C227-E013B

Access to your success
SHIMADZU

HMV-2 series

Shimadzu
Micro Hardness Tester

Automatic Force Change Function,

Windows Direct link-up Function,

Superior User Interface.

HMV-2 Series

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Shimadzu Micro Hardness Tester

The micro hardness tester is a piece of equipment that is indispensable to metallographic research, product quality control, and the creation of product certification materials.
For this type of work, it is important to be able to measure the hardness of small parts and metallic structures used in precision equipment, processed surface layers, metal plating layers, etc.
This type of measurement must be performed on a limited small area with small damege to the area being measured, and must yield extremely reliable results.
The HMV Series hardness testers have been designed to meet these demanding conditions, providing outstanding performance with ease of use and user friendly design.

Features

1. Automatic Force Change Mechanism

Test force and force duration can be selected by LCD display and Touch panel operation.

2. Windows 2000 / XP Direct link-up Function

Test results can be transferred directly to the Excel cell in Windows (It need a RS-232C cable type cross).

3. Test Modes to Match the Objective

Standard and easy testing
In addition to standard testing mode which allows the setting of verious test conditions, easy testing mode can also be selected for quick, hardness measurement based only on test force and force duration settings.

Serial testing / Single testing
In serial testing mode, first a batch of indentations is made, and then the diagonal length of those indentations are measured. In single testing mode, the diagonal length of indentation is measured after each force application.

4. High Accuracy Measurement

The minimum unit of diagonal length measurement is 0.01 µm (when the objective lens is x40), thus high-accuracy measurement is possible.

5. Excellent Man-Machine Interface

The use of an easy viewing LCD touch panel makes operation, including test condition settings and display of results, quick and easy to understand.

6. Convenient Analysis & Graph Display Functions

A wealth of analysis functions is included as standard feature, such as statistical calculation data editing, conversion, graph display and an acceptable/not acceptable decision function.

7. Automatically Revolving Electric Turret (only with HMV-2T)

After an indentation is made, the electric turret automatically revolve, making the objecive lens ready for an operator to measure the diagonal length of the indentation. This will save time and labor of the operator remarkably.

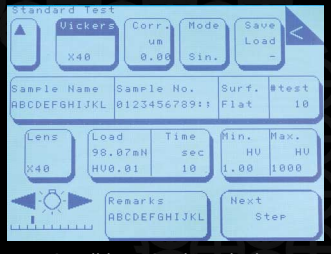
Measurement Applications

Research and Development -

1.Microstructures of all types of metal materials.
2.Hardened surface layers and transmuted layers with the finishing.
3.Welds and other points of adhesion.
4.Paint layers and metallic plating.
5.Fine ceramics.
6.Engineering plastics.

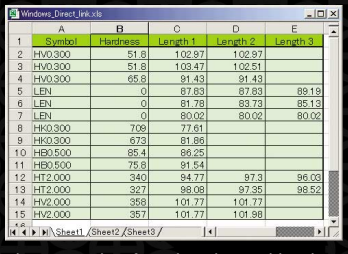
Quality Control -

1.Small precision devices such as gears, axels, and cams for clocks, cameras, sewing machines, optical instruments, etc.
2.Wire materials including steel wires,tire cords, and piano wire.
3.Thin samples such as razor blades, metal ribbon, and metal foil.
4.Electronic parts, including IC packages and circuit boards.
5.Medical related items such as artificial teeth and artificial bones.



Test Conditions Setting Display

Test Results Display



The example of testing data taking in by Windows direct link-up function.

