in compact, lightweight packages designed for flexible installation in tight spaces.

CZE1000R AUTO-REVERSING POWER SUPPLY

- ***IDEAL FOR ELECTROSPINNING***
- ***0-30KV LOCAL OR REMOTE PROGRAMMING***
- ***0-300 A LOCAL OR REMOTE PROGRAMMING***
- ***POLARITY REVERSIBLE UPON COMMAND IN <1 SEC AT NO LOAD***
- ***LOW STORED ENERGY, CURRENT LIMITED OUTPUT***
- ***FULL FEATURE FRONT PANEL, IDEAL FOR LABORATORY USEAGE***

www.spellmanhv.com/manuals/CZE1000R

Spellman's CZE1000R is a full feature rack mountable high voltage power supply ideal for laboratory usage. It's designed to meet the needs of applications requiring a hot switched reversible output voltage. The output polarity can be quickly and safely reversed via a front panel switch.

Both the output voltage and current are fully adjustable from 0 to 30kV and 0 to 300uA via front panel ten turn locking counting dials. Remote control operation is done by 0 to +10Vdc programming signals; either user generated or using the provided +10 Vdc reference and external potentiometers.

Front panel voltage and current meters provide local monitoring. Voltage and current test points are provided such that 0 to 10Vdc corresponds to 0 to 100% rated output.

A two position, normally closed, external interlock is provided for protection of external high voltage accessible areas. If the interlock is opened the high voltage will shut off and fall to zero in less than one second and not be able to be re-energized until the interlock is closed.

Excellent load and line regulation specifications along with outstanding stability and low ripple of the CZE1000R assure a stable high voltage output for consistent process results.

TYPICAL APPLICATIONS

Electrospinning
Mass Spectrometry
Capillary Electrophoresis
Electrostatic Research

OPTIONS

220 220Vac Input Voltage
RPO Rear Panel HV Output

SPECIFICATIONS

Input Voltage:
115Vac, ±10%, 50/60Hz

Input Current:
Less than 1 amp

Efficiency:
75% typical

Output Voltage:
0 to 30kV

Polarity:
Auto reversible via front panel switch

Output Current:
0 to 300µA

Power:
9 watts, maximum

Line Regulation:
0.01% for a 10% input voltage change

Load Regulation:
0.01% for a full load change

Ripple:
0.1% Vp-p

Stability:
0.02% per 8 hours (after 1/2 hr warmup)

NL Time Constant:
100ms

Stored Energy:
0.2 Joules at 30kV

Temperature Coefficient:
100ppm/°C

Operating Temperature:
0°C to 40°C

Storage Temperature:
-40°C to 85°C

Humidity:
10% to 85% RH, non condensing

Cooling:
Convection cooled

Dimensions:
5.25"H x 19"W x 17"D (13.3cm x 48.3cm x 43.2cm).

Weight:
22lbs. (10kg)

Interface Connector:
14 pin terminal block

AC Input Connector:
IEC320 connector with 6' (1.83m) cord

HV Output Connector:
Detachable 36˝ (0.91m) cable provided

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128075-001 REV.A
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

DIMENSIONS: in.[mm]

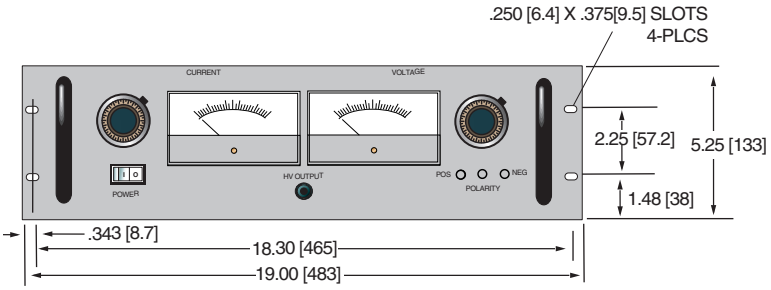
CZE1000R TERMINAL BLOCK 14 PIN

PIN	SIGNAL	PARAMETERS
1	+10Vdc Reference Output	+10Vdc, 4mA maximum
2	Internal Voltage Control	Front Panel Program Voltage (programming potentiometer)
3	Voltage Program Input	0 to 10Vdc = 0 to 100% rated output, Zin =10MΩ
4	Internal Current Control	Front Panel Current Control (programming potentiometer)
5	Current Program Input	0 to 10Vdc = 0 to 100% rated output, Zin =10MΩ
6	Signal Common	Ground
7	Voltage Test Point	0 to 10Vdc = 0 to 100% rated output, Zout =10kΩ, 1%
8	Current Test Point	0 to 10Vdc = 0 to 100% Rated Output, Zout =10kΩ, 1%
9	External Interlock Out	32Vdc @ 2 amps, max, (connect to pin 10 through safety switch)
10	External Interlock In	Return for interlock (connect to pin 9 through safety switch)
11	+10Vdc Reference Output	+10Vdc, 4mA maximum
12	Enable	Open or ground = HV OFF, >3.4Vdc (up to 15Vdc) = HV ON
13	Spare	No Connection
14	Spare	No Connection

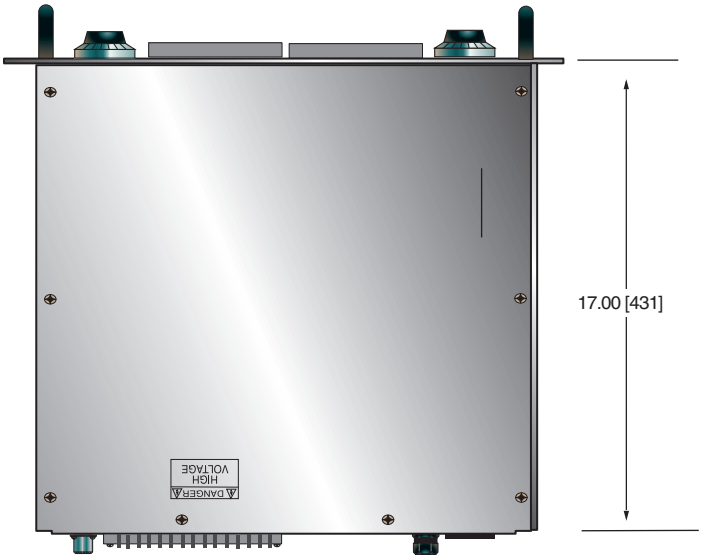
Note:
The unit is shipped with the following pins jumpered for front panel operation: 2-3, 4-5, 9-10, 11-12 It is strongly recommended to remove the 9-10 jumper and use a high voltage safety interlock switch.

High Voltage Cable:
A mating high voltage connecter is provide with the unit. Have a spare on hand or replace broken/lost mating high voltage cables by ordering Spellman part number 105719-034

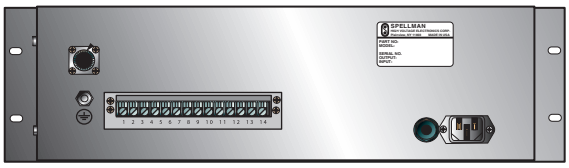
FRONT VIEW



TOP VIEW



BACK VIEW



APPLICATION SPECIFIC

CZE2000 AUTO-REVERSING POWER SUPPLY

- ***IDEAL FOR ELECTROSPINNING***
- ***0-30KV, REMOTELY PROGRAMMABLE***
- ***0-300 A, REMOTELY PROGRAMMABLE***
- ***POLARITY REVERSIBLE UPON COMMAND IN <1 SEC AT NO LOAD***
- ***LOW STORED ENERGY, CURRENT LIMITED OUTPUT***
- ***COST EFFECTIVE MODULAR DESIGN***

www.spellmanhv.com/manuals/CZE2000

Spellman's CZE2000 modular high voltage power supply is ideal for OEM usage. It is specifically designed to meet the needs of applications requiring a hot switched reversible output voltage. The output polarity of the unit can be quickly and safely reversed via the Polarity Control Signal provided on the interface connecter.

Both the output voltage and current are fully adjustable from 0 to 30kV and 0 to 300uA respectively via ground referenced remote programming signals such that 0 to +10Vdc corresponds to 0 to 100% rated output voltage and current.

Remote motioning functionality is provided by voltage and current test points such that 0 to 10Vdc corresponds to 0 to 100% rated voltage and current. Additionally remote polarity and mode indicators provide a comprehensive overview of power supply operation.

Excellent load and line regulation specifications along with outstanding stability and low ripple assure a stable high voltage output for consistent process results.

TYPICAL APPLICATIONS

Electrospinning
Mass Spectrometry
Capillary Electrophoresis
Electrostatic Research

SPECIFICATIONS

Input Voltage:
24Vdc, ±10%

Input Current:
Less than 1 amp

Efficiency:
75% typical

Output Voltage:
0 to 30kV

Polarity:
Auto reversible via command

Output Current:
0 to 300µA

Power:
9 watts, maximum

Line Regulation:
0.01% for a 10% input voltage change

Load Regulation:
0.01% for a full load change

Ripple:
0.1% Vp-p

Stability:
0.02% per 8 hours (after 1/2 hr warmup)

NL Time Constant:
100ms

Stored Energy:
0.2 Joules at 30kV

Temperature Coefficient:
100ppm/°C

Operating Temperature:
0°C to 40°C

Storage Temperature:
-40°C to 85°C

Humidity:
10% to 85% RH, non condensing

Cooling:
Convection cooled

Dimensions:
3.5"H x 5"W x 10"D (8.9cm x 12.7cm x 25.4cm).

Weight:
6.2lbs. (2.8kg)

Interface Connector:
25 pin male D connector

HV Output Connector:
Detachable 36˝ (0.91m) cable provided

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive, UL/CUL recognized file E148969

Spellman High Voltage Electronics Corporation

USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030

e-mail: sales@spellmanhv.com
www.spellmanhv.com

128076-001 REV.A

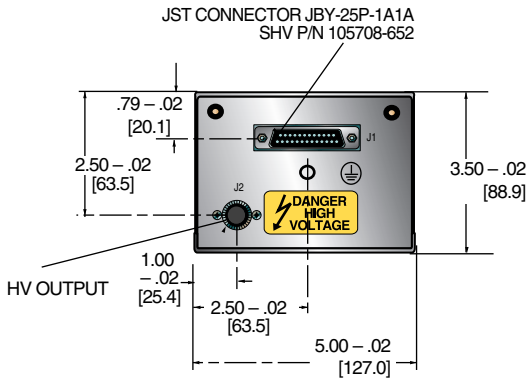
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

CZE2000 25 PIN MALE D CONNECTOR

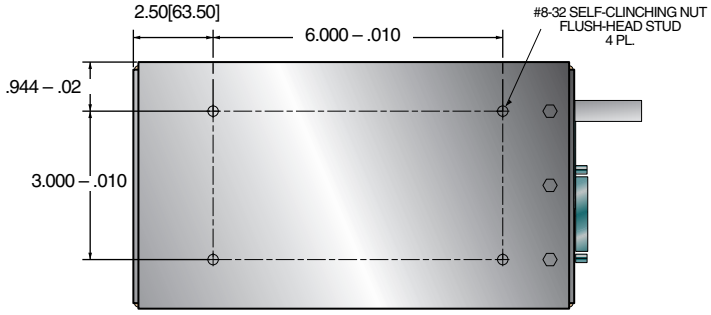
PIN	SIGNAL	PARAMETERS
1	+24Vdc Return	Power Return
2	+24Vdc Return	Power Return
3	+24Vdc Return	Power Return
4	HV Enable/Inhibit	Open or <1Vdc = HV OFF, >3.4Vdc (up to 15Vdc) = HV ON
5	Voltage Test Point	0 to 10Vdc = 0 to 100% rated output, Zout =10kΩ, 1%
6	Current Test Point	0 to 10Vdc = 0 to 100% rated output, Zout =10kΩ, 1%
7	Chassis Ground	Ground
8	Remote Voltage Control	0 to 10Vdc = 0 to 100% Rated Output, Zin =10MΩ
9	Remote Current Control	0 to 10Vdc = 0 to 100% Rated Output, Zin =10MΩ
10	+10Vdc Reference Output	+10Vdc, 4mA maximum
11	Signal Return	Signal Return
12	Polarity Control	Open or >3.4Vdc (up to 15Vdc) = Positive Polarity. Grounded or <1Vdc = Negative Polarity
13	Positive Polarity Indicator	+24Vdc sourced through a 100Ω series limiting resistor. +24Vdc = active signal
14	+24Vdc Input	Power Input
15	+24Vdc Input	Power Input
16	Chassis Ground	Ground
17	Negative Polarity Indicator	+24Vdc sourced through a 100Ω series limiting resistor. +24Vdc = active signal
18	I Mode Indicator	Open collector pulled up internally to +15Vdc through 2.7kΩ resistor with a 470Ω limiting resistor in series. Transistor OFF = signal active
19	V Mode Indicator	Open collector pulled up internally to +15Vdc through 2.7kΩ resistor with a 470Ω limiting resistor in series. Transistor OFF = signal active
20	Return Current Test Point	0 to 10Vdc = 0 to 100% rated output current, as measured returned from load. Zout =10kΩ, 1%
21	Load Return	High Voltage Return Point. Required for GFI circuit functionality
22	Ground Fault Indicator	Open collector pulled up internally to +15Vdc through 4.7kΩ resistor with a 470Ω limiting resistor in series. Transistor OFF = signal active
23	Spare	No Connection
24	Spare	No Connection
25	Spare	No Connection

DIMENSIONS: in.[mm]

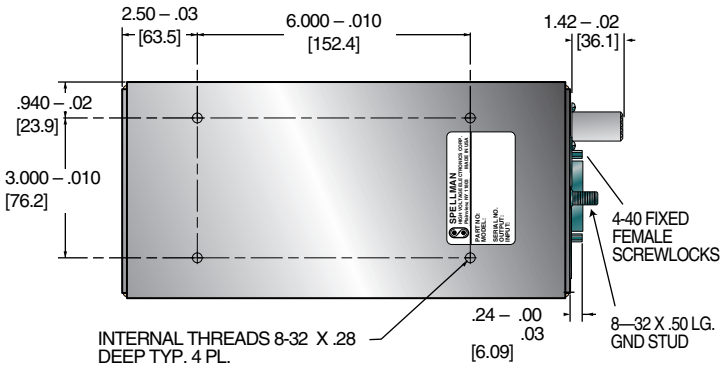
FRONT VIEW



TOP VIEW



BOTTOM VIEW



APPLICATION SPECIFIC

- ***BLANKING***
- ***THERMAL SHUT DOWN***
- ***CURRENT LIMITS***
- ***ARC PROTECTION***
- ***OEM CUSTOMIZATION AVAILABLE***

Spellman High Voltage Electronics Corporation continues to set the standards for high voltage power conversion technology with the new DGM high voltage power supply for Image Intensifier applications.

