SL 10W to 1200W COMPACT HV POWER SOURCE

- ***Very Compact and Lightweight***
- ***Voltage Range from 1kV to 130kV***
- ***Reversible Polarity Standard up to 8kV***
- ***Extensive Analog and Digital Interface***
- ***Optional VFD Front Panel/Ethernet Interface***
- ***Arc Quench/Arc Count/Arc Trip***
- ***OEM Customization Available***

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
Electrostatics	Hipot Testing
E-Beam Systems	General Laboratory

OPTIONS

See page 5 for options and descriptions

SPECIFICATIONS

Status Indicators:
Voltage and Current Control Mode, Interlock Open/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. For input current see table on page 2.

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, 3½ 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: 1¾"H(1U) x 19"W x 19"D**
(4.45cm x 48.3cm x 48.3cm).
600W – 1200W: 3½"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 EEC EMC Directive and EEC Low Voltage Directive. RoHS Compliant.

Electronic Component (Power Source)

SL series is intended for installation as a component of a system.
It is designed to meet CE standards, with conditions of acceptance often being: customer provided enclosure mounting, EMC filtering, and appropriate protection, and isolation devices. The SL series is not intended to be operated by end users as a stand-alone device. The SL series power supply can only be fully assessed when installed within a system, and as a component part within that system.

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.

SL INPUT CURRENT

MODEL	115Vac	220Vac
10 watt	<1A	<1A
30 watt	<1A	<1A
60 watt	1.1A	<1A
150 watt	2.8A	1.5A
300 watt	5.6A	3A
600 watt	11.1A	6A
1200 watt	n/a	12A

The input current numbers above are worse case assuming the power supply is being operated at maximum power and low line conditions, taking efficiency and power factor into account.

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 (Optional)
13	Remote Power Program In	
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 On=Active
20	Remote Current Mode	
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

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

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**

SL SELECTION TABLE- 600W, 1200W

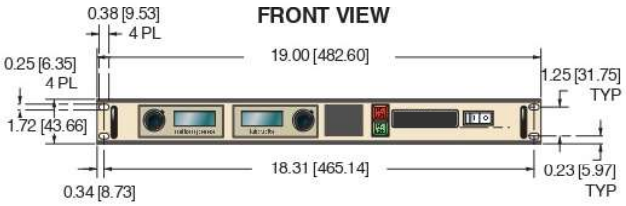
3.50" (2U)

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**

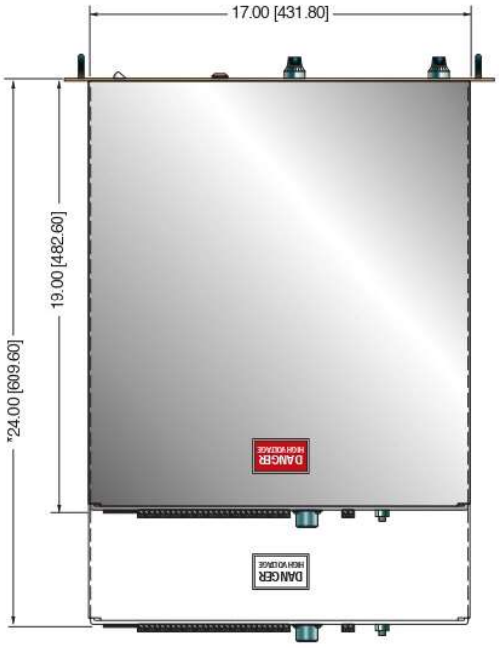
DIMENSIONS: in.[mm]

10W-300W

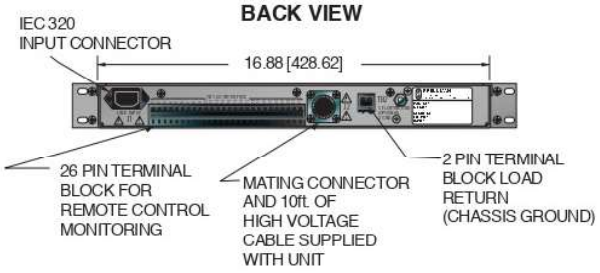
FRONT VIEW



TOP VIEW

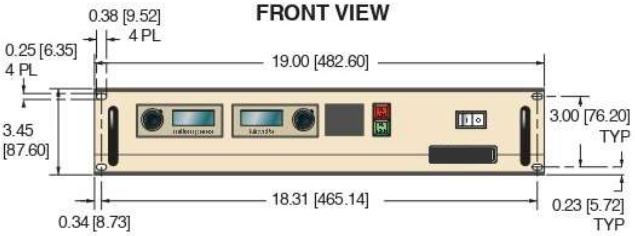


BACK VIEW

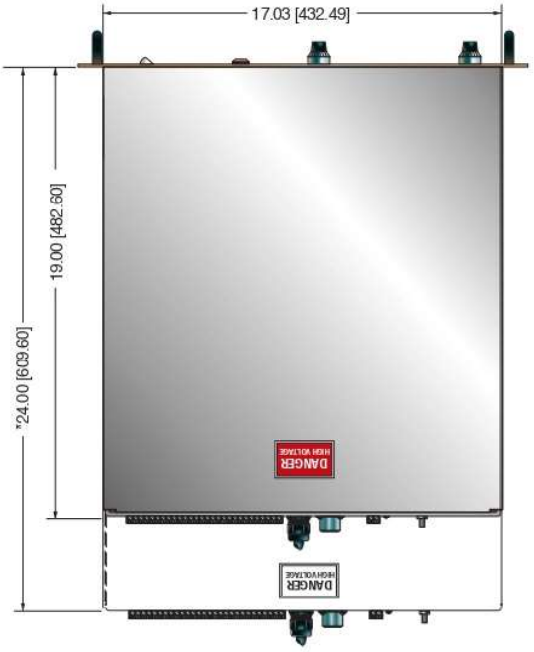


600W-1200W

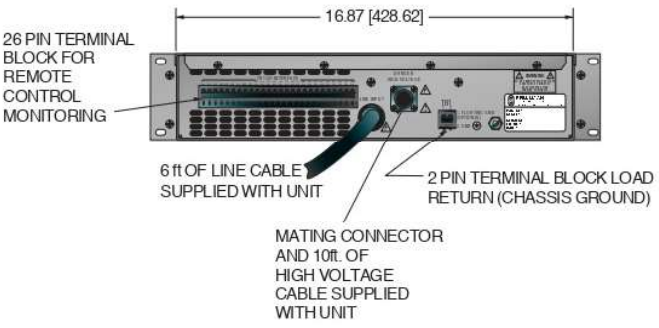
FRONT VIEW



TOP VIEW



BACK VIEW



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

eSL OPTION

The eSL Option provides a vacuum fluorescent front panel display and Ethernet connectivity. Both the 1U (1.75") and 2U (3.5") SL product offerings are available with the eSL Option. Using the front panel local controls the main menu has the following features:

Local/Remote Control
Allows operation from either the local front panel or remotely via the Ethernet Category 5 connector.

Features Menu
Allows control over Adjustable Overload Trip and Slow Start features.

Tutorial Menu
Provides information on how to use the local front panel interface.

Diagnostics Menu
Provides information on the revisions of the hard ware, firmware and IP address. Additionally the Diagnostics Menu provides information on the status of the internal low voltage housekeeping power supply voltages.

eSL Option power supplies can still be fully controlled via the SL's comprehensive remote analog interface, so these units are fully backwards compatible with standard SL power supplies.

Typical Front Panel Screens

Model Number

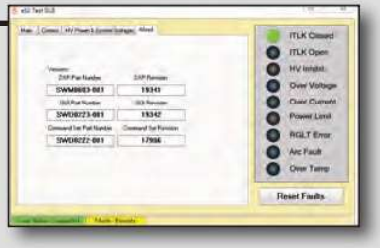
Standby

HV ON

Digital Interface

A front panel accessible Category 5 connector provides Ethernet connectivity. provides a basic demo GUI for convenience of the user, but most customers implement their own software.

About Screen
DSP part number, DSP revision, GUI part number, GUI revision, Command set part number, Command set revision

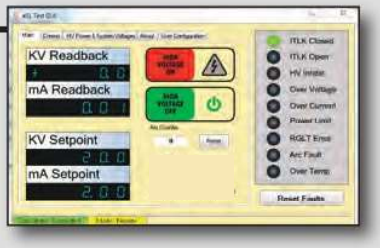


Coms Screen
Communications, IP address, IP port

HV Power and System Voltages Screen
HV power (watts) +24V, +15V, +10V, +5V, +3.3V

User Configuration Screen
Slow Start – kV, Slow Start – mA, Adjustable Over Load (AOL), Arc Control, Fault Indicators

Main Screen
kV Setpoint, kV Readback, mA Setpoint, mA Readback, HV OFF Button, HV ON Button, Arc Counter, System Diagnostics, Reset Faults Button



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.

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.

eSL *Ethernet Connectivity/VFD Front Panel*
The eSL Option provides a vacuum fluorescent front panel display. Ethernet connectivity and comprehensive front panel controls.

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.

* Option available with the Quick Delivery program

SL2KW 2000W COMPACT HV POWER SUPPLY

- ***Very Compact and Lightweight***
- ***Low EMI and RFI***
- ***Voltage Range from 500V to 50kV***
- ***Reversible Polarity Standard up to 8kV***
- ***Optional VFD Front Panel/Ethernet Interface***
- ***Extensive Analog and Digital Interface***
- ***Arc Quench/Arc Count/Arc Trip***
- ***OEM Customization Available***

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	CPT/CRT Testing
Electrostatics	Hipot Testing
E-Beam Systems	General Laboratory
Capacitor Charging	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.

Input:
Standard: 208Vac ±10%, 50/60Hz @ 8.5A/phase, three phase
Optional: 220Vac ±10%, 50/60Hz @ 19.75A, 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.

Interface Connector:
25 pin male D connector

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

AC Line Input Cable:
A 6 foot (1.83m) cable is permanently attached to the unit. Single phase units use 3 conductor 12AWG cable, three phase units use 4 conductor 16AWG cable.

Dimensions:
3.5″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 EEC EMC Directive for 3 phase units, conducted and radiated emission only for single phase units. Compliant to EEC Low Voltage Directive.
RoHS Compliant.

Electronic Component (Power Source)

SL2KW series is intended for installation as a component of a system.
It is designed to meet CE standards, with conditions of acceptance often being: customer provided enclosure mounting, EMC filtering, and appropriate protection, and isolation devices. The SL2KW series is not intended to be operated by end users as a stand-alone device. The SL2KW series power supply can only be fully assessed when installed within a system, and as a component part within that system.

eSL OPTION

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Local/Remote Control
Allows operation from either the local front panel or remotely via the Ethernet Category 5 connector.

Features Menu
Allows control over Adjustable Overload Trip and Slow Start features.

Tutorial Menu
Provides information on how to use the local front panel interface.

