

MICROBUL-D

LOW LOAD VICKERS HARDNESS TESTER

OPERATIONAL MANUAL



BMS Bulut Makina Sanayi Ve Ticaret Ltd. Şti.

İkitelli Organize Sanayi Bölgesi Dolapdere Sanayi Sitesi

Ada 4 No : 7-9 Başakşehir / **İSTANBUL-TURKEY**

Phone : +90 212 671 02 24 / 671 02 25 Fax : +90 212 671 02 26

web : www.bulutmak.com e-mail : bms@bulutmak.com

1. Technical Features	3
1.2 Standart Accessories	3
2. Part List	5
3. Installaton And Operation	5
3.1. Installation.....	5
3.2 Preparation Prior To Testing.....	5
4. Main Screen / Screen Display	6
5. Functions Of Buttons On Panel	6
6. Main Screen	7
7. Test Method	8
8. Settings.....	8
9. Starting Test	9
10. OPTOBUL Hardness Tester Software	10
10.1. ADDRESS	11
10.2. CUSTOMER.....	11
10.3. TEST	11
11. USER MANAGEMENT.....	21
12. BACKUP	22
13. CALIBRATION.....	22
14. Maintenance	25

1. Technical Features

Test loads (kgf)	0,5;1;3;5 (10kgf on request)
Load selection	Manuel
Test methods	Vickers
Load application	Automatic
Total magnification of measuring microscope	360X (with 25X objective) 140X (with 10X objective)
X-Y table dimensions (mm)	100X100
X-Y table travel (mm)	25
Max. testing height (mm)	160
Depth of thoroat (mm)	130
Power supply	AC 220V, 50Hz
Machine dimensions (mm)	750(H)X500(D)X300(W)
Case dimensions (mm)	870(H)X590(D)X440(W)
Weight (nett /gross) kg	68 / 100

1.2 Standart Accessories

Vickers pyramid diamond indenter.....	One off
HV Test block.....	One off
X-Y table.....	One off
V anvil.....	One off
Accessories box.....	One off
Set of allen keys.....	One off
Operational manual(English).....	One off
Hardness conversion table.....	One off
Calibration Certificate.....	One off
Camera.....	One off



Fig.1

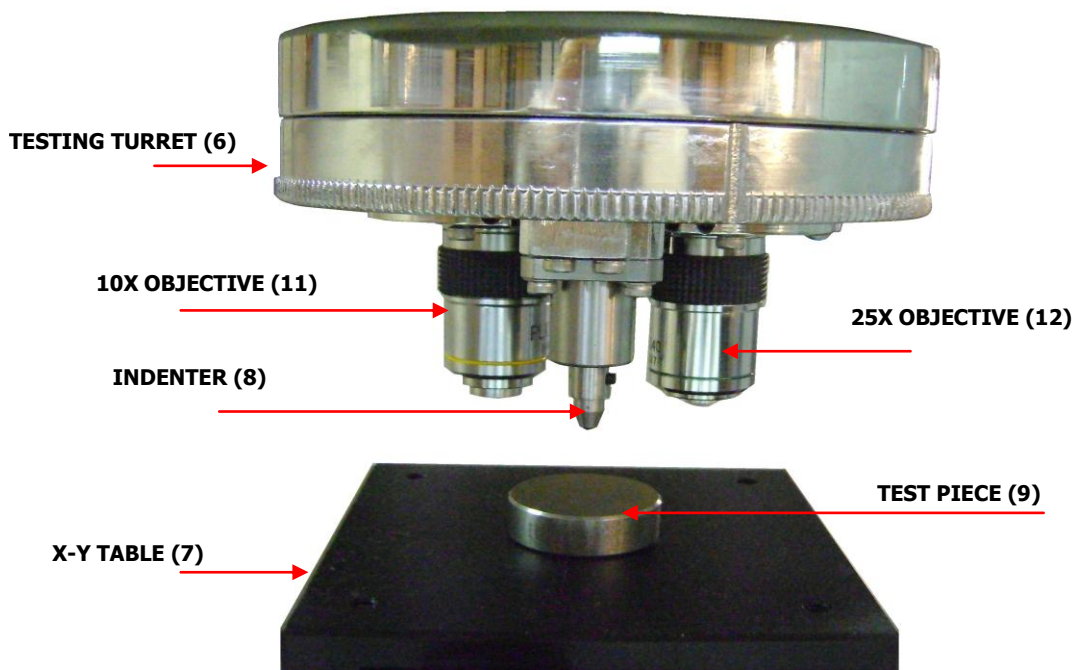


Fig.2

2.Part List

1	Body	10	Camera
2	Top cover	11	10X Objective
3	Elevating Screw	12	25X Objective
4	Nut for Elevating Screw	13	Micrometer
5	Arm	14	Weight
6	Testing turret	15	Bushing for tightening X-Y table
7	X-Y Table	16	Digital Screen Panel
8	Indenter	17	Adjustment for illumination
9	Test piece		

3.Installaton And Operation

3.1.Installation

1-The tester must be put in a room where there is no vibration and corrosive gas and whose room temperature shall be around 10~35 ° C and relative humidity no more than 70%. The power fluctuation shall be within 220V±10%. It shall be placed on a stable table which shall be perforated for screw lead to pass through. (Pls refer to drawing)

2-Take out weights (14) and camera (10) from accessories box.And locate camera and suitable weight (s) according to test to be applied.

3-Take out also X-Y table (7) from from accessories box.Clean it well and locate it it to the elevating screw hole and tighten it by means of knurled bushing (15). Adjust level of hardness tester by means of eye bull putting on X-Y table.

4-Connect power cable to power supply AC 220V and the other to power socket of the tester.

3.2Preparation Prior To Testing








a) The surface to be tested must be smooth and free of oxides and impurities. The surface finish must be enough for accurate the measurement of diagonal line of indentation. Generally, Ra shall be no more than 0.2um.

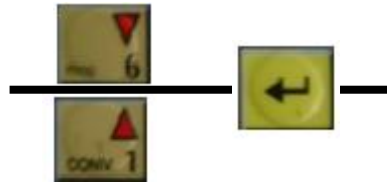
b) Suitable test load, thicknesss of test piece (or case depth) and hardness to be chosen from related table.

