The Nova Microfocus System 96000 Series is a 90kV, 80W, water-cooled X-ray source designed for applications where high power, high magnification and small spot size are important.

Operated by an external high voltage Smart Controller capable of providing variable voltage and power control, the Nova Microfocus System delivers exceptional magnification and image quality with full control of “Brightness.” Maximum flux output is maintained through automatic matching of a given power setting to a corresponding optimal spot size.

Benefits

- Exceptional magnification and image quality
- High power operation — ideal for high flux applications and experiments.
- Integrated package eliminates HV cable for improved reliability
- Complete range of user control — ideal for research applications
- Compact, lightweight design — ideal for portable applications

Applications

- Microtomography
- Microdiffraction
- Microfluorescence
- CT imaging for life sciences and industrial inspection

Specifications

<table>
<thead>
<tr>
<th>Target Material (Part#)</th>
<th>Voltage</th>
<th>Power</th>
<th>Power Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>W (96013)</td>
<td>10-90kV</td>
<td>10-80W</td>
<td>2.5 W/µm</td>
</tr>
<tr>
<td>Mo (96016)</td>
<td>20-60kV</td>
<td>20-60W</td>
<td>1.5 W/µm</td>
</tr>
</tbody>
</table>

- Operating voltage range: See product ordering table
- Maximum power: See product ordering table
- Maximum beam current: 2.0mA
- Focal spot size: 13-20µm @ maximum voltage and minimum power
- Focus to Object Distance (FOD): 4mm
- Cone of illumination: 50° x 74° (nominal) See chart on next page
- Window material and thickness: Be, 245µm
- Window diameter (unobstructed): 9.5mm (0.37")
- Window configuration: End window
- Target material: See product ordering table
- Ambient operating temperature: 10°C to 40°C
- Maximum operating temperature (anode): 70°C
- Cooling method: H₂O 0.15 l/min @ 15 psi
- Shielding: Not shielded
- Dimensions: 392.4mm L x 114.3mm W (15.5" L x 4.5" W)
- Weight: ≤ 4kg (8.81 lbs)
- Storage conditions: -10°C to 55°C
  Barometric Pressure: 50-106kPa; Humidity: 10-90% (no condensation)
  Condensation on Be window will cause window corrosion, vacuum loss and X-ray tube failure
Nova 96000 Series 90kv Water-Cooled Microfocus X-ray Source

**DIMENSIONS:** [mm] Inches

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
<th>Units</th>
<th>Farthest</th>
<th>Nominal</th>
<th>Nearest</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Location of radiation cone center</td>
<td>Degrees</td>
<td>10.6</td>
<td>12.9</td>
<td>16.4</td>
</tr>
<tr>
<td>B</td>
<td>Radius of cone</td>
<td>Degrees</td>
<td>32.2</td>
<td>36.8</td>
<td>42</td>
</tr>
<tr>
<td>C</td>
<td>Window to spot distance</td>
<td>mm</td>
<td>4.47</td>
<td>3.14</td>
<td>1.82</td>
</tr>
</tbody>
</table>

visit www.oxford-instruments.com/xt or xray-sales@oxinst.com for more information
RS232 Control Command Set

- Protocol: RS-232-C
- Baud Rate: 9600 ASYNC
- Flow control: None
- Data bits: 8
- Stop bits: 1
- Parity: None
- Connector: Type: 25 pin

Functions

- Anode voltage set: 10 to 90kV (example: VCN 50 = set 50kV)
- Brightness set: 10 to 80W (example: WCN 40 = set 40W)
- Command: X-ray ON/OFF
- Command: Voltage min-max set
- Command: Brightness min-max set

Read Back

- Voltage: (example: VM 30 = 30kV)
- Brightness: (example: WM 20 = 20W)
- Status: Stand-by, warm-up, output, fault modes in ASCII format
- Fault: Display panel information except remote/local mode will be in ASCII format
- Other: ROM version number

Power on can be accomplished remotely by X-ray on/off command. However, if cathode emitter is turned off, power is restored only through front panel on/off switch. Safety interlocks available on real panel.

