



## OVERVIEW OF THE MF/MF-U SERIES MEASURING MICROSCOPE MANUFACTURING SYSTEM

FOR CUSTOMERS WHO ARE CONSIDERING PURCHASING MEASURING MICROSCOPES

OPTICAL MEASURING



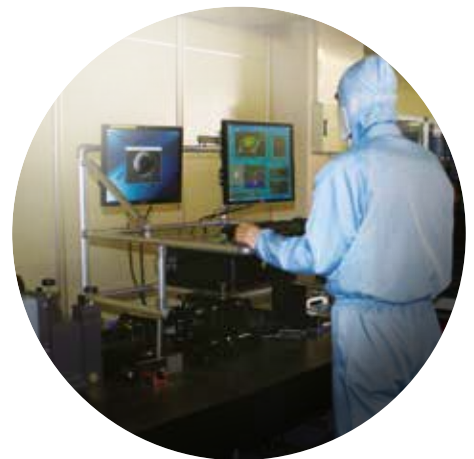
## High Quality from Mitutoyo

The MF/MF-U series of measuring microscopes is appreciated the world over.

Mitutoyo started producing toolmakers' microscopes in 1959, and since then we have designed, developed and manufactured the complete range of components for these instruments at our own factories: from highly stable microscope bodies, high-performance objective and eyepiece lenses and optical tubes, all the way through to highly accurate digital scales.

Not only do the measuring microscopes we sell have an extremely long service life, we also offer our customers a comprehensive after-sales service as well as custom fabrication facilities, which is only possible thanks to our in-house vertically integrated manufacturing system.





# Mitutoyo Quality

Mitutoyo's in-house integrated manufacturing system provides peace of mind to our customers, based on proven expertise and performance.

## 1 Mitutoyo the lens manufacturer

Kanagawa Japan  
Kawasaki Plant



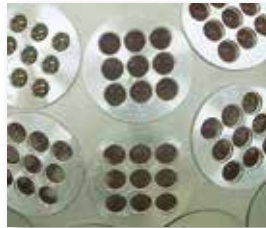
### Original lenses developed through in-house manufacturing

- Mitutoyo uses eyepieces that have wide view field specifications and objective lenses that have an ultra-long working distance.
- We also offer lenses designed for special applications\*, such as observation under infrared or ultraviolet and laser processing.

\* These lenses cannot be mounted on the MF/MF-U series.



Lens Processing line



Lens evaporation site



Various Mitutoyo lenses

## 2 Using microscopes to measure large objects as well as small ones

Hiroshima Japan  
Kure Production Department



### A lineup with a rich variety of measuring-stage size

- Mitutoyo microscopes can be used to measure large workpieces thanks to our rich variety of stage sizes, including ones measuring 400 x 200 mm.



Microscope body design



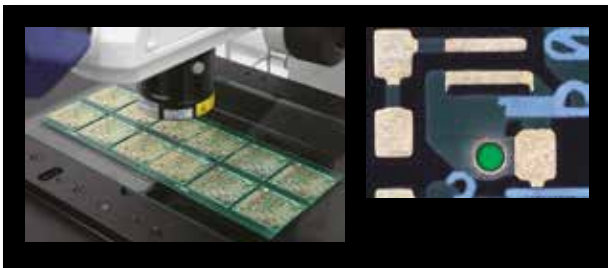
Manufacturing table units



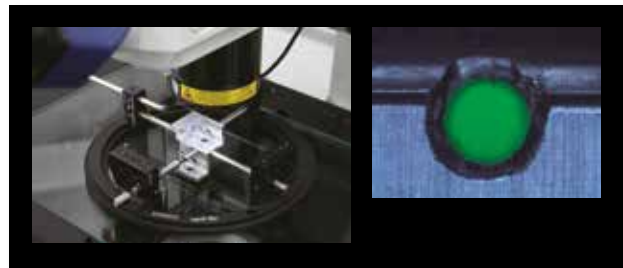
Microscope body assembly line

### Actual examples of MF/MF-U series use

- Measuring width and pitch on electronic PCBs



- Inspecting the surfaces of machined metal parts



\* Use of fixing jigs (option) to hold workpieces in place







For details, see **brochure PRE1303(4)**

### 3 An emphasis on quality all the way from the raw material stage – the secret of high precision

Hiroshima Japan  
Gohara Production Department

#### Columns and bases that ensure high precision

- Mitutoyo performs the complete process cast iron manufacture in-house, from the mixing of raw materials to the fabrication of molds that produce highly stable castings for these critical components.



Teeming line site



Cast iron manufacturing



Column and Base

### 4 The heart of a measuring instrument

Tochigi Japan  
Kiyohara Production Department

#### Highly accurate glass scales produced by advanced manufacturing

- Mitutoyo performs high-level graduation and accurate measurements at a research facility situated 9 m below ground, where the effects of temperature, humidity, and external vibrations are kept to a minimum throughout the year.
- All stage sizes have a measuring accuracy of  $(2.2 + 0.02 L) \mu\text{m}^*$  or less for both x-axis and y-axis.