The DGM was developed in conjunction with a leading supplier of medical rediagnostic imaging systems.

The DGM series can be adapted to suit specific requirements with a wide selection of multiple output voltages and power capabilities in a compact package, making it perfect for the OEM user.

TYPICAL APPLICATIONS

Radiology
Cardiology
Neuroradiology
Night surveillance
Astronomical Observations
Spectrophotometry
Non Destructive X-ray Inspection
Image Intensifiers

SPECIFICATIONS

Input Voltage:
+15Vdc and -15Vdc

Input Current:
0.5A at full output.

Programmable Output Voltages:

1. Anode Voltage
Output Voltage 33kV (40kV available)
Ripple 0.03% p-p

2. Grid 1
Output Voltage 15kV
Ripple 0.045% p-p

3. Grid 2
Output Voltage 1kV
Ripple 0.1% p-p

4. Cathode
Output Voltage 250V
Ripple 0.2% p-p

5. Pump
Output Voltage 2kV
Ripple 1% p-p

Temperature:
Operating: +10°C to +50°C.

Signal Connector:
High voltage socket output connectors
Input D-type connector

Dimensions:
6.8”H x 4.68”W x 1.37”D (173mm x 119mm x 35mm).

Weight:
2.86 lb. (1.3kg).

Custom Products
Available with Multiple Anodes, Focus and Grid Outputs.
Please consult factory for custom requirements.

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128030-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***FLOATING, PROGRAMMABLE 3KV OUTPUT***
- ***OUTPUT ISOLATED TO 16KV***
- ***WELL REGULATED, LOW RIPPLE***
- ***OUTPUT VOLTAGE MONITOR***
- ***COMPACT SHIELDED METAL ENCLOSURE***
- ***ARC AND SHORT CIRCUIT PROTECTED***

Spellman's MCP Module is a well-regulated, high performance DC-DC converter featuring a floating 3kV output, isolated to 16kV. The MCP low output ripple specification makes it ideal for use with detectors in Mass Spectrometry applications like: Electron Multipliers (EM's), Microchannel Plates Detectors (MCP's) and Channel Electron Multipliers.

This +3kV @ 330uA module is packaged in a shielded metal enclosure. The unit has remote voltage programming and a voltage monitor, and features low injected ripple when used with biasing supplies. The MCP module is easily customized to meet OEM requirements with improved ripple performance, improved stability and configurable output lead terminations as required.

TYPICAL APPLICATIONS

Mass Spectrometry Detectors
Microchannel Plates
Electron Multipliers
Channel Electron Multipliers

SPECIFICATIONS

Input Voltage:
+24Vdc, ±0.5 volts

Input Current:
600 mA maximum

Output Voltage:
+100V to +3kV, continuously variable over the entire output range

Output Current:
330uA maximum

Polarity:
Positive

Isolation Voltage:
Up to 16kV total to ground
(resistance to ground 600M on each output)

Line Regulation:
≤0.01% for input voltage change of 1V

Load Regulation:
≤0.1% for a no load to full load change

Voltage Programming:
0 to 10 volt corresponds to 0 to 100% of rated output voltage

Voltage Monitor:
0 to 5 volts corresponds to 0 to 100% of rated output voltage

Accuracy:
±1% from 10% to 100% of output.
Below 10% accuracy spec is not guaranteed

Ripple:
≤0.1% Volts p-p, 0.1Hz to 1MHz

Stability:
≤1000 ppm/hour at constant operating conditions after a 1 hour warm up.

Temperature Coefficient:
≤300ppm per degree C

Environmental:
Temperature Range:
Operating: 0˚C to 40˚C
Storage: -40˚C to 85˚C
Humidity:
10% to 90%, non-condensing.

Cooling:
Convection cooled

Dimensions:
1.49˝ H X 4.09˝ W X 6.73˝ D (38mm X 104mm X 171mm)

Weight:
2.2 pounds (1kg)

Interface/Power Connector:
9 pin male D connector

HV Output Connector:
HV positive: 29.5˝ (750mm) flying lead, coaxial HV cable
HV negative: 29.5˝ (750mm) flying lead, coaxial HV cable

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

APPLICATION SPECIFIC

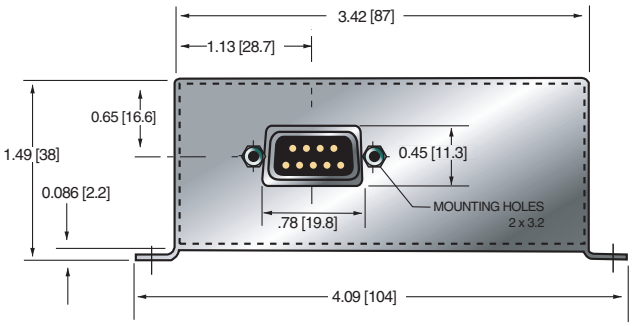
DIMENSIONS: in.[mm]

MCP INTERFACE/POWER CONNECTOR

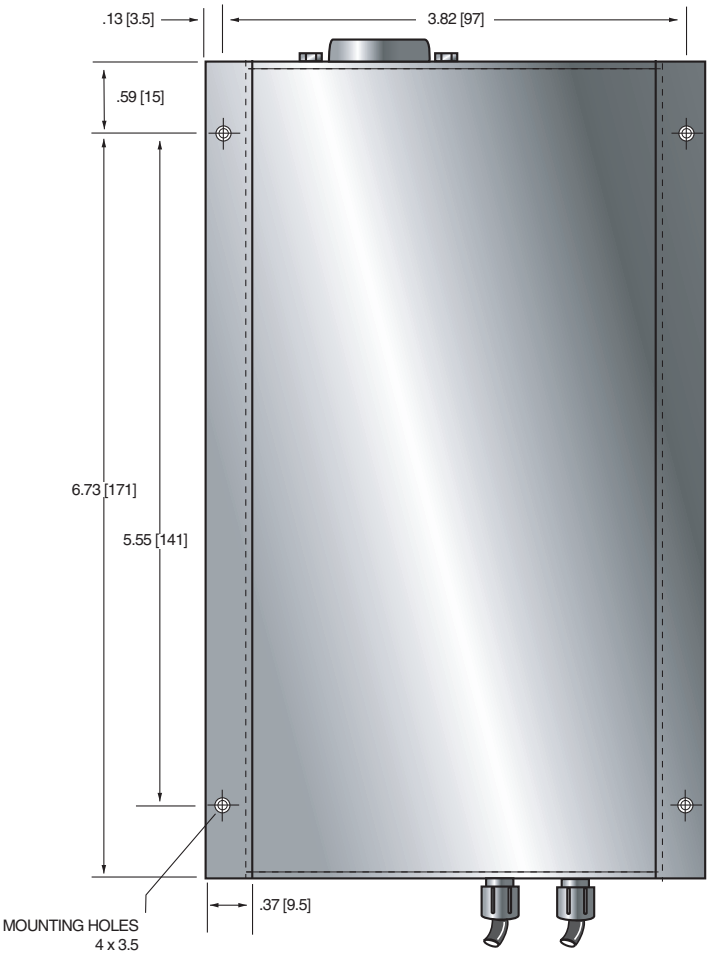
JB1	SIGNAL	SIGNAL PARAMETERS
1	Signal Ground	Signal Ground
2	Voltage Programming Input	0-10Vdc = 0-100% of Rated Output
3	+24V Input	+24V Input
4	+24V Input	+24V Input
5	Voltage Monitor	0-5Vdc=0-100% of Rated Output
6	Power Ground	Power Ground
7	Power Ground	Power Ground
8	Power Ground	Power Ground
9	Power Ground	Power Ground

FRONT VIEW

BACK VIEW



TOP VIEW



CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128027-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***HIGH VOLTAGE LENS POWER SUPPLY***
- ***DUAL POSITIVE AND NEGATIVE OUTPUTS***
- ***LOW COST, AIR INSULATED DESIGN***
- ***SMT DESIGN—SMALL SIZE AND LOW WEIGHT***
- ***UL APPROVED TO UL61010-1***
- ***ARC AND SHORT CIRCUIT PROTECTED***
- ***REMOTE ENABLE CONTROL PROVIDED***

Spellman's ML430 power supply module has been designed specifically to drive high voltage amplifiers. This compact, low cost, SMT based high performance module is printed circuit board mountable. Its dual output is ideal for amplifier driver requirements together with electrostatic lenses, deflectors and biasing supplies.

This voltage regulated, current limited, fixed, dual output unit provides up to 25mA of load current. The ML430 is fully protected against arc and short circuit conditions. The grounded metal case provides both shielding and heat sinking functions. An Enable feature is provided, allowing simple remote operation of the supply. The ML430 is CE and UL approved.

TYPICAL APPLICATIONS

High Voltage Amplifiers
Electrostatic Lenses

SPECIFICATIONS

Input Voltage:
+24 Vdc, ±1.2Vdc

Input Current:
≤1.2 amp

Output Voltage:
Output 1-Positive:
+430 volts fixed. Accuracy ±7%
Output 2-Negative:
-430 volts fixed. Accuracy ±7%
Accuracy specified over full temperature, input voltage and load ranges

Output Current:
12mA maximum – Output 1-Positive
25mA maximum – Output 2-Negative

Line Regulation: (typical)
±0.1% – Positive output
±1.0% – Negative output

Load/Cross Regulation: (typical)
±0.1% – Positive output
±3.5% – Negative output

Output Current Limit:
An auto-recovering short circuit fold back limit is employed. Fully arc protected, capable of 10 arcs in 5 seconds.

Ripple:
≤0.5% p-p of full rated output voltage

Stability:
≤0.25% per hour, constant operating conditions after 1 hour warm up.

Temperature Coefficient:
≤200ppm per degree C

Environmental:
Temperature Range:
Operating: 0˚C to 50˚C
Storage: -35˚C to 85˚C
Humidity:
10% to 90% RH, non-condensing

Cooling:
Unit must be mounted in free air, in any position with the exception of inverted (pins up). Forced air cooling is recommended.

Dimensions:
0.984˝ H X 2.362˝ W X 2.362˝ D (25mm x 60mm x 60mm)

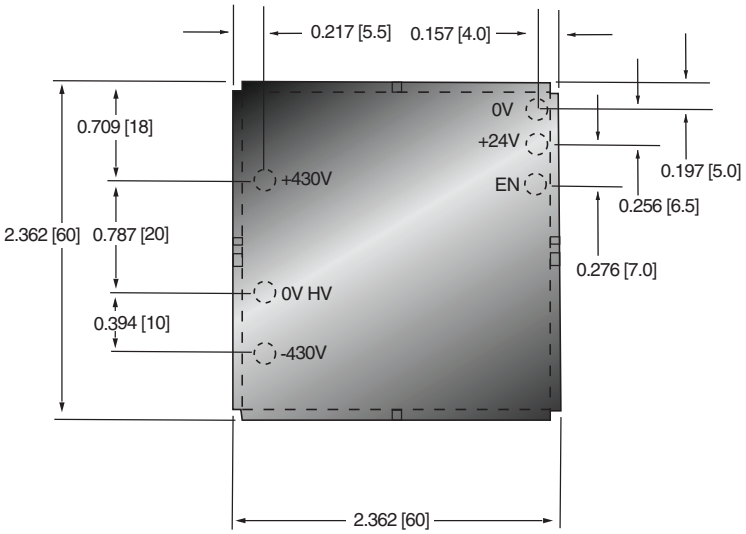
Weight:
3.31 oz. (94g)

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive, UL/CUL recognized file E227588.

