

FM Series

MICROHARDNESS TESTER



MICROHARDNESS TESTER FM-110/FM-310/FM-810Series

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

FM-810e & FM-810 make precise Vickers (HV) / Knoop (HK) / Brinell (HB) / Fracture Toughness (Kc) measurements quick and easy.

— One touch selection on touchpad —

OUTSTANDING FEATURES

USB port output

Equipped with the cylindrical/spherical offset function and the specimen thickness calculation function.

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-810 Series)

BRINELL TESTING

- Accurate light load Brinell Testing is available as a standard function.
Necessary additional optional item "Ball Indenter ϕ 1mm". (FM-810 Series)

FRACTURE TOUGHNESS TESTING, K_c

- K_c 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-810 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)

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

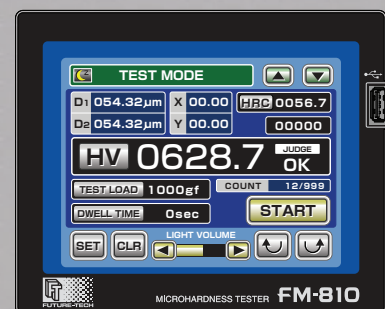
- Stage coordinate is indicated on the display in a link operation with the digital microhead (option).

4 OBJECT LENSES (OPTIONAL)

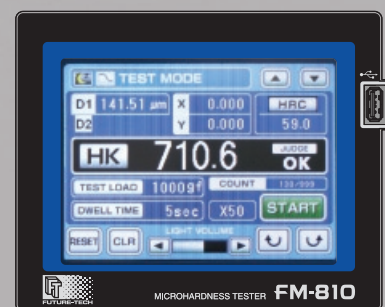
- The new turret mechanism enables to observe wide specimen area with up to 4 object lenses.
- Various magnifications easily available by rotating the correct objective into position.
- Placement of an indentation and its reading is more accurate and repeatable by choice of proper objective. (FM-810 Series)

2 INDENTERS FOR HV/HK MEASUREMENTS (OPTIONAL)

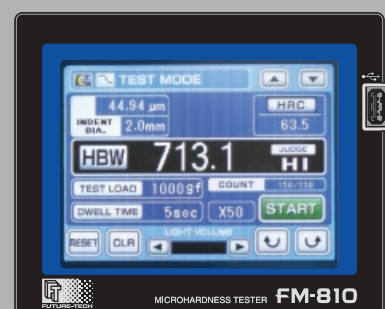
- The new turret mechanism enables to adapt 2 indenters simultaneously.
- It allows Vickers and Knoop tests without replacing the indenter. (FM-810 Series)



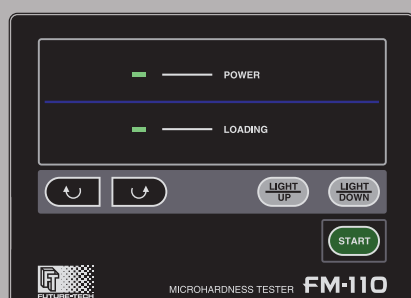
HV <FM-810Series>



HK <FM-810Series>



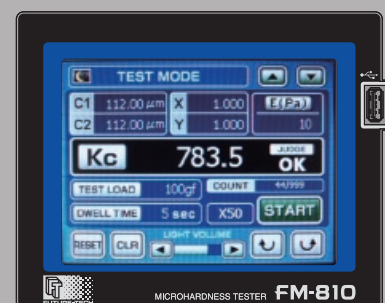
HBW <FM-810Series>



<FM-110Series>



<FM-310Series>



Kc <FM-810Series>

FM-110 / 310series FM-810series

※() Choose either 1,000 or 2,000

MODEL		FM-110e		FM-110		FM-310e		FM-310		FM-810e		FM-810	
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-110 / 310 Series & TOUCH PANEL SW for FM-810 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-110 / 310 Series & LCD for FM-810 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		LED											
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-110e	FM-110	FM-310e	FM-310	FM-810e	FM-810
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-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

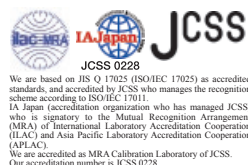
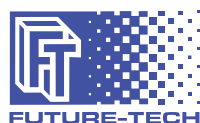


〈FM-310〉
Digital Microhardness Tester



〈FM-110〉
Analog Microhardness Tester

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



FUTURE-TECH CORP.

