

Rockwell Hardness Testing Machines HR-200/300/400/500 Series

Bulletin No. 2025



Mitutoyo

Four economical Rockwell Hardness Testing Machines to



HR-210MR Order No. 963-220-10A

Rockwell Hardness Testing Machine

Motorized application of the total (Major) test force improves accuracy and repeatability and eliminates the problems of an oil dashpot controlled system.



HR-320MS Order No. 963-231-10A

Twin type (Rockwell/Rockwell Superficial) Hardness Testing Machine

Manually handles test force and preliminary test force selection. Motor drive controls loading sequence.

Features

- ◆ The newly designed frame provides maximum clearance for positioning the workpiece. A flat table is all that is needed for mounting these testing machines.
- ◆ Simple to operate
- ◆ The Dial Model HR-210 features an automatic preset function on the indicator to set the initial (Minor) test force to zero.



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to suit practically every application...



HR-430MR Order No. 963-240-10A
Rockwell Hardness Testing Machine

- ◆ Economy type tester loaded with the features of a more expensive tester such as an Automatic Brake and Start system that stops the application of the initial (Minor) test force and starts the total (Major) test force cycle.
- ◆ Adjustable Dwell time.
- ◆ Dial Selection of total test force. MS model also feature easy dial change between Rockwell and Superficial Scales.



HR-430MS Order No. 963-241-10A
Twin type (Rockwell/Rockwell Superficial combined use) Hardness Test equipment

- ◆ The digital type (HR-430MR and HR-430MS), with the adoption of the automatic elevating screw brake & the automatic load sequence, with only simple handling test possibility.



- ◆ The digital type (HR-320MS, HR-430MR and HR-430MS) has a digimatic output and our Digimatic Mini-Processor (DP-1VR) to print and input tools (USB-ITN-E) to connect to a PC and use for data transfer.



- ◆ Light Force Brinell hardness tests can be performed by using the available optional accessories: a Brinell indenter, a weight set and a measurement microscope.

Specifications

Inch (mm)

Order Number	963-220-10A	963-231-10A	963-240-10A	963-241-10A
Model	HR-210MR	HR-320MS	HR-430MR	HR-430MS
Test Scales	Rockwell	Rockwell and Rockwell Superficial	Rockwell	Rockwell and Rockwell Superficial
Standard	JIS B 7726 ISO 6508-2 ASTM E18-10			
Preliminary Test Force	98.07N (10kgf)	98.07N (10kgf), 29.42 (3kgf)	98.07N (10kgf), 29.42 (3kgf)	98.07N (10kgf), 29.42 (3kgf)
Test Force Rockwell	588.4N (60kgf), 980.7N (100kgf), 1471N (150kgf)			
Test Force Superficial	—	147.1N (15kgf), 294.2N (30kgf), 441.3N (45kgf)	—	147.1N (15kgf), 294.2N (30kgf), 441.3N (45kgf)
Display	Dial	Matrix Backlight LCD		
Hardness Minimum Value	0.5 HR	0.1 HR		
Scale Conversions	—	HRC, HRB, HV, HBW, HS, Mpa plus offset, OK/NG		
Preliminary Test Force	Manual (with automatic zero set)	Manual (with Loading Navigator)	Manual (with automatic brake-start)	
Total Test Force Control	Automatic (loading, duration, unloading)			
Loading Method	Dead Weight			
Load Duration (Dwell)	Fixed (3s to 5.5s) or Manual		Adjustable (1s to 99s) or Manual	
Maximum Specimen Ht.	7.1" (180mm)			
Maximum Depth	6.5" (165mm)			
Data Output	—	RS-232C, SPC		
Power Supply	120V AC (±10%), 60Hz			
Dimensions (D x W x H)	20.15"(512mm) x 9.25"(235mm) x 30.7"(780mm)	20.6"(523mm) x 9.25"(235mm) x 30.7"(780mm)	20.6"(523mm) x 9.25"(235mm) x 30.7"(780mm)	20.6"(523mm) x 9.25"(235mm) x 30.7"(780mm)
Mass	100.53lb (45.6kg)	102.07lb (46.3kg)	108.69lb (49.3kg)	110.01lb (49.9kg)

STANDARD ACCESSORIES

All Models		MR Models		MS Models	
Item	Description	Item	Description	Item	Description
V Anvil (large)	30mm				
Flat Anvil	64mm	Diamond Indenter	Rockwell	Diamond Indenter	Rockwell and Superficial
1/16" Carbide Ball Indenter		Hardness test Block		Hardness test Block	60 HRC
AC Adapter		Hardness test Block	60 HRC	Hardness test Block	30 HRC
Users Manual		Hardness test Block	30 HRC	Hardness test Block	90 HRBW
Vinyl Cover			90 HRBW	Hardness test Block	65 HR30N
Accessory Box				Hardness test Block	70 HR30TW
Level					

