

## M54 50kV 4W X-ray Source

light weight and compact design - only 365 grams



**Model M54:** 50 kV, 4W X-ray Monoblock - The M54 x-ray monoblock is a fully integrated miniature 50 kV, 4W x-ray generator designed specifically to be used as component of a handheld, portable, or benchtop x-ray instrument. The source includes a miniature sealed x-ray tube with a transmission-type end window, a high voltage power supply, and control electronics contained in a compact grounded enclosure.

### Features

- Compact design** – ideal for handheld, portable and benchtop instruments
- Low power consumption** – compatible with battery operation
- Easy to operate** – analog control interface
- Integrated design** – no high voltage cables
- Machined metal enclosure** – precision mounting and alignment
- Patented X-ray Omnishield™** – 360 degree light weight radiation shielding
- Wide cone angle** – 110 degree full width x-ray cone angle
- Threaded adapter** for collimated applications – optional

### Applications

#### XRF Materials Analysis

- Alloy and metal sorting
- ROHS and ELV compliance
- Environmental analysis
- Forensic science
- Mining and geology
- Art and archeology
- Coating thickness
- Lead detection
- Quality control
- Precious metal verification

#### X-ray Imaging

- Medical, dental, small animal
- NDT
- Security, contraband

### Specifications

|                        |                          |
|------------------------|--------------------------|
| Tube type:             | Metal-ceramic            |
| Tube voltage:          | 5 kV - 50 kV             |
| Tube current:          | 0 - 200 $\mu$ A          |
| Tube power:            | 4 watts maximum          |
| Cathode type:          | Tungsten filament        |
| X-ray window:          | Be, 125 $\mu$ m          |
| Target type:           | Transmission             |
| Available targets:     | Au, Ag, Rh, W            |
| Depth to focal spot:   | 2.4 mm (see drawing)     |
| X-ray cone angle:      | 110° (see drawing)       |
| Input voltage:         | 5 - 12 VDC               |
| HV polarity:           | Grounded anode           |
| HV stability:          | < 0.1%                   |
| Electrical insulation: | Silicone potting         |
| Radiation shielding:   | Self-shielded            |
| Operating temp (case): | -10°C to 60°C            |
| Storage temp:          | -25°C to 85°C            |
| Cooling:               | Air cooled               |
| Ambient humidity:      | 90% max (non-condensing) |
| Weight:                | Approx. 365 g.           |



### Interface

| PIN    | NAME            | TYPE           | RANGE    | SCALING / VALUE                 |
|--------|-----------------|----------------|----------|---------------------------------|
| Pin 1  | V+              | Input Power    | 5-12 VDC |                                 |
| Pin 2  | V+              | Input Power    | 5-12 VDC |                                 |
| Pin 3  | GND             | Ground         | 0V       |                                 |
| Pin 4  | GND             | Ground         | 0V       |                                 |
| Pin 5  | TUBE I CONTROL  | Analog Input   | 0-4V     | 0-200 $\mu$ A (4W limit)        |
| Pin 6  | TUBE HV CONTROL | Analog Input   | 0-4V     | 0-50 kV                         |
| Pin 7  | TUBE READY      | Digital Output | TTL      | LOW = NOT READY<br>HIGH = READY |
| Pin 8  | TUBE ENABLE     | Digital Input  | TTL      | LOW = OFF<br>HIGH = ENABLE      |
| Pin 9  | TUBE HV MONITOR | Analog Output  | 0-4V     | 0-50 kV                         |
| Pin 10 | TUBE I MONITOR  | Analog Output  | 0-4V     | 0-200 $\mu$ A                   |



**Model M25:** 50 kV, 4W X-ray Monoblock - The M25 x-ray monoblock is a fully integrated miniature 50 kV, 4W x-ray generator designed specifically to be used as component of a handheld, portable, or bench top x-ray instrument. The source includes a miniature sealed x-ray tube with a transmission-type end window, a high voltage power supply, and control electronics contained in a compact grounded enclosure.

## Features

**Compact design** – ideal for handheld, portable and bench-top instruments

**Low Power** consumption – compatible with battery operation

**Integrated design** – no high voltage cables

**Machined metal enclosure** – precision mounting and alignment

**Patented X-ray Omnishield™** – 360 degree light weight radiation shielding

**Wide Cone Angle** – 110 degree full width x-ray cone angle

**Threaded adapter** for collimated applications – optional

## Applications

### XRF Materials Analysis

- Alloy and metal sorting
- ROHS and ELV compliance
- Environmental analysis
- Forensic science
- Mining and geology
- Art and archeology
- Coating thickness
- Lead detection
- Quality control
- Precious metal verification