4.Main Screen / Screen Display



5.Functions Of Buttons On Panel

 	BACKWARD & FORWARD	USED FOR PURPOSE OF MAKING TRANSITION AMONG ALTERNATIVE MENUS
 	UP&DOWN	USED FOR ENTERING FOR VARIOUS FUNCTIONS IN SELECTED MENU
	ENTER	CONFIRMATION OF ENTERING VALUE
		DECIMAL NUMBER
	ESC	USED FOR CANCELLATION



01 - X10  02 - X25

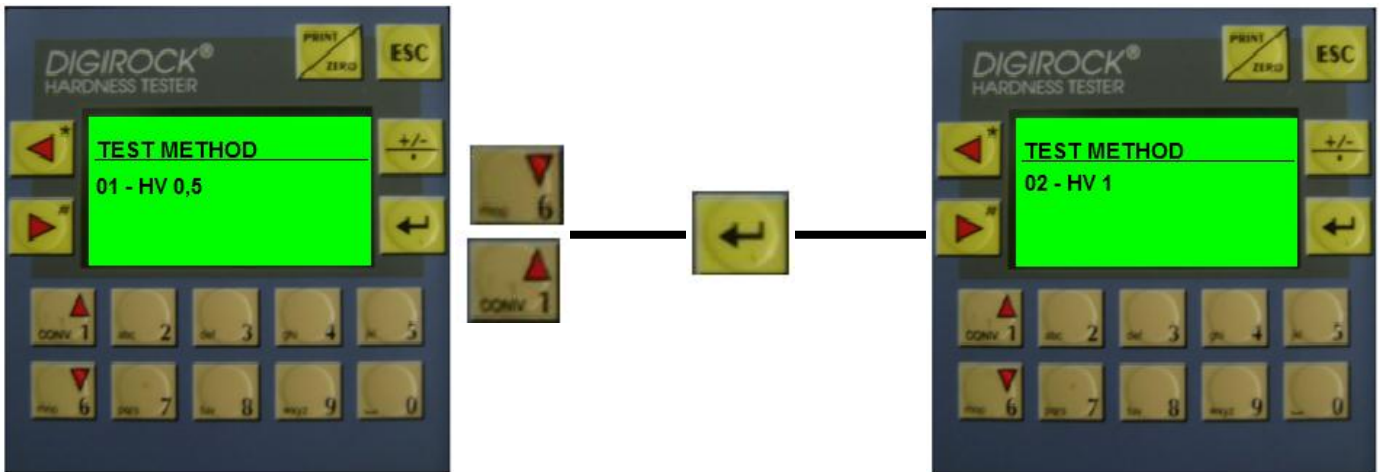
After choosing objective type
press  ESC

