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ISHB-M100
AUTOMATIC BRINELL HARDNESS TESTER
OPERATION MANUAL

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VIDEO

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Attention

1. Please don't rotate lift handwheel during dwelling.
2. Please fix the lever and stage as factory default before moving the machine, also recover the package and protection when transport the machine.

Maintenance

1. It is necessary to read carefully the usage instruction manual before the operation of the present instrument, in order to know the operational procedures and the precautions so as to avoid the damages to the instrument caused by the incorrect operation.
2. The power source of present instrument should be equipped with a voltage-regulator and a reliable grounded device. It is prohibited to dismount and alternate without permission all the electric component parts, the switches and the sockets as well as their fixed positions; otherwise the instrument will be error and caused unsafe accidents.
3. During the loading and unloading of test force, the instrument will produce a slight sound, it means that the instrument is regulating the structure automatically, and it is working in order.
4. It is necessary to oil and lubricate periodically the moving surface on such parts as the thread rod, etc.
5. The instrument should be disconnected with the power source after it has finished the measurement completely.
6. The instrument should be kept clean. It should be covered with Anti-Dust Bag after test. The Standard Test Blocks and Ball Indenters should be coated rust protecting oil to avoid rusting.

Description

1. **Brief introduction:**

This Model Digital Brinell Hardness Tester controlled by single-chip microcomputer, acquire signals by sensor, loading by stepping motor, It's a closed-loop control system.

The Brinell hardness test is suitable for to test hardness value of the cast iron, steel, non-ferrous metal and soft alloy materials, besides, it is also fit for testing hardness value for some non-metal materials such as hard plastic and Bakelite, etc. therefore the instrument is widely used in the factory, workshop, laboratories, universities and the scientific research institutes.

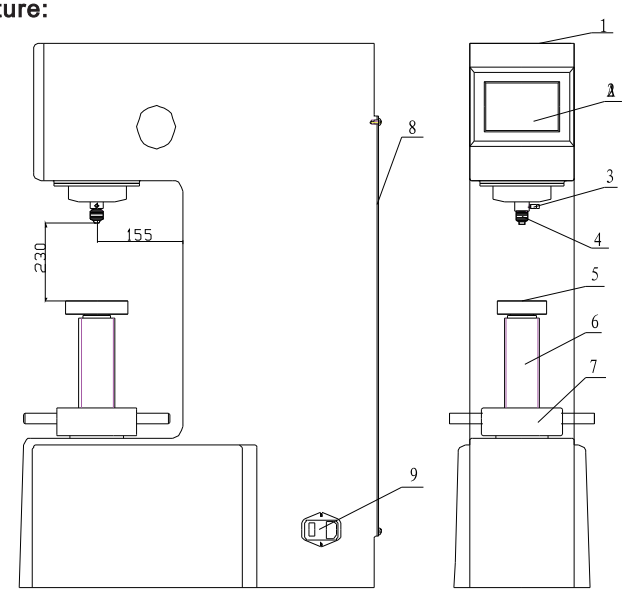
2. **Main technical specifications:**

Measuring range: 8 ~ 650HBW
Reading method: digital
Test force: 62.5, 100, 125, 187.5, 250, 500,
750, 1000, 1500, 3000kgf
Max. workpiece height: 230mm
Max. workpiece depth: 155mm
Load control: automatic (load/dwell/unload)
Load dwell time: 0 ~ 60s
Measuring microscope：20X, the graduation is 0.01mm
Power supply: 220V, 50/60Hz
Dimension: 550×210×750mm
Weight: 110kg

3. **Accuracy and repeatablility:**

Standard value	Accuracy	Repeatability
≤125HBW	±3%	3%
125<HBW≤250	±2.5%	2.5%
>250HBW	±2%	2%

A 4 **Structure:**



1. Upper Cover 2.Touch Screen 3.Indenter Screw 4.Indenter 5.Testing Table 6.Lifting Screw 7.Wheel 8. Rear Cover 9.Power Switch

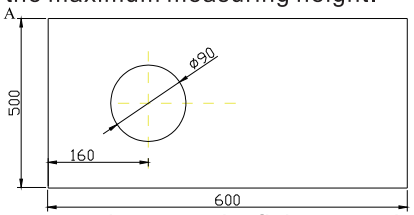
Unpacking and installation

1 Operational Conditions:
Room temperature within 10~30 ℃;
Relative room humidity inferior to 65%;
In an environment without any shock or vibration;
In a surrounding without any corrosive medium.