### X-ray Imaging

- Medical, dental, small animal
- NDT
- Security, contraband

## Specifications

|                        |                          |
|------------------------|--------------------------|
| Tube type:             | Metal-ceramic            |
| Tube voltage:          | 5 kV – 50 kV             |
| Tube current:          | 0 - 200 $\mu$ A          |
| Tube power:            | 4 watts maximum          |
| Cathode type:          | Tungsten filament        |
| X-ray window:          | Be, 125 $\mu$ m          |
| Target type:           | Transmission             |
| Available targets:     | Au, Ag, Rh, W            |
| Depth to focal spot:   | 2.4 mm (see drawing)     |
| X-ray cone angle:      | 110° (see drawing)       |
| Input voltage:         | 5-12 VDC                 |
| HV polarity:           | Grounded anode           |
| HV stability:          | < 0.1%                   |
| Electrical insulation: | Silicone potting         |
| Radiation shielding:   | Self-shielded            |
| Operating temp (case): | -10 °C to 60 °C          |
| Storage temp:          | -25°C to 85°C            |
| Cooling:               | Air cooled               |
| Ambient humidity:      | 90% max (non-condensing) |
| Weight:                | Approx. 385 g.           |



## Interface

| PIN    | NAME            | TYPE           | RANGE    | SCALING / VALUE                 |
|--------|-----------------|----------------|----------|---------------------------------|
| Pin 1  | V+              | Input Power    | 5-12 VDC |                                 |
| Pin 2  | V+              | Input Power    | 5-12 VDC |                                 |
| Pin 3  | GND             | Ground         | 0V       |                                 |
| Pin 4  | GND             | Ground         | 0V       |                                 |
| Pin 5  | TUBE I CONTROL  | Analog Input   | 0-4V     | 0-200 $\mu$ A (4W limit)        |
| Pin 6  | TUBE HV CONTROL | Analog Input   | 0-4V     | 0-50 kV                         |
| Pin 7  | TUBE READY      | Digital Output | TTL      | LOW = NOT READY<br>HIGH = READY |
| Pin 8  | TUBE ENABLE     | Digital Input  | TTL      | LOW = OFF<br>HIGH = ENABLE      |
| Pin 9  | TUBE HV MONITOR | Analog Output  | 0-4V     | 0-50 kV                         |
| Pin 10 | TUBE I MONITOR  | Analog Output  | 0-4V     | 0-200 $\mu$ A                   |



**Model M237:**

The M237 x-ray monoblock is a fully integrated 70 kV, 10 W x-ray generator designed specifically to be used as component of a handheld, portable, or bench-top x-ray instrument. The source includes a miniature sealed x-ray tube with a transmission-type end window, a high voltage power supply, and control electronics contained in a compact grounded enclosure.

**Features**

- Optimized** for x-ray imaging and high energy XRF applications
- Compact, lightweight design** – ideal for portable and bench-top instruments
- Low power consumption** – compatible with battery operation
- Fully machined metal enclosure** – precision mounting and alignment
- Patented X-ray Omnishield™** – self-shielded with lightweight radiation shielding
- Wide cone angle** – 110 degree full width standard x-ray cone angle

**Applications**

X-ray Imaging

- Medical and dental imaging
- Veterinary imaging
- NDT
- Security, contraband

XRF Materials Analysis

- PMI, including rare earth metals
- ROHS and ELV compliance
- Environmental analysis
- Forensic science
- Mining and geology
- Art and archeology
- Coating thickness
- Quality control
- Precious metal verification

**Specifications**

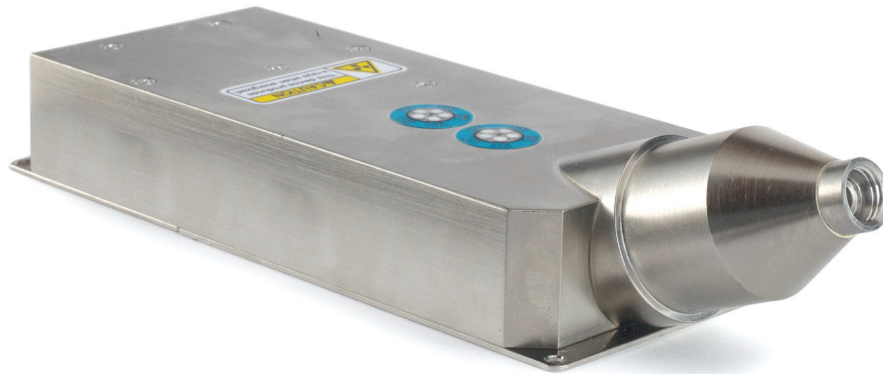
|                        |                      |
|------------------------|----------------------|
| Tube type:             | Metal-ceramic        |
| Tube voltage*:         | 35 kV – 70 kV        |
| Tube current:          | 5 – 200 µA           |
| Tube power:            | 10 watts maximum     |
| Cathode type:          | Tungsten filament    |
| X-ray window:          | Beryllium            |
| Target type:           | Transmission         |
| Available targets:     | Au, Ag, Rh, W        |
| Depth to focal spot:   | 2.4 mm (see drawing) |
| X-ray cone angle:      | 110° (see drawing)   |
| Input voltage:         | 11 VDC               |
| HV polarity:           | Grounded anode       |
| HV stability:          | < 0.1%               |
| Electrical insulation: | Silicone potting     |
| Radiation shielding:   | Self-shielded        |
| Operating temp (case): | -10°C to 60°C        |
| Storage temp:          | -25°C to 85°C        |
| Cooling:               | Air cooled           |
| Ambient humidity:      | 30 to 90%            |
| Weight:                | < 700g               |

\*Custom voltage ranges available (from 15 kV to 80 kV).