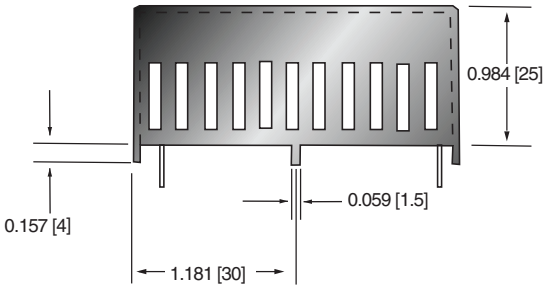
APPLICATION SPECIFIC

DIMENSIONS: in.[mm]

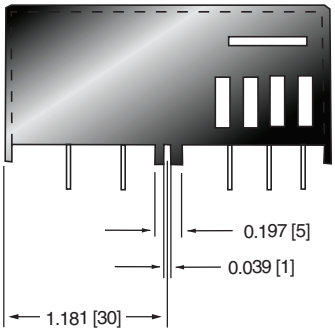
TOP VIEW



FRONT VIEW



SIDE VIEW



How to Order:
PART NO.:ML430P/N16/24

- ***QUAD OUTPUT HIGH VOLTAGE POWER SUPPLY***
- ***LOW COST, AIR INSULATED DESIGN***
- ***SMT DESIGN—SMALL SIZE AND LOW WEIGHT***
- ***ARC AND SHORT CIRCUIT PROTECTED***
- ***REMOTE ENABLE CONTROL PROVIDED***
- ***UL APPROVED TO UL61010-1***

Spellman's ML1350 power supply module has been designed specifically to drive quadrupoles used in mass spectrometry. This compact, low cost, SMT based high performance module is printed circuit board mountable. This quad output supply is ideal for quadrupole drivers and electrostatic lenses.

This voltage regulated, current limited, fixed quad output unit provides up to 15mA of load current from each output. The ML1350 is fully protected against arc and short circuit conditions. The grounded metal case provides both shielding and heat sinking functions. An Enable feature is provided, allowing simple remote operation of the supply. The ML1350 is CE and UL approved.

TYPICAL APPLICATIONS

Quadrupole HVPS
Electrostatic Lenses

SPECIFICATIONS

Input Voltage:
+24 Vdc, ±1.2Vdc

Input Current:
≤3.0 amps

Output Voltage:
Output 1-Positive:
+245 volts, fixed, accuracy <±10%
Output 2-Negative:
-245 volts, fixed, accuracy <±10%
Output 3-Positive:
+1350 volts, fixed, accuracy <±7%
Output 4-Negative:
-1350 volts, fixed, accuracy <±7%

Output Current:
15mA maximum for each output

Line Regulation: (typical)
±1 volt all outputs

Load Regulation: (typical)
±3% all outputs

Output Current Limit:
An auto-recovering short circuit fold back limit is employed. Fully arc protected, capable of 10 arcs in 5 seconds.

Ripple:
≤0.1% p-p of full rated output voltage

Stability:
≤0.25% per hour, constant operating conditions after 1 hour warm up.

Under Voltage Shutdown:
The power supply will shut down when an input under voltage condition is detected. When the input voltage is restored above 11.8 volts, operating the enable pin will reset this fault.

Temperature Coefficient:
≤200ppm per degree C

Environmental:
Temperature Range:
Operating: 0˚C to 50˚C
Storage: -35˚C to 85˚C
Humidity:
10% to 90% RH, non-condensing

Cooling:
Unit must be mounted in free air, in any position with the exception of inverted (pins up). Forced air cooling is recommended.

Dimensions:
0.984˝ H X 4.331˝ W X 3.150˝ D (25mm x 110mm x 80mm)
Width does not include mounting tab

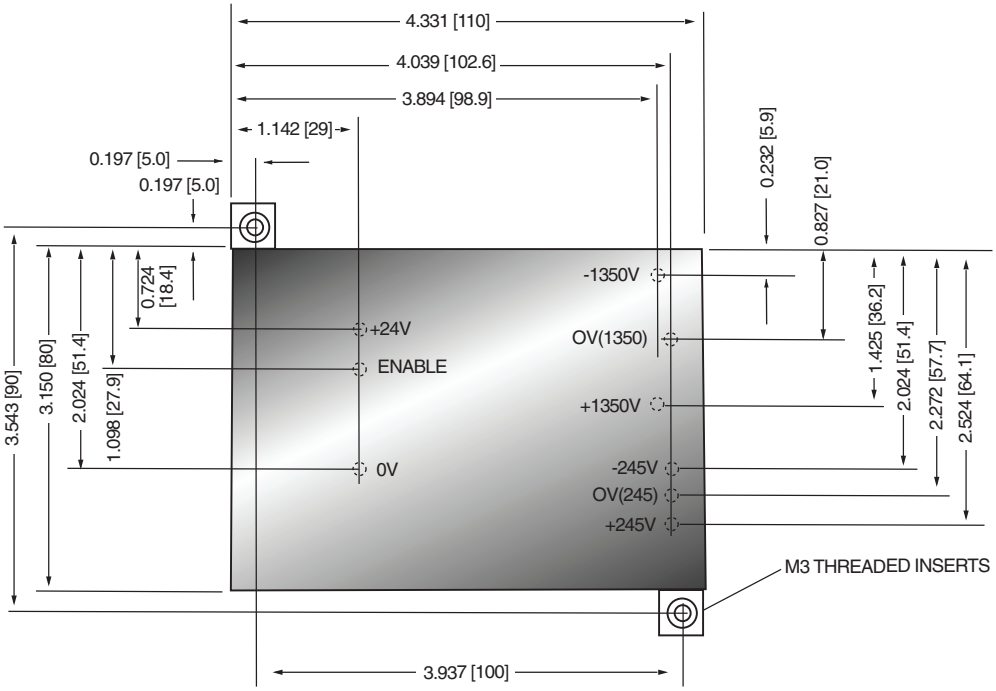
Weight:
7.27 oz. (206g)

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive, UL/CUL recognized file E227588.

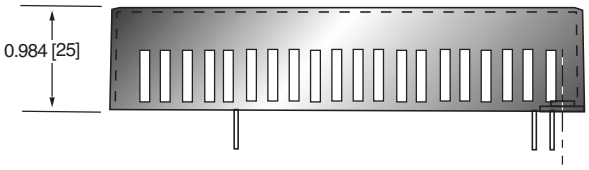
APPLICATION SPECIFIC

DIMENSIONS: in.[mm]

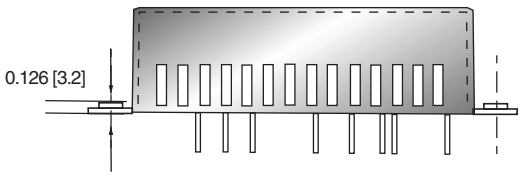
TOP VIEW



FRONT VIEW



SIDE VIEW



How to Order:
PART NO.:ML1350P/N50/24

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128037-001 REV.E
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***HOT SWITCHABLE POLARITY REVERSIBLE VIA A LOGIC SIGNAL***
- ***WELL REGULATED, LOW RIPPLE***
- ***POLARITY REVERSAL WITHIN 300mS***
- ***VOLTAGE AND CURRENT MONITOR OUTPUTS***
- ***REMOTE HV INHIBIT***
- ***SMALL PCB MOUNT MODULE***
- ***ARC AND SHORT CIRCUIT PROTECTED***

Spellman's MX2.5 is a well-regulated high performance DC-DC converter featuring a "hot switchable" polarity reversal capability. The MX's low ripple specification makes it ideal for Mass Spectrometry applications; especially security detection systems, Dynodes, sample ionization as well as capillary electrophoresis and electrostatic printing applications.

The MX2.5 is rated at 2.5kV @60uA and is packaged in a shielded metal enclosure. This unit features a logic signal input to control output polarity reversal. A HV inhibit feature, along with voltage and current monitors are provided. Easily customized to meet OEM requirements, the MX2.5 can be provided with improved ripple performance and higher voltage and current capabilities.

TYPICAL APPLICATIONS

Mass Spectrometry
Capillary Electrophoresis
Electrostatic Printing

SPECIFICATIONS

Input Voltage:
+24Vdc, ±0.5 volt

Input Current:
<200mA continuous

Output Voltage:
±100Vdc to ±2.5kV

Output Current:
0 to 60uA max.

Polarity:
Remotely reversible via logic signal, 300mS to settle to ±1%, 1 Hz maximum switch rate

Voltage Regulation:
Load: 0.05% of maximum output voltage for a no load to full load change
Line: 0.05% of maximum output voltage for a 1 volt input line change

Voltage Programming:
0 to 10 volt corresponds to 0 to 100% of rated output voltage

Voltage/Current Monitor:
0 to 10 volt corresponds to 0 to 100% of rated output voltage/current

Programming and Monitor Accuracy:
±1% Voltage Programming/Monitor
±2% Current Monitor

Ripple:
≤0.02% Volts p-p

Stability:
0.02% per hour after 1 hour warmup

Temperature Coefficient:
≤50ppm per degree C

Environmental:
Temperature Range:
Operating: 0˚C to 40˚C
Storage: -40˚C to 85˚C
Humidity:
10% to 90%, non-condensing.

Cooling:
Convection cooled

Dimensions:
1.18˝ H X 2.36˝ W X 4.72˝ D (30mm X 60mm X 120mm)

Weight:
Approximately 8.82 oz. (250g)

Interface/Power Connector:
PCB mount pins

HV Output Connector:
PCB mount pins

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

APPLICATION SPECIFIC

MX2.5 INPUT/OUTPUT CONNECTIONS

PIN NO.	SIGNAL	SIGNAL PARAMETERS
1	+24V	Power Input
2	0v	Signal and Power Ground
3	V_{prog}	0-10V Programming Voltage
4	Polarity Change	Polarity Change Input
5	Shutdown	Output Inhibit, Disables HV Output Down to <60V Within 300ms
6	V_{mon}	0-10V Output Voltage Monitor
7	Output	HT Output
8	I_{mon}	0-10V Output Current Monitor

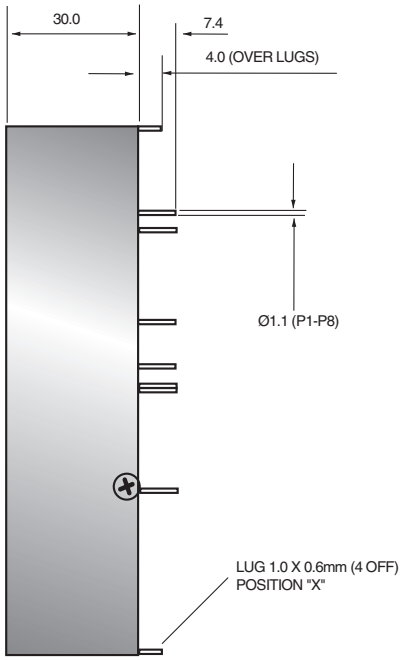
How to Order:

Standard: PART NO.:MX2.5PN24

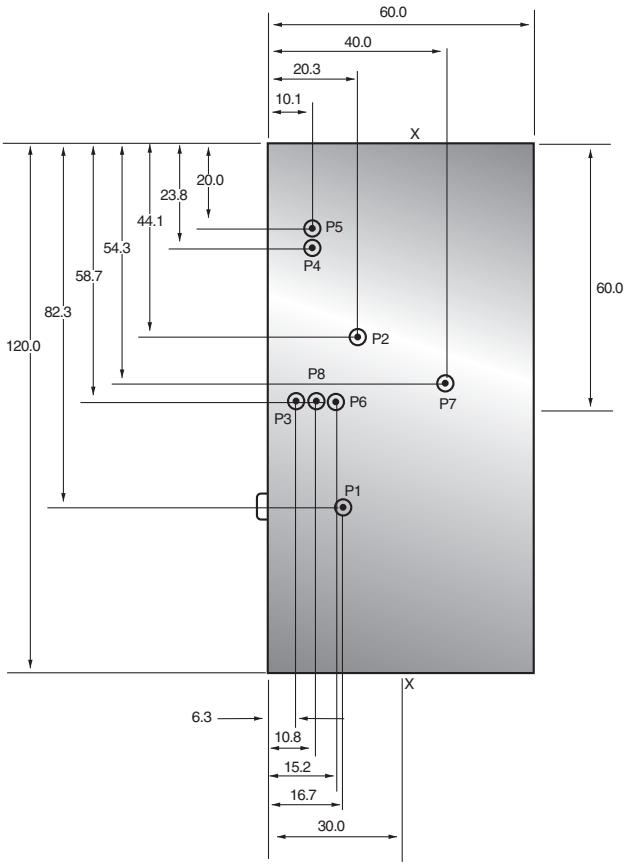
CE

DIMENSIONS: mm

SIDE VIEW



BOTTOM VIEW ON PINS



Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128049-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***±8KV 25ms POLARITY REVERSING SPEED***
- ***PRECISION ANALOG VOLTAGE AND CURRENT CONTROLS***
- ***PRECISION ANALOG VOLTAGE AND CURRENT MONITORS***
- ***HIGH STABILITY***
- ***LOW RIPPLE AND NOISE***
- ***HIGH VOLTAGE INHIBIT CONTROL***
- ***RoHS COMPLIANT***

Spellman's RoHS compliant MX8 *Plus* is a well-regulated high performance fast reversible supply featuring a 25ms "hot switchable" polarity reversing capability.

The MX8 *Plus*'s low ripple specification is typical of the topologies that make Spellman High Voltage your ideal choice for mass spectrometry applications; especially security detection systems, dynodes, sample ionisation as well as capillary electrophoresis and electrostatic printing applications. The MX8 has been designed especially for EI and APCI applications.

