OPERATION MANUAL

MICROBUL-N

LOW LOAD VICKERS HARDNESS TESTER

BMS Bulut Makina Sanayi Ve Ticaret Ltd. Şti.

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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 throat (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 (net /gross) kg	***68 / 100***

2 Standard Accessories

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

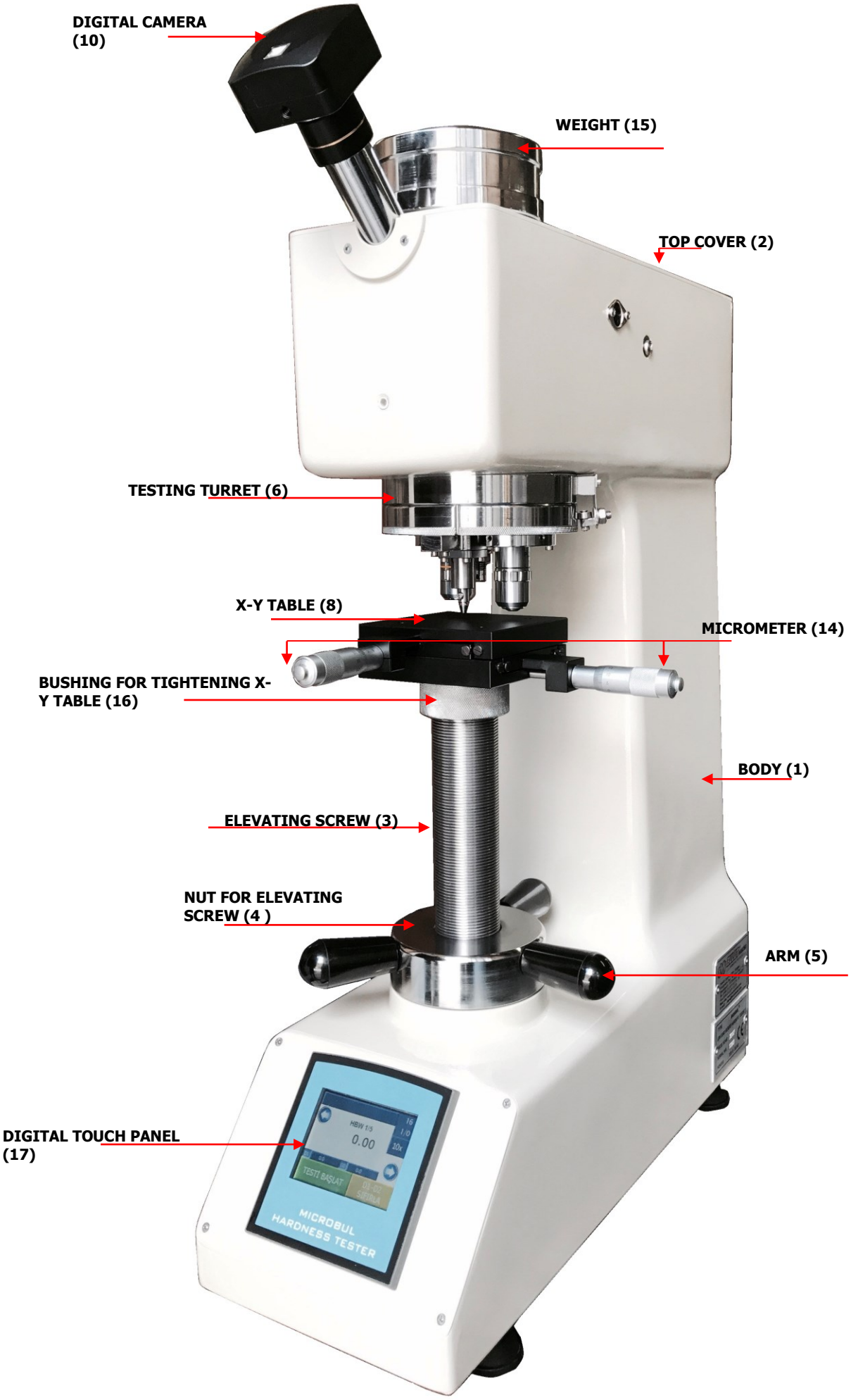

DIGITAL CAMERA (10)
WEIGHT (15)
TOP COVER (2)
TESTING TURRET (6)
X-Y TABLE (8)
MICROMETER (14)
BUSHING FOR TIGHTENING X-Y TABLE (16)
BODY (1)
ELEVATING SCREW (3)
NUT FOR ELEVATING SCREW (4)
ARM (5)
DIGITAL TOUCH PANEL (17)
MICROBUL HARDNESS TESTER

Fig.1

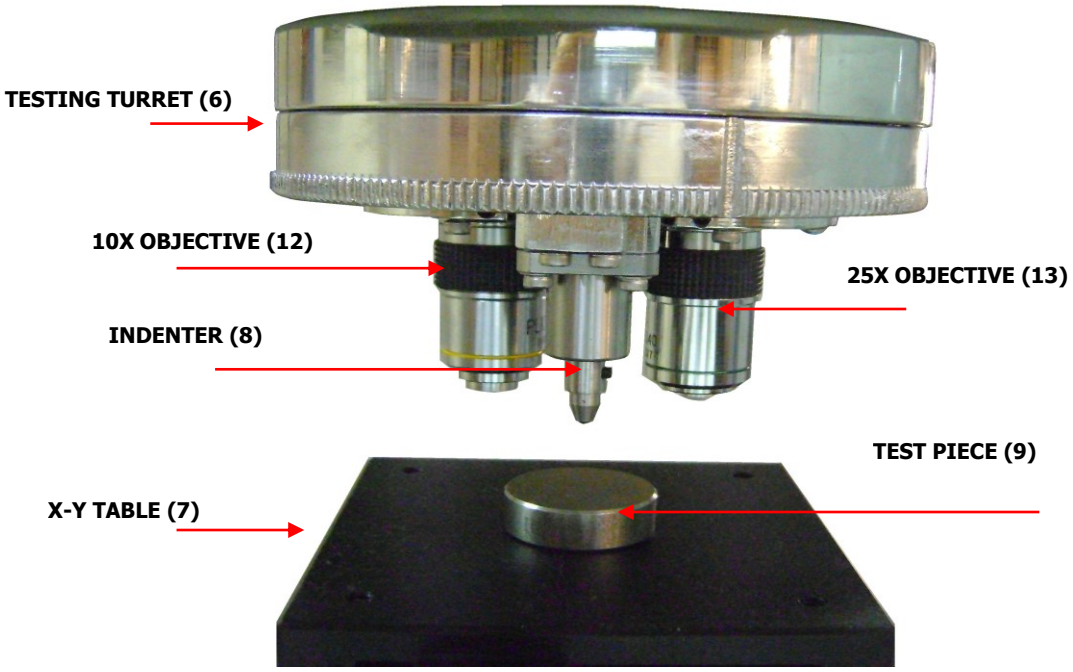


Fig.2

3 Part List

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

4 Installation and Operation

4.1 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. (Pals refer to drawing)

2-Take out weights (15) 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 accessories box. Clean it well and locate it to the elevating screw hole and tighten it by means of knurled bushing (16). 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.

4.2 Preparation 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.

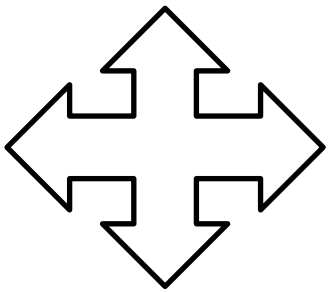
b) Suitable test load, thickness of test piece (or case depth) and hardness to be chosen from related table.

