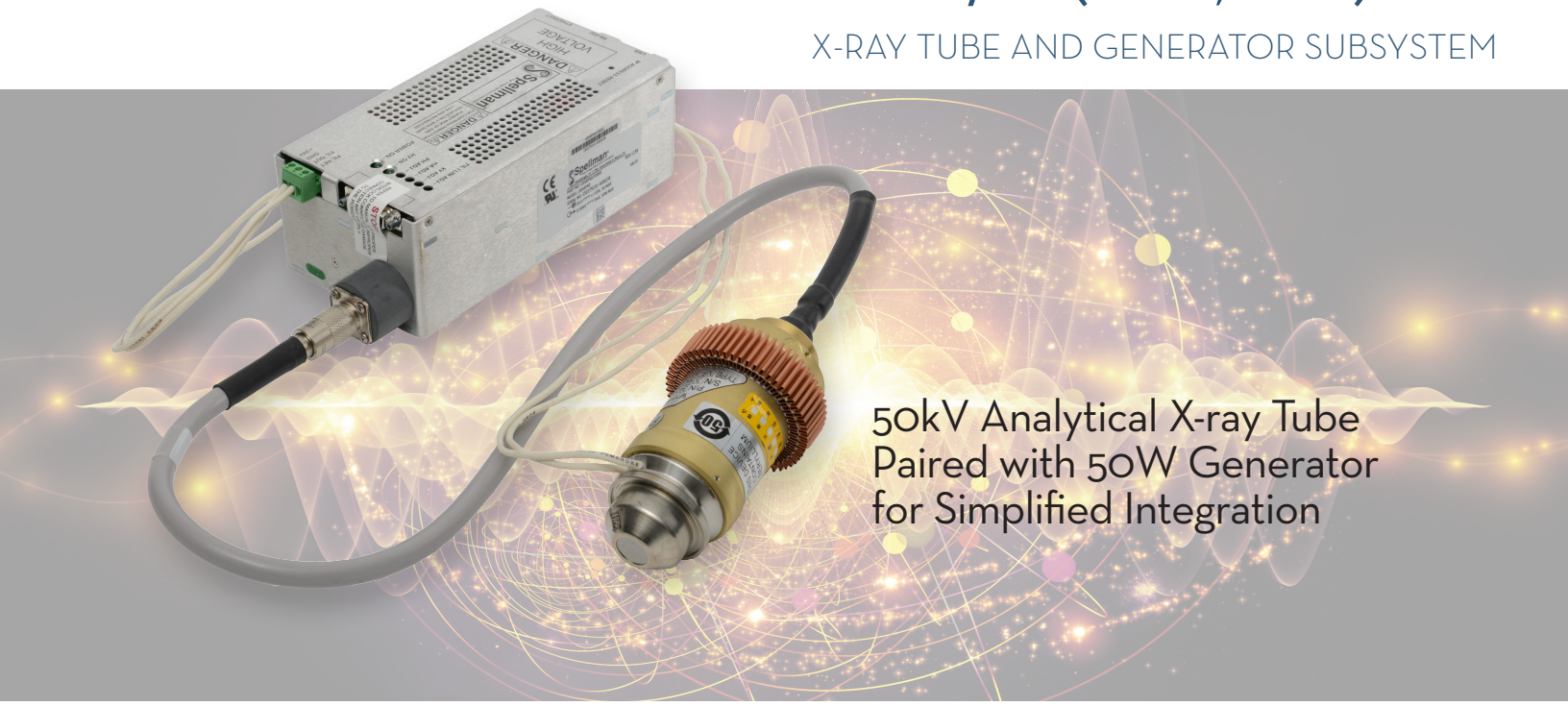
VAREX INDUSTRIAL | ENGINEERED SOLUTIONS

VF-50 / uX (50KV, 50W)

X-RAY TUBE AND GENERATOR SUBSYSTEM



OVERVIEW

Varex Imaging's VF-50 is a 50kV X-ray tube designed specifically for use in XRF applications. The end-window tube design allows for sample placement close to the X-ray source for efficient dose delivery. Long product lifetime is provided by the air-cooled ceramic tube design.

