

# MICROHARDNESS TESTER

**FM-100**  
**FM-300**  
**FM-800**



**HV**  
**HK**  
**HBS**  
**HBW**  
**Kc**

**FM-800**  
<Option : Digital microhead>

# MICROHARDNESS TESTER FM-100/FM-300/FM-800Series

Lab-friendly functions make FM Series Microhardness Testers ideal for materials labs.

FM-800e & FM-800 make precise Vickers (HV) / Knoop (HK) / Brinell (HB) / Fracture Toughness (Kc) measurements quick and easy.

— One touch selection on touchpad —

## OUTSTANDING FEATURES

### ADVANCED COLOR LCD TOUCH PANEL OPERATION AND DISPLAY

- Color LCD touch panel/display coordinated with highly integrated PC board.
- Measuring procedures, conditions and data are displayed clearly. (FM-800 Series)

### BRINELL TESTING

- Accurate light load Brinell Testing is available as a standard function. Necessary additional optional item "Ball Indenter  $\phi$  1mm". (FM-800 Series)

### FRACTURE TOUGHNESS TESTING, K<sub>c</sub>

- K<sub>c</sub> value can be measured as a standard function according to JIS R 1607/IF Method.
- Together with the value of Micro Vickers and Knoop, it is very effective to evaluate the quality of new material. (FM-800 Series)

### CLEAR VIEW AND EASY MEASURING

- The changeable aperture diaphragm and field aperture with a newly developed light source mechanism provides more resolution at both high and low magnifications.
- Easily changeable color filter provides more resolution. (All Series)

### FINE AND CLEAR MEASURING LINE

- The newly designed measuring lines with 0.04 mm width can provide clear and accurate measurement. (All Series)

### AUTO-TURRET

- Auto turret mechanism provides quick and correct sequence without rotating the turret manually.
- Capable of manual operation. (All Series)

### A VARIETY OF SELECTABLE LOADS

- Type of test load is selectable.
- You can select from an abundance of loads and have own load combination (Option/Negotiable)

### X-Y COORDINATE DISPLAY

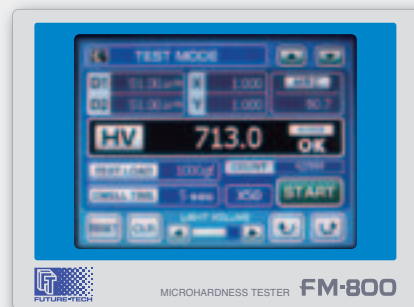
- Stage coordinate is indicated on the display in a link operation with the digital microhead (option).

### 4 OBJECT LENSES (OPTIONAL)

- The new turret mechanism enables to observe wide specimen area with up to 4 object lenses.
- Various magnifications easily available by rotating the correct objective into position.
- Placement of an indentation and its reading is more accurate and repeatable by choice of proper objective. (FM-800 Series)

### 2 INDENTERS FOR HV/HK MEASUREMENTS (OPTIONAL)

- The new turret mechanism enables to adapt 2 indenters simultaneously.
- It allows Vickers and Knoop tests without replacing the indenter. (FM-800 Series)



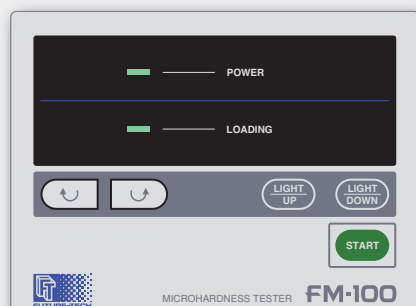
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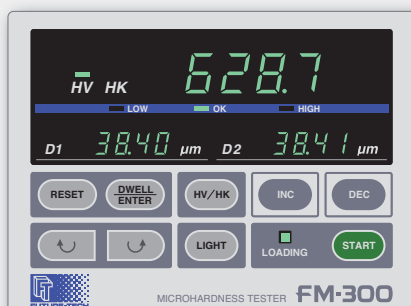
HK <FM-800Series>



