Digital X-ray Microscope

NEW μB1600

High performance in a Compact Body

www.matsusada.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 can not 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 the 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 60 kV and 12 W 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 1.5 million pixels of 1300 × 1152 clearly detects an object aimed at. Images with no distortion in every detail can be obtained.

**14-bit digital data**
High-definition data with 1.5 million pixels are imported by 14-bit. 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

**Automatic aging function**
The system memorizes the time and date of use. The aging time is automatically selected based on how many hours have passed since that day to ensure optimum aging.

**Imaging conditions replication function**
By loading the imaging conditions file for a previously captured image, you can capture new images under the exact same conditions. This eliminates the risk of mistakes being made, regardless of who is using the system.

**Autocontrast control function**
Images shot by 14-bit 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, png, tif)**
Images both before and after analyses can be easily saved. Extensions including bmp, jpg, png, 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

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

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

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

### Reduced display function

The moving image window displays not only high-resolution images with 1.5 million pixels but also reduced images allowing specimen to be inspected comparing with the images on the static image window.

### 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.

The µB1600 displays a histogram to indicate the distribution of brightness of shot images.

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

The µB1600 can measure the areas, number of holes, area of holes and area ratio of an object in a shot 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”×4.72” 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.
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.
For various applications

- Electrical components
  - BGA
  - Capacitor
- Liquid crystal device
- Connector
- Metal parts
  - Holes in Aluminum sample
- Biology
  - Fish
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 moving 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.

Enlarging / Minimizing 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>20 kV to 60 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anode current</td>
<td>200 µA MAX</td>
</tr>
<tr>
<td></td>
<td>Focus size</td>
<td>7 µm</td>
</tr>
<tr>
<td>Imaging section</td>
<td>Size of visual field</td>
<td>2.52-inch (64 mm) × 2.24-inch (57 mm)</td>
</tr>
<tr>
<td></td>
<td>Number of valid pixels</td>
<td>1.5 M pixels</td>
</tr>
<tr>
<td></td>
<td>Density resolution</td>
<td>14-bit</td>
</tr>
<tr>
<td></td>
<td>Monitor</td>
<td>24-inch</td>
</tr>
<tr>
<td></td>
<td>Lower and upper imaging part Stroke</td>
<td>7.87-inch (200 mm)</td>
</tr>
<tr>
<td>Stage</td>
<td>Size</td>
<td>X : 4.72-inch (120 mm) × Y : 4.72-inch (120 mm)</td>
</tr>
<tr>
<td></td>
<td>Load capacity</td>
<td>1 kg</td>
</tr>
<tr>
<td></td>
<td>Rotation Stroke</td>
<td>360°</td>
</tr>
<tr>
<td>Geometric image magnification</td>
<td></td>
<td>5 to 10 times</td>
</tr>
<tr>
<td>Staging</td>
<td>Shifting operation</td>
<td>Direction indication by mouse. Joystick can be used together.</td>
</tr>
<tr>
<td>Monitor magnification</td>
<td></td>
<td>25 to 50 times</td>
</tr>
<tr>
<td>Field of view</td>
<td></td>
<td>2.36 × 1.97-inch (6.0 × 5.0 mm) to 4.72 × 4.33-inch (12.0 × 11.0 mm)</td>
</tr>
<tr>
<td>Dose of X-ray leakage</td>
<td></td>
<td>less than 1 µSv / hr</td>
</tr>
<tr>
<td>Weight (main unit)</td>
<td></td>
<td>70 kg</td>
</tr>
</tbody>
</table>

Separated Item

XDSK100 : Aluminum desk for µB1600

DIMENSIONS / SYSTEM UNITS

[inch]
Customer Inquiry Sheet (µB,1600)

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

☐ I would like
  ☐ A quotation ☐ An explanation of product ☐ A demonstration ☐ To purchase
  ☐ Other ( )

☐ Give us your requirement / comment

☐ Please fill in below.

Address:

Company:

Dept.: Title:

Name:

Tel: Fax:

E-mail:

Manufacturer warranty

We warrant the specification, unless otherwise specified, at max. rated output after warm up, and scope of application is between 10 % and 100 % of max. rated output. We warrant that products contained in this catalog (hereinafter, the "Products") are free from defects in material and workmanship under normal use for a period of one (1) year from the date of shipment thereof. However, the warranty period for X-ray detectors and X-ray source shall be either one (1) year from the date of shipment or 1,000 hours, whichever shorter. The above warranty shall not apply to any Product which, at our sole judgment, has been: i) Repaired or altered by persons unauthorized by us; or ii) Connected, installed, adjusted or used otherwise than in accordance with the instructions furnished by us (including being used in an inappropriate installation environment, such as in corrosive gas, high temperature and humidity). We are not liable for any loss, damage or failure of the Products after the shipment thereof caused by external factors such as disasters. We will not inspect, adjust or repair any of our power supply products in the field or at any customer site. If you suspect that there has been a power supply failure in the field, please inspect your whole unit by yourself in an effort to determine that the problem is, in fact, arising out of our power supply products. If it is found that the problem is arising out of such power supply product after inspection, please contact your local sales office for additional troubleshooting. A "Return Merchandise Authorization" is required in case the power supply must be sent back to the factory in Japan for inspection and repair. We, at our sole discretion repair or replace such defective products at no cost to the purchaser. We assume no liability to the purchaser or any third party for special, incidental, consequential, or other damages resulting from a breach of the foregoing warranty. This warranty excludes any and all other warranties not set forth herein, express or implied, including without limitation the implied warranties of merchantability or fitness for a particular purpose. The Products are not designed and produced for such applications as requiring extremely high reliability and safety, or involving human lives (such as nuclear power, aerospace, social infrastructure facility, medical equipment, etc.). The use under such environment is not covered by this warranty and may require additional design and manufacturing processes. No modification or supplement of this warranty shall be binding unless in writing and signed by a duly authorized officer of Matsusada. Matsusada reserves the right to make any changes in the contents of catalogs or specifications at any time without advance notice. Due to compelling reason such as unavailability of components used, products might be un available or unable to repair. The products specified in catalogs or specifications are designed for use by the person who has enough expertise or under the control of such person, and not for general consumers. Schematics of products shall not be submitted to users. Test result or test data for the products shall be available upon request with charge.

Make sure you read the specification in the latest catalog before you order. Contact nearby sales office for the latest catalog.

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