

Spellman's XRB011 Series of Monoblock® X-Ray sources are designed for OEM applications powering its internal X-Ray tube up to 80kV at 20W and 80kV at 50W. Features like 24Vdc input voltage, small package size, standard analog interface and RS-232/Ethernet digital interface simplify integrating the XRB011 into your X-Ray system. Proprietary emission control circuitry provides excellent regulation of X-Ray tube current, along with outstanding stability and performance.

### TYPICAL APPLICATIONS

Medical X-Ray: Fluoroscopy and Radiography for Extremities, Specimen Radiography.  
Pulsed Fluoroscopy (contact Spellman sales)  
Industrial X-Ray: Component inspection and Non-Destructive Testing

### SPECIFICATIONS

#### X-Ray Characteristics:

Tube Type: Micro focus tube  
Focal Spot: 33 $\mu$ m Nominal, 50 $\mu$ m max. (IEC 336)  
Beam Filter: Ultem 0.060" (1.5mm)  
Oil 0.175" (4.4mm)  
Beam Geometry: Symmetrical 40° cone

#### Input Voltage:

20W: 24Vdc  $\pm$ 1V @ 2.5A  
50W: 24Vdc  $\pm$ 1V @ 4A

#### X-Ray Tube Voltage:

Nominal X-Ray tube voltage is adjustable between 35kV to 80kV

#### X-Ray Tube Current:

20W: 0-250 $\mu$ A over specified tube voltage range  
50W: 0-700 $\mu$ A over specified tube voltage range

#### X-Ray Tube Power:

20/50W maximum continuous

#### Voltage Regulation:

Line:  $\pm$ 0.5% for a  $\pm$ 1V change of nominal input line voltage  
Load:  $\pm$ 0.1% for a load change of 25 $\mu$ A to maximum rated current

- **Integrated HV Supply, Filament Supply, X-Ray Tube, Beam Port and Control Electronics**
- **Compact & Lightweight**
- **Can be Mounted in Any Physical Orientation**
- **Analog or Digital Control Interface**

#### Voltage Accuracy:

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

#### Voltage Risetime:

Ramp time shall be  $\leq$ 250ms from 10% to 90% of maximum rated output voltage

#### Voltage Temperature Coefficient:

$\leq$ 100ppm/°C

#### Over Temperature Fault:

Indicates that the internal oil temperature has exceeded 65° C. The high voltage output will be disabled. Toggling the X-Ray ON Command OFF and ON will reset the fault.

#### Over Voltage Fault:

An overvoltage (OV) fault is detected when the output voltage exceeds 82kV. The high voltage output will be disabled. Toggling the X-Ray ON Command OFF and ON will reset the fault.

#### Voltage Ripple:

1% peak to peak

#### Current Regulation:

Line:  $\pm$ 0.5% for a  $\pm$ 1V change of nominal input line voltage  
Load:  $\pm$ 0.5% for a voltage change of 35kV to 80kV

#### Current Accuracy:

Current measured through the X-Ray tube is within  $\pm$ 2.5% of the programmed value

#### Over Current Fault:

An overcurrent (OC) fault is detected when the emission current exceeds 275 $\mu$ A (20W model) and 710 $\mu$ A (50W model). Toggling the X-Ray ON Command OFF and ON will reset the fault.

#### Arc Intervention:

One arc fault. The high voltage output will be disabled. Toggling the X-Ray ON command OFF and ON will reset the fault.

#### Filament Configuration:

Internal high frequency AC filament drive with closed loop filament emission control

#### Analog Interface:

Ground referenced 10kV/V, 25 $\mu$ A/V (20W model) and 70 $\mu$ A/V (50W model) for programming and monitoring analog interface signals. Open collector, active low digital signal interface. Internal jumper is needed to be configured for analog interface.

**Digital Interface:**

RS-232: standard  
Ethernet: optional

**Control Software:**

A demo GUI is available for engineering evaluations

**Interlock/Signals:**

A hardware interlock functions in both analog and digital programming modes.

