

# FV Series

VICKERS HARDNESS TESTER



# VICKERS HARDNESS TESTER FV-110/ FV-310/ FV-810 Series

Lab-friendly functions make FV Series Vickers Hardness Testers ideal for materials labs.

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

— One touch selection on touch panel —

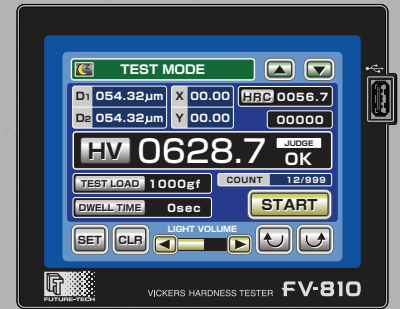
## OUTSTANDING FEATURES

### USB port output

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

### ADVANCED TOUCH PANEL OPERATION AND DISPLAY

- Clean Touch Panel coordinated with highly integrated PC board .
- Measuring procedures, conditions and data are displayed clearly. (FV-810 Series)



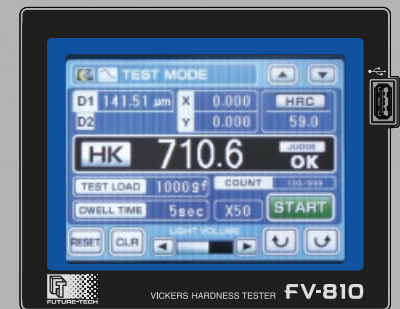
HV <FV-810 Series>

### BRINELL TEST

- Accurate light load Brinell Test is available as a standard function. Necessary additional optional item "Ball Indenter  $\phi 1\sim 5\text{mm}$ ". (FV-810 Series)

### FRACTURE TOUGHNESS TEST, 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 Vickers and Knoop, it is very effective to evaluate the quality of new material. (FV-810 Series)



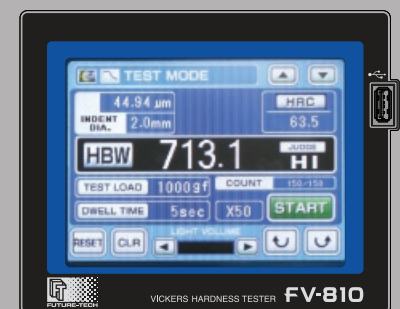
HK <FV-810 Series>

### CLEAR VIEW AND EASY MEASUREMENT

- 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)

### 4 OBJECT LENSES (OPTIONAL)

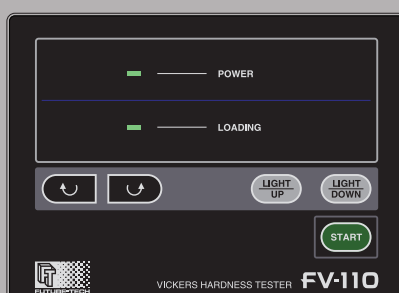
- The new turret mechanism enables to observe wide specimen area with up to 4 object lenses.
- Various magnifications easily available by rotating the correct objective into position.
- Placement of an indentation and its reading is more accurate and repeatable by choice of proper objective. (FV-810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



HBW <FV-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. (FV-810 Series)



