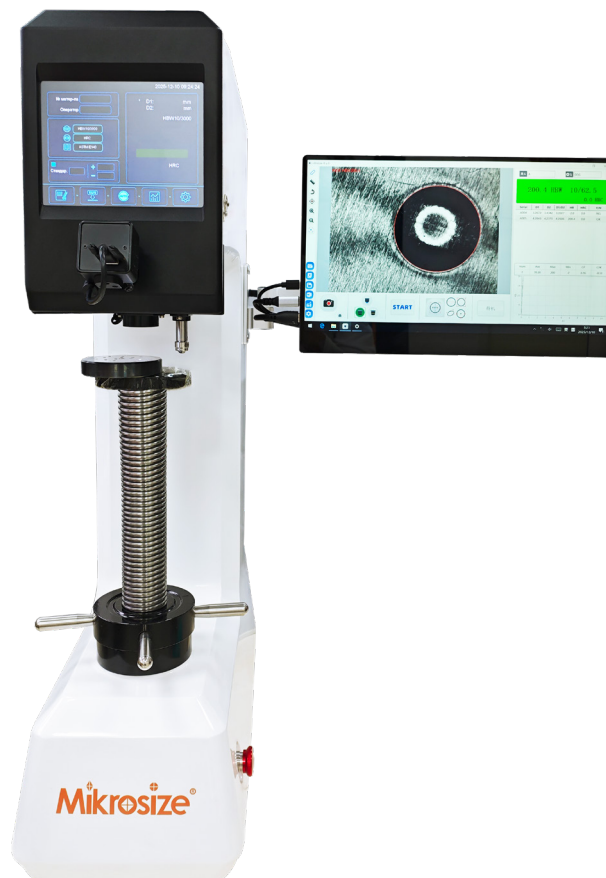




BrinMet-3000

Digital Vision Brinell Hardness Tester

Instruction Manual



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1.General Description

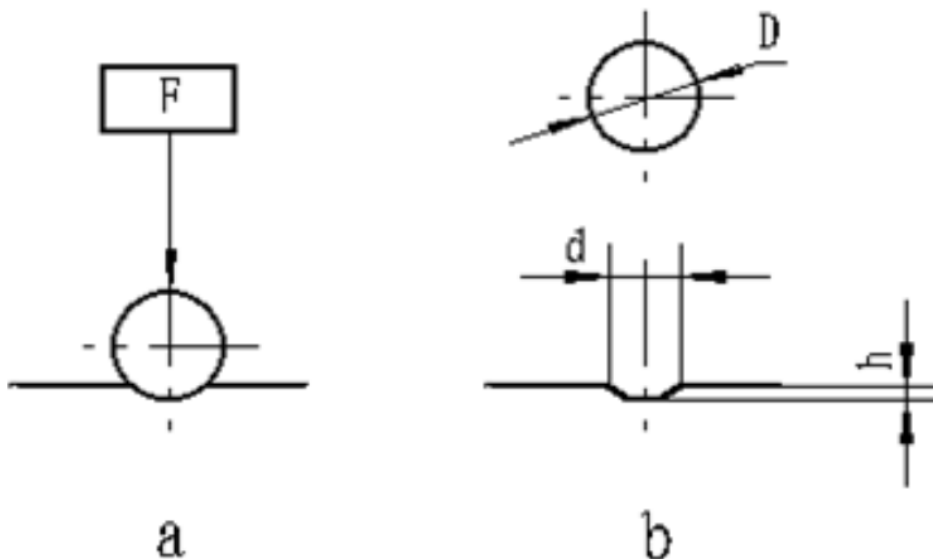
Brinell hardness testing is to apply specified test forces onto the surface of test specimen through a quenched steel ball of certain diameter and retain it for a specified period of time, then remove it and measure the diameter of indentation on the surface of specimen, and calculated as per the following formula: $HBW = 0.102 \times \frac{2F}{\pi D(D - \sqrt{D^2 - d^2})}$

F----- Test forces N

D----- Diameter of hard alloy steel ball mm

d----- Average diameter of indentation mm

HBW--- Brinell hardness.



For example: 216HBW10/3000/10 means that the hardness is 216 measured with a hard alloy ball of diameter 10mm, under a test force of 29.42KN which is retained for 10 seconds. Brinell hardness is marked with symbol HBW.