Diagnostics Menu
Provides information on the revisions of the hard ware, firmware and IP address. Additionally the Diagnostics Menu provides information on the status of the internal low voltage housekeeping power supply voltages.

eSL Option power supplies can still be fully controlled via the SL2KW's comprehensive remote analog interface, so these units are fully backwards compatible with standard SL2KW power supplies.

Typical Front Panel Screens

Model Number

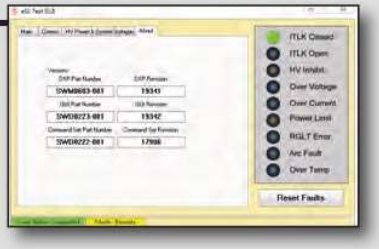
Standby

HV ON

Digital Interface

A front panel accessible Category 5 connector provides Ethernet connectivity. provides a basic demo GUI for convenience of the user, but most customers implement their own software.

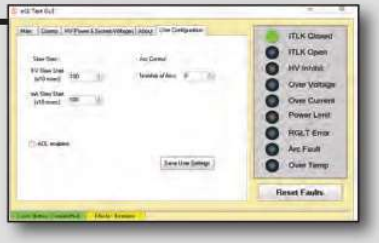
About Screen
DSP part number, DSP revision, GUI part number, GUI revision, Command set part number, Command set revision



Coms Screen
Communications, IP address, IP port

HV Power and System Voltages Screen
HV power (watts) +24V, +15V, +10V, +5V, +3.3V

User Configuration Screen
Slow Start – kV, Slow Start – mA, Adjustable Over Load (AOL), Arc Control, Fault Indicators



Main Screen
kV Setpoint, kV Readback, mA Setpoint, mA Readback, HV OFF Button, HV ON Button, Arc Counter, System Diagnostics, Reset Faults Button

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

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	EFR Common	Optional External Fault Relay
13	EFR-NC/EFR-NO	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	Open Collector 35V Max, 10mA Max, On=Active
20	Remote Current Mode	
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	Chassis Ground

How To Order:

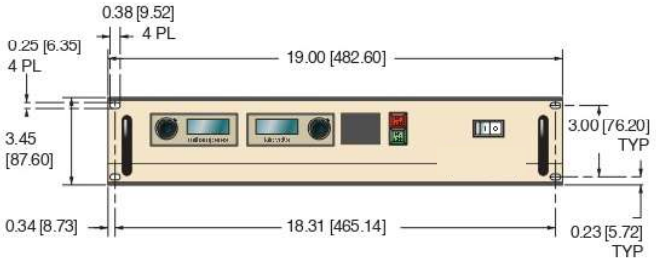
Sample model number: SL20PN2000/NSS/DPM4

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.

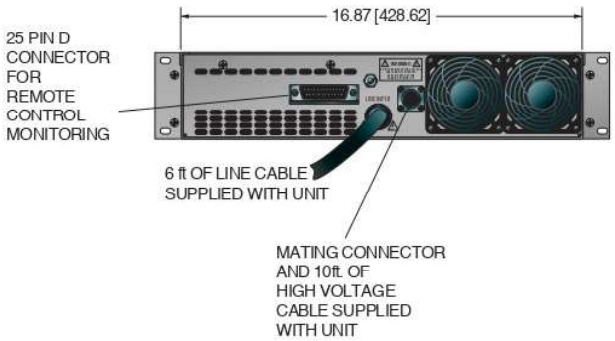
DIMENSIONS: in.[mm]

FRONT VIEW



TOP VIEW

BACK VIEW



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.

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.

ARC *Arc Sense*
A signal is provided on a spare pin (TB1-21) that changes state whenever the power supply detects an arc.

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.

eSL *Ethernet Connectivity/VFD Front Panel*
The eSL Option provides a vacuum fluorescent front panel display, Ethernet connectivity and comprehensive front panel controls.

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.

SL150kV 1200W POWER SUPPLY

HIGH VOLTAGE ELECTRONICS CORPORATION

- ***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***

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:
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%, 50/60Hz @ 12A
200Vac ±10%, 50/60Hz @ 13.2A

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 voltage 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

Operating Temperature:
0 to 40°C operating

Storage Temperature:
-40 to +85°C storage

SL150kV 1200W POWER SUPPLY

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:
Designed to meet EEC EMC Directive. Designed to meet to EEC Low Voltage Directive. RoHS Compliant.

Electronic Component (Power Source)

SL150kV series is intended for installation as a component of a system.
It is designed to meet CE standards, with conditions of acceptance often being: customer provided enclosure mounting, EMC filtering, and appropriate protection, and isolation devices. The SL150kV series is not intended to be operated by end users as a stand-alone device. The SL150kV series power supply can only be fully assessed when installed within a system, and as a component part within that system.

SL150KV ANALOG INTERFACE— JB4 25 PIN MALE D CONNECTOR

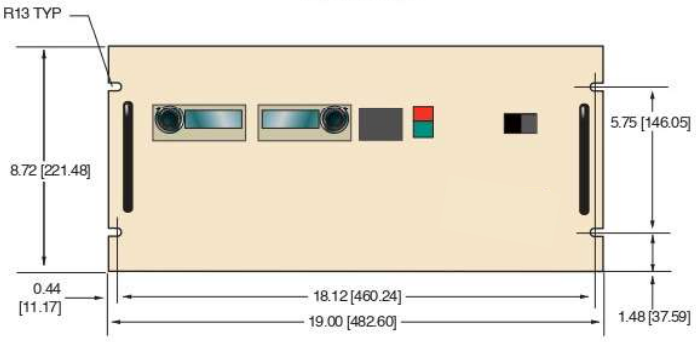
PIN	SIGNAL	PARAMETERS
1	Power Supply Common	Signal Ground
2	External Inhibit	Ground = Inhibit, Open = HV ON
3	External Interlock	+15Vdc @ open, ≤ 5mA @ closed
4	External Interlock Return	Connect to pin 3 to enable supply
5	Current Monitor	0 to 10Vdc = 0 to 100% rated voltage, Zout =10kΩ
6	Voltage Monitor	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.

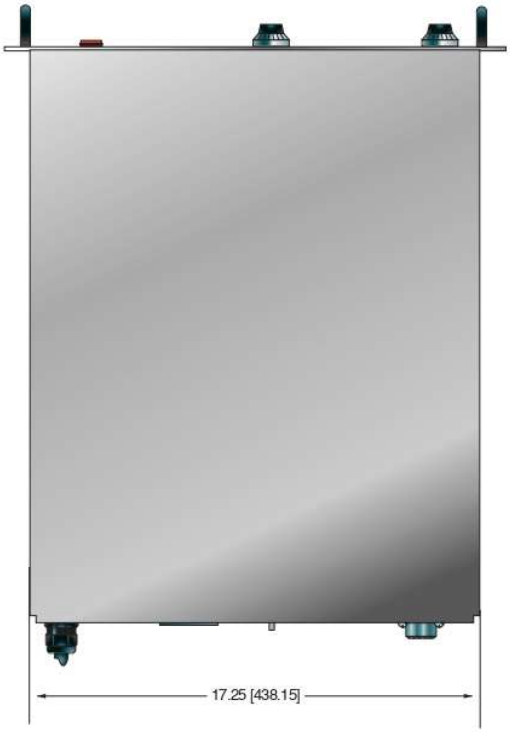
Sample Model Number: SL150P1200/BFP/LL(20)
Where SL = power supply series, 150 = maximum output voltage in kV,
P = positive output polarity, 1200 = maximum output power (watts), BFP = Blank Front Panel, LL(20) = 20 foot HV cable.

DIMENSIONS: in.[mm]

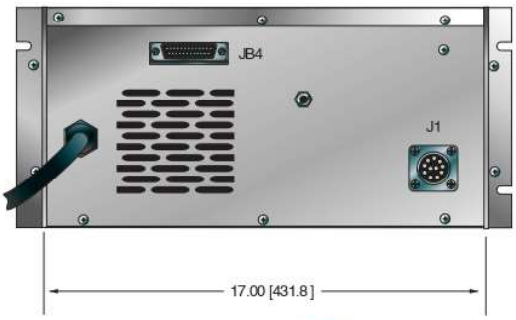
FRONT VIEW



TOP VIEW



BACK VIEW



SLS 2000W POWER SUPPLY

- ***160kV - 360kV Outputs***
- ***Low Ripple***
- ***High Stability***
- ***Overcurrent, Overvoltage and Arc Protection***
- ***Arc Detect***
- ***Lightweight, Compact Size***
- ***OEM Customization Available***

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

OPTIONS

eSL Ethernet Connectivity/VFD Front Panel

SPECIFICATIONS

Input Voltage:
Standard: 220Vac ±10%, 50/60Hz @ 8A/phase, three phase
Optional: 200Vac ±10%, 50/60Hz @ 8.9A/phase, three phase

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:
See page 3.

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

Regulatory Approvals:
RoHS compliant

Electronic Component (Power Source)

SLS series is intended for installation as a component of a system. It is designed to meet CE standards, with conditions of acceptance often being: customer provided enclosure mounting, EMC filtering, and appropriate protection, and isolation devices. The SLS series is not intended to be operated by end users as a stand-alone device. The SLS series power supply can only be fully assessed when installed within a system, and as a component part within that system.

Corona Dome Terminations:
The SLS Series of "stack" configured high voltage power supplies come in a various output voltages and different physical configurations. Appropriate corona relief is required for these units to operate at maximum output voltage. Frequently users will provide the corona relief needed so will provide stack assemblies that by themselves will not be able to operate at maximum output voltage corona free. Please be certain to discuss your requirements with to be assured you get a stack assembly in the physical configuration you require for your application. The optional K941 Toroid (5″ x 20″) should be considered if customer corona relief will not be provided.

360kV Stack shown with optional K941 Toroid

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

PIN	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	Optional EFR (common)
13	Optional 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

eSL OPTION

The eSL Option provides a vacuum fluorescent front panel display and Ethernet connectivity. Using the front panel local controls the main menu has the following features:

Local/Remote Control
Allows operation from either the local front panel or remotely via the Ethernet Category 5 connector.

Features Menu
Allows control over Adjustable Overload Trip and Slow Start features.

Tutorial Menu
Provides information on how to use the local front panel interface.

Diagnostics Menu
Provides information on the revisions of the hard ware, firmware and IP address. Additionally the Diagnostics Menu provides information on the status of the internal low voltage housekeeping power supply voltages.

eSL Option power supplies can still be fully controlled via the SL2KW's comprehensive remote analog interface, so these units are fully backwards compatible with standard SL2KW power supplies.

Typical Front Panel Screens

Model Number

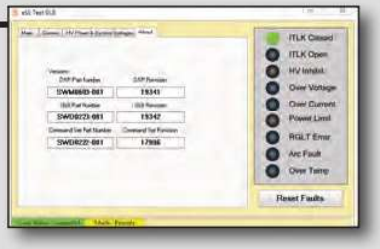
Standby

HV ON

Digital Interface

A front panel accessible Category 5 connector provides Ethernet connectivity. provides a basic demo GUI for convenience of the user, but most customers implement their own software.

