Digital X-ray Microscope

μB®1600

High performance in a Compact Body

www.matsusada-us.com
Matsusada Precision Inc.

As a leading manufacturer of high-voltage power supplies that has supported the cutting-edge area of X-ray inspection systems, semiconductor manufacturing and medical devices. We are proud to introduce the μB1600, a micromini model of micro-focus X-ray inspection system. The μB1600 has an internal micro-focus X-ray source and high-resolution X-ray camera, and can perform transmission imaging and measurements regardless of installation locations.

1. **Futuristic Technology Integration**
   
   The best images produced by state-of-the-art technology of X-ray and FPD
   
   Matsusada’s original technology detects the subtlest contrasting density of specimen that cannot be detected by conventional devices. Additionally, the FPD built in the μB1600 provides even images with no distortion.

2. **Anyone can master the μB1600 quickly!**

   **Optimal conditions are automatically set**
   
   All an operator has to do is set a specimen and emit the X-ray. The μB1600 adjusts the contrast automatically and shoots the specimen under optimal conditions.
3 Multifunctional but easy to operate

Various image processing and measurement software are included as standard equipment

The µB1600 has massive functions that can be used as an analytical device, a matter of course, also as an inspection machine. The µB1600 is easy to use. Even a first-timer can operate µB1600 smoothly.
Leading Edge Technology in compact body

**Micro-focus X-ray**
The µB1600 has an internal micro-focus X-ray source creating ultra-high image quality in spite of its compact size. The integration of 60kV and 18W X-ray tube and Matsusada’s high-voltage technique has succeeded in developing small-sized and high-performance X-ray generator.

**Digital X-ray camera**
A digital X-ray camera with a flat panel is used in the imaging part. The high-resolution camera with one million pixels of 1024 x 1024 clearly detects an object aimed at. Images with no distortion in every detail can be obtained.

**12bit digital data**
High-definition data with one million pixels are imported by 12bit. The images can be processed and analyzed flexibly afterwards.

**High-precision stage**
A rotary stage is mounted in addition to the two axes of X, Y and variable magnification. Fluoroscopic observations from all angles are possible. The µB1600 meets the need of smaller parts that have to be analyzed in more detail. The µB1600 also detects the floating of BGA.

Floating of BGA can be recognized.
**Ultimate Operability**

**Autoaging function**

Dates when the µB1600 were used are memorized. The aging time is selected automatically depending on the hours elapsed from the dates used allowing optimal aging.

**Autocontrast adjustment function**

Images shot by 12bit are displayed in optimal gradation sequence. Variations by photographers (e.g., dark images, whitish images, etc) can be eliminated to always display optimally. Even a first-timer does not miss the points that he or she wants to observe. It is also possible to display any given tonal ranges.

**Automatic shutoff function**

In some cases, people apply themselves for analyzing images and forget to turn off the X-ray. The automatic shutoff function turns off the X-ray automatically by setting time in advance. This function is also convenient in case an operator leave the device.

**Data storage (bmp, jpg, tif)**

Images both before and after analyses can be easily saved. Extensions including bmp, jpg, and tif can be selected depending on the extendability. Once saved data can be read out and analyzed repeatedly by the analysis software.
Smooth & Easy Operation even for first-timers

Image analysis

1. **High resolution by one million pixels**
   Displays transfer imaging in real time.

2. **X-ray controller**
   Controls switching ON/OFF of X-ray, X-ray tube voltage and tube current.

3. **Image controller**
   Sets reading methods including the moving image filter and display range setting, etc.

4. **Stage controller**
   Controls the stage with the click of the mouse.

The brand new image analysis software dedicated for our x-ray inspection system can controls the stage and X-ray with easily operations and is equipped with various image processing and measurement functions.
Reduced display function

The µB1600 supports 10 or more types of filtering and image processing allowing detailed image analyses. Images can be analyzed in real time by performing appropriate filtering for displaying moving images.

Filter function

The µB1600 supports 10 or more types of filtering and image processing allowing detailed image analyses. Images can be analyzed in real time by performing appropriate filtering for displaying moving images.
The contrast can be enhanced manually by setting any given densities based on the histogram of shot images.

Brightness values of shot images can be adjusted freely by adjusting gain, contrast and gamma values individually.

A shot image can be displayed in a binary manner by contrast by setting a threshold and binarizing the image.

Sizes in a captured image can be measured by drawing measurement lines on the shot image.
Shift by click

In addition to normal stage operation, clicked section becomes centered.

