



### FEATURES

- **High Packing Density:** 10kW output power in 6U rack mounted chassis
- **Output voltages** from 1kV to 100kV
- **Parallel option** to give 20kW
- **Exceptional reliability** in severe electrical environments
- **High Stability**
- **Arc Count and Extinguish (ACE)**
- **Full Local & Remote control and monitoring**
- **Analogue or RS232 remote control**
- **Voltage or current control**
- **RoHS compliant to EU Directive 2002/05/EC**
- **CE Marked for EU LV Directive 73/23/EEC**

### DESCRIPTION

The Series OLS10K range of single output high voltage power supplies meets the exacting requirements found in electron and ion beam systems, ion implantation and X-ray equipment. There are 3 different input voltage variants available to order, the OLS10K (208VAC), the OLS10KC (380VAC) and the OLS10KE (400VAC).

Designed using the latest power switching IGBTs to ensure efficient and reliable operation over the full operating range, the Series OLS10K will give exemplary performance in the most severe of electrical environments. The Series OLS10K achieves an exceptionally high packing density for high voltage power supplies of this power level, giving 169W/Litre, 2.7W/inch<sup>3</sup>. The 6U construction allows operation at full power when close-mounted in a standard equipment rack, giving significant savings in rack space in large systems. Featuring HiTek Power's unique Arc Count and Extinguish (ACE) system for managing systems where load arcing is endemic, the Series OLS10K protects both itself and the load from damage that may be caused by excessive arcing whilst allowing normal operation to continue. The Series OLS10K features both analogue and remote control (optional RS232) interfaces. A full set of commands is available over the optional RS232 interface to control and monitor the operation of the power supply.

### SPECIFICATION

#### Output Power:

10kW maximum at full rated output voltage and current.

#### Output Voltage:

Units available with maximum output voltages from 1kV to 100kV.

#### Output Current:

Up to 10A for 1kV and 100mA for 100kV (see table).

#### Input Voltage:

OLS10K: 208VAC  $\pm 10\%$  (187VAC to 229VAC) 47-63Hz 3 phase plus protective earth.

OLS10KC: 380VAC  $\pm 10\%$  (342VAC to 418VAC) 47-63Hz 3 phase plus protective earth.

OLS10KE: 400VAC  $\pm 10\%$  (360VAC to 440VAC) 47-63Hz 3 phase plus protective earth.

#### Input Current:

OLS10K: Less than 36A per phase.

OLS10KC: Less than 22A per phase.

OLS10KE: Less than 22A per phase.

#### Polarity:

Positive or negative to order.

#### Specification Range:

Specifications apply above 5% of rated output voltage. The output can be controlled down to less than 0.25% of rated output voltage.

#### Voltage Ripple:

##### OLS10K:

Voltage Mode: Less than 0.05% of rated voltage +2V, peak to peak or less than 0.01% of rated voltage +1V, rms.

Current Mode: Less than 0.5% of rated voltage peak to peak or less than 0.1% of rated voltage rms.

# Series OLS10K

## 10kW HIGH VOLTAGE POWER SUPPLY



### OLS10KC & OLS10KE:

**Voltage Mode:** Less than 0.1% of rated voltage +2V, peak to peak or less than 0.02% of rated voltage +1V, rms.  
**Current Mode:** Less than 0.5% of rated voltage peak to peak or less than 0.1% of rated voltage rms.

### Voltage Regulation:

**Line:** Less than 0.01% +0.5V change in output voltage for a 10% change in line voltage.  
**Load:** Less than 0.01% +0.5V change in output voltage for 0 to 100% change in load current.

### Current Regulation:

**Line:** Less than 0.5% of rated current for a  $\pm 10\%$  change in line voltage.  
**Load:** Less than 0.5% of rated current for 0 to 100% change in output voltage.

### Calibration:

Calibration between Voltage Demand, Output Voltage and Voltage Monitor  $\pm 0.2\%$  of setting or  $\pm 0.05\%$  of rating, whichever is greater.

### Recovery Time:

Less than 200ms to within 0.1% of previous operating level following a short circuit or arc. Maximum overshoot 2% of rated output voltage.

### Temperature Coefficient:

Less than 100ppm/ $^{\circ}\text{C}$ .

### Drift:

Less than 0.01% per hour after 1 hour's warm up, typically less than 0.02% per 8 hours after 1 hour's warm up, at constant load, line and temperature.

### Operating Temperature:

0 $^{\circ}\text{C}$  to +40 $^{\circ}\text{C}$  (32 $^{\circ}\text{F}$  to 140 $^{\circ}\text{F}$ ).

### Storage Temperature:

-20 $^{\circ}\text{C}$  to +70 $^{\circ}\text{C}$  (-4 $^{\circ}\text{F}$  to 158 $^{\circ}\text{F}$ ).

