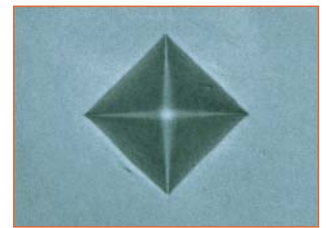




## Hardness Testing Machines



**Quality Products for Metallographic  
Sample Preparation & Analysis**

# Advanced Micro Vickers/Knoop

## Measuring microscope

Designed for measuring indentation dimensions, the microscope utilizes an integrated 10X eyepiece (video camera system #125-810354A can be installed)

## LED illumination

LED illumination unit provides long service life and low power consumption. It also reduces the time lost during the light bulb replacement required with conventional illumination units.

## Automatic turret

The positions of the indenter and objective lens can be automatically switched using the touch screen (can also be manually switched). Up to four (4) objective lenses and two (2) indenters can be installed.

## Interfacing to external instruments

Test results can be printed on a printer or output to a PC using the following:

- USB 2.0 interface (for data communication) for PC
- Digimatic interface for DP-1VR, U-WAVE, and USB-ITN
- Serial interface for DPU-414

## Wide range of test force

Precision electromagnetic controls allow the desired test force to be set between the following:

HM-210: 10 gf to 1000 gf

HM-220: 0.05 gf to 2000 gf

## Long working distance objectives

Six (6) infinity corrected objectives are available. 10X, 20X, 50X, and 100X magnifications are used when measuring indentations; 2X and 5X are used for widefield observation.

## Manual XY stage with digital micrometer heads

During test-site positioning, the positional information is digitally displayed on both the micrometer heads and the touch screen.

- 1" x 1" (25 x 25 mm) standard
- 2" x 2" (50 x 50 mm) optional

## Touch screen controller

The touch screen provides a full suite of basic functions necessary for hardness testing, including pass/fail determination, hardness value conversions, and statistical calculations.



## Video camera system 125-810354A

CCD camera and 8.4" TFT monitor enable observation and measurement of indentations at high magnification, thereby reducing operator error.