The MX8 *Plus* can be easily tailored to an OEM's requirement, such as improved ripple performance, or different voltage and/or current capabilities.

TYPICAL APPLICATIONS

Mass Spectrometry
Capillary Electrophoresis
Electrostatic Printing

SPECIFICATIONS

Input Voltage:
+24Vdc, ±10%

Input Current:
<0.5A nominal continuous
<1.2A peak during reversing

Output Voltage:
0V to ±8kV (see note 1)

Output Current:
100µA

Output Polarity:
Bipolar

Voltage Regulation:
Line: <±0.1%% for ±10% input voltage change
Load: <0.1% for 0 to full load

Current Regulation:
Line: ±0.1% for +1V input voltage change for any load condition
Load: ±0.1% for full load to short circuit

Ripple:
<0.1% p-p @ 100µA

Temperature Coefficient:
≤100ppm per degree C

Environmental:
Temperature Range:
Operating: 5˚C to 45˚C
Storage: -35˚C to 85˚C
Humidity:
10% to 85%, non-condensing

Stability:
0.05% per hour after 1 hour warm up

Polarity Reversal Time:
<25ms from command to 90% into 100pF load capacitance (see note 2)

Protection:
Arc and short circuit protected

Output Voltage Limit:
Output voltage must not exceed ±8kV ±250V under any input or output conditions

Dimensions:
1.48˝ H X 3.23˝ W X 9.45˝ D (37.6mm X 82mm X 240mm)

Weight:
Approximately 3.3 pounds (1.5kg)

Input Connector:
14 way Molex housing p/n 39-01-2140 or similar with female terminals. Cable length 508mm

Output Connector:
Alden F303D24

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive. Compliant to 2002/95/EC, RoHS.

Note 1: Linearity not guaranteed below 200V. Maximum offset ±20V when programmed to zero or disabled using remote enable.

Note 2: Unit incorporates circuitry to minimize the effects of low programmed current on reversing time. Polarity reversal time applies when current is programmed to 3µA or above.

APPLICATION SPECIFIC

MX8 *PLUS* 14 PIN SOCKET

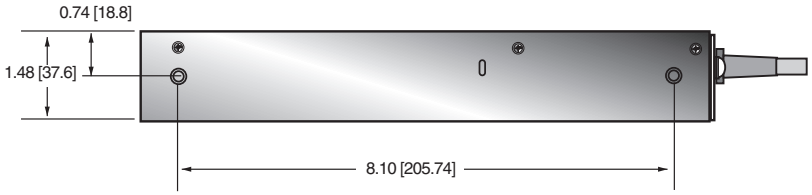
PIN	SIGNAL
1	+24Vdc Input
2	Chassis and 24Vdc Ground
3	Enable/Inhibit Input
4	8kV Voltage Monitor output
5	Voltage Control Input
6	Current Monitor Output
7	Current Control Input
8	Polarity Control Input
9	Analog Ground
10	Current/Voltage Control Indicator
11	N/C
12	N/C
13	N/C
14	N/C

How to Order:

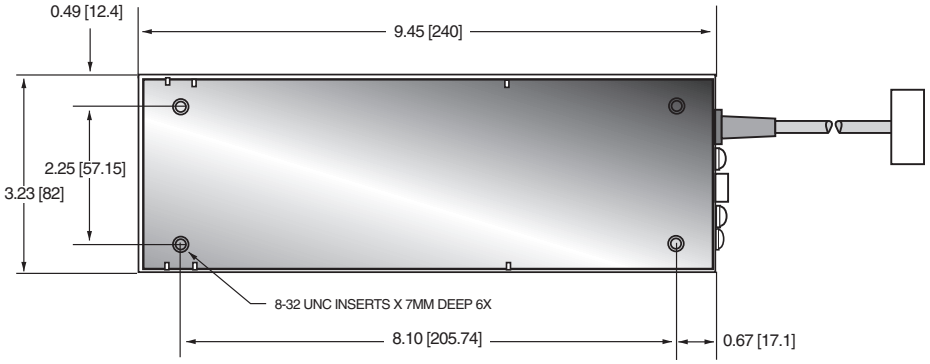
Standard: PART NO.:MXP8PN24

DIMENSIONS: in.[mm]

SIDE VIEW



TOP VIEW



FRONT VIEW

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com

- ***HOT SWITCHABLE POLARITY REVERSIBLE VIA A LOGIC SIGNAL***
- ***WELL REGULATED, LOW RIPPLE***
- ***POLARITY REVERSAL WITHIN 250mS (OPTION TO IMPROVE TO 100mS)***
- ***VOLTAGE AND CURRENT MONITOR OUTPUTS***
- ***REMOTE HV INHIBIT***
- ***FLYING HIGH VOLTAGE OUTPUT CABLE***
- ***VOLTAGE OR CURRENT CONTROL OPTIONS***

Spellman's MX10 is a well-regulated high performance DC-DC converter featuring a "hot switchable" polarity reversal capability. The MX10's low ripple specification makes it ideal for Mass Spectrometry applications; especially security detection systems, Dynodes, sample ionization as well as capillary electrophoresis and electrostatic printing applications.

The MX10 is rated at 10kV @ 100uA and is packaged in a shielded metal enclosure. This unit features a logic signal input to control output polarity reversal. A HV inhibit feature, along with voltage and current monitors are provided. Easily customized to meet OEM requirements, the MX10 can be provided with current control, improved ripple performance and higher voltage and current capabilities.

TYPICAL APPLICATIONS

Mass Spectrometry
Capillary Electrophoresis
Electrostatic Printing

OPTIONS

VCC: Voltage and Current Control

SPECIFICATIONS

Input Voltage:
+24Vdc, ±1 volt

Input Current:
<400mA continuous
<1.2A during reversing

Output Voltage:
±200Vdc to ±10kV

Output Current:
0 to 100uA max.

Polarity:
Remotely reversible via logic signal, 250mS to settle to ±2%, 1 Hz maximum switch rate

Voltage Regulation:
Load: 0.1% of maximum output voltage for a no load to full load change
Line: 0.1% of maximum output voltage for a 1 volt input line change

Current Regulation: (VCC Option)
Load: 0.1% of maximum rated current for a 0 to 100% voltage change
Line: 0.1% of maximum rated current for a 1 volt input line change

Voltage/Current Programming:
0 to 10 volt corresponds to 0 to 100% of rated output voltage

Voltage/Current Monitor:
0 to 10 volt corresponds to 0 to 100% of rated output voltage

Programming and Monitor Accuracy:
±2%

Ripple:
≤0.005% Volts p-p

Stability:
0.1% per hour after 1 hour warmup

Temperature Coefficient:
≤100ppm per degree C

Environmental:
Temperature Range:
Operating: 0˚C to 40˚C
Storage: -40˚C to 85˚C
Humidity:
10% to 90%, non-condensing.

Cooling:
Convection cooled

Dimensions:
1.63˝ H X 6.61˝ W X 4.53˝ D (41.5mm X 168mm X 115mm)

Weight:
Approximately 3 pounds (1.4kg)

Interface/Power Connector:
9 pin male D connector

HV Output Connector:
39.4˝ (1m) Flying Lead of URM76 LSF cable

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

APPLICATION SPECIFIC

MX10 TERMINAL BLOCK 9 PIN

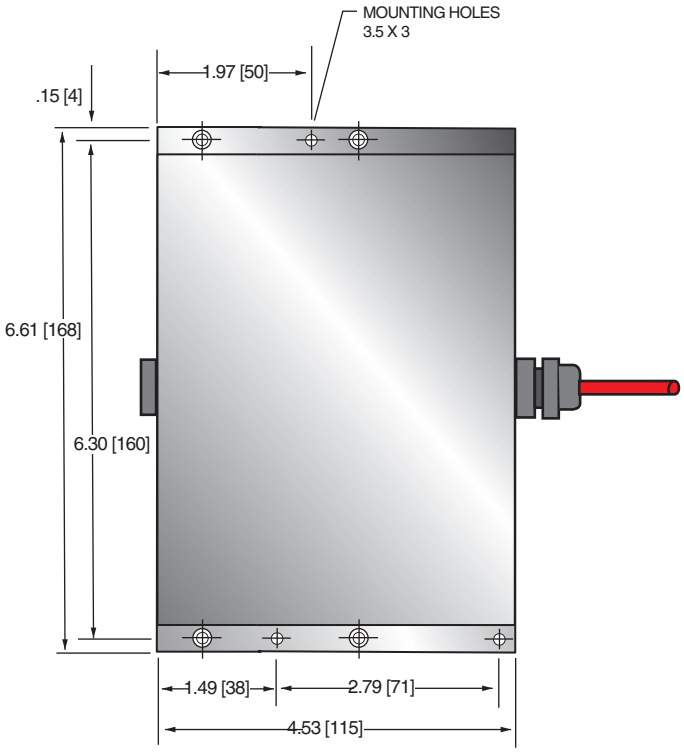
JB1	SIGNAL	SIGNAL PARAMETERS
1	Voltage Monitor	0-10V=0-100% of Rated Output
2	External Inhibit Input	Open or >10V = "OFF"; <4V = "ON"
3	Current Programming Input	0-10Vdc = 0-100% of Rated Output (on VCC option)
4	Signal Ground	Signal Ground
5	Current Monitor	0-10Vdc = 0-100% of Rated Output
6	Polarity Control Input	Open or >10V = "NEGATIVE"; <4V = "POSITIVE"
7	Voltage Programming Input	0-10Vdc = 0-100% of Rated Output
8	+24V Input	+24V Input
9	Power Ground	Power Ground

How to Order:
Standard: PART NO.:MX10PN24
VCC Option: PART NO.:MX10PN24/VCC

DIMENSIONS: in.[mm]

SIDE VIEW

TOP VIEW



CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128028-001 REV.F
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

MX10 *PLUS* HIGH PERFORMANCE DC-DC CONVERTER

- ***±10KV 25ms POLARITY REVERSING SPEED***
- ***INTEGRATED ELECTRON MULTIPLIER SUPPLY***
- ***PRECISION ANALOG VOLTAGE CONTROL***
- ***HIGH STABILITY***
- ***LOW RIPPLE AND NOISE***
- ***HIGH VOLTAGE INHIBIT CONTROL***
- ***RoHS COMPLIANT***

Spellman's RoHS compliant MX10 *Plus* is a well-regulated high performance fast reversible dynode supply featuring a 25ms "hot switchable" polarity reversing capability with an integrated -2.3kV electron multiplier supply.

The MX10 *Plus*'s low ripple specification is typical of the topologies that make Spellman High Voltage your ideal choice for mass spectrometry applications; especially security detection systems, dynodes, sample ionisation as well as capillary electrophoresis and electrostatic printing applications. The MX10 *Plus* has been designed especially for dynode detector applications.

The MX10 *Plus* can be easily tailored to an OEM's requirement, such as improved ripple performance, or different voltage and/or current capabilities.

TYPICAL APPLICATIONS

Dynode Supply
Electron Multiplier Supply

SPECIFICATIONS

Input Voltage:
+15Vdc, ±.75Vdc

Input Current:
≤500mA nominal continuous
<2A during reversing

Temperature Coefficient:
≤100ppm per degree C

Environmental:
Temperature Range:
Operating: 5˚C to 45˚C
Storage: -35˚C to 85˚C
Humidity:
10% to 85%, non-condensing

Stability:
(constant operating conditions)
≤300ppm per hour after 1 hour warm up

Protection:
Arc and Short circuit protected

Regulatory Approvals:
Compliant to 2004/108/EC, the EMC Directive and 2006/95/EC, the Low Voltage Directive. Compliant to 2002/95/EC, RoHS.