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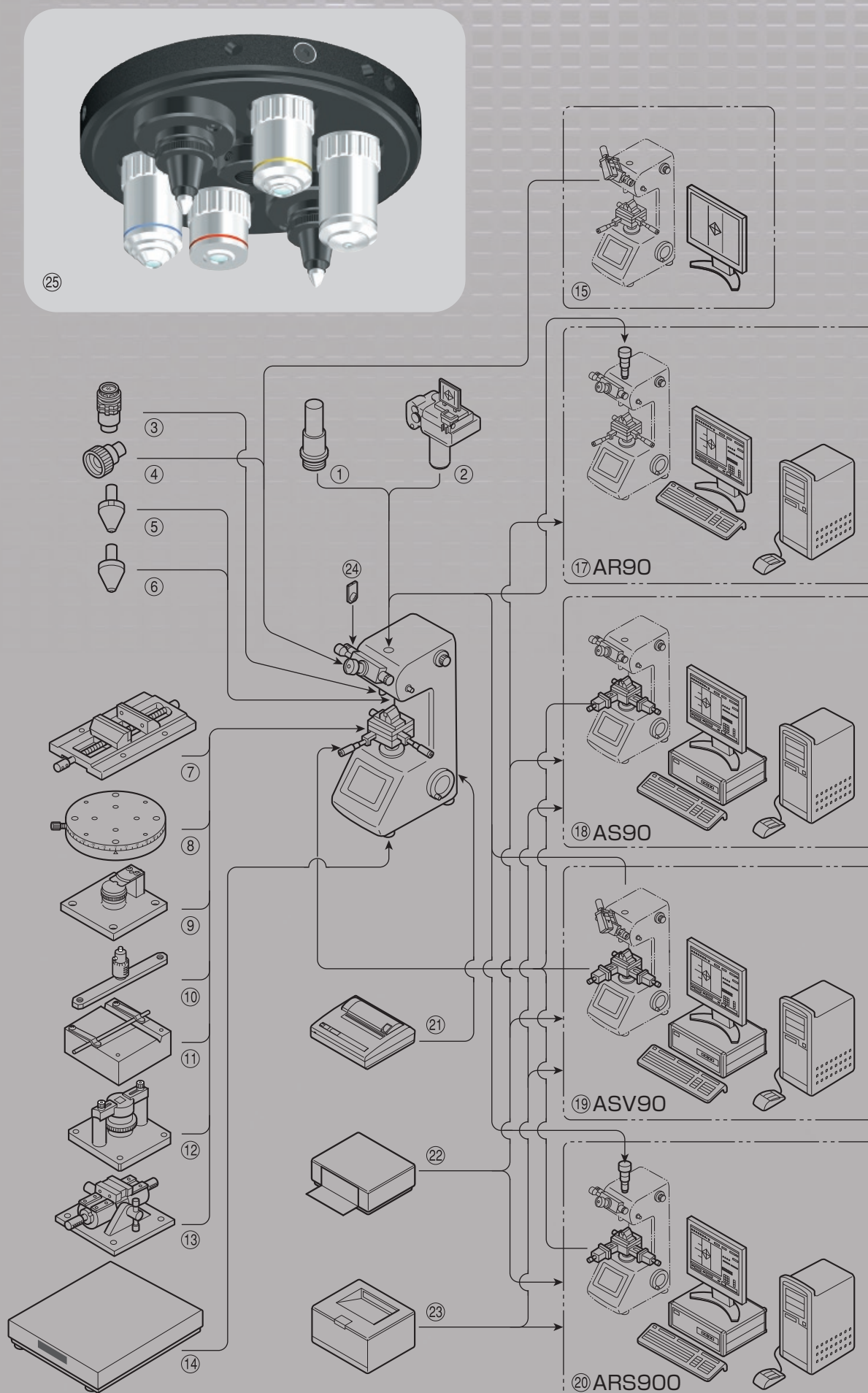
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Agent :

FM Series

SYSTEM CHART <OPTIONAL COMPONENTS>



FM Series

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 USB memory)
M-003	AUTOMATIC READING SYSTEM <AR90> ⑰		Indentation measurement is automated 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
M-002	AUTOMATIC X-Y STAGE & CONTROL UNIT <AS90> ⑱		Stage control is automated 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
M-000	SEMI-AUTOMATIC MEASURING SYSTEM WITH AUTO-STAGE <ASV90> ⑲		Stage control is automated 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
M-001	AUTOMATIC MEASURING SYSTEM WITH AUTO-STAGE <ARS900> ⑳		Indentation measurement is automated / Stage control is automated 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
M-028	PRECISION VISE ㉑		Max. opening : 100mm
M-029	ROTARY TABLE ㉒		Graduation of rotary angle : 5 degree Table diameter : φ 128 mm
M-030	THIN SPECIMEN MEASURING DEVICE ㉓		Specimen thickness : 5 mm max.
M-031	FINE SPECIMEN MEASURING DEVICE	VERTICAL TYPE ㉔	Specimen diameter : φ 5 mm max. (For measuring the cross section)
M-032		HORIZONTAL TYPE ㉕	Specimen diameter : φ 5 mm max. (For measuring the cylindrical surface)
M-033	SPECIMEN INCLINING DEVICE ㉖		Specimen height : 5 ~ 20 mm (For mounted specimen)
M-034	UNIVERSAL INCLINING VISE ㉗		Inclining device + Vise Max. opening : 45 mm
M-004	DIGITAL PRINTER	㉘	RS232C type or CENTRONICS type (For Hardness Tester)
		㉙	Ink-jet type (A4 size)
M-006	LASER PRINTER ㉚		Monochrome type (A4 size)
M-043	VIBRATION INSULATION STAND ㉛		AVT-0405 (Air type) / RET-0405 (Rubber type)
M-057	MECHANICAL PARTS FOR ADDITIONAL OBJECT LENS		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.
M-065	DUAL INDENTER TURRET (For FM-810 Series) ㉜		Used when installing two HV/HK indenters at the same time. (Please specify it when ordering the product.)

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