**Operating Temperature:**

0°C to +40°C

**Storage Temperature:**

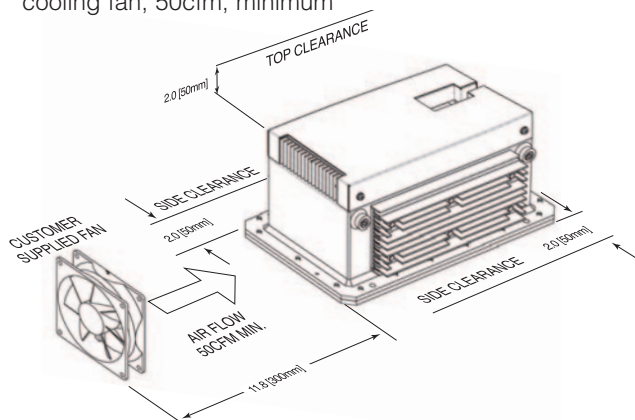
-20°C to +70°C

**Humidity:**

10% to 95% relative humidity, non-condensing

**Cooling:**

20W and 50W option: Customer provided, external cooling fan, 50cfm, minimum



**Analog Interface and Input Line Connector:**

25 pin D connector, male

**Digital Interface Connector:**

RS-232: 9 pin D connector, female  
Ethernet: RJ45 connector

**Grounding Point:**

6-32 ground stud provided on chassis

**Dimensions:**

20W: 5.81"W x 5.0"H x 10.81"D  
(147.57mm X 127mm X 274.57mm)  
50W: 6.00"W x 5.0"H x 10.81"D  
(152.4mm x 127mm x 274.57mm)

**Weight:**

20W: 18lbs (8.165kg)  
50W: 20lbs (9.072kg)

**Orientation:**

Can be mounted in any orientation.

**X-Ray Leakage:**

Less than 1mR/hr at 1 meter

**Regulatory Approvals:**

Compliant to UL/CUL recognized file E242584.  
CE to EN 61010-1 for non-medical applications.

**RS-232 DIGITAL INTERFACE – J5 9 PIN FEMALE D CONNECTOR**

| PIN | SIGNAL | PARAMETERS    |
|-----|--------|---------------|
| 1   | NC     | No Connection |
| 2   | TX Out | Transmit Data |
| 3   | RX In  | Receive Data  |
| 4   | NC     | No Connection |
| 5   | SGND   | Signal Ground |
| 6   | NC     | No Connection |
| 7   | NC     | No Connection |
| 8   | NC     | No Connection |
| 9   | NC     | No Connection |

**ETHERNET DIGITAL INTERFACE – RJ45 8 PIN CONNECTOR**

| PIN | SIGNAL | PARAMETERS      |
|-----|--------|-----------------|
| 1   | TX +   | Transmit Data + |
| 2   | TX -t  | 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   |

**ANALOG INTERFACE – J1 25 PIN MALE D CONNECTOR**

| PIN | SIGNAL                       | PARAMETERS  |
|-----|------------------------------|---|
| 1   | +24V                         | +24Vdc±1Vdc @ 4A  |
| 2   | +24V                         | +24Vdc±1Vdc @ 4A  |
| 3   | +24V                         | +24Vdc±1Vdc @ 4A  |
| 4   | NC                           | No Connection   |
| 5   | +24V RETURN                  | +24V RETURN   |
| 6   | +24V RETURN                  | +24V RETURN   |
| 7   | +24V RETURN                  | +24V RETURN   |
| 8   | Signal Ground                | Signal Ground   |
| 9   | Interlock Input              | Input, Active low, Interlock is low safe to enable high voltage. Connect to +24V Return                     |
| 10  | kV Monitor                   | Output, 0 to 8V = 0 to rated output voltage. Zout=100Ω  |
| 11  | µA Monitor                   | Output, 0 to 10V = 0 to rated output current. Zout=100Ω   |
| 12  | X-Ray Ready status           | Output, Active Low, Open Collector, 24Vdc @ 10mA max  |
| 13  | X-Ray ON status              | Output, Active Low, Open Collector, 24Vdc @ 10mA max  |
| 14  | Filament Standby status      | Output, Active Low, Open Collector, 24Vdc @ 10mA max  |
| 15  | Over Voltage Fault           | Output, Active Low, Open Collector, 24Vdc @ 10mA max  |
| 16  | Over Current Fault           | Output, Active Low, Open Collector, 24Vdc @ 10mA max  |
| 17  | ARC Fault                    | Output, Active Low, Open Collector, 24Vdc @ 10mA max  |
| 18  | Filament Current Limit Fault | Output, Active Low, Open Collector, 24Vdc @ 10mA max  |
| 19  | Signal Ground                | Signal Ground   |
| 20  | Interlock Output             | Output, Active Low, Open Collector, 24Vdc @ 10mA max  |
| 21  | µA Program                   | Input, 0 to 10V = 0 to rated output current. Zin=10kΩ   |
| 22  | kV Program                   | Input, 0 to 8V = 0 to rated output voltage. Zin=10kΩ  |
| 23  | X-Ray ON Command             | Input, Active low<br>Low (short) = X-Ray ON<br>High (open) = X-Ray OFF<br>Internal pull up resistor to +15V |
| 24  | Signal Ground                | Signal Ground   |
| 25  | Over Temperature             | Output, Active Low, Open Collector, 24Vdc @ 10mA max  |