**Interface**

| PIN    | NAME            | TYPE           | RANGE      | SCALING / VALUE                 |
|--------|-----------------|----------------|------------|---------------------------------|
| Pin 1  | V+              | Input Power    | 11 VDC     |                                 |
| Pin 2  | V+              | Input Power    | 11 VDC     |                                 |
| Pin 3  | GND             | Ground         | 0V         |                                 |
| Pin 4  | GND             | Ground         | 0V         |                                 |
| Pin 5  | TUBE I CONTROL  | Analog Input   | 0-4V       | 0-200 µA (10 W limit)           |
| Pin 6  | TUBE HV CONTROL | Analog Input   | 1.75V-3.5V | 35-70 kV                        |
| Pin 7  | TUBE READY      | Digital Output | 0V or 5V   | LOW = NOT READY<br>HIGH = READY |
| Pin 8  | TUBE ENABLE     | Digital Input  | 0V or 5V   | LOW = OFF<br>HIGH = ENABLE      |
| Pin 9  | TUBE HV MONITOR | Analog Output  | 1.75-3.5V  | 35-70 kV                        |
| Pin 10 | TUBE I MONITOR  | Analog Output  | 0-4V       | 0-200 µA                        |



**Model M47:** 50 kV, 10W X-ray Monoblock - The M47 x-ray monoblock is a fully integrated miniature 50 kV, 10 W x-ray generator designed specifically to be used as component of a handheld, portable, or benchtop x-ray instrument. The source includes a miniature sealed x-ray tube with a transmission-type end window, a high voltage power supply, and control electronics contained in a compact grounded enclosure.

## Features

**Compact design** – ideal for handheld, portable and benchtop instruments

**Low Power** consumption – compatible with battery operation

**Easy to operate** – analog control interface

**Integrated design** – no high voltage cables

**Machined metal enclosure** – precision mounting and alignment

**Patented X-ray Omnishield™** – 360 degree light weight radiation shielding

**Wide Cone Angle** – 110 degree full width x-ray cone angle

**Threaded adapter** for collimated applications – optional

## Applications

### XRF Materials Analysis

- Alloy and metal sorting
- ROHS and ELV compliance
- Environmental analysis
- Forensic science
- Mining and geology
- Art and archeology
- Coating thickness
- Lead detection
- Quality control
- Precious metal verification

### X-ray Imaging

- Medical, dental, small animal
- NDT
- Security, contraband

## Specifications

|                        |                          |
|------------------------|--------------------------|
| Tube type:             | Metal-ceramic            |
| Tube voltage:          | 5 kV - 50 kV             |
| Tube current:          | 0 - 200 $\mu$ A          |
| Tube power:            | 10 watts maximum         |
| Cathode type:          | Tungsten filament        |
| X-ray window:          | Be, 125 $\mu$ m          |
| Target type:           | Transmission             |
| Available targets:     | Au, Ag, Rh, W            |
| Depth to focal spot:   | 2.4 mm (see drawing)     |
| X-ray cone angle:      | 110° (see drawing)       |
| Input voltage:         | 11 VDC                   |
| HV polarity:           | Grounded anode           |
| HV stability:          | < 0.1%                   |
| Electrical insulation: | Silicone potting         |
| Radiation shielding:   | Self-shielded            |
| Operating temp (case): | -10°C to 60°C            |
| Storage temp:          | -25°C to 85°C            |
| Cooling:               | Air cooled               |
| Ambient humidity:      | 90% max (non-condensing) |
| Weight:                | Approx. 400 g.           |



## Interface

| PIN    | NAME            | TYPE           | RANGE  | SCALING / VALUE                 |
|--------|-----------------|----------------|--------|---------------------------------|
| Pin 1  | V+              | Input Power    | 11 VDC |                                 |
| Pin 2  | V+              | Input Power    | 11 VDC |                                 |
| Pin 3  | GND             | Ground         | 0V     |                                 |
| Pin 4  | GND             | Ground         | 0V     |                                 |
| Pin 5  | TUBE I CONTROL  | Analog Input   | 0-4V   | 0-200 $\mu$ A                   |
| Pin 6  | TUBE HV CONTROL | Analog Input   | 0-4V   | 0-50 kV                         |
| Pin 7  | TUBE READY      | Digital Output | TTL    | LOW = NOT READY<br>HIGH = READY |
| Pin 8  | TUBE ENABLE     | Digital Input  | TTL    | LOW = OFF<br>HIGH = ENABLE      |
| Pin 9  | TUBE HV MONITOR | Analog Output  | 0-4V   | 0-50 kV                         |
| Pin 10 | TUBE I MONITOR  | Analog Output  | 0-4V   | 0-200 $\mu$ A                   |