<FV-110 Series>



<FV-310 Series>



K<sub>c</sub> <FV-810 Series>

# SPECIFICATIONS

MODEL		FV-110e	FV-110	FV-300e	FV-310	FV-810e	FV-810		
TEST LOAD	TYPE A	N : 9.807 kgf : 1	19.61 2	29.42 3	49.03 5	98.07 10	196.1 20	294.2 30	490.3 50
	TYPE B	N : 2.942 kgf : 0.3	4.903 0.5	9.807 1	29.42 3	49.03 5	98.07 10	196.1 20	294.2 30
LOADING MECHANISM		Automatic Load and Release Method							
LOAD APPLYING SPEED		Initial loading speed : 120 $\mu$ m / sec Actual loading speed : 60 $\mu$ m / sec (Automatic speed changing)							
DWELL TIME		5 ~ 40 sec			5 ~ 99 sec				
TURRET MECHANISM		Manual	Automatic	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	Type A : X10 / Type B : X10 & X20							
	Option	Max. 3 Lenses				Max. 4 Lenses			
EYEPIECE		X 10							
MEASURING MICROSCOPE	Type	Mechanical			Electronic				
	Max. Measurement length	800 $\mu$ m (In case of X 100) / 400 $\mu$ m (In case of X 200)							
	Min. Graduation	Micrometer : 0.5 $\mu$ m			Digital : 0.1 $\mu$ m (In case of X100 & X200) / 0.01 $\mu$ m (In case of over X400)				
	Min. Measurement unit	Eye judgment : 0.1 $\mu$ m			Digital : 0.1 $\mu$ m (In case of X100 & X200) / 0.01 $\mu$ m (In case of over X400)				
MAX. HEIGHT OF SPECIMEN		210 mm							
MAX. DEPTH OF SPECIMEN		165 mm							
AVAILABLE TEST PARAMETER		HV / HK				HV / HK / HBS / HBW / Kc			
BRINELL HARDNESS TEST		—				HBS & HBW available Option : Ball indenter & Light load			
FRACTURE TOUGHNESS TEST (Kc)		—				Conform to JIS R1607/ IF Method			
HARDNESS CONVERSION		—				Conform to SAE (J-417b) & ASTM (E-140)			
DATA MEMORY		—				Max. 999 Data			
OPERATION PANEL (SHEET SW for Type 110 / 310 & TOUCH PANEL SW for Type 810)		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 Type 110 / 310 & LCD for Type 810)		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-7725, ASTM E-92 and ISO 6507-2							
PHOTOGRAPHIC DEVICE		Capable to mount at anytime on top of the machine (Camera / Attachment : Option)							
DIMENSIONS		(W) 215 x (D) 517 x (H) 690 mm							
WEIGHT		Approx. 55 kg (Including Standard Accessories)							
POWER SUPPLY		Japan : Single phase AC 100 V 50 / 60Hz Overseas : Single phase AC 100 ~ 240 V 50 / 60Hz (Should be specified before shipment)							

# STANDARD ACCESSORIES

CODE NO.	ITEM	FV-110e	FV-110	FV-310e	FV-310	FV-810e	FV-810
V-039	STANDARD TEST BLOCK (HV 800)	1	1	1	1	1	1
V-013	DIAMOND INDENTER	FOR HV (BUILT-IN)	1	1	1	1	1
V-043	MEASURING MICROSCOPE (WITH X 10 EYEPIECE)	MECHANICAL TYPE	1	1	—	—	—
V-044		ELECTRONIC TYPE	—	—	1	1	1
V-018	OBJECT LENS (BUILT-IN)	X 10	TYPE A & B	1	1	1	1
V-017		X 20	TYPE A	—	—	—	—
			TYPE B	1	1	1	1
V-037	φ 60 mm FLAT	1	1	1	1	1	
V-035	ANVIL	V-SHAPE (LARGE)	1	1	1	1	1
V-036		V-SHAPE (SMALL)	1	1	1	1	1
V-053	LEVEL ADJUSTING LEG	4	4	4	4	4	4
V-054	INDENTER COVER (BUILT-IN FOR TESTING)	1	1	1	1	1	1
V-080	INDENTER SHAFT FIXTURE (FOR TRANSPORTATION)	1	1	1	1	1	1
V-052	POWER CORD	1	1	1	1	1	1
	AUXILIARY TOOLS (SCREW DRIVER:1pc/SPANNER:1pc/L TYPE WRENCH: 5 pcs)	1	1	1	1	1	1
V-041	HARDNESS CALCULATION TABLE FOR HV	1	1	—	—	—	—
V-056	MACHINE COVER	1	1	1	1	1	1
	HARDNESS CONVERSION TABLE	1	1	1	1	—	—
	INSTRUCTION & MAINTENANCE MANUAL	1	1	1	1	1	1
V-057	ACCESSORY BOX	1	1	1	1	1	1
	WEIGHT SET FOR TEST LOAD	1	1	1	1	1	1

