

HITEK POWER OLS10KD SERIES

10 KW HIGH VOLTAGE POWER SUPPLY



The HiTek Power OLS10KD series high voltage power supplies recognize the requirement for high stability and very low ripple over a wide range of output voltages.

This is achieved by combining the high power, 10 kW supply with a low power, 1 kW supply in the same chassis. The outputs of these are coupled together so that either can be used. For high voltages, usually above 10% of the maximum, the High Energy (HE) supply is used; for voltages below 10% the Low Energy (LE) supply is used. The LE supply has superior ripple and regulation at the lower voltages and maintains this down to a few hundred Volts or less.

The OLS10KD series meets the exacting requirements found in electron and ion beam systems, ion implantation and X-ray systems. There are three different input voltage variants available to order, the OLS10KD (208 VAC), the OLS10KDC (380 VAC) and the OLS10KDE (400 VAC). Designed using the latest power switching IGBTs to ensure efficient and reliable operation over the full operating range, the OLS10KD will give exemplary performance in the most severe of electrical environments. The OLS10KD achieves an exceptionally high packing density for high voltage power supplies of this power level, giving 169 W/Litre, 2.7 W/inch³. 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. Many components are common between the HE and LE supplies, minimising the space required for the dual configuration. Featuring a unique Arc Count and Extinguish (ACE) system for managing systems where load arcing is endemic, the OLS10KD protects both itself and the load from damage that may be caused by excessive arcing whilst allowing normal operation to continue.

PRODUCT HIGHLIGHTS

- Wide dynamic range with dual supply configuration
- Output voltages from 10 kV to 100 kV for high range
- Output voltages from 1 kV to 10 kV for low range
- High Packing Density: 10 kW output power in 6U rack mounted chassis
- Exceptional reliability in severe electrical environments
- High Stability
- Arc Count and Extinguish (ACE)
- Full Local and Remote control and monitoring
- Analogue or RS232 remote control
- Voltage or current control
- RoHS compliant to EU Directive 2011/65/EU
- CE marked for EU LV Directive 2006/95/EC

ELECTRICAL SPECIFICATIONS

Output Power	10 kW for the HE supply and 1 kW for the LE supply at full rated output voltage and current
Output Voltage	The OLS10KD offers maximum HE output voltages from 10 kV to 100 kV, and LE output voltages from 1 kV to 10 kV
Output Current	Up to 1 A for 10 kV HE and 1kV LE, and and 100 mA for 100 kV HE and 10 kV LE
Input Current	Less than 36 A per phase
Polarity	Positive or negative to order. Both HE and LE will be of the same polarity
Specification Range	Specifications apply above 5% of rated output voltage for both HE and LE supplies. The output can be controlled down to less than 0.25% of rated 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 200 ms 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 100 ppm/ $^{\circ}\text{C}$
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 meters (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 OLS10KD is fully protected against over voltage, over temperature, fan failure and current limite. Peak arc current is resistively limited to 40 A at full HE output voltage.
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 OLS10KD 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 zSEMI S2 for electrical safety.
Safety Class	Equipment Class 1

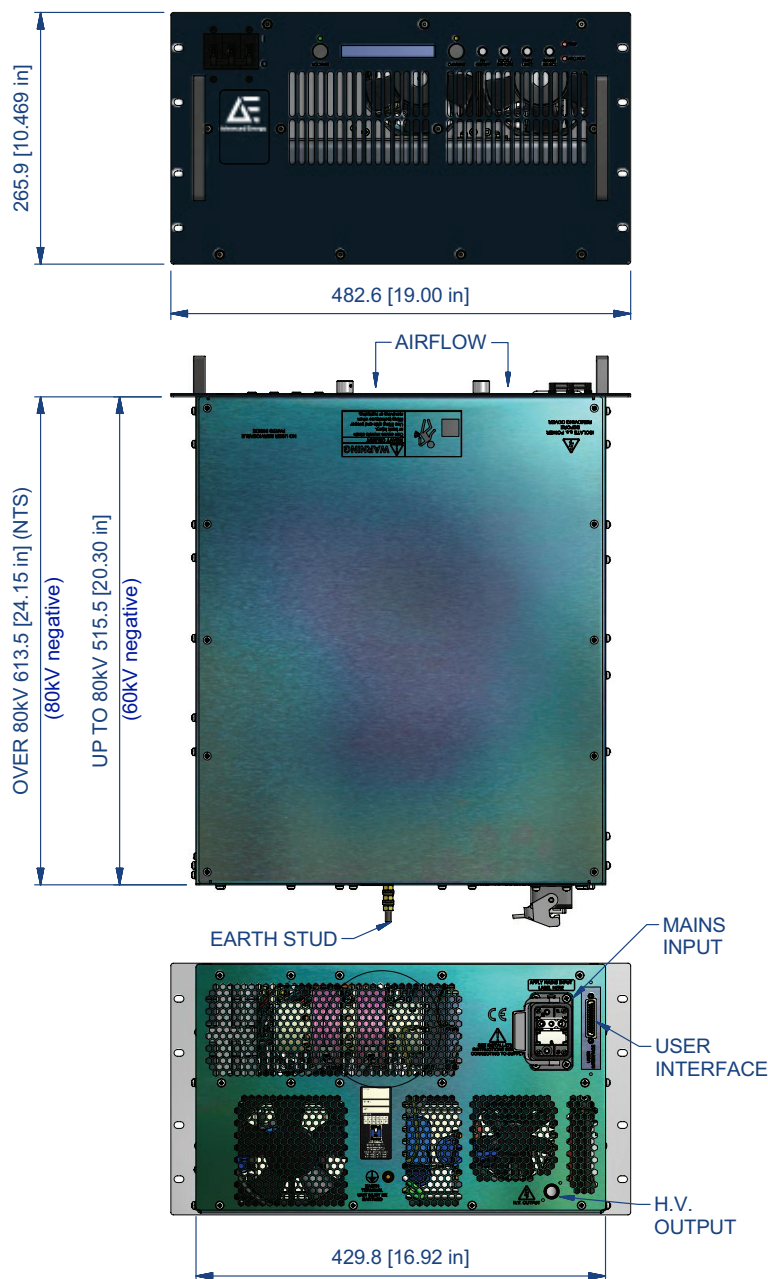
ELECTRICAL SPECIFICATIONS (CONTINUED)