5 Main Screen / Screen Display

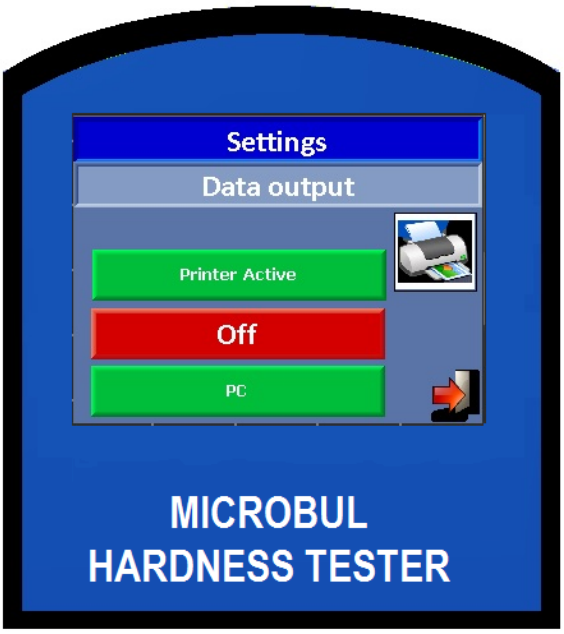
6 Main Menu

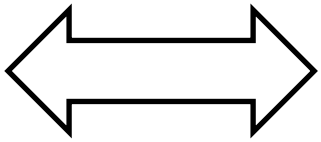
Settings display is using for enter the function, such ***as printer, date / time average name, test duration, factory settings, test lower limit, test upper limit, language selection.***

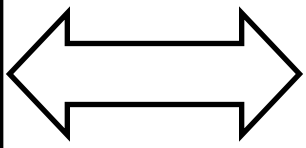
7 Settings

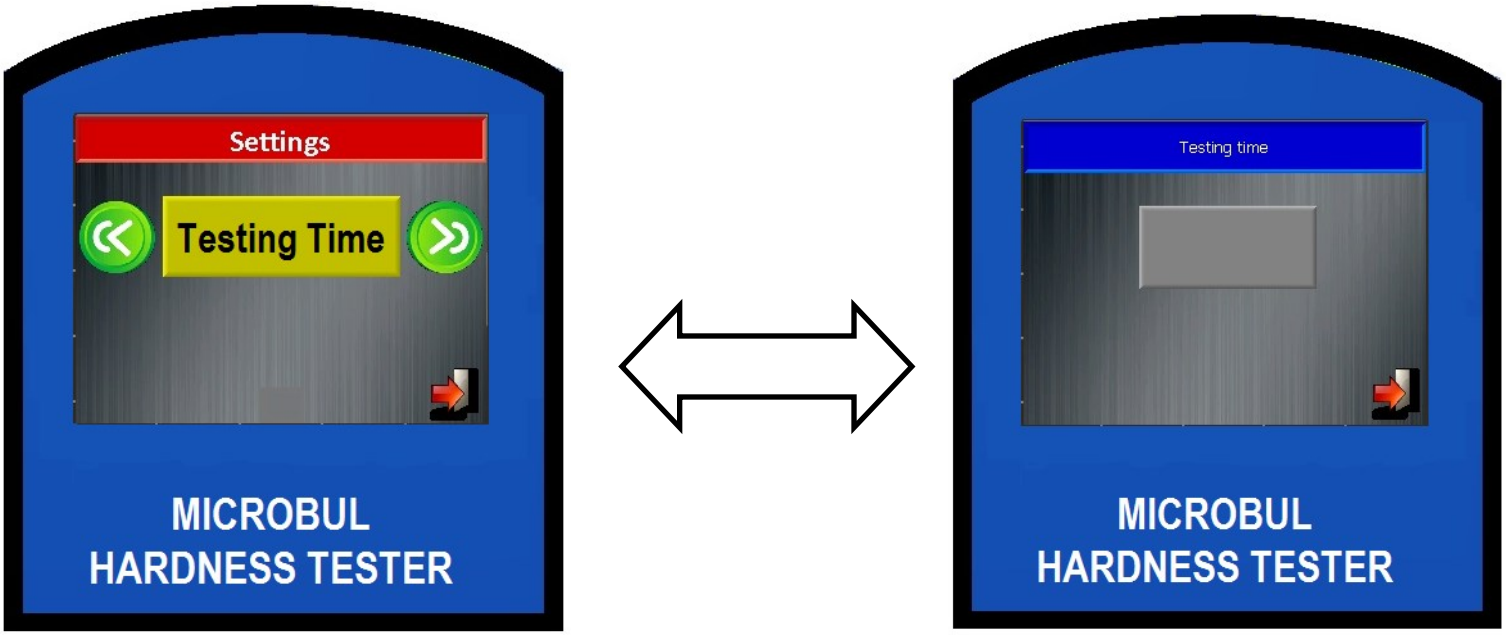


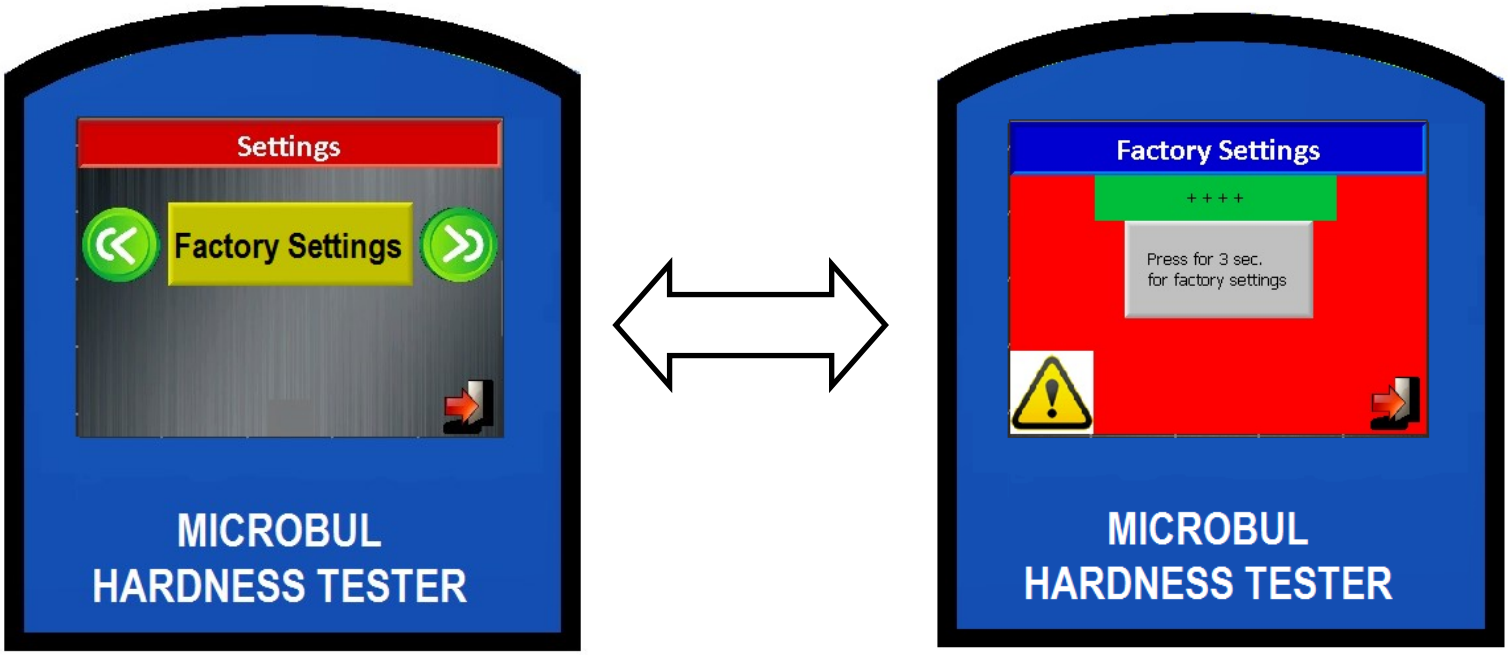
You can make the following edits from Settings Menu