DYNODE SPECIFICATIONS

Output Voltage:
±10kV

Output Current:
10µA

Output Polarity:
Remotely reversible via TTL logic signal

Switching Speed:
25ms to settle 90% into 50pF load

Voltage Regulation:
Line: ≤0.02% for a 1.5V input voltage change

Ripple:
≤10 Volts p-p

ELECTRON MULTIPLIER SPECIFICATIONS

Output Voltage:
Fixed: 0 to -2.3kV

Output Polarity:
Negative

Output Current:
≤230µA

Voltage Regulation:
Line: ≤0.02% for a 1.5V input voltage change
Load: <5V for for no load to 22M Ohms load change

Ripple:
≤200mV p-p @ 2.3kV into 22M Ohm load

Output Rise Time:
10ms

Output Fall Time:
10ms

Dimensions:
2.00˝ H X 5.30˝ W X 8.00˝ D (50.8mm X 134.6mm X 203mm)

Weight:
Approximately 3.3 pounds (1.5kg)

Interface/Power Connector:
20 pin flat ribbon connector

Output Connector:
±10kV: modified Alden #A200 connector
-2.3kV: MHV Kings bulkhead KV-79-15 or similar

APPLICATION SPECIFIC

MX10 *PLUS* TERMINAL BLOCK 20 PIN

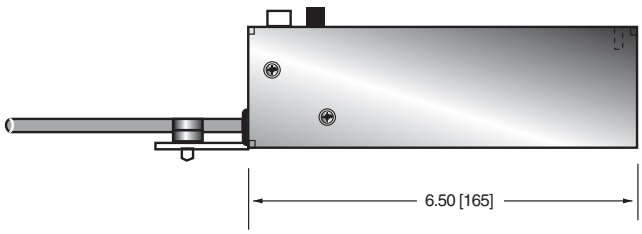
PIN	SIGNAL
1	+15Vdc Input
2	+15Vdc Input
3	N/C
4	N/C
5	Ground
6	Ground
7	Output Voltage Control
8	Signal Reference Ground
9	10kV On
10	10kV On
11	Output Polarity Control
12	EM Protect
13	-2.3kV Output Monitor
14	EM On
15	Ground
16	Ground
17	±10kV Output Monitor
18	N/C
19	+15Vdc Input
20	+15Vdc Input

How to Order:

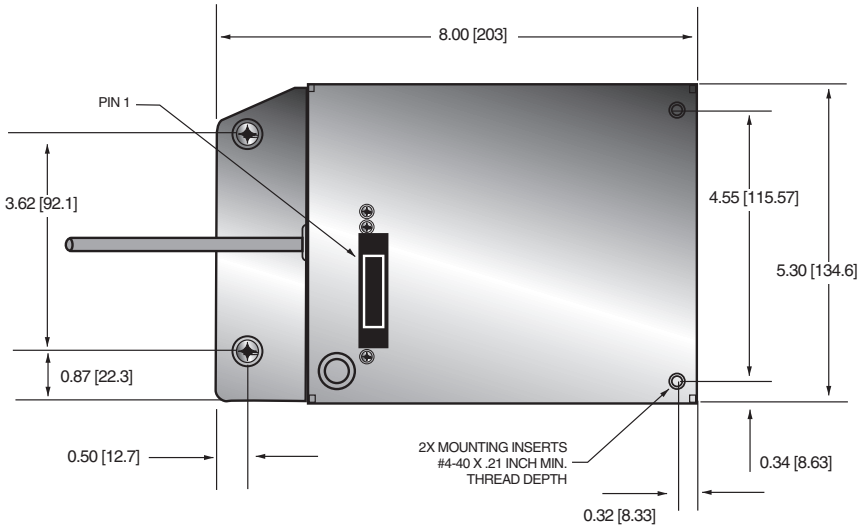
Standard: PART NO.:MXP10PN15

DIMENSIONS: in.[mm]

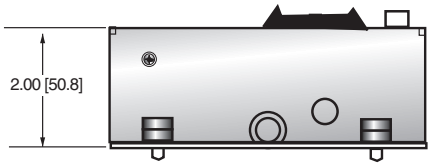
SIDE VIEW



TOP VIEW



FRONT VIEW



Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128066-001 REV.B
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

MX20 HIGH PERFORMANCE DC-DC CONVERTER

- ***HOT SWITCHABLE POLARITY REVERSIBLE VIA A LOGIC SIGNAL***
- ***WELL REGULATED, LOW RIPPLE***
- ***POLARITY REVERSAL WITHIN 500mS***
- ***VOLTAGE AND CURRENT MONITOR OUTPUTS***
- ***REMOTE HV INHIBIT***
- ***FLYING HIGH VOLTAGE OUTPUT CABLE***
- ***VOLTAGE OR CURRENT CONTROL OPTIONS***

Spellman's MX20 is a well-regulated high performance DC-DC converter featuring a "hot switchable" polarity reversal capability. The MX20's low ripple specification makes it ideal for Mass Spectrometry applications; especially security detection systems, Dynodes, sample ionization as well as capillary electrophoresis and electrostatic printing applications.

The MX20 is rated at 20kV @100uA and is packaged in a shielded metal enclosure. This unit features a logic signal input to control output polarity reversal. A HV inhibit feature, along with voltage and current monitors are provided. Easily customized to meet OEM requirements, the MX20 can be provided with current control, improved ripple performance and higher voltage and current capabilities.

TYPICAL APPLICATIONS

Mass Spectrometry
Capillary Electrophoresis
Electrostatic Printing

OPTIONS

VCC: Voltage and Current Control

SPECIFICATIONS

Input Voltage:
+24Vdc, ±1.2 volts

Input Current:
<500mA continuous
<1.2A during reversing

Output Voltage:
±500Vdc to ±20kV

Output Current:
0 to 100uA max.

Polarity:
Remotely reversible via logic signal, 500mS to settle to ±2%, 1 Hz maximum switch rate

Voltage Regulation:
Load: 0.02% of maximum output voltage for a no load to full load change
Line: 0.01% of maximum output voltage for a 1 volt input line change

Current Regulation: (VCC Option)
Load: 0.1% of maximum rated current for a 0 to 100% voltage change
Line: 0.01% of maximum rated current for a 1 volt input line change

Voltage/Current Programming:
0 to 10 volts corresponds to 0 to 100% of rated output voltage/current

Voltage/Current Monitor:
0 to 10 volts corresponds to 0 to 100% of rated output voltage/current

Programming and Monitor Accuracy:
±2% Voltage Programming/Monitor
±5% Current Programming/Monitor

Ripple:
≤0.0025% Volts p-p

Stability:
0.1% per hour after 1 hour warmup

Temperature Coefficient:
≤100ppm per degree C

Environmental:
Temperature Range:
Operating: 0˚C to 40˚C
Storage: -40˚C to 85˚C
Humidity:
10% to 90%, non-condensing.

Cooling:
Convection cooled

Dimensions:
2.05˝H X 6.61˝W X 6.50˝D (52mm X 168mm X 165mm)

Weight:
Approximately 5.51 pounds (2.5kg)

Interface/Power Connector:
9 pin male D connector

HV Output Connector:
39.4˝(1m) Flying Lead of URM76 LSF cable

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

APPLICATION SPECIFIC

MX20 TERMINAL BLOCK 9 PIN

JB1	SIGNAL	SIGNAL PARAMETERS
1	Voltage Monitor	0-10V=0-100% of Rated Output
2	External Inhibit Input	Open or >10V = "OFF"; <4V = "ON"
3	Current Programming Input	0-10Vdc = 0-100% of Rated Output (on VCC option)
4	Signal Ground	Signal Ground
5	Current Monitor	0-10Vdc = 0-100% of Rated Output
6	Polarity Control Input	Open or >10V = "NEGATIVE"; <4V = "POSITIVE"
7	Voltage Programming Input	0-10Vdc = 0-100% of Rated Output
8	+24V Input	+24V Input
9	Power Ground	Power Ground

How to Order:

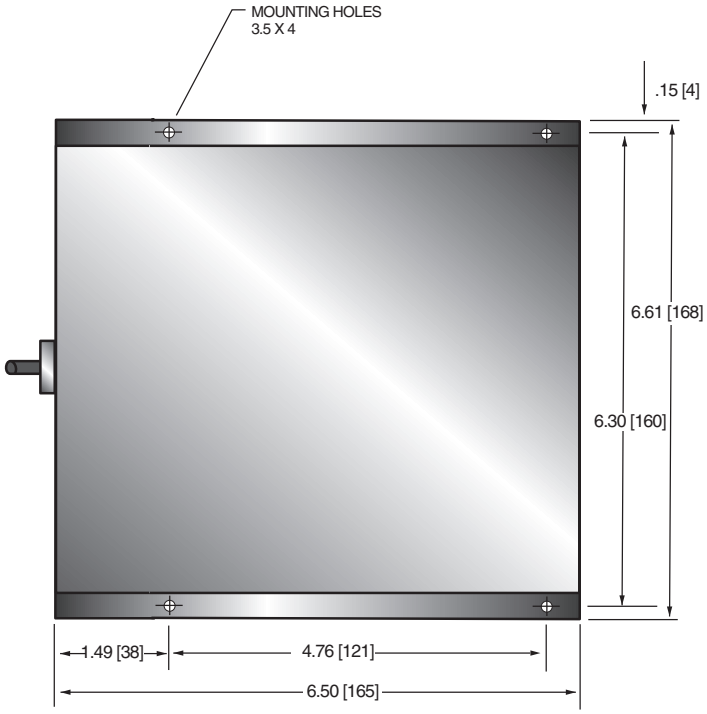
Standard: PART NO.:MX20PN24

VCC Option: PART NO.:MX20PN24/VCC

DIMENSIONS: in.[mm]

SIDE VIEW

TOP VIEW



CE

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128048-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***REMOTE OUTPUT POLARITY REVERSIBILITY VIA TTL SIGNAL CONTROL***
- ***ULTRA LOW RIPPLE AND NOISE***
- ***SMALL FOOTPRINT OEM MODULAR PACKAGING***
- ***ENCAPSULATED FOR RELIABLE, LONG TERM CORONA FREE OPERATION***
- ***CE COMPLIANT***

The TOF3000 offers critical specifications like ultra low ripple and noise, excellent temperature coefficient; a stable, repeatable and accurate output, along with remote output polarity reversing capability. These superior specifications result in improved mass spectrometer resolution. Unique high voltage packaging and surface mount fabrication techniques, coupled with Spellman's proprietary encapsulation technology provide this unit in an attractive sized OEM package.

Featuring a 0-30kV @ 400µA output with remote polarity reversing capability and dimensions of 3˝H x 5˝W x 12 5/8˝L, the TOF3000 is a small, cost-effective high voltage power supply with technology that sets the standard for the future of Mass Spectrometry applications.

TYPICAL APPLICATIONS

Mass Spectrometry

SPECIFICATIONS

Input Voltage:
+24 Vdc, +5%, -2%

Input Current:
2 amps maximum

Output Voltage:
0 to 30kV

Output Current:
0 to 400 microamperes

Polarity:
Positive or Negative with respect to ground, reversible via TTL signal

Voltage Regulation:
Line: 0.001% for input change of 1 volt
Load: 0.001% for 100µA to full load change

Current Regulation:
Line: 0.05% for +5% to -2% input change
Load: 0.1% for 0 to maximum output voltage

Ripple:
≤70mV peak to peak

Stability:
0.01% per hour, 0.02% per 8 hours after 1.0 hour warm up period

Temperature Coefficient:
100ppm per degree C (improved capabilities upon request)

Environmental:
Temperature Range:
Operating: 0˚C to 50˚C
Storage: -20˚C to 65˚C
Humidity:
10% to 90% RH, non-condensing

Control Interface

Voltage Program Input:
0 to +10Vdc corresponds to 0 to ±30kV, Zin ≥ 1 megohm

Program Accuracy:
±0.15% at 15KV, with overall accuracy of ±0.25% of maximum output

TTL Polarity Reversal:
High = positive polarity
Low = negative polarity

Voltage Monitor:
0 to 10Vdc corresponds to 0 to 30KV, Zout = 4.7Kohm

Current Monitor:
0 to 10Vdc corresponds to 0 to 400uA, Zout = 4.7Kohm

Cooling:
Convection cooled

Dimensions:
3˝H X 5˝W X 12.625˝D (70.62mm x 127mm x 321.7mm)

Weight:
9.5 pounds (4.31kg)

Interface Connector:
15 pin male D connector

Output Connector:
Alden B102, which accepts Alden B200 cable plug

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

APPLICATION SPECIFIC

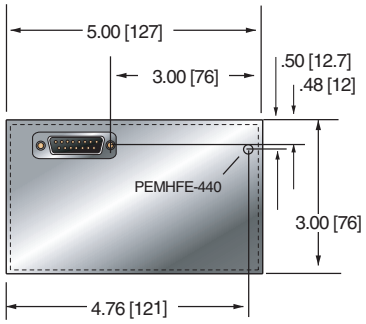
JB1 INTERFACE CONNECTOR

PIN	SIGNAL	SIGNAL PARAMETERS
1	Spare	n/c
2	Voltage Program	0 to 10V=0 to 100% Rated Output
3	Spare	n/c
4	Spare	n/c
5	Voltage Monitor	0 to 10V=0 to 100% Rated Output
6	TTL Polarity Control Signal	Hi=Positive Polarity, Low=Negative Polarity
7	Signal Ground	Signal Ground
8	Power Ground	Power Ground
9	Spare	n/c
10	Spare	n/c
11	Spare	n/c
12	TTL HV Enable	Hi=Inhibit, Low=Enable
13	Current Monitor	0 to 10V=0 to 100% Rated Output
14	Spare	n/c
15	+24Vdc	+24Vdc

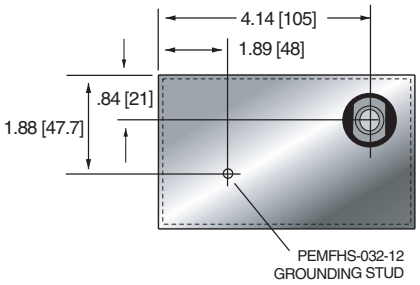
CE

DIMENSIONS: in.[mm]

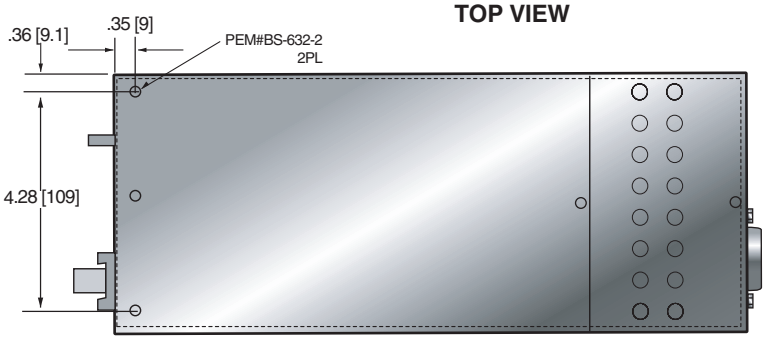
FRONT VIEW



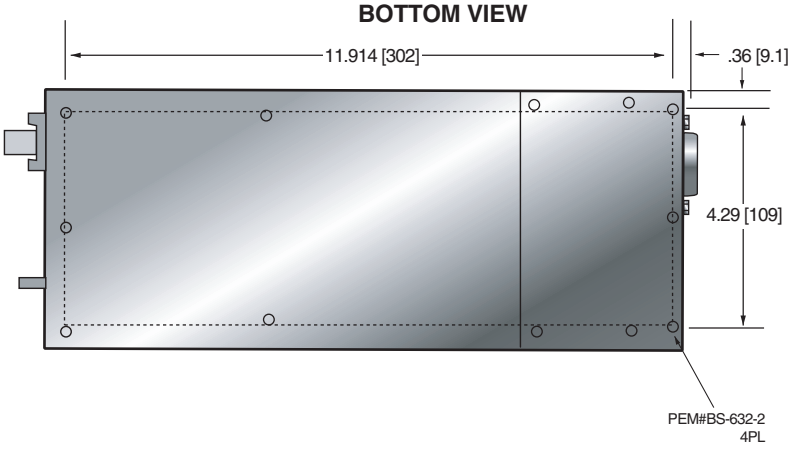
BACK VIEW



TOP VIEW



BOTTOM VIEW



Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128032-001 REV.D
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***NIM CONFIGURATION***
- ***LOW RIPPLE AND NOISE***
- ***REMOTELY PROGRAMMABLE***
- ***REVERSIBLE OUTPUT POLARITY***

Spellman's Bertan brand of NIM-AC Series high voltage power supplies utilize a precision regulated linear topology, making them ideally suited for sensitive detector applications. These stable, low noise, high voltage power supplies are arc and short circuit protected for safe, reliable operation.