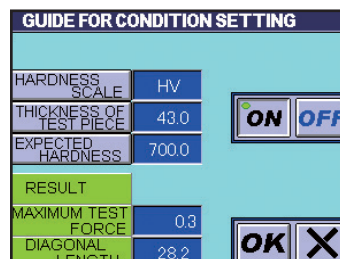


# Specifications

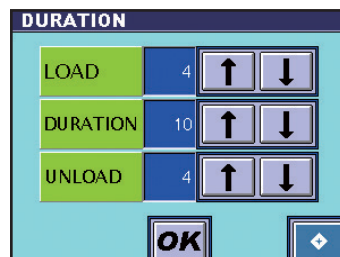
	HM-210		HM-220	
MODEL #	HM-210		HM-220	
Item Number	125-64AAB305	125-64AAB306	125-64AAB307	125-64AAB308
Applicable Standards	ASTM E384, JIS B7725, ISO 6507-2			
Test Forces	10 gf (98.07 mN), 20 gf (196.1 mN), 30 gf (294.2 mN), 50 gf (490.3 mN), 100 gf (980.7 mN), 200 gf (1961 mN), 300 gf (2942 mN), 500 gf (4903 mN), 1000 gf (9807 mN)		0.05 gf (0.4903 mN), 0.1 gf (0.9807 mN), 0.2 gf (1.961 mN), 0.3 gf (2.942 mN), 0.5 gf (4.903 mN), 1 gf (9.807 mN), 2 gf (19.61 mN), 3 gf (29.42 mN), 5 gf (49.03 mN), 10 gf (98.07 mN), 20 gf (196.1 mN), 30 gf (294.2 mN), 50 gf (490.3 mN), 100 gf (980.7 mN), 200 gf (1961 mN), 300 gf (2942 mN), 500 gf (4903 mN), 1000 gf (9807 mN), 2000 gf (19610 mN)	
Indenters Included	Vickers	Vickers, Knoop	Vickers	Vickers, Knoop
Loading Rate	Fixed at 60 µm/s		30 gf or lower: Between 2 and 60 µm/s (Adjustable in 1 µm/s Increments); 31 gf and higher: Fixed at 60 µm/s	
Test Force Loading Time	Between 1 and 99 s (Adjustable in 1 s Increments)			
Test Force Dwell Time	Between 1 and 999 s (Adjustable in 1 s Increments)			
Test Force Unloading Time	Between 1 and 99 s (Adjustable in 1 s Increments)			
Test Force Control	Electromagnetic (Voice Coil)			
Test Force Selection	LCD Touch Panel Display			
Turret Drive	Motorized			
Turret Positions	Up to 2 Indenters; up to 4 Objective Lenses			
Turret Position Selection	LCD Touch Panel Display or Manual Rotation			
Stage Included	Digimatic X-Y Stage, 25 x 25 mm (0.98" x 0.98") Travel and 1 µm Resolution			
Maximum Specimen Dimensions	Depth of 160 mm (6.3") and Height of 133 mm (5.24")			
External Connections Available	Digimatic SPC (For DP-1VR Printer), RS-232C (For DPU-414 Printer), USB 2.0 (For PC)			
External Dimensions	Approximately 406 mm W x 533 mm D x 533 mm H (16" x 21" x 21")			
Mass	42 kg (93 lb.)			
Power Supply	100-125 V AC			
Type	Integrated Multi-Function Touch Panel (5.7" Color LCD)			
Indentation Value	D1 & D2 (Maximum 5 Digits Each)			
Minimum Display Unit	Objective Lenses Lower Than 50x: 0.1 µm, Objective Lenses 50x and Higher: 0.01 µm			
Hardness Value	Minimum 0.1 HV/HK, Fracture Toughness Value (Maximum 4 Digits)			
Hardness Conversions	HV, HK, HRA, HRB, HRC, HRD, HRF, HRG, HR15N, HR30N, HR45N, HR15T, HR30T, HR45T, HBS, HS, Tensile Strength			
Test Condition	Indenter (HV/HK), Test Force, Loading Time, Dwell Time, Unloading Time			
Compensation	Cylinder, Sphere, Measurement			
Pass/Fail Determination	OK/NG			
Other	XY Stage Position, Turret Position, Calculations, Statistics			
Supported Languages	English, Spanish, Japanese, German, French, Italian			
Pass/Fail Determination	OK/NG (Based on Values Set by the User)			
Measurement Condition Wizard	Enter the Indenter, Specimen Thickness, and Presumed Hardness to Calculate a Recommended Test Force			
Compensation	Cylinder, Sphere, Measurement			
Statistics	Number of Data Points, Maximum, Minimum, Average, Range, Upper Limit, Lower Limit, Ultra Upper Limit, Ultra Lower Limit, Number of Passes, Number of Fails, Standard Deviation (n-1), Standard Deviation (n)			
Type	Infinitely Corrected Optical System			
Tube Lens Magnification	1x			
Illumination	White LED			
Aperture Diaphragm	Variable			
Objective Lenses Included	10x, 50x	10x, 20x, 50x	10x, 50x, 100x	10x, 50x, 100x
Measuring Microscope (Ocular)	Length-Measuring Microscope with 10x Eyepiece and Integrated Encoder (Results Visible on LCD Display); Can Add a Video Camera Unit for Easier Sample Observation and Measurements			
Measuring Microscope Magnification	100x, 500x	100x, 200x, 500x	100x, 500x, 1000x	100x, 500x, 1000x

## Touch Screen Controller

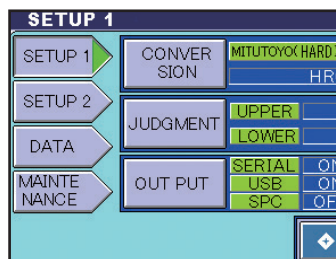
Easy-to-understand graphic display enables intuitive operation. Functions for converting values and compensating for curved surfaces, as well as test condition guiding functions, are all provided as standard features.



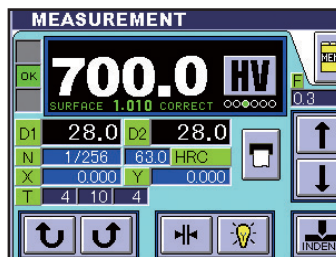
Enter the specimen thickness and the presumed hardness to set a test force that satisfies the JIS conditions.



In addition to the test force dwell time, you can specify loading and unloading testing actions.

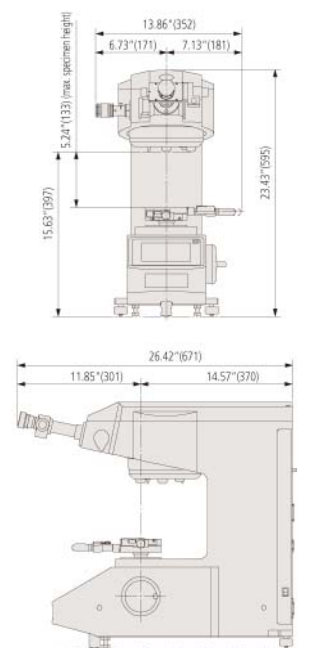


Select a conversion scale, enter a setting for Pass/Fail determination, and specify external output.



