



**HITEK POWER® XRG70**  
X-RAY POWER SUPPLY MODULES





**Exceptionally  
small and  
reliable** for high-  
performance,  
compact x-ray  
applications

Specifically developed for high-performance, compact x-ray applications, the XRG70 series is exceptionally small and reliable. It offers superior high-voltage stability, stress control, and packaging. This series includes a variety of models from 25 to 90 kV, and is based on the grounded filament series of products for grounded cathode applications. The filament is automatically controlled by the integral beam current loop-control and the power stage utilizes a current-fed resonant push-pull converter to provide high efficiency while ensuring reliable operation.

## Features

- › 72 W high-voltage output max
- › 20 W grounded filament
- › Exceptionally compact
- › Local and remote operation
- › Safety interlock
- › High accuracy and stability
- › EU RoHS compliant to 2002/95/EC
- › CE marked for EU LV Directive 2006/95/EC

## Typical Applications

- › X-ray fluorescence (XRF)
- › X-ray diffraction (XRD)
- › X-ray reflectivity (XRR)
- › X-ray imaging (XRI)



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## SPECIFICATIONS

<b>Output Power</b>	72 W max, depending on model (constant power available)
<b>Output Voltage</b>	Models available from 25 to 90 kV, full spec above 5% output
<b>Output Current</b>	Models available from 0.8 to 2 mA
<b>Input Voltage</b>	24 VDC $\pm 10\%$ , 5.5 A max (efficiency $\approx 75\%$ )
<b>Ripple</b>	0.05% +10 V peak to peak max
<b>Filament</b>	5.5 VDC, 3.5 A, controlled by internal beam control loop
<b>Filament Disabled</b>	Filament disabled: apply V > 2.8 V on pin 12
	Filament enabled: apply V < 0.8 V on pin 12
	Input Impedance: 10 k $\Omega$ max input voltage 24 V
<b>Controls (Analog Version)</b>	
<b>Voltage (Remote)</b>	0 to 10 VDC demands 0 to max voltage $\pm 0.25\% \pm 10$ V (90 kV version: $\pm 1\%$ )
<b>Voltage (Local)</b>	Internal multi-turn potentiometer for full range setting
<b>Current (Remote)</b>	0 to 10 VDC demands 0 to max current $\pm 0.25\% \pm 1$ $\mu$ A
<b>Current (Local)</b>	Internal multi-turn potentiometer for full range setting
<b>Filament Limit</b>	Internal multi-turn potentiometer for full range setting
<b>Filament Standby</b>	Internal multi-turn potentiometer for full range setting
<b>Controls (RS-232 Version)</b>	
<b>Voltage (Remote)</b>	12 bit, 0 to FFF demands 0 to max voltage $\pm 0.25\% \pm 10$ V (90 kV version: $\pm 1\%$ )
<b>Slew Rate</b>	12 bit, 0 to FFF demands 50 msec to 204 sec
<b>Current (Remote)</b>	12 bit, 0 to FFF demands 0 to max current $\pm 0.25\% \pm 22$ $\mu$ A
<b>Filament Limit</b>	12 bit, 0 to FFF demands 0 to 3.5 A, $\pm 2.5\%$ , $\pm 15$ mA
<b>Filament Standby</b>	12 bit, 0 to FFF demands 0 to 3.5 A, $\pm 2.5\%$ , $\pm 15$ mA
<b>Monitors (Analog Version)</b>	
<b>Output Voltage</b>	0 to 10 VDC demands 0 to max voltage $\pm 0.25\% \pm 10$ V
<b>Output Current</b>	0 to 10 VDC demands 0 to max current $\pm 0.25\% \pm 1$ $\mu$ A
<b>Filament Limit</b>	Internal multi-turn potentiometer for full range setting
<b>Filament Standby</b>	Internal multi-turn potentiometer for full range setting
<b>Filament Current Monitor</b>	0 to 10 V for 0 to 3.5 A, accuracy $\pm 2\% \pm 20$ mV, output impedance 1 k $\Omega$
<b>Monitors (RS-232 Version)</b>	
<b>Voltage (Remote)</b>	12 bit, 0 to FFF represents 0 to max voltage $\pm 0.45\% \pm 90$ V
<b>Current (Remote)</b>	12 bit, 0 to FFF represents 0 to max current $\pm 0.45\% \pm 2$ $\mu$ A
<b>Filament Current</b>	12 bit, 0 to FFF represents 0 to 3.5 A, $\pm 2.5\%$ , $\pm 15$ mA
<b>Filament Voltage</b>	12 bit, 0 to FFF represents 0 to 10 V $\pm 2.5\% \pm 10$ mV
<b>Voltage Demand</b>	12 bit, 0 to FFF represents 0 to max voltage
<b>Current Demand</b>	12 bit, 0 to FFF represents 0 to max current
<b>Filament Standby</b>	12 bit, 0 to FFF represents 0 to 3.5 A
<b>Filament Limit</b>	12 bit, 0 to FFF represents 0 to 3.5 A
<b>Load Regulation</b>	
<b>Output Voltage</b>	0.01% $\pm 1$ V for a 100% change in output current
<b>Beam Current</b>	0.01% $\pm 1$ $\mu$ A for a 50% voltage change
<b>Line Regulation</b>	
<b>Output Voltage</b>	0.01% for a 10% input voltage change
<b>Beam Current</b>	0.01% for a 10% input voltage change
<b>Environmental</b>	
<b>Storage Temperature</b>	-20 to 85°C (-4 to 185°F)
<b>Operating Temperature</b>	0 to 45°C (32 to 113°F) max case temperature
<b>Humidity</b>	80% max relative humidity up to 31°C (88°F), reducing linearly to 50% at 40°C (104°F); non-condensing
<b>Altitude</b>	2000 m (6500')

