



Universal Voltronics
Your High Voltage Power Partner



X-Ray

Series XRC, XRS

A stable range of Power Supplies suitable for many industrial, analytical, scientific, and medical X-ray applications

60kV-450kV, 3kW-140kW

Universal Voltronics XRC and XRS Series power supplies combine a stable .05%, low-ripple high voltage power source with one or more filament supplies in one compact, well-proven package. This series offers models optimized for use in a wide variety of industrial, analytical, and medical applications.

Two key strengths of Universal Voltronics X-Ray power supplies are reliability and stability. These qualities are achieved through the use of modular circuit architectures that benefit from UVC's 40+ years of high-voltage experience. Another contributor is the use of a proprietary solid high-dielectric encapsulation medium in most units, thus reducing weight and footprint. Finally, a deliberate "guard band" approach to the design uses components and systems with ratings that substantially exceed their typical in-service loads.

FEATURES:

- **Highly Stable**
- **Compact, Lightweight Design**
- **Digital Microprocessor Control**
- **Low Stored Energy**
- **Superior Arc Management with Configurable Arc Handling**
- **Over Voltage Protection**

UVC Industrial X-Ray Power Supplies

State of the Art Size, Weight, Ripple, and Stability.

Specified Parameters	100kV	160kV	225kV	320kV	450kV
Output					
DC Output Voltage	0-100kV	0-160kV	0-225kV	0 ± 160kV	0 ± 225kV
Output Current	30ma	40mA	30mA	30mA	30mA
Max Output Power	3kW	3kW	3kW	4.5kW	4.5kW
Polarity	Negative	Negative	Negative	Bi-Polar	Bi-Polar
Efficiency	>85%	>85%	>85%	>85%	>85%
Ripple/Noise (peak-to-peak)	0.1%	0.1%	<0.15%	0.1%	<0.15%
Input					
Voltage Range	230VAC (+10/-15%)	230VAC (+10/-15%)	230VAC (+10/-15%)	230VAC (+10/-15%)	230VAC (+10/-15%)
# Phases	1	1	1	1	1
Line Frequency	47-63Hz	47-63Hz	47-63Hz	47-63Hz	47-63Hz
Customer Interface					
HV	R-24 Cable Well	R-24 Cable Well	R-28 Cable Well	2 x R-24 Cable Well	2 x R-28 Cable Well
Remote Control Interface	Analog/RS232	Analog/RS232	Analog/RS232	Analog/RS232	Analog/RS232
Control AC Input	IEC Inlet	IEC Inlet	IEC Inlet	IEC Inlet	IEC Inlet
Mechanical/ Environmental					
Size	19"W x 10.5"H x 22"D	19"W x 10.5"H x 24"D	17"W x 20"H x 32"D	2x(19"Wx10.5"Hx24"D)	2x(17"Wx20"Hx32"D)
Weight	135lbs	155lbs	315lbs	300lbs	620lbs
Operating Temperature	0 to 40°C	0 to 40°C	0 to 40°C	0 to 40°C	0 to 40°C
Humidity	5 to 95% non-condensing	5 to 95% non-condensing	5 to 95% non-condensing	5 to 95% non-condensing	5 to 95% non-condensing
Storage Temperature	-20° to 85°C	-20° to 85°C	-20° to 85°C	-20° to 85°C	-20° to 85°C

Standard Specifications

Output	
Repeatability	0.03%
Accuracy	0.5% of set value ± 0.1kV
Long term drift	0.05% over 10hrs after 30min warm up
Temperature drift	50ppm/°C at set value
Line regulation	± 0.005%
Load regulation	± 0.05%
Voltage Ramp Up	0.1 sec to 0.3 sec for analog interface 0.1 sec to 10 sec for RS232 interface
Duty Cycle	100% continuous
MTBF	>15,000 hours
Filament Outputs*	
Filament Voltage	8VDC
Filament Current	6A
Ripple	<1%
Input	
Power Factor	0.9 or better
Customer Interface	
Mains AC Input	3 position terminal strip

225kV



320kV



* Filament is configurable to limit the x-ray tube output power. For dual filament units each filament is settable to the requirements (I & W) for the individual focal spot. All specifications subject to change without notice.

