MT-90

Direct Readout Microhardness Test System

Operation Manual

v3.0

NEWAGE
Testing Instruments, Inc.

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Section 1: Installation

1.1 Introduction

Welcome to the Newage Testing Instruments, Inc. MT-90 Automatic Microhardness Testing System. The Newage MT-90 Microhardness Testers utilizes the Rockwell-type test method to measures the depth of penetration using low loads (500g to 5000g). The indenter is a truncated cone shape.

The tester operation is extremely simple, since the entire test cycle is automatic, but the operator should be aware of several important factors in the tester setup, preparation and operation so please pay close attention to the operation manual.

1 • DIGITAL READOUT UNIT
2 • DIGITAL READOUT UNIT BRACKET
3 • LOCKING KNOB
4 • HEIGHT ADJUSTING KNOB
5 • TEST HEAD
6 • INDENTER
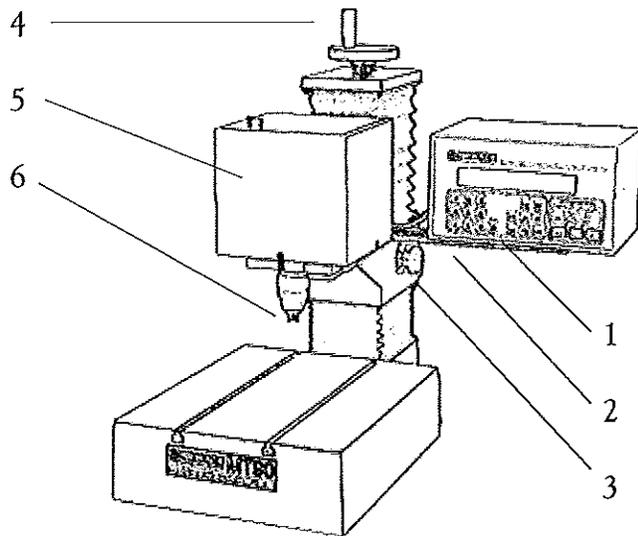
1.2 Tester Setup

1.2.1 Eletronics Setup

Mount the Digital Readout Unit bracket to the back of the Test Head caarriage bwhind where the head sits. It can be located to extend off to the right or left of the stand, depending on personal preference. Then mount the Readout Unit to the bracket. Attach the connectors to the back of the electronic box. The connectors are all keyed so they will fit only at the correct location.

1. ON/OFF SWITCH
2. POWER CONNECTOR
3. PRINTER
4. TEST HEAD - PRELOAD
5. EXTERNAL SWITCH
6. (NOT USED)
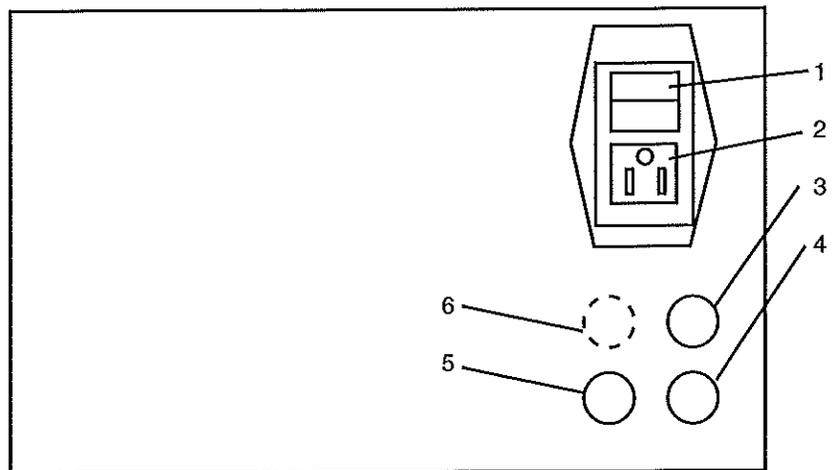
BACK VIEW OF THE DIGITAL READOUT UNIT

1.2.2 Test Head Setup

1) Raise the test head carriage by loosening the locking knob located on the right side of the stand. Then turn the height adjusting knob at the top of the stand until the head carriage is raised.

2) A special shipping screw is inserted into the MT-90 test head to prevent it from being damaged during shipping. To remove this screw, hold the test head in the upright position. Remove the Allen screw from the front of the indenter area (2) using the wrench provided in the accessory case. Place the shipping screw in the accessory case for future use.

3) Remove the protective shield and unscrew the Head Locking Collar from the indenter area of the test head. (Make sure to keep the test head in an upright position.)

