Micro Vickers Hardness Testing Machines

HM-200 Series

Bulletin No. 2055
Micro Vickers Hardness Testing Machines
HM-200 Series

Equipped both with the latest optical system ideal for measuring the dimensions of indentation images and a test-force loading device that lets you set the desired test force! The HM-200 series is ideal for quality control and mechanical characteristic evaluation using Vickers hardness testing of small areas.

Features

- Touch-panel operation
- Measurement of indentation dimensions using a measuring microscope
- Positioning using a manual XY stage unit
When an optional video camera unit is used (pixel count of the camera itself: 380,000)

<table>
<thead>
<tr>
<th>Features</th>
<th>System A</th>
<th>System B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focusing</td>
<td>Manual</td>
<td>Manual</td>
</tr>
<tr>
<td>Testing action</td>
<td>Single point</td>
<td>Single point</td>
</tr>
<tr>
<td>Test-point positioning</td>
<td>Manual XY stage</td>
<td>Manual XY stage</td>
</tr>
<tr>
<td>Measuring indentations</td>
<td>Measuring microscope</td>
<td>Automatic (AVPAK)</td>
</tr>
<tr>
<td>Camera (for observing and measuring indentations)</td>
<td>Monochrome, 300,000 pixels*</td>
<td>Color, 3 million pixels*</td>
</tr>
<tr>
<td>Operating the main unit</td>
<td>Touch panel</td>
<td>PC (AVPAK)</td>
</tr>
</tbody>
</table>

*When an optional video camera unit is used (pixel count of the camera itself: 380,000)
HM-210/220 Manual model main unit

High-functionality model Type A Systems

Measuring microscope
- Microscope for measuring indentation dimensions
- Integrated 10X eyepiece (810-354A video camera unit can be installed)

New
LED illumination unit
- Uses an LED illumination unit that offers a long service life and low power consumption.
- LED illumination reduces the time lost during the light bulb replacement required with conventional illumination units.

Automatic turret mechanism
- The positions of the indenter and the objective lens can be automatically switched using touch panel operation (can also be manually switched).
- Up to four objective lenses can be installed.
- Up to two indenter shaft units can be installed.

New
Wide range of test force
- Use of an electromagnetic method makes it possible to set the desired test force, between 0.4903 mN and 19610 mN. (HM-220)

Objective lenses provide a long working distance
- Six MH Plan objectives are available. The 10X, 20X, 50X, and 100X types are used when measuring indentations, and the 2X and 5X for widefield observation tasks.

Manual XY stage unit with digital micrometer head
- During test-site positioning, the positional information is displayed digitally and can also be displayed on the touch panel display controller
- 1”x1”(25x25mm) or 2”x2”(50x50mm) stroke can be selected.

Color touch panel controller
- Touch panel operations for controlling hardness testing provide a full suite of basic functions necessary for hardness testing, a function for converting the hardness value into various types of hardness scales, and a statistical calculation function

Interfacing to external instruments
- Provided with a wide variety of interfaces to suit any purpose
- Test results can be printed on a printer or output to a PC.
  - USB 2.0 interface (for data communication)
  - Digimatic interface
    - For DP-1VR, U-WAVE, and USB-ITN
  - Serial interface
    - For DPU-414

Video camera unit 810-354A
(For type A tester)
- CCD camera and 8.4-inch TFT monitor
- Enables observation and measurement of indentations at high magnification, thereby reducing operator error.
HM-210/220   Type B System model main unit

High-functionality model
Type B Systems

Measuring microscope
(Can be installed as an option)
Enables magnified observation and measurement of indentations. (The vision unit integrated in the system model main unit and the measuring microscope cannot be simultaneously used for observation.)

New
LED illumination unit
Uses an LED illumination unit that offers a long service life and low power consumption. LED illumination reduces the time lost during the light bulb replacement required with conventional illumination units.

New
Objective lenses provide a long working distance
Six MH Plan objectives are available. The 10X, 20X, 50X, and 100X types are used when measuring indentations, and the 2X and 5X for widefield observation tasks.

