

# Mitutoyo

Mitutoyo Quality

## ROCKWELL HARDNESS TESTING MACHINES

### HR-300/400/500 SERIES

TEST EQUIPMENT  
AND SEISMOMETERS



# Rockwell Hardness Testing Machines to suit practically every application...



Twin type (Rockwell/  
Rockwell Superficial)  
Hardness Testing Machine

**HR-320MS  
(810-192-21A)**

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



Rockwell Hardness  
Testing Machine

**HR-430MR  
(810-193-21A)**



Twin type (Rockwell/  
Rockwell Superficial  
combined use) Hardness  
Test equipment

**HR-430MS  
(810-194-31A)**

- 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. (HR-430 Models)
- Dial Selection of total test force. (HR-430 Models)
- Adjustable Dwell time.
- MS model also feature easy dial change between Rockwell and Superficial Scales.
- The frame provides maximum clearance for positioning the workpiece. A flat table is all that is needed for mounting these testing machines.
- Simple to operate, electronic scale conversion.
- Adjustable timing function.
- Includes standard accessories.

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	810-192-21A	810-193-21A	810-194-31A
Model	HR-320MS	HR-430MR	HR-430MS
Test Scales	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), 29.42 (3kgf)	98.07N (10kgf)	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	Matrix Backlight LCD		
Hardness Minimum Value	0.1 HR		
Scale Conversions	HRC, HRB, HV, HBW, HS, Mpa plus offset, OK/NG		
Preliminary Test Force	Manual (with Loading Navigator)	Manual (with automatic brake-start)	
Total Test Force Control	Automatic (loading, duration, unloading)		
Loading Method	Dead Weight		
Load Duration (Dwell)	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)	20.6"(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	102.07lb (46.3kg)	108.69lb (49.3kg)	110.01lb (49.9kg)

## STANDARD ACCESSORIES

All Models	
Item	Description
V Anvil (large)	30mm
Flat Anvil	64mm
1/16" Carbide Ball Indenter	
AC Adapter	
Users Manual	
Vinyl Cover	
Accessory Box	
Level	

MR Models	
Item	Description
Diamond Indenter	Rockwell
Hardness test Block	60 HRC
Hardness test Block	30 HRC
Hardness test Block	90 HRBW

MS Models	
Item	Description
Diamond Indenter	Rockwell and Superficial
Hardness test Block	60 HRC
Hardness test Block	30 HRC
Hardness test Block	90 HRBW
Hardness test Block	65 HR30N
Hardness test Block	70 HR30TW

## 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	Sphere ø3.175mm (1/8")		1471N (150kgf)	30-94HRG
	H	HRH			588.4N (60kgf)	80-100HRH
	E	HRE	Sphere ø6.35mm (1/4")		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	Sphere ø12.7mm (1/2")		1471N (150kgf)	
	R	HRR			588.4N (60kgf)	
	S	HRS	Sphere ø12.7mm (1/2")		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 (3kgf) 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	Sphere ø3.175mm (1/8")		441.3N (45kgf)	10-72HR45T
	15W	HR15W			147.1N (15kgf)	
	30W	HR30W	Sphere ø3.175mm (1/8")		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	Sphere ø12.7mm (1/2")		441.3N (45kgf)	
	15Y	HR15Y			147.1N (15kgf)	
	30Y	HR30Y	Sphere ø12.7mm (1/2")		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.



# Rockwell Hardness Testing Machine HR-530 Series



Unique electronic control makes the HR-530 series of hardness testers capable of Rockwell, Rockwell Superficial, Rockwell testing of plastics (A & B) and Light Force Brinell hardness testing.



**HR-530**  
**(810-233-33A)**

Maximum specimen size:  
Height 250 mm, Depth 150 mm



**HR-530L**  
**(810-333-33A)**

Maximum specimen size:  
Height 395 mm, Depth 150 mm

## Graphic display of statistical calculation results and $\bar{X}$ -R control charts

This series allows numeric display of statistical analysis results such as maximum and minimum values, mean value and graphic display of  $\bar{X}$ -R control charts and histograms required for hardness evaluation.



