



- **INTEGRATED HV SUPPLY, FILAMENT SUPPLY, X-RAY TUBE, BEAM PORT AND CONTROL ELECTRONICS**
- **COMPACT & LIGHTWEIGHT**
- **UNIVERSAL INPUT, POWER FACTOR CORRECTED WITH INTERNAL EMI FILTER**
- **CAN BE MOUNTED IN ANY PHYSICAL ORIENTATION**
- **ANALOG CONTROL INTERFACE AND STANDARD RS-232 DIGITAL INTERFACE**

[www.spellmanhv.com/manuals/XRB100](http://www.spellmanhv.com/manuals/XRB100)

Spellman's new XRB100 Monoblock® X-Ray source is designed for OEM applications powering its internal X-Ray tube up to 100kV at 100 watts. Features like universal input, small package size and a standard analog and RS-232 digital interface simplify integrating the XRB100 into your X-Ray analysis system. Proprietary emission control circuitry provides excellent regulation of X-Ray tube current, along with outstanding stability performance.

## TYPICAL APPLICATIONS

Plating Measurement, Food Inspection, Fill Level Confirmation and Security Applications

## SPECIFICATIONS

### Input Voltage:

Power factor corrected input >0.98, 90-264Vac, 46-63 Hertz, 2 Amps, maximum

### X-Ray Tube Voltage:

Nominal X-ray tube voltage is adjustable between 40kV to 100kV

### X-Ray Tube Current:

100uA to 1mA over specified tube voltage range

### X-Ray Tube Power:

100 watts, maximum

### Voltage Regulation:

Line:  $\leq \pm 0.1\%$  of maximum output voltage over a  $\pm 10\%$  change of nominal input line voltage  
Load:  $\leq \pm 0.1\%$  of maximum rated voltage for 100uA to 1mA load change

### Voltage Accuracy:

Voltage measured across the X-Ray tube is within  $\pm 2\%$  of the programmed value

### Voltage Risetime:

Standard: Ramp time shall be 1 second from 10% to 90% of maximum rated output voltage

### Voltage Overshoot:

$\leq 5\%$  of maximum voltage, to return within 2.5% of maximum voltage in less than 50mS

### Voltage Ripple:

$\leq 0.5\%$  peak to peak of maximum voltage for frequencies  $\leq 1$  kHz

### Voltage Temperature Coefficient:

$\pm 150$ ppm/°C

### Emission Current Parameters

#### Current Regulation:

Line:  $\leq 0.5\%$  of rated output current over a  $\pm 10\%$  change of nominal input line voltage  
Load:  $\leq 0.5\%$  of rated output current for a change from 50% to 100% of rated output voltage

#### Current Accuracy:

Current measured through the X-Ray tube is within  $\pm 1\%$  of the programmed value

#### Current Risetime:

Standard: Ramp time shall be 1 second from 10% to 90% of maximum rated current

#### Current Temperature Coefficient:

$\leq 100$ ppm/°C

#### Arc Intervention:

3 arcs in 10 seconds with a 200mS quench = Shutdown

#### Filament Configuration:

High frequency AC filament drive; referenced to cathode potential of the X-Ray tube. Closed loop filamentary emission control circuit regulates filament current to provide desired X-Ray tube emission current.

#### X-Ray Tube:

Type: Stationary anode, tungsten target

Focal Spot: 0.8 x 0.8mm (IEC 336)

Beam Filter: Lexan: 3.2mm  
Oil: 10mm  $\pm 0.1$ mm  
Glass: 1.8mm max.

Beam: Fan Beam. The beam angular coverage will be 74 degrees with the beam plane perpendicular to the X-Ray tube axis and 10 degrees wide  $\pm 1\%$ .

Anode Angle: 30 degrees

### Analog Interface:

Ground referenced 0 to 9Vdc for all programming and monitoring signals. Relay contacts and open collector signals for other signals. See analog interface connector pin out table.