4) Carefully lower the test head into the notch located in the front of the head carriage. Be careful not to damage the diamond indenter. Push the head back into the notch as far as it will go.

5) Thread the Head Locking Collar on over the indenter assembly and tighten firmly with the spanner wrench provided, making sure the head is seated squarely.

6) Lower the test head carriage so that the indenter is positioned 1/32" above the sample. This establishes the correct test height.

7) Tighten the locking knob on the side of the stand.

8) Perform calibration checks - see Section 6.
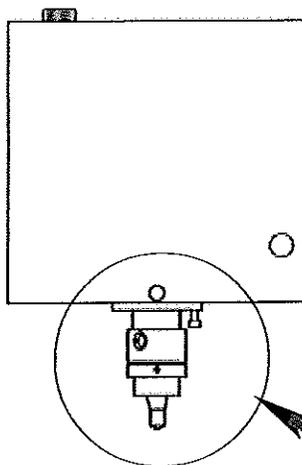
1 • TEST HEAD
2 • SHIPPING SCREW
   (Remove before Installing head)
3 • HEAD LOCKING COLLAR
4 • INDENTER SHROUD
5 • DIAMOND INDENTER
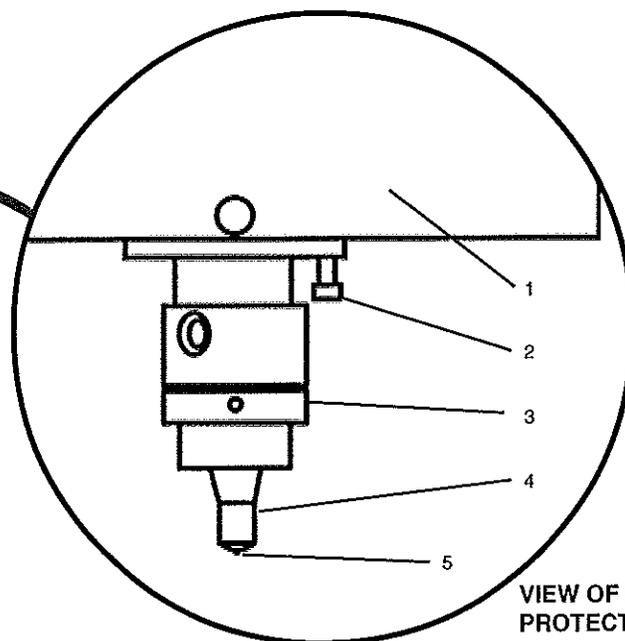
VIEW OF INDENTER ASSEMBLY WITH PROTECTIVE SHIELD REMOVED.

As an option, dual loads may be available on the test head, for example, 1000g and 500g. To select between them, an opening is provided on the top of the test head cover. For the lower load, the set screw inside the opening must be turned all the way out (counterclockwise). To select the higher load, turn the screw clockwise until a firm stop is reached. The scales for 1000g load have a 1 at the end of the scale name (HRC1) while the 500g scales have a 5 at the end of the scale name (HRC5).

NOTE: To return the Digital Readout Unit to "Ready" mode from any other mode use the NO key on the tester Digital Readout Unit.
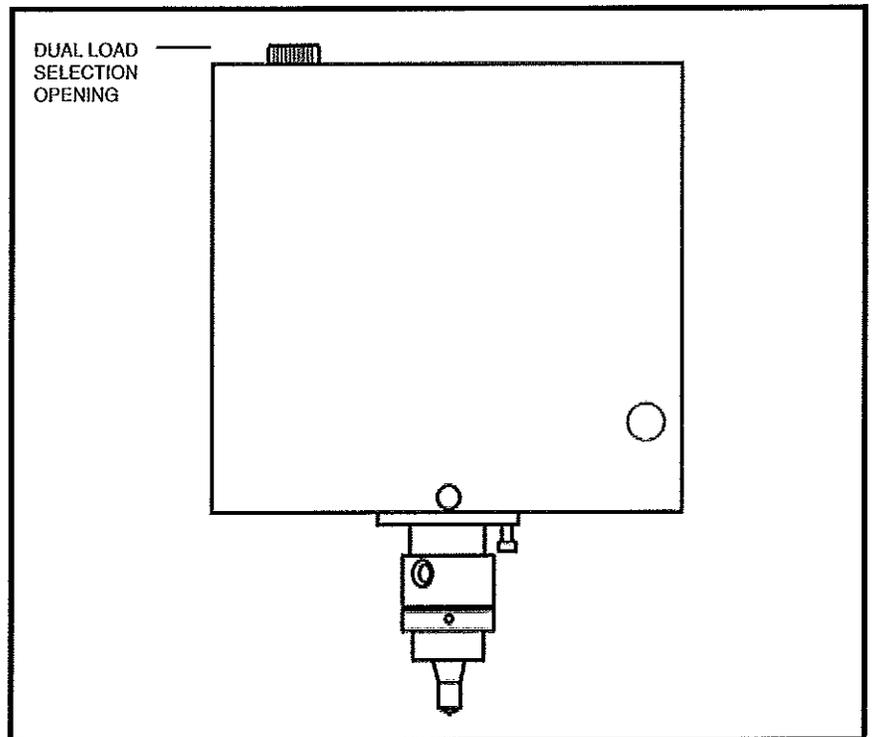
As an option, dual loads may be available. An opening is provided on the top of the Test Head to select the desired load.