- Electronic Test Force Control
- Automatic Brake-Start
- Scale Conversions
- Statistics-Output
- 4 Display Choices
- Cylindrical and Spherical\* Surface Correction

\* To ISO 6508

# Specifications

## Specifications

Order No.	810-233-33A		810-333-33A		
Model	HR-530		HR-530L		
Hardness testing methods	Rockwell/Rockwell Superficial/Brinell/Plastics hardness				
Initial test force (N)	29.42N (3kgf), 98.07N (10kgf)				
Test force (N)	Rockwell Superficial	147.1N (15kgf), 294.2N (30kgf), 441.3N (45kgf)			
	Rockwell	588.4N (60kgf), 980.7N (100kgf), 1471N (150kgf)			
	Light Force Brinell	61.29 (6.25kgf), 98.07 (10kgf), 153.2 (15.625kgf), 245.2 (25kgf), 294.2 (30kgf), 306.5 (31.25kgf), 612.9 (62.5kgf), 980.7 (100kgf), 1226 (125kgf), 1839 (187.5kgf)			
Test force control	Automatic (load/hold/unload)				
Table up/down mechanism	Manual (automatic braking and load sequencing)				
Control unit	Color touch-panel				
Test force switching	Operated with the display unit				
Test force hold time	1 to 120s (Selectable in units of 1s)				
Maximum specimen size	Height: 9.8" (250 mm) Depth: 5.9" (150 mm)		Height: 15.5" (395 mm) Depth: 5.9" (150 mm)		
Permissible inside diameter of a tube specimen	Minimum hole diameter: 1.38" (35 mm) (when using the special indenter: .87" (22 mm))				
Maximum table loading	45 lb (20 kg)				
Ball indenter	Tungsten carbide ball indenter				
Unit (display unit)	inch / mm				
Display	Hardness value, test condition, go/no-go judgment result, statistical calculation result, X-R control chart, hardness conversion value				
	Conversion function [HV, HK, HR (Rockwell hardness A, B, C, D, F, G / Rockwell Superficial 15T, 30T, 45T, 15N, 30N, 45N), HS, HB, tensile strength]				
	Go/no-go judgment function				
	Continuous test function (for specimens with the same thickness)				
	Cylindrical correction, spherical correction, offset correction, multi-point correction functions				
	Statistical calculation function (maximum value, minimum value, mean value, standard deviation, upper limit value, lower limit value, go count, range, no-go count)				
	Graph generation function (X-R control chart)				
Language support	Japanese, English, German, French, Italian, Spanish, Korean, Chinese (simplified characters/traditional characters), Turkish, Portuguese, Hungarian, Polish, Dutch and Czech				
External data output	RS-232C, digimatic, USB2.0				
Power supply	AC 120V				
External dimensions	Main unit	9.84" x 26.38" x 23.82" (250(W)x667(D)x621(H) mm)		11.8" x 26.2" x 30.1" (300(W)x667(D)x766(H) mm)	
	Touch-panel display	191(W)x147(D)x71(H) mm			
Mass	Approx. 60 kg		Approx. 69 kg		

Note: Plastic testing may not be enabled, depending on the material.

## Standard accessories

Item	Description	Item	Description	Item	Description
Diamond indenter	For Rockwell and Rockwell superficial testing	Display mounting bracket		Hardness test block	30-35HRC
Ball indenter	1/16" Tungsten carbide ball (ø1.5875)	Power cord	For AC115V	Hardness test block	60-65HRC
Flat anvil	ø64 mm	Accessory Box		Hardness test block	90-95HRB
V-anvil	ø40 mm, Groove width 30 mm	Manual		Hardness test block	64-69HR30N
				Hardness test block	70-79HR30T

## Optional accessories

The relationship between test force, optional indenter size (metric, tungsten carbide) and scale range in Brinell hardness testing is shown in the table below.

Test force (N)	Brinell hardness testing									
	61.29	98.07	153.2	245.2	294.2	306.5	612.9	980.7	1226	1839
<b>64HAA114</b> ø1 Indenter		HBW1/10			HBW1/30					
<b>64HAA115</b> ø2.5 Indenter	HBW2.5/6.25		HBW2.5/15.625			HBW2.5/31.25	HBW2.5/62.5			HBW2.5/187.5
<b>64HAA116</b> ø5 Indenter				HBW5/25			HBW5/62.5		HBW5/125	
<b>64HHA117</b> ø10 Indenter								HBW10/100		

# Optional Accessories



## Calibration Set

Order No.	Order No.	Order No.	Order No.
64HAA462	64HAA463	64HAA464	64HAA465
HRC Scale	HRBW Scale	HR30N Scale	HR30TW Scale
Test Blocks	Test Blocks	Test Blocks	Test Blocks
64HAA181	64HAA172	64HAA270	64HAA303
64HAA177	64HAA170	64HAA266	64HAA301
64HAA173	64HAA168	64HAA262	64HAA299
Universal Style Indenter with Flat			
64HAA100	64HAA119	64HAA101	64HAA119

Please see Catalog US-1005 for a complete list of test blocks.

