uVicky-1A-2E
Micro Vickers Hardness Tester
Instruction Manual



Anhui Mikrosize Precision Instrument Co.,Ltd

Add: A-4035 RuiFeng Business Expo, Wuhu City, China, 241000.

Web: www.mikrosize.com **Email:** mikrosize@mikrosize.com

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1. Introduction

1.The standard 8-speed force, from 10gf (0.098N) - 1kgf (9.8N);

2.Measuring the indentation diagonal length(the length of the indentation diagonal), the system automatically calculate and display the hardness value;

3.During the testing, the position of its indenter and objectives can be shifted automatically; hence the auto position(automatic positioning) of testing point is accuracy;

4.Calibrate according to scale or standard test block,the hardness value is automatically corrected;

5.8'touch screen, easy to operate.

6.According to the national standard /ASTM to automatically convert the hardness value;

7.Using a modular design, easy maintenance;

2. Main Parameters

Test force	10gf (0.098N)、25gf (0.245N)、50gf (0.49N)、100gf (0.98N)、200gf (1.96N)、300gf (2.94N)、500gf(4.9N)、1kgf (9.8N)
Carried standard	GBT4340.1，GBT4340.2，ASTM_E92
Min measuring unit	0.01μm
Conversion scale	HRA、HRB、HRC、HRD、HRF、HV、HBW、HR15N、HR30N、HR45N、HR15T、HR30T、HR45T
Hardness measurement range	8~2900HV
method of testing force applied	Automatic （loading、dwell、unloading）
Turret type	Automatic
Test microscope magnification	100X（observation）400X(testing)
Dwell time	1~99s
X-Y stage	Size：100*100mm Max movement：25*25mm
Max height of specimen	100mm
Distance from the center to the outer wall of the indenter	130mm
Power supply	AC220V+5%，50-60Hz
Dimension	540*260*650mm
Weight	About 50Kg

3. Installations and Debugging

1 Working condition of hardness tester

1.1 Room temperature within 23±5°

1.2 Installed in a horizontal position on a solid basement

1.3 In an environment without any shock or vibration;

1.4 In a surrounding without any corroding agent

1.5Relative room humidity(Room relative humidity) inferior to 65%

2. Unpacking and installation

2.1 Unpack the outer box, take out the accessories kit

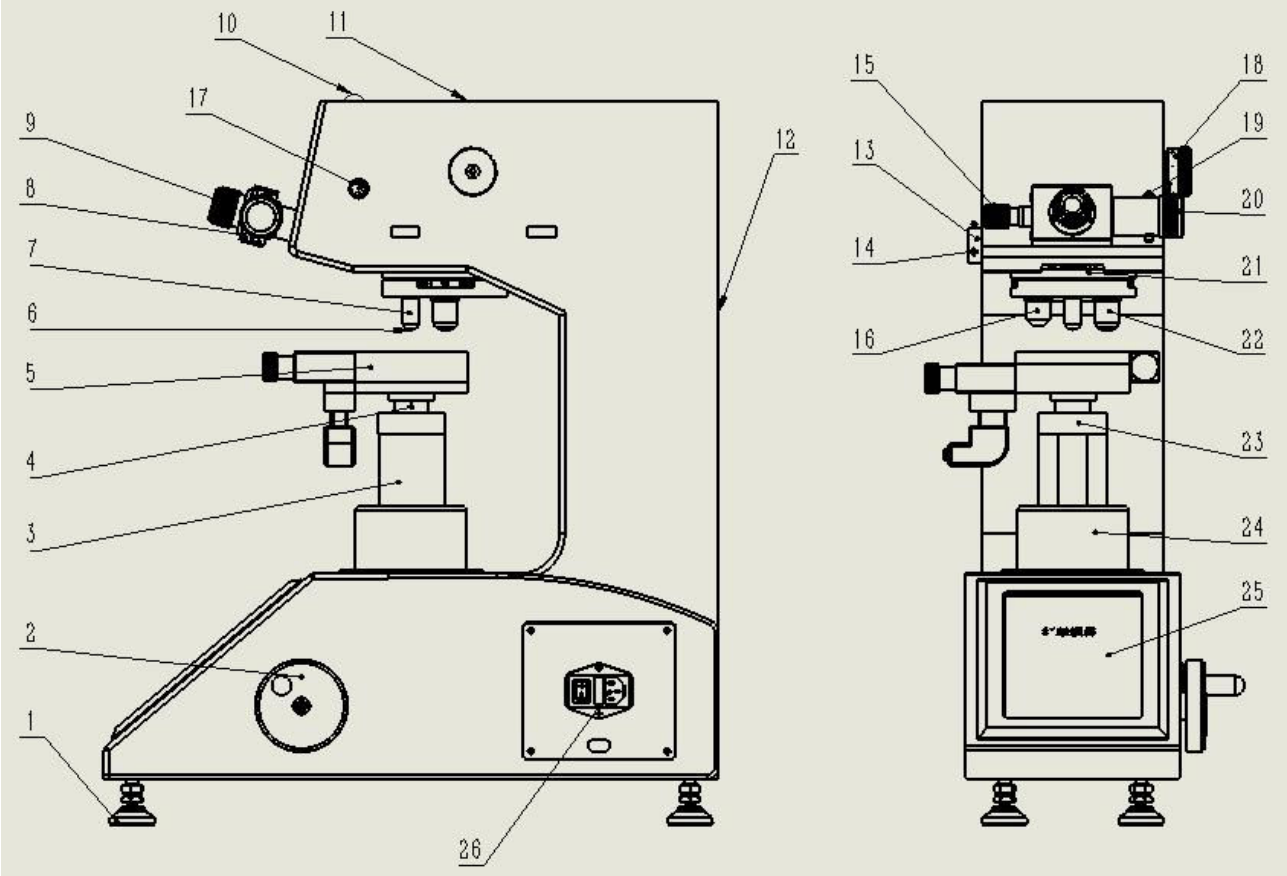
2.2 Lift up the bottom plate, screw out 4 M10 bolts under the bottom plate with a wrench, remove the hardness tester from the bottom plate, and put forward the hardness tester (pay attention to safety).