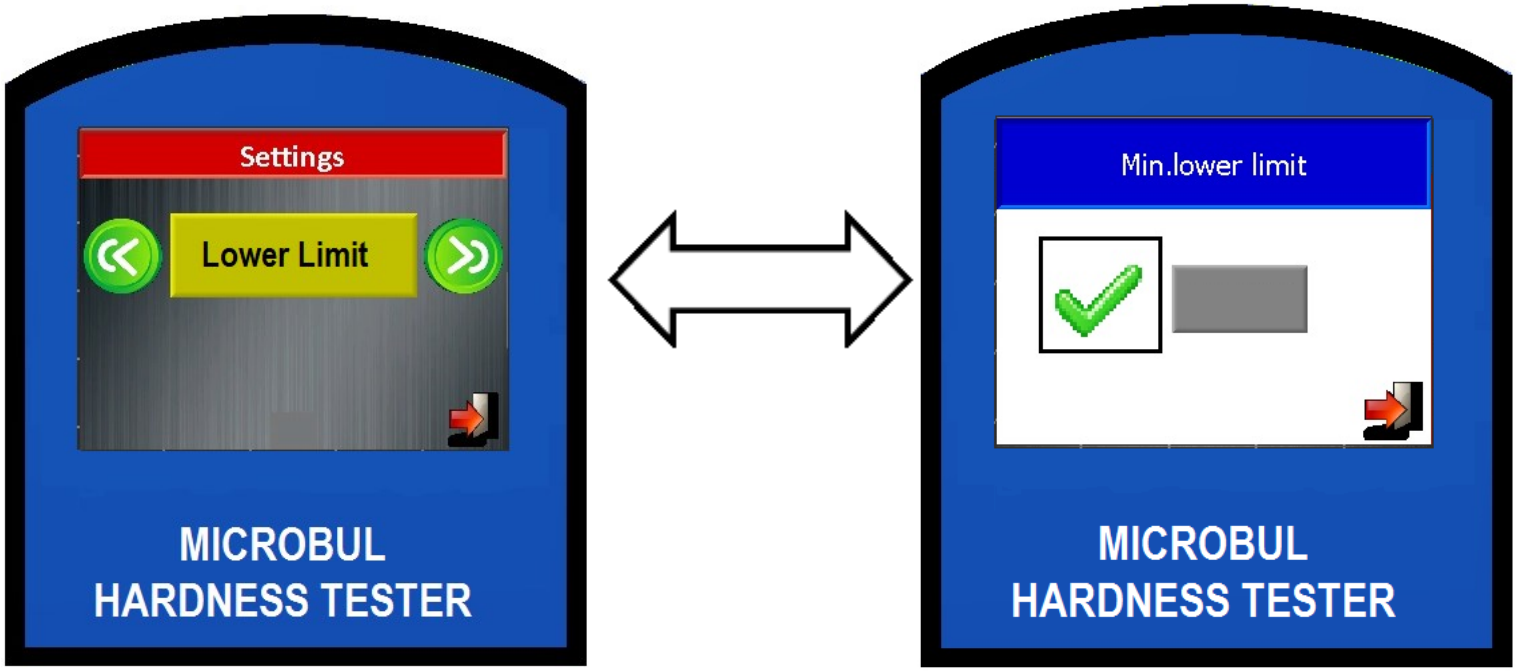







Settings
Testing Time
MICROBUL
HARDNESS TESTER
Testing time
MICROBUL
HARDNESS TESTER


Settings
Factory Settings
MICROBUL
HARDNESS TESTER
Factory Settings
+ + + +
Press for 3 sec.
for factory settings
MICROBUL
HARDNESS TESTER


Settings
Lower Limit
MICROBUL
HARDNESS TESTER
Min.lower limit
MICROBUL
HARDNESS TESTER


Settings
Upper Limit
MICROBUL
HARDNESS TESTER


Max.upper limit
9999.99
MICROBUL
HARDNESS TESTER

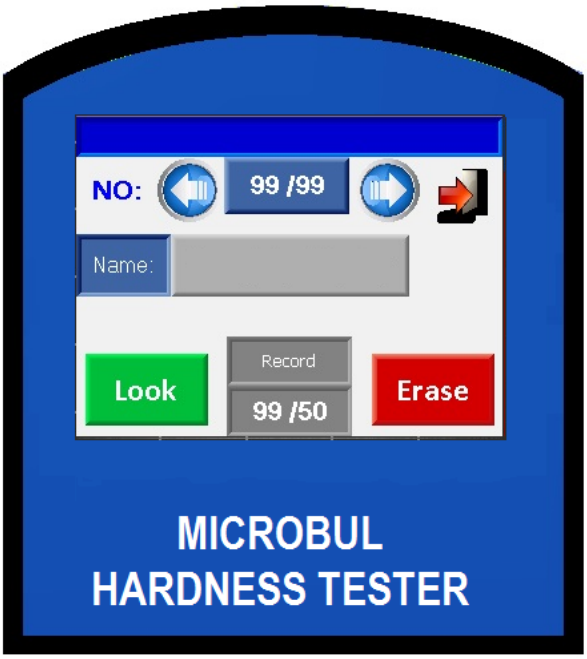

Settings
Language
MICROBUL
HARDNESS TESTER

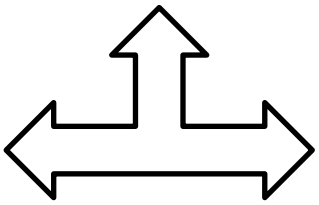

Language
TÜRKÇE
РОССИЯ
ENGLISH
ITALIANO
ESPAÑOL
اللغة العربية
DEUTSCHE
FRANÇAIS
MICROBUL
HARDNESS TESTER


Settings
SCANNING
MICROBUL
HARDNESS TESTER

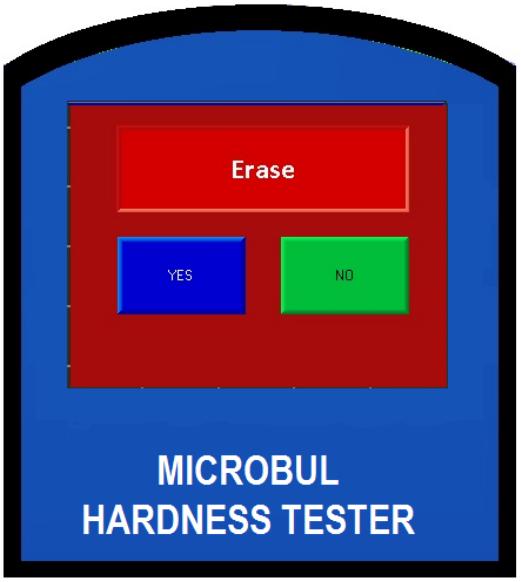

Settings
SCANNING
EYEPIECE
CAMERA
MICROBUL
HARDNESS TESTER

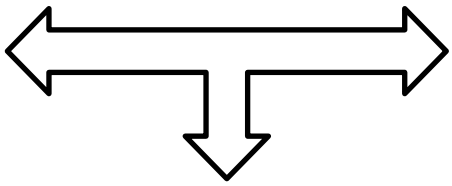
8 Records



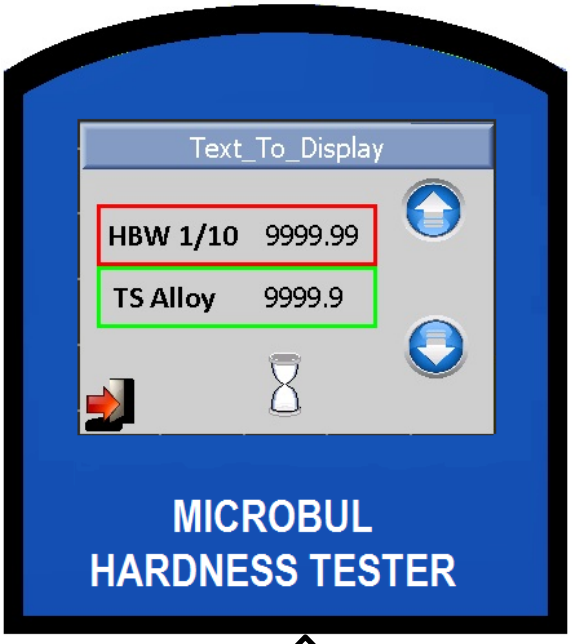


Max. 50 test data can be input. The total enrollment for each record is 100. Total 5000



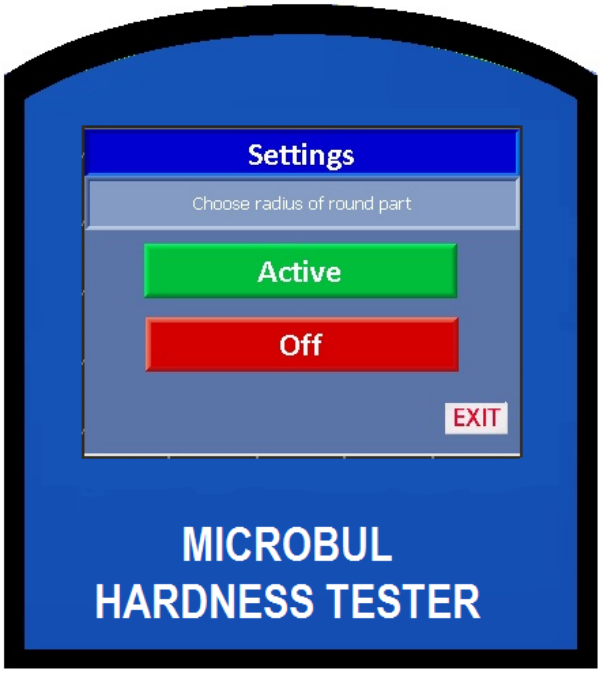


On the right you can see the online test results which you can see through the records on the left.