The Spellman uX is an ultra-compact X-ray generator module utilizing high voltage packaging and surface mount fabrication techniques coupled with proprietary encapsulation technology. The uX uses closed loop filament control circuitry providing highly regulated beam current. The low noise dc filament supply provides tight regulation, high stability and low ripple.

The combination of these market-leading components creates a sub-system optimized to the users' needs that is verified and tested as a sub-system ensuring maximum reliability out-of-the box.

FEATURES AND BENEFITS

- 50Kv at 1mA (50w max)
- Various target materials available
- End-window tube for efficient dose delivery
- Integrated HV cable for compact tube
- Integrated tube flange for use in vacuum system
- Over-voltage and short circuit protection
- Voltage & Current Programming
- Local & Remote Emission Control
- Safety Interlock
- RS-232, Ethernet & USB all as standard

APPLICATIONS[1]

- X-ray Fluorescence Analysis
- Recycling

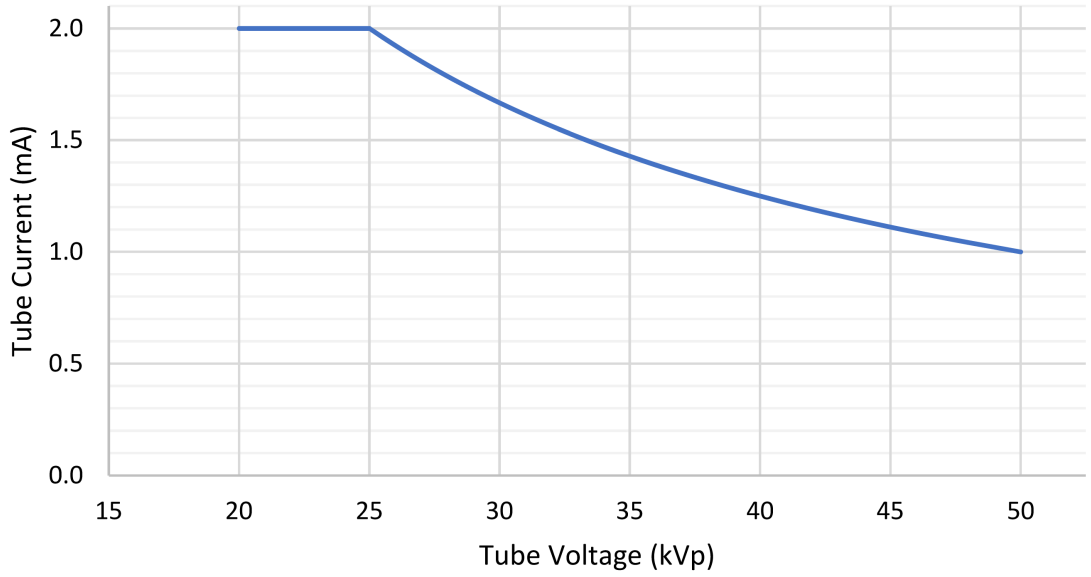
[1] System manufacturers are responsible for qualifying and validating their products for their intended uses and meeting all applicable regulatory requirements.

SUB-SYSTEM	
Maximum Power	50W (with 10 cfm forced air cooling)
Anode Potential	20 - 50 kVp (see emission chart for details)
Maximum Tube Current	2.0 mA (see emission chart for details)
Operating Temperature	+5°C to +40°C
Storage Temperature	-20°C to +70°C
Humidity	10% to 90%, non-condensing
Temperature Coefficient	0.01% per °C, voltage and current
Stability	0.05% per 8 hours after 1/2 hour warm-up

VF-50 X-RAY TUBE	
Envelope	Ceramic
Target Materials	Rhodium (Rh), Tungsten (W), Palladium (Pd) Additional materials on request
Be Window Thickness	75 µm
Anode	Copper body with the target material attached
Target Angle	90° from the Central Ray
Focal Spot, typical	1.0mm
Filament Characteristics	3.3 Amps and 2.5 Volts maximum
Cooling	Forced air convection
Weight	1.23kg
Cable Length	1m