1.1 Range of Application

The machine is a desktop Brinell hardness tester. It can be used to measure the hardness of normalizing and annealed workpieces, casting parts, non-

1.General Description

ferrous metals and steel parts . It is suitable for the metal metallurgy , chemical industry , mechanical manufacturing , industrial and university.

Measuring range : 8—650HBW

The hard alloy indenter : Suitable for measuring workpieces below 650HBW .

1.2Product Characteristic

Unique performance: This hardness tester adopts high-precision sensor, and the single-chip microcomputer controls the stepping motor to automatically load and unload.

This tester has reasonable structure , beautiful appearance and easy to use .

2.Main Performance and Parameters

Grade of test force----0.613, 0.9807, 1.226, 1.839, 2.452, 4.903, 7.355, 9.807, 14.71,29.42KN(62.5,100,125,187.5,250,500,750,1000,1500, 3000Kg).

The hard alloy ball diameter: ϕ 2.5mm , ϕ 5mm , ϕ 10mm

The keeping time:5—99 S .

Maximum height of specimen :280mm.

Distance between center of indenter and wall of instrument:175mm.

Power supply : AC110V/220V, 60/50Hz ;

Machine Dimensions:581*269*912mm

Net Weight Approx. 135kg

3. Basic Configuration and Structure

3.1 Basic Configuration

Item	Qty
Brinell hardness tester	1
Large flat anvil	1
Small flat anvil	1
V-notch anvil	1
10mm indenter	1
5mm indenter	1
2.5mm indenter	1
Brinell standard block	2
Accessory box	1
Camera	1
Brinell indentation measuring software	1
Computer	1

▲ Accessories that you can choose to buy :hard alloy ball ,various worktables, various standard block, internal fitting of this tester, various indenter.

3.2 Structure Composing

Brinell hardness tester consists of machine body, screw, working table, level system, sensor, Stepping motor loading and unloading system, Brinell Indentation measuring system, computer.

4.Touch Screen Operation

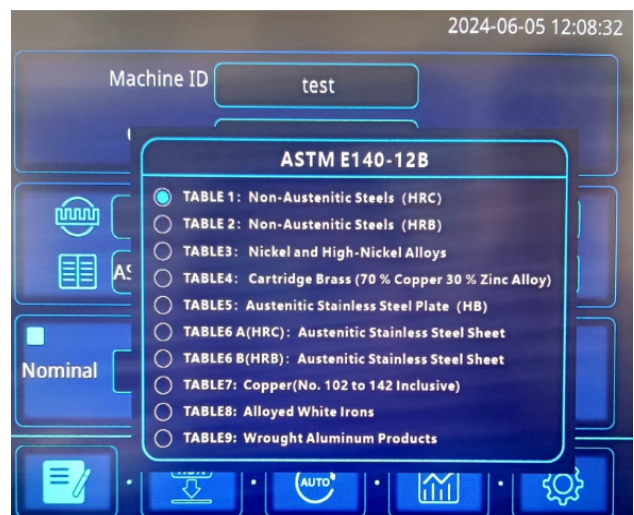


Correlation table of steel ball diameters and test force for Brinell hardness test.

Materials	Range of hardness HBS(W)	Thickness of specimen (mm)	0.102F/D	Steel ball diameter D (mm)	Test force F KN(kgf)	Test force retaining time (S)
Ferrous metals	140~450	6~3 4~2 < 2	30	10.0 5.0 2.5	29.42(3000) 7.355(750) 1.839(187.5)	12
	< 140	> 6 6~3	10	10.0 5.0	9.807(1000) 2.452(250)	12
Nonferrous \metals	> 130	6~3 4~2 < 2	30	10.0 5.0 2.5	29.42(3000) 7.355(750) 1.839(187.5)	30
	36~130	9~3 6~3	10	10.0 5.0	9.807(1000) 2.452(250)	30
	8~35	> 6	2.5	10.0	2.452(250)	60

Conversion hardness scale & standard dwell time

4.Touch Screen Operation



4.2 Test Operation

Note: In the test interface, please check whether the indenter on the hardness tester is consistent with the one displayed on the interface.

Hardness testing

1) Before starting the operation, please confirm that the indenter and workbench are installed correctly. Please pay attention to using acid-free gasoline to clean the anti-rust oil attached to the ball, and wipe the workbench and the workpiece to be tested with cotton or soft gauze.