6.Main Screen



Objective  TEST METHOD  SETTINGS

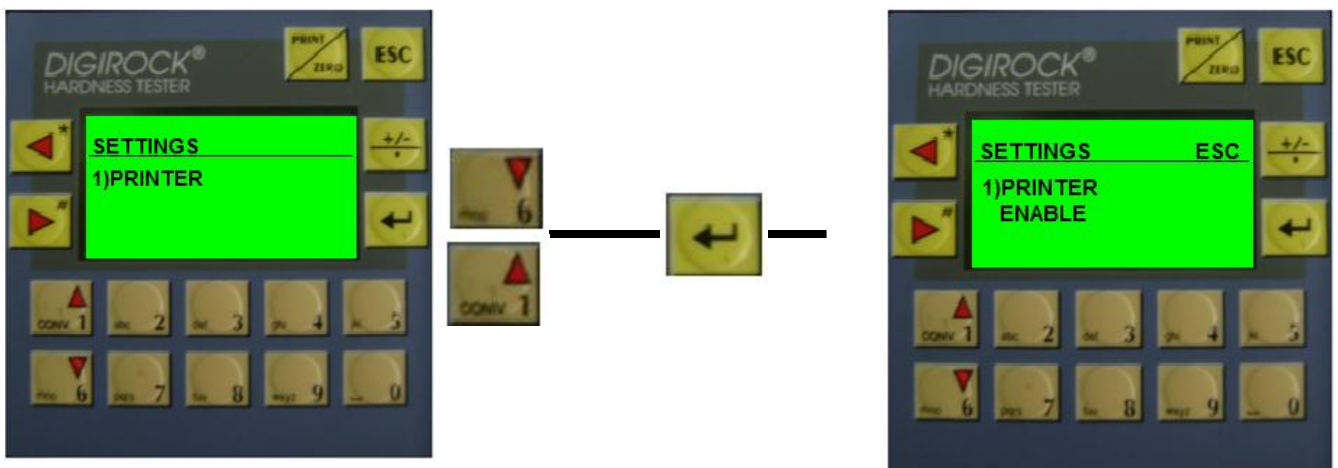
7. Test Method



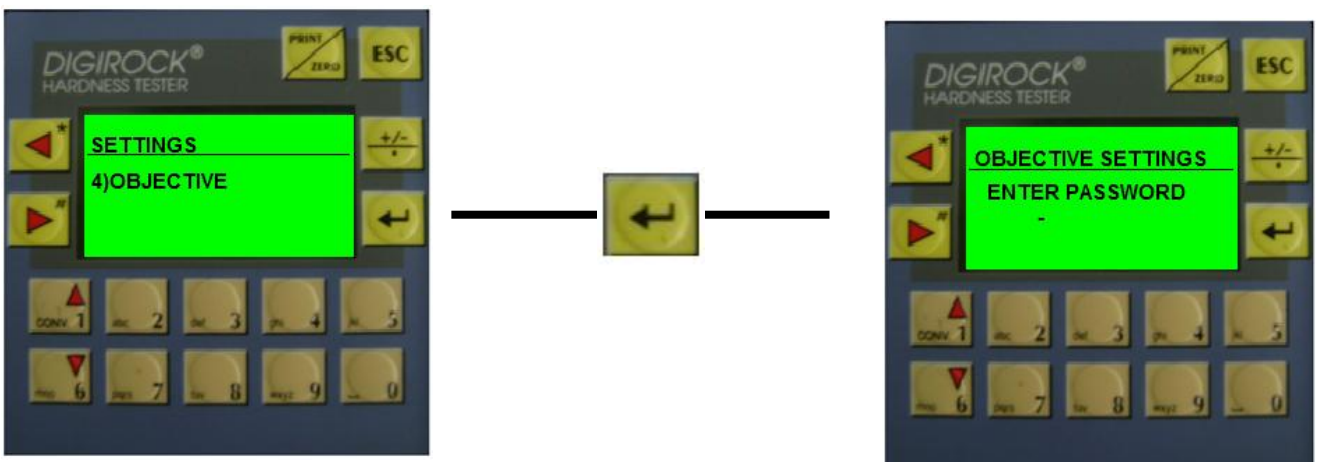
0, 4-HV 1 5-HV 3 6-HV 5 7-HV 10

When test method chosen press ESC

8. Settings



1) PRINTER 2) DATE/TIME 3) LANGUAGE 4) OBJECTIVE 5) DWELLING TIME

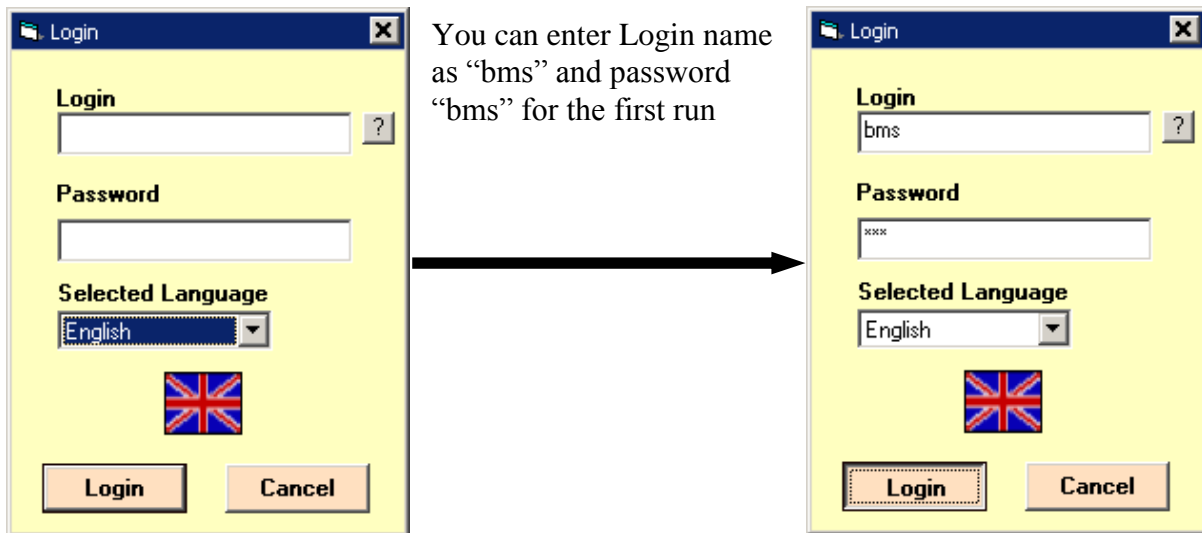


When you enter password you can change objective setting and magn. **(this is factory setting and not recommended to make any change without asking manufacturer.)**

9.Starting Test

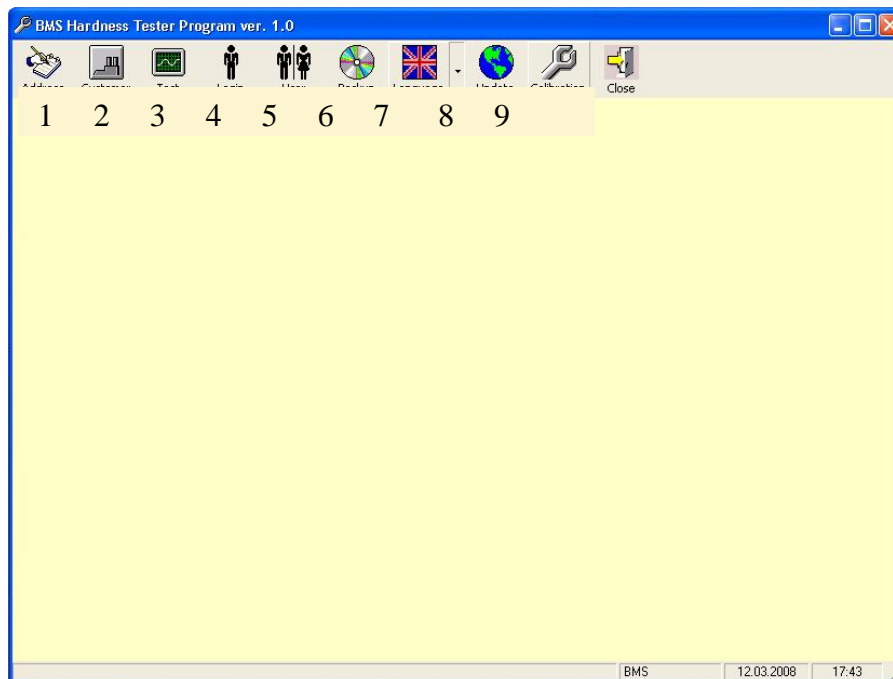
1. Turn on the power switch and the illuminating lamp is on.
2. As per the above preparation, choose suitable test load and objective .
3. Put the test sample onto the test table in a way that the tested surface is perpendicular to the axis of main shaft.
4. By rotating turret (6) bring indenter to the front and by raising elevating screw (3) with help of arms (5) adjust indenter tip distance approx.2 mm to test piece
5. Turn the 10X objective (11) to the front, by rotating testing turret (6) with help of arm (5) .And object surface of the objective is about 6 mm away from the surface of test sample (this can be adjusted approx.1,5 mm for 25X objective) by raising elevating screw slowly and at the same time observe through eyepiece glass until the processed hint can be seen clearly on the surface of test sample. If the division on the division plate is not clear, turn the ocular glass until it becomes clear.
6. Turn the indenter (8) to the front and press down the (START) key on DIGIROCK panel. Then the tester will automatically accomplish the process of loading —dwelling—unloading and will return to the original position.
7. Turn the suitable objective (either 10X or 25X). to the front and measure the indentation with the micrometer, referring to .
8. Turn the micro-move handle so that the 0 division line of micrometer is tangent to one angle of the indentation.
9. Turn the centigrade cylinder so that the other longer division line is tangent to the other angle .
10. Read the value on micrometer .

10.OPTOBUL Hardness Tester Software



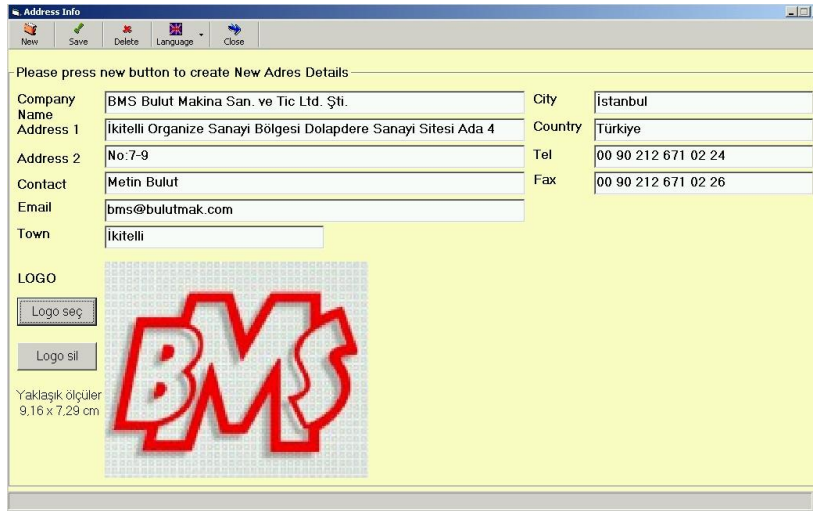
The main window includes the following functionalities as below;

- 1-Address: The address details belongs to company,
- 2-Customer: The customer address details,
- 3-Testing the hardness of materials,
- 4-Login mask,
- 5-User management,
- 6-Backup and Restore,
- 7-Language selection,
- 8-LiveUpdate of the program,
- 9-Calibration,