New
Automatic turret mechanism
The positions of the indenter and the objective lens can be automatically switched from a PC (AVPAK) (can also be manually switched). Up to four objective lenses can be installed. Up to two indenter shaft units can be installed.

New
Vision unit
USB color mega-pixel camera
A 3-million pixel, 1/2-inch color USB camera is used for the system model.

New
Wide range of test force
Use of an electromagnetic method makes it possible to set the desired test force very accurately, between 0.4903 mN and 19610 mN. (HM-220)

New
Manual XY stage unit with digital micrometer head
(System B)
During test-site positioning, the positional information is displayed digitally. 1"x1"(25x25mm) or 2"x2"(50x50mm) stroke can be selected.

AVPAK software for automatic hardness testing systems
Software that supports control, testing, and report creation related to hardness testing
Supports parameter setting and automatic measurement.
Compatible with Windows 7 Professional 32-bit
Supports a wide-screen TFT and provides improved operability.
HM-200 Series
AVPAK software for controlling Type B Systems

Multiple screen layouts for control, testing status, and result display.

Graphic view (of stored images)
For displaying the entire specimen and checking the pattern positioning.
The digital zoom function can be used to easily magnify and check the site being tested.

Pattern creation

Layout view
Photos from individual views, graphs, tables, etc., can be laid out freely to help with report creation.

Part program
Automatically records the sequence of operations in a test.
To repeat the same test, the part program can be called up for repeated execution.

Parts manager

Test result view

Hardness curve graph

Hardness distribution diagram

Test result list view
Multiple screen layouts for control, testing status, and result display.

- **Pattern pasting**
- **Video view (live image)**
  Small indentations can be observed using the digital zoom function.
- **Contrast level meter**
  Stable focusing can be easily achieved by anyone.
- **Counter**
  Displays the stage’s current coordinates.
- **Property panel**
- **Test control**
  Controls testing actions such as wide- or narrow-range auto-focusing and measurement of indentations.
- **Turret control**
  Switches the objective lens and indenter shaft.
- **Illumination control**
  Controls the illumination in 100 steps.

**Indentation-reading example**

- **Pattern panel**
- **Frequency distribution graph**
HM-200 Series
AVPAK software for controlling Type B Systems

New functions

Pattern creation
This tool supports the creation of test patterns such as straight lines, zigzag lines, and teaching patterns.

Pattern pasting
This tool supports the pasting of created test patterns. It adjusts the origin, direction, etc., to paste a pattern.

Handling of multiple specimens
Multiple specimens can be tested when a part program and Parts Manager are used.

Parts Manager
Executes a common part program for specimens having the same shape.

Indentation depth display
Displays the indentation depth of the diamond indenter while the testing force is being applied. (Reference value)

Property panel
Used for setting the test conditions such as the test force and load time, as well as the indentation measurement condition.

Navigation function
When the test position is being moved during multi-point testing, this function guides the travel of the XY fine adjustment manual stage to the next position.

Reading of indentations
Improvement in image-processing performance has improved the indentation measurement function.

*Measurement accuracy varies according to conditions.

Mitutoyo
HM-200 Series
Touch-panel control screen & System outline drawing

Touch-panel control screen

Easy-to-understand graphic display enables intuitive operation. Functions for converting values and compensating for curved surfaces, as well as a test condition guiding function are all provided as standard features. (Installed in the manual model main unit)

Displays test conditions and test results.

Used for selecting a conversion scale, entering a setting for Pass/Fail determination, and specifying external output.

In addition to the test force dwell time, you can specify loading and unloading testing actions.

You can check the test results in a statistical list.