**20W Model  
ORDERING INFORMATION**

**Medical Applications:**

- XRB011-80PN20      80kV, 250uA, 20W, Analog Interface, RS-232
- XRB011-80PN20E    80kV, 250uA, 20W, Analog Interface, RS-232, Ethernet
- XRB011-80PN20A    80kV, 250uA, 20W, Analog Interface

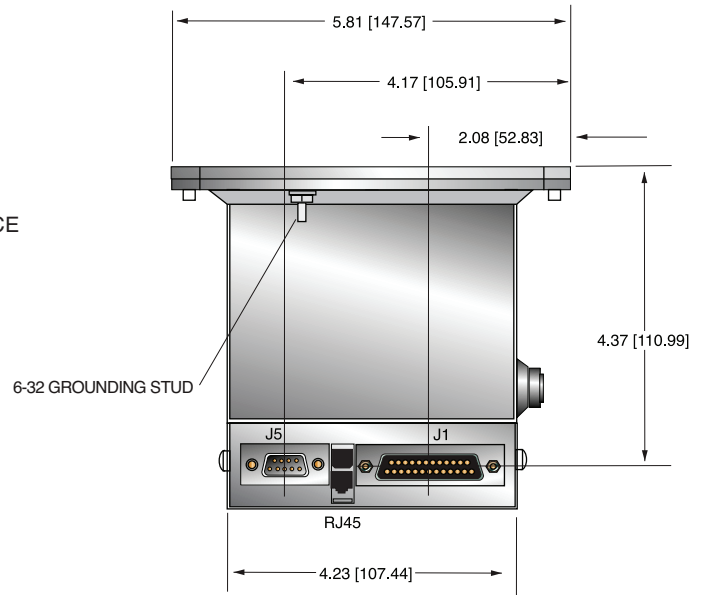
**Non-Medical Applications:**

- XRB011-80PN20/CE   80kV, 250uA, 20W, Analog Interface, RS-232, CE
- XRB011-80PN20E/CE 80kV, 250uA, 20W, Analog Interface, RS-232, Ethernet, CE
- XRB011-80PN20A/CE 80kV, 250uA, 20W, Analog Interface, CE

