

HITEK POWER OLS10K SERIES

10 KW HIGH VOLTAGE POWER SUPPLIES



The HiTek Power® OLS10K series range of single-output high voltage power supplies meets the exacting requirements found in electron-beam, ion-beam, and x-ray systems, as well as ion and chemical vapor deposition, electrostatic precipitation, and other 24/7 production processes.

Designed using the latest power-switching IGBTs to ensure efficient and reliable operation over the full operating range, the OLS10K will give exemplary performance in the most severe of electrical environments. The OLS10K series achieves an exceptionally high packing density for high voltage power supplies of this power level, giving 169 W per liter, 2.7 W per inch³.

The 6 U construction allows operation at full power when close mounted in a standard equipment rack, giving significant savings in rack space in large systems. Featuring a proprietary Arc Count and Extinguish (ACE) system for managing systems where load arcing is endemic, the OLS10K series protects both itself and the load from damage that may be caused by excessive arcing while allowing normal operation to continue. The OLS10K series features both analog 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.

PRODUCT HIGHLIGHTS

- High packing density: 10 kW output power in 6 U rack mounted chassis
- Output voltages from 1 to 80 kV
- Parallel option to give 20 to 100 kW
- High stability
- Exceptional reliability in severe electrical environments
- Arc Count and Extinguish (ACE)
- Full local and remote control and monitoring
- Analog or RS232 remote control
- Voltage or current control
- CE marked for EU LV directive 2006/95/EC
- RoHS compliant to EU directive 2011/65/EU
- Custom options available

TYPICAL APPLICATIONS

- Electron beam
- Ion beam
- X-ray
- Lasers
- HV pulse generator bias
- HV amplifier bias
- Electrostatic precipitation
- Chemical purification

ELECTRICAL SPECIFICATIONS

| Output Power | 10 kW max at full rated output voltage and current | | |
|--------------------------------|---|--|--|
| Output Voltage | Units available with max output voltages from 1 to 80 kV | | |
| Output Current | Up to 10 A for 1 kV and 125 mA for 80 kV (see table) | | |
| Model | OLS10K | OLS10KC | OLS10KE |
| Input Voltage | 208 VAC ±10% (187 to 229 VAC) 47 to 63 Hz 3 phase plus protective earth | 380 VAC ±10% (342 to 418 VAC) 47 to 63 Hz 3 phase plus protective earth | 400 VAC ±10% (360 to 440 VAC) 47 to 63 Hz 3 phase plus protective earth |
| Input Current | < 36 A per phase | < 22 A per phase | < 22 A per phase |
| Voltage Ripple: Voltage Mode | < 0.05% of rated voltage +2 V, peak to peak or < 0.01% of rated voltage +1 Vrms | < 0.1% of rated voltage +2 V, peak to peak or < 0.02% of rated voltage +1 Vrms | < 0.1% of rated voltage +2 V, peak to peak or < 0.02% of rated voltage +1 Vrms |
| Voltage Ripple: Current Mode | < 0.5% of rated voltage peak to peak or < 0.1% of rated voltage rms | < 0.5% of rated voltage peak to peak or < 0.1% of rated voltage rms | < 0.5% of rated voltage peak to peak or < 0.1% of rated voltage rms |
| Line Voltage Regulation | < 0.01% +0.5V change in output voltage for a 10% change in line voltage | | |
| Load Voltage Regulation | < 0.01% +0.5 V change in output voltage for 0 to 100% change in load current | | |
| Line Current Regulation | < 0.5% of rated current | | |
| Load Current Regulation | < 0.5% of rated current for 0 to 100% change in output | | |
| Polarity | Positive or negative to order | | |
| Specification Range | Specifications apply above 5% of rated output voltage. The output can be controlled down to < 0.25% of rated 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 | < 200 ms to within 0.1% of previous operating level following a short circuit or arc. Max overshoot 2% of rated output voltage. | | |
| Temperature Coefficient | < 100 ppm/°C | | |
| Drift | < 0.01% per hour after 1 h warmup, typically < 0.02% per 8 h after 1 h warmup, at constant load, line, and temperature | | |
| Operating Temperature | 0 to 40°C (32 to 140°F) | | |
| Storage Temperature | -20 to 70°C (-4 to 158°F) | | |
| Humidity | 80% max relative humidity up to 31°C (88°F), reducing linearly to 50% at 40°C (104°F). Non-condensing | | |
| Altitude | Sea level to 2000 m (6500') | | |
| 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 > 0.5% of rated output. Current is displayed with a resolution of > 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. | | |