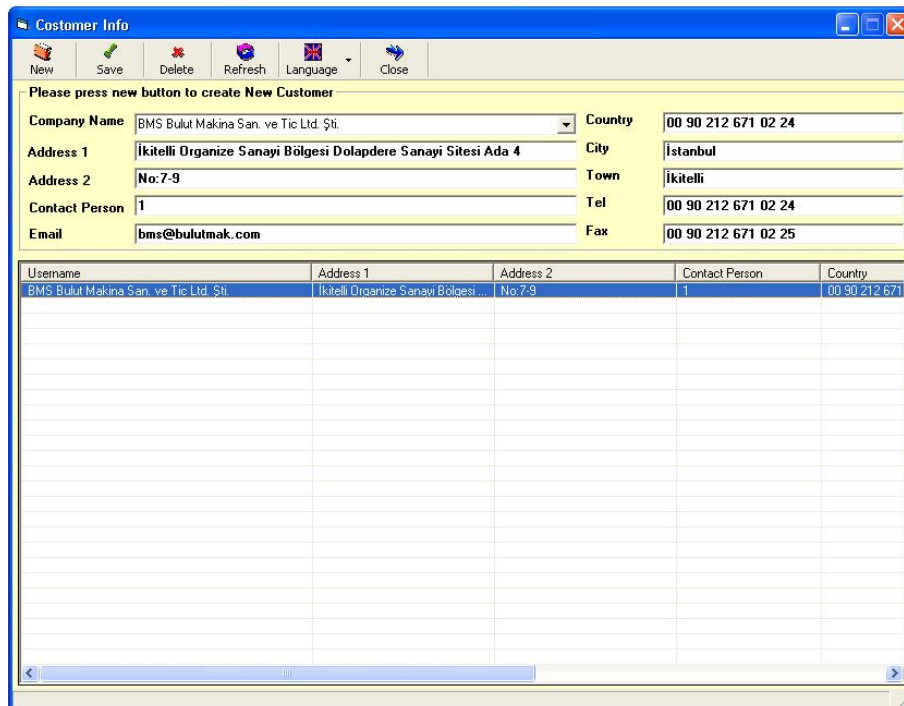
10.1. ADDRESS

Enter the company Address details by running “Address” menu button from main dialogue



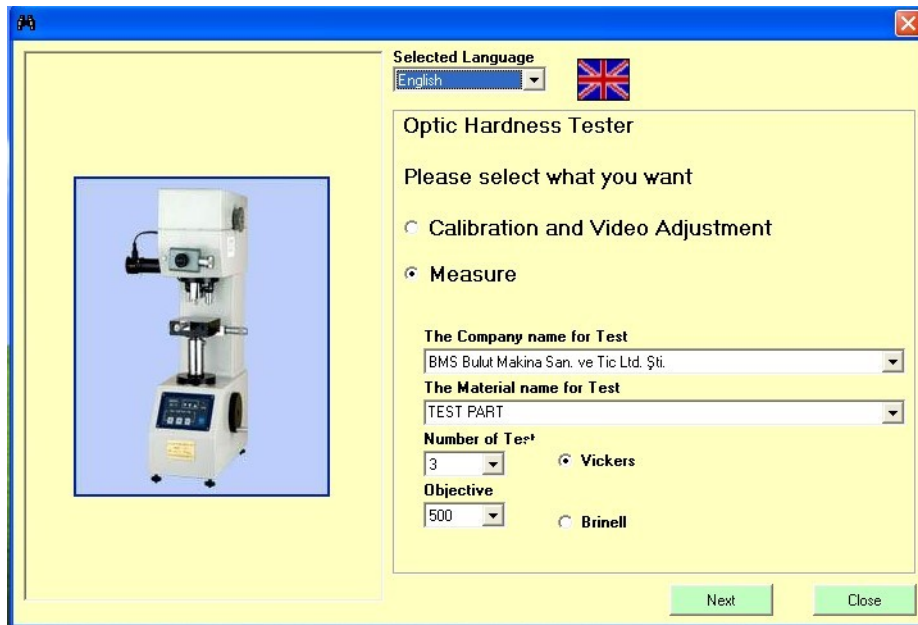
10.2. CUSTOMER

Enter the Customer Address Details by running “Customer” menu button from main dialogue

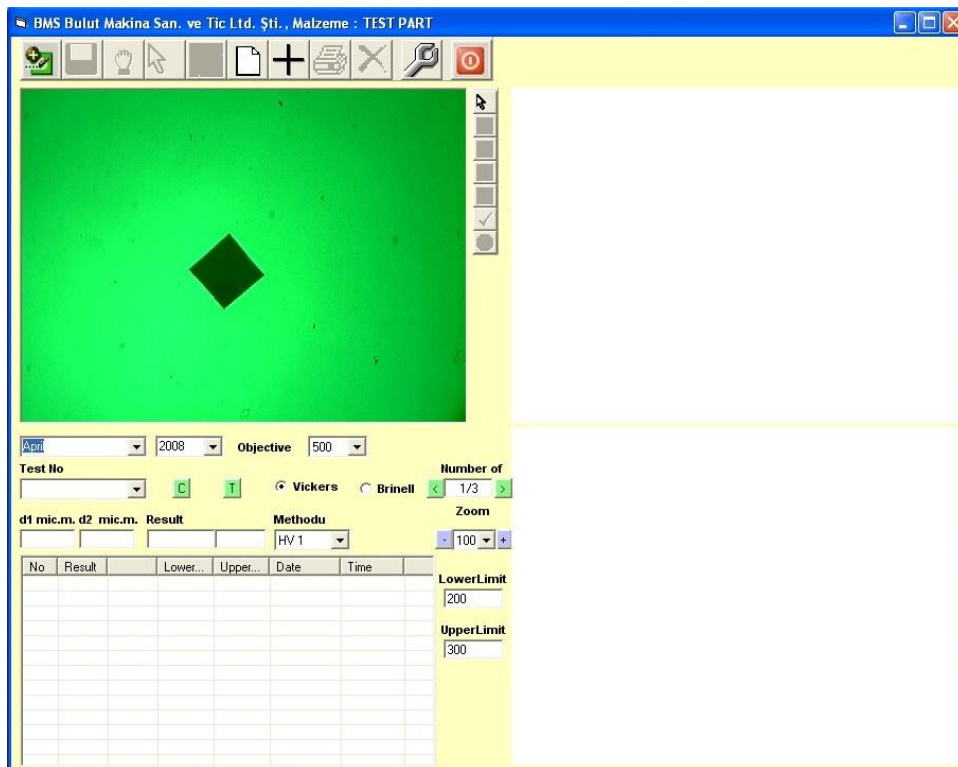


10.3. TEST

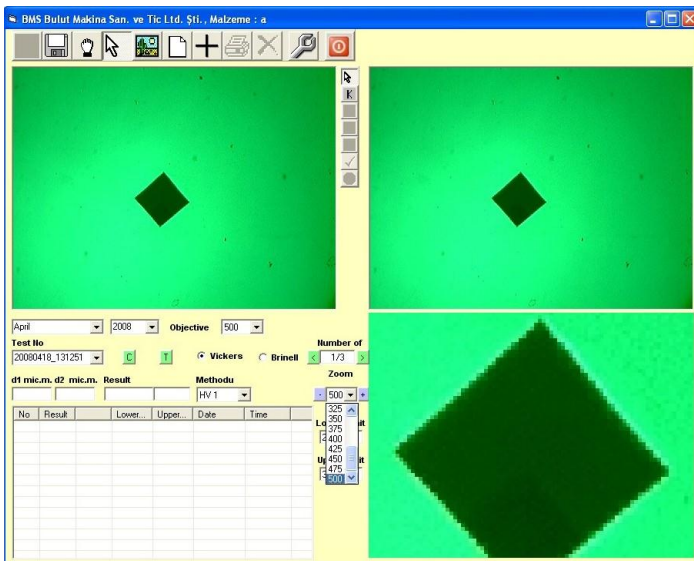
The following screen shows the “Test” window to make Hardness test of the materials. Firstly select the Customer name from list below and then write the part name in to the Material selection select Number of test for each sample that planned to make test. Select Objective from selection box, program will remember next time what you selected before. Finally, press Next button to go on.













