

MHVS-10AT Touchscreen digital Micro Vickers hardness tester

1、 Introduction:

MHVS-50AT Touchscreen Micro Vickers hardness tester It is a high-tech product of optoelectronic integration. The instrument is novel and beautiful, and it has good reliability, operability and intuition. It is an upgraded product of Vickers hardness tester.

The machine adopts computer software programming, high-power optical measurement system and closed-loop control technology of sensors. Through software input, it can adjust the test force, select Vickers and Kirschner test methods and holding time, and provide various hardness conversion tables for reference. It can display test methods and testing forces on color touch screen; measure indentation length, hardness value and testing. Force retention time, number of measurements and the ability to type in year, month, date, test results and data processing, etc., through the printer output. The hardness tester is equipped with indentation image automatic analysis system, which can photograph and measure the indentation and metallographic structure of materials. It is suitable for measuring Vickers hardness of micro, thin-shaped and surface-infiltrated coatings, and measuring Vickers hardness of brittle materials such as glass, ceramics, agate and gemstone. It is an ideal hardness test for research and testing by scientific research institutions, enterprises and quality inspection departments. Instruments.

2、 Main technical parameters

Test force:	0.3、 0.5、 1、 2、 3、 5、 10Kg
Loading method:	Automatic loading and unloading
Magnification of a microscope:	100X (Observation) 200X(Measurement)
Dwell time:	0~60s(It can also be determined according to need)
Minimum Resolution of Micro indentation:	0.01μm
Maximum height of specimen:	100mm
Maximum width of specimen:	320mm
Host weight:	About 45Kg
Power supply:	AC220V/50Hz
Shape size:	520×240×560mm

3、 Installation and adjustment of instruments

1. Working conditions of hardness tester

- 1) Within the range of 23±5°C, room temperature;
- 2) Horizontal placement on a firm basis;
- 3) In a vibration-free environment;

- 4) Peripheral non-corrosive medium;
 - 5) Indoor relative humidity not more than 65%
2. Unpacking and Installation
- 1) Remove the outer packing box, take out the main packing box, remove the lid and remove the main packing box.
 - 2) Separate the main body (1) from other accessories (Figure 1);
 - 3) Remove the horizontal adjusting screw (19) from the attachment box and rotate it at the bottom of the main body.;