About Screen
DSP part number, DSP revision, GUI part number, GUI revision, Command set part number, Command set revision



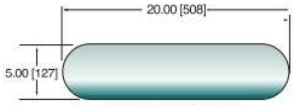
Coms Screen
Communications, IP address, IP port

HV Power and System Voltages Screen
HV power (watts) +24V, +15V, +10V, +5V, +3.3V

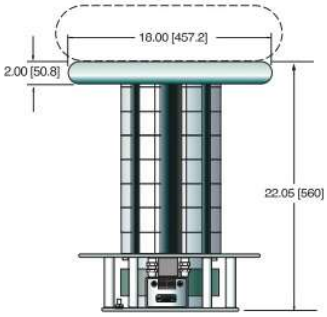
User Configuration Screen
Slow Start – kV, Slow Start – mA, Adjustable Over Load (AOL), Arc Control, Fault Indicators

Main Screen
kV Setpoint, kV Readback, mA Setpoint, mA Readback, HV OFF Button, HV ON Button, Arc Counter, System Diagnostics, Reset Faults Button

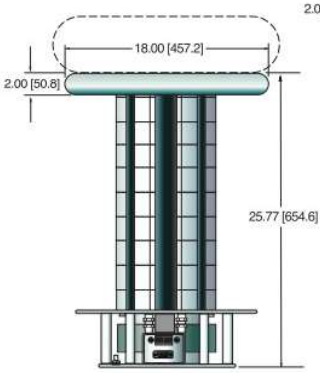
DIMENSIONS: in.[mm]



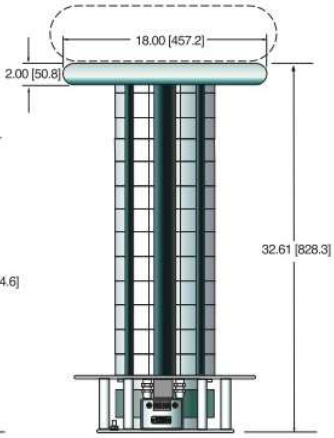
Optional 5" Toroid
fits all kV models
(Spellman kit number K941)



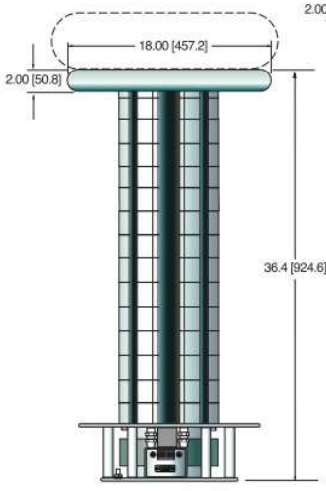
160kV Model



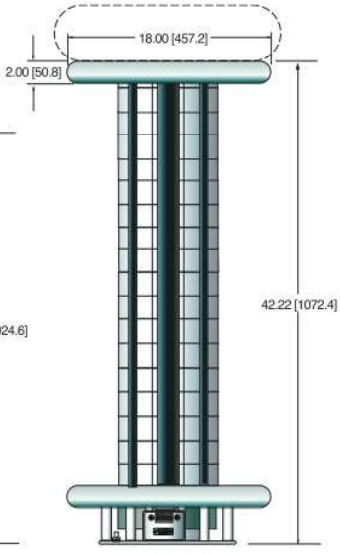
200kV Model



260kV Model

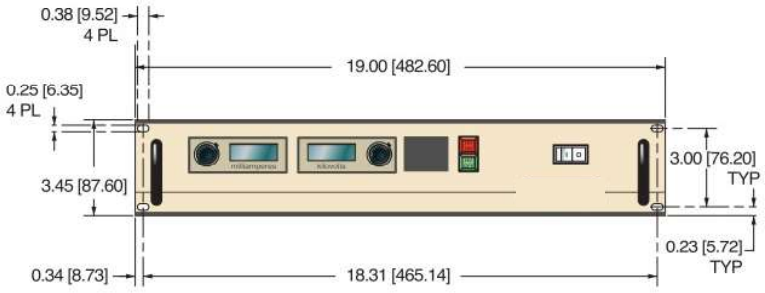


300kV Model



360kV Model

FRONT VIEW



TOP VIEW

BACK VIEW

6 ft OF LINE CABLE
SUPPLIED WITH UNIT.

LOW VOLTAGE
CONNECTION TO HV
TRANSFORMER ASSEMBLY

RoHS Compliant

STA 4kW POWER SUPPLY

- ***4kW's in Single 3U (5.25") Chassis***
- ***Models from 1kV to 70kV***
- ***Remote Analog and Remote Ethernet Interface***
- ***Arc and Short Circuit Protected***
- ***Customer Configurable Features Via Ethernet Interface***
- ***OEM Customization Available***

STA Series of 4kW high voltage power supplies are available in positive or negative polarities in 15 different models with outputs ranging from 1kV to 70kV. A full featured front panel allows easy local control, while an extensive analog interface provides comprehensive remote capability. The standard Ethernet and RS-232 digital interfaces simplify integrating the STA into your system design.

The STA's robust IGBT inverter is inherently fault tolerant and is ideal for demanding applications like semiconductor processing and vacuum deposition. Many operational features can be configured by the user to suit their particular requirements.

TYPICAL APPLICATIONS

Ion Beam Implantation
Semiconductor Processing
Electron Beam Welding
Capacitor Charging
High Power RF Transmitters
Electrostatic Precipitators
X-Ray Systems

HARDWARE BASED OPTIONS

BFP	Blank Front Panel
HS	High Stability
LL(X)	High Voltage Cable Length
1PH	180-264Vac, Single Phase Input

SOFTWARE CONFIGURABLE FEATURES

Adjustable Overload Trip
Arc Trip Count
Arc Quench Time
Arc Re-Ramp Time
Constant Power Control
Adjustable Power Trip
Slow Start Ramp Times

SPECIFICATIONS

Input Voltage:
Standard: 180-264Vac, 50/60Hz, three phase, 90% efficiency, 0.85 power factor
Optional: 180-264Vac 50/60Hz, single phase (1PH)

Input Current:
Standard: 180-264Vac, three phase 17 amps, maximum
Optional: 180-264Vac, single phase 38 amps, maximum

Output Voltage:
15 models from 1kV to 70kV. Each model is available with positive or negative outputs.

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

Voltage Regulation:
Load: 0.05% of full voltage +500mV for full load change.
Line: 0.05%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

Stability:
0.02%hr. after 1 hour warm-up.

Temperature Coefficient:
100ppm/°C. Higher stability (50ppm/°C) available on special order via the HS option

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; inlet through side panels, outlet at rear panel

Metering:
Digital voltage and current meters, accurate to within 1%

System Status Display:
"Dead Front" type indicators provide status of up to 12 system operations including voltage and current regulation, fault conditions and circuit control.

Analog Interface Connector:
50 pin female D connector

High Voltage Output Cable:
A detachable 10' (3.05m) long shielded HV cable is provided

Dimensions:
1kV to 70kV:
5.25˝ (3U)H X 19˝ W X 21˝ D (133mm x 482mm x 533mm)

Weight:
1kV to 8kV: 46 lbs. (20.87kg)
10kV to 70kV: 58 lbs. (26.31kg)
Individual kV models may vary

Regulatory Approvals:
Designed to meet EEC EMC Directive. Compliant to EEC Low Voltage Directive. RoHS Compliant.

Electronic Component (Power Source)

STA series is intended for installation as a component of a system.
It is designed to meet CE standards, with conditions of acceptance often being: customer provided enclosure mounting, EMC filtering, and appropriate protection, and isolation devices. The STA series is not intended to be operated by end users as a stand-alone device. The STA series power supply can only be fully assessed when installed within a system, and as a component part within that system.

Digital Interface

The STA features a standard RS-232 and Ethernet digital interface. Utilizing these standard digital interfaces can dramatically simplify power supply interfacing requirements saving the user both time and money, while enhancing functionality and overall capability. provides a GUI with the STA that allows the customer to both customize operational features of the STA while also providing basic power supply operational features. Details of the STA's digital interface capability are described in the STA manual, downloadable via the link on the first page of this data sheet.

Arc Intervention

STA power supplies have an arc intervention feature that senses arc currents via a fast acting current sense transformer. The purpose of the arc intervention circuitry is to prevent power supply damage from continuous, long term arcing. The factory default configuration will trip off the unit with an Arc Fault if 4 arcs occur in a 10 second time period. Customers can change basic arc intervention parameters (Arc Count, Arc Quench, Reramp Time, and Window Time) within preset limits via the digital interface interface; customized units can be provided for unique arc prone environments,

STA SELECTION TABLE

MAXIMUM RATING		MODEL NUMBER
kV	mA	
1	4,000	STA1*4
2	2,000	STA2*4
3	1,333	STA3*4
4	1,000	STA4*4
6	667	STA6*4
8	500	STA8*4
10	400	STA10*4
12	333	STA12*4
15	267	STA15*4
20	200	STA20*4
30	133	STA30*4
40	100	STA40*4
50	80	STA50*4
60	67	STA60*4
70	57	STA70*4

*Substitute "P" for positive polarity and "N" for negative polarity.
Polarity must be specified at time of order.