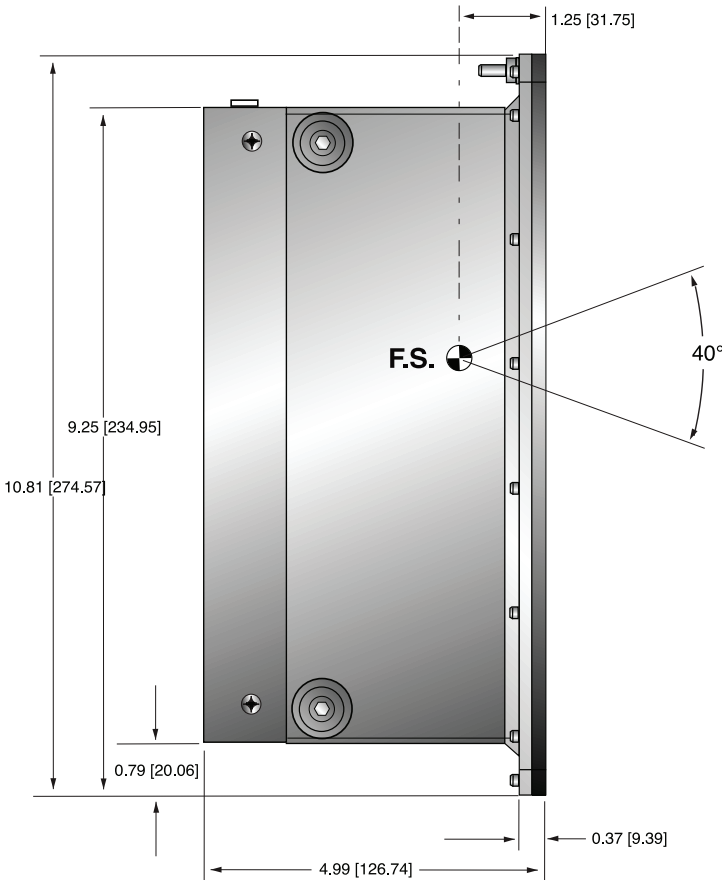
**XRB011  
20W Model**

DIMENSIONS: in.[mm]