Contents

Product Lineup

Specifications

	HMV-2	HMV-2T
Max.Force	19.61N	
Force	Automatic swiching between 9 force types (98.07, 245.2, 490.3, 980.7mN, 1.96, 2.942, 4.903, 9.807N, and 19.614N) - HV0.01, 0.025, 0.05, 0.1, 0.2, 0.3, 0.5, 1, and 2	
Loading Unit	Automatic Force Changing system	
Force Duration	Time 5 to 999 secs.	
Objective Lens	x40	
Eyepiece	x10	
Electric Turret	—	○
Effective Measurement Range	250µm(at x40)	
Resolution	0.01µm	
X-Y Stage	Surface Area: 120x120mm Stroke:±12.5mm Test Sample Height: Max. Height above Sample Stage: Approx. 100mm, Max. Depth: Approx. 140mm Z-axis: 60mm Stroke	
Statistical Calculation	256 Pieces of Data Average, Standard Deviation, Coefficient of Variation, Maximum Value, Minimum Value, Converted Value Graph Display (Scatter Graph, Histogram)	
Test conditions	10 Sets of Test Conditions Can Be Saved (1) Sample Name: 12 alphanumeric characters (2) Sample Number: 12 numeric characters (3) Test Mode: Serial/Single testing (4) Test Forces: 9 types (5) Force Duration Time: 5 to 999 sec. (user selectable in 1 sec. units) (6) No. of Tests: User selectable (256 max.) (7) Limit: Upper and lower limit settings for acceptable/not acceptable decision (max. 4-digit integers) (8) Correction (only with Vickers measurement) Correction to compensate for test sample shape. (9) Remark: 12 alphanumeric characters	
Results Display	Data No., Length of Diagonal, Hardness, Converted Values (*1), Averages, Standard Deviation, Coefficient of Variation, Maximum Value, Minimum Value, Acceptable/Not Acceptable Decision, Data Editing	
External Output	Bidirectional RS-232C, Centronics Compatible Printer	
External Dimensions(Approx.)	370mm (W), 490mm (D), 520mm (H) (*2)	
Weight (Approx.)	42kg	
Power Requirements	Single Phase AC100~240V±10%, 300VA 50/60Hz	
Environmental Conditions	Temperture: 5 to 40°C Humidity: 0 to 80% (Condensation must not be allow to form on the tester.)	

(*1) From HV into HRA, HRC, HRD, HR15N, HR30N. HR45N, HB, HS, MPa according to ASTM E 140

(*2) Dimensions when an external LCD touch panel is installed (approx.): 570mm (W), 490mm (D), 520mm (H)

System		Hardness tester HMV-2	Auto Focus	Automatic reading	Electric turret	Digital Micrometer communications	Electric X-Y stage
Model Cat. No.	P/N						
HMV-2	344-04109-XX	○ (-21 : 120V, -22 : 230V)					
HMV-2T	344-04154-XX	○ (-21 : 120V, -22 : 230V)			○		
HMV-2ADW	344-04201-02	○		○			
HMV-2TADW	344-04201-05	○		○	○		
HMV-2ADW-DM	344-04201-12	○		○		○	
HMV-2TADW-DM	344-04201-15	○		○	○	○	
HMV-2ADW-XY	344-04201-22	○		○			○
HMV-2TADW-XY	344-04201-25	○		○	○		○
HMV-FA2	344-04202-XX	○ (-21 : 120V, -22 : 230V)	○	○	○		○

Automatic Reading System HMV-AD

Significant Reduction in Operator Workload

* Scan function captures the indentation image, even if it is not centrally positioned.
* Pattern matching accurately determines the peak of the indentation.
* Images can be copied to the Clipboard for processing by other Windows applications.