## SPECIFICATIONS

<b>Cooling</b>	By conduction through the mounting panel (case) and natural convection through the holes in the lid, one side panel, and the rear panel
<b>Stability and Drift</b>	
<b>Temperature Coefficient</b>	100 ppm per °C, applies to all analog controls and monitors
<b>Stability</b>	±0.1% over 8 h after 30 min warmup
<b>Protection</b>	
<b>Input Voltage</b>	Reverse polarity and over-current
<b>HV Output</b>	Continuous shortcircuit, intermittent arc, and over-voltage protection
<b>Filament Output</b>	Continuous shortcircuit and over-voltage protection
<b>Safety and Compliance</b>	
<b>Safety</b>	Meets the requirements of the Low Voltage Directive (LVD) 2006/95/EC by complying with BS EN61010-1 when it is installed as a component part of other equipment and is CE marked accordingly. An M5 earth terminal is provided which shall be connected to a safety earth at all times when the unit is operational.
<b>RoHS</b>	Meets the requirements of EU Directive 2002/95/EC on the Restriction of use of certain Hazardous Substances in electrical and electronic equipment (RoHS).
<b>Mechanical Specifications</b>	
<b>Dimensions</b>	See drawings on page 7
<b>Weight</b>	Analog models: 3 kg (6.6 lb)
	Models with RS-232: 3.2 kg (7 lb)
	XRG70-903 (90 kV): 5.43 kg (11.97 lb)
<b>Casing</b>	Aluminum, clear, non-chrome passivate finish
<b>Input DC Power Connector</b>	Twin 63.5 mm (¼") push on spade terminals
<b>HV Output Connector</b>	HiTek Power*-designed detachable connector
<b>Filament Output Connector</b>	Molex 2 W minifit 39-29-1028

## CONNECTIONS

Pin	Name	In/Out	Function
1	MONITOR RETURN	Output	Zero-volt for commands and monitors
2	KV MON	Output	To read the actual voltage
3	mA MON	Output	To read the actual beam current
4	INTERLOCK SIGNAL	Output	Relay contact ground/open
			GROUND = interlock open
			OPEN = interlock closed
5	+10 V REF	Output	To be used as a reference voltage
6	FIL CURRENT MON	Output	To read the actual filament current
7	KV PROG	Input	To set the output voltage
8	LOCAL KV PROG	Output	To be connected to pin 7 in local mode, adjust potentiometer and read demand
9	FIL I LIMIT	Output	Read and adjust the filament current limit demand via potentiometer.
10	mA PROG	Input	To set the output current
11	LOCAL mA PROG	Output	To be connected to pin 10 in local mode, adjust potentiometer and read demand
12	FIL ENABLE	Input	Active low
13	HV ENABLE	Input	Active low
14	FIL I STANDBY	Output	Read and adjust the filament standby demand via potentiometer.
15	INTERLOCK RETURN	Input	To be connected to front panel stud and not monitor return

