



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

- 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

#### **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.

#### Meterina:

Digital voltage and current meters, 3<sup>1</sup>/<sub>2</sub> 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<sup>3</sup>/<sub>4</sub>"H(1U) x 19"W x 19"D\*\* (4.45cm x 48.3cm x 48.3cm). 600W - 1200W: 3<sup>1</sup>/<sub>2</sub>"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. RoHS compliant.



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# 10W to 1200W COMPACT HV POWER SUPPLY

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

	10 Watt		30 Watt		60 Watt	
kV	mA	Model	mA	Model	mA	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" (	(1	U	ı
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	150 '	Watt	300 Watt		
kV	mA	Model	mA	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	

# SL SELECTION TABLE- 600W, 1200W

# 3.50" (2U)

	600 Watt			1200 Watt		
kV	mA	Model	mA	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		

# SL TERMINAL BLOCK 26 PIN

PIN	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	OH-AGUVC		
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		

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

# **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.

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



DIMENSIONS: in.[mm]

#### 10W-300W 600W-1200W 0.38 [9.53] **FRONT VIEW** 0.38 [9.52] **FRONT VIEW** 4 PL 4 PL 0.25 [6.35] 19.00 [482.60] 0.25 [6.35] 19.00 [482.60] 4 PL .25 [31.75] 4 PL TYP 3.00 [76.20] 10 1.72 [43.66] 3.45 [87.60] 18.31 [465.14] 0.23 [5.97] 0.34 [8.73] TYP 18.31 [465.14] 0.23 [5.72] 0.34 [8.73] TYP **TOP VIEW TOP VIEW** 17.00 [431.80] 17.03 [432.49] [482.60] 19.00 [482.60] 19.00 24.00 [609.60] 24.00 [609.60] DANGER HICH VOLTAGE DANGER NOLTAGE **BACK VIEW BACK VIEW** IFC 320 16.87 [428.62] INPUT CONNECTOR 26 PIN TERMINAL 16.88 [428.62] BLOCK FOR REMOTE CONTROL MONITORING 2 PIN TERMINAL 26 PIN TERMINAL **BLOCK LOAD** MATING CONNECTOR 6 ft OF LINE CABLE BLOCK FOR 2 PIN TERMINAL BLOCK LOAD RETURN AND 10ft. OF SUPPLIED WITH UNIT RETURN (CHASSIS GROUND) REMOTE CONTROL (CHASSIS GROUND) HIGH VOLTAGE MONITORING CABLE SUPPLIED MATING CONNECTOR WITH UNIT AND 10ft, OF HIGH VOLTAGE CABLE SUPPLIED

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





**Corporate Headquarters** 



WITH UNIT

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#### **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.

#### **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.

