



## Microhardness testers DUH Series

The dynamic microhardness testers DUH-211/211S series are developed by SHIMADZU for use in all industries. These microhardness testers are designed to determine the surface hardness of materials and finished products. The equipment fully meets the high requirements for work in laboratories and production.

### High quality results at low cost

- Determination of hardness and material parameters in accordance with accepted standards (ISO 14577-1 Annex A. "Metallic materials - Instrumental indentation for (Determination of hardness and material parameters - Part 1: Test method. Annex A: Determination of material parameters from load/surface indentation data).
- Highly accurate determination of the modulus of elasticity.
- Control of the force applied during the process tests with a resolution of 0.196  $\mu\text{N}$ .
- Wide range of loads from 0.1 to 1961 mN.
- Highly accurate measurement of trace depth.
- Wide range of testing methods.
- Possibility of choosing identifiers, including for conducting Vickers and Knoop tests (optional).
- Conducting cyclic tests.

### Application areas

- Thin films (specially treated surfaces, such as a nitride layer).
- Plastics.
- Fibers (ultra-fine, such as optical fibers and carbon fibers).
- Rubbers, caoutchoucs and other elastomers.
- Hardware.
- Fragile materials (glass, ceramics, etc.).
- Microscopic electronic components.



## Specification. [Models DUH-211/211S].

1. Model name		DUH-211	DUH-211S
2. Loading block	Loading method	Electromagnetic coil	
	Load range	Full scale from 0.1 to 1961 mN	
	Load accuracy	±19.6 µN or ±1% of displayed test force (whichever is greater)	
	Step increase in load	0.196 µN	
3. Measurement movements	Method of measurement	Differential transformer	
	Measurement range	From 0 to 10 microns	
	Move step	0.0001 µm	
	Linearity	±2% of full scale (20 µm)	
4. Indenter (tip)	Type	Triangular pyramid with apex angle of 115° (Vickers and Knoop testers available as an option)	
	Indenter tip radius	0.1 µm max.	
5. Optical monitor	Total magnification (microscope)	-500	
	Objective lens	-50 (up to 2 lenses can be added)	
	Eyepiece	-10	
	Backlight method	Indirect lighting	
	Light source	LED: 3W, 3V	
	Path of light	Observation or photography (optional)	
6. Micrometer	Collimation method	Direct connection between the encoder and the control lever; synchronized movement of the two indicators.	
	Detector	Optical encoding device	
	Effective measurement range	200 µm (with -50 objective lens)	
	Step	0.01 µm/pulse	
7. Specimen stage	Vertical distance	Approx. 60mm	
	Square	Approx. 125(W) - 125(D), mm	
	Table travel range	25mm in both X and Y directions	
	Sample holder	Sample dimensions (8 (thickness) - 30 (width) mm), when using a thin type attachment	
8. Test modes		Load-hold; load-unload; cyclic testing.	Load-hold; load-unload; cyclic test; depth-set test; depth-set load-unload; step load; step load-unload.
9. PC requirements	Operating system	Windows 7(32bit edition)/XP(32bit edition)	
	CPU	not less than 1 GHz	
	Drive	CD-ROM	
	Display resolution	1024 - 768 min. (recommended)	
	Expansion bus	PCI bus, 2 edge connectors min. (175 mm and 120 mm cards can be used)	
10. Terms of use	Power requirements	220±10 V, 50/60 Hz, single phase	
	Power consumption	Approx. 100W (excluding PC power consumption)	
	Grounding	Grounding class D (not more than 100 Ohm)	
	Temperature	Recommended: 23±1°C; acceptable range: from 10°C to 35°C.	
	Vibration	Horizontal: 0.017 gal max (@ -10 Hz); 0.01 µm max (< 10 Hz) Vertical: 0.010 gal max (@ -10 Hz); 0.005 µm max (< 10 Hz)	
11. Dimensions (WxLxH, mm)		80% max (non-condensing)	
		Tester: approx. 355(W) - 405(D) - 530(H), mm Control unit: approx. 315 (W) - 375 (D) - 110 (H), mm	
12. Weight (kg)		Tester: approx. 60 kg; Control unit: approx. 5 kg	



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