



SEMI-AUTOMATIC BRINELL HARDNESS TESTING MACHINE

MODELS : AKB-3000-N & OPAB-3000-N



MODELS : AKB-3000-N

Mastering the fine art of testing



MODELS: OPAB-3000-N

APPLICABILITY & RANGE OF APPLICATION :

- ▶ Semi-Automatic Brinell hardness testing machine is designed for measuring the Brinell hardness of steels & other ferrous materials as well as non-ferrous materials like Brass, Bronze, Aluminium, etc.
- ▶ This machine basically used in Foundries, Forging units, Engineering industries, Material testing laboratories & Heat treatment plants.
- ▶ Machine is simple in design, easy to operate, yet sensitive and accurate.
- ▶ Machine has facility to check hardness of flat or round or irregular shaped specimen with the help of fixture.

SAILENT FEATURES OF MACHINE :

- ▶ Specially designed fabricated main lever.
- ▶ Operation of the machine is by push buttons.
- ▶ Imported linear bearings are used for plunger movement, which gives better accuracy & repeatability.
- ▶ Hydraulic cylinder & piston assembly for lifting the main lever up or down is fitted directly below the main lever. Lifter shaft in-between piston & main lever is eliminated. This will increase reliability of the machine.
- ▶ Lever lifting piston is double acting. So better control and there is no spring pressure.
- ▶ The working pressure is reduced to 15 bar at 3.2 lpm flow rate. Due to this modification oil heating will be reduced.
- ▶ Pressure gauge has been provided in the hydraulic circuit.
- ▶ Solenoid operated valves are provided in the machine.
- ▶ Separate valves are provided for adjusting up / down speeds of lever.
- ▶ Cycle is fully automatic with adjustable load holding time.
- ▶ Power pack is completely within the body. Due to this the motor & pump noise is eliminated.
- ▶ Height of the oil tank and drain port is increased and therefore oil draining is easy.
- ▶ Proximity switches are used in place of limit switches for better accuracy and reliability.
- ▶ Ball and ball seat suspension is provided to fulcrum 'V' support of main lever. Ball bearing guides are provided to plunger for avoiding its rotation.
- ▶ Provision of fine lever ratio adjustment.
- ▶ Due to above salient features, the system friction is reduced to minimum and so improved repeatability. Much better accuracy, linearity & sensitivity of the system, thus the machine is more dependable.
- ▶ The machine accuracies strictly confirm to IS : 2281-2005 & BS : 240 standards.

MODEL: AKB-3000-N

CONSTRUCTION OF THE MACHINE :

- ▶ The machine body is of fully enclosed steel fabrication which protects the inside mechanism and systems from dust & extraneous elements.
- ▶ The machine has a C-shaped body, with top & back covers, with main nut & screw assembly at the bottom.
- ▶ The main screw will be raised or lowered manually depending on the height of the specimen.
- ▶ The specimen supporting table is fixed on the main screw or main screw extension top.
- ▶ Main screw extension is fixed with main screw to adjust the smaller job height.
- ▶ For the application of minor load of 250 kgf, specially designed fabricated main lever is used. This minor load of 250 kgf is adjusted in the effective weight of the main lever.
- ▶ For the application of minor load, the specimen is raised against the penetrator till the small pointer reaches the red dot marked on the dial gauge. A second auxiliary lever carrying weight pan at its extreme end is raised or lowered hydraulically.
- ▶ The weight is transferred to knife edges of the main lever during lowering of auxiliary lever. That means the weight of main lever is of 250 kgf load. The weight pan itself is equivalent to 250 kgf load and the ten loose weights supplied with the machine each equivalent to 250 kgf load, making a total load capacity of 3000 kgf.
- ▶ Load application system is of dead weight type & operated of the machine is by push buttons.
- ▶ At the lower rear portion of the frame, compact power pack is installed within the body, consists of oil tank, pressure gauge, solenoid operated valves, oil level indicator, flanged motor & gear pump in it. The delivery of gear pump is connected to the specially designed cylinder & piston assembly. This cylinder & piston assembly is fitted directly to auxiliary lever of machine for unloading & loading.

OPERATION OF MACHINE :

- ▶ Select proper diameter of ball indenter & fix it to the machine. Put correct weight on the loading hanger, which is fitted at the rear end of auxiliary lever.
- ▶ 'ON' push button for starting the hydraulic system & for initial lifting of auxiliary lever with weights.
- ▶ Then place the job on the table & raise it against the penetrator till the small pointer reaches the red dot marked on the dial gauge. This means minor load is applied on the job.
- ▶ Now 'CYCLE START' push button to press for complete loading / unloading process on job to a set time.
- ▶ Now release the minor load by taking down the main screw. Remove the job from the machine table & measure the diameter of indentation with the help of hand held microscope of 0.01 mm least count & of 25X magnification. Check the hardness 'HB' for the corresponding diameter in the hardness chart available in our supplied instruction manual.
- ▶ Then off the machine by pressing 'OFF' push button.