System A Outline drawing

System B Outline drawing

* When the .98” x .98” (25 x 25mm) manual XY stage is used

* When the .98” x .98” (25 x 25mm) manual XY stage is used

Unit: Inch(mm)
<table>
<thead>
<tr>
<th>Code No.</th>
<th>Item Name</th>
<th>Details</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>64AAB305</td>
<td>HM210 Type A</td>
<td>Standard test force, 10x, 50x, measuring microscope, 1&quot; x 1&quot; Digimatic X-Y stage</td>
<td>Vickers Indenter</td>
</tr>
<tr>
<td>64AAB306</td>
<td>HM210 Type A</td>
<td>Standard test force, 10x, 20x, 50x, measuring microscope, 1&quot; x 1&quot; Digimatic X-Y stage</td>
<td>Vickers Indenter</td>
</tr>
<tr>
<td>64AAB307</td>
<td>HM220 Type A</td>
<td>Low test force, 10x, 50x, 100x, measuring microscope, 1&quot; x 1&quot; Digimatic X-Y stage Vickers Indenter</td>
<td></td>
</tr>
<tr>
<td>64AAB308</td>
<td>HM220 Type A</td>
<td>Low test force, 10x, 50x, 100x, measuring microscope, 1&quot; x 1&quot; Digimatic X-Y stage Vickers Indenter</td>
<td></td>
</tr>
<tr>
<td>64AAB323</td>
<td>HM210 Type B</td>
<td>Standard test force, 10x, 50x, AVPak Software, camera, 1&quot; x 1&quot; Digimatic X-Y stage</td>
<td>Vickers and Knoop Indenters, Requires PC, no microscope or manual control console</td>
</tr>
<tr>
<td>64AAB324</td>
<td>HM210 Type B</td>
<td>Standard test force, 10x, 20x, 50x, AVPak Software, camera, 1&quot; x 1&quot; Digimatic X-Y stage</td>
<td>Vickers and Knoop Indenters, Requires PC, no microscope or manual control console</td>
</tr>
<tr>
<td>64AAB325</td>
<td>HM220 Type B</td>
<td>Low test force, 10x, 50x, 100x, AVPak Software, camera, 1&quot; x 1&quot; Digimatic X-Y stage</td>
<td>Vickers Indenter, Requires PC, no microscope or manual control console</td>
</tr>
<tr>
<td>64AAB326</td>
<td>HM220 Type B</td>
<td>Low test force, 10x, 50x, 100x, AVPak Software, camera, 1&quot; x 1&quot; Digimatic X-Y stage</td>
<td>Vickers and Knoop Indenters, Requires PC, no microscope or manual control console</td>
</tr>
</tbody>
</table>

**System configurations**

- Please contact Mitutoyo for information on custom built testers.
## Specifications  Main Unit

<table>
<thead>
<tr>
<th>Model name</th>
<th>HM-210 Type A</th>
<th>HM-210 Type B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main unit</td>
<td>HM-210 manual model main unit</td>
<td>B10-400A</td>
</tr>
<tr>
<td></td>
<td>HM-210 system model main unit</td>
<td>B10-403A</td>
</tr>
</tbody>
</table>

### Hardness tester
- **Applicable standards**
  - JIS B 7725 / ISO 6507-2 / ASTM E 384
- **Test force**
  - Hardness unit: HV0.0005, HV0.001, HV0.002, HV0.003, HV0.005, HV0.01, HV0.02, HV0.03, HV0.05
  - Test force: 0.408x10⁻³, 0.980x10⁻³, 2.942x10⁻³, 4.903x10⁻³, 9.807x10⁻³
  - Hardness unit: N
  - Test force: 196.1x10⁻³, 294.2x10⁻³, 490.3x10⁻³, 980.7x10⁻³, 1.961x10⁻², 3.922x10⁻², 7.843x10⁻²
- **Indentation approach speed**
  - 1 - 99s: Settable in 1s increments.
- **Test force loading time**
  - 0.999%: Can be set in 1s increments.
- **Test force unloading time**
  - 1 - 99s: Can be set in 1s increments.