Display test conditions and test results.

## Outline Drawing



\* When the .98"x.98"(25x25mm) manual XY stage is used

# Micro Vickers/Knoop

## Halogen illumination

The halogen illumination system features an adjustable aperture diaphragm.

## Manual or motorized turret

All turrets support up to two (2) indenters and three (3) infinity corrected long working distance objectives. The 50X objective lens provides a 2.5 mm working distance.

## Wide range of test force

A closed loop electromagnetic loading system features standard 10 to 1000 gf load ranges with eight (8) selectable increments.

## Loading rate

Fixed load rate is set at 60  $\mu\text{m}$  per second.

## Manual XY stage with digital micrometer heads

During test-site positioning, the positional information is digitally displayed on both the micrometer heads and the touch screen.

- 1" x 1" (25 x 25 mm) standard
- 2" x 2" (50 x 50 mm) optional



## Digital display of measurement results

LCD touch screen shows stage position, test procedure, statistics and scale conversions.





# Specifications

	MODEL #	HM-101	HM-112	HM-122
Main Unit	Item Number	125-810124A	125-81012607A	125-81012702A
	Applicable Standards	ASTM E384, JIS B7725, ISO 6507-2		
	Test Forces	10 gf (98.07 mN), 25 gf (245.2 mN), 50 gf (490.3 mN), 100 gf (980.7 mN), 200 gf (1961 mN), 300 gf (2942 mN), 500 gf (4903 mN), 1000 gf (9807 mN)		
	Indenters Included	Vickers		Vickers, Knoop
	Loading Rate	Fixed at 60 µm/s		
	Test Force Loading Time	Between 5 and 30 s (Adjustable in 1 s Increments)	Between 5 and 99 s (Adjustable in 1 s Increments)	
	Test Force Control	Automatic (Loading, Duration, Unloading)		
	Test Force Selection	Dial		
	Turret Drive	Manual		Motorized
	Turret Position Selection	Manual Rotation		LCD Touch Panel Display or Manual Rotation
	Stage Included	X-Y Stage with 25 x 25 mm (0.98" x 0.98") Travel; 10 µm Resolution	Digimatic X-Y Stage, 25 x 25 mm (0.98" x 0.98") Travel; 1 µm Resolution	
	Maximum Specimen Dimensions	Depth of 150 mm (5.9") and Height of 95 mm (3.7")		
	External Connections Available	N/A	Digimatic SPC (For DP-1VR Printer), RS-232C (For DPU-414 Printer), Centronics	
	External Dimensions	Approximately 410 mm W x 600 mm D x 590 mm H (16.1" x 23.6" x 23.2")		
	Mass	42 kg (93 lb.)		
Power Supply	120 V AC (±10%), 60 Hz			
LCD Display	Type	External Multi-Function Touch Panel (Color LCD)		
	Indentation Value	D1 & D2		
	Minimum Display Unit	Objective Lenses Lower Than 50x: 0.1 µm; Objective Lenses 50x and Higher: 0.01 µm		
	Hardness Conversions	HV, HK, HRA, HRB, HRC, HRD, HRF, HRG, HR15N, HR30N, HR45N, HR15T, HR30T, HR45T, HBS, HS, Tensile Strength		
	Compensation	Curve Correction: 0.01 mm to 200.00 mm (0.00039" to 7.87")		
	Pass/Fail Determination	OK/NG		
	Other	XY Stage Position, Turret Position, Calculations, Statistics		
	External Dimensions	Approximately 165 mm W x 260 mm D x 105 mm H (6.5" x 10.2" x 4.1")		
	Pass/Fail Determination	OK/NG (Based on Values Set by the User)		
	Compensation	Curve Correction: 0.01 mm to 200.00 mm (0.00039" to 7.87")		
Calculations & Statistics	Statistics	Number of Data Points, Maximum, Minimum, Average, Range, Upper Limit, Lower Limit, Good, Over, Under, Standard Deviation (n-1), Standard Deviation (n)		
		Halogen		
Optics	Illumination	10x, 50x		10x, 20x, 50x
	Objective Lenses Included	10x Eyepiece with Filars		
	Measuring Microscope (Ocular)	Digital Optical Encoder (Results Visible on LCD Display)		
	Measuring Method	Micrometer Drum		
Measuring Microscope Magnification		100x, 500x	100x, 200x, 500x	

