Series OLH10KD
10kW HIGH VOLTAGE POWER SUPPLIES

FEATURES
- 10kW of output power
- Wide dynamic range with dual supply configuration
- Output voltages from 60kV to 500kV for high range
- Output voltages from 6kV to 10kV for low range
- Robust IGBT converter design
- Exceptional reliability
- 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
- Custom options available
- CE Marked

DESCRIPTION
The Series OLH10KD range of high voltage power supplies recognises the requirement for high stability and very low ripple across a wide range of output voltages. This is achieved by combining the high power (HE), 10kW supply with a low power (LE), 1kW supply in the same converter chassis. The output from the low power supply is coupled into the HV unit so that either can be used.

The Series OLH10KD is designed to meet the rigorous requirements of ion and electron beam systems, ion implantation and X-ray equipment.

There are three different input voltage variants available to order: the OLH10KD (208VAC), the OLH10KDC (380VAC) and the OLH10KDE (400VAC).

The Series OLH10KD system consists of two units: a rack mounting power converter through which both local and remote controls can be facilitated, and a separate HV unit employing a modular disc construction. Numerous features are incorporated to ensure system integrity is maintained during adverse operating conditions, including HiTek Power’s unique Arc Count and Extinguish (ACE) system for managing systems where load arcing is endemic.

If none of the models listed below suit your requirements, please contact our Sales Team to discuss a custom version.

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

Output Voltage:
Units available with maximum HE output voltages from 60kV to 500kV and LE output voltages from 6kV to 10kV.

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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 ±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 ambient and air intake.

Storage Temperature:
-20°C to +85°C.

Humidity:
80% maximum relative humidity up to 31 Deg C, reducing linearly to 50% at 40 Deg 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.

Protection:
The units are fully protected against over voltage, over current, over temperature, load arcing and output short circuits.

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 OLH10KD high voltage power supplies meet the requirements of the Low Voltage Directive, LVD, 2006/95/EC by complying with BS EN61010-1 when installed as a component part of other equipment. They are CE marked accordingly.

Safety Class:
Equipment Class 1.

Cooling:
Converter: 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 195cm² directly in front of the unit front panel slots. An additional free air opening with a minimum effective area of 195m² 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 units must not exceed 40°C (104°F).

HV Unit: The HV Unit may be mounted in any orientation, but at least 150mm of free space should be allowed around the HV base for air intake/exhaust from the fans. The side panel grilles must not be obstructed. The maximum temperature of air entering the HV base must not exceed 40°C (104°F).

Adequate clearance must be allowed around the HV discs to take account of the high voltage output.

The HV unit can dissipate up to 1kW, therefore provision must be made to extract the exhaust air from the rack in order to prevent possible overheating.

EMC:
The Series OLH10KD 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 OLH10KD meets the requirements of EU Directive 2011/65/ EU on the Restriction of use of Certain Hazardous Substances in electrical and electronic equipment (RoHS).
## Series OLH10KD
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### Mechanical Specification:
Please contact the Sales Team for 400kV and 500kV mechanical outline details and weights.

- **Dimensions:** 60kV-300kV models - see outline drawings attached.
- **Weight:**
  - 60kV-300kV Converter: 27kg
  - 60kV-300kV Stacks: 91kg

### Remote Control Interface Connections:
The Series OLH10KD is fitted with an analogue remote control interface as standard, control is via a 25-way female D-type connector:

- **V STATUS INDICATOR**
- **I STATUS INDICATOR**
- **HV OUTPUT VOLTAGE MONITOR**
- **FAULT INDICATOR**
- **LOCAL INDICATOR**
- **HV ON INDICATOR**
- **VOLTAGE DEMAND MONITOR**
- **HV ON/OFF CONTROL Lo**
- **HV ON/OFF CONTROL Hi**
- **VOLTAGE DEMAND Lo**
- **VOLTAGE DEMAND Hi**
- **HV ENABLE Lo**
- **HV ENABLE Hi**
- **CURRENT DEMAND Lo**
- **CURRENT DEMAND Hi**
- **HV OUTPUT CURRENT MONITOR**
- **HV OFF INDICATOR**
- **REMOTE INDICATOR**
- **+10V REFERENCE VOLTAGE**
- **NO CONNECTION**
- **NO CONNECTION**
- **NO CONNECTION**
- **NO CONNECTION**
- **NO CONNECTION**
- **NO CONNECTION**
- **NO CONNECTION**
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- **NO CONNECTION**
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- **NO CONNECTION**
- **NO CONNECTION**
- **NO CONNECTION**