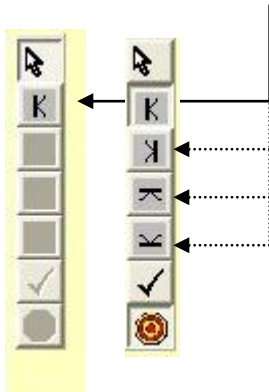
At first run, you can see the following picture that shows the online camera view at left side




- Please select working month and year follow the steps below;
- Select Objective
- Select Test Method (Vickers or Brinell)
- Press New button at the Toolbar menu
- Select the Zoom as the following
- Press the button as shown in figure below,




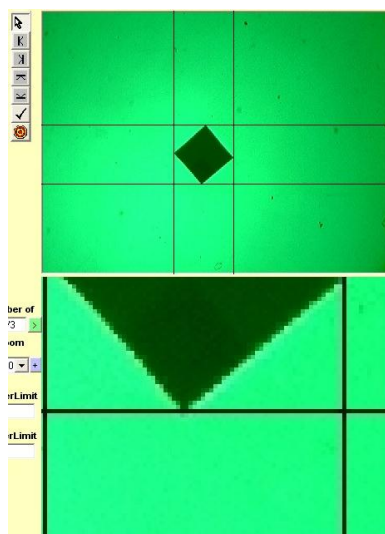
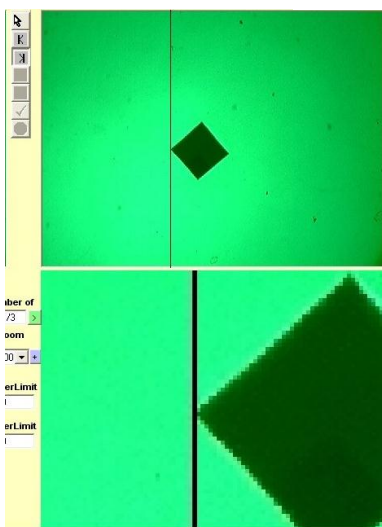
-  , Saves the test data,
-  , Moves the zoomed picture,
-  , release the mouse,
-  , Load picture from online cam window,
-  , Starts the new test,
-  , Draws the cross sign the correct position of sample figure,
-  , Prepare report in excel file,
-  , Deletes the selected test,
-  , Adjust the Camera settings,
(SELECT "YUV2" TO GET BETTER VIEW)
-  , Exit form dialogue.




After pressing the button showed with arrow, then move mouse from left to right and stop when the left corner touches the line as shown in below figure. Then click the mouse left button the make first starting point for D1 value. Seconsly, do the same for end point for D1 to find distance D1 value in μm , and repeat steps for horizontal lines too as show in below figure.

This button  calculates the result again, if you need to correct some parameters about test method.

This button  is using for sensitive movement of vertical and horizontal lines by keyboard up-down and left-right arrow keys, while the lines approaching to the corners of the below figure



When the result is calculated then press “Save” button  in the Toolbar menu, you can continue to make test for new sample from selected part and continue to complete all sample tests.


April 2008 Objective 500

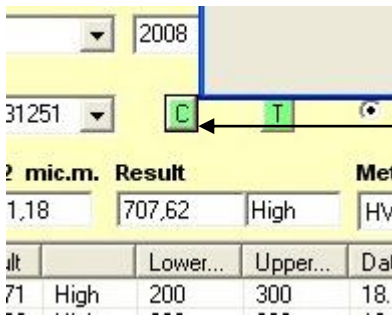
Test No 20080418_131251 C T Vickers Brinell Number of 3/3

d1 mic.m. d2 mic.m. Result Methodu Zoom
 51,18 51,18 707,62 High HV 1 500

No	Result		Lower...	Upper...	Date	Time
1	717,71	High	200	300	18.04.2008	13:16:50
2	707,62	High	200	300	18.04.2008	13:17:50
3	707,62	High	200	300	18.04.2008	13:18:32

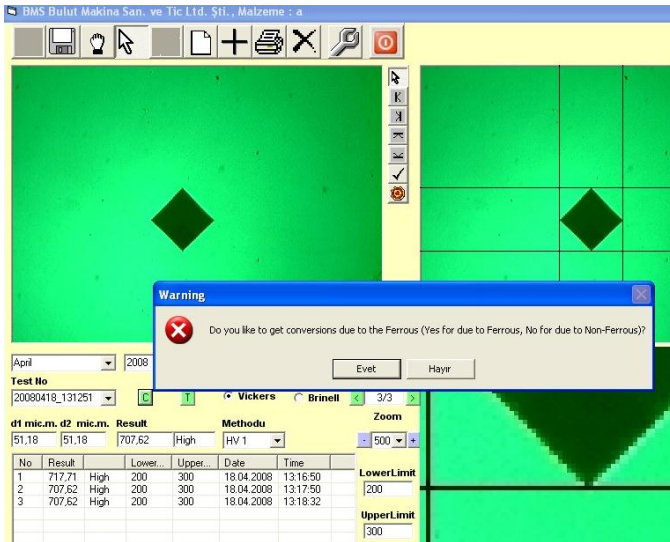
LowerLimit 200
UpperLimit 300

When all sample tests completed then you can see the above figure. Press “Report” menu  from Toolbar and then get the report in excel format as shown in next page;



When you press the “C” button then you can get the conversions of the found data as shown below;

When you press the “T” button then you can see the standard conversion table as shown below;



You can get the conversion list for results due to the ferrous or non-ferrous.

Follow same steps as described above for Brinell tests, You can see same sample pictures as shown below;

The screenshot displays a software interface for Brinell hardness testing. The main window shows a video feed of a circular indentation on a metal surface. Below the video, there are control panels for test parameters, a data table, and a conversion table. A secondary window at the bottom shows a hardness conversion table with a green V-shaped graphic.

Test Parameters:

- Test No: 2008041
- Objective: 14
- Number of: 1/3
- Zoom: 100
- LowerLimit: 200.05
- UpperLimit: 45001

Conversion Table (Bottom Window):

Ölçülen	HRA	HRB	HRC	HRD	HRE	HRF	HRG	HRH	HRK
717.71	81.45	60.90	71.45						
707.62	81.23	60.46	71.23						
707.62	81.23	60.46	71.23						

After pressing "T" button, the complete standard conversion list shown at left figure.