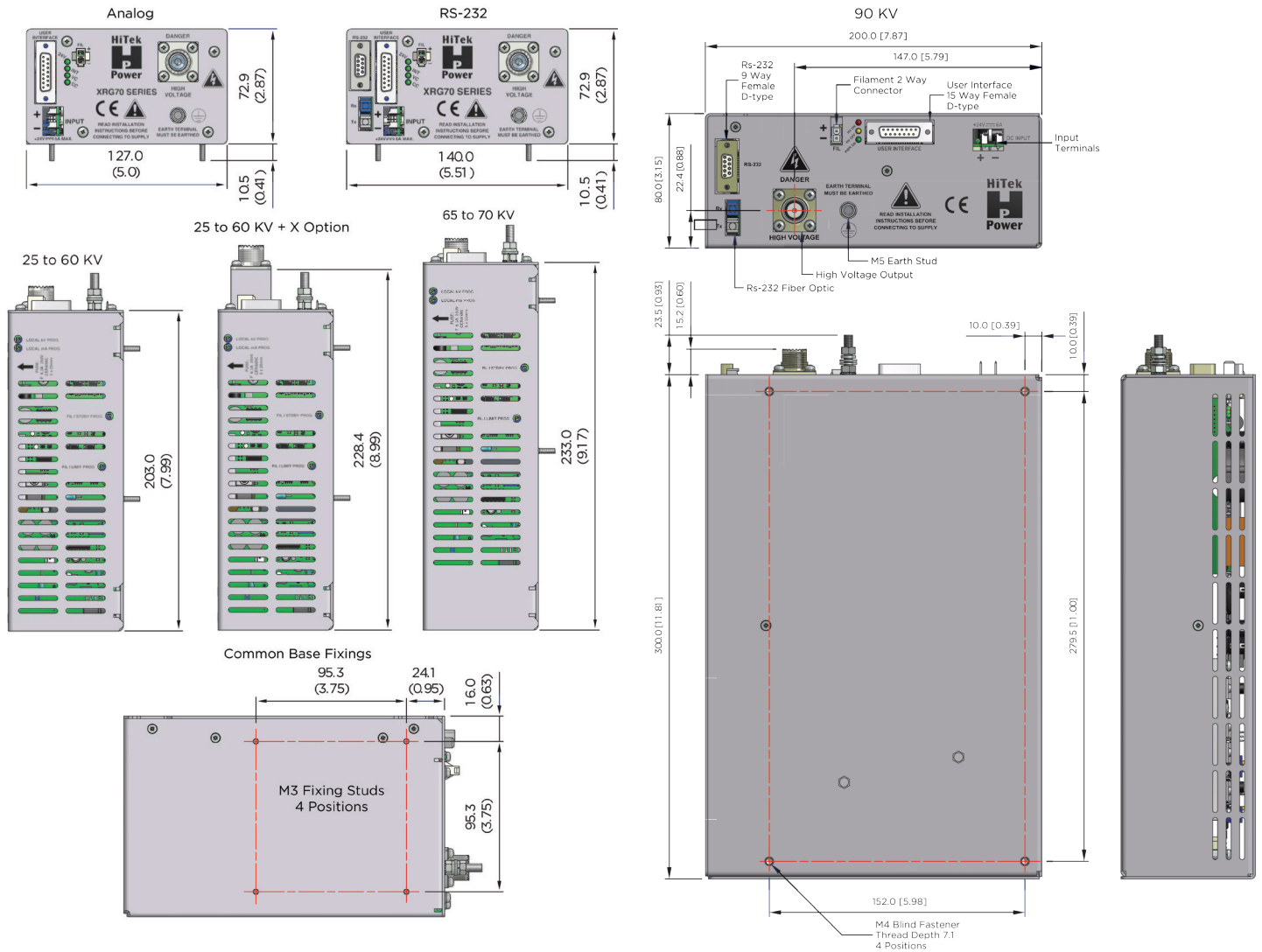


LED DISPLAY	
LED	Function
CC	On when current limit loop is in control
VC	On when voltage loop is in control
INT	On when interlock is closed
24V	On when unit is live

Output and Ordering Information			
Model	Output Voltage	Output Current	Output Power
XRG70-253	25 kV	2 mA	50 W
XRG70-403	40 kV	1.5 mA	60 W
XRG70-503	50 kV	1.2 mA	60 W
XRG70-603	60 kV	1.2 mA	72 W
XRG70-653	65 kV	1 mA	65 W
XRG70-703	70 kV	1 mA	70 W
XRG70-903	90 kV	0.8 mA	72 W
Accessories			
33400206-00	XRG70 1M HV cable		
33400206-01	XRG70 3M HV cable		
33400206-02	XRG70 5M HV cable		
Suffixes (Required; add to model number)			
P or N	High-voltage output polarity (normally positive for grounded filaments)		
F	Specifies if the internal filament is required		
X	Extends the high-voltage cable (to enable compatibility with other products, e.g. MH60, and a greater range of x-ray tubes)		
C	RS-232 computer control (hard wired and fiber optic)		
Examples			
XRG70-603N	Negative output		
XRG70-603PFC	Positive with filament and RS-232		
XRG70-603PFXC	Positive with filament, extended cable, and RS-232		

Analog models with fixed constant power and RS-232 models with adjustable constant power, as well as many different interlock options, are available upon request.





Drawing dimensions are in mm (inches).  
HV output cable available upon request.