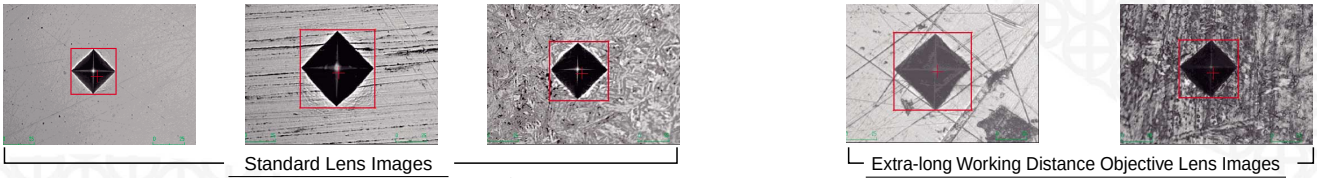
Reading Specifications

Automatic reading method	Digital image analysis (Vickers, Knoop hardness)
Automatic reading time	Approx. 0.3 sec
Manual reading method	Manual reading of line length on CRT (Vickers hardness, Knoop hardness)
Reading resolution	Manual reading: 0.16µm (x40 objective lens) Automatic reading: 0.08µm (x40 objective lens)
Effective measuring range	Approx. 80µm (V) x 100µm (H) (x40 objective lens)
Test result storage format	Test conditions and results: CSV Images: Can be copied to Clipboard

Other Functions

Electric turret	Hardness tester function that automatically switches the objective lens and indenter
Digital Micrometer communication	RS-232C communication allows positional information from the digital micrometer (DM) mounted on the stage to be read by a PC. (The digital micrometer is available as an optional accessory for the hardness tester.)
Electric X-Y stage	Stroke: 25 mm for X and Y axes Resolution 0.001 mm Automatically applies forces and reads the indentations at multiple positions according to a preset test-position pattern.

An extra-long working distance objective lens may permit automatic reading of sample surfaces with a comparatively indistinct pattern due to deep scratching or etching, which cannot be automatically read using the standard hardness tester lens. Use the Objective Lens X40, Extra-long Working Distance Type (Part No. 344-89300-01) for automatic reading across a wider range of samples. The examples below were all automatically read using the extra-long working distance objective lens. The standard lens could read only the first three examples, marked "Standard Lens Images."



Standard Lens Images

Extra-long Working Distance Objective Lens Images

Automatic Reading System

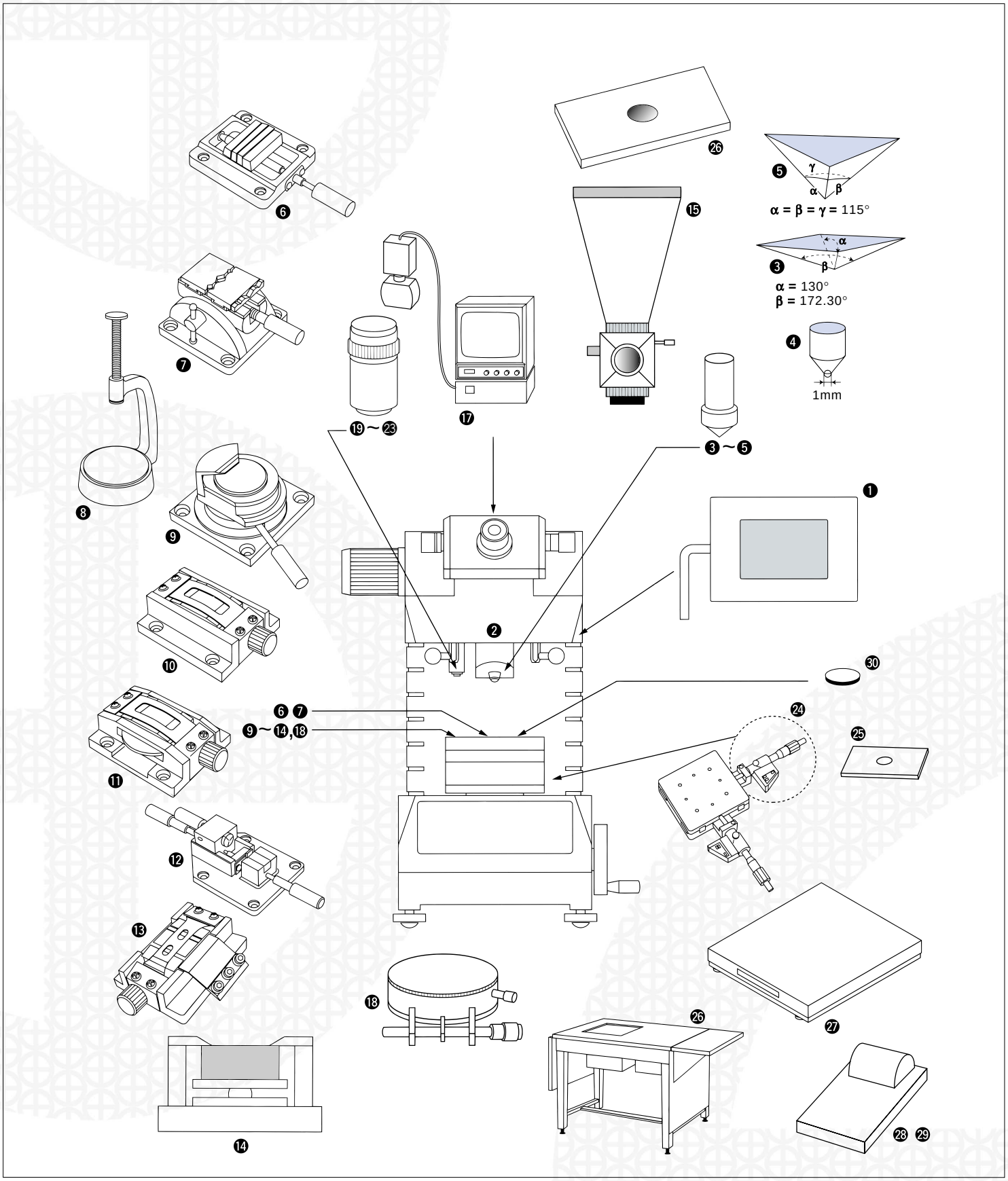
Windows, Excel is a trademark of Microsoft Corporation