THIS COMPLETES THE SETUP

2.2 DO'S & DON'TS

DO:

- Tighten the specimen in the mount very firmly. Any slight motion of the specimen during testing will adversely affect repeatability.

- Keep the test head level and the indenter and shroud clean.

DO NOT:

- Hit the indenter with any object, at any time. This includes avoiding the sample and mount during table travel from camera to indenter position.

- Test onto the specimen mount clips, off the edge of the specimen, or off the edge of the sample mount.

- Change setting of Digital Readout Unit while in the middle of a test.

Section 2: Operation

2.1 ROUTINE Startup and Test Operation

Turn on the power switch on the back of the test head and mount a test specimen into the self-leveling metallurgical mount or stage. For the first few seconds after the power is turned on the he digital display will read:

SELF TEST

While this display remains on for a short time it performs routine checks of internal functions and the transducer. After all functions have been verified for proper operation the tester will enter the test mode and the display will show a ready status:

HRC READY

This display would indicate that the tester was in equivalent Rockwell C scale and the tester was ready to start performing tests.

With a test specimen ready for testing so it is stable and level, initiate a test by pressing the start switch or the Start or "0" button on the keypad. The tester will start the test cycle, pause at the full load position, finish the test cycle and display the result. Typically the display for the result would appear like this:

HRC 60.3

This display would indicate that the tester was set to read out in an equivalent HRC scale and the result was 60.3.

Each succeeding test is performed simply by placing the part in position, initiating a test, and reading out the hardness result from the digital display.

Scale changes can also be easily performed as a part of the standard operation but these will be described in the following section.

PLEASE NOTE: In order to operate, the readout must indicate a ready status by displaying the "READY" message, or a hardness result from a previous test.

PLEASE NOTE: The maximum capacity of the electronic memory is 3500 test results. These results will remain in the memory even after the system has been turned off until the battery runs out (rated five year)

2.2 Keypad layout
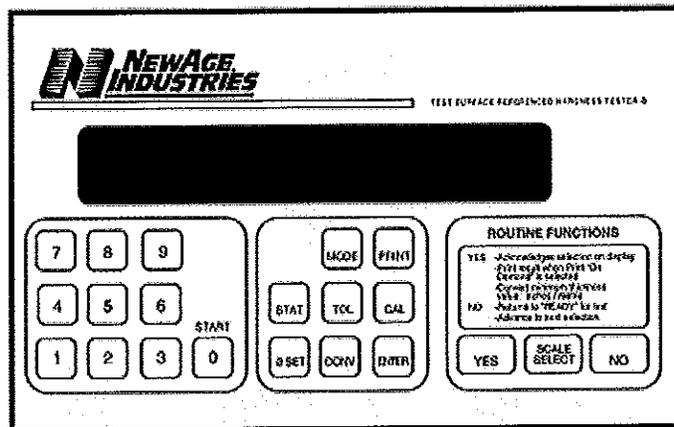
2.3 List of key functions

Each key on the keypad has a number of functions. A brief rundown of these functions is as follows: PLEASE NOTE: The memory of the tester remains active even if the tester is turned off so test parameters and test results will not be lost.