4.Touch Screen Operation

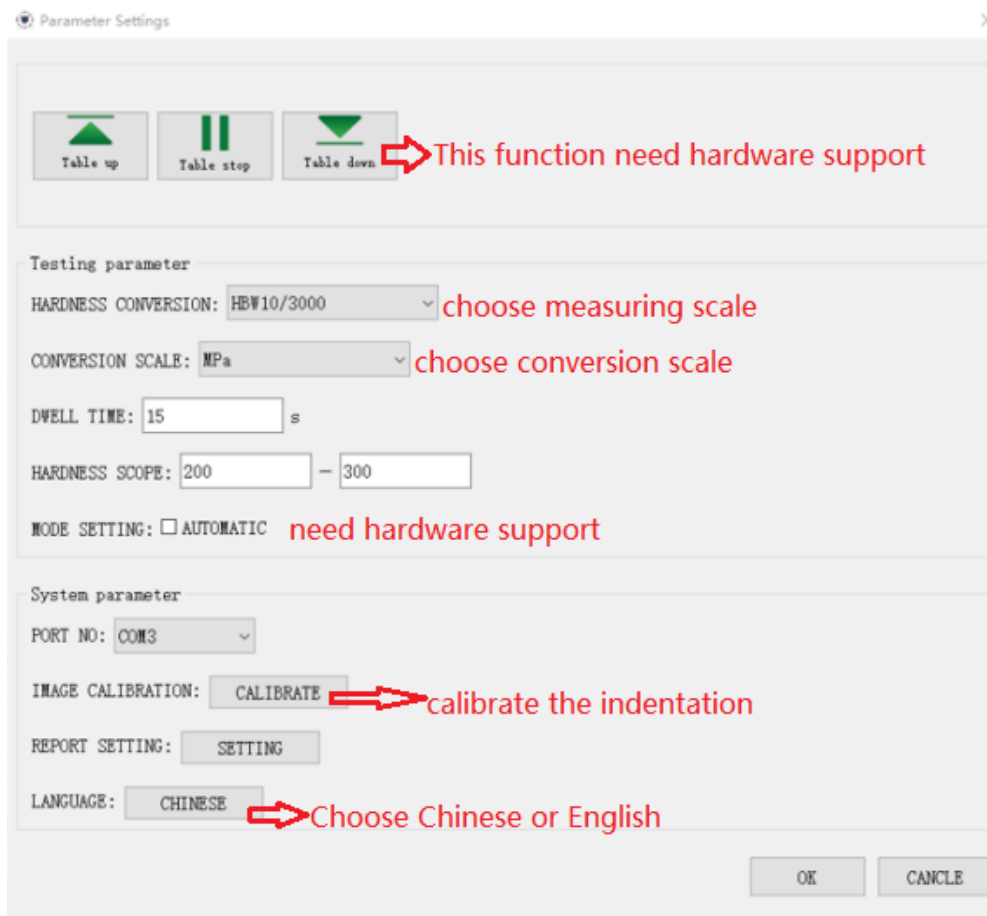


2) Connect the Hardness Tester power supply and turn on the power switch. At same time the computer will open automatically, open the Brinell indentation measuring software, please select the corresponding test force and conversion scale in Software. Then the hardness tester will be automatically update same as software.