Results can be turn the method using  icon

You can see the diameter correction factor by selecting the radius of the material in the measurements



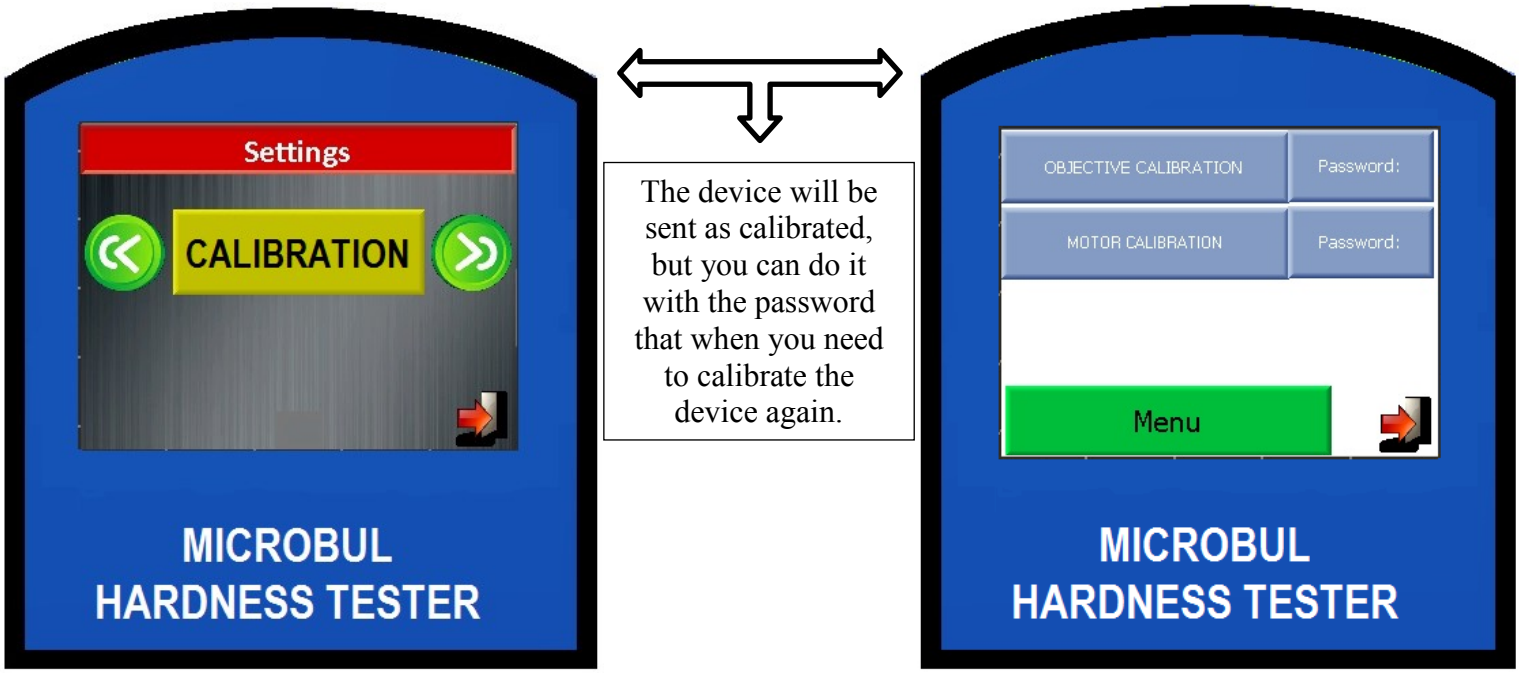
9 Calibration

9.1 Objective Calibration

<u>The device is calibrated by our company and not need to calibrate again by the user.</u>

If necessary, the calibration of the device must be carried out by qualified personnel. If the person performed an incorrect calibration, the original calibration values can be recalled by entering SETTINGS and using the RESTORE FACTORY SETTINGS function.

You need to enter the password for the objective and motor setting. Here you can select the objective, motor setting and magnification factor. (This factory is saved as a setting and it is highly advised not to change it without asking the manufacturer even if the password is known.)



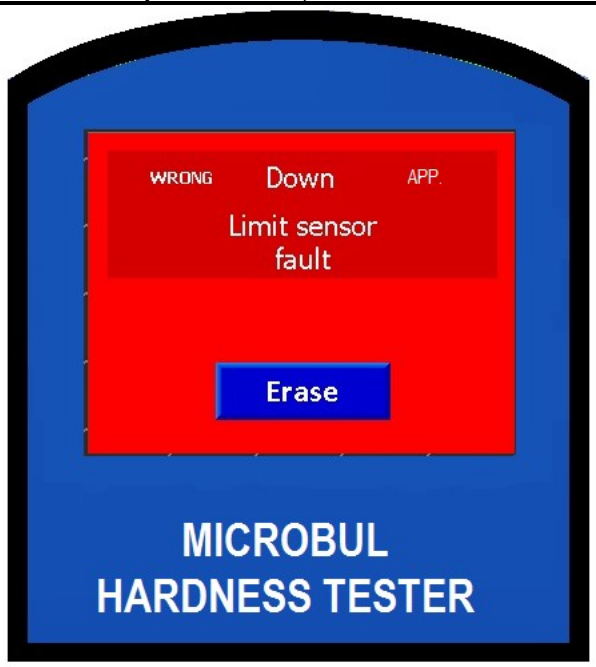
9.2 Motor Calibration

If you want to make a calibration as a factory calibration you need know the password
NOTE: If the values are stored as factory settings, calibration must be repeated if the calibration is incorrect.

10 Test Method

10.1 Test Screen

NOTE: If you see the screen below after waiting for some time after the start button has been pressed, the optical sensor is out of order and you need to contact the company.



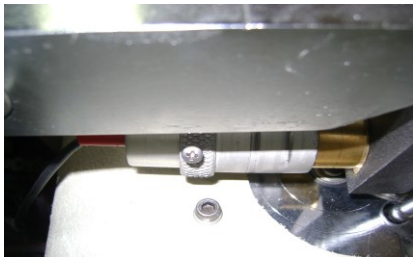
When you enter password you can change objective setting and magn. (This is factory setting and not recommended to make any change without asking manufacturer.)

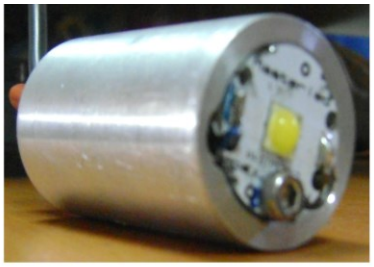
11 Starting Test

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 bring indenter to the front and by raising elevating screw with help of arms, adjust indenter tip distance approx.2 mm to test piece
5-Turn the 10X objective to the front, by rotating testing turret with help of arm. 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 camera until the processed hint can be seen clearly on the surface of test sample.
6-Turn the indenter to the front and press down the (START) key on MICROBUL 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 digital encoder.
Turn the micro-move handle so that the 0 division line of micrometer is tangent to one angle of the indentation,
Make sure when the machine is on, before test don't forget the press D1+D2 RESET button on test screen
Press the button for d1 than press again for d2.
Than you will see the test result on the MICROBUL panel
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

12 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





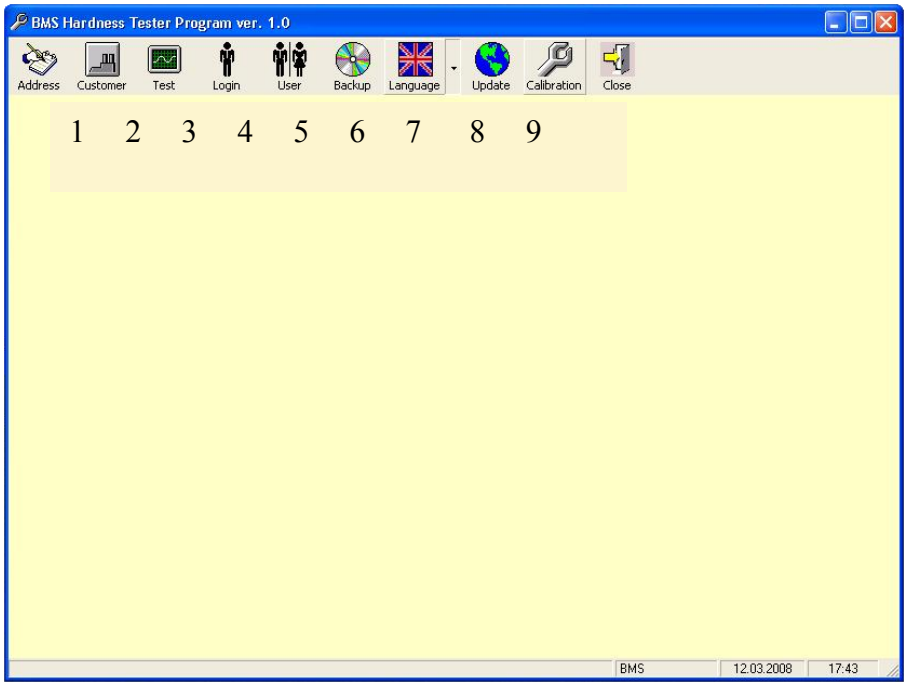
1-Turn power off.
2-Open the left cover of machine. Hold it housing as per shown in above picture and remove out it complete.
3-Loose the bulb by twisting and take it out .Replace with a new 12V - 5W bulb.
Note: Illumination is durable to use.