TOL: - For viewing or modifying tolerance values

SCALE SELECT: - For changing hardness scale displays

YES: - Acknowledges questions on display
                     - Prints out results if Print/On Demand function is selected
                     - Converts minimum thickness between inches and millimeters

NO: - Negates selection on display and restores "READY"
                     - Advances individual key function selection to next selection

STAT: - Clear Last Result function
                     - Clear All Results function
                     - Change Sequence Number function
                     - Change Lot Number function
                     - View Statistics on LED display

ENTER: - Enters numeric values in memory
CONV: - Clears numeric values from the display
                     - Initiates "SELF TEST" function for Security Code entry

PRINT: - Print totals of all Statistics
                     - Print Graph (histogram)
                     - Print History of all results in memory
                     - Print Results of each test as it is performed
                     - Print On Demand the results when operator prompts the tester
                     - Print Trace of all messages and results appearing on the display

MODE: - Time at load function
                     - Minimum Thickness function
                     - Continuous Display function

CAL: - Calibrate Hardness function
                     - Calibration Displacement function

ZERO SET: - Zero Displacement function

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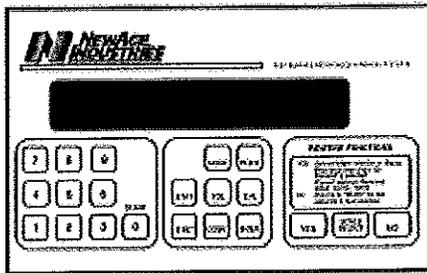
2.4 Security code procedure

Many of the keypad functions remain inoperable unless a code number is entered and certain function keys are pressed. This procedure "enables" these keys and key functions. This security feature is designed to prevent unauthorized personnel from changing the test inputs and outputs. The following keys are affected by the security code in the following ways:

SCALE SELECT not accessible without code

ZERO DISP	may be viewed but not changed without code
CAL	not accessible without code
TOL	may be viewed but not changed without code
STAT	partial access for viewing without code
PRINT	partial access for operation without code
MODE	not accessible without code

The following routine will enable any of the function keys desired:

1) Turning the unit on, or pressing the CONVERT (CONV) key when the tester displays "READY" causes the following message to appear on the display:

SELF TEST

2) Within a few seconds after this display appears the operator must begin to input the security code number. If the operator fails to begin to enter the security code procedure within the time allotted, the system will revert back to the test mode. (Once the first key is pressed the operator will have about 30 seconds more to complete the procedure.)

3) Firmly press the keys controlled by the code that are to be enabled. Any combination of function keys may be enabled so that the operator may have partial or complete access to the machine capabilities. Do not press the YES, NO, ENTER, or CONV keys - the display will revert back to the "READY" status.

4) Press the ENTER key. This completes the security procedure and the system returns to the test mode.

PLEASE NOTE: The enabled keys will stay enabled, even after the system has been switched off, then on, until they are deliberately disabled. Hence the security code does not need to be used every time the system is turned on, if it is to be used with the same security status.

The method for disabling keys is to key-in the security code and press ENTER without pressing the particular function keys to be disabled. (Those function keys which are pressed at this time will be enabled.) If the code is used and no function keys are pressed then all functions controlled under the security code will be disabled. If the wrong code is entered the machine will automatically enter the test mode.
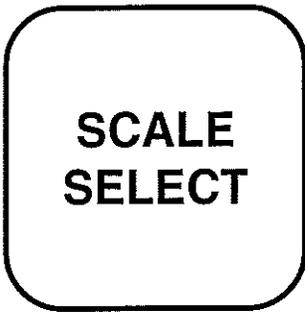
**SCALE
SELECT**

2.5 Keypad Functions

2.5.1 Scale selection

This tester performs all its testing in equivalent Rockwell C. These scales are setup with only the basic information necessary to get a test result. This allows the scale to be setup, if desired, with test parameters such as high and low tolerances. Once these parameters have been setup, the operator can quickly switch scales for testing on other parts without entering new parameters. The 1000g scale is HRC1. The optional 500g scale is called HRC5.

When the tester is turned on, it will always return to the same hardness scale it was in when it was turned off. The hardness scale is always displayed while the tester is in the test mode. Typical displays when the tester is ready to perform a test might be:

<div align="center">HRC1 READY   [or]   HRC1 60.5</div>

These displays would indicate that the tester was "READY" to start testing in the "HRC" scale or that it had performed a test in the "HRC" scale with a result of HRC 60.5 and was now ready to perform another test.

To Change Scale

Pressing the SCALE SELECT key (when security code enabled) will display:

<div align="center">HRC1 1 YES?</div>

This is the scale that uses a 1000g load. Pressing YES will enter the HRC scale and return the tester to the test mode. The operator must also change the adjusting screw located in the top of the test head by turning it all the way clockwise.