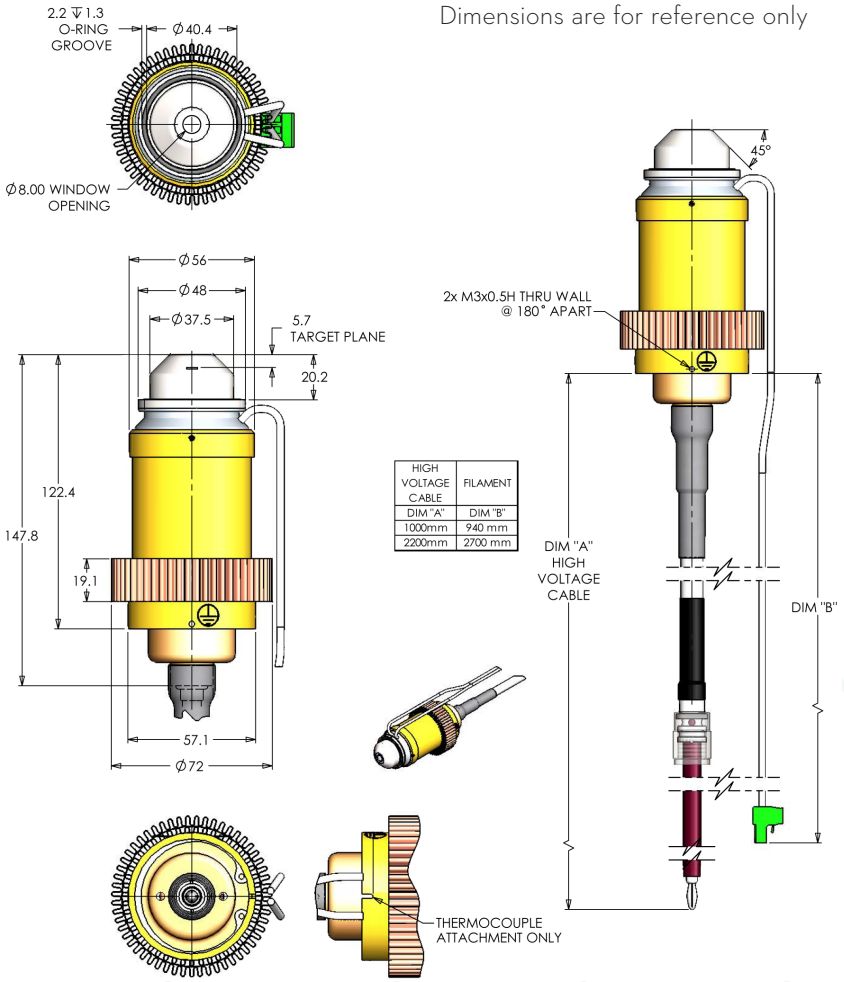
uX GENERATOR	
Input Power	+24Vdc ±10%, 5.0A maximum
Voltage Control – Local	Internal multi-turn potentiometer to set voltage from 0 to full output voltage
Voltage Control – Remote	0 to +10V DC proportional from 0 to full output voltage Accuracy: ±1%; ZIN: 10Mohm
Emission Control - Local	Local: Internal potentiometer to set beam current between 0 and full output current
Emission Control - Remote	0 to +10Vdc proportional from 0 to full output current
Emission Control – Accuracy	±1%. ZIN: 10Mohm. Filament limit and filament preheat control capability is also provided
Digital Interfaces	RS-232, USB, Ethernet
Dimensions	101.6 x 73.0 x 228.6 mm3
Weight	2.1kg
Regulatory Approvals	Compliant to EEC EMC Directive. Compliant to EEC Low Voltage Directive. RoHS Compliant. UL/CUL recognized, File E227588