Analytical X-Ray Power Supplies

Highly Stable Micro Processor Controlled.

Specified Parameters	X-Ray Diffraction	X-Ray Fluorescence
Output Parameters:		
DC Output Voltage	- 60kV	+ 70kV
Output Rated Current	0-125mA	0-150mA
Polarity	Negative	Positive
Max Output Power	4kW	4kW
Emission Current Regulation:		
Line	<50ppm (0.005%) over specified input range	<50ppm (0.005%) over specified input range
Load	<50ppm (0.005%) of rated output for full load change	<50ppm (0.005%) of rated output for full load change
Long Term Stability	0.01%/8 hours	0.01%/8 hours
Filament supply:		
Voltage, Current	0-13VDC, 12A	0-15VDC, 12A
Ripple	1% rms<100Hz, 3%>100Hz	1% rms<100Hz
Interface HV Receptacle	US Fed std 3 pin; C, S shorted	US Fed std 3 pin; C, L, S shorted



XRD



XRF

(covers removed)

Standard Analytical Specifications

Output Parameters:

DC Output Power 3 & 4kW models available
 Ripple/Noise 0.03% rms (0.085% p-p) <1kHz, 0.3% rms (0.85% p-p) >1kHz

Output Voltage Regulation:

Line + 0.005% High to Low Line
 Load + 0.005% NL to FL
 Temperature Coefficient, Vout 50ppm/°C
 Long Term Stability 0.01% over 10hrs after 30min warmup
 Accuracy <0.5%
 Arc Protection Programmable Arc Counter.
 1 to 32 arcs in 10 sec based on dI/dt detection

Emission Current Regulation:

Line + 0.005% High to Low Line
 Load 0.005%
 Temperature Coefficient, Iem <50ppm/ °C
 Long Term Stability <0.1% over 10 hours
 Accuracy <0.5%

Agency Approvals:

CE Compliant to EMC 89/336/EEC and LV 73/23EEC directives

Input Parameters:

Phases 1
 Line Frequency 50/60Hz
 Voltage Range 230VAC +10/-15% (195.5 - 253VAC)
 Efficiency 85%
 Power Factor >0.9; Active PFC

Filament supply:

Current 0-12A
 Voltage Ramp Up Time Programmable from 20ms to 10 sec
 when using RS232 control

Switching Frequency .. Ranges from 20 to 28kHz depending on kV ref

Operating Temperature 0 to 40°C
 Operating Humidity 5 to 95% non-condensing
 Storage Temperature -20 to 85 °C
 Storage Humidity 5 to 95% non-condensing
 Dimensions 19"W x 5.25"H x 22"D
 Weight <65lbs
 MTBF >40,000 hrs
 Control Interface RS232 or Analog Interface

Medical X-Ray Capabilities

UVC has Medical X-ray expertise across multiple medical imaging applications, including volume OEM and developmental CT-scan and Mammography power sources.

UVC Medical X-Ray Capabilities

- Up to 140kW
- Up to 200kV
- Emission current to 1000mA
- Integrated filament power supplies
- Adjustable arc management
- Ripple as low as 14V p-p on 140kV
- Scalable power conversion building blocks
- Designs suitable for gantry mounting in CT applications
- Extremely fast rise and fall times for certain applications.
- Built to all applicable CE requirements
- Flexible customer control interface, read back & diagnostic options
- Oil or solid dielectric designs available



Recent UVC Medical X-ray Projects



UVC has a long history in X-ray and CT-scan applications, and indeed was a pioneering vendor during the Eighties in the development of reliable power supplies for first-generation enclosed CT-Scan units.