### Humidity:

80% maximum relative humidity up to 31 $^{\circ}\text{C}$ , reducing linearly to 50% at 40 $^{\circ}\text{C}$ . Non-condensing (ref BS EN61010-1).

### Altitude:

Sea level to 2000 metres (6500 feet).

### Installation Category:

II (BS EN61010-1)

### Pollution Degree:

2 (BS EN61010-1)

### Usage:

Indoor use only.

### Metering:

Provided as part of an alpha-numeric display. Voltages are displayed with a resolution of better than 0.5% of rated output. Current is displayed with a resolution of better than 1.5% of rated output.

Voltage and current set values can be displayed by pressing the relevant control potentiometer.

### Status Indication:

Uses the alpha-numeric display to show the reason for any trip condition.

### Protection:

The units are fully protected against over voltage, over temperature, fan failure and current limit. Peak arc current is resistively limited.

### Arc Count and Extinguish (ACE):

Each time the ACE system detects an arc it blanks the supply off for a brief period to extinguish the arc. The unit is then allowed to recover. If more arcs occur they are counted to determine the arc rate; if this exceeds a safe level the power supply is shut down. The parameters are factory set to 25 arcs in any 5 second period.

### Safety:

The Series OLS10K meets the requirements of the Low Voltage Directive, LVD, 2006/95/EC by complying with BS EN61010-1:2001 when installed as a component part of other equipment. The units are CE marked accordingly. Designed to meet the general requirements of SEMI S2 for electrical safety.

### Safety Class:

Equipment Class 1.

### Cooling:

The unit utilises forced air cooling. Air is drawn in via the front panel slotted opening and through side panel vents. Ensure that within the rack there is a free air opening with a minimum effective area of 195cm<sup>2</sup> directly in front of the unit front panel slots. An additional free air opening with a minimum effective area of 195cm<sup>2</sup> is required for the side vents. Air flow from this additional free air opening to the side vents of the power converter must not be restricted. The expected air flow for each opening is approximately 50 Litres per second. The maximum temperature of the air entering the unit must not exceed 40 $^{\circ}\text{C}$ .

The unit can dissipate up to 2kW, therefore provision must be made to extract the exhaust air from the rack in order to prevent possible overheating.

### EMC:

The Series OLS10K is intended for installation as a component of a system and is designed to meet:

EN55022 class B for conducted and radiated emissions  
EN61000-4-2 ESD - levels  $\pm 4\text{kV}$  contact, 8kV air discharge  
EN61000-4-4 fast transients on mains input - levels  $\pm 2\text{kV}$   
EN61000-4-5 surges - levels  $\pm 2\text{kV}$  line to earth,  $\pm 1\text{kV}$  line to line  
EN61000-4-8 magnetic fields - levels 30A/m at 50/60Hz  
EN61000-4-11 voltage dips, interruptions

The unit will not trip and recovers to normal operation after a disturbance as defined in SEMI F47-0706.

The EMC performance of the power supply can only be fully assessed when installed within, and as part of, the final system.

### RoHS:

The Series OLS10K meets the requirements of EU Directive 2002/95/EC on the Restriction of use of Certain Hazardous Substances in electrical and electronic equipment (RoHS).

### Mechanical Specification:

Dimensions: See outline drawing.  
 Weight: Up to 80kV: 45kg (99 lb).  
 Over 80kV: 55kg (121 lb)  
 Connections: All connections are mounted on the rear panel.  
 Mains: Harting HAN C , 3m cable provided.  
 Safety Earth: M6 stud.  
 HV Output: Proprietary coaxial connector. 3m cable provided.  
 Front panel: Stoving enamel trimite full gloss S60/9 colour blue RAL5011 as standard.  
 Blank front panel available to order (see below).

### Outputs and Ordering Information:

Model No 208VAC input	Model No 380VAC input	Model No 400VAC input	Output Voltage	Output Current
OLS10K-102*	OLS10KC-102*	OLS10KE-102*	1kV	10A
OLS10K-202*	OLS10KC-202*	OLS10KE-202*	2kV	5A
OLS10K-502*	OLS10KC-502*	OLS10KE-502*	5kV	2A
OLS10K-103*	OLS10KC-103*	OLS10E-103*	10kV	1A
OLS10K-203*	OLS10KC-203*	OLS10E-203*	20kV	500mA
OLS10K-303*	OLS10KC-303*	OLS10E-303*	30kV	333mA
OLS10K-403*	OLS10KC-403*	OLS10E-403*	40kV	250mA
OLS10K-503*	OLS10KC-503*	OLS10E-503*	50kV	200mA
OLS10K-603*	OLS10KC-603*	OLS10E-603*	60kV	166mA
OLS10K-803*	OLS10KC-803*	OLS10E-803*	80kV	125mA
OLS10K-104*	OLS10KC-104*	OLS10E-104*	100kV	100mA

