FUTURE-TECH

MICROHARDNESS TESTER

FM Series

FM-110/FM-310/FM-810



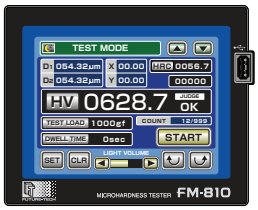


FM Series

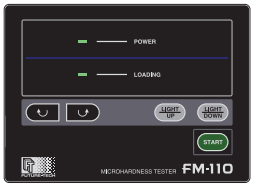
FM-110, FM-310, FM-810

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

FM-810e & FM-810 make precise Vickers (HV) / Knoop (HK) /
Brinell (HBS & HBW) / Fracture Toughness (Kc) measurements quick and easy.
— One touch selection on touchpad —



〈FM-810 Series〉



〈FM-110 Series〉



〈FM-310 Series〉



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-810 Series)

■ BRINELL TESTING

Accurate light load Brinell Testing is available as a standard function.
Required optional item “Ball Indenter ϕ1mm” . (FM-810 Series)

■ FRACTURE TOUGHNESS TESTING, Kc

Kc value can be measured as a standard function according to JIS R1607/ 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.
Easy to change 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 are of 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)

■ USB PORT OUTPUT

■ EQUIPPED WITH THE CYLINDRICAL/SPHERICAL OFFSET FUNCTION AND THE SPECIMEN THICKNESS CALCULATION FUNCTION.

■ HARDENED LAYER DEPTH CALCULATION FUNCTION (FM-810 SERIES)

The hardened layer depth can be automatically calculated by a simple operation.

SPECIFICATIONS

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 / gf : 5	98.07 / 10	245.2 / 25	490.3 / 50	980.7 / 100	1,961 / 200	2,942 / 300	4,903 / 500	9,807 / 1,000	19,614 / 2,000
	TYPE B	mN : 9.807 / gf : 1	29.42 / 3	49.03 / 5	98.07 / 10	245.2 / 25	490.3 / 50	980.7 / 100	1,961 / 200	2,942 / 300	4,903 / 500	9,807 / 1,000	
	TYPE C	mN : 9.807 / gf : 1		49.03 / 5	98.07 / 10	245.2 / 25	490.3 / 50	980.7 / 100	1,961 / 200	2,942 / 300	4,903 / 500	9,807 / 1,000	19,614 / 2,000
	TYPE D	mN : 9.807 / gf : 1		49.03 / 5	98.07 / 10	245.2 / 25	490.3 / 50	980.7 / 100		2,942 / 300	4,903 / 500	9,807 / 1,000 ※	19,614 / 2,000 ※
	TYPE E	mN : 9.807 / gf : 1	29.42 / 3	49.03 / 5	98.07 / 10	245.2 / 25	490.3 / 50	980.7 / 100		2,942 / 300	4,903 / 500	9,807 / 1,000	
LOADING MECHANISM		Automatic Load and Release Method					
LOAD APPLYING SPEED		60 μm / 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		X10					
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	100x100mm					
	Max. movement	(X)25x(Y)25mm					
	Min. micro graduation	1/100mm					
	Option	Digital microhead				Digital microhead (Panel display)	
PRECISION VISE	Max. opening	50mm					
MAX. HEIGHT OF SPECIMEN		95mm					
MAX. DEPTH OF SPECIMEN		115mm					
TEST PARAMETER		—		HV/HK		HV / HK / HBS / HBW / Kc	
FRACTURE TOUGHNESS TEST (Kc)		—				Conform to JIS R1607 / 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) USB : (D1/ D2 / HV-HK / HARDNESS VALUE/ TEST LOAD/ OK-NG)		RS232C / USB (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					
COMPLIANT STANDARD		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		W186 x D450 x H504mm					
WEIGHT		Approx. 40 kg (Including Standard Accessories)					
POWER SUPPLY		Japan : Single phase AC 100V　50/ 60Hz Overseas : Single phase AC100～240V　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 - 0 2 6	X -Y STAGE		1	1	1	1	1	1
M - 0 2 7	PRECISION VISE		1	1	1	1	1	1
M - 0 3 7	STANDARD TEST BLOCK (HV700)		1	1	1	1	1	1
M - 0 1 3	DIAMOND INDENTER PYRAMID (BUILT-IN)		1	1	1	1	1	1
M - 0 4 1	MEASURING MICROSCOPE (WITH X10 EYEPIECE)	MECHANICAL TYPE	1	1	—	—	—	—
M - 0 4 2		ELECTRONIC TYPE	—	—	1	1	1	1
M - 0 6 1	OBJECT LENS (BUILT-IN)	X 50	1	1	1	1	1	1
M - 0 1 8		X 10	1	1	1	1	1	1
M - 0 5 2	LEVEL ADJUSTING LEG		4	4	4	4	4	4
M - 0 6 6	LEVEL		1	1	1	1	1	1
M - 0 5 3	INDENTER COVER (BUILT-IN)		1	1	1	1	1	1
M - 0 5 5	MACHINE COVER		1	1	1	1	1	1
M - 0 5 1	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 - 0 3 9	HARDNESS CALCULATION TABLE (FOR VICKERS)		1	1	—	—	—	—
	HARDNESS CONVERSION TABLE		1	1	1	1	—	—
	INSTRUCTION & MAINTENANCE MANUAL		1	1	1	1	1	1
M - 0 5 6	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 for the product improvement.