Recent projects in UVC's OEM Division have included two remarkably compact, high density groundbreaking supplies for highly demanding medical applications:

70 kW, 140 kV CT-Scan Type Power Supply, with a remarkably low ripple specification of 70 volts or less at any frequency up to 10 MHz.

60 kW, 150 kV Scanning-Beam Type Power Supply, designed with very low stored energy to withstand repetitive arcing conditions that are intrinsic to this application type.



All specifications subject to change without notice.

X-Ray high-voltage power for Industrial, Analytical, or Medical applications, UVC offers Proven Competence

Whether the systems application is industrial, analytical, or medical/dental, Universal Voltronics X-ray power supplies benefit from UVC's long experience and proven design/manufacturing competence. Among the features that optimize UVC power sources for X-ray use are:

- **Low Ripple (0.1% peak-to-peak)** for better imaging and shorter exposure times. This in turn improves industrial production throughput, as well as limiting patient exposure in medical applications. Unusually precise cathode voltage and current regulation ratings of 0.1%, and a ripple rating of 0.1% p-p assure measurement and image accuracy. Line and load regulation are also notably superior to competitive products.
- **High Voltage Stability (0.05% of rated output after warm-up)** provides both short and long-term repeatability, vital in critical inspection applications such as aircraft castings, welded and brazed assemblies, industrial ceramics, complex electronic modules and molded plastic parts
- **Field-proven Building Blocks** enhance reliability, and make "off-the-shelf customization" practical, straightforward and quick for manufacturers/integrators.
- **Modern Cellular Manufacturing Techniques** enhance responsiveness to customer needs.
- **Proprietary Solid-dielectric HV-Brick Encapsulation** In contrast to many competitors, UVC relies heavily on solid-dielectric encapsulation, rather than cumbersome oil-encapsulated HV modules.
- **UVC's Proprietary Labview Control** is an option for applications in which computer based remote control is desirable. These choices assure versatility in applications involving remote computer-based control of power supply parameters.
- Power factor correction provides wide input operating range and improved immunity to power-line disturbances.
- Automatic ramp-up of high voltage and emission current to preset values
- EMI reduction circuits on input line
- Microprocessor-controlled
- Local analog control or Serial Remote Control
- Remote interlock per CFR1020
- Mechanical configurations include rack mount and custom enclosures
- Low Stored Energy
- Short circuit and Arc Protected
- Over voltage protection
- Remote monitoring of high-voltage and supplementary outputs
- Designed to meet UL 1010 (EN61010) and EN61326
- Designed to meet CE Standards.





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The Power of Experience

With over forty years of experience in every form of high-voltage application — from radar to rail guns to X-rays — Universal Voltronics is truly one of the pioneers in high voltage design. Our long experience influences every aspect of our design processes, and has provided us the expertise to be innovative in customizing supplies to a particular need.

Assured Quality

Every Universal Voltronics power supply conforms to a stringent Quality Assurance program that insures the consistent performance and long life of each. Most of our supplies meet the highest standards, including UL, IEC, and CE.

High Constructional Standards

Universal Voltronics systems are assembled in rugged, heavy gauge aluminum chassis. Structural elements have been selected both for their mechanical attributes and, as required, for their endurance at high voltages. Thermal management is achieved by over-spec levels of thermal mass and heat dissipating capability of the heat sink, and a predictable directed air stream on fin structure. Our in-house transformer fabrication department enables us to achieve our customer's specific electronic and mechanical specifications.

Conservative Electrical Design

All supplies incorporate conservative electrical design with all components used well below advertised full load ratings. Great emphasis has been placed on the power supply's ability to withstand arcs and short circuits. Each supply is subjected to rigorous test procedures before shipment.

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57 Commerce Drive, Brookfield CT 06804 USA • (203) 740-8555 • Fax (203) 740-9555 • www.voltronics.com

For immediate assistance
Call (800) 229-3129
ext. 203

or visit us on the web at
www.voltronics.com



Universal Voltronics Corp.
57 Commerce Drive, Brookfield, CT 06804 USA