Pressing NO will return the tester to the last scale that was actually entered. Pressing the SCALE SELECT key again will cause the readout to display the next scale in sequence (if available):

<div align="center">HRC5 2 YES?</div>

This is the scale that uses a 500g load. Pressing YES will enter this scale and return the tester to the test mode. The operator must also change the adjusting screw located in the top of the test head by turning it all the way counter-clockwise. Pressing the SCALE SELECT key a third time will cause the readout to go back to the first scale. At any point a scale may be selected by pressing the YES key. The operator may also choose to return to the test mode without changing scales by pressing the NO or another function key.

PLEASE NOTE: Changing the scale will erase stored data.

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CAL
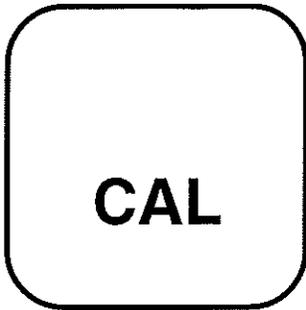
2.5.2 Calibration Functions

This function allows the operator to calibrate the machine to the test block. It is under the security code and must therefore be enabled.

PLEASE NOTE: This function should be performed after a test has been taken on a test block so that the unit has a previous value to compare to.

Pressing the CAL key will cause the display to read:

CALIB. HARD?

Pressing YES will change it to

ENTER VALUE.

The value of the test block should now be entered followed by the ENTER key. An asterisk * will appear on the display to indicate the change in calibration. The tester will store the change in memory.

Pressing NO to CALIB. HARD will cause the display to read:

CALIB. DISPL?

This function is reserved for the calibration at the factory and is protected by a different security code.

Pressing NO will cause the display to read:

CLEAR HARD?

Pressing YES will clear the calibration back to the original factory calibration and will cause the * to disappear from the display.
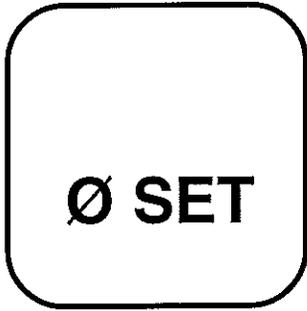
Pressing NO will cause the display to read:

CLEAR DISPL?

This function is reserved for the calibration at the factory and is protected by a different security code.

Pressing NO will cause the display to read:

A/D FACTOR

This function is reserved for the calibration at the factory and is protected by a different security code.

Ø SET

2.5.3 Zero Set Function

This function is a secondary mode for calibration. It is under security code and must therefore be enabled.

After pressing the ZERO SET Key, the display will show the existing value. Changing it to a higher or lower value changes the calibration of the unit. For example, after taking a few tests on a test block, if the results are consistently lower than the value of the block, the machine can be calibrated by increasing the value of the zero set by the difference between the machine results and block value. The ENTER key must be pressed after the value is entered in order for the machine to put it in memory. Pressing NO after viewing the zero set value does not effect it.

TOL
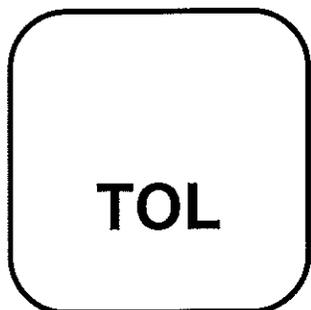
2.5.4 Tolerance Functions

The tolerance function allows the operator to view or set high and low tolerance limits for acceptable hardness results. These limits may be viewed at any time but the TOL key must be enabled to change the values. When a test is performed the display will indicate the scale, the result of the test, and whether it fell within tolerance. "HI" or "LO" indicators on the display flash on and off. An example of a display result might be:

HRC 60.5 OK

Viewing the Tolerance Function

Pressing the TOL key, when the Tolerance function is not enabled, will cause the display to show the high and low tolerances. For example:

HRC 59.0, 60.5

This display would indicate a low tolerance of 59.0 and a high tolerance limit of 60.5. This message will remain on the display until either the NO key is pressed or until another function is selected.

Changing the Tolerance Function

Pressing the TOL key, when the Tolerance function is enabled, will cause the display to show the scale and the low tolerance setting. For example:

HRC LOW = 59.0

(Pressing NO or another function button after pressing the TOL key will cause the system to return to the test mode without changing the low tolerance setting.)

Pressing numeric keys and the ENTER key will cause a new low tolerance value to replace the old one and the display to show the current high tolerance value (see next example).

(Pressing the ENTER key alone without changing the low tolerance value will also cause the tester to display the high tolerance value.)

HRC HIGH = 60.5

This value may be changed or left the same like the low tolerance value. When the ENTER key is pressed the system will return to the test mode.