MODEL : OPAB-3000-N

CONSTRUCTION OF THE MACHINE :

The machine can be divided into three systems viz; Loading system, Optic system & Indexing system.

Loading System :

- ▶ The machine body is of fully enclosed steel fabrication which protects the inside mechanism and systems from dust & extraneous elements.
- ▶ The machine has a C-shaped body, with top & back covers, with main nut & screw assembly at the bottom.
- ▶ The main screw will be raised or lowered manually depending on the height of the specimen.
- ▶ The specimen supporting table is fixed on the main screw or main screw extension top.
- ▶ Main screw extension is fixed with main screw to adjust the smaller job height.
- ▶ Specially designed fabricated main lever is used. This main lever load of 250 kgf is adjusted in the effective weight of the main lever.
- ▶ For the load application, a main lever carrying weights at its extreme end is raised or lowered hydraulically.
- ▶ The weight is transferred to front knife edges of the main lever during loading. The weight of main lever with weight pan is of 500 kgf load and the ten loose weights supplied with the machine each equivalent to 250 kgf load, making a total load capacity of 3000 kgf.
- ▶ Load application system is of dead weight type & operated of the machine is by push buttons.
- ▶ At the lower rear portion of the frame, compact power pack is installed within the body, consists of oil tank, pressure gauge, solenoid operated valves, oil level indicator, flanged motor & gear pump in it. The delivery of gear pump is connected to the specially designed cylinder & piston assembly. This cylinder & piston assembly is fitted directly to main lever of machine for unloading & loading.

Optic System :

- ▶ This system consists of three sub assemblies:
 - a) Illumination system - Consists of Condensing tube, Condensing lens & Halogen bulb.
 - b) Magnification System - Consists of Matched optics, Mirror & Prism.
 - c) Measuring Device - Consists of Optical screen assembly with measuring line marked plain & frosted glass set & Micrometer with a least count of 0.01mm & 14X magnification.

Indexing System :

- ▶ An automatic indenter swiveling index head system is provided. This system is basically for bringing the indenter axis at the center of spindle axis before loading & also for tilting the indenter after the impression, so that the Optic axis is made clear for viewing the indentation on screen. The system operates automatically with a feedback from the position of the main lever.

OPERATION OF MACHINE :

- ▶ Select proper diameter of ball indentor & fix it to the machine. Put correct weight on the loading hanger, which is fitted to the rear end of main lever.
- ▶ ON' push button for starting the hydraulic system & for initial lifting of main loading lever with weights (Unloading position). Switch ON the toggle switch for halogen bulb. When the main lever is at the top position, the turret should get indexed such that the optic axis is clear for view.
- ▶ Now place the job on the table & take up screw such that the job just touches the lower support plate. In this position a clear image of the object is seen on the screen.
- ▶ Then 'CYCLE START' push button to press for complete loading / unloading process on job to a set time.
- ▶ Automatically after dwell time is completed, the job is unloaded & indentation is seen on the screen. Measure the diameter of indentation on screen with a least count of 0.01 mm. Check the hardness 'HB' for the corresponding diameter in the hardness chart available in our supplied instruction manual.
- ▶ Take down the main screw, remove the job from the machine table.
- ▶ Then off the halogen bulb by toggle switch & off the machine by pressing 'OFF" push button.

Ball size & Weight selection as per the material to be tested. Refer following table for selection :

Dia of ball (D)	Force required for various materials (F)		
	Ferrous 30 D2 (For soft steel castings, malleable cast iron = Hardness range 67 - 500 HB)	Brass 10 D2 (For light metal castings & forgings, die casting alloys copper, brass, bronze, nickel = Hardness Range 23 - 315 HB)	Aluminium 5 D2 (Pure aluminium, magnesium, zinc, cast brass = Hardness Range 11 - 158 HB)
10 mm	3000 kgf	1000 kgf	500 kgf
5 mm	750 kgf	250 kgf	-----
2.5 mm	187.5 kgf	-----	-----

Technical specifications :

