



HITEK POWER® XR150
X-RAY POWER SUPPLY MODULE





Complete high voltage power source

for industrial
x-ray systems,
elemental analysis
equipment,
x-ray diffraction
spectrometers,
and materials
process monitoring
applications



Specifically developed for high-performance x-ray applications, the compact and reliable XR150 series is surface mountable and built with superior high voltage stress control and packaging techniques. The filament is automatically controlled by integral beam loop control and the power stage utilizes a current-fed resonant push-pull converter to provide high efficiency and reliability.

Features

- › 150 W high voltage output
- › 17 W floating filament
- › High accuracy and stability
 - Emission accuracy: 0.1%
 - Regulation: 0.1%
 - Stability: 100 ppm
- › Exceptionally compact
- › Remote operation
- › Analog or RS-232 control interface
- › Safety interlock
- › Extensive tube and system protection functions
- › CE marked for EU LV directive 2006/95/EC
- › EU RoHS compliant to 2002/95/EC

Typical Applications

- › Inspection and analytical x-ray systems with floating filament tubes
 - X-ray fluorescence (XRF)
 - X-ray diffraction (XRD)
 - X-ray reflectivity (XRR)
 - X-ray imaging (XRI)
- › Industrial process x-ray systems
 - Elemental analysis equipment
 - Process quality, safety, compliance
 - Materials monitoring
 - Food safety inspection
- › Digital x-ray imaging and inspection
 - Industrial
 - Veterinary
 - Pharma, cellular, biotech
 - Security

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SPECIFICATIONS

Electrical Input

| | |
|----------------|--------------------|
| Voltage | 24 VDC ± 1 VDC |
| Current | 11 A, max |

Electrical Output

| | |
|-----------------|---|
| Voltage | 0 to -60 kV; full spec applies above -3 kV |
| Current | 0 to -2.5 mA |
| Power | 150 W, max |
| Ripple | < 100 V, peak to peak |
| Filament | 0 to 3.7 A (4.5 V, max) Controlled by internal beam control loop |

Controls (Analog Version)

| | |
|-----------------------|---|
| Voltage Demand | 0 to 5 VDC demands 0 to -60 kV $\pm 0.5\%$ ± 100 V |
| Current Demand | 0 to 5 VDC demands 0 to -2.5 mA $\pm 2\%$ ± 5 μ A |
| Filament Limit | Internally settable between 1 and 3.7 A |

Controls (RS-232 Version)

| | |
|-------------------------|---|
| Voltage Demand | 12 bit; 0 to FFF demands 0 to -60 kV $\pm 0.5\%$ ± 100 V |
| Current Demand | 12 bit; 0 to FFF demands 0 to -2.5 mA $\pm 2\%$ ± 5 μ A |
| Filament Standby | 12 bit; 0 to FFF demands 0 to 3.7 A |

Monitors (Analog)

| | |
|-------------------------|--|
| Output Voltage | 0 to 5 V $\pm 0.5\%$ ± 20 mV for 0 to -60 kV |
| Beam Current | 0 to 5 V $\pm 2\%$ ± 20 mV for 0 to -2.5 mA |
| Filament Current | 0 to 5 V $\pm 5\%$ ± 20 mV for 0 to 3.7 A |
| Filament Voltage | 0 to 5 V $\pm 5\%$ ± 20 mV for 0 to 5 V |

Monitors (RS-232)

| | |
|-------------------------|--|
| Output Voltage | 12 bit; 0 to FFF represents 0 to -60 kV |
| Output Current | 12 bit; 0 to FFF represents 0 to -2.5 mA |
| Filament Current | 12 bit; 0 to FFF represents 0 to 3.7 A |
| Filament Voltage | 12 bit; 0 to FFF represents 0 to 5 V |

Load Regulation, Output Voltage

| | |
|---------------------|---|
| Static | < 60 V no load to full load |
| Dynamic | < 3 kV, recovery to within 1% of previous setting within 200 msec |
| Beam Current | < ± 2 μ A for a 10 to 100% of change of rated load |

Line Regulation

| | |
|-----------------------|---|
| Output Voltage | < 60 V for a 1 V change in the 24 V supply |
| Beam Current | < ± 2 μ A for a 1 V change in the 24 V supply |

Stability and Drift

| | |
|--------------------------------|---|
| Temperature Coefficient | 100 ppm/ $^{\circ}$ C over operating temperature range |
| Drift | $\pm 0.1\%$ of rating over an eight-hour period after 30 min warmup |

Environmental

| | |
|------------------------------|---|
| Operating Temperature | 0 to +40 $^{\circ}$ C (+32 to +104 $^{\circ}$ F) |
| Storage Temperature | -20 to +85 $^{\circ}$ C (-4 to +185 $^{\circ}$ F) |



