

Hardness Testing Machines

Start quality control from the material — Mitutoyo's hardness testing machines can handle it

HM-200

SERIES 810 — Micro Vickers Hardness Testing Machines

• Introduction of electromagnetic force generation into the loading mechanism

The latest electromagnetic force motor used in the loading mechanism enables the test force to be freely selected (see test force specifications) over the wide range of 0.4903mN to 19610mN. It is also possible to freely set the loading time and duration time. Now your desire for absolute control over the indentation size in Vickers hardness testing can be satisfied. The HM-200 series always offers the test force most appropriate for the specimen material and shape.

Note: Changing the test force may change the hardness value obtained due to material non-homogeneity. Surface treatment, such as Nitriding, can also produce the same effect because the material hardness changes with depth, and indentation depth depends on the test force.

• Newly-designed optical system

The new HM Plan series objective lenses are optimized for measuring characteristic indentation images. The lineup includes 6 types of long working distance objectives: 10X, 20X, 50X and 100X for measuring indentation images, and 2X and 5X for enabling wide-range measurement around indentations. LEDs, which have a longer life, produce less heat, consume less power and are more energy efficient than incandescent bulbs, are employed for the illumination system.



System A (HM-210A/220A)

SPECIFICATIONS

Order No.	810-401, 810-404														810-406, 810-409																	
Model	HM-210														HM-220																	
Applicable standards	JIS B 7725, ISO 6507-2																															
Test force	mN	98.07	196.1	294.2	49.03	980.7	0.4903	0.9807	1.961	2.942	4.903	9.807	19.61	29.42	49.03	98.07	mN	1961	2942	4903	9807	—	196.1	294.2	490.3	980.7	1961	2942	4903	9807	19610	—
	(gf)	10	20	30	50	100	0.05	0.1	0.2	0.3	0.5	1	2	3	5	10							20	30	50	100	200	300	500	1000	2000	
	(gf)	200	300	500	1000	—																										
Arbitrary test force	1 type [Default: 245.2mN (25gf)]																															
Test force control	Electromagnetic generation of force (force motor) and automatic control (load, duration, unload)																															
Indenter shaft unit	Up to 2 pcs. mountable (one indenter shaft unit with Vickers indenter is mounted as standard)																															
Objective lens unit	Up to 4 pcs. mountable (one standard lens 50X mounted as standard)																															
Resolution of diagonal length of an indentation	Objective lens less than 50X: 0.1µm (Objective lens more than 50X: 0.01µm)																															
Turret drive	Motor-driven and manual operation																															
Specimen dimensions	System A/B: height 133mm, depth 160mm (when using manual XY stage 25X25) System C: height 112mm, depth 160mm, System D: height 72mm, depth 160mm																															
Control panel	Built-in touch panel, 5.7" Color LCD (HM-210A/220A for System A), Control software (PC for System B/C/D)																															
Functions*1	Calculation of Vickers/Knoop*2 hardness, and ceramic fracture toughness based on IF method (JIS R1697), 3 display format (standard, list, simple), GO/NG judgment, test condition guide, curve and user correction, hardness corresponding value, statistics calculation																															
Output	Digimatic, serial, USB2.0 series A (for memory)*1, USB2.0 B Type (for system communication)																															
External dimensions (excluding protrusions and stage); Main unit mass	System A: 315(W)×671(D)×595(H)mm/38.5kg System B/C/D: 315(W)×586(D)×741(H)mm/37.4kg																															
Power supply (main unit)	AC100V 50/60Hz System A: 31W System B/C/D: 30W														AC100V 50/60Hz System A: 44W System B/C/D: 43W																	
Power supply*3 (Control unit)	AC100V 50/60Hz 67W																															

*810-401, 810-406: System A, 810-404, 810-409: System B/C/D

*1: Functions for System A. *2: For Knoop hardness test, Knoop indenter (optional) is required. *3: Supplied only for System C/D.



An inspection certificate is supplied as standard. Refer to page X for details.