Cooling	<p>The OLS10KD utilizes forced forced air cooling. Air is drawn in via the front panel louvered opening and through side panel vents. Ensure that within the rack there is a free air opening with a minimum effective area of 195 cm² directly in front of the unit front panel louvre. An additional free air opening with a minimum effective area of 195cm² 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°C.</p> <p>The unit can dissipate up to 2 kW, therefore provision must be made to extract the exhaust air from the rack in order to prevent possible overheating.</p>
EMC ¹	EN55022 class B for conducted and radiated emissions
	EN61000-4-2 ESD - levels ±4 kV contact, 8 kV air discharge
	EN61000-4-4 fast transients on mains input - levels ±2 kV
	EN61000-4-5 surges - levels ±2 kV line to earth, ±1 kV line to line
	EN61000-4-8 magnetic fields - levels 30 A/m at 50/60 Hz
EN61000-4-11 voltage dips, interruptions	
RoHS	The OLS10KD meets the requirements of EU Directive 2002/95/EC on the Restriction of use of Certain Hazardous Substances in electrical and electronic equipment (RoHS).
Input Voltage	
OLS10KD	208 VAC ±10% (187 VAC to 229 VAC) 47-63 Hz 3 phase plus protective earth
OLS10KDC	380 VAC ±10% (342 VAC to 418 VAC) 47-63 Hz 3 phase plus protective earth
OLS10KDE	400 VAC ±10% (360 VAC to 440 VAC) 47-63 Hz 3 phase plus protective earth
Voltage Ripple (High and Low Range)	
Voltage Mode	Less than 0.05% of rated voltage +2 V, peak to peak or less than 0.01% of rated voltage +1 V, rms
Current Mode	Less than 0.5% of rated voltage peak to peak or less than 0.1% of rated voltage rms
Voltage Regulation (High and Low Range)	
Line	Less than 0.05% +0.5 V change in output voltage for a 10% change in line voltage
Load	Less than 0.05% +0.5 V change in output voltage for 0 to 100% change in load current
Current Regulation (High and Low Range)	
Line	Less than 0.5% of rated current for a ±10% change in line voltage
Load	Less than 0.5% of rated current for 0 to 100% change in output voltage

¹ The OLS10KD is intended for installation as a component of a system and is designed to meet these requirements. 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.

MECHANICAL SPECIFICATIONS

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



INTERFACE

Remote Control Interface Connections:

The OLS10KD is fitted with an analog remote control interface as standard, control is via a 25-way D-type connector.

Analogue Remote Control 25-way female D-type connector:

V STATUS INDICATOR	1	14	HV OUTPUT CURRENT MONITOR
I STATUS INDICATOR	2	15	HV OFF INDICATOR
HV OUTPUT VOLTAGE MONITOR	3	16	REMOTE INDICATOR
FAULT INDICATOR	4	17	ARC MONITOR INDICATOR
LOCAL INDICATOR	5	18	+10V REFERENCE VOLTAGE
HV ON INDICATOR	6	19	NO CONNECTION
VOLTAGE DEMAND MONITOR	7	20	NO CONNECTION
HV ON/OFF CONTROL Lo	8	21	HV ENABLE Lo
HV ON/OFF CONTROL Hi	9	22	HV ENABLE Hi
VOLTAGE DEMAND Hi	10	23	CURRENT DEMAND Lo
VOLTAGE DEMAND Lo	11	24	CURRENT DEMAND Hi
OV	12	25	NO CONNECTION
MONITOR OV	13		

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

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

All analogue Voltage and Current Inputs are 0 V to +10 V on the Hi input with respect to the Lo input representing 0 V to rated output $\pm 0.2\%$ of setting $\pm 0.1\%$ of rating. Input impedance is greater than 50 k Ω .

Digital RS232 Remote Control 9-way male D-type connector:

NO CONNECTION	1	6	NO CONNECTION
TXD TRANSMIT DATA	2	7	NO CONNECTION
RXD RECEIVE DATA	3	8	NO CONNECTION
NO CONNECTION	4	9	NO CONNECTION
SIGNAL GROUND	5		

The OLS10KD 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.



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ABOUT ADVANCED ENERGY

Since 1981, Advanced Energy (AE) has perfected how power performs for its customers. For both end users and OEMs, AE's comprehensive portfolio of standard and custom high voltage components precisely match system specifications to deliver unparalleled energy, quality, and performance. Through close customer collaboration, design expertise, application insight, and world-class support, AE creates successful partnerships and enables customers to push the boundaries of innovation and stay ahead of evolving market needs.

PRECISION | POWER | PERFORMANCE



CAUTION:
High Voltage

Read and understand all documentation before you install, operate, or maintain Advanced Energy high voltage power supplies. Follow all safety instructions and precautions to protect against property damage and serious or possibly fatal bodily injury. Never defeat safety interlocks or grounds.

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