FUTURE-TECH

We are based on JIS Q 17025 (ISO/IEC 17025) as accredited standards, and accredited by JCSS who manages the recognition scheme according to ISO/IEC 17011. IA Japan (accreditation organization who has managed JCSS) who is signatory to the Mutual Recognition Arrangement (MRA) of International Laboratory Accreditation Cooperation (ILAC) and Asia Pacific Accreditation Cooperation (APAC).
We are accredited as MRA Calibration Laboratory of JCSS.
Our accreditation number is JCSS 0228.

No.1172-ISO 9001

JAB CM002

FUTURE-TECH CORP.
http://www.ft-hardness.com

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2020.11

FM Series

SYSTEM CHART

〈OPTIONAL COMPONENTS〉



OPTIONAL ACCESSORIES

CODE No.	ITEM			DESCRIPTION	
M - 0 1 4	KNOOP INDENTER		⑤	Rhombic diamond indenter for Knoop hardness	
M - 0 6 3	BRINELL TEST	TUNGSTEN CARBIDE BALL INDENTER	⑥	ϕ 1mm	
M - 0 3 9	HARDNESS CALCULATION TABLE	FOR HV		5gf - 50kgf (This is standard accessory for FM-100/FM-100e)	
M - 0 4 0		FOR HK		5gf - 50kgf	
M - 0 1 6	OBJECT LENS		③	×40	
M - 0 1 7				×20	
M - 0 1 9				×5	
M - 0 6 2	EYEPIECE		④	×15	
M - 0 2 2	COLOR FILTER		㉓	ϕ 20mm: Yellow & Blue ("Green" is standard accessory.)	
M - 0 2 3	COLOR TEMPERATURE CONVERSION FILTER			For the color monitor measuring device	
M - 0 2 4	APERTURE DIAPHRAGM			ϕ 1 ～ 6 mm each selectable (6 kinds)	
M - 0 2 5	FIELD APERTURE			ϕ 1 ～ 7 mm each selectable (7 kinds)	
M - 0 5 4	CAMERA MOUNTING TUBE		①	For adapting photographic camera & CMOS camera	
M - 0 0 9	MONITOR MEASURING DEVICE		⑮	Color CMOS camera + 23" LCD + L-type attachment + Image saving function (with 4GB USB memory)	
M - 0 0 3	AUTOMATIC READING SYSTEM 〈AR〉 **Automatically measures indentation**		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 repeatabil ity exceeding any skilled technician. **System configuration :** 1.3M CMOS camera, camera attachment, personal computer, 23" LCD, connecting cable and exclusive control/data processing software. **Minimum unit :** 0.1 μm **Measurement scale :** HV, HK **Measurement method :** Shading image processing method **Repeat accuracy :** ±0.5% / HV500 500gf	
M - 0 0 1	AUTOMATIC X-Y STAGE & CONTROL UNIT 〈ARS〉 **Automatically measures indentation Automate stage control**		⑱	**Indentation measurement is automated / Stage control is automated** Reduced reading errors by operators and greatly reduced work time. **System configuration :** .3M CMOS camera, camera attachment, automatic X-Y stage, control box, personal computer,23" LCD, connecting cable and exclusive control/data processing software. **Minimum unit :** 0.1 μm **Measurement scale :** HV, HK **Measurement method :** Shading image processing method **Repeat accuracy :** ±0.5% / HV500 500gf **Stage dimensions :** 110mm×110mm **Stage movement :** X50mm×Y50mm	
