



The uX Series is the result of Spellman's exceptional high voltage packaging and surface mount fabrication techniques coupled with proprietary encapsulation technology producing this ultra-compact X-Ray generator module. The uX powers grounded cathode X-Ray tubes from a variety of well-known manufacturers, featuring a 0 to 50kV/65kV high voltage output @ 2mA limited to 50, 65 or 75 Watts. The uX uses closed loop filament control circuitry providing highly regulated beam current. The low noise dc filament supply operates between 0.3 and 3.5 amps. Offering tight regulation, high stability and low ripple, the uX provides users local and remote analog control to set beam voltage, emission current and filament current limit. USB, RS-232 and Ethernet interface is standard.

TYPICAL APPLICATIONS

The uX is designed to run a variety of tubes from industry leading manufacturers. Contact Spellman sales to determine if the X-Ray tube of interest can be powered by the uX.

OPTIONS

XCC	XRM Compatible HV Cable (50kV only)
5VPM	0 to 5 Volt Programming and Monitor Scaling
GB	Grid Bias
GF	Grounded Filament
5302	Mammoflex HV cable for uX
2001	Mammoflex HV cable for uX w/XCC option

SPECIFICATIONS

Input:

+24Vdc $\pm 10\%$, 5.0A maximum for either 50 Watts or 75 Watts.
+24Vdc $\pm 1V$, 5.0A maximum for 65kV/65W units.

Efficiency:

75%, typical

Output:

0 to 50kV at 0 to 2mA, limited to a maximum of 50 watts or 75 Watts. 0-65kV at 2mA limited to 65 Watts.

Voltage Control:

Local: Internal multi-turn potentiometer to set voltage from 0 to full output voltage.
Remote: 0 to +10Vdc proportional from 0 to full output voltage. Accuracy: $\pm 1\%$. Z_{IN} : 10Mohm.

- **50kV at 2 mA. 50 or 75 Watt Max.**
- **65kV at 2 mA. 65 Watt Max.**
- **Adjustable Isolated Filament Supply**
- **Overvoltage & Short Circuit Protection**
- **Voltage & Current Programming**
- **Local and Remote Emission Control**
- **Safety Interlock**
- **RS-232, Ethernet, & USB Standard**
- **Redundant HV Monitor Signal Available**
- **OEM Customization Available**

www.spellmanhv.com/manuals/uX

Emission Control:

Local: Internal potentiometer to set beam current between 0 and full output current.

Remote: 0 to +10Vdc proportional from 0 to full output current.
Accuracy: $\pm 1\%$. Z_{IN} : 10Mohm. Filament limit and filament preheat control capability is also provided.

DC Filament Supply:

Isolated filament power supply generates emission current feedback signal for accurate low X-Ray tube current performance.

Current: 3.5A, adjustable limit
Voltage: 5.0 volt limit

Environmental:

Operational: 0°C to +50°C
Storage: -40°C to +85°C
Humidity: 0% 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.

Voltage and Current Monitors:

0 to +10Vdc proportional from 0 to rated output. Accuracy $\pm 1\%$.

Redundant Voltage Monitor:

A redundant high voltage feedback divider with proportional 0 to +10Vdc = 0 to 100% output voltage signal can be provided on a custom basis.

Dimensions:

50kV Unit: 4.00"H x 2.87"W x 8.00"D
(101.6mm x 72.95mm x 202.20mm).
65kV Unit: 4.00"H x 2.87"W x 9.00"D
(101.6mm x 72.95mm x 228.60mm).
XCC Option: 4.00"H x 2.87"W x 9.00"D
(101.6mm x 72.95mm x 228.60mm).

Weight:

4.5 lbs. (2.1kg) typical

Regulatory Approvals:

Compliant to EEC EMC Directive. Compliant to EEC Low Voltage Directive. RoHS Compliant. UL/CUL recognized, File E227588

Digital Interface

The uX features a standard USB, RS-232 and Ethernet digital interface. Utilizing these standard digital interfaces can dramatically simplify power supply interfacing requirements saving the user both time and money, while enhancing functionality and overall capability. Spellman provides a GUI with the uX that allows the customer to both customize operational features of the uX while also providing basic power supply operational features. Details of the uX's digital interface capability are described in detail in the uX manual.



