

LAS SERIES

Up to 160kV and Up to 1.5kW



LAS SERIES

LAS Series of high voltage power supplies are designed to satisfy high performance standards in a minimum of space. The circuitry includes a power factor corrector, a high frequency inverter with proprietary control which provides full protections against over voltage, over current, and in extreme transient and arcing environments. These full featured supplies are available in a wide range of outputs.

TYPICAL APPLICATION

Analytical X-ray
Electrostatics
E-Beam Systems

Capacitor Charging
Hipot Testing
General Laboratory

FEATURES

Arc Quench. The HV output is inhibited for a short period after each load arc to help extinguish the arc.

Arc Count. Internal circuitry constantly senses and integrates arcs that occur over a given time. In the event a system or load arcing problem develops and exceeds factory-set parameters, the power supply will cycle off in an attempt to clear the fault and then automatically restart after a pre-set “off dwell time”.

Pulse-Width Modulation. Off-the-line pulse-width modulation provides high efficiency and a reduced parts count for improved reliability.

Embedded Microcontroller control. Front panel digital encoders provide high resolution local adjustment of voltage and current program. Integral RS-232, USB and optional ethernet communications provide remote control program and monitor.

Voltage and Current Control Mode, Interlock Open/Closed, High Voltage Inhibit, Overcurrent and Overvoltage, Arc, Regulation Error, Overtemperature, Over Power (optional).

Models available from 1kV to 160kV. Each model is available in positive or negative.

Voltage and current are continuously adjustable by rotary encoders, stand by button, high voltage ON/OFF switch/indicator.

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:

For 600W and less, input voltage is from 100Vac to 240Vac, 50/60Hz. Specify with order. For input current see table on page 3.

Output:

Models available from 1kV to 160kV. Each model is available in positive or negative.

Front Panel Controls:

Voltage and current are continuously adjustable by rotary encoders, standby button, high voltage ON/OFF switch/indicator.

Voltage Regulation:

Load: 0.05% of maximum voltage +10V for full load change.

Line: $\pm 0.05\%$ of full voltage +2V over specified input range

Current Regulation:

Load: 0.05% of maximum current $\pm 100\mu\text{A}$ for full voltage change.

Line: $\pm 0.05\%$ of maximum current for a $\pm 10\%$ input line change.

Ripple:

0.1% p-p +1Vrms.

Temperature Coefficient:

100ppm/ $^{\circ}\text{C}$ voltage or current regulated.

Voltage Rise/Decay Time Constant:

The voltage rise time constant is 300 ms typical for all models using either HV enable or remote programming control.

The voltage decay time constant is 300 ms with a 50% resistive load for 70 kV to 160 kV models and 200 ms with a 50% resistive load for 12 kV to 60 kV models and 50 ms with a 50% resistive load for 1 kV to 10 kV models.

Slow Start:

Adjustable ramp time from 0.3 to 30 seconds. Output ramps from 0 V to programmed voltage level.

Polarity:

Available with either positive, negative to chassis ground.

Protection:

Automatic current regulation protects against all overloads, including arcs and short circuits.

Thermal switches and RPM sensing fans protect against thermal overload. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

Arc Count:

Internal circuitry senses the number of arcs caused by external load discharges. If the rate of consecutive arcs exceeds approximately one arc per second for five arcs, the supply will turn off.

External Interlock:

Open = HV ON Disable,
Closed = HV ON Enable.

Stability:

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

Dimensions:

1U: 1.75'H x 19'W x 19'D

(44.5mm x 482mm x 482mm).

2U: 3.5'H x 19'W x 19'D

(89mm x 482mm x 482mm).

Depth becomes 24'(607mm) for 70 to 130kV ranges.

4U: 7'H x 19'W x 24'D

(177.5mm x 482mm x 606mm).

Input Current

| MODEL | 110Vac | 220Vac |
|------------|--------|--------|
| ≤300 watt | 6A | 3A |
| ≤600 watt | 12A | 6A |
| ≤1000 watt | n/a | 10A |
| ≤1500 watt | n/a | 16A |

Electrical interfaces and functions

Front Panel Elements.

Output Voltage & Current Display:

3.5 Digit digital meters.

Indicators: AC Power, Current Mode, Voltage Mode, Pol +, Pol -, Fault, Fine Adjustment, Preset, Control Lock, Remote Enable, Remote Program, HV On.