\* Please choose the input voltage required, then add the required suffixes to the appropriate model number (in the order given) to indicate polarity and type of front panel required, as well as whether RS232 control is required:

- P Positive polarity
- N Negative polarity
- B Blank front panel (remote control only)
- C RS232 control interface

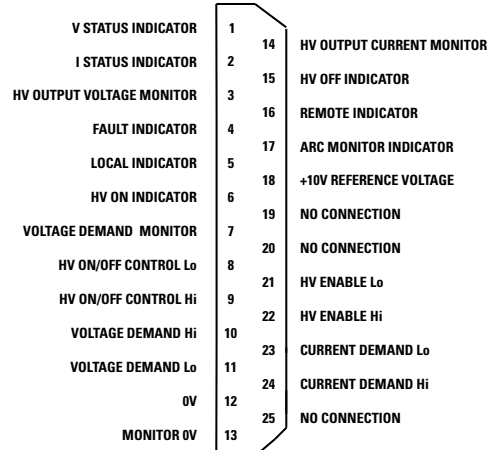
eg OLS10KC-203PBC for a 380VAC input voltage unit with 20kV positive polarity with no display or front panel controls (blank front panel), with an RS232 interface.

For voltages not listed above, please contact our sales team.

**NOTE:** See separate datasheet on our Series OLS10KD for dual voltage range capability with accurate control and low ripple down to 1% of maximum rated output. Other voltages and combinations are available to special order.

### Remote Control Interface Connections:

The Series OLS10K is fitted with an analogue remote control interface as standard, control is via a 25-way female D-type connector:

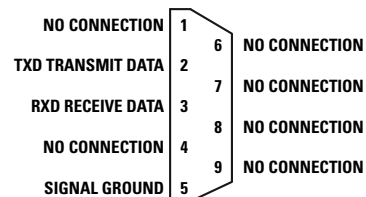


All logical indicators are open collector outputs rated at 16V (max) in the off state. An internal 100Ω resistor is connected in series with the open collector transistor. The pull down voltage is 0.9V plus the internal resistor drop.

All analogue Voltage and Current Monitors are 0V to +10V ±0.5% ±20mV, with respect to pin 13, representing 0 to rated output. Signal impedance is less than 100Ω and minimum external load resistance is 2kΩ.

All analogue Voltage and Current Inputs are 0V to +10V on the Hi input with respect to the Lo input representing 0V to rated output ±0.2% of setting ±0.1% of rating. Input impedance is better than 50kΩ.