### Digital Interface:

Jumpers are needed to be configured and the digital interface cable installed to enable the RS232 interface.

### Control Software:

A demo GUI will be provided for the RS-232 digital interface.

### Interlock/Signals:

A hardware interlock functions in both analog and digital programming modes. The hardware X-Ray Enable signal only functions in analog programming mode.

### Operating Temperature:

0°C to +40°C

### Storage Temperature:

-40°C to +70°C

### Humidity:

10% to 95% relative humidity, non-condensing

### Cooling:

Forced air and natural convection augmented by customer provided external cooling fan to maintain a tank temperature below 55°C.

### Input Line Connector:

3 pin, Phoenix Contact 1829167, SHV part number 105725-219. Mating connector Phoenix Contact #1805990, SHV part number 105808-475 provided with unit.

### Analog Interface Connector:

15 pin D connector, male

### Digital Interface Connector:

9 pin D connector, female

### Grounding Point:

8-32 ground stud provided on chassis

### Dimensions:

See page 3 of 3

### Weight:

<55 pounds (25 kg)

### Orientation:

Can be mounted in any orientation.

### X-Ray Leakage:

Not to be greater than 0.5mR/hr at 5cm outside the external surface per FDA 21 CFR 1020.40 and OSHA 29 CFR 1020.96

### Regulatory Approvals:

Compliant to 2004/108/EC, The EMC Directive and 2006/95/EC, The Low Voltage Directive.

### AC LINE POWER CONNECTOR— J1 THREE POSITION PHOENIX CONTACT

PIN	SIGNAL
1	Earth Ground
2	Line
3	Neutral

Mating connector provided with unit

### RS-232 DIGITAL INTERFACE— J3 9 PIN FEMALE D CONNECTOR

PIN	SIGNAL	PARAMETERS
1	N/C	No Connection
2	TD	Transmit Data
3	RD	Receive Data
4	N/C	No Connection
5	SGND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection

### XRB ANALOG INTERFACE— J2 15 PIN MALE D CONNECTOR

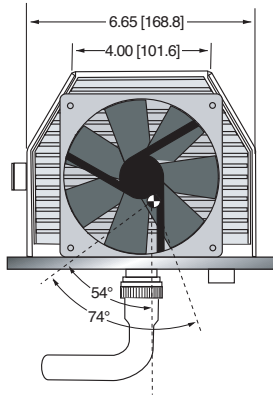
PIN	SIGNAL	PARAMETERS
1	Power Supply Fault Output	Open collector, 35 volts @ 10mA max. high = no fault
2	mA Program Input	0 to 9.00Vdc = 0 to 100% rated output, Zin = 10MΩ
3	kV Program Input	0 to 9.00Vdc = 0 to 100% rated output, Zin = 10MΩ
4	X-Ray On Lamp Relay Output	Common, dry contacts, 30Vdc @ 1 amp, max.
5	X-Ray On Lamp Relay Output	Normally open, X-Ray ON = closed
6	mA Monitor Output	0 to 9Vdc = 0 to 100% rated output, Zout = 10kΩ
7	X-Ray On Lamp Relay Output	Normally closed, X-Ray ON = open
8	kV Monitor Output	0 to 9.00Vdc = 0 to 100% rated output, Zout = 10kΩ
9	Signal Ground	Ground
10	Signal Ground	Ground
11	HV Interlock Return Input	Connect to Pin 12 to close HV interlock
12	HV Interlock Output	+15Vdc @ open, ≤5mA when connected to pin 11
13	X-Ray Enable Output	+15Vdc @ open, ≤5mA when connected to pin 15
14	X-Ray Status Output	Open collector, 35 volts @ 10mA max. high = X-Ray OFF
15	X-Ray Enable Return Input	Connect to pin 13 to enable X-Ray generation