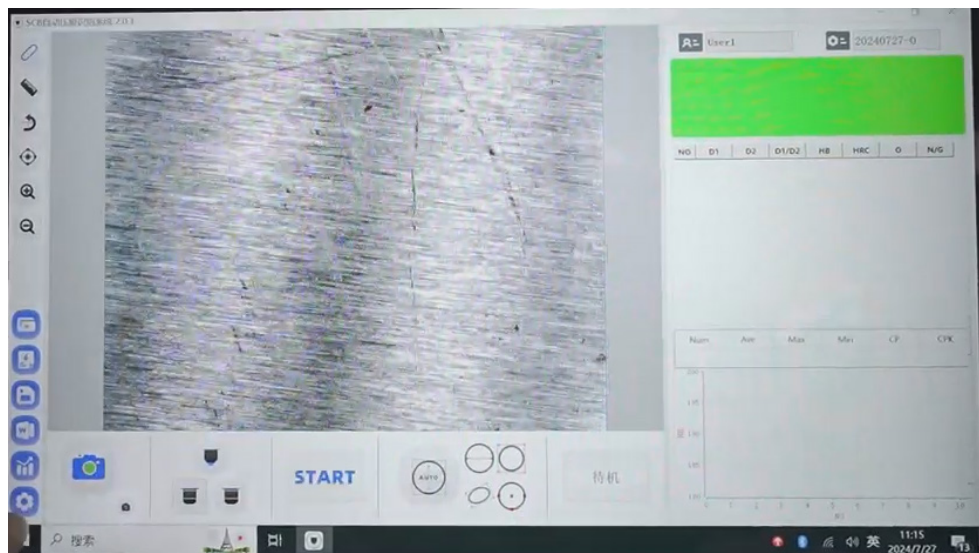
Hardness Tester Interface

4.Touch Screen Operation



Software interface

3)Place the workpiece on the workbench, turn the handwheel clockwise to make the workpiece rise, observe the clearest state of the workpiece surface from computer Brinell indentation software, and stop turning the handwheel,see below.

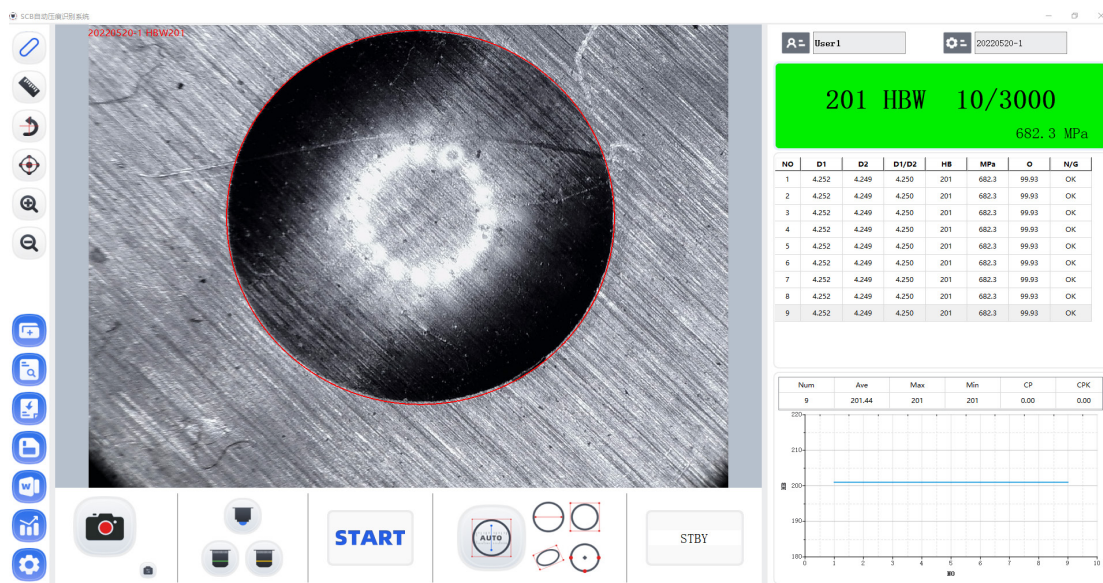


4.Touch Screen Operation

4)When ready, click the "START" button in software, and the hardness tester left interface will display the random force value curve change. After loading-dwell-unloading, it stops.



5)After unloading, the objective will automatically turn into the front, then you can check the indentation bigger photo in computer software,then press auto measuring will show hardness value in the right. Detailed operation, please see"Brinell Hardness Measurement Software User's Manual" as below.



4.Touch Screen Operation

4.3 Before shipping, the parameters and performance of the hardness tester have been adjusted to the best state. It is recommended that customers do not modify the original settings of the hardness tester without authorization. If necessary, please contact us.

▲ Note: When the test force error of this hardness tester exceeds the national standard, it shall be calibrated by the manufacturer or technical supervision department. Other personnel shall not enter the calibration test force menu.

▲ Note: The machine should be calibrated with a standard Brinell hardness block before each test.

5.Guideline for Troubleshooting

Start the machine without display: Make sure the power is on, the power fuse is in good condition, and the link of the power line is good, the power supply is 110/220V.

The experiment did not maintain the setting time: there is on specimen or the specimen is too soft. Please choose the correct indenter and the test force refer to "Selection of steel ball diameters and test force in Brinell Hardness Test".

Experimental error: Check whether the experimental force conforms to standards with the dynamometer.

If you have any further problems, please contact the manufacturer or supplier..