## Carbide Ball Indenters

Description	Mitutoyo Round Style Order No.	Universal w/ Flat Style Order No.	Tapered w/Flat Style Order No.
1/16" Carbide ball indenter	64HAA120	64HAA119	64HAA129
1/8" Carbide ball indenter		64HAA122	
1/4" Carbide ball indenter		64HAA124	
1/2" Carbide ball indenter		64HAA126	
1/16" Carbide ball (10pc.)		64HAA131	
1/8" Carbide ball (1pc.)		64HAA133	
1/4" Carbide ball (1pc.)		64HAA135	
1/2" Carbide ball (1pc.)		64HAA137	

Steel Indenters/Balls Available Upon Request

## Digimatic mini-processor DP-1VA LOGGER 264-505A

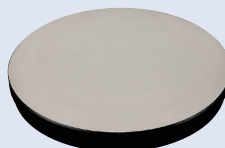
Connection cable not supplied. (To be ordered separately.)  
Connection cable (1m) 12AAJ112



## Data processing software 11AAC237

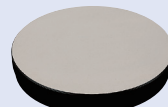
## Foot switch 11AAD537

## Round table 810-038 Outside ø250 mm



For large specimens such as molded items

## Round table 810-037 Outside ø180 mm



For large specimens such as molded items

## V-anvil (large) 810-040

(Outside ø40 mm, Groove width 30 mm)



For round specimens (max. ø60 mm)

## V-anvil (small) 810-041

(Outside ø40 mm, Groove width 6 mm)



For shaft materials (max. ø8.4 mm)

## Spot anvil 810-043

(Outside ø12 mm)



## Spot anvil 810-044

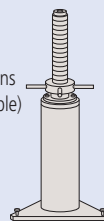
(Outside ø5.5 mm)

For sheet specimens



## Jack rest 810-028

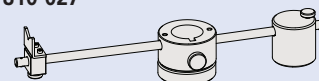
For supporting long specimens (Used with anvil or round table)



## Vibration isolator 810-643

Only for mounting hardness testing machines

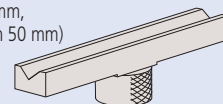
## VARI-REST 810-027



For testing long specimens (commonly used for the anvil)

## Special V-anvil 810-029

(Length 400 mm, Groove width 50 mm)



For round specimens ø14-98 mm

## Fine-adjustment table for Jominy testing 810-700/701



JIS G 0561  
For steel hardenability testing

## Diamond-spot anvil 810-030

(Outside ø10 mm)

For sheet specimens



\*Dedicated to the Rockwell Superficial hardness test

## Small V-anvil 810-042

(Outside ø10 mm)

For round specimens (max. ø16 mm)



## Testing machine table 11AAD186

Supplied with stability bracket





# Test Blocks and Diamond Indenters

## Test Blocks\*

Rockwell Test Blocks\*

Order No.	Hardness
64HAA145	HRA22 Rockwell Test Block
64HAA147	HRA30 Rockwell Test Block
64HAA149	HRA39 Rockwell Test Block
64HAA151	HRA49 Rockwell Test Block
64HAA153	HRA63 Rockwell Test Block
64HAA155	HRA68 Rockwell Test Block
64HAA157	HRA73 Rockwell Test Block
64HAA159	HRA78 Rockwell Test Block
64HAA161	HRA83 Rockwell Test Block
64HAA163	HRBW0 Rockwell Test Block
64HAA164	HRBW10 Rockwell Test Block
64HAA165	HRBW20 Rockwell Test Block
64HAA166	HRBW30 Rockwell Test Block
64HAA167	HRBW40 Rockwell Test Block
64HAA168	HRBW50 Rockwell Test Block
64HAA169	HRBW60 Rockwell Test Block
64HAA170	HRBW70 Rockwell Test Block
64HAA171	HRBW80 Rockwell Test Block
64HAA172	HRBW95 Rockwell Test Block
64BAA124	HRC40/45 Rockwell Test Block
64BAA123	HRC30/35 Rockwell Test Block
64BAA158	HRC20/25 Rockwell Test Block

Order No.	Hardness
64HAA173	HRC25 Rockwell Test Block
64HAA174	HRC30 Rockwell Test Block
64HAA175	HRC35 Rockwell Test Block
64HAA176	HRC40 Rockwell Test Block
64HAA177	HRC45 Rockwell Test Block
64HAA178	HRC50 Rockwell Test Block
64HAA179	HRC55 Rockwell Test Block
64HAA180	HRC60 Rockwell Test Block
64HAA181	HRC63 Rockwell Test Block
64HAA182	HRC65 Rockwell Test Block
64HAA183	HRC67 Rockwell Test Block
64HAA193	HREW57 Rockwell Test Block
64HAA194	HRE62 Rockwell Test Block
64HAA195	HRE68 Rockwell Test Block
64HAA196	HRE75 Rockwell Test Block
64HAA197	HRE81 Rockwell Test Block
64HAA198	HRE87 Rockwell Test Block
64HAA199	HRE93 Rockwell Test Block
64HAA200	HRE99 Rockwell Test Block
64BAA156	HR15T61/63 Rockwell Test Block