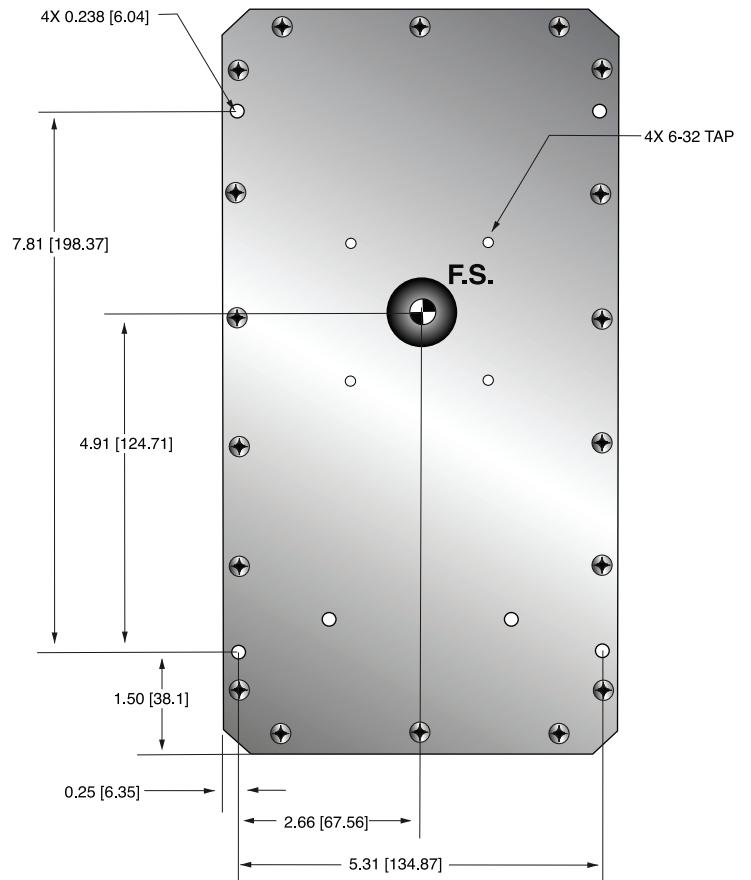
**FRONT VIEW**



**SIDE VIEW**



**TOP VIEW**



### 50W Model ORDERING INFORMATION

#### Medical Applications:

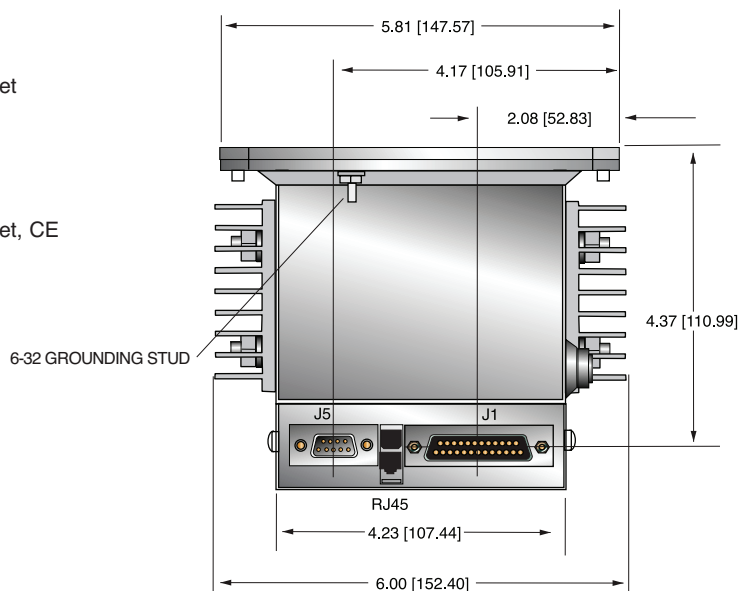
|                |  |
|----------------|--|
| XRB011-80PN50  | 80kV, 700uA, 50W, Analog Interface, RS-232           |
| XRB011-80PN50E | 80kV, 700uA, 50W, Analog Interface, RS-232, Ethernet |
| XRB011-80PN50A | 80kV, 700uA, 50W, Analog Interface                   |

#### Non-Medical Applications:

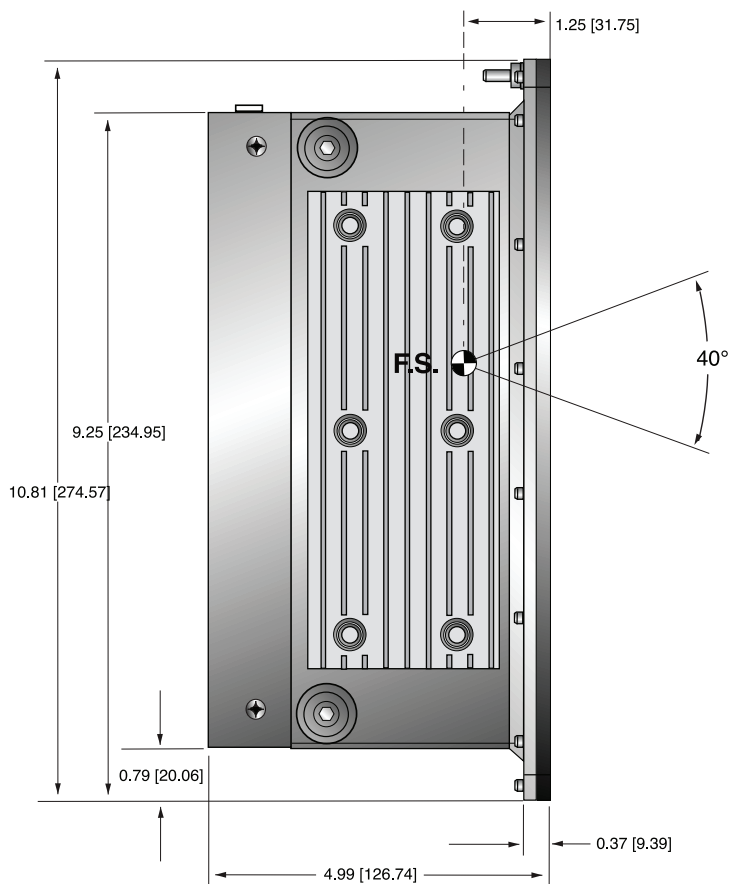
|                   |  |
|-------------------|--|
| XRB011-80PN50/CE  | 80kV, 700uA, 50W, Analog Interface, RS-232, CE           |
| XRB011-80PN50E/CE | 80kV, 700uA, 50W, Analog Interface, RS-232, Ethernet, CE |
| XRB011-80PN50A/CE | 80kV, 700uA, 50W, Analog Interface, CE                   |

**XRB011**  
**50W Model**  
DIMENSIONS: in.[mm]

**FRONT VIEW**



**SIDE VIEW**



**TOP VIEW**