### Digital RS232 Remote Control 9-way female D-type connector:



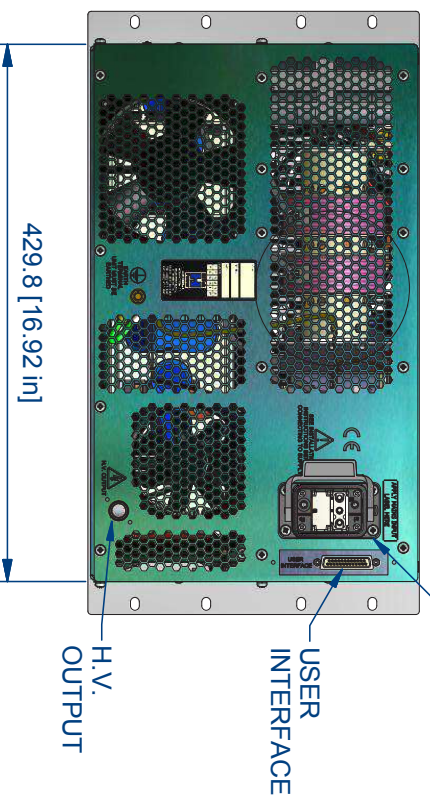
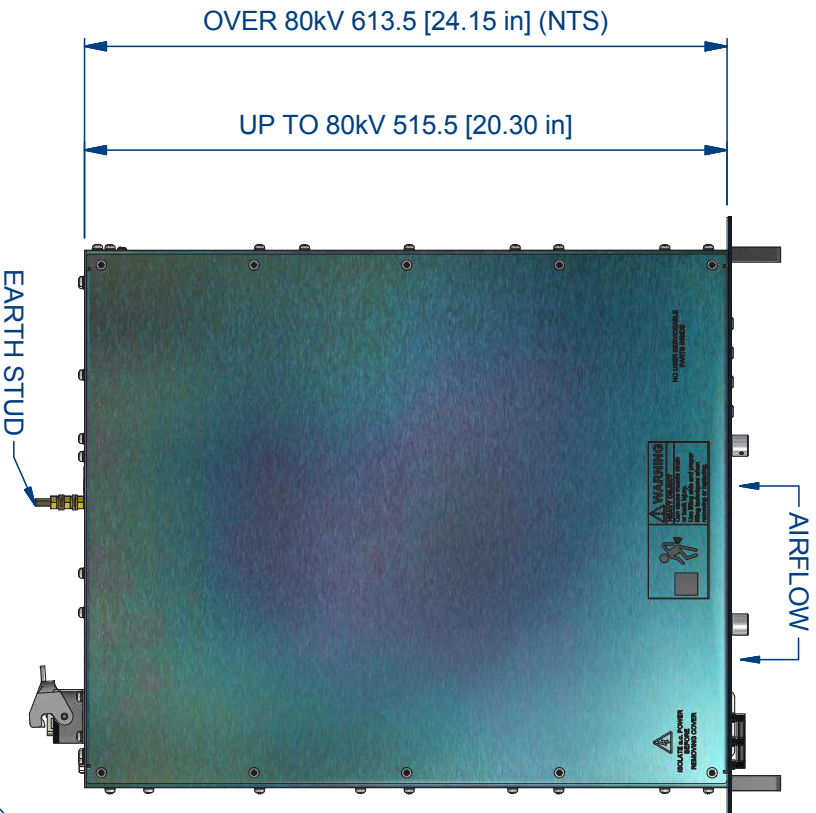
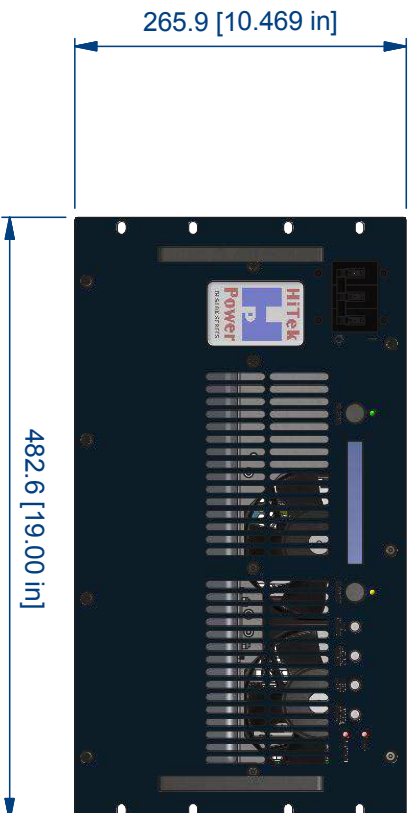
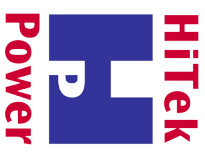
The Series OLS10K is configured as a DCE device. To connect to a PC or other DTE device, use a 'pin-pin' DB9 female to male serial cable.

The communication is set to 9,600 Baud, one start bit, one stop bit and no parity.

The connector shell can be connected to earth and cable screen.

A comprehensive set of commands is available for the control and monitoring of the power supply.

# Series OLS10K 10kW HIGH VOLTAGE POWER SUPPLY



Drawing dimensions are in mm (inches)  
Design developments may result in specification changes

# HiTek



# Power

*The Power Supply  
Pioneer*

## **UK**

HiTek Power Ltd  
Hawthorn Road, Littlehampton  
West Sussex BN17 7LT  
UK

Tel: **+44 (0) 1903 712400**

Fax: **+44 (0) 1903 712500**

e-mail: [sales.uk@hitekpower.com](mailto:sales.uk@hitekpower.com)

## **USA**

HiTek Power Inc  
124 Jewett Street, Unit #2  
Georgetown, MA 01833-1868  
USA

Tel: **+1 (978) 352-9100**

Fax: **+1 (978) 352-9133**

e-mail: [sales.us@hitekpower.com](mailto:sales.us@hitekpower.com)

## **GERMANY**

HiTek Power GmbH  
Joh.-Friedr.-Boettger-Str. 21  
D-63322 Roedermark  
Germany

Tel: **+49 (0) 6074 69285 0**

Fax: **+49 (0) 6074 69285 10**

e-mail: [sales.de@hitekpower.com](mailto:sales.de@hitekpower.com)

## **JAPAN**

HiTek Power Japan  
1-5-13 Kyutaroumachi  
Chou-ku, Osaka 541-0056  
Japan

Tel: **+81 (6) 6271 8180**

Fax: **+81 (6) 6271 8190**

e-mail: [info@hitekpowerjapan.co.jp](mailto:info@hitekpowerjapan.co.jp)