AC Power: Rocker switch

Switches (momentary): HV On, SS Slope, Standby, Remote Enable, Remote Program, Preset, Fine Adjust, Control Lock.

Rotary Encoders: Voltage Adjust, Current Adjust.

Rear Panel Elements.

AC power entry connector, ground stud, HV output connector, remote interface connector and interlock studs. Integral RS-232, USB and optional ethernet communications provide remote control program and monitor.

Output Cable:

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

Weight:

8.8 to 103.4lbs (4 to 47kg) depending on model.

Regulatory Approvals:

Compliant to EEC EMC Directive and EEC Low Voltage

RS232/USB/Ethernet Programming and Monitor Accuracy:

Resolution: 0.025% of full scale for both the voltage and the current programs. 0.1% of full scale for both the voltage and the current monitors

Remote setting accuracy: Voltage setting accuracy is better than 0.5% of setting + 0.2% of rated.

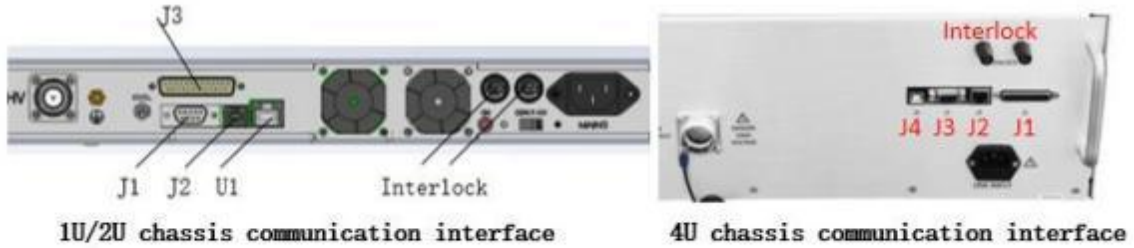
Remote reading accuracy: Voltage reading accuracy is 0.5% of reading + 0.2% of rated. Current reading accuracy is 1% of reading + 0.1% of rated.

The signals provided on the remote interface connector are as follows:

Inputs: Safety interlock, output voltage and current program signals, high voltage enable and remote HV on.

Outputs: Output voltage and current monitor signals, HV status, fault status, I/V mode status and a +5 V reference source.

Rear panel communication interface definition



| J1 RS232 | | J2 USB | | J3 DB25 | |
|----------|--|--------|--|--------------------|------------------|
| 2 TX1 | | 1 VCC | | 2 GND | 12 Ref +5V |
| 3 RX1 | | 2 DM | | 3 Interlock | 15 Remote Switch |
| 5 GND | | 3 DP | | 4 PLC Fault1 | 16 Remote Switch |
| | | 4 GND | | 5 PLC GND | 17 PLC 24V |
| | | 5 GND | | 6 Voltage Program | 18 PLC Fault2 |
| | | 6 GND | | 7 Current Program | 20 HV ON |
| | | | | 8 GND | 21 HV Status |
| | | | | 9 Voltage Monitor | 22 Fault Status |
| | | | | 10 Current Monitor | 23 CT/CL |
| | | | | 11 GND | 24 Spark |

| U1 ETHERNET | |
|-------------|--------------|
| 1 TX+ | 6 RX- |
| 2 TX- | 9 ACT LED+ |
| 3 RX+ | 10 ACT LED- |
| 4 CT | 11 LINK LED- |
| 5 CT | 12 LINK LED+ |