ROCKWELL HARDNESS SCALES

	Scale	Hardness symbol*1	Indenter	Preliminary test force	Total test force	Hardness range applicable
Rockwell hardness	A	HRA	Conical diamond	98.07N (10kgf)	588.4N (60kgf)	20-95HRA
	D	HRD			980.7N (100kgf)	40-77HRD
	C	HRC			1471N (150kgf)	10-70HRC
	F	HRF	Sphere ø1.5875mm (1/16")		588.4N (60kgf)	60-100HRF
	B	HRB			980.7N (100kgf)	20-100HRB
	G	HRG			1471N (150kgf)	30-94HRG
	H	HRH	Sphere ø3.175mm (1/8")		588.4N (60kgf)	80-100HRH
	E	HRE			980.7N (100kgf)	70-100HRE
	K	HRK			1471N (150kgf)	40-100HRK
	L	HRL	Sphere ø6.35mm (1/4")		588.4N (60kgf)	
	M	HRM			980.7N (100kgf)	
	P	HRP			1471N (150kgf)	
	R	HRR	Sphere ø12.7mm (1/2")		588.4N (60kgf)	
	S	HRS			980.7N (100kgf)	
	V	HRV			1471N (150kgf)	

	Scale	Hardness symbol* 1	Indenter	Preliminary test force	Total test force	Hardness range applicable
Rockwell Superficial hardness	15N	HR15N	Conical diamond	29.42N Coverage	147.1N (15kgf)	70-94HR15N
	30N	HR30N			294.2N (30kgf)	42-86HR30N
	45N	HR45N			441.3N (45kgf)	20-77HR45N
	15T	HR15T	Sphere ø1.5875mm (1/16")		147.1N (15kgf)	67-93HR15T
	30T	HR30T*2			294.2N (30kgf)	29-82HR30T
	45T	HR45T			441.3N (45kgf)	10-72HR45T
	15W	HR15W	Sphere ø3.175mm (1/8")		147.1N (15kgf)	
	30W	HR30W			294.2N (30kgf)	
	45W	HR45W			441.3N (45kgf)	
	15X	HR15X	Sphere ø6.35mm (1/4")		147.1N (15kgf)	
	30X	HR30X			294.2N (30kgf)	
	45X	HR45X			441.3N (45kgf)	
	15Y	HR15Y	Sphere ø12.7mm (1/2")		147.1N (15kgf)	
	30Y	HR30Y			294.2N (30kgf)	
	45Y	HR45Y			441.3N (45kgf)	

*1: In the case of scales which specify a spherical indenter, a letter should be appended to the hardness symbol ("S" for steel, "W" for tungsten carbide) when quoting the measurement result to show that it was obtained with an indenter made of the indicated material.

*2: Applied to a specimen of less than 0.6mm thickness a special test, which takes account of the influence of the impression made by the test sphere on such a thin specimen, may be designated as HR30Tm and is defined in JIS Z 2245 appendix A.

Advanced Rockwell Type Hardness Testing Machines

HR-521/523

Advanced Rockwell Hardness Testing Machines

Features

- ◆ Multiple test force generation for Rockwell, Rockwell Superficial and optional Brinell hardness.
- ◆ Projected-nose indenter arm for easy reach of interior (min. $\phi 1.6"$ (40mm)/ $\phi 0.86"$ (22mm)*) and exterior surfaces.
*When using an optional diamond indenter (19BAA292).
- ◆ Closed Loop electronic test force control for accurate loading.
- ◆ Auto-stop elevation table and automatic preliminary test force loading provide consistent test force generation.



Specifications

Inch (mm)