13 OPTOBUL Hardness Tester Software

You can enter Login name as “bms” and password “bms” for the first run

The main window includes the following functionalities as below;

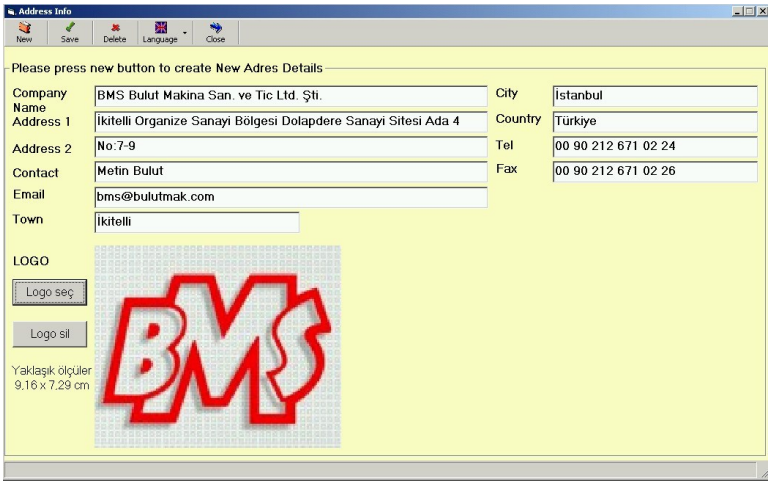
1-Address: The address details belongs to company,
2-Customer: The customer address details,
3-Testing the hardness of materials,
4-Login mask,
5-User management,
6-Backup and Restore,
7-Language selection,
8-LiveUpdate of the program,
9-Calibration,



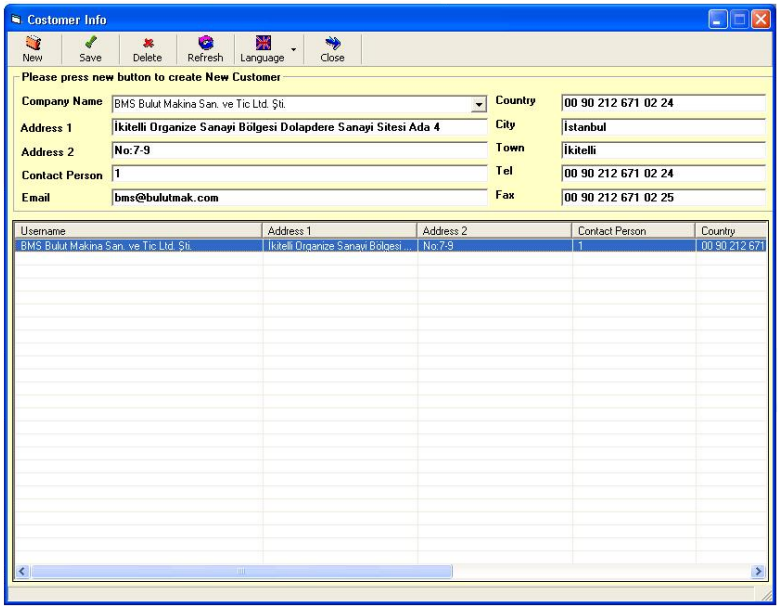
13.1 Address

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

13.1.1 Customer

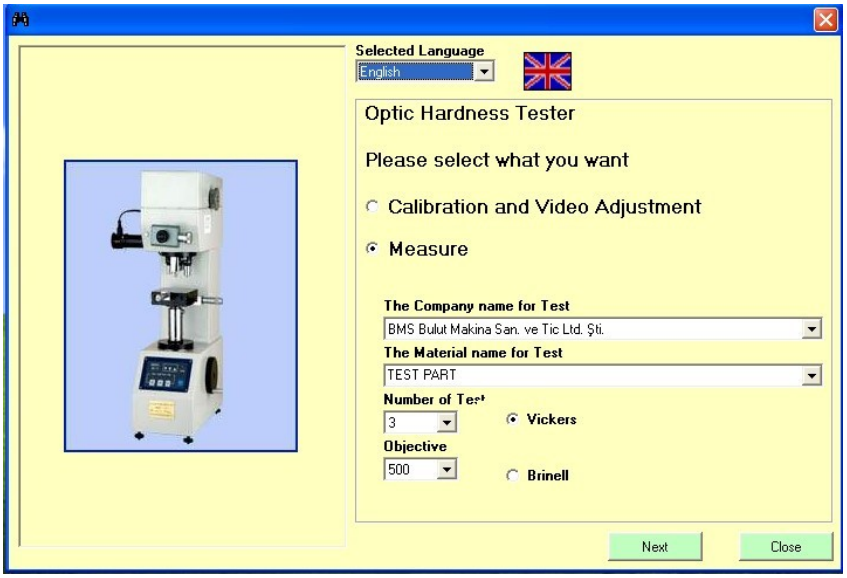


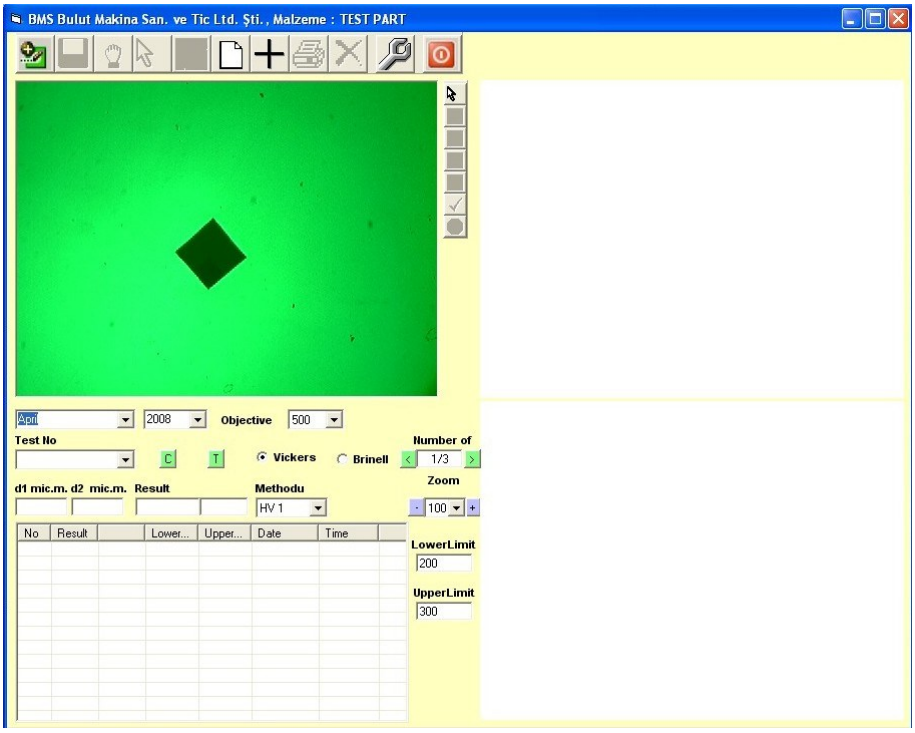
Enter the Customer Address Details by running “Customer” menu button from main dialogue



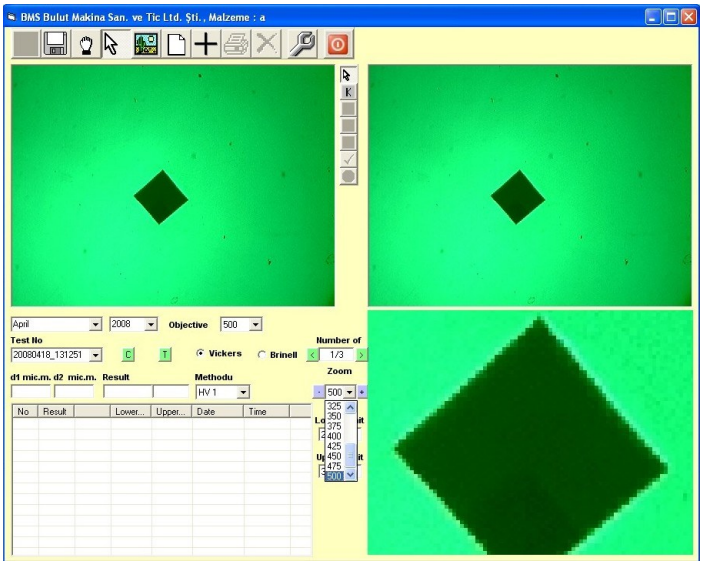
13.2 Test

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.