6. Maintenance and Precautions

Fill the lubricant to the moving parts 2 times per month.

Protect the tester with dust-proof cover when it will not be used for a long period of time.

If long distance transportation should be restored to the original packing.

When loading and unloading the indenter must be carefully to protect the hard-alloy ball from damaging and polluting. The indenter should be unloaded and properly kept when it is not used for a long time.

The surface of working table and Brinell standard block should be no pollution, no scratches and no bruises. Preservation with antirust oil after use.

Working environment should be free of vibration and corrosive medium.

Machine must be grounded to avoid accidents.

Fill adequate machine oil to the lead screw and hand wheel periodically. Take off the cover of the lead crew, fill the lubricating oil onto it, then rotating hand wheel and repeat lifting the screw to make the lubricating oil evenly. At last put back the cover of the screw. Notice: The lubricating oil cannot be injected too much.

Hardness testing and calibration shall be carried out according to national standards.

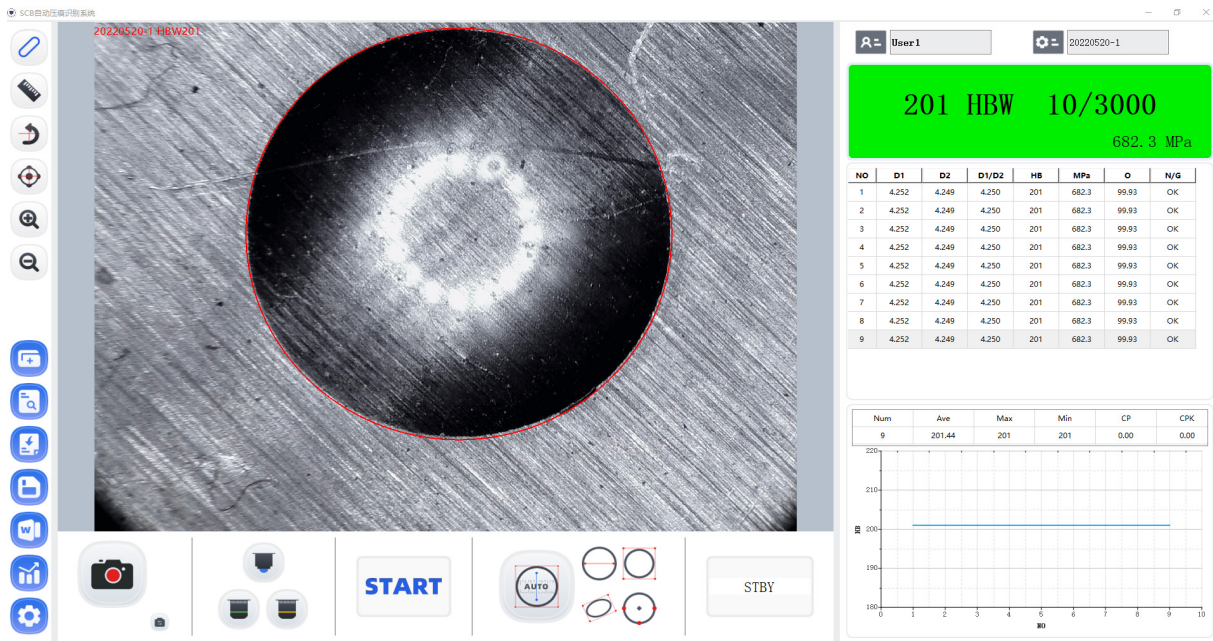
This machine belongs to precision instrument, do not disassemble and adjust any part in the machine. Any abnormality in the machine please contact us for repair.

7.Measurement Software User's Manual







Brinell hardness measurement software is mainly used to automatically measure indentation and calculate hardness values, as well as other functions such as hardness conversion, report printing, and data saving etc. Some functions are just suitable for Automatic Software controlling hardness tester.

I.Interface Introduction

II.1.1 Main Interface:





1.2 Interface Logo Information:

-  Software connecting main machine: Get control of main machine.
-  Disconnect software, given up the control of main machine.
-  Measuring scale: click this button then on the bottom right side of screen display this symbol, click again the measuring scale will disappear.
-  Reticle: Click this button in the middle of screen will appear the Reticle, click again will disappear.
-  Resetting cross migration: Click this button reticle will automatically recover to the middle of screen.
-  Image Magnification

7.Measurement Software User's Manual

 Image Reduction

 New Document: Click this button to empty all the current data and record new group data.