Order Number	810-202-03A	810-205-03A	810-204-03A	810-207-03A
Model	HR-521	HR-521L	HR-523	HR-523L
Test Scales	Rockwell and Rockwell Superficial			
Standard	JIS B 7726 ISO 6508-2 ASTM E18-10			
Preliminary Test Force	98.07N (10kgf), 29.42 (3kgf)			
Test Force Rockwell	588.4N (60kgf), 980.7N (100kgf), 1471N (150kgf)			
Test Force Superficial	147.1N (15kgf), 294.2N (30kgf), 441.3N (45kgf)			
Touch Screen LCD Showing: Hardness value, Converted hardness value, Test conditions, OK/NG tolerance judgement, statistical processing result. Cylindrical/spherical surface compensation, data offset, Hardness conversion (HV, HK, HRA/B/C/D/F/G/15T/30T/45T/15N/30N/45N, HS, HB,HBW, tensile strength), OK±NG tolerance judgement, measured data editing, data memory (max 1024 data), SPC calculation (No. of data, max/min/mean values, range, upper/lower limit values, standard deviation, No. of passing/defective) Histogram, 'x-R chart.				
Hardness Minimum Value	0.1 HR			
Scale Conversions	Advanced with corrections			
Preliminary Test Force	Manual (with automatic brake-start)		Fully Motorized Power Elevating Screw	
Total Test Force Load Control	Automatic (loading, duration, unloading)			
Loading Method	Closed Loop Electronic Force			
Load Duration (Dwell)	Adjustable (0s to 120s) or manual			
Maximum Specimen Height	8.1" (205mm)	15.5" (395mm)	8.1" (205mm)	15.5" (395mm)
Maximum Depth	5.9" (150mm)			
Data Output	RS-232C, SPC and Centronics			
Power Supply	120V AC (±10%), 60Hz			
Dimensions (D x W x H)	26.4" (670mm) x 9.8" (250mm) x 23.8" (605mm)	26.4" (670mm) x 9.8" (250mm) x 29.5" (750mm)	26.4" (670mm) x 9.8" (250mm) x 23.8" (605mm)	26.4" (670mm) x 9.8" (250mm) x 29.5" (750mm)
Mass	132.28lb (60ka)	154.32lb (70ka)	132.28lb (60ka)	154.32lb (70ka)

Optional Accessories for Rockwell/Rockwell Superficial



Calibration Set

Order No.	Order No.
64BAA241	64BAA242
C Scale Set	B Scale Set
Test Blocks	Test Blocks
64BAA125	64BAA126
64BAA124	64BAA132
64BAA158	64BAA135
Indenter	Indenter
64BAA072	64BAA078
Order No.	Order No.
64BAA243	64BAA244
30N Scale Set	30T Scale Set
Test Blocks	Test Blocks
64BAA128	64BAA129
64BAA165	64BAA140
64BAA167	64BAA130
Indenter	Indenter
64BAA073	64BAA078

810-038-7 Round table ø9.85" (250mm)

For large specimens



810-037-7 Round table ø7.09" (180mm)

For large specimens



810-040-7 V anvil (large) ø1.6" (40mm), groove width 1.18" (30mm) For large specimens



810-043 Spot anvil ø.47" (12mm) For sheet specimens



810-041-7 V anvil (small) ø1.6" (40mm), groove width 6mm For cylindrical specimens

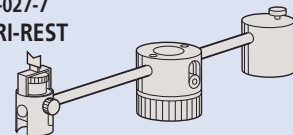


810-044-7 Spot anvil ø.22" (5.5mm) For sheet specimens



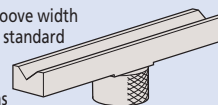
810-027-7 VARI-REST

For testing long specimens using anvil



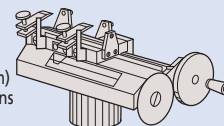
810-029 Special V anvil

Length 16" (400mm), groove width 2" (50mm) Supports the standard hardenability test for steel
For cylindrical specimens



810-026 Fine adjustment table for Jominy test

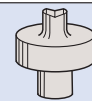
Fine adjustment table for Jominy test
Length 16" (400mm)
groove width 2" (50mm)
For cylindrical specimens



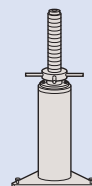
810-030-7 Diamond spot anvil .39" (10mm) For sheet specimens



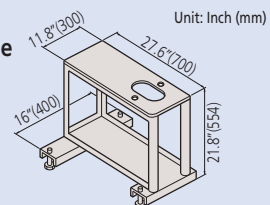
810-042-7 Small V anvil ø.39" (10mm) For cylindrical specimens



810-028-7 Jack rest For testing long specimens using table or anvil



810-048 Console table



264-504-5A Digimatic mini-processor DP-1VR * No connection cable supplied. (Should be ordered separately) Connection cable (1m) 937387