Interlink function

Interlink function realizes a piece of fluoroscopic image at maximum 4.72”x4.72” for a large-sized specimen that can’t be captured with one shot. Interlink function can also make a piece of fluoroscopic image of a large-sized specimen by specifying points. By shooting and saving an interlinked image once, you can use automatic transfer function to move the stage to the clicked position from interlinked fluoroscopic images by just reading-in an image. Interlink function realizes enabling to tile the sections you want to inspect to be one image.
Teaching function

The teaching function moves the stage automatically to the pre-registered points. This allows the system to "learn" problem areas and capture on an X-ray image automatically. Setting X-ray output, enlargement factor and stop time, etc for each point supports various test objectives. The teaching function moves the stage automatically to the pre-registered points. This allows the system to "learn"
For various applications

**Electrical components**
- BGA
- Capacitor
- Liquid crystal device
- Connector

**Metal parts**
- Holes in Aluminum sample

**Biology**
- Fish
Various standard functions

Easy operations by joystick

The joystick allows easy movements of the stage along the X and Y axis, 360-degree rotation of the stage, and changes of image magnification.

**Stage transfer stick**

The stage moves along the X and Y axis by tilting the stick to the right, left, forward and backward. The transfer speed of the stage can be adjusted in three steps (high, medium and low) by the tilting angle of the stick.

**Enlarge / Reduce button**

Enlarge or reduce the image.

Display the position of observing

The laser pointer indicates the center of displayed image. It is possible to position by observing the sample.

Safety functions

**Low-leakage X-ray dose**

The operator needs no special licensing to operate the µB1600.

**Emergency Stop Function**

Pushing this button stops the x-ray and the stage from operating in an emergency situation.

**Interlock Function**

The X-ray will shut off the moment the door is opened.
## SPECIFICATIONS

<table>
<thead>
<tr>
<th>X-ray source</th>
<th>Anode voltage</th>
<th>20kV to 60kV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anode current</td>
<td>200µA MAX</td>
</tr>
<tr>
<td>Focus size</td>
<td></td>
<td>7µm</td>
</tr>
<tr>
<td>Imaging section</td>
<td>Size of visual field</td>
<td>1.96&quot; × 1.96&quot;</td>
</tr>
<tr>
<td></td>
<td>Number of valid pixels</td>
<td>1,040,000 pixels</td>
</tr>
<tr>
<td></td>
<td>Density resolution</td>
<td>12bit</td>
</tr>
<tr>
<td></td>
<td>Monitor</td>
<td>17 inch</td>
</tr>
<tr>
<td></td>
<td>Lower and upper imaging part Stroke</td>
<td>7.87&quot;</td>
</tr>
<tr>
<td>Stage</td>
<td>Sample platform</td>
<td>Size 4.7&quot; × 4.7&quot;(Y)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Load capacity 2.2lb</td>
</tr>
<tr>
<td></td>
<td>XY Stroke</td>
<td>X:4.7&quot;, Y:4.7&quot;</td>
</tr>
<tr>
<td></td>
<td>Rotation Stroke</td>
<td>360°</td>
</tr>
<tr>
<td></td>
<td>Shifting operation</td>
<td>Direction indication by mouse. Joystick can be used together.</td>
</tr>
<tr>
<td>Input voltage</td>
<td>115V 50/60Hz</td>
<td></td>
</tr>
<tr>
<td>Dose of X-ray leakage</td>
<td>less than 1µSv/hr</td>
<td></td>
</tr>
<tr>
<td>Weight (main unit)</td>
<td>153lb</td>
<td></td>
</tr>
</tbody>
</table>

### Imaging section

<table>
<thead>
<tr>
<th>Geometric image magnification(times)</th>
<th>Max.</th>
<th>Min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max.</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Monitor magnification(times)</td>
<td>56</td>
<td>28</td>
</tr>
<tr>
<td>Field of view(inch)</td>
<td>0.196&quot; × 0.196&quot;</td>
<td>0.4&quot; × 0.4&quot;</td>
</tr>
</tbody>
</table>

### OPTION

- 1600DSK : Aluminum desk for µB1600

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## DIMENSIONS / SYSTEM UNITS

### FRONT

- 13.77"
- Pilot lamp during X-ray radiation

### TOP

- 43.7"
- 19.3"
- 27.55"
- Aluminum desk is an option.
Customer Inquiry Sheet (µB.1600)

Please copy this page and above fax number after filling out form below.

☐ Please a ☑ the box below.
   ☑ I would like...
      ☐ a quotation ☐ product explanation ☐ a sample evaluation ☐ to see demonstration
   ☑ I am now...
      ☐ considering to order one ☐ applying for budget ☐ interested in x-ray inspection system
      ☐ other ( )

☐ comments / questions

☐ Please fill in below.

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- The warranty period for X-ray detectors and X-ray source shall be either 1 year after shipment or 1,000 hours, shorter one.
- We limit warranty of our products to shipping a replacement and neither assure nor compensate for damages on the compatibility of the products with specific use or the secondary value derived from the products. Our products are not designed and produced for such applications as requiring extremely high reliability and safety, or involving human lives (nuclear power, aerospace, social infrastructure facility, medical equipment, etc.). The use under such environments is not covered by the warranty and may require additional design and manufacturing processes.
- Information that we recognize as our design and production know-hows, such as circuit diagrams of products, cannot be provided. Test reports and test data are available upon request for extra charge.
- Regulations and requirements for installing a X-ray equipment is different for each state. Contact the state office for details.