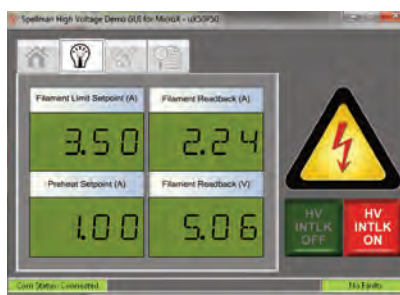
Closeup showing digital interface connectors



Main Control Screen



Communication Screen



Filament Status Screen

Grid Bias Option (GB):

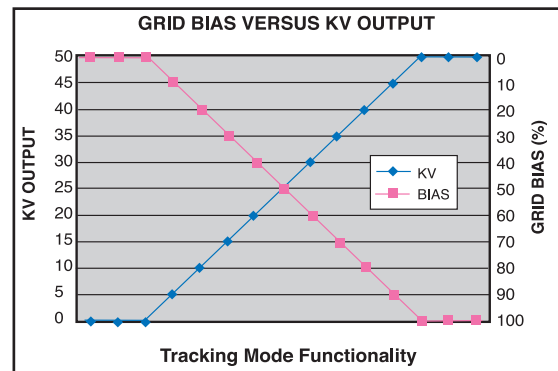
Spellman's Grid Bias Option for the uX Series is specifically designed for popular commercially available grid bias X-Ray tubes. The Grid Bias voltage is developed via the use of a separate integrated high frequency switching circuit, providing maximum flexibility and control. The Grid Bias output is a voltage regulated, current compliant topology ideally suited for Wehnelt electrode applications. Arc and short circuit protection of the Grid Bias output prevents any damage due to transient events or installation errors.

Tracking Mode Operation

Functioning in tracking mode the voltage monitor (0-10Vdc = 0 to 50kV) of the main high voltage output is internally connected to the Grid Bias programming input (0-10Vdc = 0 to -300Vdc of Grid Bias). Connected in this manner the Grid Bias output will track in a linearly proportional fashion the setting of the main kV output.

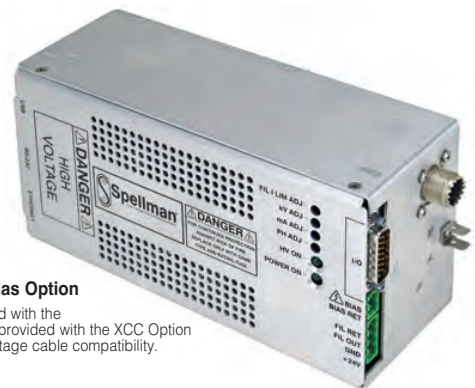
A multiturn potentiometer limits the maximum magnitude of Grid Bias output applied to the X-Ray tube, providing unparalleled flexibility.

The output of the Grid Bias option is provided via an auxiliary two position Phoenix Contact terminal block, the mating connector is provided.



GRID BIAS SPECIFICATIONS

- Output Voltage:** 0 to -300Vdc
- Output Current:** 0.25mA, maximum
- Load Regulation:** 1% of output voltage, no load to full load
- Line Regulation:** 1% for a ±10% change in input voltage
- Ripple:** 1% of maximum rated voltage



uX with Grid Bias Option

Note: Units ordered with the GB Option will be provided with the XCC Option for proper high voltage cable compatibility.

HIGH VOLTAGE OUTPUT CONNECTOR

Spellman drywell type detachable connector.

Standard: A one meter (39.4") long polyethylene mating high voltage cable is provided.

5302: A one meter (39.4") long Mammoflex mating high voltage cable is provided, SHV p/n 201946-007

2001: A one meter (39.4") long Mammoflex mating high voltage cable is provided, compatible with the XCC Option SHV p/n 201946-002

POWER INPUT/FILAMENT CONNECTOR 4 PIN PHOENIX CONTACT

PIN	SIGNAL	PARAMETER
1	+24V Input	+24 volts @ 5A, max.
2	24V Return (Gnd.)	Power Ground
3	Filament Out	0.3A to 3.5A, 5 volt, max.
4	Filament Return	Filament Return

Note: On the standard uX unit, the filament return wire cannot be grounded as this would short circuit the tube return current monitoring to the uX. If grounding of the filament is required, please select the GF (Grounded Filament) option when ordering.