DC EMISSION CHART



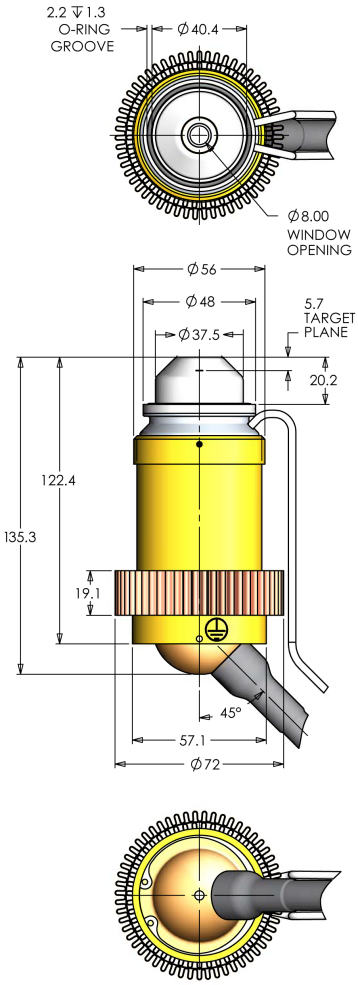
VF-50J

Dimensions are for reference only

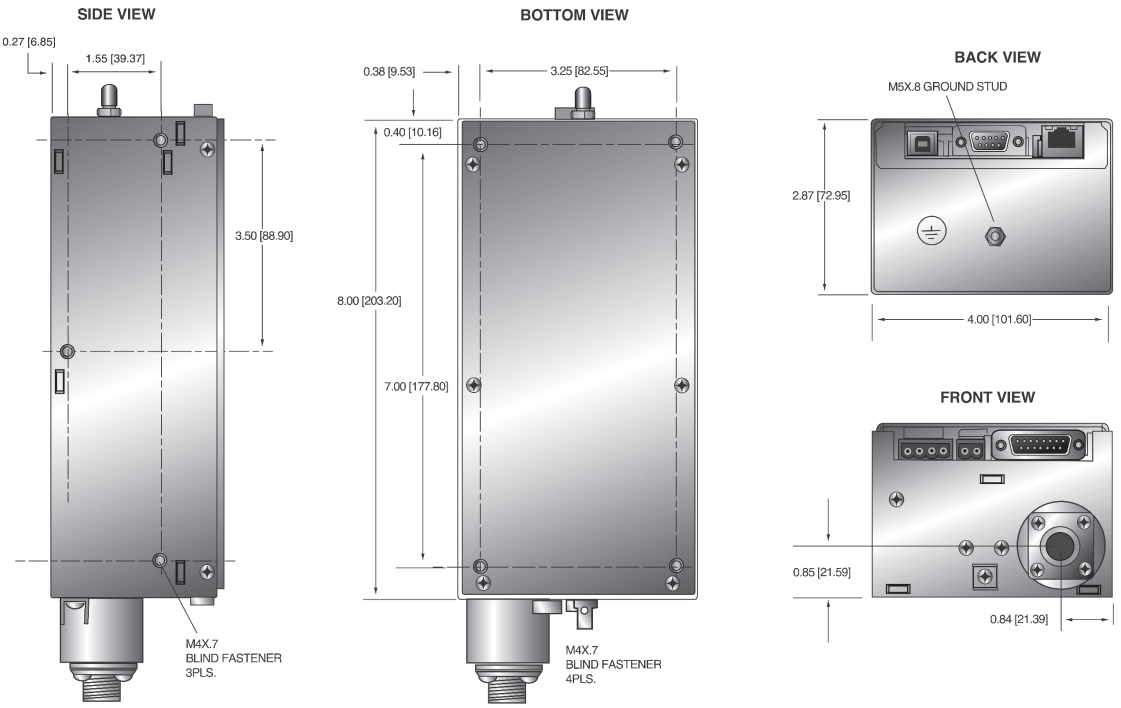


HIGH VOLTAGE CABLE	FILAMENT
DIM "A"	DIM "B"
1000mm	940 mm
2200mm	2700 mm

VF-50J (45°)



uX GENERATOR



POWER/FILAMENT CONNECTOR - 4 PIN PHOENIX CONTACT		
PIN	SIGNAL	PARAMETER
1	+24V Input	+24V @ 5A max
2	+24V Return	Power Ground
3	Filament Out	0.3A to 3.5A, 5V, max
4	Filament Return	Filament Return
ANALOG INTERFACE CONNECTOR		
1	Monitor Return	Signal Ground
2	Voltage Monitor	0-10 volts = 0 to full scale, Zout=1KΩ
3	Current Monitor	0-10 volts = 0 to full scale, Zout=1KΩ
4	Interlock Output	Connect 12V HV ON bulb to pin 15 to enable
5	+10 Volt Reference	+10V at 1mA, maximum
6	Filament Monitor	1 volt = 1 amp, Zout=1KΩ
7	Voltage Program Input	0-10 volts = 0 to full scale, Zin=10MΩ
8	Local Voltage Program*	0-10 volts, screwdriver adjust
9	Filament Limit Setpoint*	1 volt = 1 amp, screwdriver adjust
10	Current Program Input	0-10 volts = 0 to full scale, Zin=10MΩ
11	Local Current Program*	10 turn pot, screwdriver adjust
12	Not used (+24V Out for Interlock)	(Optional Interlock configuration)
13	Not used (Interlock Coil)	(Optional Interlock configuration)
14	Filament Preheat Setpoint*	1 volt = 1 amp, screwdriver adjust
15	Interlock Return	Interlock Ground