 Search Data: Click this button will appear below interface, choose all the testing data to creating report.





The screenshot displays the 'Record' window of the measurement software. On the left, there is a list of data entries with checkboxes, dated 2022/5/20. The main area shows a circular image of a metal surface with a red circle highlighting a specific region. Below the image is a table with the following data:


TIME	NO	OPERATOR	X DIA	Y DIA	X/Y DIA	HARDNESS	CONVERSION	ROUNDNESS	OK/NG
20220520154016	20220520-1	User1	4.252	4.249	4.250	201	682.3	99.93	OK

At the bottom left, there are checkboxes for 'All' and a 'Report' button.

 Import: Click import button to import image for measuring

 Save: Save current Image

 Report: Click this button to create report of current data


 Database: All the measuring data will automatically saving in the database,can find and use it at anytime.

7.Measurement Software User's Manual


Data base

	TIME	NO	OPERATOR	X DIA	Y DIA	X/Y DIA	HARDNESS	CONVERSION	ROUNDNESS	OK/NG
1	20220520154016	20220520-1	User1	4.252	4.249	4.250	201	682.3	99.93	OK
2	20220520154017	20220520-1	User1	4.252	4.249	4.250	201	682.3	99.93	OK
3	20220520154018	20220520-1	User1	4.252	4.249	4.250	201	682.3	99.93	OK
4	20220520154019	20220520-1	User1	4.252	4.249	4.250	201	682.3	99.93	OK


2022/5/20 2022/5/20 Query
IDQuery
Export


 Parameter Setting: Can set Scale,Conversion Scale,Dwell Time,Hardness Scope,Calibration,Report Setting, Language etc.

Parameter Settings

Table up Table stop Table down  This function need hardware support


Testing parameter

HARDNESS CONVERSION: HBW10/3000  choose measuring scale

CONVERSION SCALE: MPa  choose conversion scale


DWELL TIME: 15 s

HARDNESS SCOPE: 200 - 300


MODE SETTING: AUTOMATIC  need hardware support

System parameter

PORT NO: COM3

IMAGE CALIBRATION: CALIBRATE  calibrate the indentation

REPORT SETTING: SETTING

LANGUAGE: CHINESE  Choose Chinese or English

OK CANCEL

7.Measurement Software User's Manual



Camera Setting

Normally, Before shipping, we had already adjust the camera parameter into good condition, so no need to adjust again,But if you find not satisfied with the image, you can adjust the camera setting slightly.



Indenter: Click this button, the machine indenter will turn into right ahead position.



Left Lens: click this button, left lense will turn into right ahead position.

START Click this button, the indenter will turn into right ahead position, and start loading, after loading, the lense will automatically turn into right ahead position.



Auto Measure: Click this button, can automatically measuring the indentation and show the hardness scale.

III.Operation of Measuring Software

2.1. Image Calibration


2.1.1 Measuring the standard indentation, can get the result 201HBW (below photo)

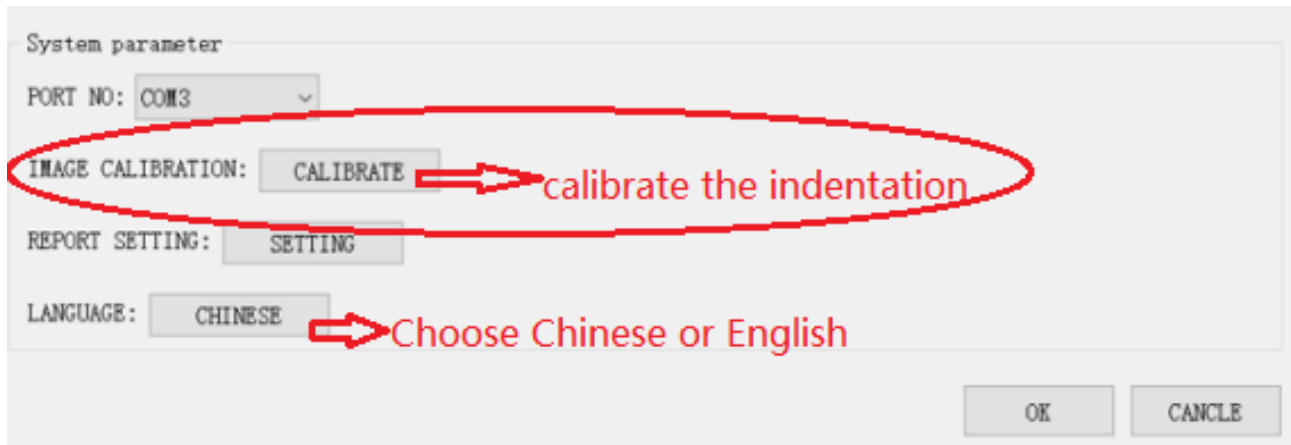
NO	D1	D2	D1/D2	HB	MPa	σ	N/G
1	4.252	4.249	4.250	201	682.3	99.93	OK
2	4.252	4.249	4.250	201	682.3	99.93	OK
3	4.252	4.249	4.250	201	682.3	99.93	OK
4	4.252	4.249	4.250	201	682.3	99.93	OK
5	4.252	4.249	4.250	201	682.3	99.93	OK
6	4.252	4.249	4.250	201	682.3	99.93	OK
7	4.252	4.249	4.250	201	682.3	99.93	OK
8	4.252	4.249	4.250	201	682.3	99.93	OK
9	4.252	4.249	4.250	201	682.3	99.93	OK