ANALOG INTERFACE CONNECTOR MALE 15 PIN MINI "D"

PIN	SIGNAL	PARAMETER
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 HVON bulb to pin 15 to enable
5	+10 Volt Reference	+10 Volts 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 accessible through holes in cover

GRID BIAS CONNECTOR 2 PIN PHOENIX CONTACT

PIN	SIGNAL	PARAMETER
1	Ground	Chassis Ground
2	Grid Bias	0 to -300Vdc

USB DIGITAL INTERFACE – 4 PIN USB "B" CONNECTOR

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

ETHERNET DIGITAL INTERFACE – 8 PIN RJ45 CONNECTOR

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 – 9 PIN FEMALE D CONNECTOR

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

How To Order:

Sample model number:

50 Watt unit: uX50P50

65 Watt unit: uX65P65

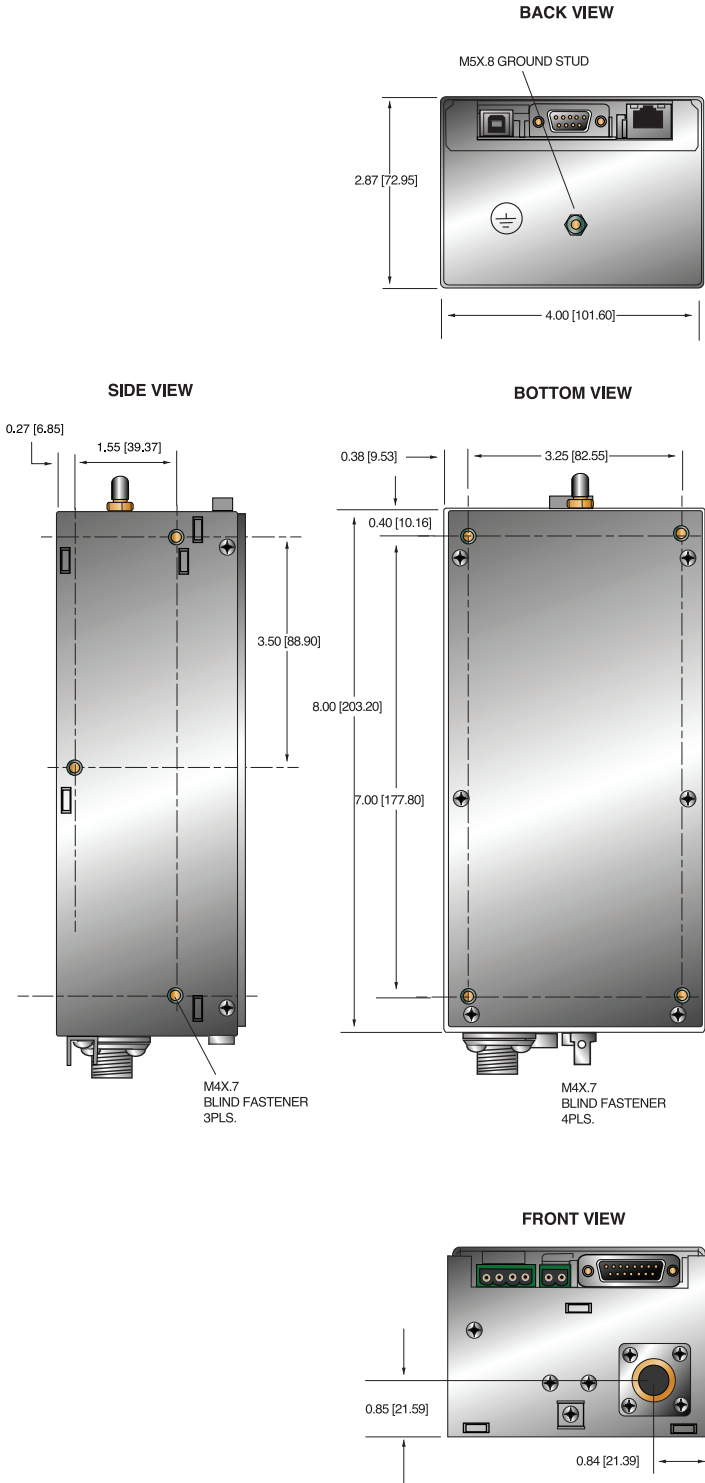
75 Watt unit: uX50P75

Options are added to the model number as follows:

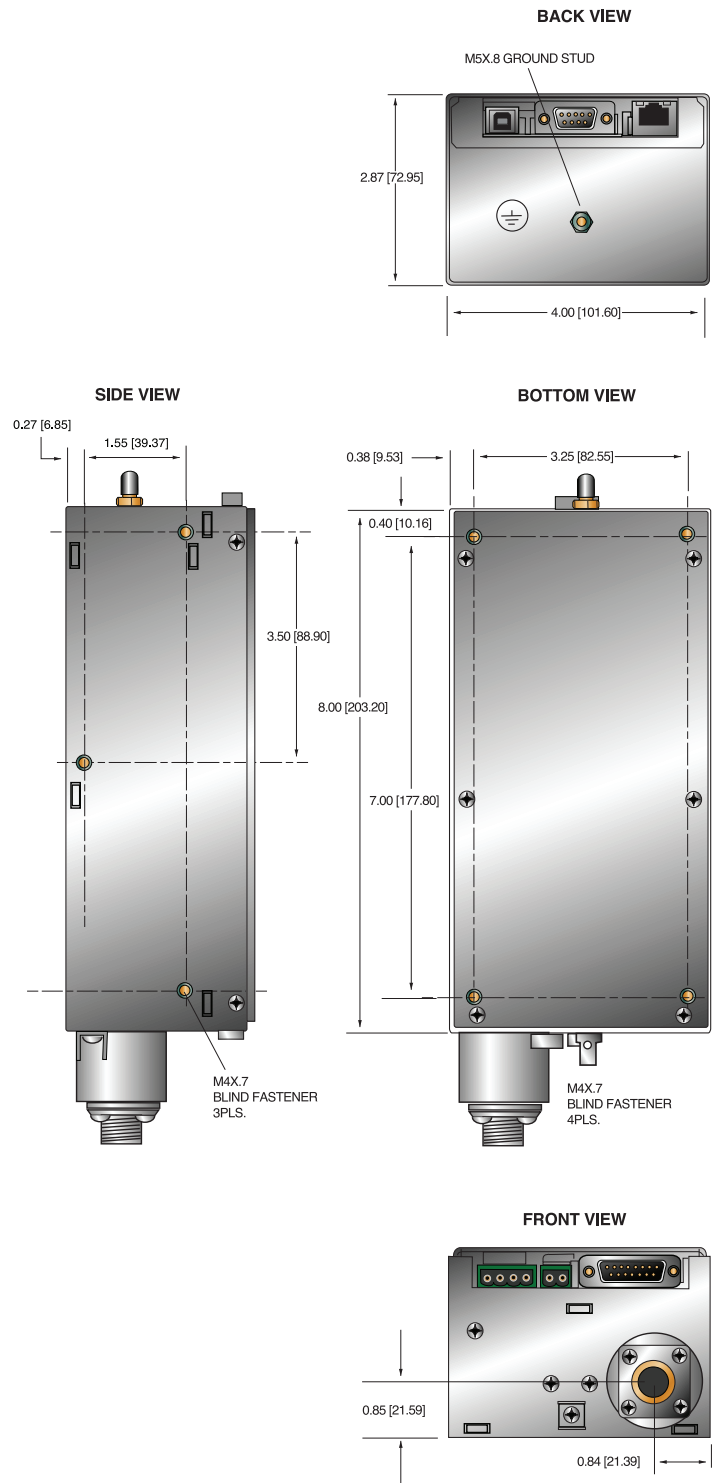
uX50P50/XCC or uX50P75/GB

Ask about our X-Ray subsystem capabilities

DIMENSIONS: in.[mm]
50kV

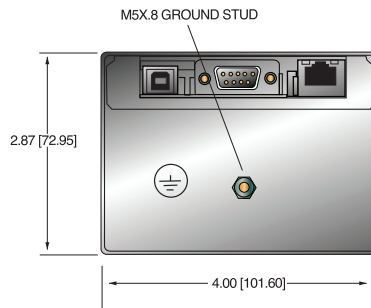


DIMENSIONS: in.[mm]
50kV with XCC Option

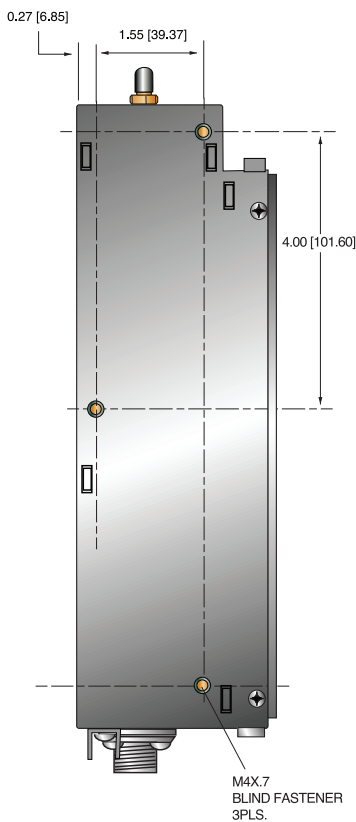


DIMENSIONS: in.[mm]
65kV

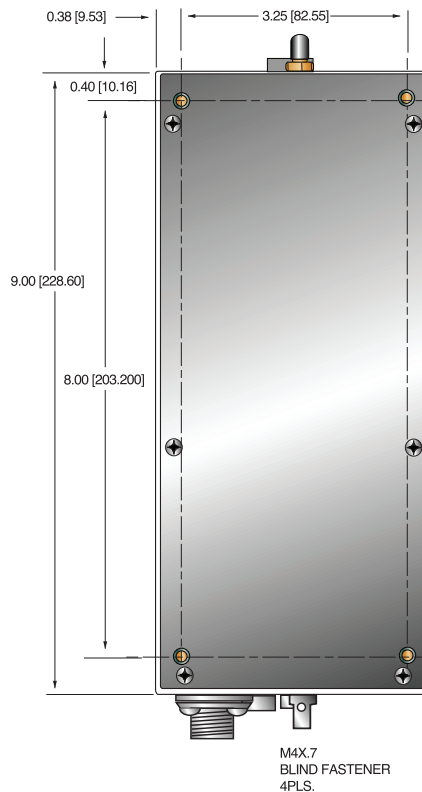
BACK VIEW