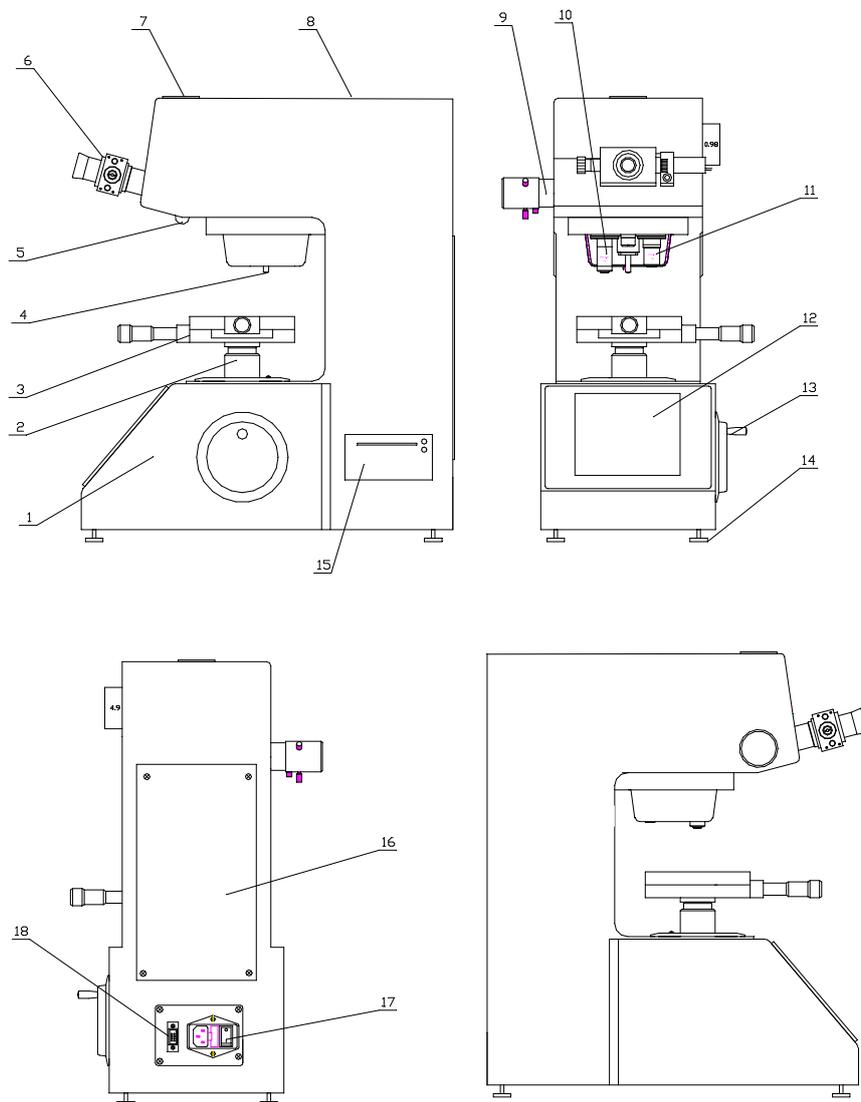


Fig1

1. Main machine 2. Lifting screw 3. Cross test bed 4. Indenter 5. Photography and Measurement pull rod

6. Digital micrometer eyepiece 7. Photographic cover plate 8. Upper cover
 9. Measuring lamp holder 10. 10^XObjective lens
 11. 20^XObjective lens 12. Display operation panel 13. Focusing hand wheel
 14. Horizontal adjustment screw 15. Thermosensitive printer
 16. Back cover 17. Power switch socket 18. 232 Communication interface
- 4) Pull out the dust cover of the micrometer eyepiece, remove the micrometer eyepiece from the accessory box, insert it into the eyepiece tube hole, and insert the plug into the right socket of the main body.;
 - 5) Remove the test-bed from the attachment box, wipe the rust-proof oil with gasoline, and then apply a suitable amount of thin grease after drying.
 - 6) Install cross test bed on lifting screw and fasten with screw;
 - 7) Place the level gauge on the cross test bed, adjust the horizontal adjustment screw before and after adjusting, so that the blister is in the middle.