ELECTRICAL SPECIFICATIONS (CONTINUED)

| | |
|---|---|
| Safety | The OLS10K series meets 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. 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 utilizes 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 195 cm ² directly in front of the unit front panel slots. An additional free air opening with a minimum effective area of 195 cm 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 liters per second. The maximum temperature of the air entering the unit must not exceed 40°C. 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. |
| EMC | Intended for installation as a component of a system and designed to meet: |
| | 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 |
| | 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 OLS10K series meets the requirements of EU Directive 2011/65/EU on the Restriction of use of certain Hazardous Substances (RoHS) in electrical and electronic equipment. |

MECHANICAL SPECIFICATIONS



| | |
|--------------|--|
| Dimensions | See outline drawing |
| 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 color blue RAL5011 as standard Blank front panel available to order |

| Volumes and Weights | | |
|---------------------|----|----|
| | kg | lb |
| Weight | 45 | 99 |

INTERFACE

Remote Control Interface Connections:

The OLS10K series is fitted with an analog remote control interface as standard, control is via a 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 | +10 V 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 |
| 0 V | 12 | 25 | NO CONNECTION |
| MONITOR 0 V | 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 to +10 V $\pm 0.5\% \pm 20$ mV, with respect to pin 13, representing 0 to rated output. Signal impedance is < 100 Ω and minimum external load resistance is 2 k Ω .

All analog voltage and current inputs are 0 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 better than 50 k Ω .

Digital RS232 Remote Control 9-way female 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 OLS10K series is configured as a DCE device. To connect to a PC or other DTE device, use a pin to pin DB9 female to male serial cable.

The communication is set to 9600 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.

ORDERING INFORMATION

| Model No 208 VAC input | Model No 380 VAC input | Model No 400 VAC input | Output Voltage | Output Current |
|------------------------|------------------------|------------------------|----------------|----------------|
| OLS10K-102* | OLS10KC-102* | OLS10KE-102* | 1 kV | 10 A |
| OLS10K-202* | OLS10KC-202* | OLS10KE-202* | 2 kV | 5 A |
| OLS10K-502* | OLS10KC-502* | OLS10KE-502* | 5 kV | 2 A |
| OLS10K-103* | OLS10KC-103* | OLSK10E-103* | 10 kV | 1 A |
| OLS10K-203* | OLS10KC-203* | OLS10KE-203* | 20 kV | 500 mA |
| OLS10K-303* | OLS10KC-303* | OLS10KE-303* | 30 kV | 333 mA |
| OLS10K-403* | OLS10KC-403* | OLS10KE-403* | 40 kV | 250 mA |
| OLS10K-503* | OLS10KC-503* | OLSK10E-503* | 50 kV | 200 mA |
| OLS10K-603* | OLS10KC-603* | OLSK10E-603* | 60 kV | 166 mA |
| OLS10K-803* | OLS10KC-803* | OLS10KE-803* | 80 kV | 125 mA |
| A1040958-3M0 | OLS10K 3M HV Cables | | | |
| A1040958-5M0 | OLS10K 5M HV Cables | | | |
| A1040958-10M | OLS10K 10M HV Cables | | | |

* 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 (80 kV maximum)
- B Blank front panel (remote control only)
- C RS232 control interface

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

See separate datasheet on our OLS10KD series 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.

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



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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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