To eliminate the Tolerance function display, set the high and low tolerance values at "0" and "999.9". No indication of HI, LO, or OK will appear.

PLEASE NOTE: If the tolerances are changed in the middle of a lot, the printout and statistical calculations will use the final tolerance values for the entire lot.
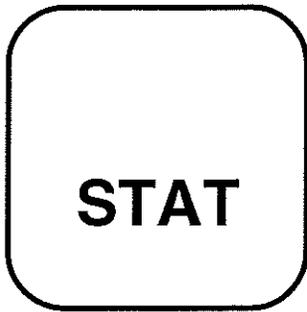
STAT

2.5.5 Stat Functions

The Stat functions control the test information stored in the system memory. There are five Stat functions: Clear Last, Clear All, Sequence Number, Lot Number, and Statistics. These functions appear in sequence when the operator presses the NO key as each appears on the display. Clear Last and Clear All will appear in sequence only if Stat is enabled through the security code. The other three History Data function values may be viewed without being enabled, but the operator will not be able to change them.

CLEAR LAST

Pressing the **STAT** key will cause the display to read:

HRC CLEAR LAST?

Pressing **YES** will remove the last hardness reading from the history data and the system will return to the test mode. This procedure can be repeated to remove additional readings.

CLEAR ALL

Pressing **NO** when the display reads "STATISTICS?" bypasses the Statistics function and causes the display to read:

HRC CLEAR ALL?

Pressing **YES** will clear all the hardness results from the memory and return the system to the test mode. The sequence number and the lot number cannot be cleared with the Clear All function. (These numbers must be cleared in the Sequence and Lot functions.)

PLEASE NOTE: The Clear All function is automatically performed each time the calibrate function is performed or the zero displacement number is changed.

SEQUENCE NUMBER

Pressing **NO** when the display reads "CLEAR LAST" will leave the data unchanged and cause the display to read:

HRC SEQ #?

Pressing **YES** will select the SEQUENCE NUMBER function. The sequence numbers are used to identify individual tests. Each time a test is performed the sequence number is increased by a value of one to a maximum of 65535. The sequence number will appear on the test results printout. When the Sequence Number function is selected by pressing **YES** the display might read:

HRC SEQ # 1332
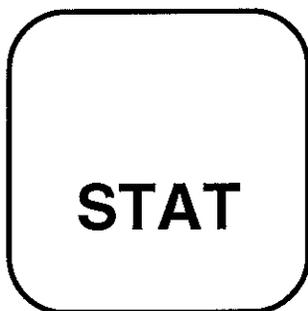
STAT

(The "#" symbol as it actually appears on the display is three parallel lines.) This display shows the current scale is HRC and the last sequence number is 1332. If the STAT key is enabled, the operator may select and enter a new sequence number. To start a sequence at a given number, enter the prior sequence number. For example, to start the sequence at "1" the operator must press 0, and then the ENTER key.

If the NO button or another function button is pressed before a new number is entered, the system will return to the test mode or initiate the new function without changing the sequence number. After a number is selected and entered the system will return to the test mode.

LOT NUMBER

Pressing NO when the display reads "SEQ #?" will bypass the Sequence Number function and cause the display to read:

<div align="center">HRC LOT #?</div>

Pressing YES will select the LOT NUMBER function. The lot number function is used to identify tests performed on particular groups of materials and will appear on the printout. The lot number function allows the operator to observe and, if history data is enabled, change the lot number. When this function is selected the display might read:

<div align="center">HRC LOT # = 5858</div>

This display would indicate the system is in the HRC scale and that the lot number is 5858. The operator may now select and enter a new number if the history data function is enabled. The system will then return to the test mode. If the NO button is pressed the system will return to the test mode without changing the lot number.

VIEWING STATISTICS

Pressing NO when the display reads "LOT #?" will bypass the Lot Number function and cause the display to read:

<div align="center">HRC STATISTICS?</div>

7. Pressing YES will enable the operator to view the statistics. This function displays the mean and standard deviation of the readings. All of the readings since the last Scale Select, Clear All, Calibration, or Zero Displacement functions were performed will be included in these calculations. A maximum of 500 values (or 3500 optional) can be stored for statistical analysis. The statistics display might read:

<div align="center">HRC 60.2, 1.443</div>

The first number would indicate an average value of 60.2 and the second number would indicate a standard deviation of 1.433. These values will remain on display until the NO button or another function button is selected.
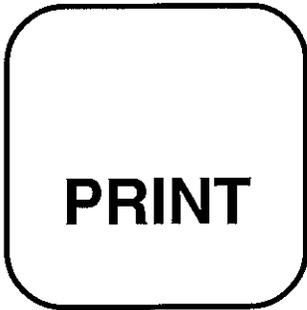
PRINT

2.5.6 Print Functions

A printer may be attached to the tester. There are seven Print functions: Totals, Graph, Print History, On Demand, Print On/Off, Trace, and Set Baud. These functions appear in sequence when the operator presses the NO key repeatedly. Samples of the printouts are included at the end of the section.