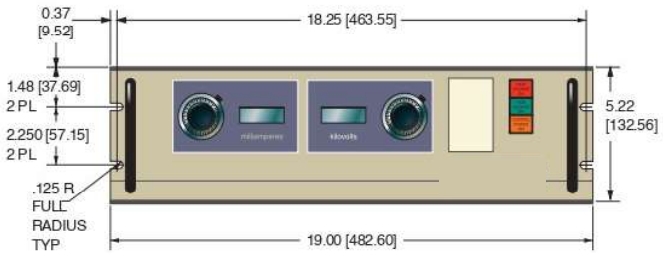
STA rear panel shown with local operation plug installed in 50 pin D connector

JB1 STA ANALOG INTERFACE— 50 PIN FEMALE D CONNECTOR

PIN	SIGNAL	PARAMETERS
1	Power Supply Common	Power Supply Ground
2	Reset/HV Inhibit	Normally open, Low = Reset/Inhibit
3	External Interlock	+24Vdc @ open, <25mA @ closed
4	External Interlock Return	Return for External Interlock
5	mA Test Point	0-10Vdc = 0-100% rated output, Zout= 1KΩ, 1%
6	kV Test Point	0-10Vdc = 0-100% rated output, Zout= 1KΩ, 1%
7	+10Vdc Reference Output	+10Vdc @ 1mA
8	mA Program Input	0-10Vdc = 0-100% rated output, Zin>10MΩ
9	Local mA Program Output	0-10Vdc = 0-100% rated output, front panel pot
10	kV Program Input	0-10Vdc = 0-100% rated output, Zin>10MΩ
11	Local kV Program Output	0-10Vdc = 0-100% rated output, front panel pot
12	Remote Power On Output	+24Vdc @ open, 2A peak, 1Adc @ closed
13	Remote Power On Return	Return for Remote Power On
14	Remote HV Off	+24Vdc @ open, 2A peak, 1Adc @ closed, connect to pin15 for front panel operation
15	Remote HV Off/On Common	HV On/Off Common
16	Remote HV On	+24Vdc @ open, 2A peak, 1Adc @ closed, momentarily connect to pin 15 enable high voltage
17	HV Off Indicator	+24Vdc @ 25mA = HV Off
18	HV On Indicator	+24Vdc @ 25mA = HV On
19	Power Supply Common	Supply Ground
20	+24Vdc Output	+24Vdc @ 100mA, maximum
21	Voltage Mode Status	Open Collector, Low = Active
22	Current Mode Status	Open Collector, Low = Active
23	Power Mode Status	Open Collector, Low = Active
24	Interlock Closed Status	Open Collector, Low = Active
25	Power Test Point	0-10Vdc = 0-100% rated output, Zout= 5KΩ, 1%
26	Spare	
27	Spare	
28	Remote Overvoltage Adjust	0-10Vdc = 0-100% rated output
29	Over Power Fault	Open Collector, Low = Active
30	Over Voltage Fault	Open Collector, Low = Active
31	Over Current Fault	Open Collector, Low = Active
32	System Fault	Open Collector, Low = Active
33	RGLT Error Fault	Open Collector, Low = Active
34	Arc	Open Collector, Low = Active
35	Over Temp Fault	Open Collector, Low = Active
36	AC Fault	Open Collector, Low = Active
37	Spare	
38	Spare	
39	Spare	
40	Spare	
41	Spare	
42	Remote Power Program Input	0-10Vdc = 0-100% rated output, Zin>10MΩ
43	Local Power Program Output	0-10Vdc = 0-100% rated output, internal pot
44	+5Vdc Output	+5Vdc @ 100mA, maximum
45	+15Vdc Output	+15Vdc @ 100mA, maximum
46	-15Vdc Output	-15Vdc @ 10mA, maximum
47	RS232 Tx	
48	RS232 Rx	
49	RS232 GND	
50	Power Supply Common	Power Supply Ground

DIMENSIONS: in.[mm]

FRONT VIEW



TOP VIEW

BACK VIEW

STR 6kW POWER SUPPLY

HIGH VOLTAGE ELECTRONICS CORPORATION

Need higher power? The ST Series provides 12kW in the same size as the STR Series

- ***6kW's in Single 6U (10.5") Chassis***
- ***Models from 1kV to 150kV***
- ***Remote Analog and Remote Ethernet Interface***
- ***Arc and Short Circuit Protected***
- ***Customer Configurable Features Via Ethernet Interface***
- ***OEM Customization Available***

STR Series of 6kW high voltage power supplies are available in positive or negative polarities in 19 different models with outputs ranging from 1kV to 150kV. A full featured front panel allows easy local control, while an extensive analog interface provides comprehensive remote capability. The standard Ethernet and RS-232 digital interfaces simplify integrating the STR into your system design.

The STR's robust IGBT inverter is inherently fault tolerant and is ideal for demanding applications like semiconductor processing and vacuum deposition. Many operational features can be configured by the user to suit their particular requirements.

TYPICAL APPLICATIONS

Ion Beam Implantation
Semiconductor Processing
Electron Beam Welding
Capacitor Charging
High Power RF Transmitters
Electrostatic Precipitators
X-Ray Systems

HARDWARE BASED OPTIONS

BFP	Blank Front Panel
HS	High Stability
LL(X)	High Voltage Cable Length
400VAC	360-528Vac, Three Phase Input
1PH	180-264Vac, Single Phase Input

SOFTWARE CONFIGURABLE FEATURES

Adjustable Overload Trip
Arc Trip Count
Arc Quench Time
Arc Re-Ramp Time
Constant Power Control
Adjustable Power Trip
Slow Start Ramp Times

SPECIFICATIONS

Input Voltage:
Standard: 180-264Vac, 50/60Hz, three phase, 90% efficiency, 0.85 power factor
Optional: 360-528Vac 50/60Hz, three phase (400VAC)
180-264Vac 50/60Hz, single phase (1PH)

Input Current:
Standard: 180-264Vac, three phase 25 amps, maximum
Optional: 360-528Vac, three phase 12.5 amps, maximum
180-264Vac, single phase 57 amps, maximum

Output Voltage:
19 models from 1kV to 150kV. Each model is available with positive or negative outputs. 1kV to 10kV units are internally reversible.

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

Voltage Regulation:
Load: 0.05% of full voltage +500mV for full load change.
Line: 0.05%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

Stability:
0.02%hr. after 1 hour warm-up.

Temperature Coefficient:
100ppm/°C. Higher stability (50ppm/°C) available on special order via the HS option

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; inlet through side panels, outlet at rear panel

Metering:
Digital voltage and current meters, accurate to within 1%

System Status Display:
"Dead Front" type indicators provide status of up to 12 system operations including voltage and current regulation, fault conditions and circuit control.

Analog Interface Connector:
50 pin female D connector

High Voltage Output Cable:
A detachable 10' (3.05m) long shielded HV cable is provided

Dimensions:
1kV to 120kV:
10.5˝ (6U)H X 19˝ W X 21˝ D (266mm x 482mm x 533mm)
150kV:
10.5˝ (6U)H X 19˝ W X 23˝ D (266mm x 482mm x 584mm)

Weight:
1kV to 50kV: <100 pounds (45.36kg)
60kV to 120kV: <140 pounds (63.50kg)
150kV: <150 pounds (68kg)
Individual kV models may vary

Regulatory Approvals:
Compliant to EEC EMC Directive. Compliant to EEC Low Voltage Directive. RoHS Compliant.

Electronic Component (Power Source)

STR series is intended for installation as a component of a system.
It is designed to meet CE standards, with conditions of acceptance often being: customer provided enclosure mounting, EMC filtering, and appropriate protection, and isolation devices. The STR series is not intended to be operated by end users as a stand-alone device. The STR series power supply can only be fully assessed when installed within a system, and as a component part within that system.

STR SELECTION TABLE

MAXIMUM RATING		MODEL NUMBER
kV	mA	
1	6,000	STR1*6
2	3,000	STR2*6
3	2,000	STR3*6
4	1,500	STR4*6
6	1,000	STR6*6
8	750	STR8*6
10	600	STR10*6
12	500	STR12*6
15	400	STR15*6
20	300	STR20*6
30	200	STR30*6
40	150	STR40*6
50	120	STR50*6
60	100	STR60*6
70	86	STR70*6
80	75	STR80*6
100	60	STR100*6
120	50	STR120*6
150	40	STR150*6

*Substitute "P" for positive polarity and "N" for negative polarity. Polarity must be specified at time of order.

1-10kV units are inherently reversible by design requiring an internal wiring change to swap polarities. Intermediate voltage units are available by special order.

Digital Interface
The STR features a standard RS-232 and Ethernet digital interface. Utilizing these standard digital interfaces can dramatically simplify power supply interfacing requirements saving the user both time and money, while enhancing functionality and overall capability. provides a GUI with the STR that allows the customer to both customize operational features of the STR while also providing basic power supply operational features. Details of the STR's digital interface capability are described in the STR manual, downloadable via the link on the first page of this data sheet.

Main control screen

Status screen

User configuration screen

Arc Intervention
STR power supplies have an arc intervention feature that senses arc currents via a fast acting current sense transformer. The purpose of the arc intervention circuitry is to prevent power supply damage from continuous, long term arcing. The factory default configuration will trip off the unit with an Arc Fault if 4 arcs occur in a 10 second time period. Customers can change basic arc intervention parameters (Arc Count, Arc Quench, Reramp Time, and Window Time) within preset limits via the digital interface interface; customized units can be provided for unique arc prone environments,