Electric Turret Models HMV-2T

With HMV testers that have an automatic turret mechanism, all you need to do is check the test sample surface then press the test start key and the tester automatically performs a series of test operations (switching to the Indenter, applying the force, holding the force, removing the force, and lens switching). Automatic operation eliminates operation errors and provides outstanding safety.

Observe Test Sample Surface → **Start Test** → **The Following Series of Test Operations Is Performed Automatically:**
Indenter Switching
Force Application
Force Duration
Unloading
Lens Switching

System Configuration



Accessories List

Optional Accessories

P/N	Description		Remarks
347-20413-01	External LCD	❶	
347-20389-01	Electric Turret	❷	
347-20418	Knoop Indenter	❸	Longitudinal edge angle 172.30°, 130°
347-20419-11	Brinell Indenter	❹	Steel Ball Indenter 1mm Diameter, for HBW 1/1 Measurement.
347-20420	Triangle Pyramid Indenter	❺	Tip Angle: 115°
341-64251	Standard Vise	❻	36mm Opening, 42mm Width
344-17140	Universal Vise	❼	22mm Max. Opening Width,"❽ Leveling Stage" is necessary.
344-13218	Leveling Stage for Universal Vise	❽	For Leveling the sample on the Universal Vise
344-16039	Thin Specimen Attachment, Type 1	❾	For Specimen : 0.4 to 3mm thickness
344-17040	Thin Specimen Attachment, Type 2	❿	For Specimen : 0.02 to 0.5mm thickness
344-17737	Thin Specimen Attachment, Type 3	⓫	For Specimen : 0.02 to 8mm thickness
344-16038	Slender Specimen Attachment, Type 1	⓬	For Specimen : 0.4 to 3mm diameter
344-82943	Slender Specimen Attachment, Type 2	⓭	For Specimen : 0.15 to 1.6mm diameter
347-21990	Specimen inclining Attachment	⓮	It is able to adjust level it on the surface of sample
347-23172-01	Polaroid Camera Unit	⓯	Polaroid Camera, Photography Unit, and Camera Adaptor
344-81198-03	Length Measuring TV System	⓱	CCD Camera, TV Monitor, and Length Measuring Adaptor
344-82857	Rotary Stage	⓲	125mm diameter, Movement Range : +/-5°
344-89941	Objective Lens X10	⓳	
344-89924	Objective Lens X20	⓴	
344-89300-01	Objective Lens X40, Extra-long Working distance type	㉑	Used to Enhance Contrast
344-89964	Objective Lens X50	㉒	
344-89977	Objective Lens X100	㉓	
081-02772-01	Digital Micrometer Head for Sample Stage	㉔	Digital Display of position, 1µmMinimum Reading 1 pc. is either for X-axis or for Y-axis.
046-60201-02	Objective Micrometer(OB-MM)	㉕	Used to Adjust Microscope Magnification Ratio
344-04193-01	Shock Absorbing Bench	㉖	
344-81401	Bench-Top Shock Absorber	㉗	
347-20928-XX	Line printer	㉘	Print of result and graph -02 : 120V -03 : 230V
347-21007-XX	Dot printer	㉙	Print of result -02 : 120V -03 : 230V
340-06619-07	Standard Hardness Block HMV 700	㉚	
088-50906-11	RS-232C cable		
344-04184-11	AD system		This system measure diagonal pf indentation auto matically
344-86201-02	Disk vacuous adsorpton device		5, 6, 8 inches (Adsorption air resource necessary)
347-21500	Correspondence HV 0.005 system		