2.3Remove the adjusting screw (1) from the attachment box, screw it to the bottom of the main body (FIG. 1), and adjust it to the level;

2.4 Remove 4 horizontal screws (1) from the attachment box and screw them to the bottom of the main machine.

2.5 Unscrew the 4 screws of the upper cover plate (11) and remove the upper cover plate

3. Installations and Debugging



（Fig 1）

1.Regulating Screw

2.Up and Down Rotating Wheel

3.Up and Down Rotating Wheel

4.screw 5.X-Y stage 6.Indenter

7.Protection cover

8.Eyepiece

9.Eye guard

10.Photo cover

11.Upper cover

12.Back cover

13.Light source

14.Adjusting Nut of Light Source

15.Left Drum Wheel

16.10X objective

17.Round socket

18.Load-Change Hand Wheel

19.Measurement button

20.Right Drum Wheel

21.Turret

22.40X objective

23.XY stage connector

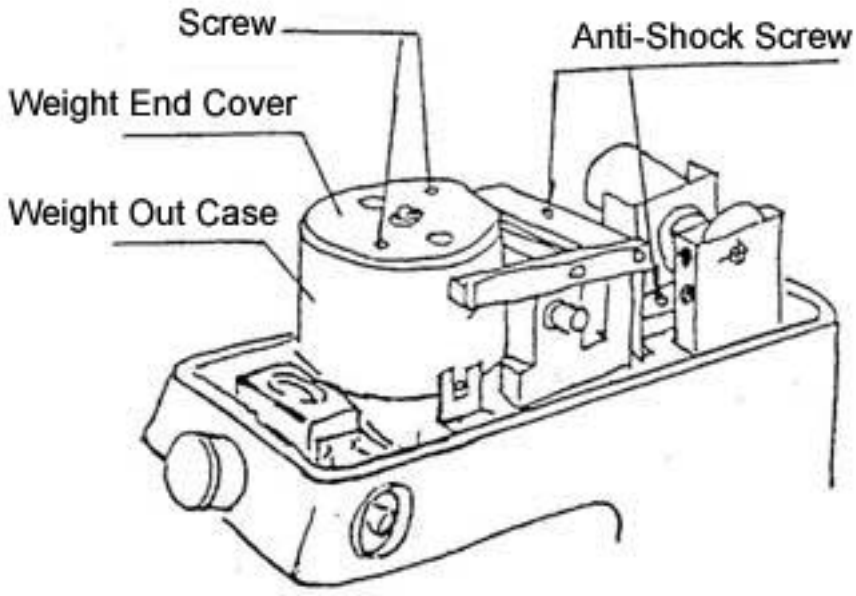
24. Lifting screw protection cover

25.Touch screen

26.Power jacks and switches

3. Installations and Debugging

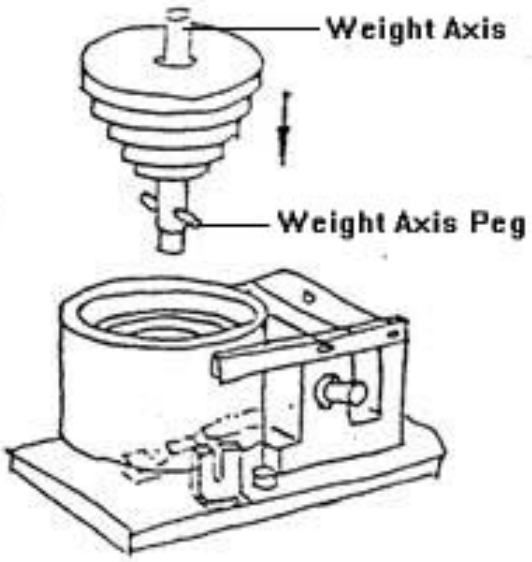
2.6 Unscrew 1 shock-proof screw and 2 screws from the weight housing (FIG. 2).



（Fig 2）

2.7 Hold the top of the Weight Axis, and put the Weight Axis into the Weight Out Case and rotate the Weight Axis to enable the Weight Axis Peg may fall into the V-Shaped groove (Fig.3)