DB25 Definition

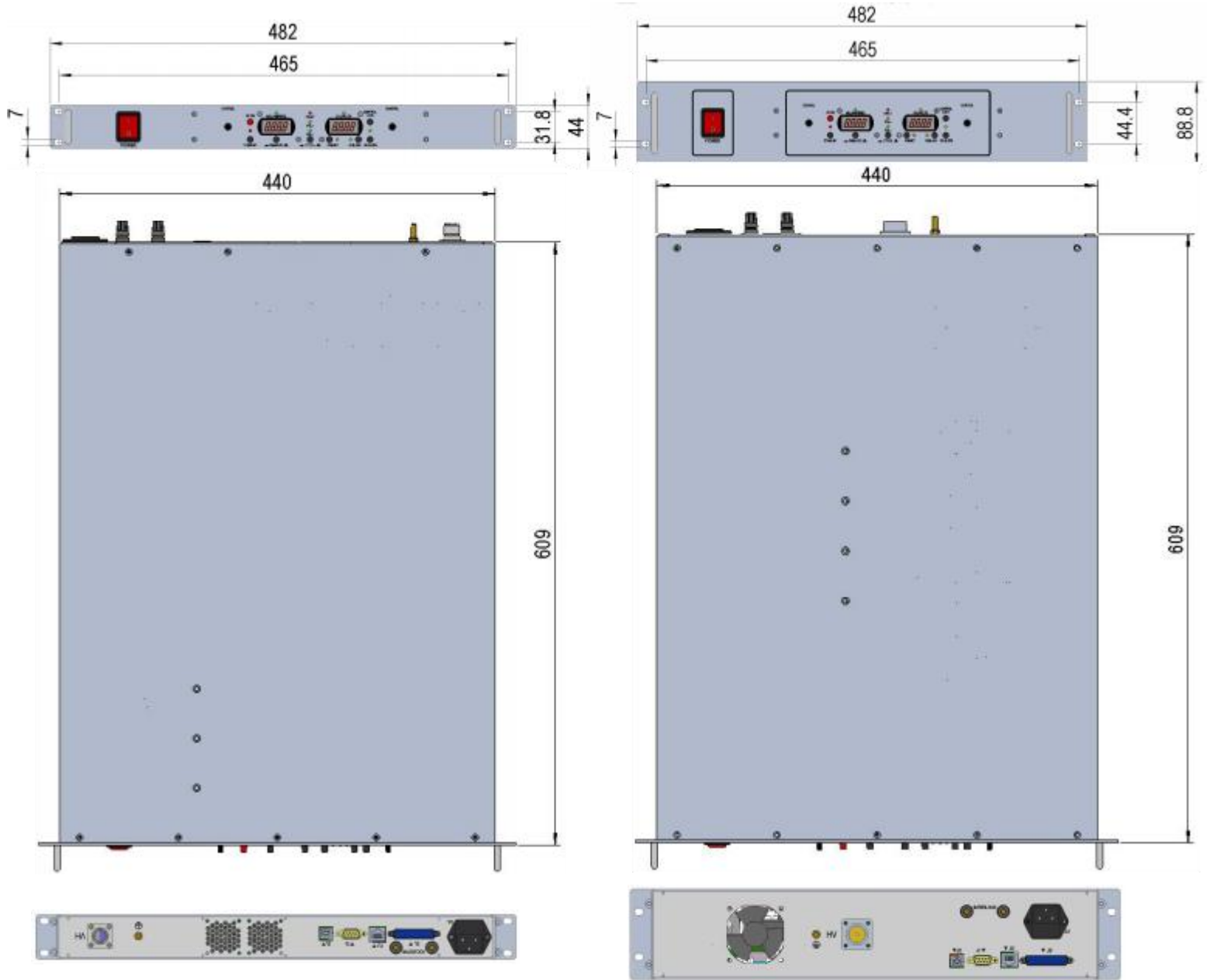
Red font: input signal Blue font: output signal

| PIN | SIGNAL | SIGNAL PARAMETERS |
|-------------------|-----------------|--|
| 1,13,14, 19,25 | NC | No connect |
| 2,8,11 | GND | Signal Ground |
| 3 | Interlock | Connect to GND=Interlock, Open=Uninterlock |
| 4 | PLC FAULT1 | See DB25 diagram, 0V=Fault (Output fault), +5V=No Fault (Normal) |
| 5 | PLC GND | GND of PLC |
| 6 | Voltage Program | 0 to 5V=0 to 100% Rated Output |
| 7 | Current Program | 0 to 5V=0 to 100% Rated Output |
| 9 | Voltage Monitor | 0 to 5V=0 to 100% Rated Output |
| 10 | Current Monitor | 0 to 5V=0 to 100% Rated Output |
| 12 | +5Vdc Reference | +5Vdc, 1mA Max |
| 15,16 | Remote Switch | Connect to +5V=BD25 Control, Open or Connect to GND=PC Control |
| 17 | PLC 24V | +24V voltage from PLC |
| 18 | PLC FAULT2 | See DB25 diagram, 0V=Fault (over Temp), +5V=No Fault (Normal), |
| 20 | HV ON | +5V=HV ON, OPEN=HV OFF |
| 21 | HV Status | See DB25 diagram, 0V=HV ON Status, +5V=HV OFF Status |
| 22 | Fault Status | See DB25 diagram, 0V=Fault, +5V=No Fault |
| 23 | CT/CL | Connect to GND=Current Trip, Open=Current Limit |
| 24 | Spark | 0V=Spark, +5V=No Spark |