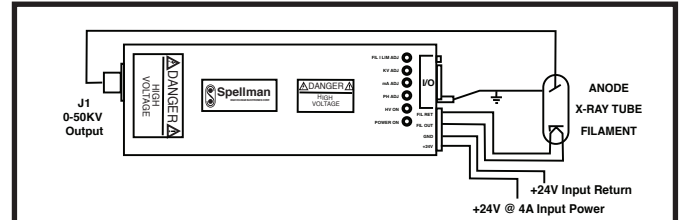
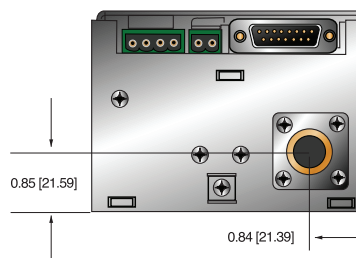
SIDE VIEW



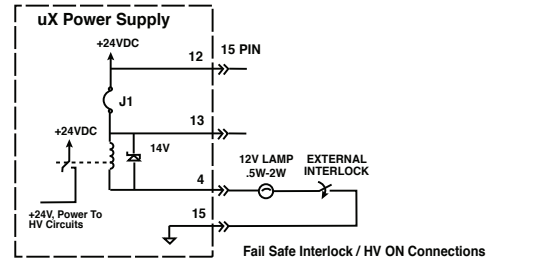
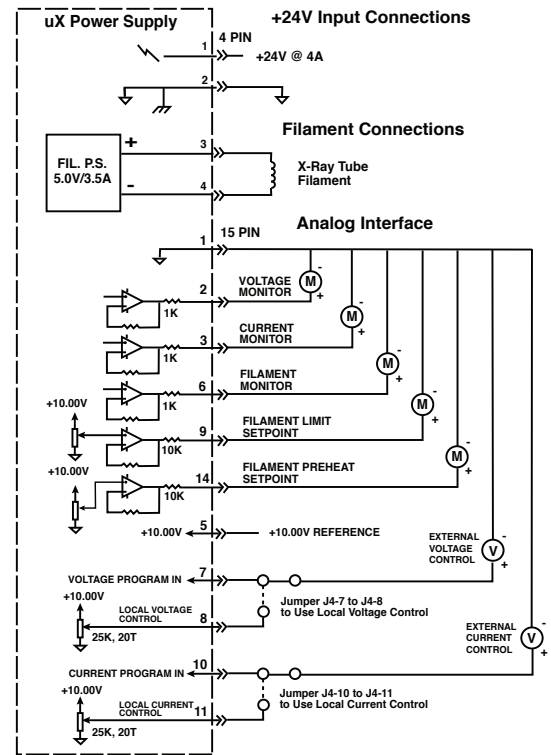
BOTTOM VIEW



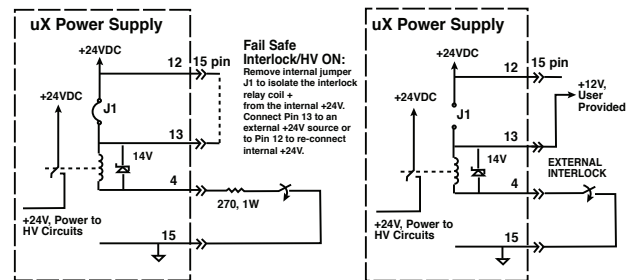
FRONT VIEW



Typical uX Operating Setup



Alternate Interlock Configurations



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