TOTALS

Pressing the **PRINT** button will cause the display to read:

TOTALS?

Pressing **YES** causes the printer to print out the SPC values for the hardness results in memory. These values include number of tests, minimum, maximum, average, standard deviation, etc.

GRAPH

Pressing the NO button when the display reads "TOTALS?" by-passes the totals function and causes the display to read:

GRAPH?

If the **YES** button is pressed, the Graphics printout feature gener-ates a frequency distribution diagram (histogram) showing the readings obtained in a certain lot grouped in 18 ranges, with the indication of number of results in each range. These ranges are au-tomatically scaled to the data. If there is a test result that is way out of tolerance, it may render the histogram meaningless.
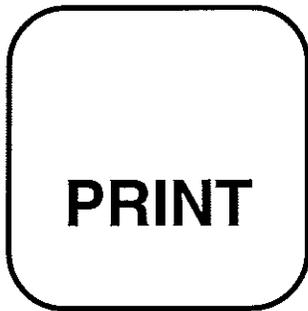
HISTORY

If the NO button is pressed when the display reads "GRAPH?", the Graph function is bypassed and the display will read:

HISTORY?

If the **YES** button is pressed the display asks:

HOW MANY?

The operator can select and enter the number of tests he wants to be printed. If all the tests in memory are needed, enter 999. The format of the printout will display sequence number, hardness scale, test result, and tolerance result (High, Low, or OK.)

PRINT

ON DEMAND

If the NO button is pressed when the display reads "HISTORY?" the History function is bypassed and the display will read:

<div align="center">ON DEMAND</div>

Pressing the YES button will activate the On Demand function. This function allows the operator to print the results of the last test by pressing the YES button. The printout will appear in the History Data printout form.

If two tests are performed before the YES button is pressed the prior test will not be printed.

The On Demand function is deactivated by entering any other function.

PRINT OFF / ON

If the NO button is pressed when the display reads "ON DE-MAND" the ON DEMAND function is bypassed and the display will read:

<div align="center">PRINT OFF/ ON?</div>

If the display reads PRINT OFF? then this function is already de-activated. Press YES to turn it back on. If the display reads PRINT ON? then this function is already activated. Press NO to turn it back on. When this function is activated the printer will first printout values for lot number, sequence number, zero displacement, calibration status (asterisk), and tolerance settings.

If the NO button is pressed when the display reads "PRINT OFF/ ON?", the Print function is bypassed and the next message displayed is (if the Print key is not enabled the system returns to the test mode):

<div align="center">TRACE ON / OFF ?</div>

If the display reads TRACE OFF? then this function is already de-activated. Press YES to turn it on. If the display reads TRACE ON? then this function is already activated. Press NO to turn it off. When this function is activated, the printer will first printout values for lot number, sequence number, zero displacement, calibration status (asterisk), and tolerance settings.
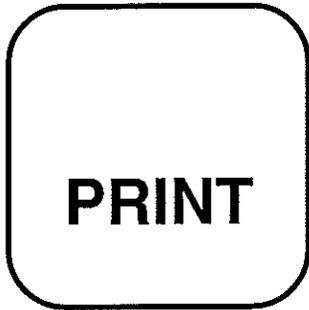
PRINT

This function will automatically cause results to be printed after each test. It will also cause every message which appears on the display to be printed. A ">" in the first column of the printout identifies these lines on the printout. Whenever the Trace function is activated, the message which was on the display before the PRINT key was pressed will also be printed.

PLEASE NOTE: If the Trace function is activated, it will remain activated even if the security code procedure is later repeated without enabling the PRINT key again. If the PRINT key is not enabled, the Trace function will not appear as the operator views the Print function sequence so it cannot be deactivated. If this occurs, and the operator wants to stop the Trace function, the security code procedure must be performed again (see section 7.7 Security Code Procedure) and the Print function enabled. Then, after pressing the PRINT key and returning to the Trace function, which will now be displayed, the operator must simply press YES to the TRACE OFF question.