4 . Introduction of Touch Screen panel Function

4.1 Opening page (Fig 4)

4.2 Operating page (Fig5)

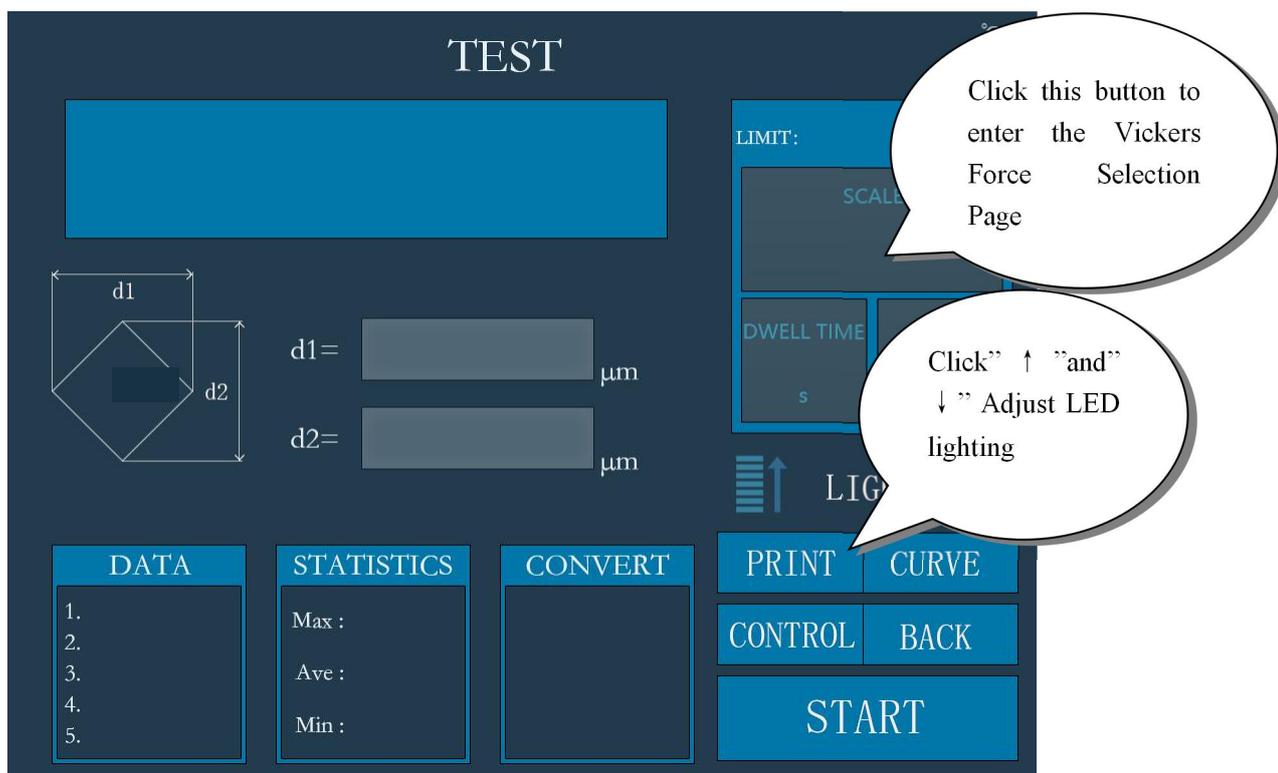


图 5

4.3 System Settings Page (Fig 6)

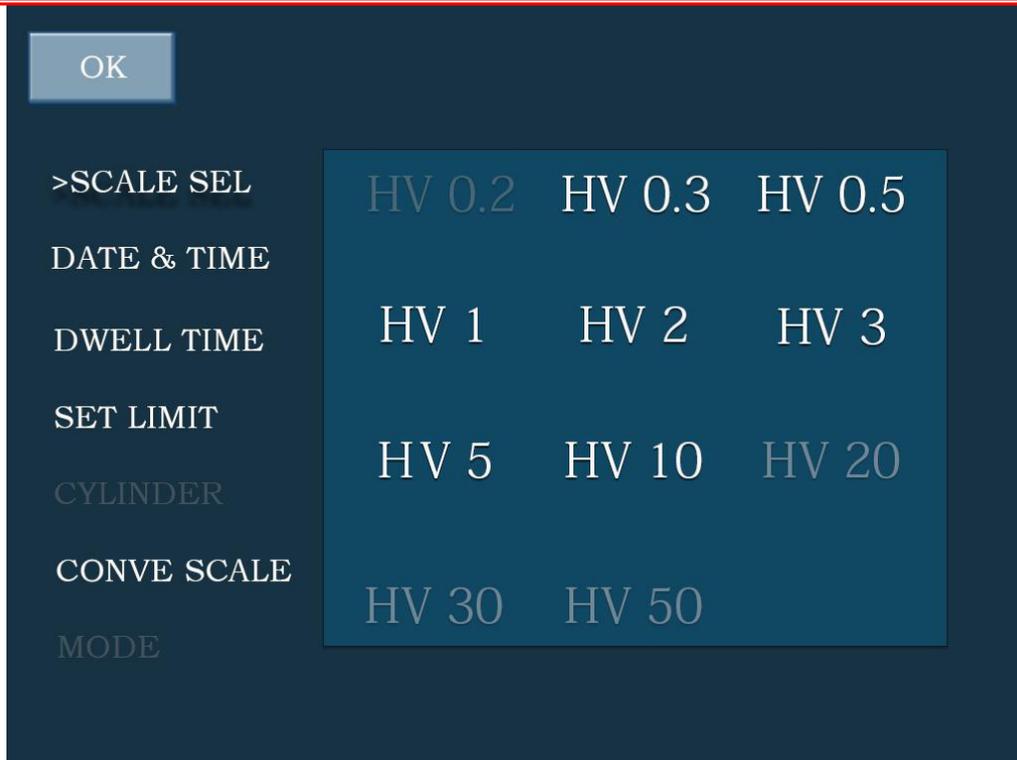


Fig 6

Note: Click the button in the picture above to enter the corresponding settings page.