HBW <FM-800Series>



<FM-100Series>

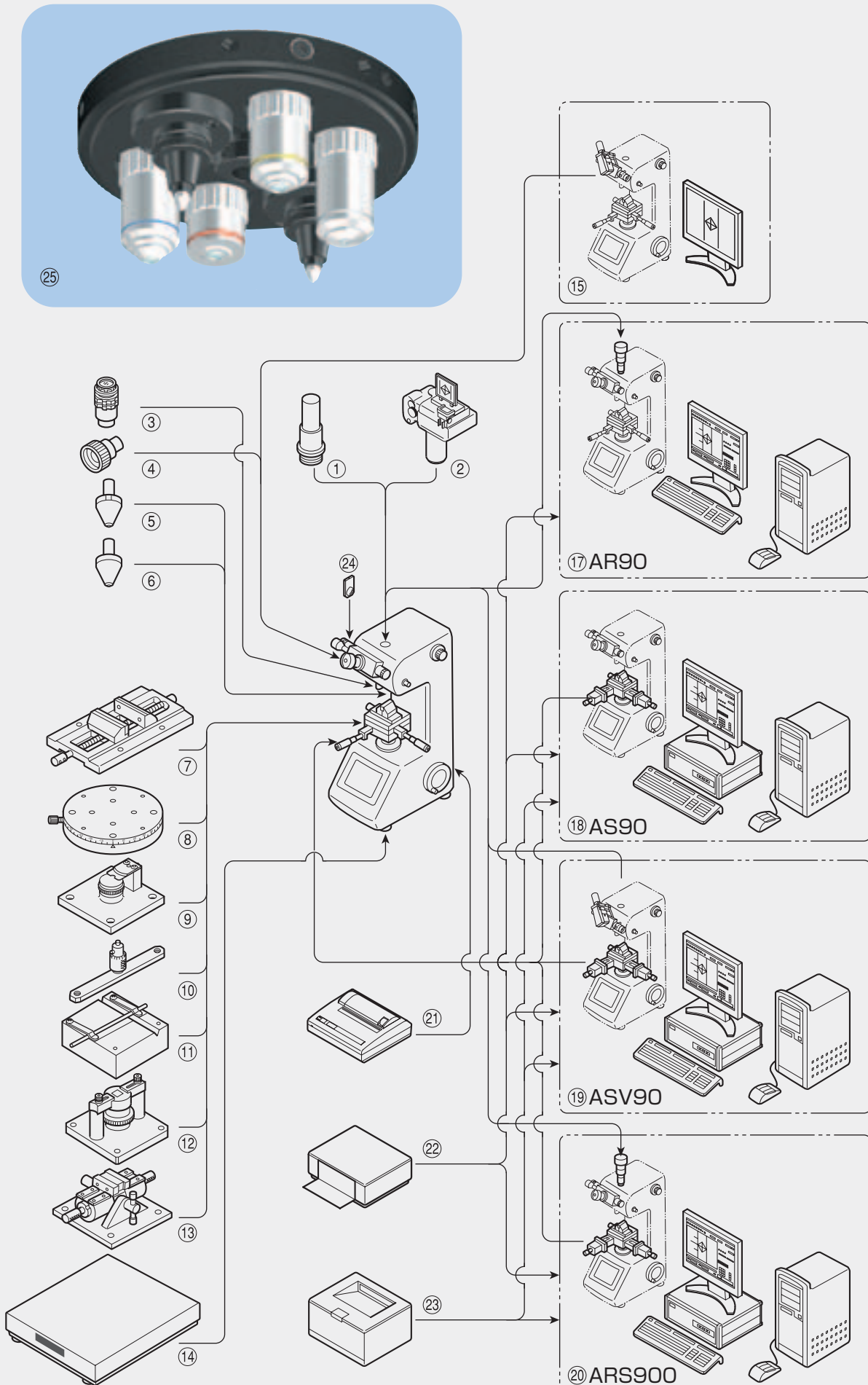


<FM-300Series>



Kc <FM-800Series>

# SYSTEM CHART <OPTIONAL COMPONENTS>



# OPTIONAL ACCESSORIES

CODE No.	ITEM		DESCRIPTION
M-014	KNOOP INDENTER ⑤		Rhombic diamond indenter for Knoop hardness
M-063	BRINELL TEST	TUNGSTEN CARBIDE BALL INDENTER ⑥	φ 1mm
M-039	HARDNESS CALCULATION TABLE	FOR HV	5gf - 50kgf (This is standard accessory for FM-100/FM-100e.)
M-040		FOR HK	5gf - 50kgf
M-015	OBJECT LENS ③		× 100
M-016			× 40
M-017			× 20
M-019			× 5
M-062	EYEPIECE ④		× 15
M-022	COLOR FILTER ②④		φ 20mm: Yellow & Blue ("Green" is standard accessory.)
M-023	COLOR TEMPERATURE CONVERSION FILTER		For the color monitor measuring device
M-024	APERTURE DIAPHRAGM		φ 1~6 mm each selectable (6 kinds)
M-025	FIELD APERTURE		φ 1~7 mm each selectable (7 kinds)
M-054	CAMERA MOUNTING TUBE ①		For adapting photographic camera & CCD camera
M-012	DIGITAL CAMERA ATTACHMENT ②		C MOUNT ATTACHMENT (Digital camera is not included)
M-008	MONITOR MEASURING DEVICE	Black & White ⑮	B & W CCD camera + 8.4" LCD + L TYPE ATTACHMENT
M-009		Color	Color CMOS camera + 17" LCD + L-type attachment + Image saving function (with 1GB SD card)
M-003	AUTOMATIC READING SYSTEM <AR90> ⑰		<p><b>Indentation measurement is automated</b>            Light-and-dark image processing protects this system against the influence of metals or damage. Automatic measurement can be done with high accurate repeatability exceeding any skilled technician.            System configuration: CCD camera, CCD camera attachment, personal computer, printer, 17" LCD, image board, connecting cable and exclusive control/data processing software</p>
M-002	AUTOMATIC X-Y STAGE & CONTROL UNIT <AS90> ⑱		<p><b>Stage control is automated</b>            In complicated multi-point measurement, stage movement is automated when an indentation is made and read.            System configuration: Automatic X-Y stage, control box, personal computer, printer, 17" LCD, connecting cable and exclusive control/data processing software</p>