### Outputs and Ordering Information:

<table>
<thead>
<tr>
<th>Model No 208VAC input voltage</th>
<th>Model No 380VAC input voltage</th>
<th>Model No 400VAC input voltage</th>
<th>HE Output Voltage</th>
<th>LE Output Voltage</th>
<th>Output Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLH10KD-603*</td>
<td>OLH10KDC-603*</td>
<td>OLH10KDE-603*</td>
<td>60kV</td>
<td>64V</td>
<td>166mA</td>
</tr>
<tr>
<td>OLH10KD-803*</td>
<td>OLH10KDC-803*</td>
<td>OLH10KDE-803*</td>
<td>80kV</td>
<td>80V</td>
<td>120mA</td>
</tr>
<tr>
<td>OLH10KD-104*</td>
<td>OLH10KDC-104*</td>
<td>OLH10KDE-104*</td>
<td>100kV</td>
<td>100V</td>
<td>100mA</td>
</tr>
<tr>
<td>OLH10KD-124*</td>
<td>OLH10KDC-124*</td>
<td>OLH10KDE-124*</td>
<td>120kV</td>
<td>120V</td>
<td>80mA</td>
</tr>
<tr>
<td>OLH10KD-144*</td>
<td>OLH10KDC-144*</td>
<td>OLH10KDE-144*</td>
<td>140kV</td>
<td>140V</td>
<td>65mA</td>
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<tr>
<td>OLH10KD-164*</td>
<td>OLH10KDC-164*</td>
<td>OLH10KDE-164*</td>
<td>160kV</td>
<td>160V</td>
<td>55mA</td>
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<tr>
<td>OLH10KD-184*</td>
<td>OLH10KDC-184*</td>
<td>OLH10KDE-184*</td>
<td>180kV</td>
<td>180V</td>
<td>45mA</td>
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<tr>
<td>OLH10KD-204*</td>
<td>OLH10KDC-204*</td>
<td>OLH10KDE-204*</td>
<td>200kV</td>
<td>200V</td>
<td>40mA</td>
</tr>
<tr>
<td>OLH10KD-243*</td>
<td>OLH10KDC-243*</td>
<td>OLH10KDE-243*</td>
<td>240kV</td>
<td>240V</td>
<td>30mA</td>
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<tr>
<td>OLH10KD-304*</td>
<td>OLH10KDC-304*</td>
<td>OLH10KDE-304*</td>
<td>300kV</td>
<td>300V</td>
<td>15mA</td>
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<tr>
<td>OLH10KD-404*</td>
<td>OLH10KDC-404*</td>
<td>OLH10KDE-404*</td>
<td>400kV</td>
<td>400V</td>
<td>10mA</td>
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<tr>
<td>OLH10KD-504*</td>
<td>OLH10KDC-504*</td>
<td>OLH10KDE-504*</td>
<td>500kV</td>
<td>500V</td>
<td>10mA</td>
</tr>
</tbody>
</table>

* Please add the required suffix to the part number:

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

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

### PLEASE NOTE:

- The attached outline drawings are only applicable to 60kV-300kV model variants. Please contact our Sales Team for mechanical information on the 400kV and 500kV models.

- See separate datasheet on our Series OLH10K for single output voltage range version. Other voltages and combinations are available to special order.

### Connections:
All connections are mounted on the rear panel.

- **Mains**: Harting Han C (mating part provided).
- **Safety earth**: M6 stud on both the converter and HV unit.
- **HV output**: Direct connection to the top of the HV unit.
- **Front panel**: Stoving enamel trinite full gloss S60/9 colour blue RAL5011 as standard.

Blank front panel available to order (see below).

### 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 OLH10KD 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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This 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 specific dimensions changes
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**ALL DIMENSIONS - MILLIMETRES [INCHES]**

<table>
<thead>
<tr>
<th>OUTPUT kV</th>
<th>DIM 'A' NOMINAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>229.2 [9.0]</td>
</tr>
<tr>
<td>80</td>
<td>260.1 [10.0]</td>
</tr>
<tr>
<td>100</td>
<td>331.0 [13.0]</td>
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<tr>
<td>120</td>
<td>381.9 [15.0]</td>
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<tr>
<td>140</td>
<td>432.8 [17.0]</td>
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<tr>
<td>160</td>
<td>483.7 [19.0]</td>
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<tr>
<td>180</td>
<td>534.6 [21.0]</td>
</tr>
<tr>
<td>200</td>
<td>585.5 [23.1]</td>
</tr>
<tr>
<td>300</td>
<td>893.0 [35.1]</td>
</tr>
</tbody>
</table>

**DIMENSIONS**

- **FRONT COVER**
- **INPUT CONNECTOR**
- **AIR**
- **FAN**

**INPUT CONNECTOR**
- 192.0 [7.6]
- 270.0 [10.6]
- 109.6 [4.3]

**FRONT COVER**
- 283.2 [11.1]
- 93.6 [3.7]

**DIMENSIONS**

- **DIM A HEIGHT INCLUDING FIXINGS**
- **HOLE Ø8.7 10 POSITIONS**

**Drawing dimensions are in mm (inches)**

Design developments may result in specification changes.