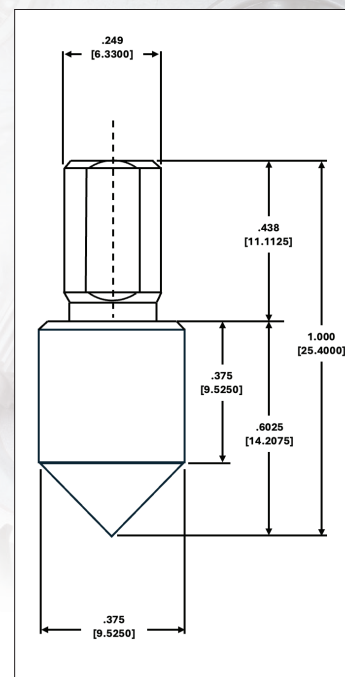
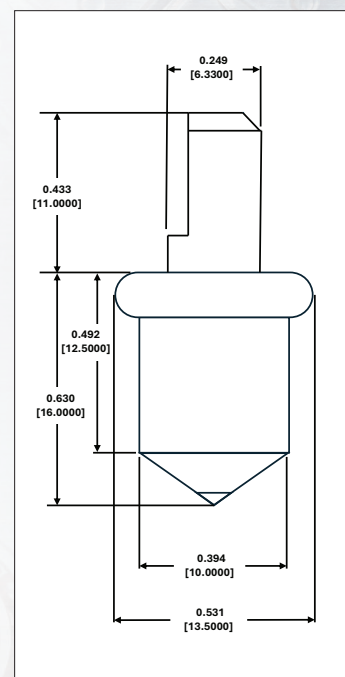
Superficial Test Blocks\*

Order No.	Hardness
64HAA251	HR15N 72 Rockwell Test Block
64HAA253	HR15N 78 Rockwell Test Block
64HAA255	HR15N 83 Rockwell Test Block
64HAA257	HR15N 88 Rockwell Test Block
64HAA259	HR15N 91 Rockwell Test Block
64HAA261	HR15N 94 Rockwell Test Block
64HAA262	HR30N 46 Rockwell Test Block
64HAA264	HR30N 55 Rockwell Test Block
64HAA266	HR30N 64 Rockwell Test Block
64HAA268	HR30N 73 Rockwell Test Block
64HAA270	HR30N 80 Rockwell Test Block
64HAA272	HR30N 86 Rockwell Test Block
64HAA273	HR45N 25 Rockwell Test Block
64HAA276	HR45N 43 Rockwell Test Block
64HAA278	HR45N 55 Rockwell Test Block
64HAA280	HR45N 67 Rockwell Test Block
64HAA282	HR45N 72 Rockwell Test Block

Order No.	Hardness
64HAA284	HR15TW 61 Rockwell Test Block
64HAA286	HR15TW 67 Rockwell Test Block
64HAA288	HR15TW 73 Rockwell Test Block
64HAA290	HR15TW 80 Rockwell Test Block
64HAA292	HR15TW 86 Rockwell Test Block
64HAA294	HR30TW 15 Rockwell Test Block
64HAA296	HR30TW 28 Rockwell Test Block
64HAA298	HR30TW 43 Rockwell Test Block
64HAA300	HR30TW 56 Rockwell Test Block
64HAA302	HR30TW 70 Rockwell Test Block
64HAA304	HR45TW 2 Rockwell Test Block
64HAA306	HR45TW 23 Rockwell Test Block
64HAA308	HR45TW 42.5 Rockwell Test Block
64HAA310	HR45TW 67 Rockwell Test Block
64HAA278	HR45N 55 Rockwell Test Block
64HAA280	HR45N 67 Rockwell Test Block
64HAA282	HR45N 72 Rockwell Test Block

## Rockwell Type Diamond Indenters

Scale	Mitutoyo Round Style Order No.	Universal w/ Flat Style Order No.
C	64HAA105	64HAA100
N	64HAA106	64HAA101
C & N	64HAA107	64HAA104
A		64HAA102
"A" For Carbides		64HAA103



\* Please inquire for other hardness ranges



**Whatever your challenges are,  
Mitutoyo supports you from start to finish.**

Mitutoyo is not only a manufacturer of top quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed up by comprehensive services that ensure your staff can make the very best use of the investment.

Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver bespoke measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.



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