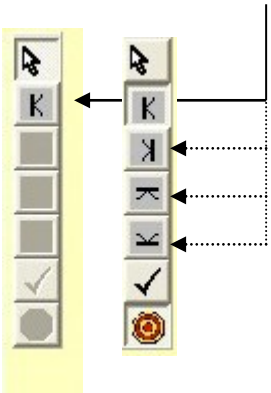




At first run, you can see the following picture that shows the online camera view at left side
Please select working month and year follow the steps below;
Select Objective
Select Test Method (Vickers)
Press new button at the Toolbar menu
Select the Zoom as the following
Press the button as shown in figure below,



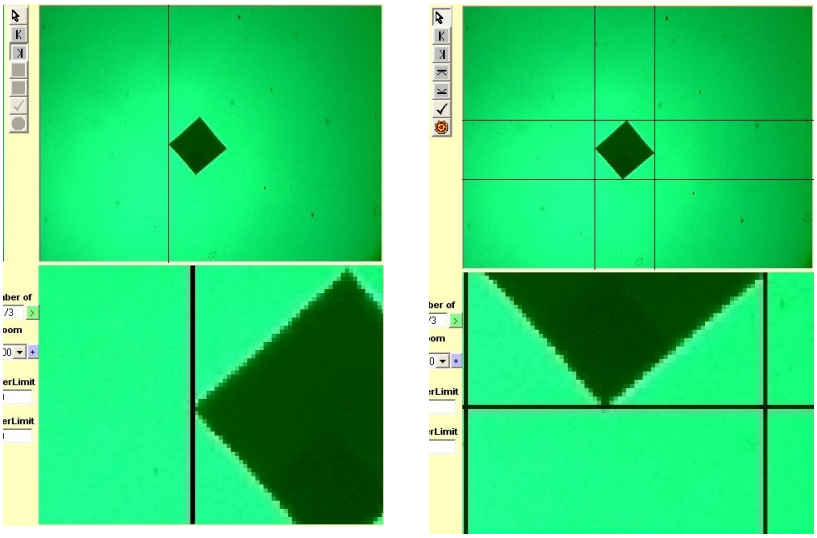
, Saves the test data,
, Moves the zoomed picture,
, release the mouse,
, Load picture from online cam window,
, Starts the new test,
, Draws the cross sign the correct position of sample figure,
, Prepare report in excel file,
, Deletes the selected test,
, Adjust the Camera settings, (SELECT "YUV2"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



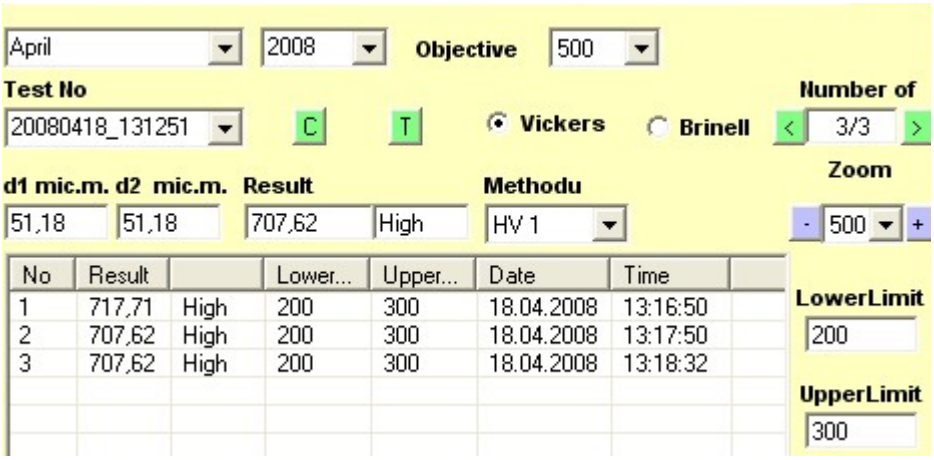
After pressing the button showed with arrow, then move mouse from left to right and stop when the left conner touches the line as shown in below figure. Then click the mouse left button the make first starting point for D1 value. Secondly, do the same for end point for D1 to find distance D1value in 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.



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;

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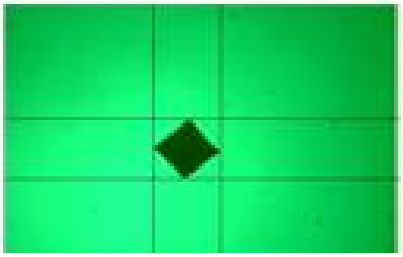
TEST PROTOCOL

TEST BY	
DATE	18-Nis-2008
MATERIAL	a

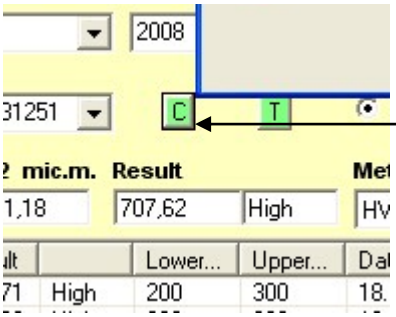
TEST RESULTS

No	Value	Test Method	Result
1	717,71	HV 1,	High
2	707,62	HV 1,	High
3	707,62	HV 1,	High
Up./Low. Limit	Average	Std. Deviation	Result
200 /300	710,98	5,83	High