4.5 Dwell time setting page(Fig 8)



Fig 8

4.6 Convert hardness setting page (Fig 9)



Fig 9

Note: Click on the corresponding scale in the picture above to set the convert hardness scale.

4.7 Time Settings Page (Fig10)



Fig 10

4.8 Test force Selection Page (Figure 11)

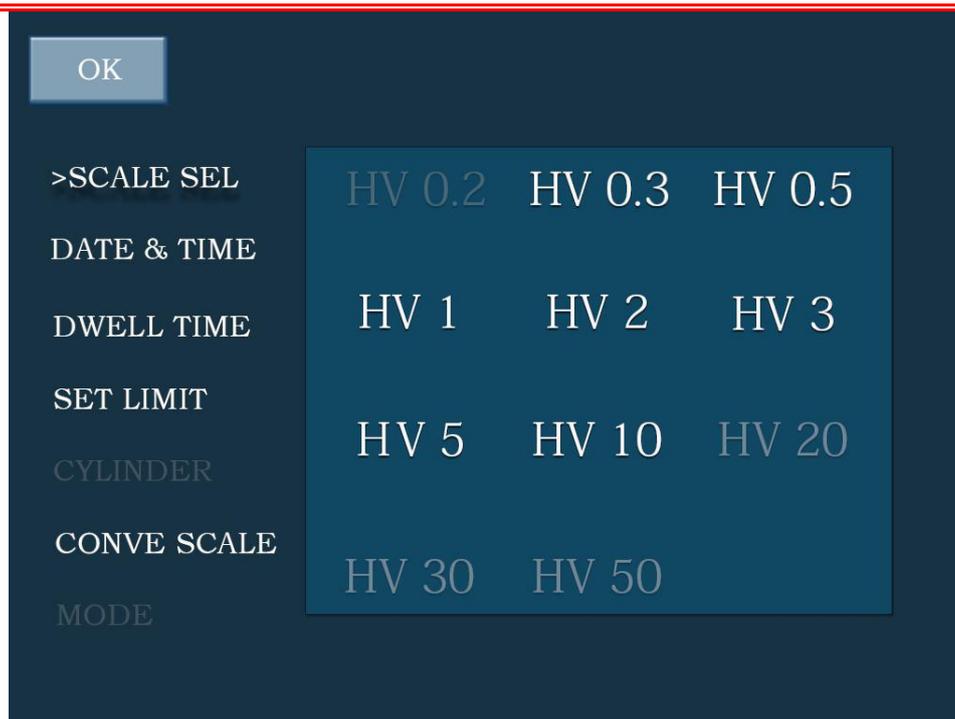


Fig 11

5. Use of hardness tester

- 5.1 The switch board is located at the back of the instrument. The power cord is taken out of the accessory box and connected to the power supply.
- 5.2 Turn on the power switch, light up the main screen, and select the test force according to the requirements.
- 5.3 At this time, the main screen shows (see Fig. 5). **Zero position must be calibrated every time the machine switch on.** When the drum is turned clockwise, the lines in the field of view move close, and when the edges of the two lines are close, the transmission gap decreases gradually. When the two lines are in the critical state with or without optical gap (see Fig. 14), press the button on the eyepiece for about 5 seconds (i.e. zero), then the instrument enters the standby state. At this time, the sample can be placed and the test can be started by pressing the "start" button after focusing.
- 5.4 When the hardness tester is turned on, the 20x objective is automatically transferred to the forward position of the main body (the magnification of the optical system is 200x, the measurement state), and the 10x objective is used for observation (the magnification of the optical system is 100x at this time).
- 5.5 The standard specimen or sample should be placed on the test bench (placed in the center of the objective lens). Turn the upward screw of the focusing handwheel. When the lower end of the objective lens is 1-3 mm apart from the specimen or sample, the brightness gradually increases, indicating that the focusing surface is coming. At this time, the focusing handwheel should be rotated slowly until the clear image of the test block or sample surface is observed in the eyepiece, and the focal length has been adjusted.