06ADV380E USB Direct Input Tool The USB plug is connected to a computer

Type Hardness Testing Machines

Test Blocks*

Order No.	Hardness
64BAA159	HRA81/86 Rockwell Test Block
64BAA160	HRA75/79 Rockwell Test Block
64BAA161	HRA70/73 Rockwell Test Block
64BAA162	HRA65/68 Rockwell Test Block
64BAA163	HRA60/62 Rockwell Test Block
64BAA249	HRBW95/100 Rockwell Test Block
64BAA126	HRBW90/95 Rockwell Test Block
64BAA131	HRBW80/85 Rockwell Test Block
64BAA132	HRBW70/75 Rockwell Test Block
64BAA133	HRBW60/65 Rockwell Test Block
64BAA134	HRBW50/55 Rockwell Test Block
64BAA135	HRBW40/45 Rockwell Test Block
64BAA127	HRBW30/35 Rockwell Test Block
64BAA136	HRBW20/25 Rockwell Test Block
64BAA137	HRBW10/15 Rockwell Test Block
64BAA138	HRBW0/5 Rockwell Test Block
64BAA125	HRC60/65 Rockwell Test Block
64BAA157	HRC50/55 Rockwell Test Block
64BAA124	HRC40/45 Rockwell Test Block
64BAA123	HRC30/35 Rockwell Test Block
64BAA158	HRC20/25 Rockwell Test Block

Order No.	Hardness
64BAA129	HR30T74/79 Rockwell Test Block
64BAA139	HR30T70/73 Rockwell Test Block
64BAA140	HR30T63/67 Rockwell Test Block
64BAA141	HR30T56/60 Rockwell Test Block
64BAA142	HR30T49/53 Rockwell Test Block
64BAA130	HR30T43/47 Rockwell Test Block
64BAA143	HR30T36/39 Rockwell Test Block
64BAA144	HR30T29/33 Rockwell Test Block
64BAA145	HR30T22/26 Rockwell Test Block
64BAA146	HR30T15/18 Rockwell Test Block
64BAA147	HR15T90/92 Rockwell Test Block
64BAA148	HR15T86/69 Rockwell Test Block
64BAA149	HR15T83/85 Rockwell Test Block
64BAA150	HR15T80/82 Rockwell Test Block
64BAA151	HR15T77/79 Rockwell Test Block
64BAA152	HR15T72/74 Rockwell Test Block
64BAA153	HR15T70/72 Rockwell Test Block
64BAA154	HR15T68/69 Rockwell Test Block
64BAA155	HR15T64/66 Rockwell Test Block
64BAA156	HR15T61/63 Rockwell Test Block

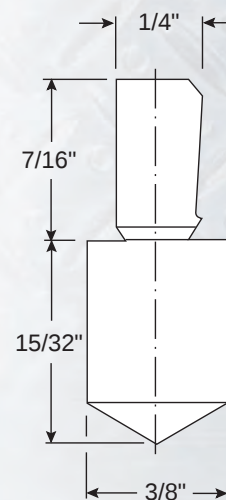
Order No.	Hardness
64BAA222	HR45N65/70 Rockwell Test Block
64BAA223	HR45N55/60 Rockwell Test Block
64BAA224	HR45N45/50 Rockwell Test Block
64BAA225	HR45N35/40 Rockwell Test Block
64BAA226	HR45N25/30 Rockwell Test Block
64BAA128	HR30N77/82 Rockwell Test Block
64BAA164	HR30N68/73 Rockwell Test Block
64BAA165	HR30N59/64 Rockwell Test Block
64BAA166	HR30N50/55 Rockwell Test Block
64BAA167	HR30N40/45 Rockwell Test Block
64BAA168	HR15N90/93 Rockwell Test Block
64BAA169	HR15N85/88 Rockwell Test Block
64BAA170	HR15N80/83 Rockwell Test Block
64BAA171	HR15N75/77 Rockwell Test Block
64BAA172	HR15N69/72 Rockwell Test Block

Order No.	Description
64BAA118	HRE 50/55 Rockwell Test Block
64BAA119	HRE 60/65 Rockwell Test Block
64BAA120	HRE 70/75 Rockwell Test Block
64BAA121	HRE 80/85 Rockwell Test Block
64BAA122	HRE 90/95 Rockwell Test Block

Carbide Ball Indenters

Order No.	Description
19BAA515	1/16" Carbide ball indenter
19BAA504	1/8" Carbide ball indenter
19BAA505	1/4" Carbide ball indenter
19BAA506	1/2" Carbide ball indenter
19BAA507	1/16" Carbide ball (1pc.)
19BAA508	1/8" Carbide ball (1pc.)
19BAA509	1/4" Carbide ball (1pc.)
19BAA510	1/2" Carbide ball (1pc.)

Rockwell Type Diamond Indenters



Order No.	Scale
64BAA072	C
64BAA073	N
64BAA086	A
64BAA071	C & N

* Please inquire for other hardness ranges

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