M-000	SEMI-AUTOMATIC MEASURING SYSTEM WITH AUTO-STAGE <ASV90> ⑲		<p><b>Stage control is automated</b>            In complicated multi-point measurement, stage movement is automated when an indentation is made and read. It is possible to measure an indentation enlarged on the PC (personal computer) monitor.            System configuration: CCD camera, L-type CCD camera attachment, automatic X-Y stage, control box, personal computer, printer, 17" LCD, image board, connecting cable and exclusive control/data processing software</p>
M-001	AUTOMATIC MEASURING SYSTEM WITH AUTO-STAGE <ARS900> ⑳		<p><b>Indentation measurement is automated / Stage control is automated</b>            Light-and-dark image processing realizes the automation of indentation measurement and stage movement.            System configuration: CCD camera, CCD camera attachment, automatic X-Y stage, control box, personal computer, printer, 17" LCD, image board, connecting cable and exclusive control/data processing software</p>
M-028	PRECISION VISE ⑦		Max. opening : 100mm
M-029	ROTARY TABLE ⑧		Graduation of rotary angle : 5 degree    Table diameter : φ 128mm
M-030	THIN SPECIMEN MEASURING DEVICE ⑨		Specimen thickness : 5mm max.
M-031	FINE SPECIMEN MEASURING DEVICE	VERTICAL TYPE ⑩	Specimen diameter : φ 5mm max. (For measuring the cross section)
M-032		HORIZONTAL TYPE ⑪	Specimen diameter : φ 5mm max. (For measuring the cylindrical surface)
M-033	SPECIMEN INCLINING DEVICE ⑫		Specimen height : 5 ~ 20 mm (For mounted specimen)
M-034	UNIVERSAL INCLINING VISE ⑬		Inclining device + Vise    Max. opening : 45mm
M-004	DIGITAL PRINTER ㉑		RS232C type or CENTRONICS type (For Hardness Tester)
			Ink-jet type (A4 size)
M-006	LASER PRINTER ㉒		Monochrome type (A4 size)
M-043	VIBRATION INSULATION STAND ⑭		AVT-0405 (Air type) / RET-0405 (Rubber type)
M-057	MECHANICAL PARTS FOR ADDITIONAL OBJECT LENS		<p>Turret internal parts for installing the third and fourth object lenses.            (Please specify them when ordering the product.)            Only our factory can add them after shipment.</p>
M-065	DUAL INDENTER TURRET (For FM-800 Series) ㉓		<p>Used when installing two HV/HK indenters at the same time.            (Please specify it when ordering the product.)</p>