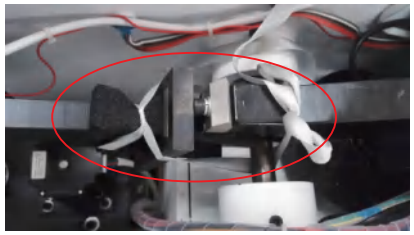
2 Open the wooden box, take out the protection bubbles and accessary box.
Open the hardness packaging bag, take out dust cover and operation manual etc.
Note: Please wear gloves to prevent injury during process.

3 Remove two M10 screws on the base board as picture 1, to move the hardness tester.

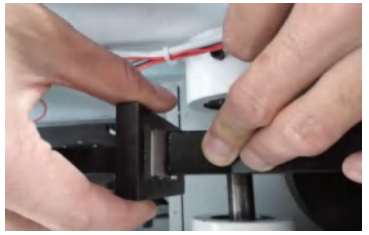
4 The hardness tester should be put on a stable stage after unpacking, and take the base when moving. And the levelness of the stage should be no more than 1mm/m. A hole shall be drilled at an appropriate location on the stage to enable the thread rod to go down and get the maximum measuring height.

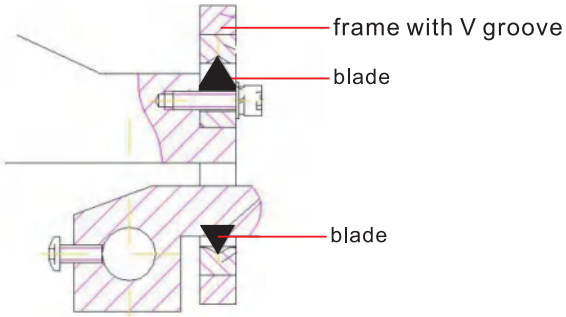


5 Open the top cover and remove the fixing material as following.



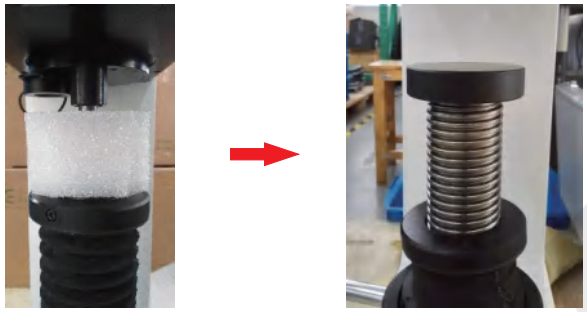
6 Press the front lever and make fit blades into the V groove of the frame. Please note the blades should be properly fitted both up and down.





7 Re-mount the top cover.

8 Turn down the stage and remove the protection foam, also the move down the cover of the thread rod and then put on the stage.
Note: **The thread rod should be oiled for rust protection.**

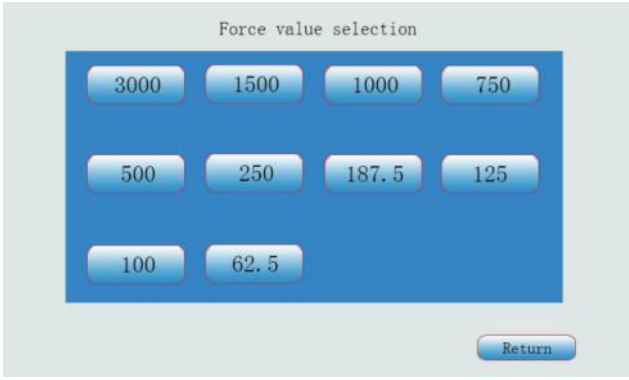


9 Connect the power cable and turn on the machine.

Introduction to touch screen

1 Open the power switch, pop up operation interface.

2 Click the force value [ ], select the test force.



3 click Retention time [ ], set the dwell time.10~15 seconds for ferrous metal, 30 seconds for non-ferrous metal, 60 seconds for those hardness value is less than 35HBW.

4 The test force is factory calibrated, generally no longer allowed users to calibrate, if there's special circumstances, please contact our company, Counseling by staff and calibrated, the method is very simple.

5 Click the calculate button in the main interface to enter measurement interface. Input the actual measured values of D1 and D2 into the corresponding box. Click on "Calculate" to automatically calculate and display Brinell hardness values, no need to look-up table calculation.

Operation

Preparatory work:

1.1 The surface of the specimen must be clean. There can't be dirty, oxide skin, pits or significant processing trace, must ensure that the test force is applied perpendicular to the specimen.