- 5.6 If there are local light and dark conditions in the planar image of the test block, the three adjusting screw on the light source device can be adjusted so that the light source is in the central position. If the field of view is too bright or too dark, the light intensity can be directly adjusted to a comfortable and clear state by pressing the "" key on the panel.。
- 5.7 If you want to observe a large field of view on the surface of the test block (such as finding the preset position, etc.), the 10x objective is converted to the front of the main body. The focal plane of the 20x objective is slightly different from that of the 10x objective. The preset position can be found by moving the sample focus up and down by rotating the first wheel of focusing and moving the X-Y platform. Note: If the hardness test is to be carried out, please rotate the 20x objective lens in front of the main body to make the image clear, because the instrument adjusts the coordination between the components based on the 20x objective imaging.
- 5.8 Press the "Start" button on the panel to load the instrument. At this time, the upper right of the main screen shows "in test" indicating that it is being tested. After the end of the test, the 20X objective will automatically turn back to the measuring position. At the same time, the buzzer emits a "beep" sound, indicating that the test is over and can be measured.
- Note: If the surface of the sample is uneven or has many surfaces, when switching the indenter, care should be taken to prevent the indenter from touching the sample.**
- 5.9 Observe the indentation image in the eyepiece and control the movement of the test head up and down to make the image clear. Because the indentation has depth, when enlarging the 200X objective, the tiny depth still affects the focal plane, which is normal.
- 5.10 Move the eyepiece's marking to make it close step by step. When the inside of the marking is infinitely close, the inside of the two markings is in a critical state without light gap (see figure 14). Press the button on the eyepiece for about 5 seconds (i.e. clearing zero). At this time, the number of d1: on the main screen is zero, which is the zero position in the terminology.
- 5.11 Turn the handwheel on the right to separate the markings, then move the drum on the left side of the eyepiece to move the markings on the left side. When the inner side of the left markings is tangent to the intersection point of the left shape of the indentation, then move the right markings so that the inner side is tangent to the intersection point of the indentation shape. Press the measuring button on the lower eyepiece to complete the measurement of the diagonal length d1. Move the eyepiece 90 degrees. Angle length d2, press the measuring button, then the home screen shows the indication of this measurement and the hardness conversion. If you think there is an error in the measurement, you can repeat the above procedure to measure again.

5.12 At the end of the first test, the second test can be carried out. According to the requirements of the verification rules, the first indentation is not counted, so the hardness of the second indentation is the first time recorded in the test number. At this time, the state of the home screen is displayed in the test number: 1 time.

5.13 When the indentation image is too large in the eyepiece (referring to 60% of the eyepiece field of view as the effective field of view), please reduce the test load. Otherwise, there is a certain error in the value obtained. If the indentation observed in the eyepiece is small, the test load can be increased (within the allowable range, otherwise it may break down the specimen), so as to improve the measurement accuracy.

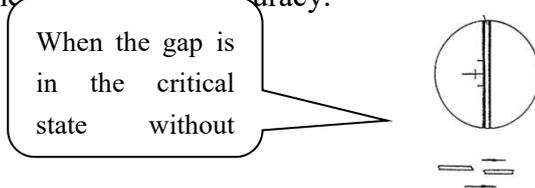


Fig 14

5.15 Click the "control" button in the main interface, enter the control interface, press the corresponding "right lens", "press head" and "left lens" to control 10X and 20X lens and press head switch, slide brightness adjustment prescription, and then press "determine" to adjust lighting brightness.

6. Adjustment of hardness tester and matters needing attention

6.1 Before using the instrument, carefully read the instructions, understand the operation steps and the matters needing attention in detail, so as to avoid the instrument damage or personal safety accidents caused by improper use.

6.2 When installing and debugging the instrument, please carefully tear off the tape used to protect the press head and transport the shock-proof tape. Overexertion will destroy the positioning accuracy of the press head.

6.3 It is strictly forbidden to disassemble and assemble the electrical, mechanical and optical devices of this instrument. If disassembled and assembled without authorization, accidents may occur.