M - 2 0 6 A	AUTOMATIC MEASURING SYSTEM WITH AUTO-READ & STAGE & FOCUS 〈ARS-F〉 **Automatic focus, automatic indentation measurement, automatic stage**		⑲	**Fully automatic system** All processes of indentation formation, focus adjustment and indentation measurement after the sample setting are performed unattended. **System configuration :** 1.3M CMOS camera, camera attachment, automatic X-Y stage, control box, personal computer,23" LCD, connecting cable, joystick controller, sample contact prevention safety mechanism, and exclusive control/data processing software. **Minimum unit :** 0.1 μm **Measurement scale :** HV, HK **Measurement method :** Shading image processing method **Repeat accuracy :** ±0.5% / HV500 500gf **Stage dimensions :** 110mm×110mm **Stage movement :** X50mm×Y50mm	
M - 0 2 8	PRECISION VISE		⑦	Max. opening : 100mm	
M - 0 2 9	ROTARY TABLE		⑧	Graduation of rotary angle : 5 degree	Table diameter : ϕ 128mm
M - 0 3 0	THIN SPECIMEN MEASURING DEVICE		⑨	Specimen thickness : 5mm max	
M - 0 3 1	FINE SPECIMEN MEASURING DEVICE	VERTICAL TYPE	⑩	Specimen diameter : ϕ 5mm max	(For measuring the cross section)
M - 0 3 2		HORIZONTAL TYPE	⑪	Specimen diameter : ϕ 5mm max	(For measuring the cylindrical surface)
M - 0 3 3	SPECIMEN INCLINING DEVICE		⑫	Specimen height : 5 ～ 20mm	(For mounted specimen)
M - 0 3 4	UNIVERSAL INCLINING VISE		⑬	Inclining device + Vise Max. opening : 45mm	(For mounted specimen)
M - 0 0 4	DIGITAL PRINTER		⑳	RS232C type or CENTRONICS type	(For Hardness Tester)
			㉑	Ink - jet type	(A4 size)
M - 0 4 3	VIBRATION INSULATION STAND		⑭	AVT-0405 (Air type) / RET-0405 (Rubber type)	
M - 0 5 7	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 - 0 6 5	DUAL INDENTER TURRET (For FM-810 Series)		㉔	Used when installing two HV/HK indenters at the same time. (Please specify it when ordering the product.)	
M - 3 0 5	EXCEL DATA TRANSFER SOFTWARE FOR FM		㉕	Excel data transfer software (CD-R), RS232C cable for PC connection.	
M - 3 0 6	FOR EXCEL DATA TRANSFER SOFTWARE RS232C → USB CONVERSION CABLE		㉖	RS232C → USB conversion cable * Required when the PC side cable outlet is a USB port instead of RS232C.	

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