Controller Unit Specifications

- Functions: Key switched power, HV on/off, kV adjust, brightness/autofocus adjust
- External control: Remote control
- Power consumption: 100W maximum
- Input voltage: 110/240 AC autosensing
- Approximate weight: 4kg
- HV cable: Not necessary
- LV cable: Std 25 pin D-type connector (up to 25 feet)

Item | RS232 Control | Manual Operation | Notes
--- | --- | --- | ---
Remote/local switch | No | Yes | Switch is located on rear panel
Power on/off | No | Yes | For remote operation, front panel on/off switch must be “On”
X-ray on/off | Yes | Yes | For remote operation, front panel on/off switch must be “On”
Voltage up/down | Yes | No | Front panel switch disabled
Brightness control | Yes | No | Front panel switch disabled

Controller Unit Reference Drawing
Dimensions in mm
Nova 96000 Series 90kv Water-Cooled Microfocus X-ray Source

Software Control Option

- Runs under LabVIEW RT & MS-Windows
- Works in conjunction with RS232 control interface
- Complete control of voltage, power, and focus
- Dynamic status display
- Dynamic fault display
- Ideal for R&D applications
- Open software architecture allows for modification to user interface with available additional development software

<table>
<thead>
<tr>
<th>Functions</th>
<th>Software Control</th>
<th>Manual Operation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote/Local switch</td>
<td>No</td>
<td>Yes</td>
<td>Switch is located on rear panel</td>
</tr>
<tr>
<td>Power On/Off</td>
<td>No</td>
<td>Yes</td>
<td>For software operation, front panel On/Off switch must be “On”</td>
</tr>
<tr>
<td>X-ray On/Off</td>
<td>Yes</td>
<td>Yes</td>
<td>For software operation, front panel On/Off switch must be “On”</td>
</tr>
<tr>
<td>Voltage up/down</td>
<td>Yes</td>
<td>No</td>
<td>Front panel switch disabled</td>
</tr>
<tr>
<td>Power adjust</td>
<td>Yes</td>
<td>No</td>
<td>Front panel Brightness dial disabled</td>
</tr>
</tbody>
</table>

Microfocus Source with the following Class-Leading Performance Characteristics:

- The Nova 96000 Series is a fully integrated 90kV X-ray source. Its high voltage power supply and controller provide variable control of high voltage from 10-90kV and beam current from .33-2 milliamps with full control of “Brightness”. The Smart Controller calculates spot size for a given power setting for maximum flux output.
- Voltage and current rating (90kV, 2.0mA) are subject to maximum power dissipation rating of 80W. The X-ray tube assembly is sealed, water-cooled, and rated for continuous operation.
- X-ray microfocus spot size is continuously adjustable from 13µm to 20µm. Power de-rating is provided at small spot sizes but source power is greater than or equal to 20W for a 20µm spot size.
- The anode target material is comprised of Tungsten as standard, however a molybdenum target is also available. The target is inclined at a takeoff angle of 15 degrees with respect to the electron beam, and the exit window is aligned at an angle of 30 degrees with respect to the electron beam, so that a round microfocus X-ray spot is projected through the exit window.
- The stability of the microfocus X-ray spot shall be less than 5µm RMS over a period of 8 hours, as verified by test. A warm-up time of up to two hours is necessary in order to meet this specification.
- The system is supplied with a 254 micron Be exit window, allowing for close coupling (4mm) of object with the anode X-ray spot.
- LabVIEW RT Software Interface: The Smart Controller is outfitted with a software package that provides remote control of the various functions, such as kV, mA, Brightness, power etc. It includes an RS232 Communication package and an RT version of National Instruments LabVIEW. See Software control datasheet for complete description.

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