6.4 When the test force is loading or unloading is not completed (i.e. when "in test" appears at the upper right of the main screen under the test condition, turning the turntable is strictly prohibited, otherwise the instrument and diamond indenter will be damaged.

6.5 When the instrument is in the measuring state, please do not apply the test force. If you press the "start" button carelessly, only wait for the test force to be applied, the objective will automatically rotate and then measure.

6.6 diamond indenter

Diamond indenter and indenter shaft are very important parts of the instrument, so we should be very careful not to touch the indenter in operation.

- (2) In order to ensure the accuracy of the test, the pressure head should be clean. When it is contaminated with oil or dust, it can be dipped with alcohol (industrial) or ether with degreased sponge and wiped carefully and gently at the top of the pressure head.
- (3) There is a red mark on the outer circle of the indentation head. When the indentation head is unloaded and reloaded, the red dot should be in front of the indentation head. At this time, the diagonal intersection of the indentation and the red dot are in line. (See Figure 17)

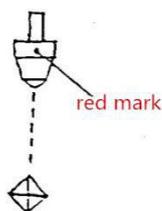


fig17

6.7 Micrometer eyepiece

- ① Because of the parallax of each person, the markings in the field of view of the eyepiece may be blurred. Therefore, when the observer changes the person, the eyepiece lens should be rotated slightly to make the inner measurement of the markings in the field of view clear.
- ② When measuring the indentation diagonal line and turning the eyepiece 90 degrees in the eyepiece tube, we should pay attention to the micrometer eyepiece close to the eyepiece tube, so that it can not leave gaps, otherwise the measurement accuracy will be affected.

6.8 Microscopic light source

The central position of the light source lamp will directly affect the image quality of the indentation. If the image quality is blurred or the brightness is not uniform, the center needs to be adjusted. Three screws can be carefully adjusted so that the central position of the light bulb is consistent with that of the light source. (See Figure 18)

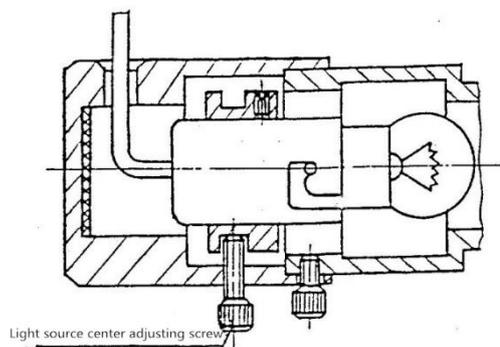


Fig 18

6.9 Sample

- ①The surface of the sample must be clean. If the surface is contaminated with grease and dirt, the accuracy of measurement will be affected. When cleaning the sample, it can be wiped with alcohol or ether.
- ②When the sample is fine wire, thin sheet or small piece, the fine wire clamping table, thin sheet clamping table and mouth clamping table can be used respectively. The small sample must be polished and then tested. The surface roughness of the specimens is not more than 0.05 micron, and that of the supporting surface is not more than 0.8 micron.

6.10 Test optical path switching

- ①Open the white plastic cover on the top cover and screw the optical connector in the accessory box into the eyepiece seat thread.
- ②Take out the CCD camera and connect the camera interface to the other end of the optical connector.
- ③Observe the surface in a micrometer eyepiece. When the image is clear, pull out the photogrammetric transfer rod on the left side of the main body. This time path is changed to the shooting state.
- ④In the hardness test software window, if the surface of the sample is not clear, the image can be made clear by controlling the movement of the test head up and down by the software.

7、Accessories (packing list)

1. Main machine (Including a Micro Vickers indenter, 10x、20x objective lens)

2. Test bed、Microscope accessories

Cross test bed	1
Slice clamping table	1
Flat-mouthed clamping table	1
Filament clamping table	1
screwdriver	2
Horizontal adjustment screw	4
Power cord	1
10xDigital micrometer eyepiece	1
Vickers hardness block	1 sets (2 pieces)
Level	1
Spare core	2

3. Hardness Testing Software Analysis System (Contracted)

Image analysis software 1

CCD	Camera
1	
Optical tie rod	1
Computer (can be configured according to user's requirements)	1
4. Product Qualification Certificate	1
5. Manual book	1