1.2 The minimum thickness of the specimen shall be more than10 times the depth of the indentation. There can't be visual deformation traces on the back of specimen after testing. Relationship between minimum thickness of specimen and hardness.

Indentation's average diameter	Specimen's minimum thickness			
	Ball diameter			
	D=1	D=2.5	D=5	D=10
0.2	0.08			
0.3	0.18			
0.4	0.33			
0.5	0.54			
0.6	0.8	0.29		
0.7		0.4		
0.8		0.53		
0.9		0.67		
1		0.83		
1.1		1.02		
1.2		1.23	0.58	
1.3		1.46	0.69	
1.4		1.72	0.8	
1.5		2	0.92	
1.6			1.05	
1.7			1.19	
1.8			1.34	
1.9			1.5	
2			1.67	
2.2			2.04	
2.4			2.46	1.17
2.6			2.92	1.38
2.8			3.43	1.6
3			4	1.84
3.2				2.1
3.4				2.38
3.6				2.68
3.8				3
4				3.34
4.2				3.7
4.4				4.08
4.6				4.48
4.8				4.91
5				5.36
5.2				5.83
5.4				6.33
5.6				6.86
5.8				7.42
6				8

2 Operation of the hardness tester

2.1 Such as HBW10/3000. Install the 10mm indenter into main shaft hole and make it close to the bearing surface. Aim the notch of the indenter to the screw, and then tighten the indenter screw(3) slightly.

2.2 The testing table(5) should be place in the hole of the lifting screw(6).

2.3 Continue rotating the wheel(7) until the specimen touches the indenter and the actual force value in the bottom of interface is larger than 90, the instrument would make a sound like “Du”,then the instrument automatically applies the test force to 3000kgf ,retention for 10 seconds, unloading and back to main screen.

NOTE: 500kg~3000kg test forces be selected, rotate the wheel to make the test force larger than 90kg,the instrument would make a sound like “Du”,then the instrument automatically applies the test force.

62.5kg~250kg test forces be selected, rotate the wheel to make the test force about 27~37kg,the instrument would make a sound like “Du”,then the instrument automatically applies the test force; If the manual force is larger than 37kg, the instrument issues a “Du, Du, …” constant sound and does not work, please descend the testing table, and retest, do not applies test force larger than 37kg.

2.4 The hardness test should be uniformly distributed on the specimen. The distance between two adjacent indentation's centers should be not less than 3 times the diameter of the indentation; the distance between the indentation center and the edge of the specimen should be not less than 2.5 times the diameter of the indentation. Please test according to what mentioned above, otherwise the indentation will be asymmetric and the hardness value will be incorrect.

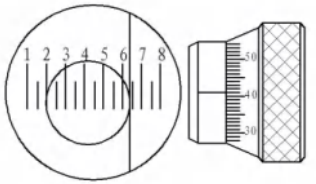
2.5 The electric of the instrument uses the loop control system; it can dynamically reflect the real changes of the test force. During the whole dwell time, the display window “test force” constantly shows the instantaneous force value, with the indenter gradually pressed into the specimen, force value decreases. And when the value is reduced to a prescribed error range, the instrument will automatically adjust that the test force will always be maintained in the specified range.

3 Usage of the Reading Microscope

3.1 Additional reading microscope is mainly used for Brinell hardness indentation measurements; it has the advantages of simple structure and convenient operation.

3.2 Put the tested hardness block on a stable table and place the reading microscope on the hardness block, with the notch of the long lens barrel faced to natural light or illuminated with light. Rotate the eye guard on the eyepiece and make the indentation edge clear.

3.3 Make any digit of the fixed glass of the eyepiece as the starting line left tangent to the indentation, stable the reading microscope, rotating the drum wheel, and make the movable glass lines right tangent to the indentation.



3.4 Read from the eyepiece, the integer value is 6-2 = 4mm, and accumulate the remaining fraction, the method is as follows: read from the drum wheel, it's 41 grids, and each grid for 0.01mm, then 41×0.01mm = 0.41mm, the indentation diameter is 4mm+0.41mm = 4.41mm. Check the “Brinell hardness control table”: 186HBW10 / 3000.

3.5 Maintenance of the reading microscope

3.5.1 The precision of the reading microscope has been adjusted before ex-factory. Don't disassembly and assembly voluntarily.

3.5.2 The reading microscope should avoid the environment of dust, damp and corrosive gases when stored and used.

3.5.3 If the surface of the reading microscope lens is dirty, it can be wiped by soft cotton and lens paper; if it is oil polluted, it can be wiped by the cotton dipped in a little mixed liquid of alcohol and ether.