BMS Bulut Makina San. ve Tic Ltd. Şti., Malzeme : a

Video Format Video Driver Video Settings

Objective 14

Test No: 20080413_093237

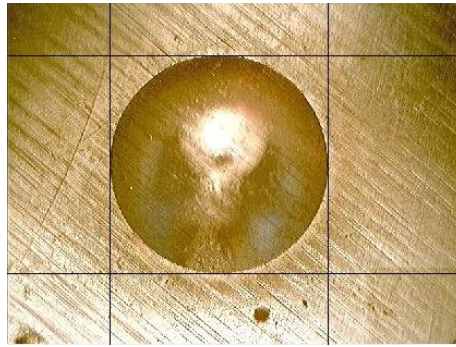
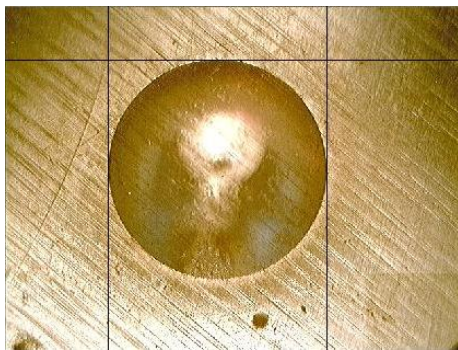
Vickers Brinell

d1 mic.m. d2 mic.m. Result Bilge Çapı Kg. Zoom

10 3000 358

No	Result	Lower...	Upper...	Date	Time

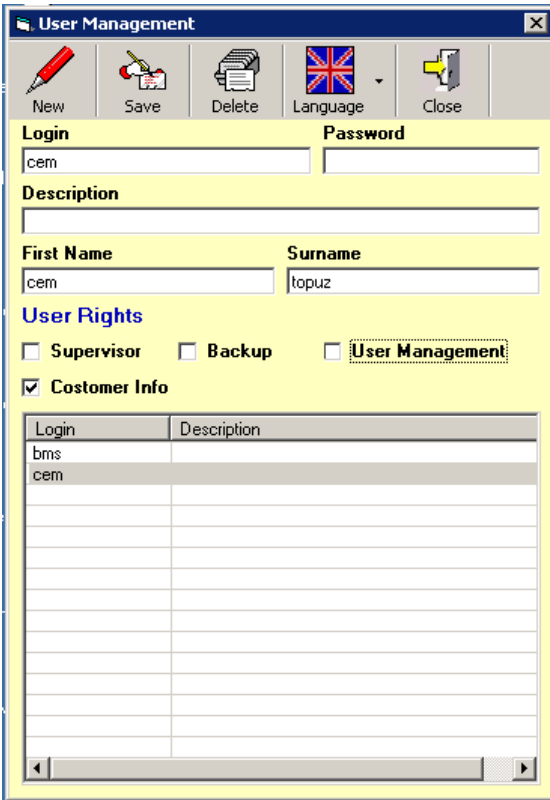
LowerLimit: 200,05
UpperLimit: 45001



11. USER MANAGEMENT

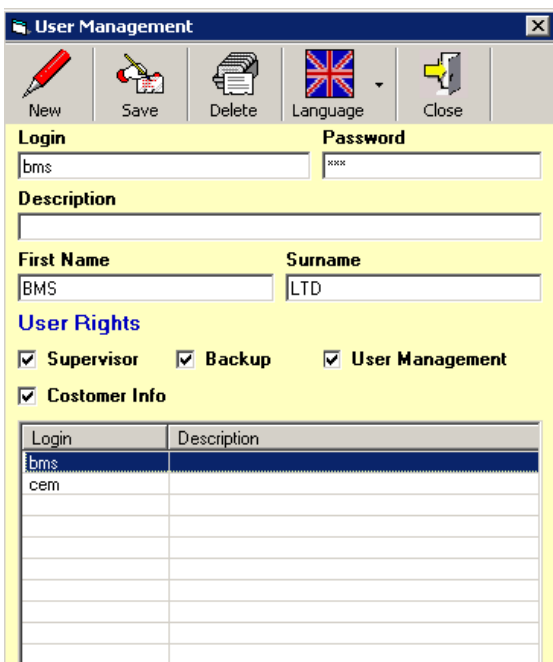
The program allows maximum 5 users to connect database. One client can connect to machine directly by COM port (RS232) and connect to database by ODBC network connection with full functionalities due to the user rights.

The other 4 clients connect database only to see test results and get print outs for Test Protocols by ODBC network connection.



User Management allows that the user rights to manage program functionalities. The selected checkboxes shows that the sections are allowed to use for the selected user. Others is not free for the user. "Name" and "Surname" information must be filled for the user. This information is necessary for Test Protocol document.

You can see the user has got rights only for Customer address details section at the left figure.



You can see the user has got rights for all sections at the left figure.

Supervisor: This allows to user that can use all program sections.

Backup: Only to use Backup Section.

User Management: Only to use User Management section.

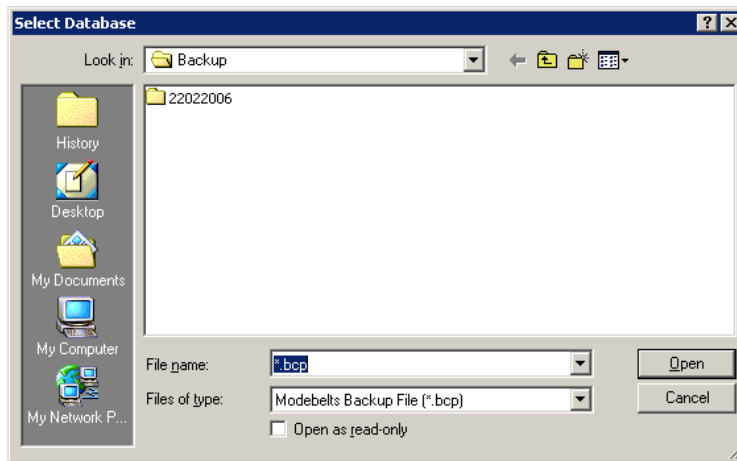
Customer: Only to use Customer section.

12. BACKUP

If you press “Backup” button, program creates a folder under the “Backup” folder in program installation path. This folder name generated by the program due to the backup date in ‘dd/mm/yyyy’ format. The backup file saves in this folder as ‘dd/mm/yyyy_hhmmss.bcp’ format, (example backup file name : 22022006_094631.bcp).