# Accessories

## Micro Vickers/Macro Vickers/Knoop

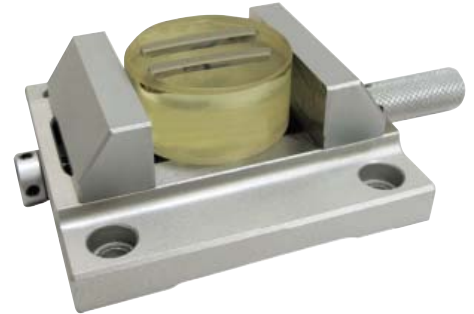
### Self-Leveling Vise - #125-810020

This vise secures any mounted specimen that has a measuring surface difficult to stabilize perpendicular to the indenter axis.



### Clamping Vise - #125-810016

This vise with 2" (51 mm) max opening comes standard with the HM-100 series.



### Digimatic Mini-Processor DP-1VR Printer #125-2645045A

Easily print measurement data from the digimatic gage or perform statistical analysis with this device.



## Halogen illumination

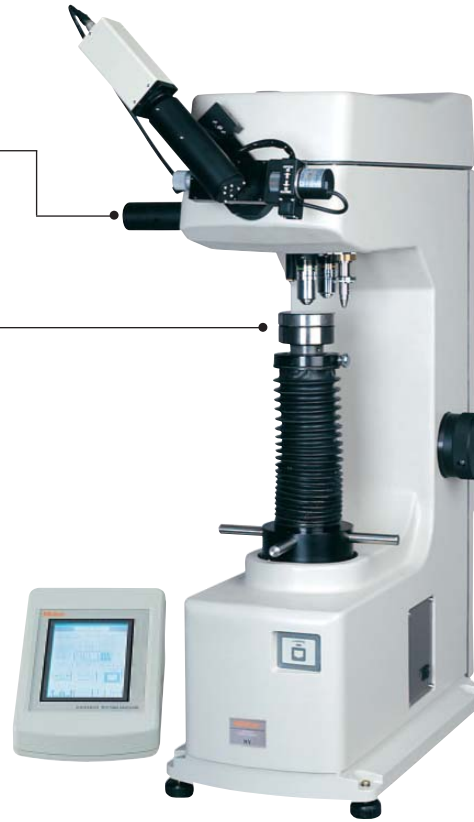
The halogen illumination system features an adjustable aperture diaphragm.

## Motorized turret

Remotely controllable, this turret supports one (1) indenter and two (2) objectives.

## Backlit LCD display

The LCD panel displays: indentation size; hardness value and scale; test condition (HV indenter type, test force, load duration); OK/NG tolerance judgement; cylindrical/spherical surface compensation; and offset information.



## Wide range of test force

Test force ranges from 0.2 kgf (19.61 N) to 20 kgf (196.1 N) with the HV-113 and 1 kgf (9.807 N) to 50 kgf (490.3 N) with the HV-115.



## Monitor display

A 9" monochrome CRT is available for easy viewing of results.