### Model name
- **Main unit**
  - HM-210 manual model main unit
  - B10-405A
  - ○
  - HM-210 system model main unit
  - B10-408A
  - ○

### Hardness tester
- **Applicable standards**
  - JIS B 7725 / ISO 6507-2 / ASTM E 384
- **Test force**
  - Hardness unit: HV0.0005, HV0.001, HV0.002, HV0.003, HV0.005, HV0.01, HV0.02, HV0.03, HV0.05
  - Test force: 0.408x10⁻³, 0.980x10⁻³, 2.942x10⁻³, 4.903x10⁻³, 9.807x10⁻³
  - Hardness unit: N
  - Test force: 196.1x10⁻³, 294.2x10⁻³, 490.3x10⁻³, 980.7x10⁻³, 1.961x10⁻², 3.922x10⁻², 7.843x10⁻²
- **Indentation approach speed**
  - Variable between 2 and 60 μm/s: Can be set in 1μm/s increments.
  - 0.999%: Can be set in 1s increments.
- **Test force loading time**
  - 1 - 99s: Can be set in 1s increments.
- **Test force dwell time**
  - 0.999%: Can be set in 1s increments.
- **Test force unloading time**
  - 1 - 99s: Can be set in 1s increments.

### Mechanism
- **Loading device**
  - Test force control: Electromagnetic (voice coil)
  - Test force switching: Touch panel
  - Drive method: Motor drive
  - Operation method: Touch panel / Manual
  - Number of turret ports: Indenter shaft unit: Up to two can be installed (including the standard Vickers indenter shaft unit already installed); Objective lens unit: Up to four can be installed
  - Minimum display unit: For objective lenses of 50X or higher: 0.01 μm; For lower than 50X: 0.1 μm
  - Indenter approach speed: Fixed at 60 μm/s
  - Test force unloading time: 1- 99s: Can be set in 1s increments.
  - Test force dwell time: 0-999s: Can be set in 1s increments.

### Controller
- **Display content**
  - Indentation value: DT, D2, max. 5 digits each
  - Minimum display unit: For objective lenses of 50X or higher: 0.01 μm; For lower than 50X: 0.1 μm
  - Hardness value: Maximum of four digits, Minimum of 0.1 HV0.005, Fracture toughness value
  - Test condition: Indenter (HV/HK), test force, loading, dwell, and unloading times
  - Compensation: Cylinder, sphere, measurement
  - Pass/Fail determination: OK/NG
  - Language used: Japanese, English, German, French, Italian, Spanish
  - Other: XY positional data, turret position display, statistical calculation
- **Calculation functions**
  - Pass/Fail determination function: Determines whether or not the measured hardness is acceptable (OK/NG) based on the upper and lower limits that have been set.
  - Function for guiding measurement condition setup: Enter the indenter, specimen thickness, and presumed hardness to calculate the maximum test force.
  - Compensation function: Cylindrical compensation, spherical compensation, measurement compensation
  - Statistical calculation function: Number of data units, maximum value, minimum value, average, range, upper limit, lower limit, number of passes, number of fails, ultra upper limit and ultra lower limit, standard deviation (n-1), standard deviation (n)
  - Test force unloading time: 1-99s: Can be set in 1s increments.
  - Test force dwell time: 0-999s: Can be set in 1s increments.
  - Indenter approach speed: Fixed at 60 μm/s

### External connection interface
- **For printer:** Serial interface (compatible with the RS-232C standard); For Digimatic interface and data communication: USB 2.0

### Main unit
- **Maximum specimen dimensions:**
  - Maximum specimen depth: 160 mm, Maximum specimen height: 133 mm
- **Maximum load capacity:** 3kg
- **Main unit mass:** Approx. 43 kg
- **Main unit power supply:** AC 100-125V