2.8 Align the hole on Weight End Cover and the Weight Axis, enable the Weight End Cover fit for install on the Weight Out Case closely



（Fig 3）

3. Installations and Debugging

2.9 Align the hole on the end cover with the weight shaft so that it is mounted flat on the weight housing

2.10 Rotate and transform the handwheel (18) to make the shell of the weight flexible up and down in the positioning hole.Then cover (11).

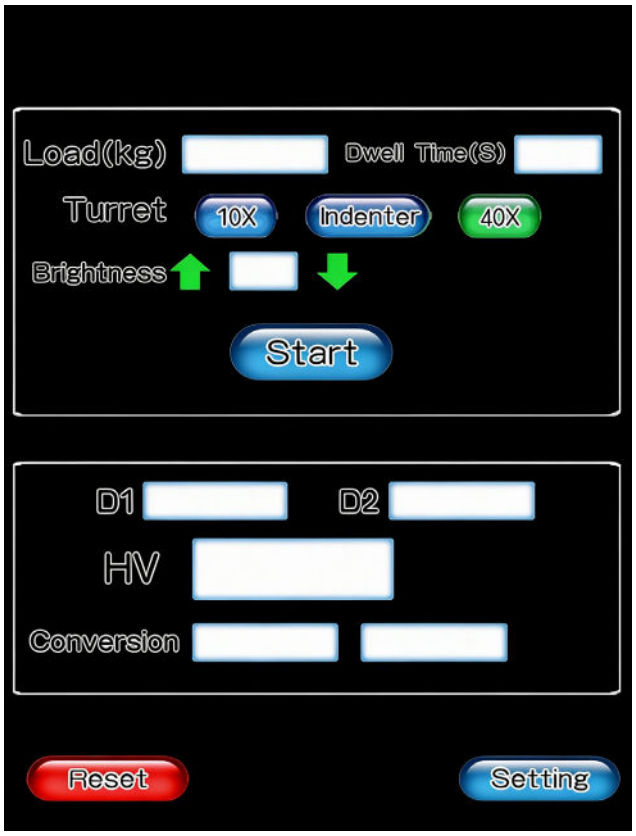
2.11Remove the dust cover, remove the micrometer eyepiece (8) from the accessory box, insert it into the hole, and insert it to the bottom. See the installation direction (figure 1).The wire plug on the eyepiece (8) is inserted into the round socket (17) on the right side of the main body.

2.12Remove the cross test bench (5) from the accessory box, insert its shaft into the XY test bench joint (23) hole, and tighten the screw (4).

2.13Remove the level gauge from the accessory box and place it on the cross table (5). Adjust the screw (1) to make it level.

4.Operation Panel And Function Introduction

1.Turn on the power，main screen lights up,turn out the operation interface（Fig 4）



（Fig 4）

The text box on the right side of "tester, sample name, qualified range, load holding time and conversion" is used for information input by clicking, and the operation method is as follows: single finger to enter the corresponding input interface.