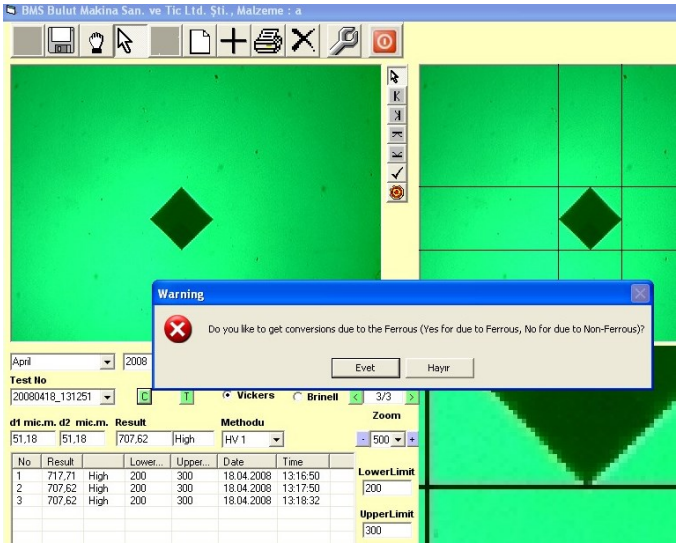
Sign Tester

Sign Qualified

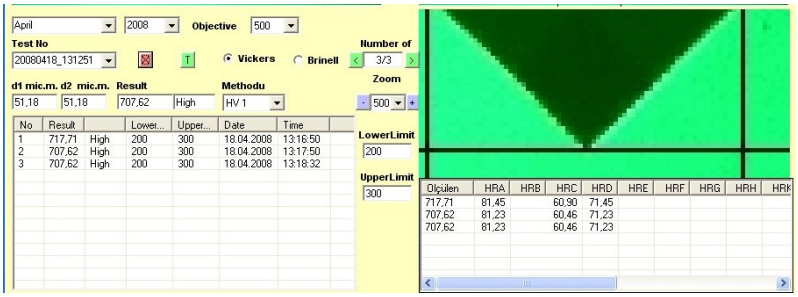


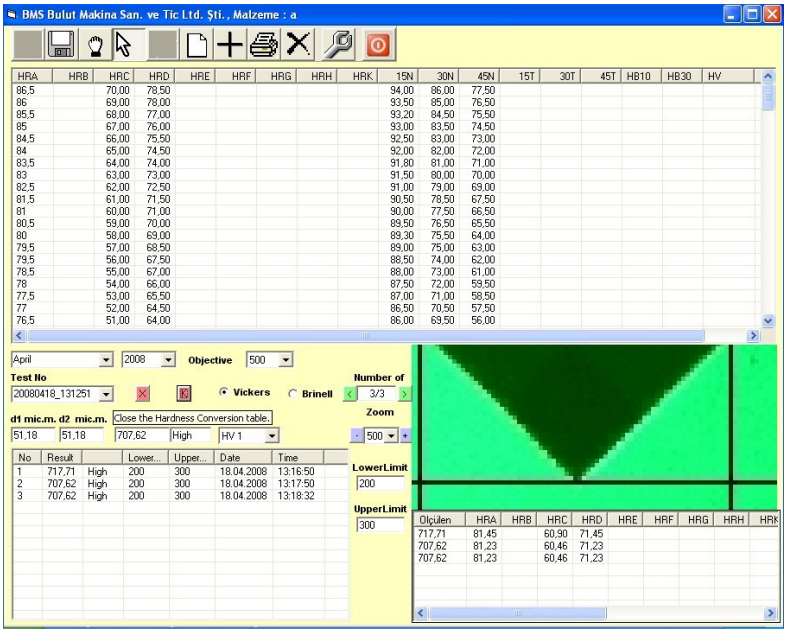
When you press the “C” button then you can get the conversions of the found data as shown below;

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.

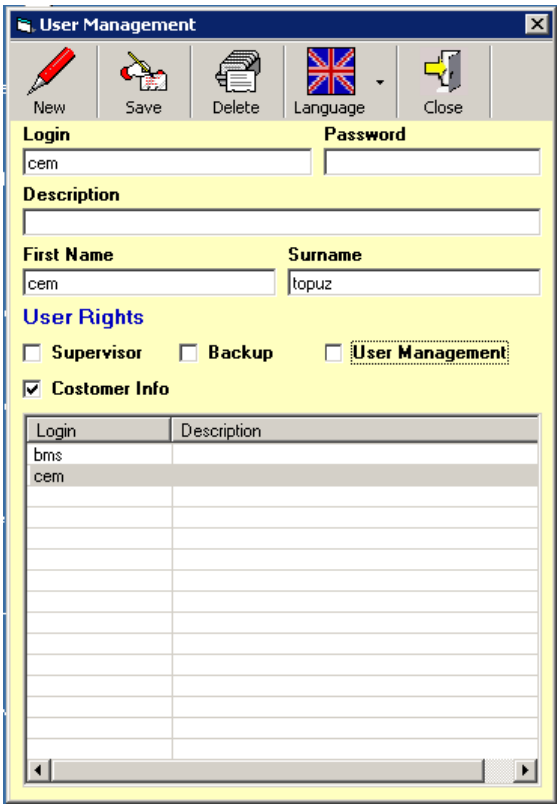




After pressing “T” button, the complete standard conversion list shown at left figure.

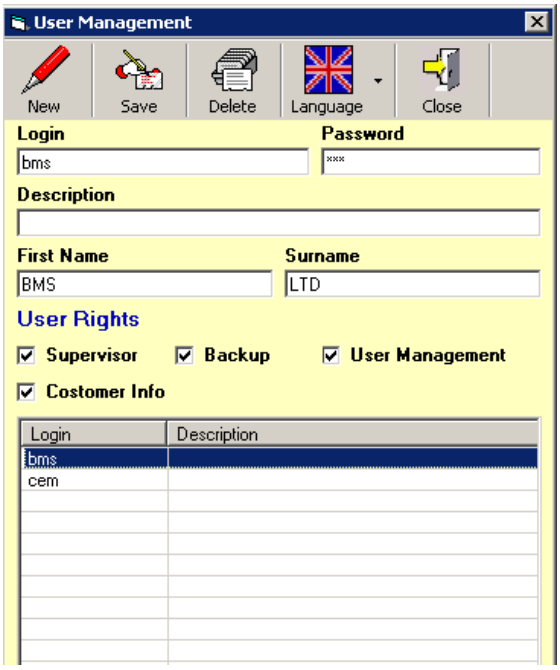
13.3 User Management

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.

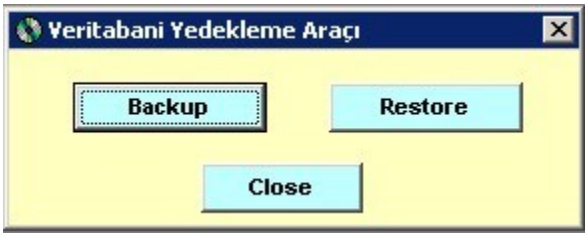
Backup: Only to use Backup Section.

User Management: Only to use User Management section.

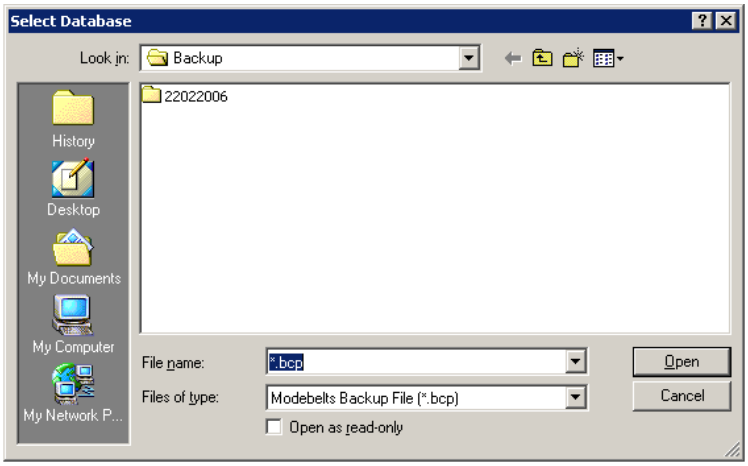
Customer: Only to use Customer section.

13.4 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).

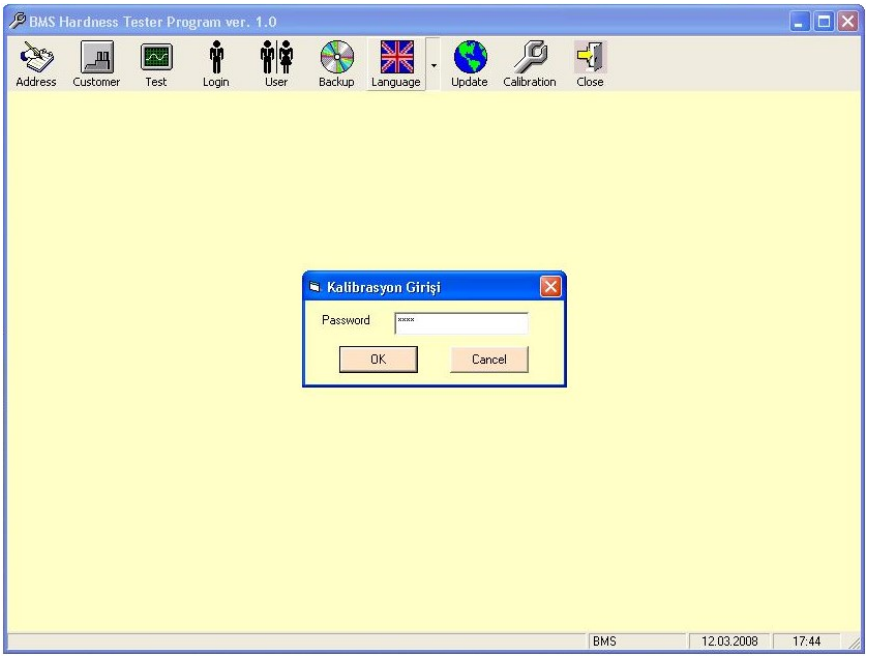


If you press “Restore” button then you can see the following figures to select date and the backup file to restore it.



