HiTek Power

Series OLS10KD
10kW HIGH VOLTAGE POWER SUPPLY

FEATURES

- Wide Dynamic range with dual supply configuration
- Output Voltages from 10kV to 80kV for high range
- Output Voltages from 1kV to 10kV for low range
- High Packing Density: 10kW output power in 6U rack mounted chassis
- Exceptional reliability in severe electrical enviroments
- 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 2011/65/EU
- CE Marked for EU LV Directive 2006/95/EC

DESCRIPTION

The Series OLS10KD range of high voltage power supplies recognises the requirement for high stability and very low ripple over a wide range of output voltages.

This is achieved by combining the high power, 10kW supply with a low power, 1kW 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 Series OLS10KD meets the exacting requirements found in electron and ion beam systems, ion implantation and X-ray systems. There are 3 different input voltage variants available to order, the OLS10KD (208VAC), the OLS10KDC (380VAC) and the OLS10KDE (400VAC).

Designed using the latest power switching IGBTs to ensure efficient and reliable operation over the full operating range, the Series OLS10KD will give exemplary performance in the most severe of electrical environments. The Series OLS10KD achieves an exceptionally high packing density for high voltage power supplies of this power level, giving 169W/Litre, 2.7W/inch^3. 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 HiTek Power's unique Arc Count and Extinguish (ACE) system for managing systems where load arcing is endemic, the Series OLS10KD protects both itself and the load from damage that may be caused by excessive arcing whilst allowing normal operation to continue.

The Series OLS10KD features both analogue and remote control (optional RS232) interfaces. A full set of commands is available over the RS232 interface to control and monitor the operation of the power supply.

SPECIFICATION

Output Power:
10kW for the HE supply and 1kW for the LE supply at full rated output voltage and current.

Output Voltage:
Units available with maximum HE output voltages from 10kV to 80kV, and LE output voltages from 1kV to 10kV.

Output Current:
Up to 1A for 10kV HE & 1kV LE, and 100mA for 80kV HE & 10kV LE (see table).

Input Voltage:

OLS10KD:	208VAC ±10% (187VAC to 229VAC) 47-63Hz 3 phase plus protective earth.
OLS10KDC:	380VAC ±10% (342VAC to 418VAC) 47-63Hz 3 phase plus protective earth.
OLS10KDE:	400VAC ±10% (360VAC to 440VAC) 47-63Hz 3 phase plus protective earth.

Input Current:
Less than 36A per phase.

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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.

Voltage Ripple:
High and Low Range:

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.

Voltage Regulation:
High and Low Range:

Line:	Less than 0.05% +0.5V change in output voltage for a 10% change in line voltage.
Load:	Less than 0.05% +0.5V 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.

Calibration:
Calibration between Voltage Demand, Output Voltage and Voltage Monitor ±0.2% of setting or ±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/°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°C to +40°C (32°F to 140°F).

Storage Temperature:
-20°C to +70°C (-4°F to 158°F).

Humidity:
80% maximum relative humidity up to 31°C, reducing linearly to 50% at 40°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 limite. Peak arc current is resistively limited to 40A 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 Series 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 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 louvered opening and through side panel vents. Ensure that within the rack there is a free air opening with a minimum effective area of 195cm^2 directly in front of the unit front panel louvre. An additional free air opening with a minimum effective area of 195cm^2 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.

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.

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EMC:
The Series OLS10KD 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 ±4kV contact, 8kV air discharge
EN61000-4-4 fast transients on mains input - levels ±2kV
EN61000-4-5 surges - levels ±2kV line to earth, ±1kV 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 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).

Mechanical Specification:

Dimensions:	See outline drawings.
Weight:	45kg (99 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 voltage	Model no 380VAC input voltage	Model no 400VAC input voltage	HE Output Voltage	LE Output Voltage	Output Current
OLS10KD-103*	OLS10KDC-103*	OLS10KDE-103*	10kV	1kV	1A
OLS10KD-203*	OLS10KDC-203*	OLS10KDE-203*	20kV	2kV	500mA
OLS10KD-303*	OLS10KDC-303*	OLS10KDE-303*	30kV	3kV	333mA
OLS10KD-403*	OLS10KDC-403*	OLS10KDE-403*	40kV	4kV	250mA
OLS10KD-503*	OLS10KDC-503*	OLS10KDE-503*	50kV	5kV	200mA
OLS10KD-603*	OLS10KDC-603*	OLS10KDE-603*	60kV	6kV	166mA
OLS10KD-803*	OLS10KDC-803*	OLS10KDE-803*	80kV	8kV	125mA

* Please add the required suffixed to the part number:

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

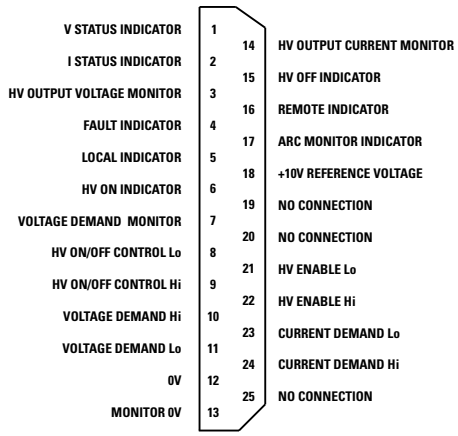
eg OLS10KD-203PBC for a 20kV positive polarity unit with no display or front panels with an RS232 interface.