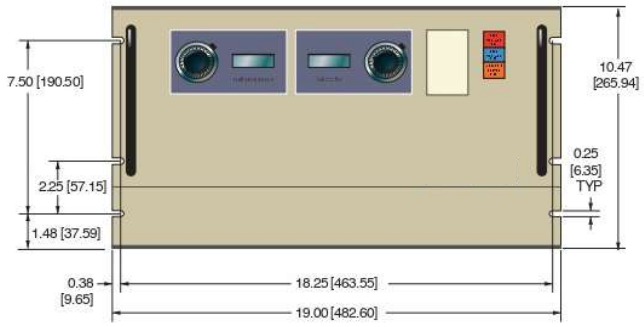
STR rear panel view

JB1 STR ANALOG INTERFACE— 50 PIN FEMALE D CONNECTOR

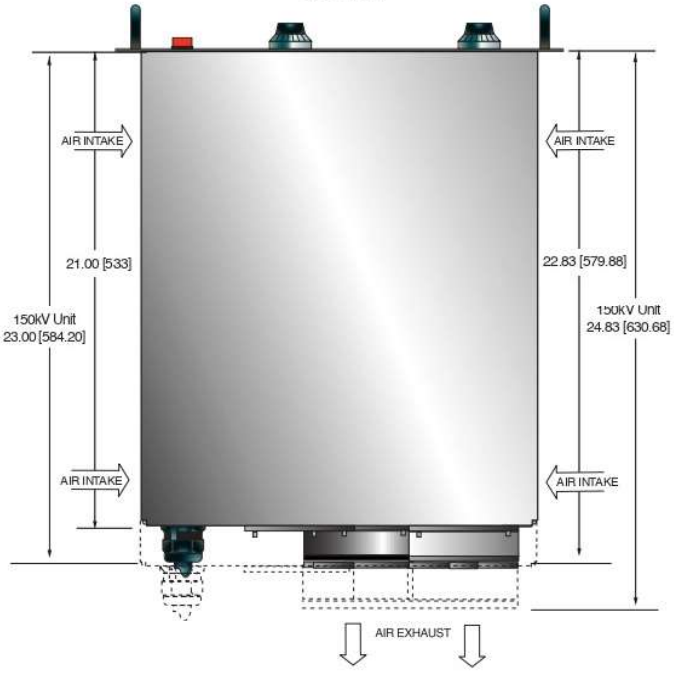
PIN	SIGNAL	PARAMETERS
1	Power Supply Common	Power Supply Ground
2	Reset/HV Inhibit	Normally open, Low = Reset/Inhibit
3	External Interlock	+24Vdc @ open, <25mA @ closed
4	External Interlock Return	Return for External Interlock
5	mA Test Point	0-10Vdc = 0-100% rated output, Zout= 1KΩ, 1%
6	kV Test Point	0-10Vdc = 0-100% rated output, Zout= 1KΩ, 1%
7	+10Vdc Reference Output	+10Vdc @ 1mA
8	mA Program Input	0-10Vdc = 0-100% rated output, Zin>10MΩ
9	Local mA Program Output	0-10Vdc = 0-100% rated output, front panel pot
10	kV Program Input	0-10Vdc = 0-100% rated output, Zin>10MΩ
11	Local kV Program Output	0-10Vdc = 0-100% rated output, front panel pot
12	Remote Power On Output	+24Vdc @ open, 2A peak, 1Adc @ closed
13	Remote Power On Return	Return for Remote Power On
14	Remote HV Off	+24Vdc @ open, 2A peak, 1Adc @ closed, connect to pin15 for front panel operation
15	Remote HV Off/On Common	HV On/Off Common
16	Remote HV On	+24Vdc @ open, 2A peak, 1Adc @ closed, momentarily connect to pin 15 enable high voltage
17	HV Off Indicator	+24Vdc @ 25mA = HV Off
18	HV On Indicator	+24Vdc @ 25mA = HV On
19	Power Supply Common	Supply Ground
20	+24Vdc Output	+24Vdc @ 100mA, maximum
21	Voltage Mode Status	Open Collector, Low = Active
22	Current Mode Status	Open Collector, Low = Active
23	Power Mode Status	Open Collector, Low = Active
24	Interlock Closed Status	Open Collector, Low = Active
25	Power Test Point	0-10Vdc = 0-100% rated output, Zout= 5KΩ, 1%
26	Spare	
27	Spare	
28	Remote Overvoltage Adjust	0-10Vdc = 0-100% rated output
29	Over Power Fault	Open Collector, Low = Active
30	Over Voltage Fault	Open Collector, Low = Active
31	Over Current Fault	Open Collector. Low = Active
32	System Fault	Open Collector, Low = Active
33	RGLT Error Fault	Open Collector, Low = Active
34	Arc	Open Collector, Low = Active
35	Over Temp Fault	Open Collector, Low = Active
36	AC Fault	Open Collector, Low = Active
37	Spare	
38	Spare	
39	Spare	
40	Spare	
41	Spare	
42	Remote Power Program Input	0-10Vdc = 0-100% rated output, Zin>10MΩ
43	Local Power Program Output	0-10Vdc = 0-100% rated output, internal pot
44	+5Vdc Output	+5Vdc @ 100mA, maximum
45	+15Vdc Output	+15Vdc @ 100mA, maximum
46	-15Vdc Output	-15Vdc @ 10mA, maximum
47	RS232 Tx	
48	RS232 Rx	
49	RS232 GND	
50	Power Supply Common	Power Supply Ground

DIMENSIONS: in.[mm]

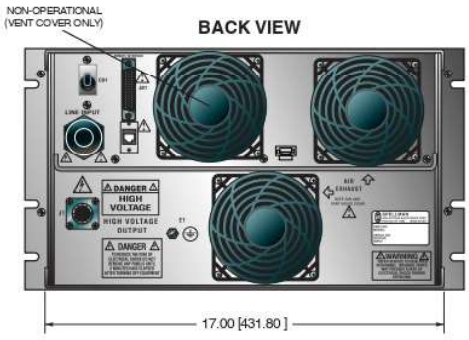
FRONT VIEW



TOP VIEW



BACK VIEW



ST 12kW->100kW POWER SUPPLY

- ***12kW's in Single 6U (10.5") Chassis***
- ***Models from 1kV to 225kV***
- ***Remote Analog and Remote Ethernet Interface***
- ***Parallel Units for >100kW's***
- ***Arc and Short Circuit Protected***
- ***Customer Configurable Features Via Ethernet Interface***
- ***OEM Customization Available***

ST Series of 12kW high voltage power supplies are available in positive or negative polarities in 20 different models with outputs ranging from 1kV to 225kV. A full featured front panel allows easy local control, while an extensive analog interface provides comprehensive remote capability. The standard Ethernet and RS-232 digital interfaces simplify integrating the ST into your system design.

The ST's robust IGBT inverter is inherently fault tolerant and is ideal for demanding applications like semiconductor processing and vacuum deposition. Many operational features can be configured by the user to suit their particular requirements. Power >100kW's can be provided by configuring additional chassis in parallel.

TYPICAL APPLICATIONS

Ion Beam Implantation
Semiconductor Processing
Electron Beam Welding
Capacitor Charging
High Power RF Transmitters
Electrostatic Precipitators
X-Ray Systems

HARDWARE BASED OPTIONS

BFP	Blank Front Panel
HS	High Stability
LL(X)	High Voltage Cable Length
400VAC	360-528Vac Input

SOFTWARE CONFIGURABLE FEATURES

Adjustable Overload Trip
Arc Trip Count
Arc Quench Time
Arc Re-Ramp Time
Constant Power Control
Adjustable Power Trip
Slow Start Ramp Times

SPECIFICATIONS

Input Voltage:
Standard: 180-264Vac, 50/60Hz, three phase, 90% efficiency, 0.85 power factor
Optional: 360-528Vac 50/60Hz, three phase (400Vac)

Input Current:
Standard: 180-264Vac, three phase; 50 amps, maximum
Optional: 360-528Vac, three phase; 25 amps, maximum

Output Voltage:
20 models from 1kV to 225kV. Each model is available with positive or negative outputs. 1kV to 10kV units are internally reversible.

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

Voltage Regulation:
Load: 0.05% of full voltage +500mV for full load change.
Line: 0.05%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:
0.3% p-p +1Vrms. Lower ripple available via special order

Stability:
0.02%hr. after 1 hour warm-up.

Temperature Coefficient:
100ppm/°C. Higher stability (50ppm/°C) available on special order via the HS option

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; inlet through side panels, outlet at rear panel

Metering:
Digital voltage and current meters, accurate to within 1%

System Status Display:
"Dead Front" type indicators provide status of up to 12 system operations including voltage and current regulation, fault conditions and circuit control.

Input Line Connector:
A 6 foot (1.8 meter) long captive line cord is provided.

Analog Interface Connector:
50 pin female D connector

High Voltage Output Cable:
1-150kV: A detachable 10' (3.05m) long shielded HV cable is provided
225kV: R-28 type X-Ray connector. No output cable is provided

Dimensions:
1kV to 120kV:
10.5˝ (6U)H X 19˝ W X 21˝ D (266mm x 482mm x 533mm)
150kV:
10.5˝ (6U)H X 19˝ W X 23˝ D (266mm x 482mm x 584mm)
225kV:
20.55˝ H X 17.01˝ W X 29.7˝ D (521mm x 432mm x 754mm)

Weight:
1kV to 50kV: <100 pounds (45.36kg)
60kV to 120kV: <140 pounds (63.50kg)
150kV: <150 pounds (68.03kg)
225kV: <260 pounds (117.9kg)

Individual kV models may vary

Regulatory Approvals:
Compliant to EEC EMC Directive. Compliant to EEC Low Voltage Directive. RoHS Compliant.

Electronic Component (Power Source)

ST series is intended for installation as a component of a system.
It is designed to meet CE standards, with conditions of acceptance often being: customer provided enclosure mounting, EMC filtering, and appropriate protection, and isolation devices. The ST series is not intended to be operated by end users as a stand-alone device. The ST series power supply can only be fully assessed when installed within a system, and as a component part within that system.

Parallel Capability

The ST series is designed to offer additional power capability by adding chassis in parallel to create a Master/Slave configuration providing up to and beyond 100kW's. The Master chassis is the point of connection for customer interfacing; this multi-chassis system effectively functions as a single power supply. The Master unit retains the full featured front panel, while slave units have a Blank Front Panel. To configure an orderable model number, simply use applicable base ST model number and increment the power denominator in 12kW steps as required:

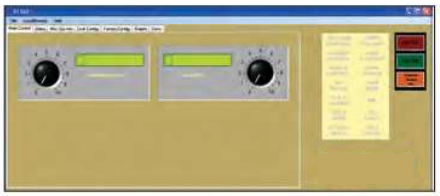
ST60P24 This would be an ST with a 60kV, positive polarity, providing 24kW's of power (2 chassis)

Rear panel showing connections for parallel operation

Master/slave 24kW ST

Digital Interface

The ST features a standard RS-232 and Ethernet digital interface. Utilizing these standard digital interfaces can dramatically simplify power supply interfacing requirements saving the user both time and money, while enhancing functionality and overall capability. provides a GUI with the ST that allows the customer to both customize operational features of the ST while also providing basic power supply operational features. Details of the ST's digital interface capability are described in the ST manual, downloadable via the link on the first page of this data sheet.



Main control screen

Status screen

User configuration screen

Arc Intervention

ST power supplies have an arc intervention feature that senses arc currents via a fast acting current sense transformer. The purpose of the arc intervention circuitry is to prevent power supply damage from continuous, long term arcing. The factory default configuration will trip off the unit with an Arc Fault if 4 arcs occur in a 10 second time period. Customers can change basic arc intervention parameters (Arc Count, Arc Quench, Reramp Time, and Window Time) within preset limits via the digital interface interface; customized units can be provided for unique arc prone environments,

ST SELECTION TABLE

MAXIMUM RATING		MODEL NUMBER
kV	mA	
1	12,000	ST1*12
2	6,000	ST2*12
3	4,000	ST3*12
4	3,000	ST4*12
6	2,000	ST6*12
8	1,500	ST8*12
10	1,200	ST10*12
12	1,000	ST12*12
15	800	ST15*12
20	600	ST20*12
30	400	ST30*12
40	300	ST40*12
50	240	ST50*12
60	200	ST60*12
70	171	ST70*12
80	150	ST80*12
100	120	ST100*12
120	100	ST120*12
150	67	ST150*10
225	40	ST225*10

*Substitute "P" for positive polarity and "N" for negative polarity. Polarity must be specified at time of order.
1-10kV units are inherently reversible by design requiring an internal wiring change to swap polarities. Intermediate voltage units are available by special order. 150kV and 225kV units are limited to a maximum output of 10kW's

NOTE: ST225 units cannot be paralled!

Parallel operation:
Additional power can be provided in increments of 12kW's by connecting chassis in parallel via the use of the ST's master/slave configuration.

Use the applicable base ST model number and increment the power denominated in 12kW steps as required.