## Specifications  Optical system

<table>
<thead>
<tr>
<th>Item name</th>
<th>HM-210 Type A</th>
<th>HM-210 Type B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tube lens magnification</td>
<td></td>
<td>Infinitely corrected optical system, 4-port objective lens switching method</td>
</tr>
<tr>
<td>Light source</td>
<td></td>
<td>White LED</td>
</tr>
<tr>
<td>Aperture diaphragm</td>
<td></td>
<td>Variable</td>
</tr>
<tr>
<td>Lens</td>
<td></td>
<td>MH Plan 50x</td>
</tr>
<tr>
<td>Working distance [mm]</td>
<td></td>
<td>2.5</td>
</tr>
<tr>
<td>Total field of view and imaging range</td>
<td></td>
<td>Field of view: ø0.14 mm</td>
</tr>
<tr>
<td>Imaging range [H] mm x [V] mm (Vision unit)</td>
<td></td>
<td>2.95x2.1</td>
</tr>
</tbody>
</table>

### Objective lens unit (including holder) (factory-installed options)
- **Part No.**
  - MH Plan 2x: 11AAC104
  - MH Plan 5x: 11AAC105
  - MH Plan 10x: 11AAC106
  - MH Plan 20x: 11AAC107
  - MH Plan 100x: 11AAC108
- **Working distance [mm]**
  - 3.5 (reference): 11AAC105
  - 1.4 (reference): 11AAC106
  - 0.7: 11AAC107
  - 0.3: 11AAC108
- **Measurement range [D] mm**
  - 2.95: 11AAC104
  - 1.18x0.89: 11AAC105
  - 0.59x0.44: 11AAC106
  - 0.35x0.22: 11AAC107
  - 0.059x0.044: 11AAC108
### Specifications  Manual XY stage unit

<table>
<thead>
<tr>
<th>Item name</th>
<th>Manual XY stage unit 1&quot;×1&quot;</th>
<th>Manual XY stage unit 2&quot;×2&quot;</th>
<th>Manual XY stage 25X25</th>
<th>Manual XY stage 50X50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code No.</td>
<td>810-424</td>
<td>810-427</td>
<td>810-420</td>
<td>810-423</td>
</tr>
<tr>
<td>Stage travel range</td>
<td>25.4×25.4 mm</td>
<td>50.8×50.8 mm</td>
<td>25×25 mm</td>
<td>50×50 mm</td>
</tr>
<tr>
<td>Table size</td>
<td>100×100 mm</td>
<td>130×130 mm</td>
<td>100×100 mm</td>
<td>130×130 mm</td>
</tr>
<tr>
<td>Minimum display unit</td>
<td>0.001 mm/0.0005&quot;</td>
<td>0.001 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XY stage dimensions</td>
<td>211(W)×211(D)×77(H) mm</td>
<td>305(W)×305(D)×77(H) mm</td>
<td>211(W)×211(D)×77(H) mm</td>
<td>305(W)×305(D)×77(H) mm</td>
</tr>
<tr>
<td>XY stage mass</td>
<td>2.5 kg</td>
<td>6.6 kg</td>
<td>2.5 kg</td>
<td>6.6 kg</td>
</tr>
</tbody>
</table>

### Specifications  Video camera unit

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TFT screen magnification</td>
<td>10X: Approx. 200 times</td>
</tr>
<tr>
<td></td>
<td>20X: Approx. 1000 times</td>
</tr>
<tr>
<td></td>
<td>50X: Approx. 2000 times</td>
</tr>
<tr>
<td>CCD camera</td>
<td>Imaging method: 8UA</td>
</tr>
<tr>
<td></td>
<td>Imaging device: 1/3-inch interline CCD</td>
</tr>
<tr>
<td></td>
<td>External dimensions: 31(W)×72.5(D)×25(H) mm</td>
</tr>
<tr>
<td>TFT monitor</td>
<td>Number of pixels: 640(H)×480(V)</td>
</tr>
<tr>
<td></td>
<td>Rotation range: 35º</td>
</tr>
<tr>
<td></td>
<td>Tilting range: 5-45º</td>
</tr>
<tr>
<td></td>
<td>Power supply: AC 100-230V 50/60Hz</td>
</tr>
<tr>
<td></td>
<td>Power consumption: 12VA</td>
</tr>
<tr>
<td></td>
<td>External dimensions: 22.8(W)×61.5(D)×195(H) mm</td>
</tr>
<tr>
<td></td>
<td>[222.0(W)×227.0(D)×426.5(H)] mm (when installed on the stand)</td>
</tr>
<tr>
<td></td>
<td>Mass: 1.8 g (4.2 kg including the stand)</td>
</tr>
</tbody>
</table>