## Specifications

		HV-113 125-810981A	HV-115 125-810985A
Main Unit	Applicable Standards	ASTM E384, JIS B7725, ISO 6507-2	
	Test Forces	0.2 kgf (1.961 N), 0.3 kgf (2.942 N), 0.5 kgf (4.903 N), 1 kgf (9.807 N), 2.5 kgf (24.51 N), 5 kgf (49.03 N), 10 kgf (98.07 N), 20 kgf (196.1 N)	1 kgf (9.807 N), 2 kgf (19.61 N), 3 kgf (29.42 N), 5 kgf (49.03 N), 10 kgf (98.07 N), 20 kgf (196.1 N), 30 kgf (294.2 N), 50 kgf (490.3 N)
	Test Force Accuracy	±1%	
	Indenter Included	Vickers	Vickers
	Test Force Control	Automatic, Between 50 and 100 µm/s (Loading, Duration, Unloading)	
	Test Force Loading Time	Between 5 and 99 s (Adjustable in 1 s Increments)	
	Test Force Selection	Dial	
	Turret Drive	Motorized	
	Turret Positions	1 Indenter; up to 2 Objective Lenses	
	Turret Position Selection	LCD Touch Panel Display or Manual Rotation	
	Anvils Included	Flat Anvil (2.5" Ø), V-Anvil (40 mm Ø with 30 mm Groove), V-Anvil (40 mm Ø with 6 mm Groove)	
	Maximum Specimen Dimensions	Depth of 170 mm (6.7") and Height of 205 mm (8.07")	
	External Connections Available	Digimatic SPC (For DP-1VR Printer), RS-232C (For DPU-414 Printer), Centronics	
	External Dimensions	Approximately 245 mm W x 515 mm D x 770 mm H (9.7" x 20.3" x 31.3")	
	Mass	55 kg (121 lb.)	
Power Supply	120 V AC (±10%), 60 Hz		
LCD Display	Type	Integrated Multi-Function Touch Panel (Color LCD)	
	Indentation Value	D1 & D2	
	Minimum Display Unit	0.1 µm	
	Hardness Conversions	HV, HK, HRA, HRB, HRC, HRD, HRF, HRG, HR15N, HR30N, HR45N, HR15T, HR30T, HR45T, HBS, HS, Tensile Strength	
	Test Condition	Indenter (HV/HK), Test Force, Loading Time, Dwell Time, Unloading Time	
	Compensation	Cylinder, Sphere, Measurement	
	Pass/Fail Determination	OK/±NG	
	Other	Turret Position, Calculations, Statistics	
Calculations & Statistics	Supported Languages	English, Spanish, Japanese, German, French, Italian	
	Pass/Fail Determination	OK/±NG (Based on Values Set by the User)	
	Compensation	Cylinder, Sphere, Measurement	
Optics	Statistics	Number of Data Points, Maximum, Minimum, Average, Range, Upper Limit, Lower Limit, Number of Passes, Number of Fails, Standard Deviation (n-1), Standard Deviation (n)	
	Type	Infinitely Corrected Optical System	
	Tube Lens Magnification	1x	
	Illumination	Halogen (6 V, 20 W)	
	Objective Lenses Included	10x, 20x	
	Measuring Microscope (Ocular)	Length-Measuring Microscope via Included Video Camera Unit and Integrated Encoder (Results Visible on LCD Display);	
Measuring Microscope Magnification	100x, 200x		

# Rockwell Testing Machines

**Also Available from Allied!**

Request our full-line Rockwell Testing Machines Brochure



**HR-521 Advanced Rockwell**



**HR-430MS Twin Type  
(Rockwell/Rockwell Superficial)**



**Projected-nose indenter arm for easy reach of interior and exterior surfaces**



**Easy-to-read digital display**



# Accessories

- Test Blocks
- Knoop & Vickers Indenters

- Vises & Tables
- Specimen Holders
- Spare Bulbs

Test Blocks		
Item Number	Description	Load
125-64BAA173	Vickers 100 HV Test Block	100 gf
125-64BAA174	Vickers 200 HV Test Block	100 gf
125-64BAA175	Vickers 300 HV Test Block	100 gf
125-64BAA176	Vickers 400 HV Test Block	100 gf
125-64BAA177	Vickers 500 HV Test Block	100 gf
125-64BAA178	Vickers 600 HV Test Block	100 gf
125-64BAA179	Vickers 700 HV Test Block	100 gf
125-64BAA180	Vickers 800 HV Test Block	100 gf
125-64BAA181	Vickers 900 HV Test Block	100 gf
125-64BAA182	Vickers 100 HV Test Block	500 gf
125-64BAA183	Vickers 200 HV Test Block	500 gf
125-64BAA184	Vickers 300 HV Test Block	500 gf
125-64BAA185	Vickers 400 HV Test Block	500 gf
125-64BAA186	Vickers 500 HV Test Block	500 gf
125-64BAA187	Vickers 600 HV Test Block	500 gf
125-64BAA188	Vickers 700 HV Test Block	500 gf
125-64BAA189	Vickers 800 HV Test Block	500 gf
125-64BAA190	Vickers 900 HV Test Block	500 gf
125-64BAA191	Vickers 100 HV Test Block	1000 gf
125-64BAA192	Vickers 200 HV Test Block	1000 gf
125-64BAA193	Vickers 300 HV Test Block	1000 gf
125-64BAA194	Vickers 400 HV Test Block	1000 gf
125-64BAA195	Vickers 500 HV Test Block	1000 gf
125-64BAA196	Vickers 600 HV Test Block	1000 gf
125-64BAA197	Vickers 700 HV Test Block	1000 gf
125-64BAA198	Vickers 800 HV Test Block	1000 gf
125-64BAA199	Vickers 900 HV Test Block	1000 gf
125-64BAA200	Knoop 200 HK Test Block	100 gf
125-64BAA201	Knoop 300 HK Test Block	100 gf
125-64BAA202	Knoop 400 HK Test Block	100 gf
125-64BAA203	Knoop 500 HK Test Block	100 gf
125-64BAA204	Knoop 600 HK Test Block	100 gf
125-64BAA205	Knoop 700 HK Test Block	100 gf
125-64BAA206	Knoop 800 HK Test Block	100 gf
125-64BAA207	Knoop 250 HK Test Block	500 gf
125-64BAA208	Knoop 300 HK Test Block	500 gf
125-64BAA209	Knoop 400 HK Test Block	500 gf
125-64BAA210	Knoop 500 HK Test Block	500 gf
125-64BAA211	Knoop 600 HK Test Block	500 gf
125-64BAA212	Knoop 700 HK Test Block	500 gf
125-64BAA213	Knoop 800 HK Test Block	500 gf
125-64BAA214	Knoop 250 HK Test Block	1000 gf
125-64BAA215	Knoop 300 HK Test Block	1000 gf
125-64BAA216	Knoop 400 HK Test Block	1000 gf
125-64BAA217	Knoop 500 HK Test Block	1000 gf
125-64BAA218	Knoop 600 HK Test Block	1000 gf
125-64BAA219	Knoop 700 HK Test Block	1000 gf
125-64BAA220	Knoop 800 HK Test Block	1000 gf