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■ FM-100 / 300series ■ FM-800series

MODEL		FM-100e		FM-100		FM-300e		FM-300		FM-800e		FM-800	
TEST LOAD	TYPE A	mN : 49.03 98.07 245.2 490.3 980.7 1,961 2,942 4,903 9,807 19,614 gf : 5 10 25 50 100 200 300 500 1,000 2,000											
	TYPE B	mN : 9.807 29.42 49.03 98.07 245.2 490.3 980.7 1,961 2,942 4,903 9,807 gf : 1 3 5 10 25 50 100 200 300 500 1,000											
	TYPE C	mN : 9.807 49.03 98.07 245.2 490.3 980.7 1,961 2,942 4,903 9,807 19,614 gf : 1 5 10 25 50 100 200 300 500 1,000 2,000											
	TYPE D	mN : 9.807 49.03 98.07 245.2 490.3 980.7 2,942 4,903 9,807 19,614 gf : 1 5 10 25 50 100 300 500 ※ 1,000 ※ 2,000											
	TYPE E	mN : 9.807 29.42 49.03 98.07 245.2 490.3 980.7 2,942 4,903 9,807 gf : 1 3 5 10 25 50 100 300 500 1,000											
LOADING MECHANISM		Automatic Load and Release Method											
LOAD APPLYING SPEED		60μm/ sec											
DWELL TIME		5 ~ 40 sec				5 ~ 99 sec							
TURRET MECHANISM		Manual		Automatic		Manual		Automatic		Manual		Automatic	
DIAMOND INDENTER	Standard	Vickers Indenter (HV)											
	Option	—								Knoop Indenter (HK) / Two Indenters (HV + HK) are available on the special Dual Indenter Turret simultaneously			
OBJECT LENS	Standard	2 Lenses (X 50 & X 10)											
	Option	Max. 3 Lenses (X 50 & X 10 plus 1 Lenses)								Max. 4 Lenses (X 50 & X 10 plus 2 Lenses)			
EYEPIECE		X 10											
MEASURING MICROSCOPE	Type	Mechanical				Electronic							
	Max. measurement length	In case of X 100 : 850 μm / In case of X 500 : 170 μm											
	Min. graduation	Micrometer : 0.5 μm				Digital : 0.01 μm (In case of X 500)							
	Min. measurement unit	Eye judgement : 0.1 μm				Digital : 0.01 μm (In case of X 500)							
X-Y STAGE	Type	Manual											
	Dimensions	100 x 100 mm											
	Max. movement	(X) 25 x (Y) 25 mm											
	Min. micro graduation	1/100 mm											
	Option	Digital microhead								Digital microhead (Panel display)			
PRECISION VISE	Max. opening	50 mm											
MAX. HEIGHT OF SPECIMEN		95 mm											
MAX. DEPTH OF SPECIMEN		115 mm											
TEST PARAMETER		—				HV / HK				HV / HK / HBS / HBW / Kc			
FRACTURE TOUGHNESS TEST (Kc)		—				Conform to JIS R1807 / IF Method							
HARDNESS CONVERSION		—				Conform to SAE (J-417b) & ASTM (E-140)							
OPERATION PANEL (SHEET SW for FM-100 / 300 Series & TOUCH PANEL SW for FM-800 Series)		START / LIGHT UP-DOWN / TURRET ROTATION (For Auto-Turret Type)				START / RESET / DWELL TIME / LIGHT UP-DOWN / TURRET ROTATION (For Auto-Turret Type)				START / RESET / DWELL TIME / LIGHT UP-DOWN / TEST LOAD / CONVERSION SCALE / TURRET ROTATION (For Auto-Turret Type) / CLEAR			
DATA DISPLAY (LED for FM-100 / 300 Series & LCD for FM-800 Series)		POWER / LOADING (Pilot Lamp)				D1 / D2 / HV-HK / HARDNESS VALUE / LOADING / OK-NG CRITERIA				D1 / D2 / HV-HK / HARDNESS VALUE / CONVERSION DATA / OK-NG CRITERIA / START (Blinking for Loading) / TEST TIMES / etc.			
DATA OUTPUT & PRINT OUT		—				RS232C (HV-HK / HARDNESS VALUE / OK-NG) CENTRONICS (D1 / D2 / HV-HK / HARDNESS VALUE / TEST LOAD / OK-NG)				RS232C / CENTRONICS (D1 / D2 / HV-HK / HARDNESS VALUE / TEST LOAD / OK-NG / CONVERSION SCALE / CONVERSION DATA / STATISTIC DATA / etc.)			
OK / NG CRITERIA		—				Limit setting and HI / OK / LO display							
SELF DIAGNOSIS		—								Display troubles with motors and switches			
LIGHT SOURCE		6 V / 18 W (Auto-iris mechanism)											
OPTICAL FUNCTION		Aperture diaphragm / Field aperture / Color filter : Replaceable											
ACCURACY		Conform to JIS B-7734 / B-7725, ASTM E-384, and ISO 6507-2											
PHOTOGRAPHIC DEVICE		Capable to mount at anytime on top of the machine (Camera / Attachment : Option)											
DIMENSIONS		(W) 186 x (D) 450 x (H) 504 mm											
WEIGHT		Approx. 40 kg (Including Standard Accessories)											
POWER SUPPLY		Japan : Single phase AC 100V 50 / 60Hz Overseas : Single phase AC 100 ~ 240V 50 / 60Hz(Should be specified before shipment)											