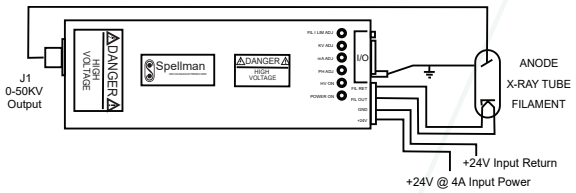
*Denotes 10 turn potentiometer accessable through holes in cover

USB DIGITAL INTERFACE		
PIN	SIGNAL	PARAMETER
1	VBUS	+5Vdc
2	D-	Data -
3	D+	Data +
4	GND	Ground

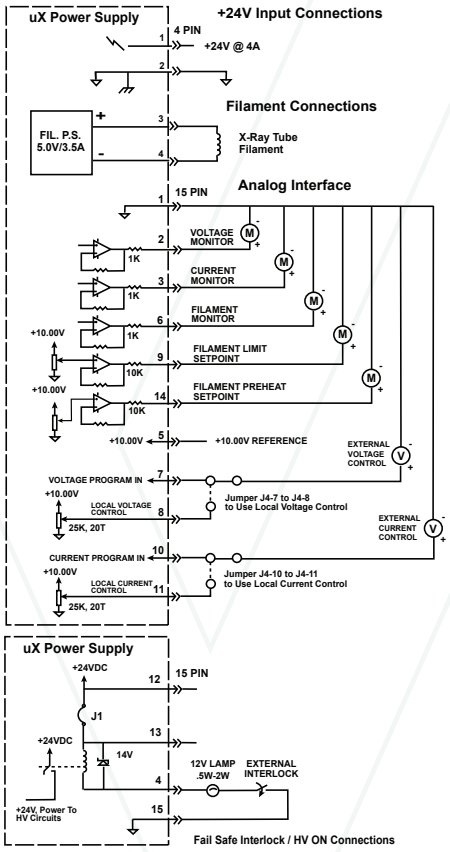
ETHERNET DIGITAL INTERFACE		
PIN	SIGNAL	PARAMETER
1	TX+	Transmit Data +
2	TX-	Transmit Data -
3	RX+	Receive Data +
4	NC	No Connection
5	NC	No Connection
6	RX-	Receive Data -
7	NC	No Connection
8	NC	No Connection

RS-232 DIGITAL INTERFACE		
PIN	SIGNAL	PARAMETER
1	NC	No Connection
2	TX out	Transmit Data
3	RX in	Receive Data
4	NC	No Connection
5	SGND	Ground
6	NC	No Connection
7	NC	No Connection
8	Voltage Monitor 2	0-10V = 0 to full scale, Zout = 1KΩ
9	Power Supply OK	+15V = OK, 0V = Fault, Sink/Source 3mA max

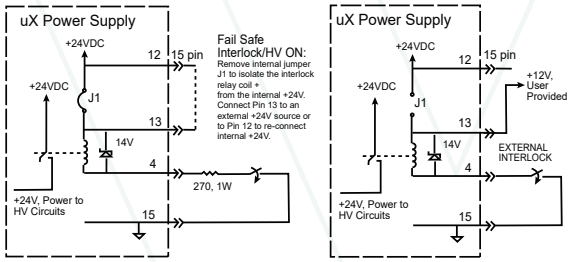
WIRING DIAGRAM



TYPICAL uX OPERATING SET UP



ALTERNATE INTERLOCK CONFIGURATION



Alternate Interlock Configuration: Fail Safe Lamp Replaced With a 270 Ohm Resistor

Alternate Interlock Configuration: Customer Provided +12V For HV ON Relay, Relay Return Grounded

Contents in this document are subject to change without notice.

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