Stages and Specimen Holders for HM-Series Testers	
Item Number	Description
125-810013	Thin Plate Holder, 5 mm (0.20") Max Thickness
125-810014	Wire/Ball Holder (Horizontal Orientation), 3 mm (0.12") Max Ø
125-810015	Wire/Ball Holder (Vertical Orientation), 4 mm (0.16") Max Ø
125-810016	Vise, 2" (51 mm) Max Opening
125-810017	Vise, 3.94" (100 mm) Max Opening
125-810018	Rotary Table, 1° Min Graduation
125-810019	Tilting Holder, 37 mm (1.46") Jaw Opening, ±15° Tilting, ±25° Rotation
125-810020	Self-Leveling Vise, for Mounted Samples
125-810085	Adjustable Thin-Plate Holder, 3 mm (0.12") Max Thickness, 56 mm (2.2") Max Width
125-810424	Digimatic X-Y Stage, 25.4 x 25.4 mm (1" x 1") Travel
125-810427	Digimatic X-Y Stage, 50.8 x 50.8 mm (2" x 2") Travel
125-810650-1	Mount Holder, for 25.4 mm (1") Ø Mounts, 39 mm (1.54") Max Height
125-810650-2	Mount Holder, for 30 mm (1.18") Ø Mounts, 39 mm (1.54") Max Height
125-810650-3	Mount Holder, for 32 mm (1.25") Ø Mounts, 39 mm (1.54") Max Height
125-810650-4	Mount Holder, for 38 mm (1.5") Ø Mounts, 39 mm (1.54") Max Height
125-810650-5	Mount Holder, for 40 mm (1.57") Ø Mounts, 39 mm (1.54") Max Height

Tables and Anvils for HV-Series Testers	
Item Number	Description
125-810037-7	Round Table, 205 mm (8") Ø
125-810038	Round Table, 250 mm (9.8") Ø
125-810039	Flat Anvil, 63.5 mm (2.5") Ø
125-810040	V-Anvil, 40 mm (1.57") Ø with 30 mm (1.18") Groove
125-810041	V-Anvil, 40 mm (1.57") Ø with 6 mm (0.24") Groove

Other Accessories	
Item Number	Description
125-810354A	Video Camera Unit (Includes Digital Camera, Camera Adapter, and 8.4" TFT Monitor)
125-02AGD600B	DPU-414 Receipt Printer, with Connecting Cable
125-19BAA157	Printer Paper, 10 Rolls, for DPU-414
125-2645045A	DP-1VR Digimatic Mini-Processor
125-936937	SPC Connecting Cable, 1 m, for DP-1VR
125-965014	SPC Connecting Cable, 2 m, for DP-1VR

For a complete list of accessories, please contact your Allied product application specialist.



PowerCut 10" Abrasive Cut-Off Saw



MetPrep 4" Polishing System w/AD-5" Fluid Dispenser



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