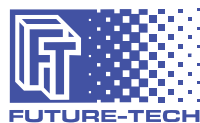


〈FV-310〉 (Type B)  
Digital Vickers Hardness Tester



〈FV-110〉 (Type B)  
Analog Vickers Hardness Tester

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



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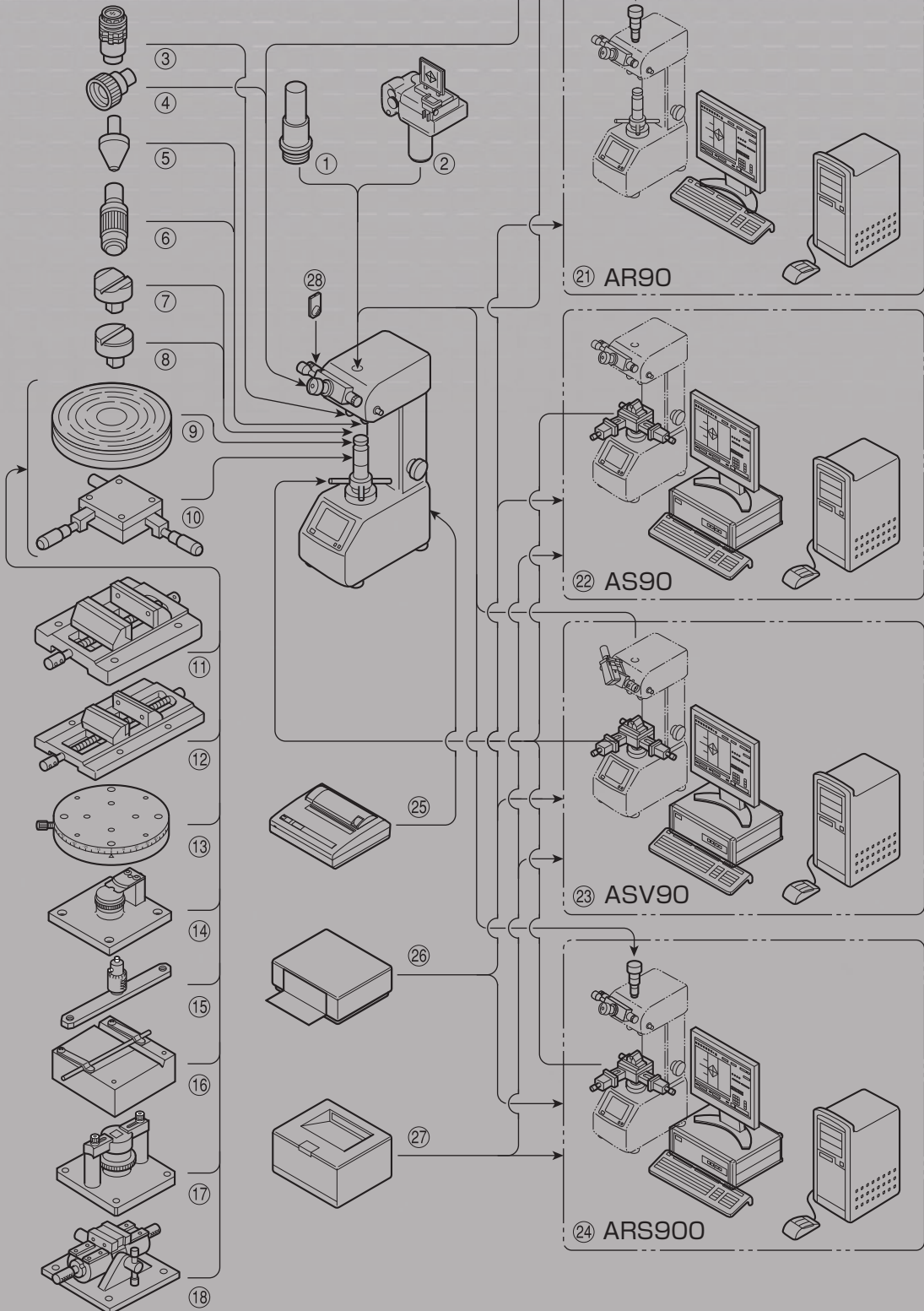
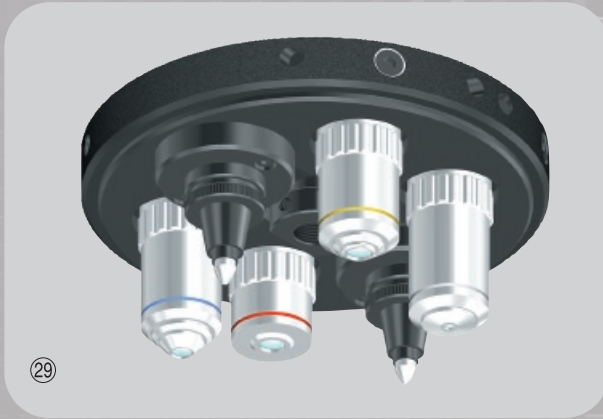
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Agent :