2 Information input

2.3 Choose dwell time

Click dwell time ,normally choose 10s,click "OK" button,scree goes back to the main interface.

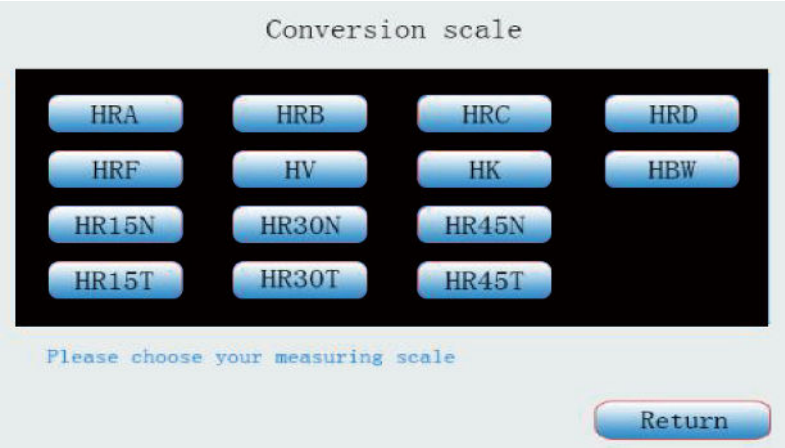
2.4Light source adjustment

Click brightness button,numbers increase to high brightness and decrease to low brightness.

4.Operation Panel And Function Introduction

2.5 Hardness value conversion

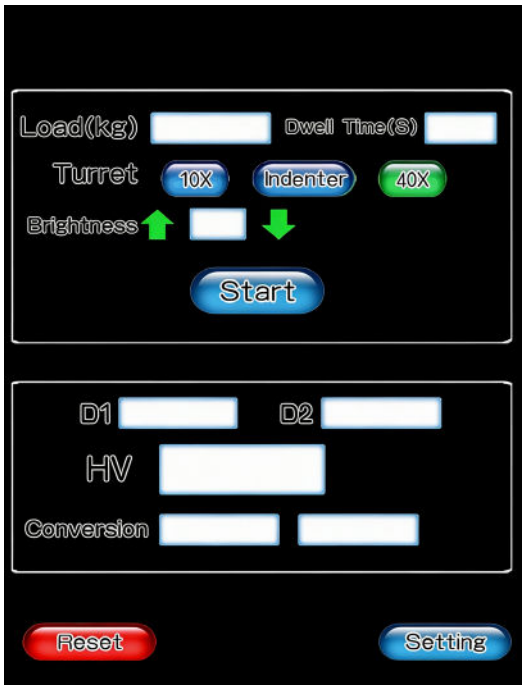
Click "Conversion" and choose the scale. If don't need to modify, click Return. as shown in figure 5;



（Fig 5）

5.Usage Of Hardness Tester

1.After power on, the pressure head is turned to the front position, and the screen enters the main interface, as shown in figure 6: the screen has been set before the instrument leaves the factory, if you want to reset it, please follow the panel operation description.



5.Usage Of Hardness Tester

2 For example:test 1kgf scale

2.1Rotate the load-change handwheel (18) to select the test force to be detected as 1kgf.

2.2 Click dwell time ,normally choose 10s.

2.3 Click indenter indenter (6) turns to the front position.

2.4Place the standard test block or specimen on the test bench (5) and rotate the lifting roller (2) to make the test bench rise when the specimen is 0.5 ~ 1mm from the lower end of the indenter,click 40X 40X objective(22)turns to the front position,the total magnification of this time path system is 400x.

2.5Observe close to the micrometer eyepiece (8).Bright spots appear in the field of view of the micrometer eyepiece, indicating that the focusing surface is coming. At this time, the test bench should be slowly and slightly raised until the surface of the sample is clear observed in the micrometer eyepiece. At this time, the focusing process is completed.If the focal plane of the specimen cannot be found,then click 10X 10x objective(16)turns to the front position,the total magnification of this time path system is 100x,the focal plane can be easily found after the magnification is reduced.

Note: when testing irregular specimens, care should be taken to prevent the head from striking the specimen and damaging the head.