All units require AC input line power, either 115Vac or 220Vac and therefore can operate without a NIM bin DC power supply.

All models feature reversible polarity. The polarity switch is located either internally or on top of the unit, depending upon the model. An LED front panel polarity indicator is provided.

Programming these units can be done via the provided front panel controls.

SPECIFICATIONS

Input Voltage:

Model 353
115Vac, ±10% @ 0.25amps or 220Vac, ±10% @ 0.125 amps, 50/60 Hertz

Models 313B, 315B, 323PS and 325
115Vac, ±10% @ 1amp or 220Vac, ±10% @ 0.5 amps, 50/60 Hertz

Output Voltage:

See "model selection" table

Output Polarity:

Polarity reversal for single width Model 353 is achieved by rotating an internal polarity selector plug. Models 313B, 315B, 323PS and 325 have a screwdriver accessible switch located on the top of the unit. Polarity setting is indicated via an LED indicator on the front panel.

Output Current:

See "model selection" table

Voltage Regulation:

Line: ≤0.001% of rated output voltage over specified input voltage range

Load: ≤0.002% of rated output voltage for a full load change

Current Regulation:

Internally set to limit at less than 110% of rated current. Supply will self-restore upon removal of overload condition

Ripple:

See "model selection" table

Temperature Coefficient:

≤50ppm/°C

Stability:

≤0.01%/hour, 0.02% per 8 hours after a 1/2 hour warm up

Front Panel Features:

Metering:

Model 313B and 353 have a 0 to 3kV high voltage output meter. Meter accuracy is ±5%.

Model 323PS and 325 have a 3.5 digit digital meter for monitoring both output voltage and output current. A selector switch determines which parameter is displayed. Meter accuracy is ±0.5% + 10 V for voltage readings, and ±0.5% + 10uA for current readings.

Controls:

Calibrated, direct reading, front panel output voltage controls are provided. Models 313B, 315B and 353 employ a 500 volt/step switch and a 10 turn potentiometer. Models 323PS: 3 turns; Model 315B: 5 turns.

Remote Control:

Model 353 has provisions for remote high voltage inhibit control via an open collector or relay closure to ground applied at a rear panel BNC connecter.

Models 313B, 315B, 323PS and 325 have remote high voltage output programming capability. This is accomplished via a 0 to -5 volt (equals 0 to 100% of rated output) signal being applied at the remote interface connector. Input impedance is 10MΩ.

APPLICATION SPECIFIC

Operating Temperature
0°C to +50°C

Storage Temperature:
-40°C to +85°C

Humidity:
20% to 85% RH, non-condensing

Power Input Connector:
Standard captive North American 3 conductor line cord and plug

353 Inhibit Connector:
BNC receptacle UG-290/U

313B, 315B, 323PS, 325 Programming Connector:
BNC receptacle UG-290/U

Output Connector:
SHV (Kings 1707-1 or equivalent)

Cooling:
Convection cooled

Dimensions
Single Width:
1.35˝W X 8.7˝H X 9.7˝D
(34mm X 221mm X 246mm)

Double Width:
2.7˝W X 8.7˝H X 9.7˝D
(69mm X 221mm X 246mm)

Weight:
Model 353:
4.5 lbs (2.1kg)

Models 313B, 315B, 323PS and 325:
11 lbs (5 kg)

MODEL SELECTION TABLE

Model	Width	Voltage	Current	Ripple
353	Single	0 to ±3kV	0 to 2mA	5mV
325	Double	0 to ±5kV	0 to 5mA	25mV
323PS	Double	0 to ±3kV	0 to 10mA	10mV
313B	Double	0 to ±3kV	0 to 10mA	10mV
315B	Double	0 to ±5kV	0 to 5mA	25mV

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128053-001 REV.B
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***NIM CONFIGURATION***
- ***LOW RIPPLE AND NOISE***
- ***REMOTELY PROGRAMMABLE***
- ***REVERSIBLE OUTPUT POLARITY***

Spellman's Bertan brand of NIM-DC Series high voltage power supplies utilize a precision regulated linear topology, making them ideally suited for sensitive detector applications. Each unit is a single width standard NIM module. These stable, low noise, high voltage power supplies are arc and short circuit protected for safe, reliable operation.

All units require ±24Vdc and ±12Vdc as provided by a standard NIM bin, or the MINI-BIN, model number BIN-6DC.

All models feature reversible polarity, the internal polarity switch is easily accessible. An LED front panel polarity indicator is provided.

Programming these units can be done via the provided front panel controls.

SPECIFICATIONS

Input Voltage:

Model 342A
±24Vdc ±1%, @ 83mA; ±12Vdc ±1%, @ 50mA

Models 362 and 365
±24Vdc ±1%, @ 160mA; ±12Vdc ±1%, @ 60mA

Output Voltage:

See "model selection" table

Output Polarity:

Polarity reversal on Model 342A is achieved by rotating a single polarity selector plug located inside the unit. For dual output models 362 and 365, there are independent polarity selector plugs. Polarity setting is indicated via an LED indicator on the front panel.

Output Current:

See "model selection" table

Voltage Regulation:

Line: ≤0.001% of rated output voltage over specified input voltage range

Load: ≤0.002% of rated output voltage for a full load change

Current Regulation:

Internally set to limit at less than 110% of rated current. Supply will self-restore upon removal of overload condition

Ripple:

See "model selection" table

Temperature Coefficient:

≤50ppm/°C

Stability:

≤0.01%/hour, 0.02% per 8 hours after a 1/2 hour warm up

Front Panel Features:

Metering:

Model 342A has a 0 to 2kV high voltage output meter. Meter accuracy is ±5%.

Models 362 and 365 have two 0 to maximum output, 10 division meters to display both high voltage outputs.

Controls:

Model 342A has a 0 to 1000 volt, 10 turn precision potentiometer and a 2 step switch (500 volts/step) for setting the high voltage output.

Model 362 has a 2 turn potentiometer and counting dial for setting the high voltage output.

Model 365 has a 5 turn potentiometer and counting dial for setting the high voltage output.

ON/OFF Switch:

A front panel switch controls high voltage operation. Models 362 and 365 have two switches, for independent control of each high voltage output.

Remote Control:

Model 342A has provisions for remote high voltage inhibit control via an open collector or relay closure to ground applied at a rear panel BNC connecter or NIM power connector pin.

Models 362 and 365 have provisions for remote high voltage inhibit via an open collector or relay closure to ground applied at the remote interface connecter. Remote high voltage output programming is accomplished via a 0 to -5 volt (equals 0 to 100% of rated output) applied at the remote interface connector. Input impedance is 10MΩ.

Operating Temperature
0°C to +50°C

Storage Temperature:
-40°C to +85°C

Humidity:
20% to 85% RH, non-condensing

Power Input Connector:
Standard NIM bin power connector

342A Inhibit Connector:
BNC receptacle UG-290/U

362, 365 Programming Connector:
Amphenol 126-220

Output Connector:
Kings 1707-1. Dual output units have 2 connectors

Cooling:
Convection cooled

Dimensions
1.35″ W X 8.7″ H X 9.7″ D
(34mm X 221mm X 246mm)

Weight:
≤4 pounds (1.8kg)

MODEL SELECTION TABLE

Model	Voltage	Output Type	Current	Ripple
342A	0 to ±2kV	Single	0 to 1mA	2mV
362	0 to ±2kV	Dual	0 to 1mA	2mV
365	0 to ±5kV	Dual	0 to 0.3mA	5mV

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128052-001 REV.B
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***INTEGRATED POWER SUPPLY/SOCKET DESIGN***
- ***REGULATED OUTPUT***
- ***LOW RIPPLE***
- ***FULLY ENCAPSULATED***
- ***ARC/SHORT CIRCUIT PROTECTED***

Spellman's PMTS is a custom designed high voltage power supply and integrated mounting socket for standard 1.125 inch (28mm) side-on photomultiplier tubes. Ten equally divided, incremental output voltages are generated and provided via the use of a 10 stage voltage multiplier arrangement.

The output voltage is programmable over the entire rated range via a ground referenced 0 to 5Vdc signal. The stable, well regulated and low ripple outputs enhance PMT operation and performance. An internal feedback divider resistor allows output regulation, provides a bleed function while also generating a ground referenced output voltage monitoring signal.

The PMTS is fully encapsulated for optimum reliability. Isolating the high voltage circuitry from the local environment minimizes contamination concerns while enhancing user safety. The Anode current signal is provided via a length of shielded coaxial cable to preserve signal integrity. A metal installation flange is provided allowing easy mounting and installation.

SPECIFICATIONS

Input Voltage:
+15Vdc, ±5%

Input Current:
≤200mA maximum, typically 100mA

Output Voltage:
0 to 1000 volts, via 10 equally divided incremental taps

Output Polarity:
Negative, with respect to ground

Output Current:
20 microamps, maximum

Voltage Regulation:
Line: ≤0.005% of rated output voltage over specified input voltage range
Load: ≤0.005% of rated output voltage for a full load change

Ripple:
≤1.0 millivolt peak to peak, photoelectron spikes excluded

Temperature Coefficient:
≤100ppm ppm/˚C

Stability:
≤0.01%/hr, after 1/2 hour warm up

Accuracy:
±2% at maximum output

Operating Temperature:
0˚C to +50˚C

Storage Temperature:
-40˚C to +85˚C

Humidity:
10% to 85% RH, non-condensing

Input Connector:
4 pin Molex, mating connecter provided

PMT Current Signal Cable:
9.25˝ (235mm) of RG174/U, terminated as required

PMT Socket:
Standard 1.125˝ (28mm) socket for side on photomultiplier tubes

Cooling:
Convection cooled

Dimensions:
1.25˝ diameter X 2.52˝ long (31.75mm X 64mm)

APPLICATION SPECIFIC

- ***FULL ARRAY OF DRY CONTACT CLOSURES AVAILABLE FOR REMOTE STATION ALARM MONITORING***
- ***FULLY-PROGRAMMABLE ELECTRONIC TEST LOAD CAPABLE OF DISSIPATING 5KW***
- ***ELECTRODING FUNCTIONS PROVIDED***
- ***SINGLE CABINET. REAR DOOR PROVIDED FOR SAFETY INTERLOCKING***

Spellman High Voltage Electronics, the leading independent supplier of Power Feed Equipment to the Telecom industry, has developed a new generation of Low Voltage Power Feed Equipment, (LVPFE). This proposed new LVPFE is targeted at the emerging requirements for shorter submarine cable installations, while addressing underlying markets issues such as lower cost, smaller foot print, and easier operation.

KEY FEATURES

Redundancy is provided for the converters (1+1)

Simplified sliding drawers for PFE open, grounding, test modes

Redundancy is provided for the LCU. In case of failure of LCU, the PFE will continue to operate normally

LCU contains pull-out 17˝ LCD screen, keyboard, trackball and CPU

Simplified keylock scheme ensures safety of operating personnel

Highly visible Vacuum Fluorescent Display (VFD) on each Converter displays voltage, current and modes of operation

Unique protective “trap door” barrier allows a converter or test load to be replaced safely while the PFE is still powering the cable

SPECIFICATIONS

Output Voltage:
6kV maximum rated continuous operation, 5kV nominal

Output Current:
1.2A maximum rated continuous operation, 1.0A nominal

Output Power:
5kW for 1+1 redundancy

Inpur Voltage:
-40.5 VDC to -60 VDC

Programming:
Full-featured programming, monitoring, alarms, diagnostics, and ramping functions provided via LCU module.