# FV Series

## SYSTEM CHART <OPTIONAL COMPONENTS>



# FV Series

## OPTIONAL ACCESSORIES

CODE NO.	ITEM		DESCRIPTION
V-014	KNOOP INDENTER ⑤		Rhombic diamond indenter for Knoop hardness
V-041	HARDNESS CALCULATION TABLE	FOR HV	5gf - 50kgf (This is standard accessory for FV-110/FV-110e.)
V-042		FOR HK	5gf - 50kgf
V-015	OBJECT LENS ③		X 100
V-061			X 50
V-016			X 40
V-017			X 20 (Standard accessory for TYPE B.)
V-019			X 5
V-062	EYEPIECE ④		X 15
V-022	COLOR FILTER ②⑧		φ20mm: Yellow & Blue ("Green" is standard accessory.)
V-023	COLOR TEMPERATURE CONVERSION FILTER		For the color monitor measuring device
V-024	NUMERICAL APERTURE		φ1~6 mm each selectable (6 kinds)
V-025	FIELD APERTURE		φ1~7 mm each selectable (7 kinds)
V-055	CAMERA MOUNTING TUBE ①		For adapting photographic camera & CCD camera
V-012	DIGITAL CAMERA ATTACHMENT ②		C MOUNT ATTACHMENT (Digital camera is not included)
V-008	MONITOR MEASURING DEVICE	Black & White ①⑨	B & W CCD camera + 8.4" LCD + L TYPE ATTACHMENT
V-009		Color	Color CMOS camera + 17" LCD + L-type attachment + Image saving function (with USB memory)
V-003	AUTOMATIC READING SYSTEM <AR90> ②①		<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
V-002 / V-002A	AUTOMATIC X-Y STAGE & CONTROL UNIT <AS90> ②②		<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
V-000 / V-000A	SEMI-AUTOMATIC MEASURING SYSTEM WITH AUTO-STAGE <ASV90> ②③		<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
V-001 / V-001A	AUTOMATIC MEASURING SYSTEM WITH AUTO-STAGE <ARS900> ②④		<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
V-038	ROUND TABLE ⑨		φ200 mm
V-026	MANUAL X-Y STAGE ⑩		Max. movement : 50 x 50 mm Min. micro inching : 1 / 100 mm Dimensions : 110 x 110 mm
V-027	PRECISION VISE ⑪		Max. opening : 50 mm
V-028			Max. opening : 100 mm
V-029	ROTARY TABLE ⑬		Graduation of rotary angle : 5 degree Table diameter : φ128 mm
V-030	THIN SPECIMEN MEASURING DEVICE ⑭		Specimen thickness : 5 mm max.
V-031	FINE SPECIMEN MEASURING DEVICE	VERTICAL TYPE ⑮	Specimen diameter : φ5 mm max. (For measuring the cross section)
V-032		HORIZONTAL TYPE ⑯	Specimen diameter : φ5 mm max. (For measuring the cylindrical surface)
V-033	SPECIMEN INCLINING DEVICE ⑰		Specimen height : 5 ~ 20 mm (For mounted specimen)
V-034	UNIVERSAL INCLINING VISE ⑱		Inclining device + Vise Max. opening : 45 mm
M-035	ANVIL	V SHAPE (Large) ⑦	Specimen diameter : φ13 ~ φ40 mm (For measuring the cylindrical surface)
M-036		V SHAPE (Small) ⑧	Specimen diameter : φ2 ~ φ6 mm (For measuring the cylindrical surface)
V-004	DIGITAL PRINTER ⑳		RS232C type or CENTRONICS type (For Hardness Tester)
			Ink-jet type (A4 size) (For Automatic System)
V-006	LASER PRINTER ㉑		Monochrome type (A4 size) (For Automatic System)
V-063~066	BRINELL HARDNESS TEST (For FV-810 Series)	TUNGSTEN CARBIDE BALL INDENTER ⑥	φ1, 2.5, 5 mm
V-067 } V-078		TEST WEIGHT	N 12.26 24.52 39.23 61.29 76.61 153.2 245.2 kgf 1.25 2.5 4 6.25 7.8125 15.625 25
			N 306.5 392.3 612.9 980.7 1226 kgf 31.25 40 62.5 100 125
V-058	MECHANICAL PARTS FOR ADDITIONAL OBJECT LENS		Turret internal parts for installing the second, third and fourth object lenses. (Please specify them when ordering the product.) The second object lens of TYPE B is supplied as standard accessory.
M-079	DUAL INDENTER TURRET (For FV-810 Series) ㉒		Used when installing two HV/HK indenters at the same time. (Please specify it when ordering the product.)