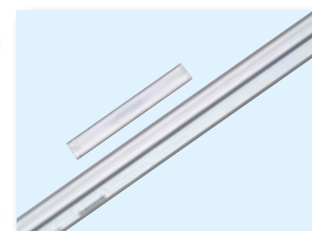
\* L: measuring length (mm)



Underground research facility

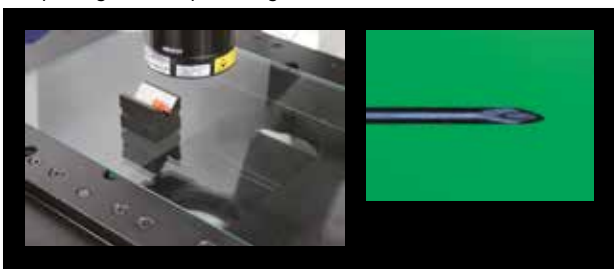


Clean room

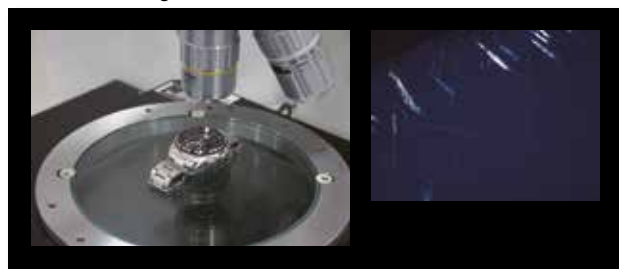


Glass scales

- Inspecting needle tips for angle and wear



- Observation of glass surface defects that cannot be seen with the naked eye



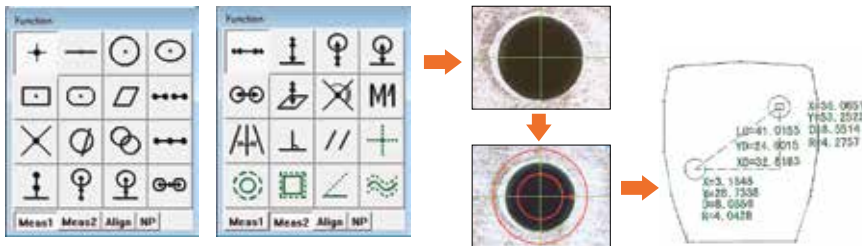
# Would you like to upgrade your measuring microscopes to vision measuring machines?

- The Vision Unit is the PC analysis system option of the MF/MF-U series. Installing this unit makes it possible to measure, analyse, and generate inspection tables efficiently.

## Main benefits of installing the vision unit

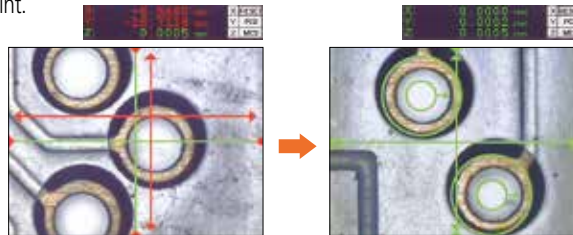
### Reduction in human error

- The automatic edge detection method, where you select the measurement items and then click the screen, is used to perform measurements. This makes it possible for anyone to perform stable measurements.



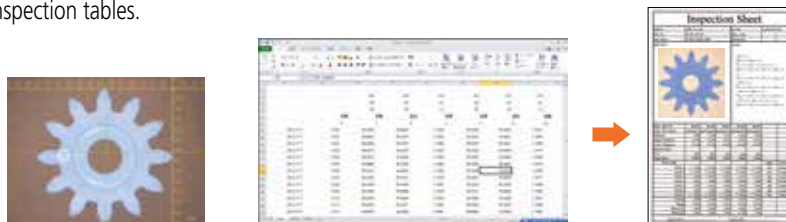
### Reduction in operation time

- If the entire measuring area is within the screen, the measurement can be performed without having to move the stage. Furthermore, during repeat measurements the software navigates to the next measurement point.



### Efficient inspection table generation

- The colour image in the video window can be saved as a BMP format file. Measurement results can be output to general spreadsheet software in CSV format, which enables easy generation of inspection tables.



### Freedom from troublesome focusing

- An auto focus function\* can be used to perform accurate and reproducible focusing with a single click of the mouse.

\* Only available for MF/MF-U series models with motor-driven stages.

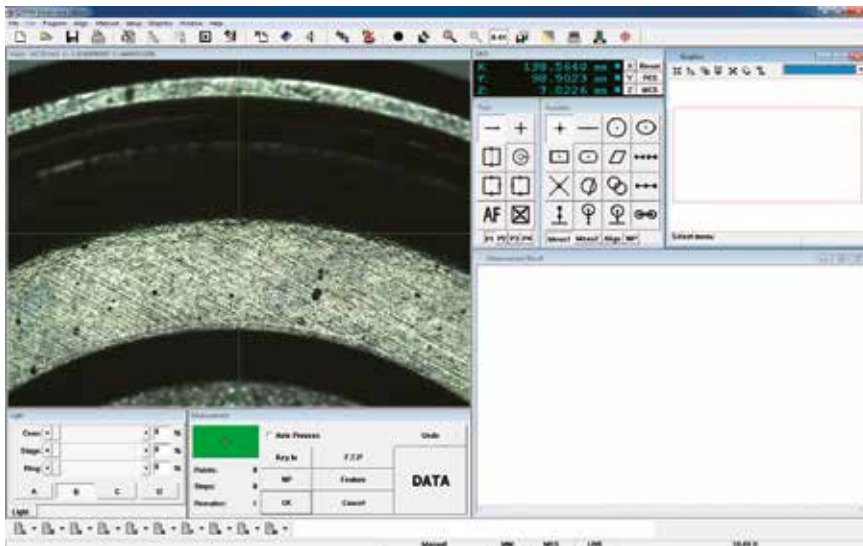


• Vision Auto Focus

• Laser Auto Focus



System example



Operation screen image



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**Whatever your challenges are, Mitutoyo supports you from start to finish.**

Mitutoyo is not only a manufacturer of top quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed up by comprehensive services that ensure your staff can make the very best use of the investment.

Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver bespoke measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.



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