Monitoring:
Full local and remote monitoring via Ethernet connection.

Current Ripple:
10mA peak to peak of maximum output

Voltage Ripple:
0.2% peak to peak of maximum output

Current Stability:
0.1% (constant load) after a 4 hour warm up

Operating Temperature:
5 to 40°C operating

Storage Temperature:
-40 to +85°C storage

Humidity:
5% to 85%, non-condensing

Cooling:
Forced Air

Dimensions:
86.68”H x 23.64”W x 23.64”D
(2200mm x 600mm x 600mm)

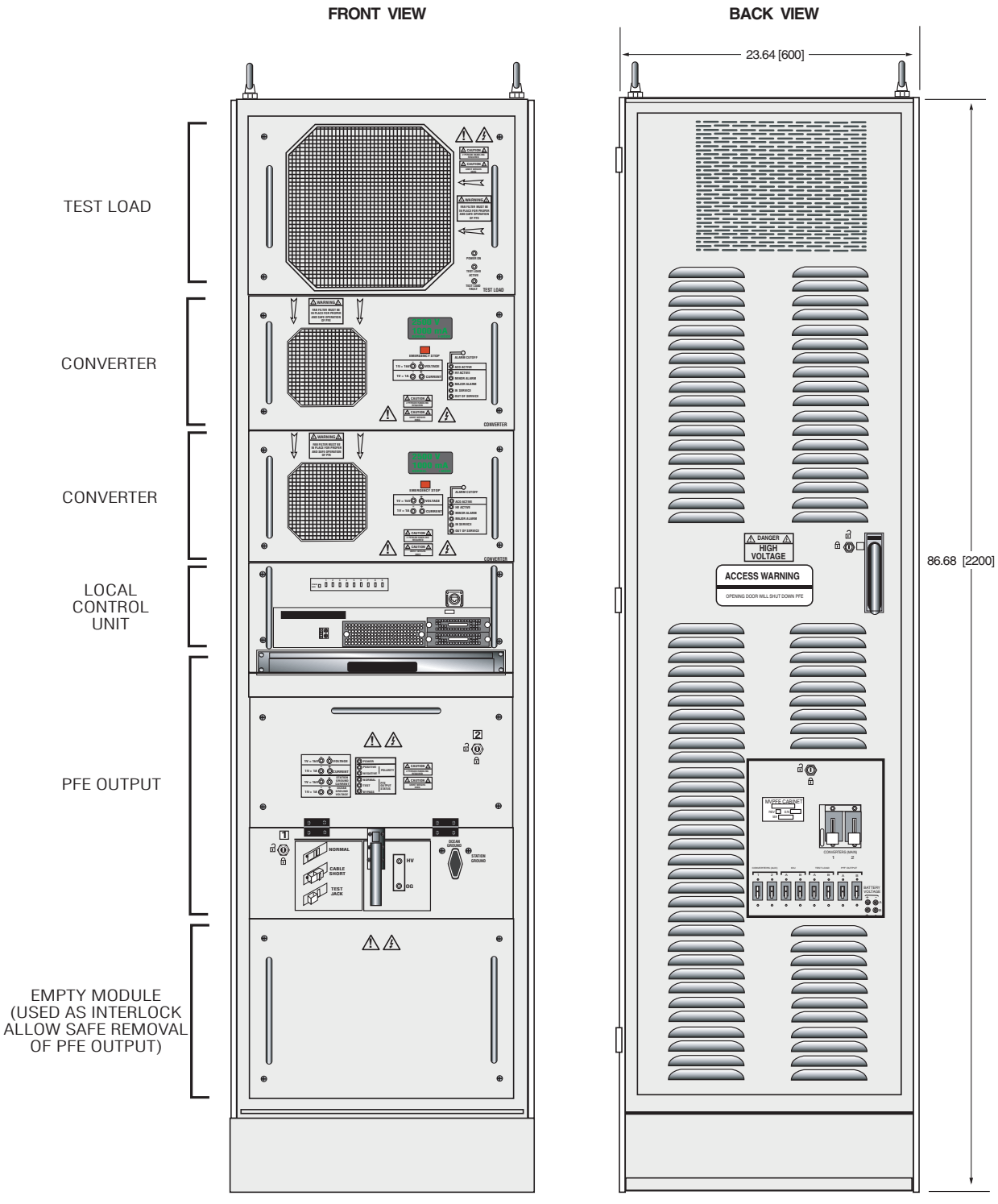
Weight:
900 pounds (335.9kg)

Regulatory Approvals:
Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive. Also complies with: GR-63-CORE, GR-189-CORE, ETSI ETS 300 019, ETS 300 118, ETS 300 127, ETSI EN 300 132-2, ETSI EN 300 386, EN 60950.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com

Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

DIMENSIONS: in.[mm]



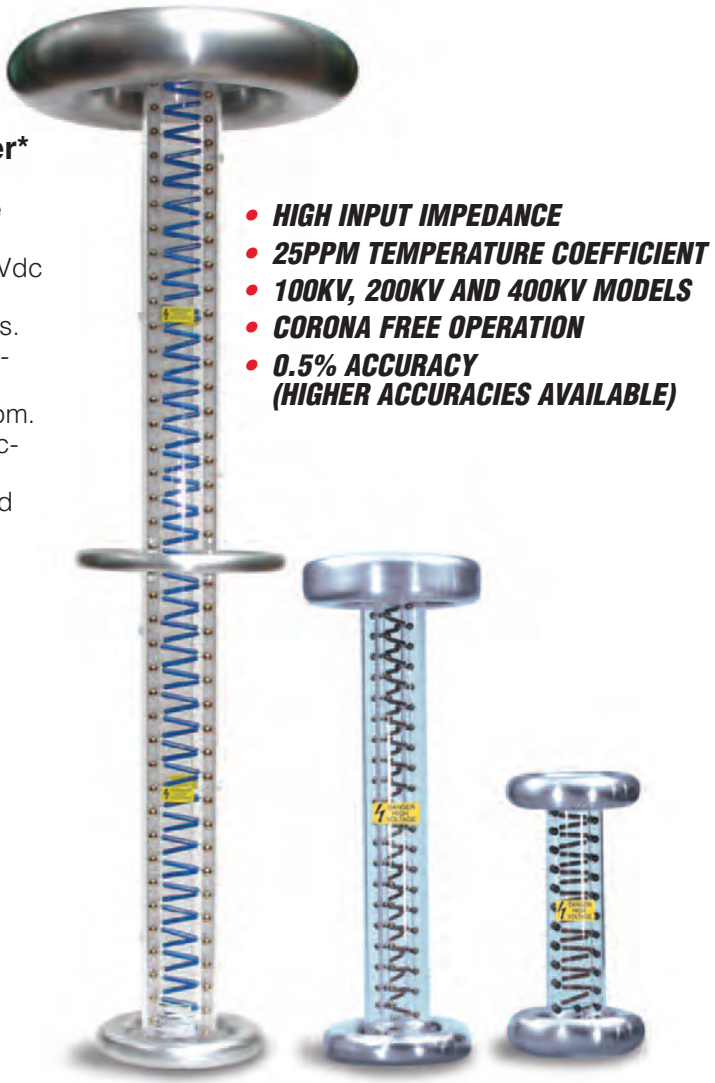
APPLICATION SPECIFIC

Resistive Voltage Dividers

...for the measurement of high voltages using a standard digital voltmeter*

Spellman's HVD Series of high voltage dividers provide laboratory or production facilities with a convenient method of measuring up to 100kVdc, 200kVdc or 400kVdc with accuracy better than 0.5%. These dividers are designed for use with high impedance digital voltmeters. All HVD dividers are housed in a Plexiglas cylinder containing a matched set of precision metal film resistors which have a temperature coefficient of less than 25 ppm. A ladder-type construction technique is used in conjunction with polished high voltage bushings specifically designed to minimize corona. BNC connectors are used to provide the low voltage proportional output signal.

*Impedance of 10Gohm or higher.



- ***HIGH INPUT IMPEDANCE***
- ***25PPM TEMPERATURE COEFFICIENT***
- ***100KV, 200KV AND 400KV MODELS***
- ***CORONA FREE OPERATION***
- ***0.5% ACCURACY (HIGHER ACCURACIES AVAILABLE)***

WARNING

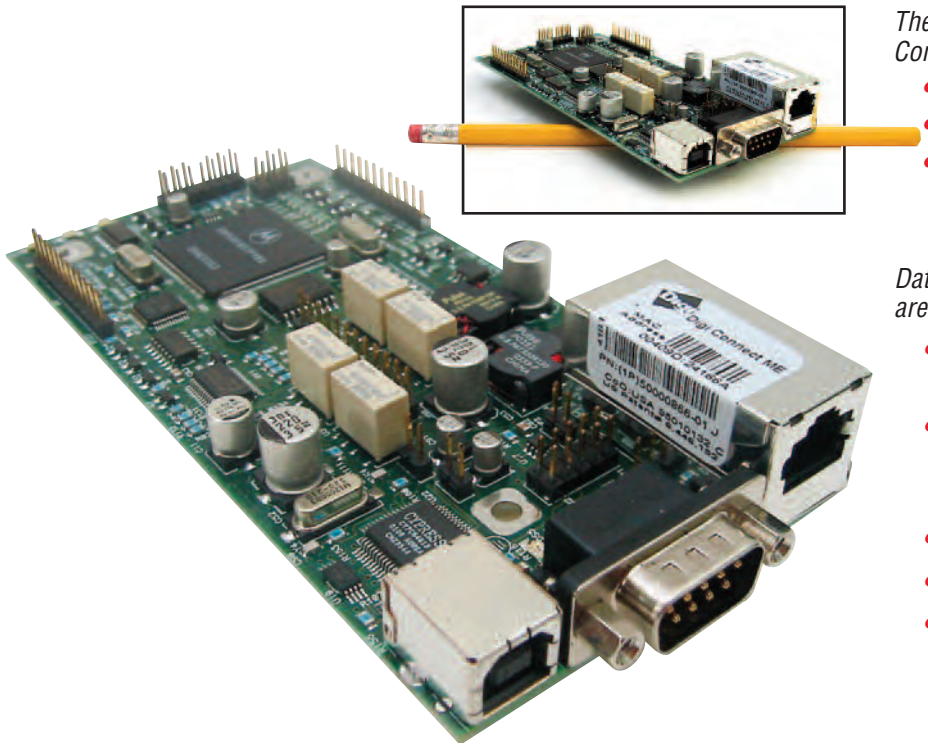
DANGEROUS LIFE THREATENING VOLTAGES MAY BE PRESENT ON THIS EQUIPMENT. OBSERVE EXTREME CAUTION WHEN OPERATING OR WORKING NEAR HIGH VOLTAGE DEVICES. NEVER TOUCH ANY HIGH VOLTAGE ASSEMBLY THAT IS SUSPECTED TO BE ENERGIZED OR CHARGED. DO NOT HANDLE OR COME WITHIN THE PROXIMITY OF HIGH VOLTAGE CONNECTIONS UNTIL ALL EQUIPMENT IS TURNED OFF AND THE SETUPS CAPACITANCE IS DISCHARGED. FAILURE TO FOLLOW SAFETY PROCEDURES MAY BE FATAL.

HVD

	HVD100	HVD200	HVD400
Input Voltage	0-100kVdc	0-200kVdc	0-400kVdc
Input Impedance	1000Mohms	2000Mohms	4000Mohms
Output Impedance	1M; 100kohms	20kohms	40kohms
Output Taps	100V, 10V	2V	4V
Accuracy	0.5%: (0.1% opt)[1]	0.5%: (0.25% opt)[2]	0.5%: (0.25% opt)[2]
Stability	0.01%/8hrs	0.025%/8hrs	0.025%/8hrs
Temp. Coefficient	25ppm/˚C	25ppm/˚C	25ppm/˚C
Height	17.5" (44.5cm)	33.5" (84.5cm)	61" (154.94cm)
Max. Diameter	10" (25.4cm)	12" (30.5cm)	20" (50.8cm)
Weight	6.75 lbs (3.1kg)	12 lbs (5.5kg)	24.45 lbs (11.8kg)
Output Connector	BNC type	BNC type	BNC type

(1) For accuracy of 0.1% specify HVD100-1
(2) For accuracy of 0.25% specify HVD200-1 or HVD400-1

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com
128055-001 REV.C
Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company



The SIC Option Provides 3 Types of Communications Interfaces:

- ***RS-232***
- ***ETHERNET (10/100-BASE-T)***
- ***USB—UNIVERSAL SERIAL BUS***

Data Acquisition and Control capabilities are Provided by:

- ***14 CHANNELS OF 12 BIT ANALOG TO DIGITAL CONVERTERS***
- ***2 ADDITIONAL ANALOG CHANNELS THAT MONITOR THE HOUSEKEEPING POWER SUPPLY AND AMBIENT TEMPERATURE***
- ***5 DIGITAL OUTPUT BITS***
- ***8 DIGITAL INPUT BITS***
- ***3 RELAYS/INTERLOCKS***

www.spellmanhv.com/manuals/SIC

HARDWARE FEATURES

The digital hardware includes a 40MIPS digital signal processor, a network processor, and a USB processor/controller. Serial port 0 of the DSP is jumper selectable to allow firmware updating through either the RS-232 port or the Ethernet interface.