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

NOTE: See **Series OLS10K** for a single output voltage range that can be paralleled to give 20kW. See separate datasheet. Other voltages and combinations are available to special order.

Remote Control Interface Connections:
The Series OLS10KD is fitted with an analogue remote control interface as standard, control is via a 25-way D-type connector.

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

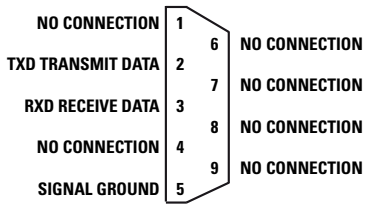


All logical indicators are open collector outputs rated at 16V (max) in the off state. An internal 100Ω resistor is connected in series with the open collector transistor. The pull down voltage is 0.9V plus the internal resistor drop.

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 greater than 50kΩ.

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



The Series 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.

CE These component power supplies meet the requirements of EC Directive 2006/95/EC (LVD).

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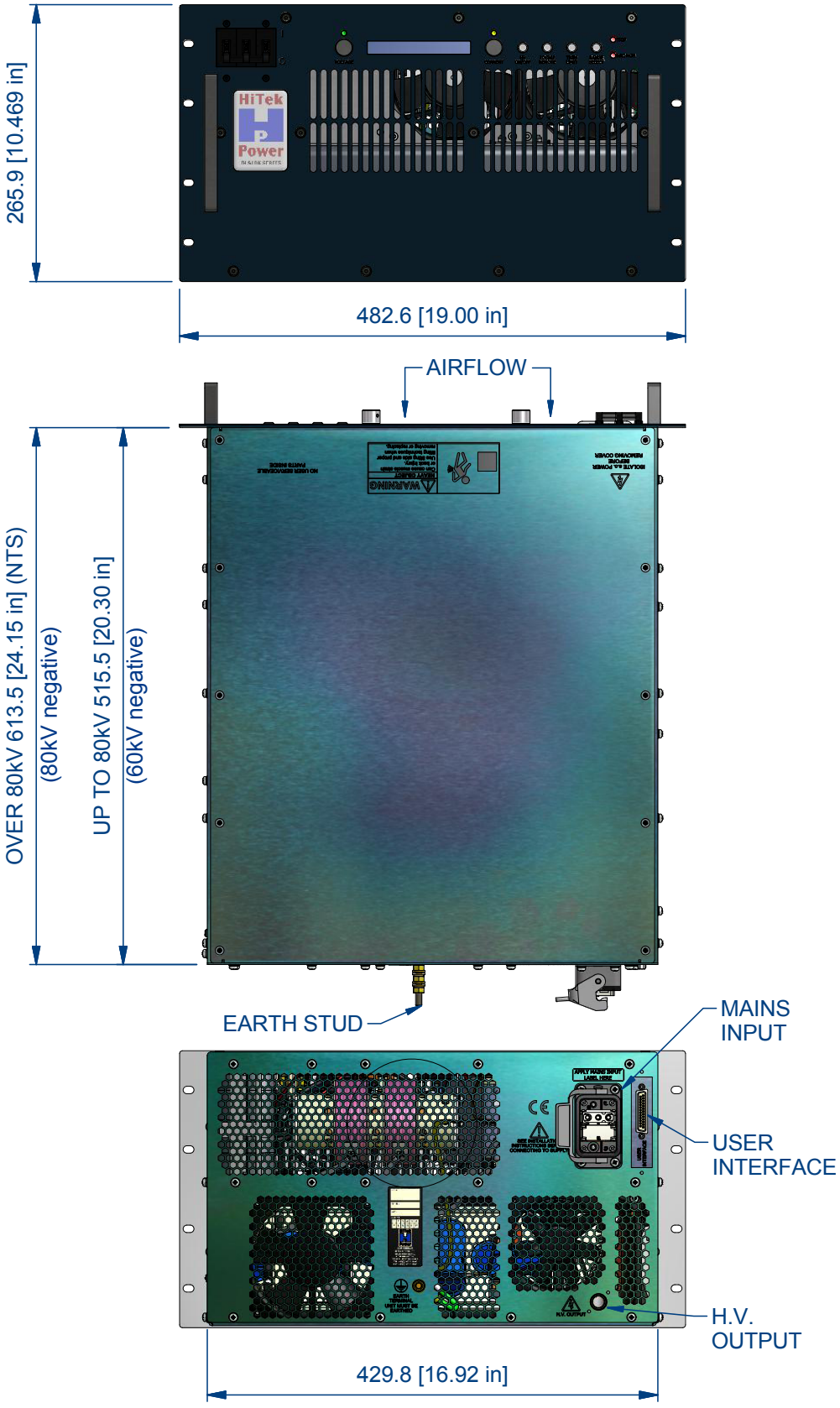

Drawing dimensions are in mm (inches)
Design developments may result in specification changes

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