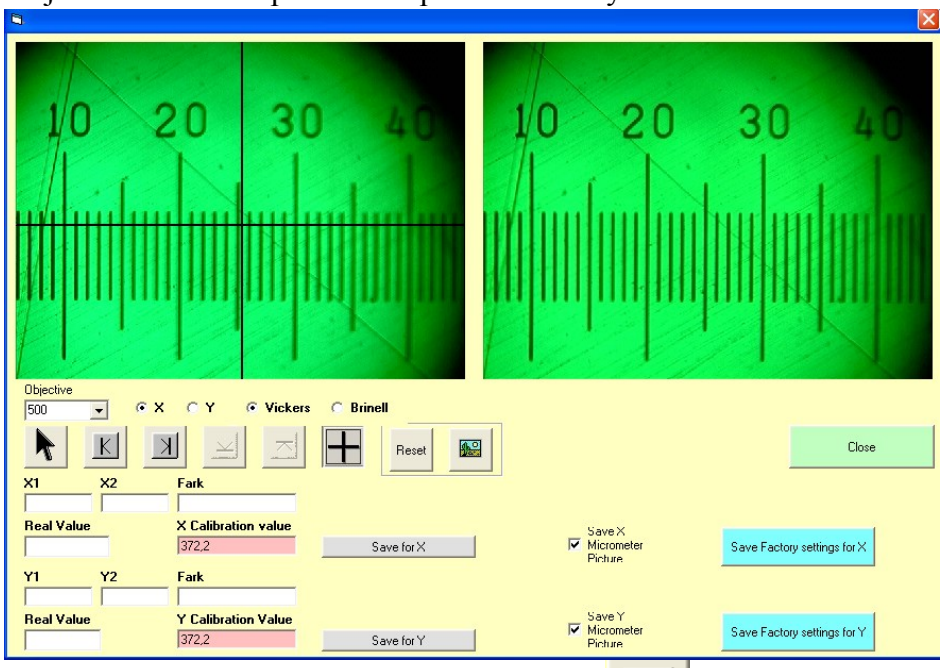
13.5 Calibration

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.

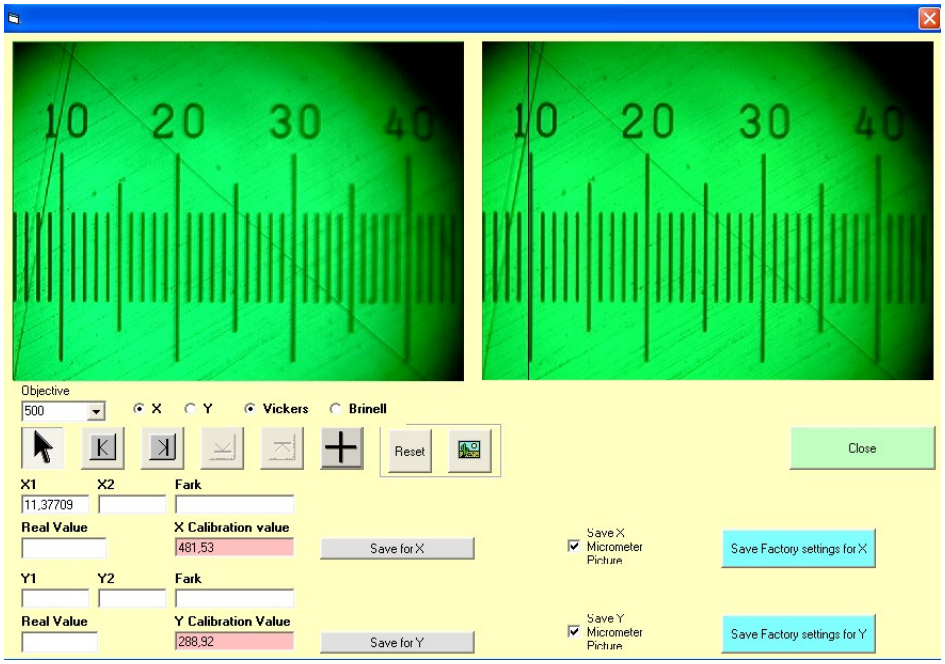


Select Zoom and the cross sign to correct the figure by rotating camera it's around as shown below;

Select the "Objective" and then press "X" option to start by button  from left to right approximation

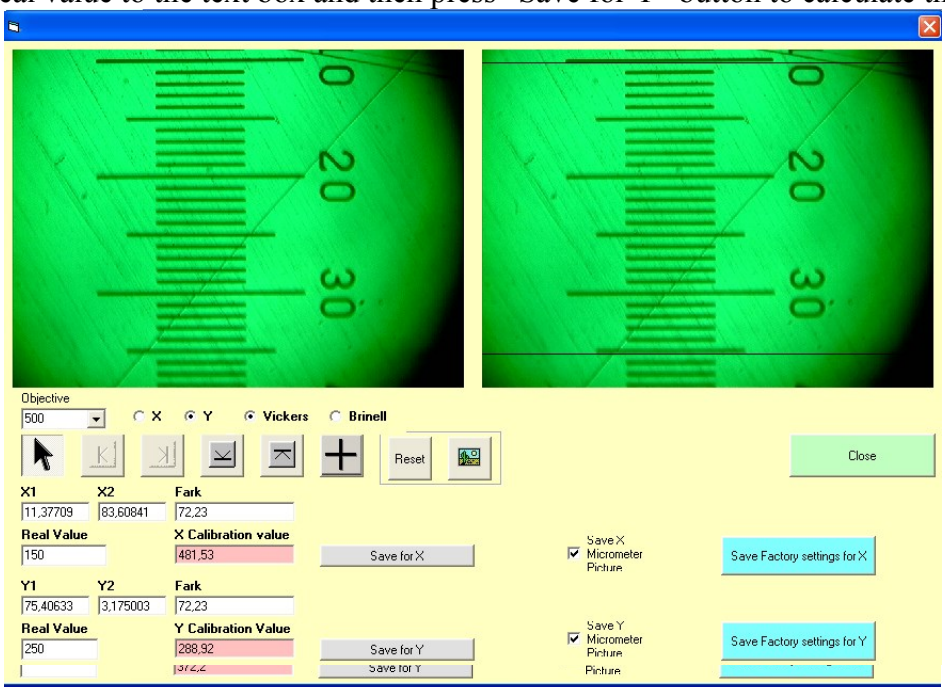


to one reference point like below. Secondly, press button  to measure a distance in □m from reference point to the end point.

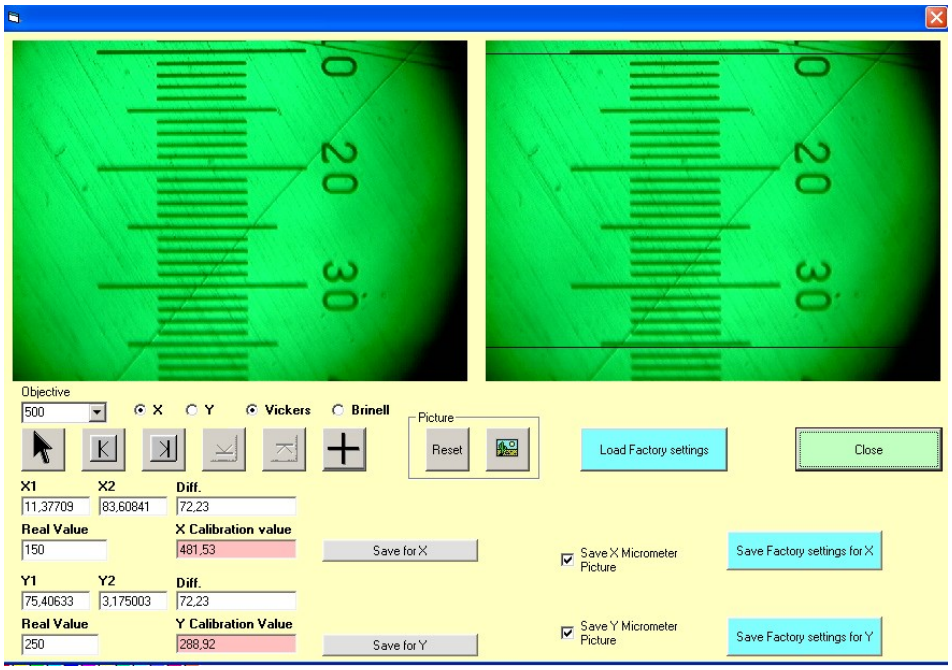


Write the real value to the text box and then press "Save for X" button to calculate the calibration parameter and save it to the database. After saving it, if you want you can press "Save factory settings for X" button and too.
Repeat steps for Y as the following;

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 □m 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.