Num	Ave	Max	Min	CP	CPK
9	201.44	201	201	0.00	0.00

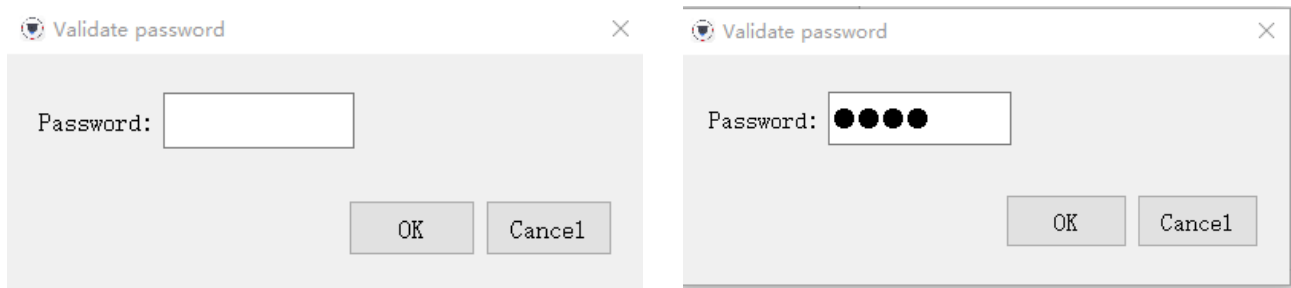
7.Measurement Software User's Manual

2.1.2 For example, Standard Specimen is 198HBW10/3000.

2.1.3 Click on  parameter setting, you can find the system parameter--Image calibration,click it.



You will find below Validate password, full in 1234,then ok.

