Advanced Energy®

HITEK POWER® XRG70

X-RAY POWER SUPPLY MODULE

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
- CE marked for EU LV directive 2006/95/EC
- EU RoHS compliant to 2002/95/EC
- Safety interlock
- High accuracy and stability

Typical Applications

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

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Note: *Contact AE for custom versions with additional options for power control, interlock, and enable signals.*

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

SPECIFICATION

Cooling	By conduction through the mounting panel (case) and natural convection through the holes in the lid, one side panel, and the rear panel
Stability and Drift	
Temperature Coefficient	100 ppm/ºC, applies to all analog controls and monitors
Stability	±0.1% over an eight hour period after 30 min warmup
Protection	
Input Voltage	Reverse polarity and over-current
HV Output	Continuous short-circuit, intermittent arc, and over-voltage protection
Filament Output	Continuous short-circuit and over-voltage protection
Safety and Compliance	
Safety	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
RoHS	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	
Dimensions	See outline drawings, on page 6.
Weight	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)
Casing	Aluminum, clear, non-chrome passivate finish
Input DC Power Connector	Twin 63.5 mm (¼") push on spade terminals
HV Output Connector	HiTek Power®-designed detachable connector
Filament Output Connector	Molex 2W 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

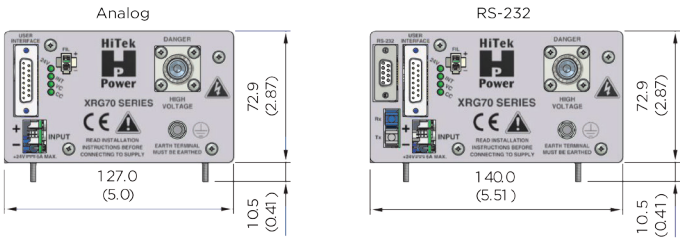
LED	Function
CC	On when current limit loop is in control
VC	On when voltage loop is in control
INT	On when interlock is closed
24V	On when unit is live

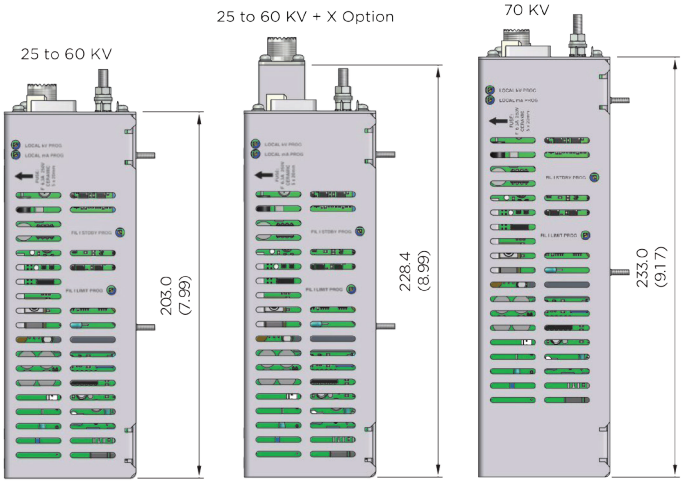
OUTPUT AND ORDERING INFORMATION

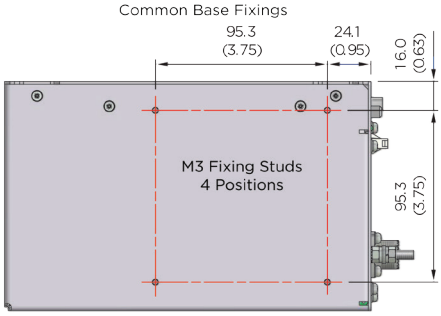
Model	Output Voltage	Output Current	Output Power
XRG70-253	25 kV	2 mA	50 W
XRG70-403	40 kV	1.5 mA	60 W
XRG70-503	50 kV	1.2 mA	60 W
XRG70-603	60 kV	1.2 mA	72 W
XRG70-653	65 kV	1 mA	65 W
XRG70-703	70 kV	1 mA	70 W
XRG70-903	90 kV	0.8 mA	72 W
Suffixes (Required; add to model number.)			
P or N	High voltage 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		

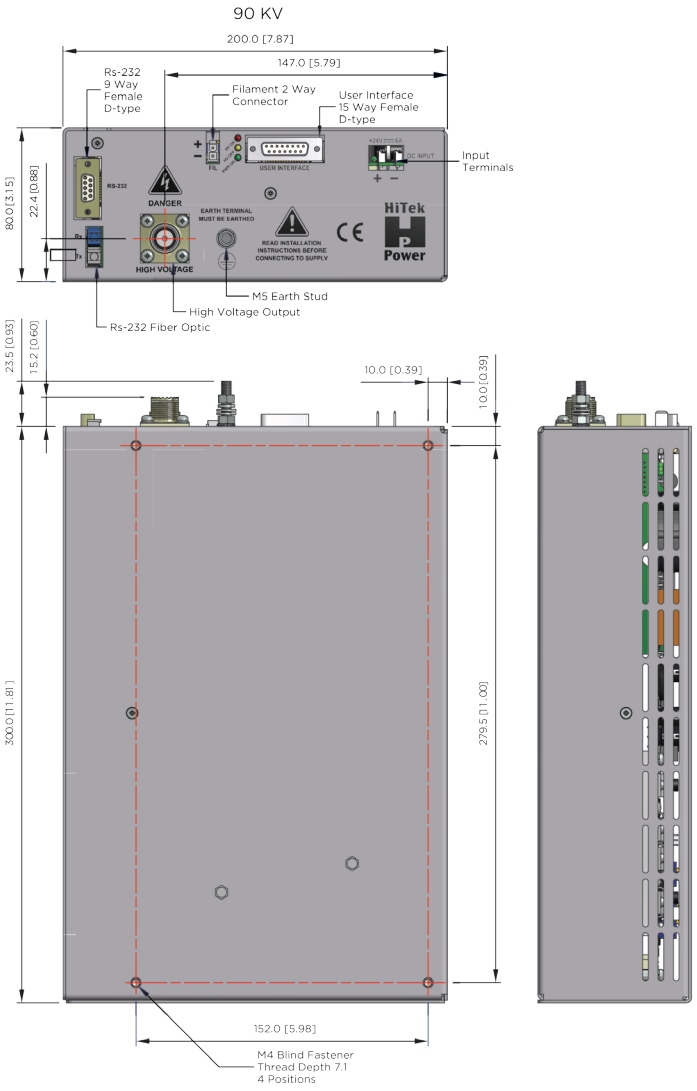
Please note that analog models with fixed constant power and RS-232 models with adjustable constant power, as well as many different interlock options, are available upon request.

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. HV output cable available upon request.

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

ENG-HV-XRG70-230-02 2.16

Mouser Electronics

Authorized Distributor

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Advanced Energy:

XRG70-403PFX XRG70-503PF XRG70-253PFXC XRG70-403PF XRG70-503PFXC XRG70-503PFC XRG70-403PFXC XRG70-903PFC XRG70-253PF XRG70-253PFX XRG70-503PFX XRG70-253PFC XRG70-903NC XRG70-903PF XRG70-653PFC XRG70-403PFC