ST10P24 10kV @ 24kW's
ST10P36 10kV @ 36kW's
ST10P48 10kV @ 48kW's

ST 1-150kV rear panel view

ST 225V rear panel view

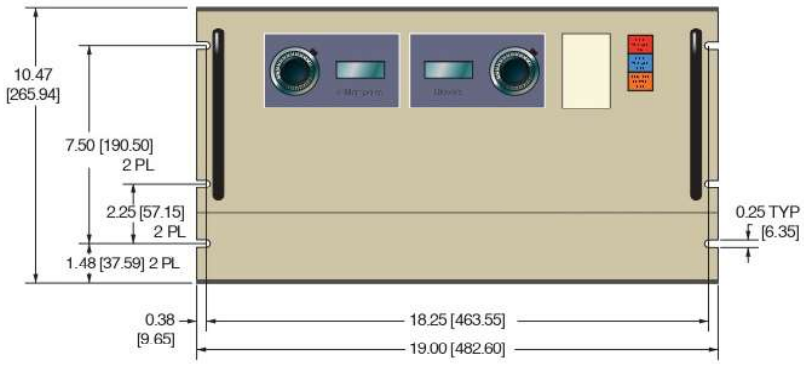
JB1 ST ANALOG INTERFACE— 50 PIN FEMALE D CONNECTOR

PIN	SIGNAL	PARAMETERS
1	Power Supply Common	Power Supply Ground
2	Reset/HV Inhibit	Normally open, Low = Reset/Inhibit
3	External Interlock	+24Vdc @ open, <25mA @ closed
4	External Interlock Return	Return for External Interlock
5	mA Test Point	0-10Vdc = 0-100% rated output, Zout= 1KΩ, 1%
6	kV Test Point	0-10Vdc = 0-100% rated output, Zout= 1KΩ, 1%
7	+10Vdc Reference Output	+10Vdc @ 1mA
8	mA Program Input	0-10Vdc = 0-100% rated output, Zin>10MΩ
9	Local mA Program Output	0-10Vdc = 0-100% rated output, front panel pot
10	kV Program Input	0-10Vdc = 0-100% rated output, Zin>10MΩ
11	Local kV Program Output	0-10Vdc = 0-100% rated output, front panel pot
12	Remote Power On Output	+24Vdc @ open, 2A peak, 1Adc @ closed
13	Remote Power On Return	Return for Remote Power On
14	Remote HV Off	+24Vdc @ open, 2A peak, 1Adc @ closed, connect to pin15 for front panel operation
15	Remote HV Off/On Common	HV On/Off Common
16	Remote HV On	+24Vdc @ open, 2A peak, 1Adc @ closed, momentarily connect to pin 15 enable high voltage
17	HV Off Indicator	+24Vdc @ 25mA = HV Off
18	HV On Indicator	+24Vdc @ 25mA = HV On
19	Power Supply Common	Supply Ground
20	+24Vdc Output	+24Vdc @ 100mA, maximum
21	Voltage Mode Status	Open Collector, Low = Active
22	Current Mode Status	Open Collector, Low = Active
23	Power Mode Status	Open Collector, Low = Active
24	Interlock Closed Status	Open Collector, Low = Active
25	Power Test Point	0-10Vdc = 0-100% rated output, Zout= 5KΩ, 1%
26	Spare	
27	Spare	
28	Remote Overvoltage Adjust	0-10Vdc = 0-100% rated output
29	Over Power Fault	Open Collector, Low = Active
30	Over Voltage Fault	Open Collector, Low = Active
31	Over Current Fault	Open Collector, Low = Active
32	System Fault	Open Collector, Low = Active
33	RGLT Error Fault	Open Collector, Low = Active
34	Arc	Open Collector, Low = Active
35	Over Temp Fault	Open Collector, Low = Active
36	AC Fault	Open Collector, Low = Active
37	Spare	
38	Spare	
39	Spare	
40	Spare	
41	Spare	
42	Remote Power Program Input	0-10Vdc = 0-100% rated output, Zin>10MΩ
43	Local Power Program Output	0-10Vdc = 0-100% rated output, internal pot
44	+5Vdc Output	+5Vdc @ 100mA, maximum
45	+15Vdc Output	+15Vdc @ 100mA, maximum
46	-15Vdc Output	-15Vdc @ 10mA, maximum
47	RS232 Tx	
48	RS232 Rx	
49	RS232 GND	
50	Power Supply Common	Power Supply Ground

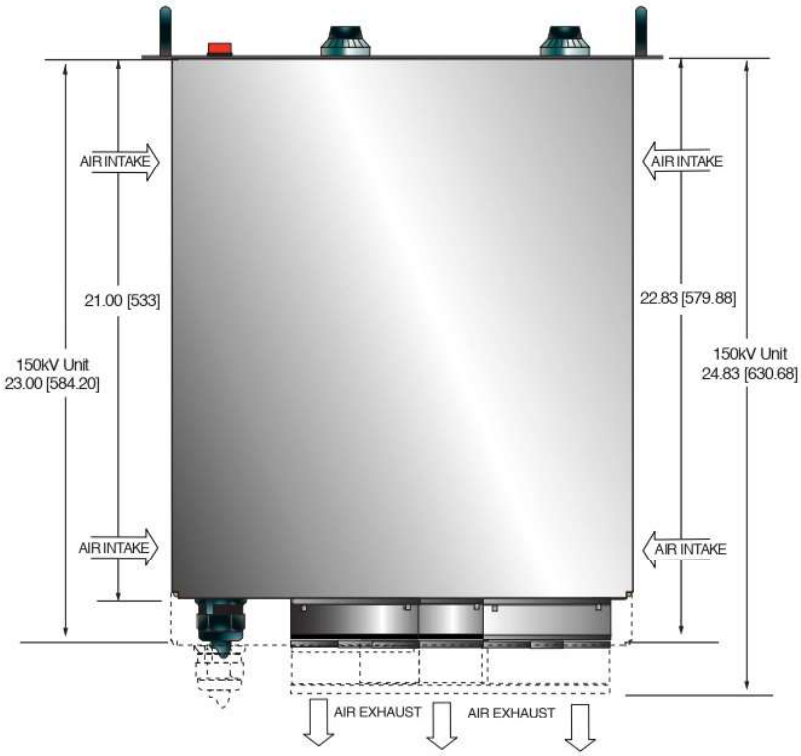
DIMENSIONS: in.[mm]

ST 1kV-150kV

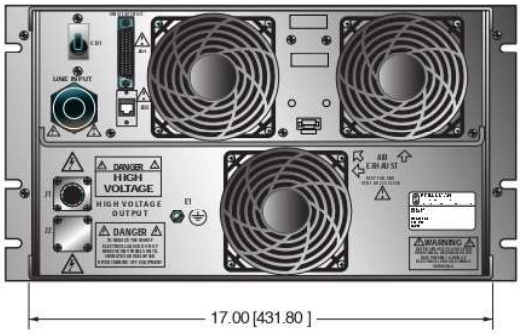
FRONT VIEW



TOP VIEW



BACK VIEW

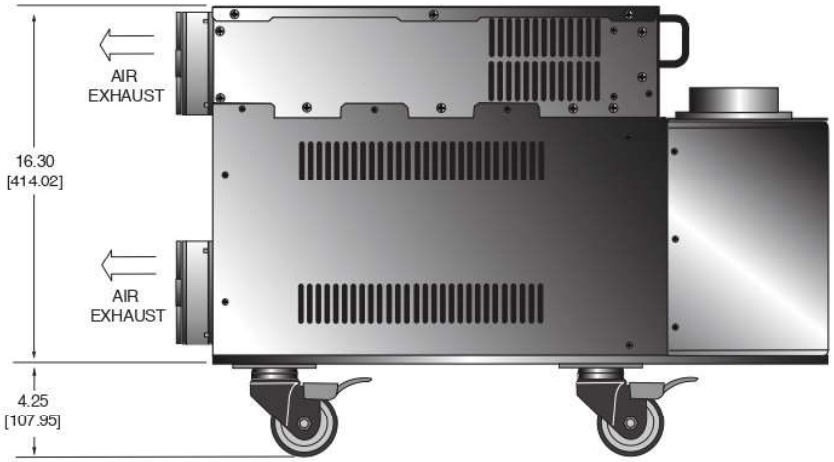


DIMENSIONS: in.[mm]

ST 225kV

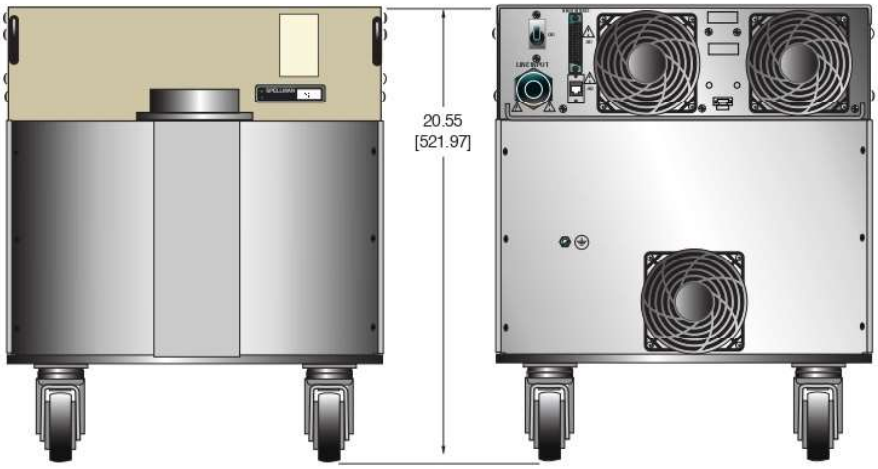
TOP VIEW

SIDE VIEW



FRONT VIEW **REAR VIEW**

NOTE:
Blank front
panel on
ST 225kV units



CZE1000R AUTO-REVERSING POWER SUPPLY

- ***Ideal for Electrospinning***
- ***0-30kV Local or Remote Programming***
- ***0-300µA 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***

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:
Designed to meet EEC EMC Directive. Designed to meet EEC Low Voltage Directive.

CZE1000R AUTO-REVERSING POWER SUPPLY

CZE1000R TERMINAL BLOCK 14 PIN

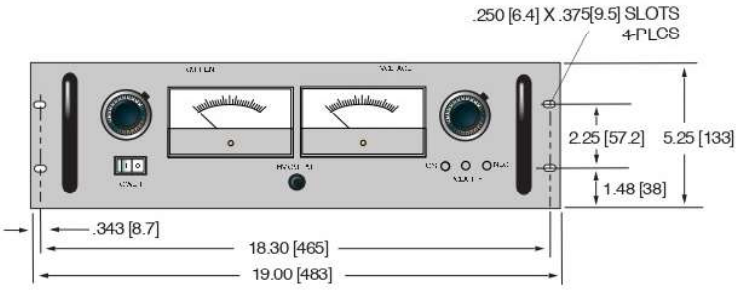
PIN	SIGNAL	PARAMETERS
1	+10Vdc Reference Output	+10Vdc, 4mA maximum
2	Internal Voltage Control	Front Panel Program Voltage (programming potentiometer)
3	Voltage Program Input	0 to 10Vdc = 0 to 100% rated output, Zin =10MΩ
4	Internal Current Control	Front Panel Current Control (programming potentiometer)
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

DIMENSIONS: in.[mm]

FRONT VIEW



TOP VIEW

BACK VIEW

EVA 3/6/12kW EVAP POWER SUPPLY

HIGH VOLTAGE ELECTRONICS CORPORATION

12kW 10.50" (6U) Chassis

- ***Specially Designed for E Beam Coating Applications***
- ***3kW, 6kW and 12kW Power Levels***
- ***Remote Analog and Ethernet/RS-232 Interface***
- ***Arc and Short Circuit Protected, Fast Arc Recovery***
- ***User Configurable Dynamic Arc Intervention***
- ***Optional Filament Gun Supply (up to 3 channels)***
- ***OEM Customization Available***

EVA Series is specifically designed for demanding electron beam coating applications. A full featured front panel provides local control, while an extensive analog interface allows remote capability. The included Ethernet and RS-232 digital interfaces simplify integrating the EVA into your system design.