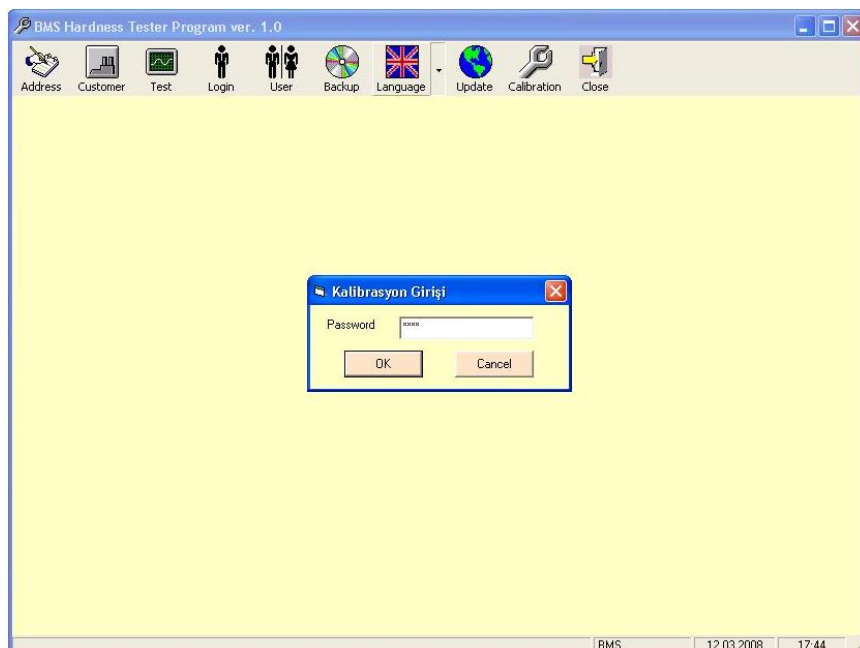


If you press “Restore” button then you can see the following figures to select date and the backup file to restore it.

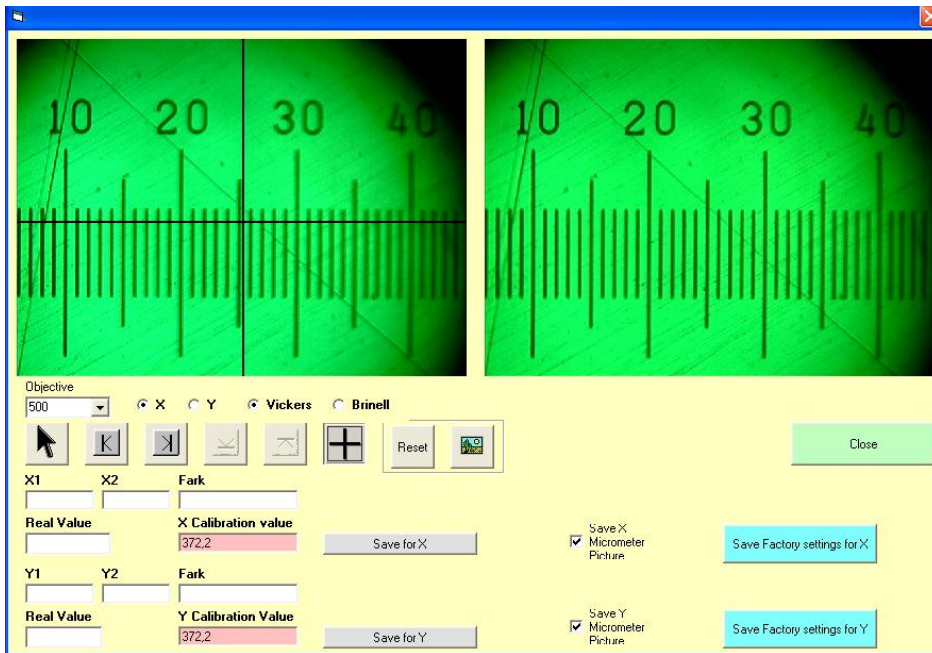




13. CALIBRATION

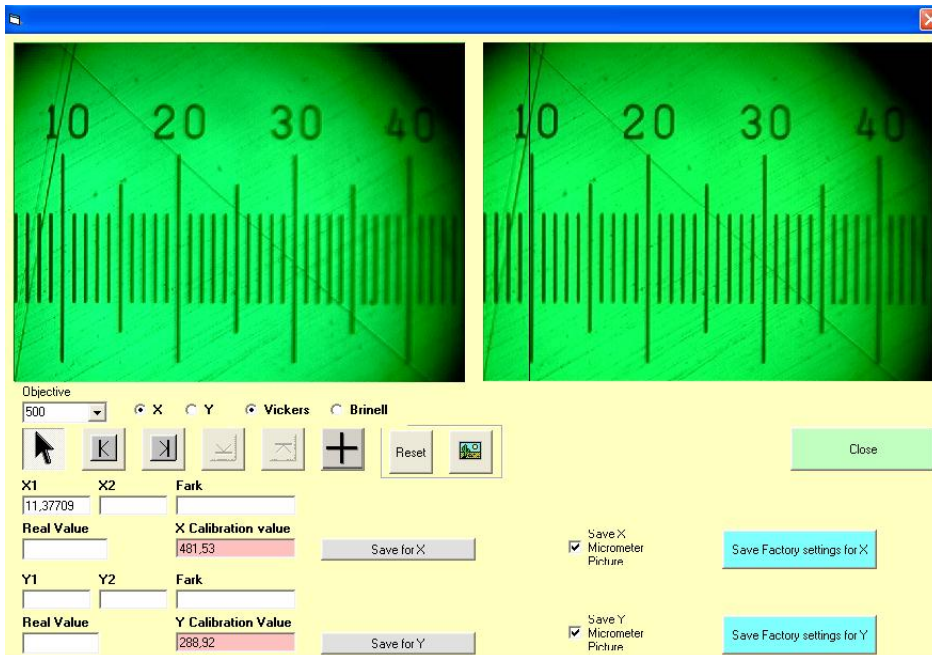
Software has been already calibrated on the tester at our works according to related norms. You do not need to calibrate it again. But, any case, to make Calibration, press “Calibration” button and enter password that will be given by our company when you need it.



Select Zoom and the cross sign to correct the figure by rotating camera its around as shown below;





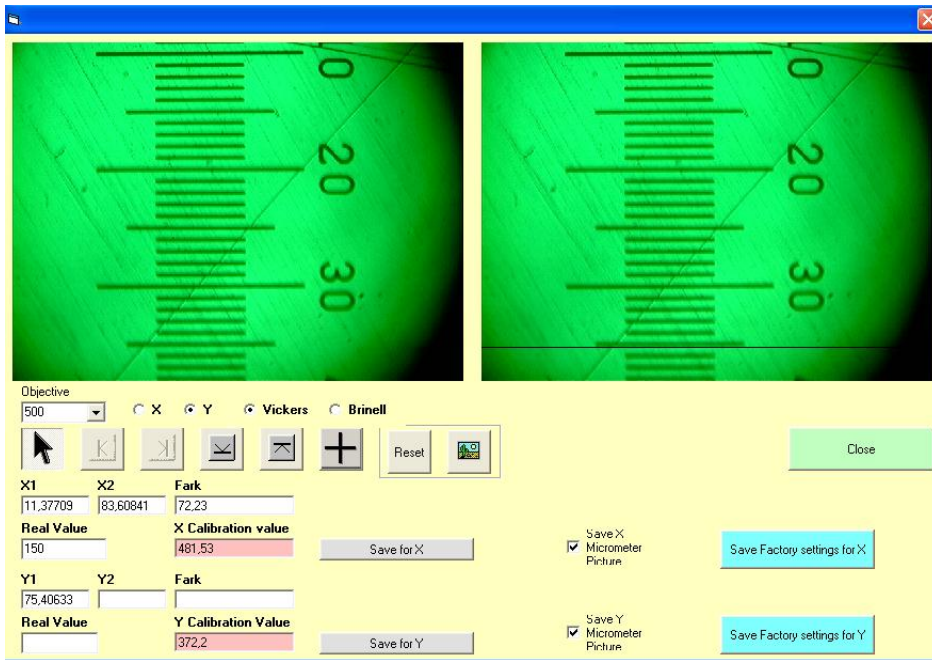
Select the “Objective” and then press “X” option to start by button  from left to right approximation to one reference point like below. Secondly, press button  to measure a distance in μm from reference point to the end point.