Standard Accessories (include in Main Unit)

P/N	Description	Q'ty
347-05052	Instruction Manual	1 pc.
341-64236	X-Y Stage	1 pc.
347-20344	Vickers Indenter	1 pc.
081-02702-01	Micro Meter Head	2 pcs.
341-64026	Eyepiece x10	1 pc.
347-20212	Objective Lens x40	1 pc.
	Power Cord	1 pc. 071-60815-04 : 120V 347-20836 : 230V
347-20424	Fuse set	2set (4 pcs.)
339-83806	Halogen Lamp	2 pcs.
	Tools	1 set.
339-86365-01	Vinyl Cover	1 pc.

Full automatic Micro vickers Hardness tester

Full automatic micro Vickers hardness tester
(Specimen attachment is option.)
The personal computer is not included in the standard setup.

The procedure of Vickers hardness measurement is
1. Focus on the sample surface sing microscope.
2. Set test position using XY stage.
3. Set examination conditions.
4. Test.
5. Reading.

It is the full automatic hardness that added the automatic reading function, the electric XYZ stage function, and the auto focus function to the hardness main body.

Specification

1. Electric XY stage	(1) Stroke: 50mm (2) Resolution: 0.001mm (3) Drive system: Ball screw sending by the stepping motor. (4) Control system: Open loop control. 2-axis simultaneous operation is possible.
2. Auto reading	(1) Auto reading method: Digital image analysis. (2) Effective measuring range: 80µm~100µm (x40 objective lens) (3) Reading resolution: 0.08µm (x40 objective lens)
3. Auto focus	(1) Focus time: Approx. 3 sec
4. Image display on Personal Computer	(1) Magnification: Maximum 2400 times (on a 17 inch monitor)
5. Test Position Pattern	(1) Test position: Maximum 5000 points (2) Test edit pattern: Line (divided number), Line (pitch), Area matrix, Rectangle (divided number), Rectangle (pitch), Square, Circle (divided number), Circle (pitch), Free, Zigzag

JQA-0376

Founded in 1875, Shimadzu Corporation, a leader in the development of advanced technologies, has a distinguished history of innovation built on the foundation of contributing to society through science and technology. We maintain a global network of sales, service, technical support and applications centers on six continents, and have established long-term relationships with a host of highly trained distributors located in over 100 countries. For information about Shimadzu, and to contact your local office, please visit our Web site at **www.shimadzu.com**

SHIMADZU

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