The EVA's robust IGBT inverter design is inherently fault tolerant. The proprietary low capacitance, low stored energy high voltage output section is ideal for dynamic load and fault conditions encountered in coating applications. Fast arc recovery times (<2ms) minimize process interruptions. Many operational parameters can be configured by the user to suit their particular requirements via the provided graphical user interface (GUI).

An optional filament gun supply is available. The EVA can support one, two or three filament gun supply channels providing unprecedented flexibility and cost effectiveness.

3kW/6kW 5.25" (3U) Chassis

HARDWARE BASED OPTIONS

3PH	180-264Vac Three Phase Input
1PH	180-264Vac Single Phase Input (3kW & 6kW only)
400VAC	360-528Vac, Three Phase Input (6kW & 12kW only)
LL(X)	High Voltage Cable Length
HV2	Two High Voltage Output Connectors
HV3	Three High Voltage Output Connectors
FIL1	Filament Gun Supply—One Channel
FIL2	Filament Gun Supply—Two Channels
FIL3	Filament Gun Supply—Three Channels
HPF	50 Amp Filament Supply

SOFTWARE CONFIGURABLE FEATURES

Adjustable Overload Trip
Arc Trip Count
Arc Quench Time
Arc Reramp Time
Arc Window Time

3/6/12KW HV SPECIFICATIONS

Input Voltage: (must be specified at time of order)

Option 3PH:	180-264Vac, 50/60Hz, three phase, 90% efficiency, 0.85 power factor
Option 1PH:	180-264Vac 50/60Hz, single phase, 90% efficiency, 0.65 power factor (3kW & 6kW only)
Option 400VAC:	360-528Vac 50/60Hz, three phase, 90% efficiency, 0.85 power factor (6kW & 12kW only)

Input Current:

Option 3PH:	180-264Vac, 50/60Hz, three phase 3kW—13 amps, maximum 6kW—25 amps, maximum 12kW—50 amps, maximum
Option 1PH:	180-264Vac, 50/60Hz, single phase 3kW—29 amps, maximum 6kW—57 amps, maximum
Option 400VAC:	360-528Vac, 50/60 Hz, three phase, 6kW—13 amps, maximum 12kW—25 amps, maximum

Output Voltage:
5kV @ 600mA, negative polarity. 3kW maximum.
10kV @ 600mA, negative polarity. 6kW maximum.
10kV @ 1200mA, negative polarity. 12kW maximum.

Local Output Controls:
Voltage is continuously adjustable over entire range via a 10 turn potentiometer.

Voltage Regulation:
Load: 0.05% of full voltage +500mV for full load change.
Line: 0.05%of full voltage +500mV over specified input range.

Ripple:
<3% Vrms

Stability:
0.02%hr. after 1 hour warm-up.

Temperature Coefficient:
100ppm/°C.

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; inlet through side panels, outlet at rear panel

Metering:
Front panel digital voltage and current meters, 3.5 digit, accurate to within 1%.

3/6/12KW HV SPECIFICATIONS

System Status Display:
"Dead Front" type indicators provide status of up to 12 system parameters including voltage regulation, fault conditions and circuit control.

Input Power Connector:
A 6 foot (1.8 meter) long captive line cord will be provided.

Analog Interface Connector:
50 pin female D connector

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

Dimensions:
3kW/6kW Units:
5.25"(3U)H x 19" W x 21" D (133mm x 482mm x 533mm)
12kW Units:
10.5"(6U)H x 19" W x 21" D (266mm x 482mm x 533mm)

Weight:
3kW/6kW Units: 46 pounds (20.87kg)
12kW Units: 90 pounds (40.82kg)

Regulatory Approvals:
Compliant to EEC EMC Directive. Compliant to EEC Low Voltage Directive. UL/CUL recognized file E227588. RoHS compliant.

Digital Interface

The EVA features a standard RS-232 and Ethernet digital interface, simplifying power supply communication requirements saving the user time and money, while enhancing functionality and overall capability. provides a GUI allowing customization of operational features while also providing basic power supply functionality and control via a sample simulated front panel.

Arc Intervention

EVA power supplies sense arc events via a fast acting current sense transformer. The arc intervention circuitry prevents power supply damage from continuous, long term arcing. Customers can change arc intervention parameters (Arc Count, Arc Quench, Reramp Time, and Window Time) within preset limits via the provided GUI. Customized units can be configured for unique arc prone environments,

Additional High Voltage Output Connectors

EVA is designed to provide 1, 2 or 3 parallel configured high voltage output connectors. The standard unit provides one high voltage output connector. If you intend to use the EVA in a multi channel application but want to utilize your own filament power supply, this factory installed option provides the additional high voltage connections required. Hardware Option HV2 provides two high voltage output connectors, while Hardware Option HV3 provides three high voltage output connectors.

Optional Beam Controller (Filament Power Supply) and Gun Output Box

Multiple beam control units can be provided, allowing 1, 2 or 3 separate electron guns to be independently operated.

Each beam control unit consists of a beam controller and a gun output box. The beam controller is a 1U rack-mounted chassis containing the filament power, control and emission regulation circuitry. The gun output box contains the high frequency filament transformer which is referenced to the high voltage output potential. This box should be mounted close to the electron gun to minimize the length of the high current filament connections. The box also contains electron gun emission current monitoring circuitry and provides a feedback signal used to regulate the electron gun emission current.

Each beam control channel, if operated alone, can utilize 0 to 100% of the rated emission current capacity. When two or three beam control channels are used at the same time, the total system emission current capacity remains the same. Individual channel programming must be done such that the total current does not exceed the system's total emission current available.

BEAM CONTROLLER SPECIFICATIONS

Input Voltage:
180-264 Vac, 50/60Hz, single phase, 7.5 amps maximum

Output Voltage/Current:
0-12Vrms at ≈ 30kHz, 0-35 amps. An optional 50 amp filament (HPF) is available.

Metering:
Front panel digital filament current and emission current meters, 3.5 digit, accurate to within 1%.

System Status Display:
"Dead Front" type indicators provide status of up to 12 system operations including voltage regulation, fault conditions and circuit control.

Input Power Connector:
A 6 foot (1.8 m) long IEC320 Cord Set will be provided.

BEAM CONTROLLER SPECIFICATIONS

Analog Interface Connector:
Male 25 pin D connector

Filament Output Connections: (gun drive cable)
The secondary leads of the filament power transformer exiting the gun output box are 36" (91.44cm) long. The cover of this box is interlocked for safety purposes.

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; inlet through side panels, outlet at rear panel.

Dimensions:

Beam Controller:
1.75"H (1U) x 15" W x 19"D (44.5 x 381 X 482.6mm)

Gun Output Box:
4.06"H x 6.13"W x 11"D (103.2 x 155.7 x 279.4mm)

Weight:

Beam Controller:
18 pounds (8.1kg)

Gun Output Box:
6 pounds (2.7kg)

Emission current is programmed locally (front panel adjustment) or remotely (0-10Vdc = 0-100% of rated current) via each beam controller. Filament Limit Set Point, Filament PreHeat Set Point, and Automatic. Filament PreHeat functionality are provided.

EVA MODEL CONFIGURATION

Ordering:

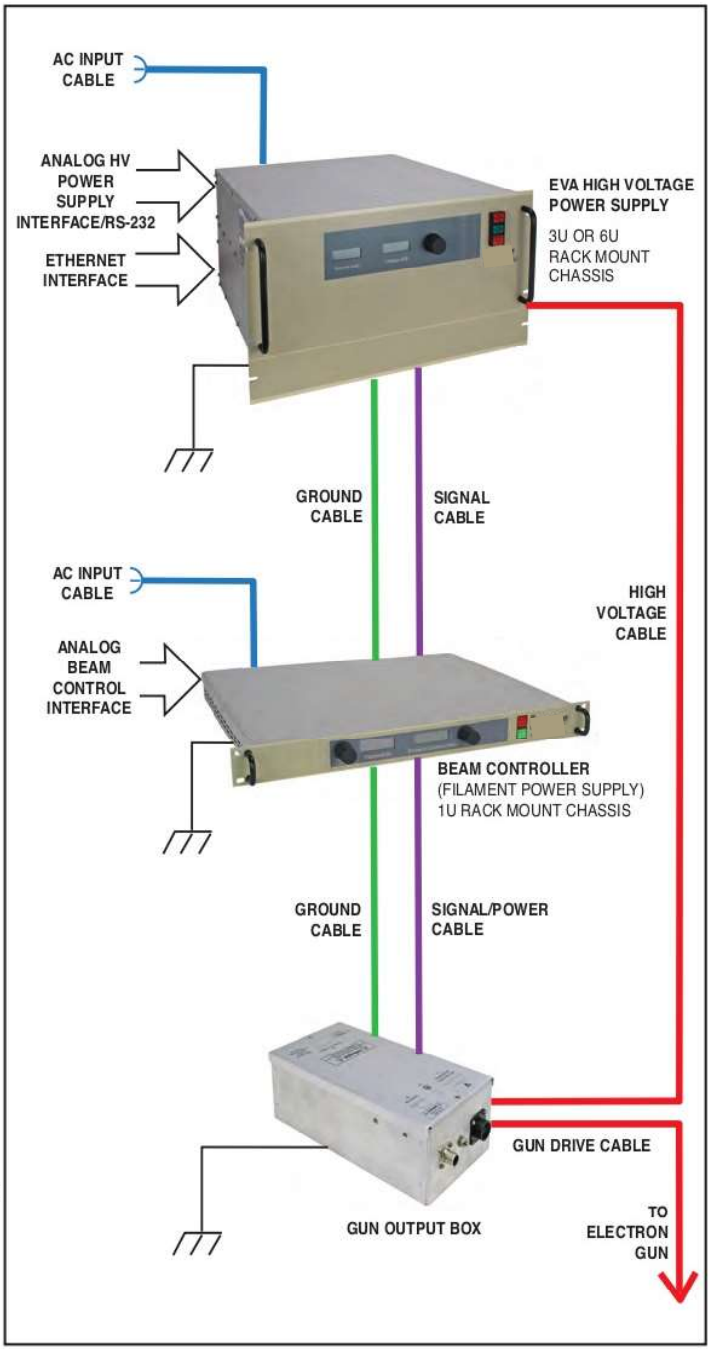
EVA5N3/1PH	3 kilowatt unit, single phase
EVA10N6/3PH	6 kilowatt unit, three phase
EVA10N12/400VAC	12 kilowatt unit, 360-528Vac

Note: Input voltage must be specified at time of order. EVA model number must contain input voltage option code to be valid.