Models	AKB-3000-N	OPAB-3000-N
Machine frame type	C-Type	C-Type
Test loads for Brinell test (kgf)	500 to 3000 in steps of 250	500 to 3000 in steps of 250
Maximum test height (mm)	380 (Standard) {With Standard flat table size of dia.200 mm} 300 (Optional) {With Optional Special large table size of 500 mm (L) x 380 mm (W) x 50 mm (T)}	380 (Standard) {With Standard flat table size of dia.200 mm} 300 (Optional) {With Optional Special large table size of 500 mm (L) x 380 mm (W) x 50 mm (T)}
Depth of throat (mm)	200	200
Load capacity of table (kg)	40	40
Diameter of balls used for indentation (mm)	5 & 10	5 & 10
Device for indentation measurement with magnification	By a separate hand held microscope of 25X magnification (Diameter is to be measured separately on hand held microscope & hardness value to see from hardness chart provided in our instruction manual).	Inbuilt optical screen with 14X magnification (Diameter is to be measured directly on optical screen & hardness value to see from hardness chart provided in our instruction manual).
Maximum diameter of indentation which can be measured (mm)	6	6
Least count of measuring device (mm)	0.01	0.01
Hardness measuring range (HB)	50 to 600	50 to 600
Operation of the machine	By push buttons	By push buttons
Accuracy of load measurement (%)	± 1	± 1
Oil used for hydraulic system (Grade / Qty) (To be arranged by customer)	Servo System 32 No. OR Veedol Avalon 68 No. of required quantity 22 liters.	Servo System 32 No. OR Veedol Avalon 68 No. of required quantity 22 liters.
Drive motor (hp / rpm)	0.5 / 1400	0.5 / 1400
Mains supply	3-Phase, 415-Volts, 50-Hz, AC	3-Phase, 415-Volts, 50-Hz, AC
Net weight of machine (kg) approx.	400	425
Overall size of the machine (mm) approx.	(L) 750 x (W) 425 x (H) 1250	(L) 750 x (W) 425 x (H) 1250

Standard Accessories :

Models	AKB-3000-N	OPAB-3000-N
Flat testing table dia.200 mm	1 No	1 No
"V" Groove testing table dia.70 mm for round jobs of dia.10 to 80 mm.	1 No	1 No
Ball holder with TC ball of dia. 5 mm	1 No	1 No
Ball holder with TC ball of dia. 10 mm	1 No	1 No
Standard Test Block HBW - 5/750 (With manufacturers certificate)	1 No	1 No
Standard Test Block HBW - 10/3000 (With manufacturers certificate)	1 No	1 No
Measuring Device	Separate hand held optical microscope	Direct reading optical device (Screen assembly with plain & frosted glass set)
Allen Spanner Set	1 Set	1 Set
Instruction Manual	1 Book	1 Book

Following Special Models are also available:

Models	AKB-3000 (SPL)-N	OPAB-3000 (SPL)-N
Machine & Accessories as per all the above specifications will be supplied, except few specification changes given below AND additional accessories will be supplied as given below.	1 No	1 No
Test loads for Brinell test (kgf)	187.5, 250, 500 to 3000 in steps of 250	187.5, 250, 500 to 3000 in steps of 250
Diameter of balls used for indentation (mm)	2.5, 5 & 10	2.5, 5 & 10
Net weight of machine (kg) approx.	425	450
Ball holder with TC ball of dia. 2.5 mm	1 No	1 No
Standard Test Block HBW -2.5/187.5 (With manufacturers certificate)	1 No	1 No
Standard Test Block HBW - 5/250 (With manufacturers certificate)	1 No	1 No

Optional Accessories :

Test Block of desired hardness range (NABL Certificate for any Standard Test Block will cost extra).
Special Test fixtures for odd jobs / Production testing.
Special heavy duty large table size of 500 mm (L) x 380 mm (W) x 50 mm (T).
Brinell Impression Measuring System (BIMS) with software for above models.
We can also supply with motorized lifting table with single screw or twin screws for Optical Brinell hardness tester.

Note : Unloading of machine to customer site, Unpacking of machine, Foundation of machine with foundation bolts & nuts in it, Keeping the machine on foundation, Hydraulic oil of required quantity & Electric supply to be arranged by customer at his cost

We can also supply : Universal testing machines, Compression testing machines, Tensile testing machines, Horizontal chain & rope testing machines, Spring testing machines, Vickers / Brinell / Rockwell hardness testing machines, Vertical & Horizontal Dynamic balancing machines, Impact testing machines, Torsion testing machines, Fatigue testing machines, Portable Dynamic hardness tester & Special purpose Material testing machines, etc.

Sold & Serviced by -



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