RS232 INTERFACE

— 115k bits per second
— No Parity
— 8 Data Bits
— 1 Stop Bit
— No Handshaking
— DB-9 Connector (as shown)

ETHERNET INTERFACE

— 10/100-Base-T
— IP Address can be set by the system integrator
— Network Mask can be set by the system integrator
— TCP Port Number can be set by the system integrator
— RJ-45 connector
— Network attachment via Crossover and standard Ethernet cables
— Supported Operating Systems: Windows 98 2ED, Windows 2000 (SP2), Windows NT (SP6), Windows XP Professional, and most other major operating systems

USB—UNIVERSAL SERIAL BUS INTERFACE

— Compliant with USB 1.1 and USB 2.0 specifications
— Type B male connector
— Included driver can be communicated with via standard Windows serial communications methods

RS-232 CABLING

A standard RS-232 cable where lines 2 and 3 are reversed is used to connect the SIC serial port to the serial port on a standard personal computer

ETHERNET CABLING

Category 5 (CAT5) Ethernet patch cables are used to connect the SIC to the host computer. There are two ways to connect the SIC board via Ethernet: the first is to directly cable between the host and the SIC board, and the second is through the use of a hub, switch or network

USB CABLING

A high-quality double-shielded USB 2.0 Type A or B (host to slave) cable should be used in all applications. This type of cable is a standard PC to peripheral cable that utilizes full size connectors.

High EMI Environments

If the SIC USB interface is being used in a high-EMI environment, ferrites should be added to the USB cable.

ACCESSORIES

SOFTWARE COMPATIBILITY

RS232

The RS-232 interface makes use of a standard 'command/response' communications protocol. All software that addresses the RS-232 interface must adhere to the following parameters:
— 115k bits per second
— No Parity
— 8 Data Bits
—1 Stop Bit
— No handshaking

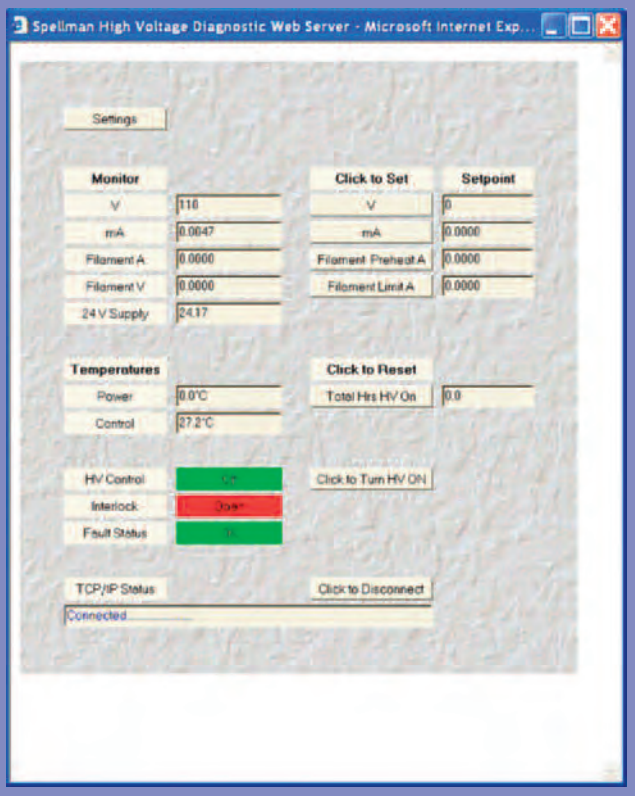
ETHERNET

The SIC board contains an embedded diagnostic web server that can be accessed through any standard web browser by browsing to the SIC's IP address. The Ethernet interface communicates using the following protocols:
— TCP/IP
— HTTP
— Telnet
— FTP
These assemblies can auto-switch between 10 Mb/s and 100Mb/s

USB

The USB interface makes use of a standard 'command/response' communications protocol. The USB interface is accessed through a Windows USB driver that emulates a standard communications port (just like in RS-232). Before you can communicate with the SIC USB interface, you must load the supplied USB driver disc. This driver will create a 'virtual' comm port that can be checked by using Windows Device Manager.

Diagnostic Web Server



The diagnostic web server can control and monitor an SIC equipped power supply from a web browser. It displays operating status of the Power Supply and allows the unit to be configured in real time. The application consists of three web pages; a page displaying contact information, a license agreement, and a monitoring and control applet that is at the heart of this application.

Spellman High Voltage Electronics Corporation
USA +1-631-630-3000 FAX: +1-631-435-1620
UK +44 (0)1798 877000 FAX: +44 (0)1798 872479
JAPAN +81 (0)48-447-6500 FAX: +81 (0)48-447-6501
CHINA +86 (0)512-67630010 FAX: +86 (0)512-67630030
e-mail: sales@spellmanhv.com
www.spellmanhv.com

Spellman High Voltage is an ISO 9001:2000 and ISO 14001:2004 registered company

- ***PROVIDES EASY BENCH TOP USAGE OF NIM UNITS***
- ***BIN-8AC POWER AC NIM UNITS***
- ***BIN-6DC POWER DC NIM UNITS***
- ***CONVECTION COOLED***
- ***PORTABLE***

Spellman's Bertan brand of Nuclear Instrumentation Module (NIM) mini-bin enclosures provide convenient bench top mounting and input power for NIM high voltage power supplies and other compatible NIM instruments. The mini-bins conform to the AEC TID 20893 (Rev) standard and allow users to configure individual NIM instruments into a complete dedicated system.

The units are of steel construction with nylon guides to assure positive module alignment. Integrated venting allows for cooling by natural air convection. The carry handle at the top of the enclosure provides portability. The fold-up tilt stand in the base of the unit facilitates bench top use.

Two models are available. Model BIN-8AC for powering AC input NIM modules and BIN-6DC for powering DC input NIM modules.

SPECIFICATIONS: BIN-8AC

Input Voltage:
115Vac, 50/60 Hertz @ 4 amps

Output Voltage:
Eight 3 wire, 115Vac receptacles are provided at the rear panel to power eight NIM AC input modules. A rear panel power switch controls all receptacles.

Dimensions:
11.4" W x 9" H x 12.7"D (289mm x 229mm x 324mm)

Unloaded Weight:
9 pounds (4.1kg)

Input Power Connector:
IEC320 cord set is provided.

SPECIFICATIONS: BIN-6DC

Input Voltage:
115Vac, 50/60 Hertz @ 1.5 amps

Output Voltage:
±12Vdc @ 1 amp and ±24Vdc @ 0.6 amps is distributed to six standard NIM connecters. Automatic over current protection is provided. A front panel lighted pushbutton controls power to all plug in modules. The provided DC power is regulated to 0.1% for a ±10% line change and a 100% load change. Ripple on all outputs is less than 5mV.

Dimensions:
11.4" W x 9" H x 12.7"D (289mm x 229mm x 324mm)

Unloaded Weight:
17 pounds (7.7kg)

Input Power Connector:
IEC320 cord set is provided.

SPELLMAN GLOBAL FACILITIES

Global Headquarters, Hauppauge, NY USA
100,000-square-foot facility, including design, manufacturing and corporate management.

Bohemia, NY USA
30,000-square-foot facility, dedicated to metal fabrication and electronic assembly.

Valhalla, NY USA
35,000-square-foot facility dedicated to design, manufacturing, sales and service.

Matamoros, Mexico Plant 1
88,000-square-foot manufacturing center, mirroring our New York headquarters in capital equipment and production process technologies.

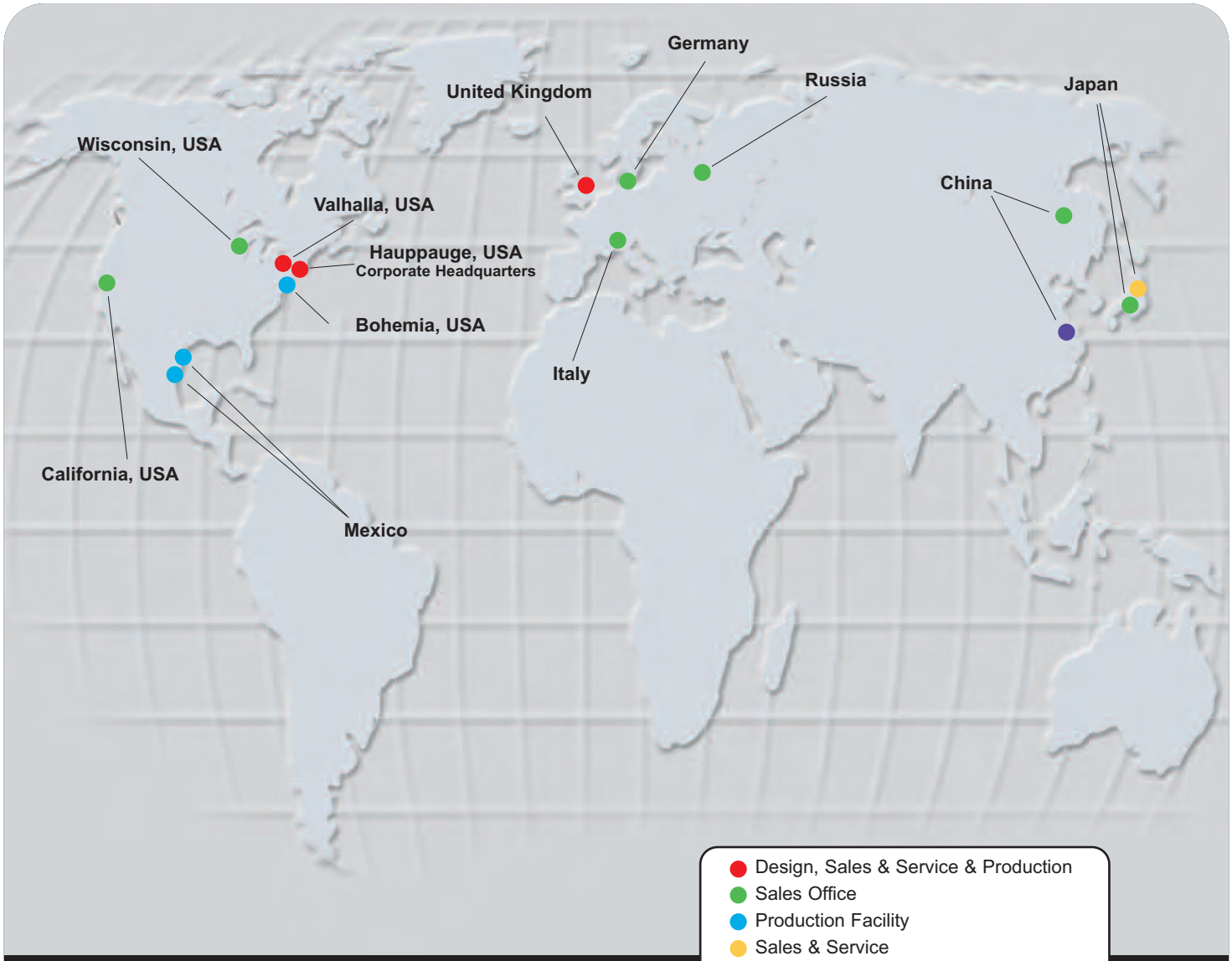
Matamoros, Mexico Plant 2
37,500-square-foot facility supporting Plant 1 including sheet metal fabrication capabilities

Pullborough, UK
20,000-square-foot facility dedicated to design, manufacturing, sales and service.

Tokyo, Japan
7,000-square-foot facility dedicated to sales and service.

Suzhou, China
37,000-square-foot facility dedicated to manufacturing, sales and service.

SPELLMAN GLOBAL SUPPORT



www.spellmanhv.com
631-630-3000

Spellman USA and Corporate HQ
475 Wireless Blvd.
Hauppauge, NY 11788
United States
tel: +1-631-630-3000
fax: +1-631-435-1620

Spellman Valhalla NY USA
One Commerce Park
Valhalla, NY 10595
United States
tel: +1-914-686-3600
fax: +1-914-686-5424

Spellman Bohemia NY USA
30 Crossways East
Bohemia, NY 11716
United States

Spellman UK
Broomers Hill Park #14, Broomers Hill
Pulborough, West Sussex,
United Kingdom RH20 2RY
tel: +44 (0) 1798 877000
fax: +44 (0) 1798 872479

Spellman Japan
4-3-1 Kamitoda,
Toda-shi, Saitama-ken,
Japan 335-0022
tel: +81(0) 48-447-6500
fax: +81(0) 48-447-6501

Spellman China
Spellman High Voltage Electronics (SIP) Co Ltd.
Block D, No.16 SuTong Road,
Suzhou Industrial Park 215021 China
tel: +(86)-512-69006010
fax: +(86)-512-67630030

Spellman de Mexico
Diagonal Lorenzo de la Garza # 65
Cd. Industrial
H. Matamoros, Tamps CP 87494
Mexico
tel: +52 868 150-1200
fax: +52 868 150-1218

Spellman de Mexico
Avenida Pedregal No. 2
Entre Avenida Chapultepec y Esquina
Parque Industrial Finsa
H. Matamoros, Tamps CP 87340
Mexico

Spellman®
High Voltage Electronics Corporation

www.spellmanhv.com
e-mail:sales@spellmanhv.com