Optional Accessories

- 19BAA058:** Diamond indenter for Vickers (For HM-210 series)
- 19BAA059:** Diamond indenter for Vickers (For HM-220 series)
- 19BAA061:** Diamond indenter for Knoop (For HM-210 series)
- 19BAA062:** Diamond indenter for Knoop (For HM-220 series)
- 19BAA001:** Hardness standard block 100HVM
- 19BAA002:** Hardness standard block 200HVM
- 19BAA003:** Hardness standard block 300HVM
- 19BAA004:** Hardness standard block 400HVM
- 19BAA005:** Hardness standard block 500HVM
- 19BAA006:** Hardness standard block 600HVM
- 19BAA007:** Hardness standard block 700HVM
- 19BAA008:** Hardness standard block 800HVM
- 19BAA009:** Hardness standard block 900HVM
- 19BAA010:** Hardness standard block 40HVM
- 810-017:** Special vise (opening width 100mm)
- 810-013:** Sheet specimen table
- 810-014:** Thin specimen table (horizontal type)
- 810-015:** Thin specimen table (vertical type)
- 810-019:** Tilting specimen table
- 810-020:** Adjustable specimen holder
- 810-018:** Rotary table
- 810-084:** Rotatable adjustable specimen table
- 810-085:** Sheet specimen table
- 810-095:** Rotary tilting specimen table
- 375-056:** Objective micrometer (for calculation of dimension ratio for a pixel of CCD camera)
- 810-650-1:** Resin mold specimen table ø25.4
- 810-650-2:** Resin mold specimen table ø30
- 810-650-3:** Resin mold specimen table ø31.75
- 810-650-4:** Resin mold specimen table ø38.1
- 810-650-5:** Resin mold specimen table ø40
- 02ATE760:** Dedicated table (for testing machine, PC)
- 810-641:** Vibration Isolator (for testing machine)



Refer to the Hardness Testing Machines (Catalog No. E17001) for more details.

System A (HM-210A/220A)

All-in-one model with simple color touch-panel operation for motorized test force switching and motorized turret mount.

*Camera and monitor are optional accessories.



System C (HM-210C/220C)

In addition to the functions of System B, System C is equipped with motorized XY stage. This system is useful for improving the efficiency of operations such as multi-point hardness testing.

Automatic measurement of indentation / motorized XY stage



System B (HM-210B/220B)

System B is equipped with **AVPAK-20**, a the software package for automatic hardness testing systems that automatically measures the diagonal length of an indentation and calculates the corresponding hardness value. This means that measurement error caused by variation in operator interpretation is eliminated, so reducing costs.

Automatic measurement of indentation



System D (HM-210D/220D)

In addition to the functions of System B and System C, System D is equipped with the autofocus function.

This function allows for automatic hardness testing, thereby increasing efficiency and reducing labor costs.

Automatic measurement of indentation / motorized XY stage / Autofocusing



CAUTION: The **AVPAK-20** software package is not for use within, or export to, the United States of America. The **AVPAK-10** software package is for the United States of America.



An inspection certificate is supplied as standard. Refer to page X for details.

HM-100 SERIES 810 — Micro Vickers Hardness Testing Machines

- This entry-level series of microhardness testers is suited for mechanical characteristic evaluation and quality control of electric/electronic components where test forces no smaller than 98.07mN/10gf are sufficient.



SPECIFICATIONS

Order No.	810-124		810-125			810-959			
Model	HM-101		HM-102			HM-103			
Applicable standards	JIS B 7725, ISO 6507-2								
Test force	mN	98.07	245.2	490.3	980.7	1961	2942	4903	9807
	(gf)	10	25	50	100	200	300	500	1000
Test force control	Direct load method and automatic control (load, duration, unload)								
Objective lens	50X (for measurement) 10X (for observation)			50X (for measurement), 10X (for measurement/observation)					
Resolution of diagonal length of an indentation	0.2μm			0.1μm					
Turret drive	Manual switching								
Specimen dimensions	height:95mm, depth:150mm								
Control panel	—			Membrane keypad					
TV monitor unit	—			—			Standard		
Function	—			Calculation of Vickers / Knoop* hardness and GO/NG judgment					
Output	—			Digimatic, serial, and parallel					
External dimensions (excluding protrusions and stage); Main unit mass	—			380(W)×600(D)×590(H)mm/42kg					
	—			Control panel: 165(W)×235(D)×125(H)mm/1.5kg					
	—			—			TV monitor: 232(W)×227(D)×415(H)mm/4.4kg		
Power supply	—			AC100V 50/60Hz			—		
	Less than 20W			Less than 60W			Less than 90W		

*For Knoop hardness test, Knoop indenter (optional) is required.



Refer to the Hardness Testing Machines (Catalog No. E17001) for more details.