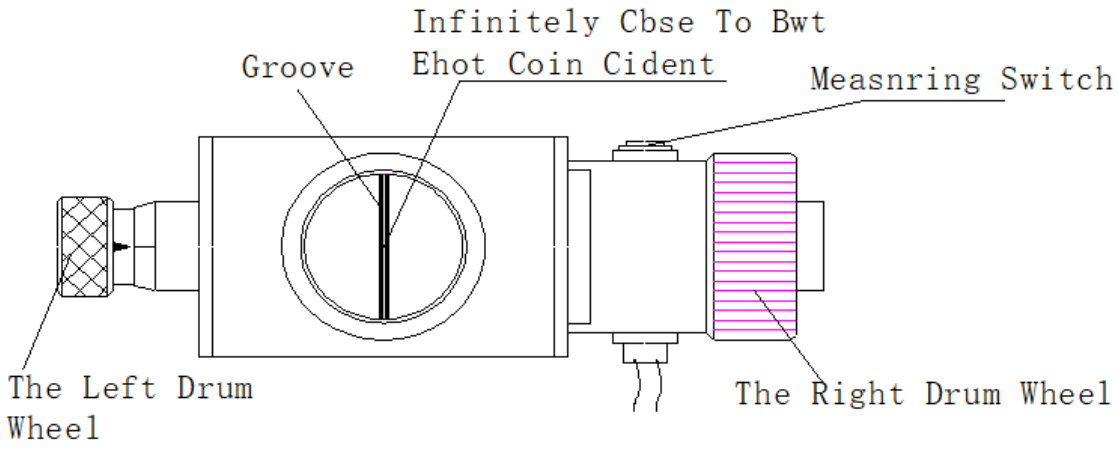
2.6 Click Start ,indenter turns to the front position,click Start then load the test force(motor start),at the same time, screen shows"↓""loading","dwell","↑" unloading,after unloading,indenter is automatically returned,40X objective(22) turns to the front position,screen goes back to the operation interface.

Note: when the motor is in working state, it is not allowed to move the test piece again. It can only move after the completion of loading and unloading this time. Otherwise, the instrument will be damaged.

5.Usage Of Hardness Tester

2.7The indentation can be seen in the field of view of the micrometer eyepiece (8). At this time, the diagonal length of indentation can be measured in the micrometer eyepiece. If the indentation is not clear, the rotating wheel (2) can be slowly turned to be the clearest. If the two lines of engraving in the micrometer eyepiece are blurred, the eye mask (9) can be adjusted to make it the clearest, which is determined by each person's vision.

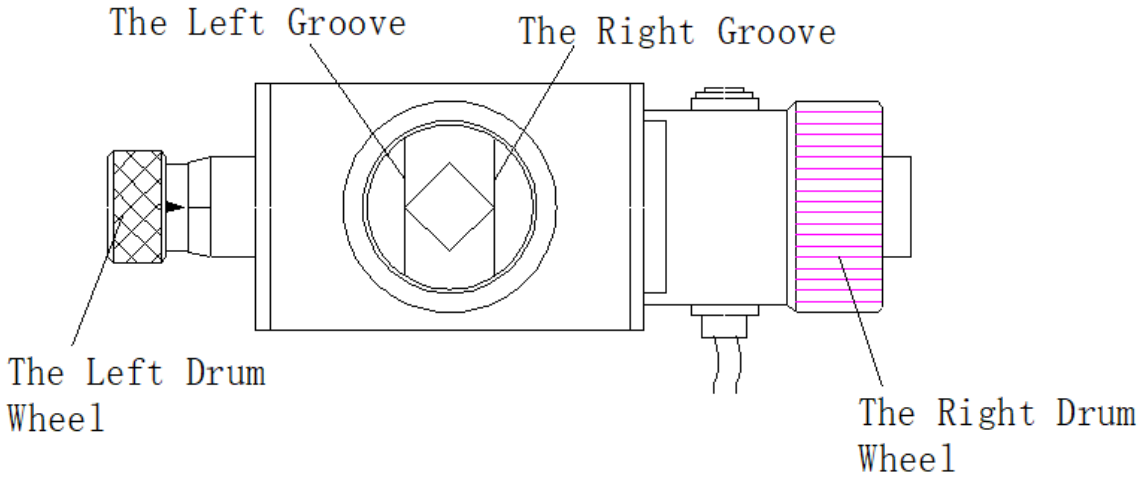
2.8Rotate the right drum wheel (20) and move the engraving line in the eyepiece to gradually draw the two engraving lines together. When the inner side of the engraving line is infinitely close (the inner side of the engraving line is in the critical state of no light gap, but the two engraving lines must not overlap),click "reset" ,at this point, the values d1:0 and d2:0 on the home screen are zero (Fig 7), which is the zero in the terminology.This allows you to measure the diagonal length of indentation in a micrometer eyepiece.