### LED INDICATORS

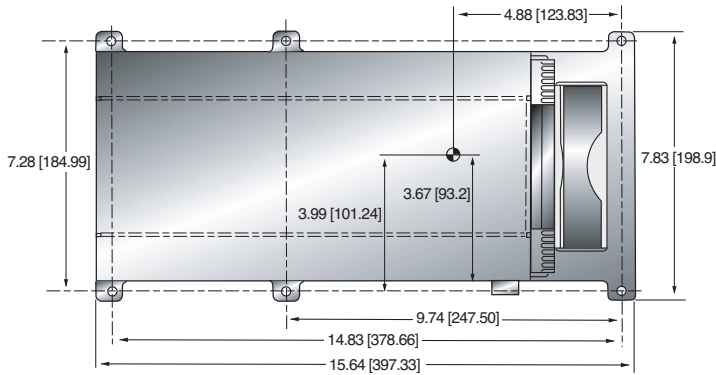
INDICATOR	SIGNAL NAME	CONDITION Illuminated When...
LED 1	OV	High kV occurs
LED 2	UV	Low kV occurs
LED 3	UC	Low mA occurs
LED 4	OC	High mA occurs
LED 5	ARC FLT	Arc fault occurs
LED 6	OT	Over temperature occurs
LED 7	X-RAY ON	X-Rays are enabled
LED 8	PWR	Power is ON

DIMENSIONS: in.[mm]

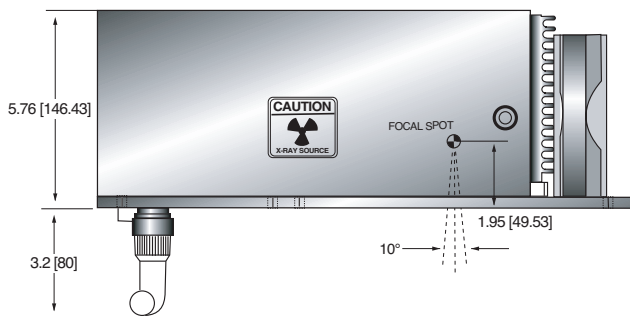
**X-RAY GENERATOR  
FRONT VIEW**



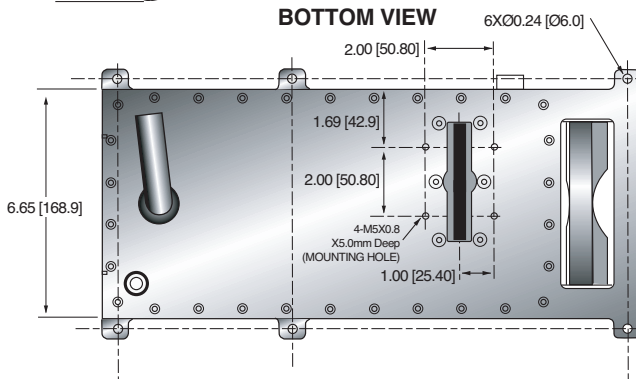
**TOP VIEW**



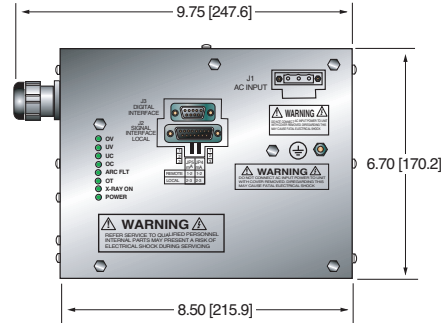
**SIDE VIEW**



**BOTTOM VIEW**



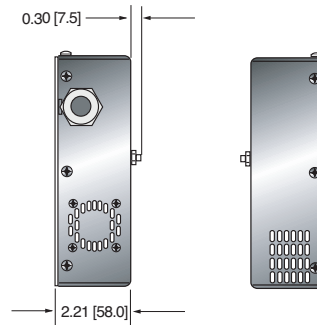
**CONTROL UNIT  
FRONT VIEW**



**TOP VIEW**



**SIDE VIEW**



**BOTTOM VIEW**