| SPECIFICATION | |
|---|--|
| Humidity | 80% maximum relative humidity up to 31°C (88°F), reducing linearly to 50% at 40°C (104°F), non-condensing (ref BS EN61010-1) |
| Vibration | In accordance with BS EN60068-2-6:1995 transport, when contained in the original packaging |
| Frequency Range | 10 to 500 Hz |
| Acceleration | 20 m/sec ² crossover at 58 Hz |
| Displacement | 0.15 mm (0.006") max |
| Altitude | 0 to 2000 m (0 to 6562') |
| Installation Environment | Installation category 1, pollution degree 2, indoor use only |
| Cooling | Fan assisted |
| Connectors | |
| Input DC Power | Deutsch IMC24-1602 |
| HV Output | HiTek Power*-designed detachable poke home connector |
| Filament Output | HiTek Power*-designed detachable poke home connector |
| Control Interface | 15-way, D-type socket (analog) 9-way, D-type socket (RS-232) |
| Protection, Safety, and Compliance | |
| Protection | Input voltage reverse polarity Over-temperature Over-current (continuous short circuit and intermittent arc) on both HV output and filament Over-voltage on both HV output and filament |
| Safety | This high voltage module meets the requirements of the Low Voltage Directive (LVD), 2006/95/EC by complying with BS EN61010-1:2001 when it is installed as a component part of other equipment and is CE marked accordingly. |
| EMC | This high voltage module is intended for installation as part of a system. Basic EMC filtering is provided. |
| RoHS | The XR150 series 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 (W x H x D) | 80 mm x 179.5 mm x 320 mm; 3.15" x 7.07" x 12.6" (excluding fan) |
| Weight | 8 kg (18 lb) |
| Casing | Aluminum, clear non-chrome passivate finish See outline drawing (analog version). |



ORDERING INFORMATION

| Model | Output Voltage | Output Current |
|------------|----------------|----------------|
| XR150-603* | -60 kV | 2.5 mA |

*Please add the required suffix for control option to the part number:

A Analog control

C RS-232 control

Example: XR150-603C for RS-232 controlled unit

INTERFACE CONNECTIONS

Analog, 15-way, Female, D-Type Connector

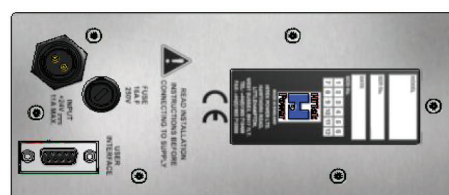
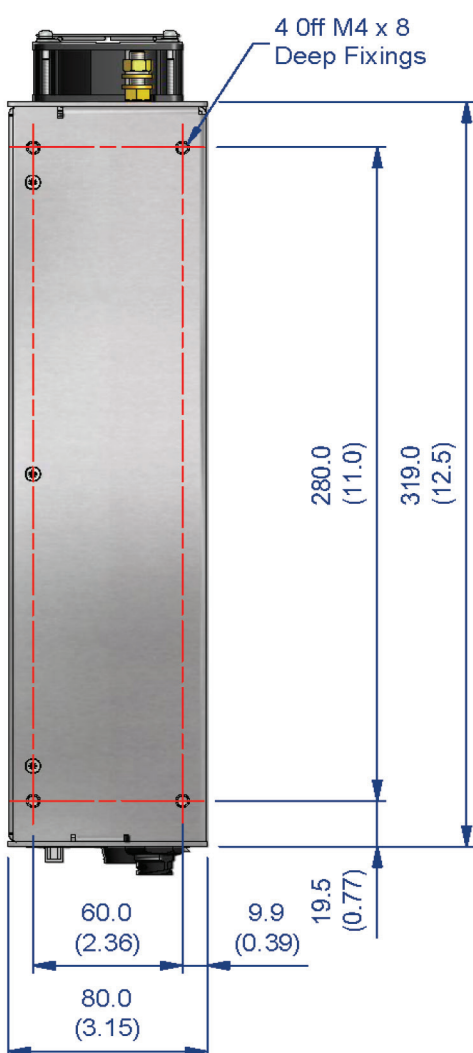
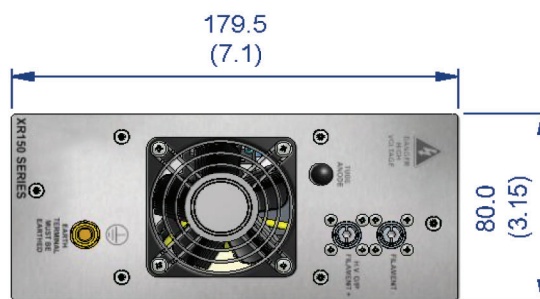
| | | | |
|--------------------------|---|----|----------------------------|
| FILAMENT CURRENT MONITOR | 1 | 9 | 0 V (SIGNAL) |
| kV DEMAND | 2 | 10 | OVER-TEMPERATURE |
| 0 V (SIGNAL) | 3 | 11 | NO CONNECTION |
| FILAMENT VOLTAGE MONITOR | 4 | 12 | RESERVED |
| BEAM CURRENT DEMAND | 5 | 13 | OVER-VOLTAGE |
| 0 V (SIGNAL) | 6 | 14 | OVER-CURRENT |
| kV MONITOR | 7 | 15 | COMMON RETURN FOR 10 13 14 |
| BEAM CURRENT MONITOR | 8 | | |

Digital, Remote-Control (RS-232) 9-Way, Female, D-Type Connector

| | | | |
|---------------|---|---|---------------|
| NO CONNECTION | 1 | 6 | NO CONNECTION |
| TXD | 2 | 7 | NO CONNECTION |
| RXD | 3 | 8 | NO CONNECTION |
| NO CONNECTION | 4 | 9 | NO CONNECTION |
| 0 V | 5 | | |

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

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





For international contact information, visit
advanced-energy.com.