（Fig 7）

2.9 Rotate the Right Drum Wheel (20) to let graduated lines separate each other, turn the Left Drum Wheel (15) to move the left graduated line until it's inner side tangent to the intersecting point at left outside of the indentation, and then move the right graduated line until it's inner side tangent to the intersecting point at right outside of indention (Fig 8)

5.Usage Of Hardness Tester



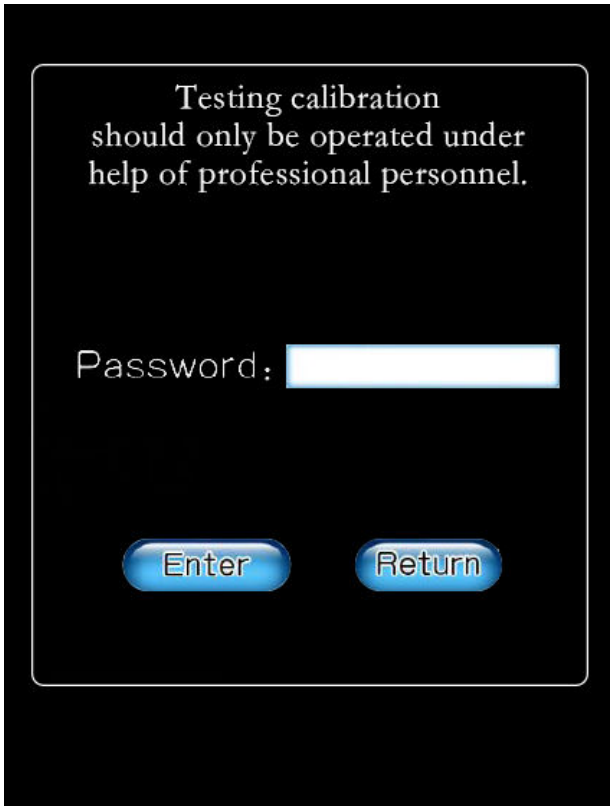
（Fig 8）

After measurement, press the measuring button (19), the measurement of length d1 of the diagonal is completed; turn micrometer eyepiece (8) 90 °. Use the above methods to measure the diagonal length of the d2, press the measuring button (19). At this time, the screen shows testing display value and exchanged hardness display value measured at present time. If the correctness of the measurement is not sure, you can repeat measuring again as methods described above.

3 Calibration of Hardness Displaying Value

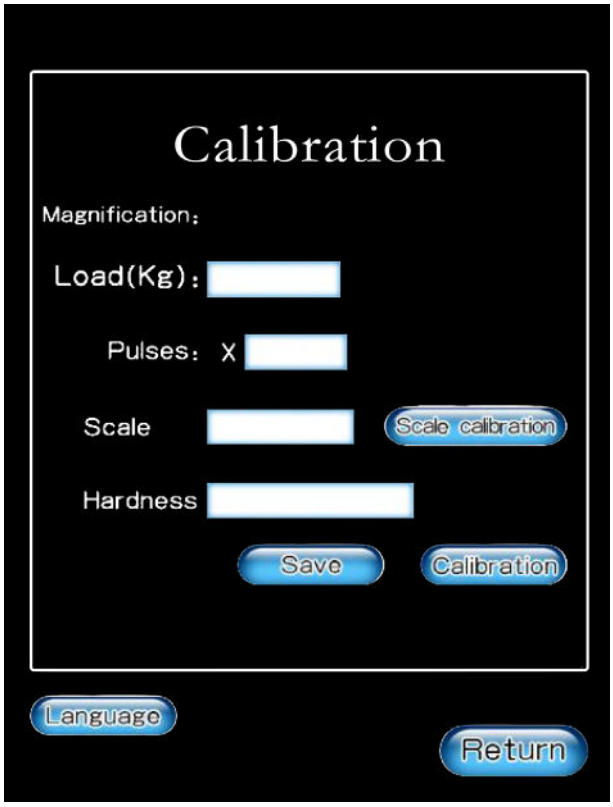
3.1 The precision of hardness displaying value of the hardness tester is calibrated before delivery. If an error is caused or according to the various requirement of the client, the hardness value may be revised by pressing input keys. The method is as following: Load on a hardness block, then click “Calibrate”, turns out figure 9