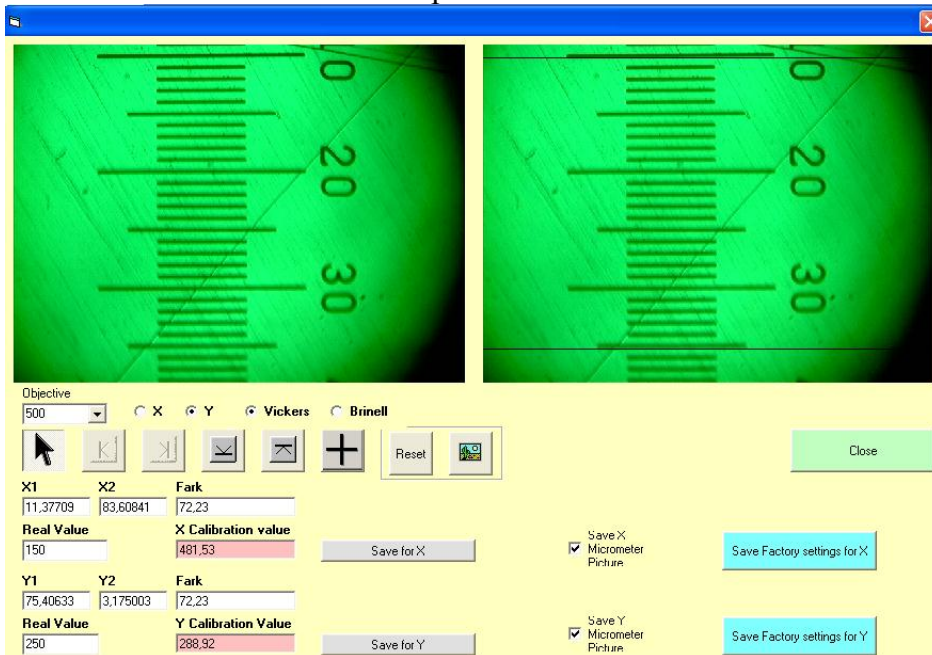
Write the real value to the text box and then press “Save For X” button to calculate the calibration parameter and save it to the database. After saving it , if you want you can press “Save factory settings for X” button and too.

Repeat steps for Y as the following;

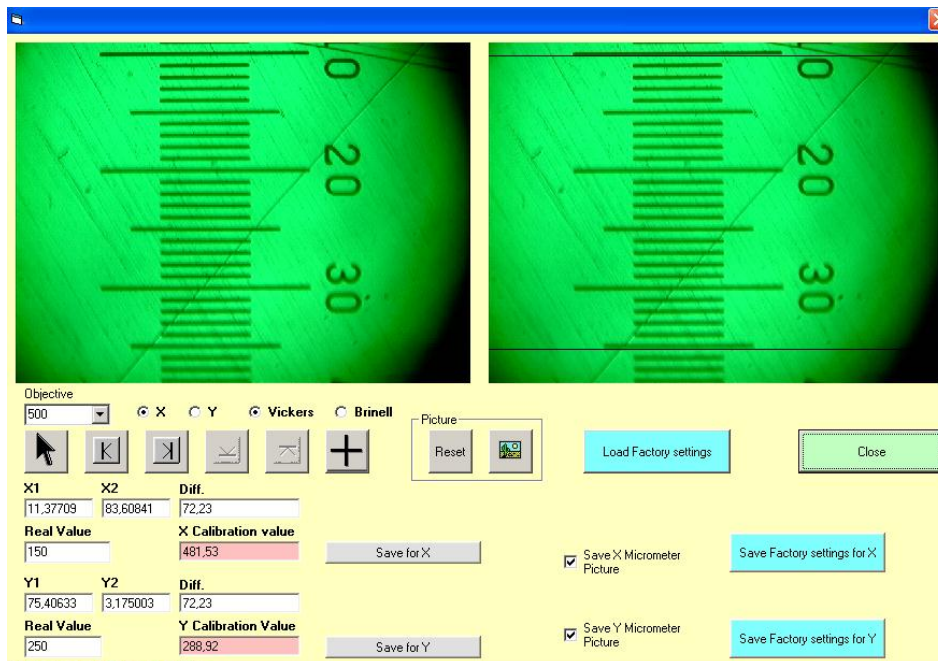
Select the “Objective” and then press “Y” option to start by button  from left to right approximation to one reference point like below. Secondly, press button  to measure a distance in μm from reference point to the end point.



Write the real value to the text box and then press “Save For Y” button to calculate the calibration



parameter and save it to the database. After saving it , if you want you can press “Save factory settings for Y” button and too.



When you made any mistake while you are making calibration, you can “**Restore Factory defaults**” by pressing button “Load Factory Settings” shown above figure.

For above sample ,HV1 , using 25X objective , every line is accepted as of 100 units. 5×100 units = 500 + 18 lines on micrometer = 518 units. Input 518 for 1.Point on DIGIROCK panel. Read second vale by turning 90° of eyepiece and input 518 for 2.Point and and press An see result on panel .(see main screen of DIGIROCK)

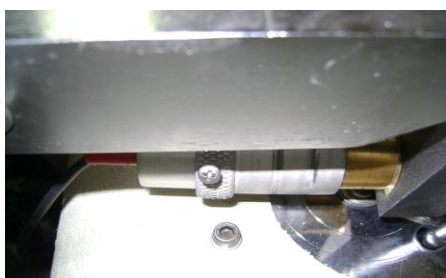
Note :

The coincidence of 0 division line of micrometer and zero line of centigrade cylinder shall be corrected at random during the test process. If not coincident, loose the three screws on the centigrade cylinder and turn lightly the outside ring until they are coincident. And then tighten those three screws.

14.Maintenance

The hardness tester is a precise instrument that must be maintained carefully to keep its accuracy.

Should something be wrong with the illumination of the tester, it can be replaced by the illumination in the accessory box as follows



1-Turn power off.

2-Open the left cover of machine.Hold it housing as per shown in above picture and remove out it complete.

3-Loose the bulb by twisting and take it out .Replace with a new 12V - 5W bulb.

Note: Illumination is durable to use.