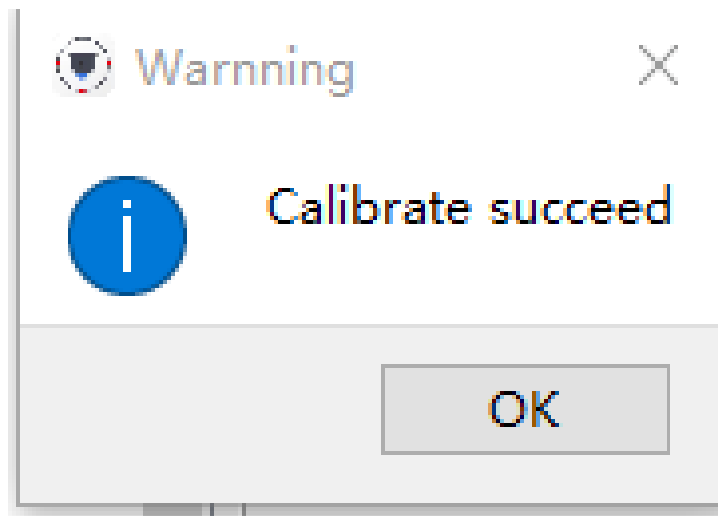
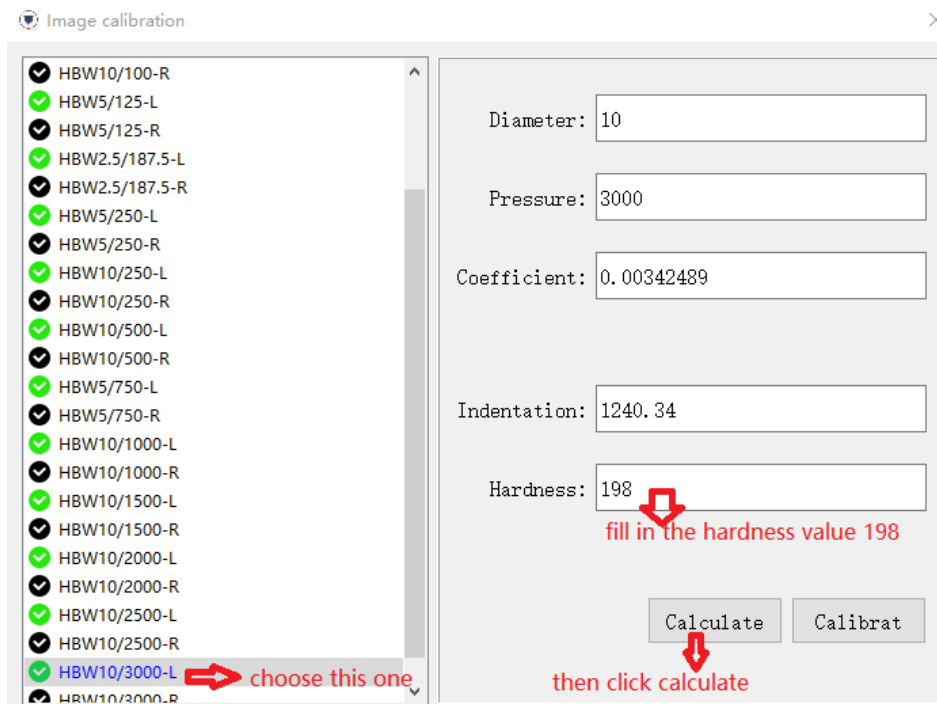


Then it will appear below interface--image calibration.

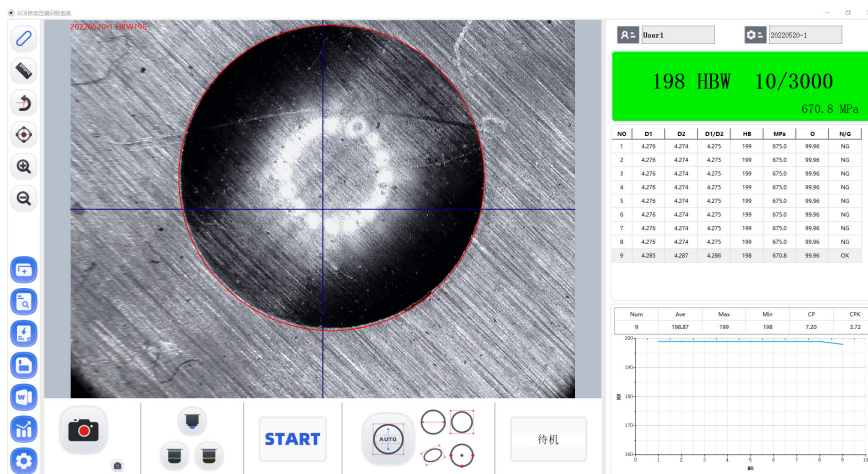
2.1.4 Image Calibration include test force and left and right lense, which one you need to calibration, you can choose item to calibration.

For example, we want to calibration HBW10/3000, use the left lense, we can operate as below,choose HBW/3000-L, fill in hardness value, then calculate, then calibrate succeed.

7.Measurement Software User's Manual



2.1.5 Then you can measure again to verify it's right, then ok.



8.Packing List

No.	Descriptions	Specification	Quantity
1	Brinell Hardness Tester		1 set
2	Large flat anvil		1
3	Small flat anvil		1
4	V-notch anvil		1
5	Indenter	Φ2.5mm	1
6	Indenter	Φ5mm	1
7	Indenter	Φ10mm	1
8	Brinell standard block	100±25HBW	1
9	Brinell standard block	200±50HBW	1
10	Accessory box		1
11	Screw driver		1
12	Power line		1
13	Brinell Indentation measuring software		1
14	Camera		1
15	Computer		1
16	Packing list & Certificate		1
17	Operation Instruction		1

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