5.Usage Of Hardness Tester



（Fig 9）

3.2 Click turns out numeric keyboard, input 12345678, click "Enter", turns out figure 10



（Fig 10）

5.Usage Of Hardness Tester

3.3Click hardness , input the hardness value of the standard block value, then measure the indentation, press the measuring switch(19), finish the measurement of indentation diagonal's length d1. Turn the eyepiece 90°,then measure the indentation diagonal's length d2 with same method, click "Calibrate", after measurement, click "Save", calibration is finished.

6.Instrument And The Precautions

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 It is prohibited to dismount and alternate without permission all the electric component parts, the switches and sockets as well as their fixed positions; otherwise the instrument will be error and caused(cause) unsafe accidents.

3 It is prohibited to rotate the indenter, unless the testing force has been unloaded, otherwise it would damage the instrument. Only after testing force has been unloaded and the screen turns back to operating page, then the indenter can be rotated.

4 When the instrument is under testing,do not select test force, if press start button accidentally,do not rotate the indenter, please wait until the loading is finished.

5 If the height of specimen is higher than 80mm, it must to loose the hexagon socket set screw and take off the extension bar(24).

6 The diamond indenter

1) The diamond indenter and the indenter shaft are important parts of the instrument, and hence it is necessary to take care not to touch the indenter during the operation.

2) In order to assure the precision of the measurement, it is important to keep the indenter clean. If it is covered with grease or dust, the tip of indenter should be cleaned carefully and lightly with absorbent cotton wetted with a little alcohol (industrial use) or ether.

7 Eyepiece

1)Owing to the difference of the personal visions, the graduated lines observed in the vision field of the eyepiece may seem vague. And accordingly, the observer should turn slightly the Eye Guard (9) on the eyepiece so as to observe the graduated line in the vision field clearly.

2)Note: the Eyepiece should be inserted to the bottom of eyepiece tube and keeping without any space between them, otherwise it would affect the correctness of the measurement. When testing the length of diagonal line of indentation, it is necessary to measuring the tip points of diagonal line, then turn the Eyepiece by 90o and test other a pair of tip points for diagonal lines.

8 The specimen

1)The surface of the specimen must be clean, as the grease or the dirt on the surface would affect the precision of the measurement. Please clear the specimen with alcohol or ether.

2)When the specimen is thin filament, slice or small pieces, can choose Filament clamping testing table, Thin Specimen Testing Table and Flat clamping testing table accordingly .If specimen is too small to hold, please test after mounting press and polishing.

3)The thickness of specimen or detection should be 1.5times diagonal's length.

9 The measurement for Knoop Hardness

1)Exchange the Indenter

6.Instrument And The Precautions

Loosen the screw fixed on the Indenter (5) with a screwdriver to take the Indenter out, change the Knoop Indenter for replacement. Note the direction when assembling. The red point of the indenter should be in face to front direction, the long diagonal line of indentation (the shape of indention is a long rhombus) should be in parallel with testing table. It may be to regulate the center of indentation in vision field after install Knoop Indenter.

2)Testing hardness value

The hardness testing method of Knoop is mainly same as that of Vickers, besides it is only required to measure the length of long diagonal line for indentation. Press the Measuring Button to confirm, then the HK hardness value will display on the screen.

7.Accessories(packing list)

A. The main hardness tester (including a Micro Vickers Indenter, a 10X Objective and a 40X Objective)

B. The accessories Kit

Number	Item	Quantity
1	Weight Axis	1
2	Weights	6
3	Digital Cross Test Table	1
4	Socket head wrench(2.5mm)	1
5	Regulation screw	4
6	Level	1
7	10X Micro Eyepiece	1
8	Micro Vickers Hardness Test Block:High,Middle	Each 1
9	Fuse(2A)	2
10	Power cord	1
11	Touch pen	1
12	Dust bag	1
13	Certificate	1
14	Operation Manual	1

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Anhui Mikrosize Precision Instrument Co.,Ltd

Factary Producing Add: NO13 Shuiku Road Shatou, Changan Town, Dongguan, China.
International Trading Office: A-4035 RuiFeng Business Expo , Wuhu City, China.
Web: www.mikrosize.com Email: mikrosize@mikrosize.com