Sample Options:

EVA10N6/1PH/HV2	Single Phase Input & 2 HV Connectors
EVA10N12/400VAC/FIL3	360-528Vac Input & 3 Gun Supplies

TYPICAL EVA OPERATING SETUP



The signal cable connecting the high voltage power supply to the beam controller is 39.4" (1m) long. A captive but field replacable 10 foot (3.05m) long high voltage cable is provided to connect each beam control output box to the high voltage power supply.

HV POWER SUPPLY INTERFACE— 50 PIN FEMALE D CONNECTOR

PIN	SIGNAL	PARAMETERS
1	Power Supply Common	Power Supply Ground
2	Reset/HV Inhibit	Normally open, Low = Reset/Inhibit
3	External Interlock	+24Vdc @ open, <25mA @ closed
4	External Interlock Return	Return for External Interlock
5	mA Test Point	0-10Vdc = 0-100% rated output, Zout= 1KΩ, 1%
6	kV Test Point	0-10Vdc = 0-100% rated output, Zout= 1KΩ, 1%
7	+10Vdc Reference Output	+10Vdc @ 1mA
8	mA Program Input	0-10Vdc = 0-100% rated output, Zin>10MΩ
9	Local mA Program Output	0-10Vdc = 0-100% rated output, front panel pot
10	kV Program Input	0-10Vdc = 0-100% rated output, Zin>10MΩ
11	Local kV Program Output	0-10Vdc = 0-100% rated output, front panel pot
12	Remote Power On Output	+24Vdc @ open, <25mA @ closed
13	Remote Power On Return	Return for Remote Power On
14	Remote HV Off	+24Vdc @ open, <25mA @ closed, connect to pin15 for front panel operation
15	Remote HV Off/On Common	HV On/Off Common
16	Remote HV On	+24Vdc @ open, <25mA @ closed, momentarily connect to pin 15 enable high voltage
17	HV Off Indicator	+24Vdc @ 25mA = HV Off
18	HV On Indicator	+24Vdc @ 25mA = HV On
19	Power Supply Common	Supply Ground
20	+24Vdc Output	+24Vdc @ 100mA, maximum
21	Voltage Mode Status	Open Collector, Low = Active
22	Current Mode Status	Open Collector, Low = Active
23	Spare	
24	Interlock Closed Status	Open Collector, Low = Active
25	Spare	
26	Spare	
27	Spare	
28	Remote Overvoltage Adjust	0-10Vdc = 0-100% rated output
29	Spare	
30	Over Voltage Fault	Open Collector, Low = Active
31	Over Current Fault	Open Collector, Low = Active
32	System Fault	Open Collector, Low = Active
33	RGLT Error Fault	Open Collector, Low = Active
34	Arc	Open Collector, Low = Active
35	Over Temp Fault	Open Collector, Low = Active
36	AC Fault	Open Collector, Low = Active
37	Spare	
38	Spare	
39	Spare	
40	Spare	
41	Spare	
42	Spare	
43	Spare	
44	+5Vdc Output	+5Vdc @ 100mA, maximum
45	+15Vdc Output	+15Vdc @ 100mA, maximum
46	-15Vdc Output	-15Vdc @ 10mA, maximum
47	RS232 Tx	
48	RS232 Rx	
49	RS232 GND	
50	Power Supply Common	Power Supply Ground

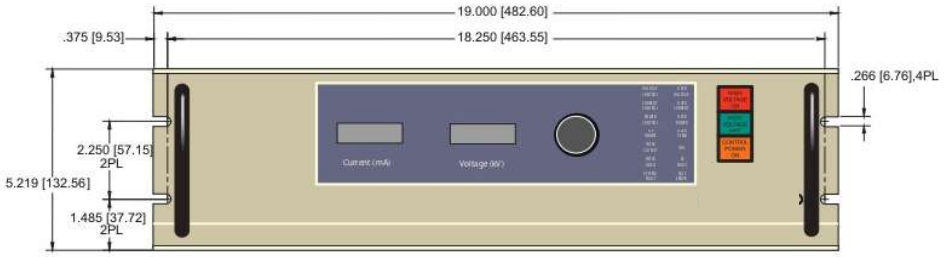
BEAM CONTROLLER INTERFACE— 25 PIN FEMALE D CONNECTOR

PIN	SIGNAL	SIGNAL PARAMETERS
1	Power Supply Common	Signal Ground
2	Spare	
3	External Interlock	+15Vdc at Open, <15mA @ Closed
4	External Interlock Return	Return for Interlock
5	Filament Current Test Point	0 to 10Vdc = 0 to 100% rated output
6	Beam Current Test Point	0 to 10Vdc = 0 to 100% rated output
7	+10Vdc Reference	+10Vdc, 1mA Max
8	Filament Limit Program Input	0 to 10Vdc = 0 to 100% rated output
9	Local Filament Limit Program	Front panel potentiometer wiper
10	Beam Current Program Input	0 to 10Vdc = 0 to 100% rated output
11	Local Beam Current Program	Front panel potentiometer wiper
12	Filament Preheat Program In	0 to 10Vdc = 0 to 100% rated output
13	Local Fil. Preheat Program	Internal potentiometer
14	Beam Off	+15Vdc at Open, <25mA @ Closed
15	Beam On/Off Common	Connect together for FP operation
16	Beam On	Momentarily connect to pin 15 = Beam On
17	Remote Beam Off Indicator	0=Beam On, +15V, 10mA Max=Beam
Off		
18	Remote Beam On Indicator	0=Beam Off, +15V, 10mA Max=Beam
On		
19	Spare	
20	Spare	
21	Spare	
22	Remote PS Fault	0 = Fault, +15Vdc @ 0.1mA = No Fault
23	Spare	

DIMENSIONS: in.[mm]

3U 6kW Power Supply

FRONT VIEW



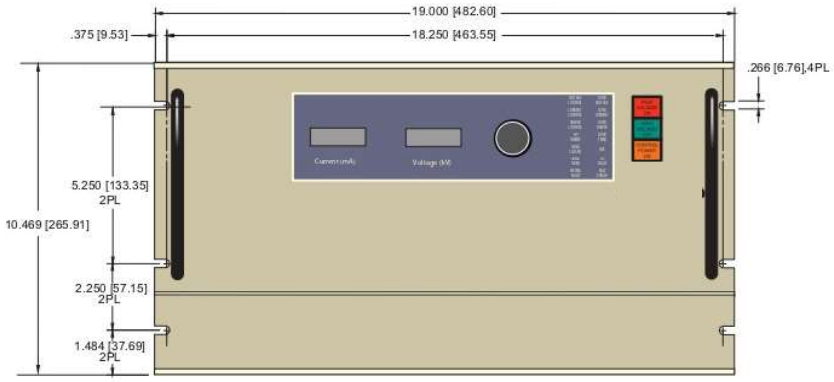
TOP VIEW

BACK VIEW

DIMENSIONS: in.[mm]

6U 12kW Power Supply

FRONT VIEW



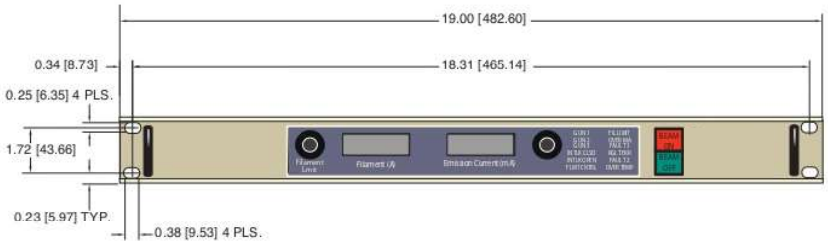
TOP VIEW

BACK VIEW

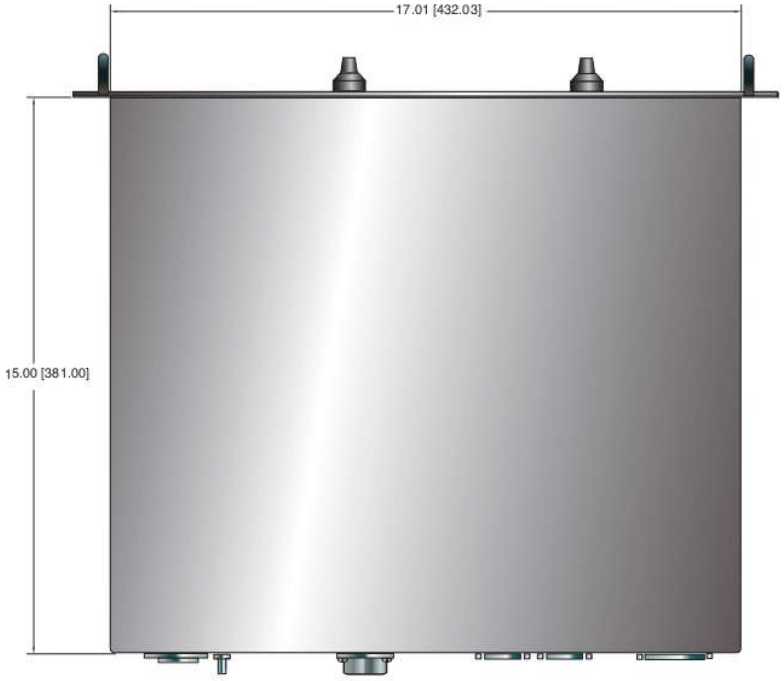
DIMENSIONS: in.[mm]

Beam Controller

FRONT VIEW



TOP VIEW

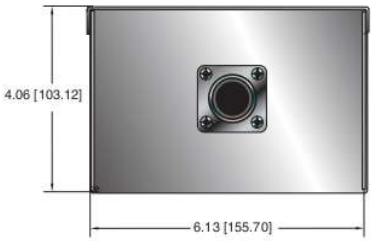


BACK VIEW

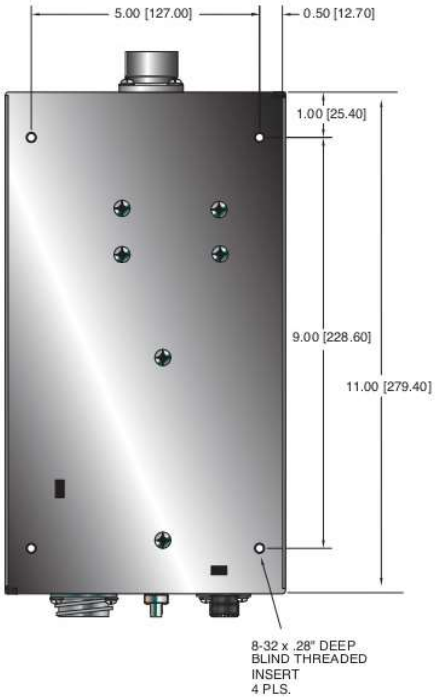
DIMENSIONS: in.[mm]

Gun Output Box

FRONT VIEW



TOP VIEW



BACK VIEW