### Standard accessories

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Item name</th>
<th>Specification/Remarks</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>19BAA058</td>
<td>Diamond indenter*1</td>
<td>Vickers for HM-210</td>
<td>1</td>
</tr>
<tr>
<td>19BAA059</td>
<td>Diamond indenter*1</td>
<td>Vickers for HM-220</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Hardness testing block*2</td>
<td>700HV/100×1.25 mm (diameter) × 1.25 mm thickness</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Indenter shaft unit*1</td>
<td>With Vickers indenter</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Objective lens unit*1</td>
<td>SGX-1</td>
<td>1</td>
</tr>
<tr>
<td>19BAA133</td>
<td>Spacer</td>
<td>Material: Bakelite: 11(W)×42(D)×13(H) mm</td>
<td>1</td>
</tr>
<tr>
<td>11AA8405</td>
<td>Extension shaft</td>
<td>For elevation shaft: 38 mm, With two set screws</td>
<td>1</td>
</tr>
<tr>
<td>11AA8406</td>
<td>Extension shaft</td>
<td>For elevation shaft: 76 mm, With two set screws</td>
<td>1</td>
</tr>
<tr>
<td>02CA417</td>
<td>Dust cover</td>
<td>For the hardness tester main unit</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Plastic Phillips screwdriver</td>
<td>No.330 Philips 2×100</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Precision flathead screwdriver</td>
<td>No.205 flathead 1.2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Hex-head screwdriver</td>
<td>1.5 mm</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Hex-head screwdriver</td>
<td>2.5 mm</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Hex wrench</td>
<td>2.5 mm</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Hex wrench</td>
<td>3.0 mm</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Holder</td>
<td>Nangen bolt for the main unit</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Cap*1</td>
<td>Cap for the holder</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Cable clamp</td>
<td>Gray</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Cable clamp</td>
<td>Black</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Spiral tube</td>
<td>Black, approx. 2 m</td>
<td>1</td>
</tr>
<tr>
<td>02ZAR000</td>
<td>Power supply cord set-PSI</td>
<td>Classification: Unmarked*1</td>
<td>1</td>
</tr>
<tr>
<td>02ZAR050</td>
<td>AC cord set-GDE-5A</td>
<td>Classification: A</td>
<td>1</td>
</tr>
<tr>
<td>99MG127A</td>
<td>User’s manual for the manual main unit</td>
<td>English</td>
<td>1</td>
</tr>
<tr>
<td>99MG137A</td>
<td>User’s manual for the system main unit</td>
<td>English</td>
<td>1</td>
</tr>
<tr>
<td>11AAC198</td>
<td>Configuration disk</td>
<td>For the system main unit</td>
<td>1</td>
</tr>
<tr>
<td>11PAA054</td>
<td>Accessory case</td>
<td>In both Japanese and English</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Certificate for the tester</td>
<td>In both Japanese and English</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Certificate for the hardness test block</td>
<td>In both Japanese and English</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Warranty</td>
<td>In both Japanese and English</td>
<td>1</td>
</tr>
</tbody>
</table>

*1 Already installed in the main unit when it is delivered.

*2 The numeric values shown are nominal; actual values will be slightly above or below the nominal values.

Note: All information regarding our products, and in particular the illustrations, drawings, dimensional and performance data contained in this printed matter as well as other technical data are to be regarded as approximate average values. We therefore reserve the right to make changes to the corresponding designs. The stated standards, similar technical regulations, descriptions and illustrations of the products were valid at the time of printing. In addition, the latest applicable version of our General Trading Conditions will apply. Only quotations submitted by ourselves may be regarded as definitive. Specifications are subject to change without notice.

Mitutoyo products are subject to US Export Administration Regulations (EAR). Re-export or relocation of our products may require prior approval by an appropriate governing authority.

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