# STANDARD ACCESSORIES

CODE NO.	ITEM		FM-100e	FM-100	FM-300e	FM-300	FM-800e	FM-800
M-026	X-Y STAGE		1	1	1	1	1	1
M-027	PRECISION VISE		1	1	1	1	1	1
M-037	STANDARD TEST BLOCK (HV700)		1	1	1	1	1	1
M-013	DIAMOND INDENTER	PYRAMID (BUILT-IN)	1	1	1	1	1	1
M-041	MEASURING MICROSCOPE (WITH X 10 EYEPIECE)	MECHANICAL TYPE	1	1	—	—	—	—
M-042		ELECTRONIC TYPE	—	—	1	1	1	1
M-061	OBJECT LENS (BUILT-IN)	X 50	1	1	1	1	1	1
M-018		X 10	1	1	1	1	1	1
M-052	LEVEL ADJUSTING LEG		4	4	4	4	4	4
M-066	LEVEL		1	1	1	1	1	1
M-053	INDENTER COVER (BUILT-IN)		1	1	1	1	1	1
M-055	MACHINE COVER		1	1	1	1	1	1
M-044	SPARE LIGHT SOURCE BULB (6V 18W)		2	2	2	2	2	2
M-045	SPARE FUSE	100 ~ 120V 2A	—	—	—	—	—	—
		200 ~ 240V 1A	—	—	—	—	—	—
		200 ~ 240V 2A	—	—	—	—	—	—
M-051	POWER CORD		1	1	1	1	1	1
	AUXILIARY TOOLS (SCREW DRIVER : +1PC & -1PC & L WRENCH : 4 PCS)		1	1	1	1	1	1
M-039	HARDNESS CALCULATION TABLE	FOR VICKERS	1	1	—	—	—	—
	HARDNESS CONVERSION TABLE		1	1	1	1	—	—
	INSTRUCTION & MAINTENANCE MANUAL		1	1	1	1	1	1
M-056	ACCESSORY BOX		1	1	1	1	1	1

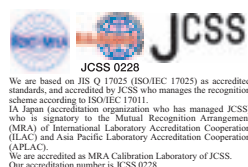
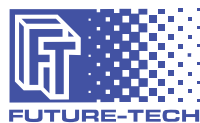


〈FM-300〉  
Digital Microhardness Tester



〈FM-100〉  
Analog Microhardness Tester

※ Appearance and specifications are subject to change without prior notice.



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