DIMENSIONS: mm

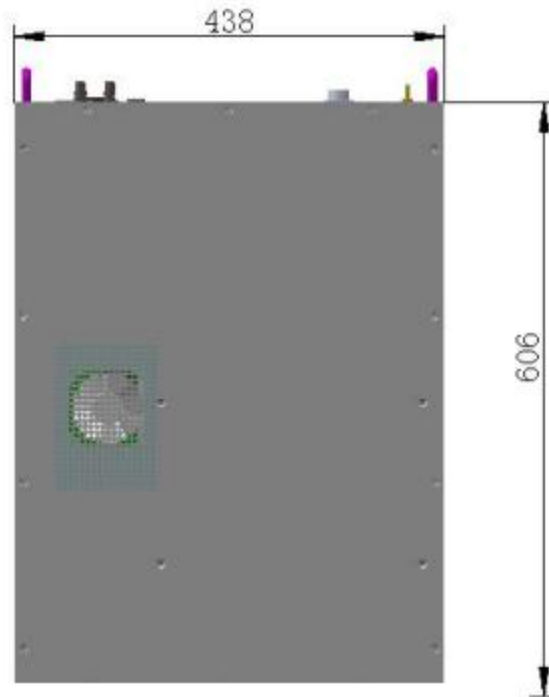
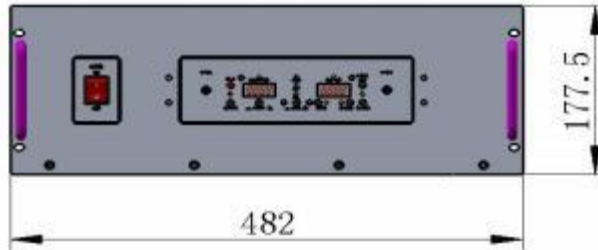
300W 1U

300W 2 U



DIMENSIONS: mm

600-1500W 4U



LAS1U SELECTION TABLE-300W

| 300 Watt | | |
|----------|------|---------------|
| kV | mA | Model |
| 1 | 30 | LAS1U1P/N300 |
| 2 | 15 | LAS1U2P/N300 |
| 3 | 10 | LAS1U3P/N300 |
| 6 | 5 | LAS1U6P/N300 |
| 8 | 3.75 | LAS1U8P/N300 |
| 10 | 3 | LAS1U10P/N300 |
| 15 | 2 | LAS1U15P/N300 |
| 20 | 1.5 | LAS1U20P/N300 |
| 30 | 1.0 | LAS1U30P/N300 |
| 40 | 0.75 | LAS1U40P/N300 |
| 50 | 0.60 | LAS1U50P/N300 |
| 60 | 0.50 | LAS1U60P/N300 |

LAS4U SELECTION TABLE-600W

| 600 Watt | | |
|----------|-----|----------------|
| kV | mA | Model |
| 1 | 600 | LAS4U1P/N600 |
| 2 | 300 | LAS4U2P/N600 |
| 3 | 200 | LAS4U3P/N600 |
| 6 | 100 | LAS4U6P/N600 |
| 8 | 75 | LAS4U8P/N600 |
| 10 | 60 | LAS4U10P/N600 |
| 15 | 40 | LAS4U15P/N600 |
| 20 | 30 | LAS4U20P/N600 |
| 30 | 20 | LAS4U30P/N600 |
| 40 | 15 | LAS4U40P/N600 |
| 50 | 12 | LAS4U50P/N600 |
| 60 | 10 | LAS4U60P/N600 |
| 70 | 8.5 | LAS4U70P/N600 |
| 80 | 7.5 | LAS4U80P/N600 |
| 100 | 6 | LAS4U100P/N600 |
| 120 | 5 | LAS4U120P/N600 |
| 130 | 4.5 | LAS4U130P/N600 |

LAS4U SELECTION TABLE 600-1500W

| 600-1500 Watt | | |
|---------------|------|-----------------|
| kV | mA | Model |
| 140 | 4 | LAS4U140P/N560 |
| 150 | 4 | LAS4U150P/N600 |
| 160 | 4 | LAS4U160P/N640 |
| 140 | 10 | LAS4U140P/N1400 |
| 150 | 10 | LAS4U150P/N1500 |
| 160 | 9.37 | LAS4U160P/N1500 |

LAS xU V P/N P

Model Size kV Polarity W

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