SET BAUD

If the NO key is pressed when the display reads "TRACE ON ?", the Trace function is bypassed and the display will read:

SET BAUD?

If the tester is going to be directly connected to a printer, you may need to adjust the baud rate to match the printer. You may select one of three settings: 300, 1200, or 9600. Press YES to select this function and key in the desired value. Press ENTER to complete the process. If the tester is used with the PC it came with, the 300 Baud default setting must be used. The Set Baud function is the last of the Print functions so the operator is then returned to the test mode.
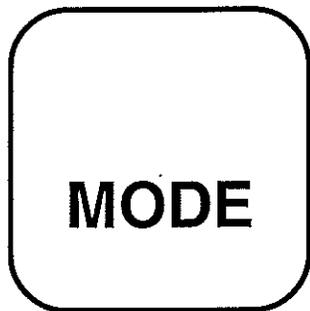
MODE

2.5.7 Mode Functions

There are four Mode key functions: Time at Load, Minimum Thickness, Continuous On, and Average On. These functions appear in sequence when the operator presses the NO key as each appears on the display after entering the Mode key. These functions do need to be enabled through the security code.

TIME AT LOAD

Pressing YES will display "TIME AT LOAD = x". A number between 1 and 30 seconds can be entered. Pressing no will cause the display to read:

HRC MIN. THICK?

Pressing **YES** will cause the minimum thickness value for the last test result to be displayed. This value is calculated as ten times the depth of penetration. An example of this display might look like:

HRC MIN = .015IN

This display would indicate the scale was HRC and the minimum thickness was .015 inches. This display can give the minimum thickness value in millimeters (as indicated by an "MM" instead of "IN"). To switch back and forth from millimeters to inches press the YES key. This value will remain on the display until the NO key or another function key is pressed.

TRANSDUCER CHK?

Pressing YES will cause this function to be activated. This function will cause the transducer input value to be displayed. This is the primary value that is used to calculate the Brinell value. After each test the LVDT input value will be displayed for two seconds then switch to the normal result display. A sample display might appear as:

HRC V=4100

HRC indicates the scale, and 4100 is the LVDT input value. The LVDT is verified to be operating correctly if the readings are between 3500 and 4500 with the test head at the preload position, (the nosepiece just contacting the specimen) and they do not fluctuate more than 4 counts.
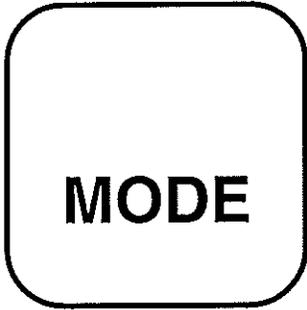
MODE

AVERAGE

Pressing NO to TRANSDUCER CHECK? will cause the display to read:

AVERAGE OF x

This mode enables the unit to automatically calculate the average for the readings. Enter in the desired value from 0 to 50 and press enter. A value of 0 essentially turns off the automatic averaging function.

DISABLE HISTORY

Pressing NO to the Average Of question will cause the display to read:

DISABLE HISTORY?

Press YES to deactivate the history function. If the display reads ENABLE HISTORY? then this function is already deactivated. Press YES to turn it on. Answering NO to either of these will return the display to the Ready status.

2.6 Digital Readout Codes

2.6.1 NORMAL OPERATION DISPLAY CODES

* - Appears when the hardness scale in operation has been calibrated through a calibration or zero displacement function.

"HI" "LO" "OK" - Indicates whether a hardness result fell within tolerance limits. Appears only when the tolerance function is activated

SELF TEST - Appears whenever the system is turned on or whenever the CONV key is pressed while the system is in the test mode.

=_ - Stands for the number sign, "#".

2.6.2 Operation Error Codes

Whenever an error occurs during calculations or function selection, the error will be displayed and all the functions will halt until the error is cleared by pressing the NO key which will return the system to the test mode. These codes are:

CLEAR MEMORY - May appear when the display first comes on, instead of the display "SELF TEST." This code indicates there is an error in the memory which must be cleared by pressing the YES key before testing can proceed.

PLEASE NOTE: If this display appears, it indicates that there was an error in the system and all the results, statistics, and test parameters have been cleared out of the memory.

E1 Thru E9 INVALID TEST - Indicates either system or operator error produced a bad test result. Press NO to reset.

Section 3: Calibration

- Check the accuracy and repeatability of the tester with standard microhardness test blocks. Take 5 readings in each quadrant of the test block.

- The allowable range of repeatability from those readings should be within HRC 1.7 pts. at HRC 60, and within HRC 3.0 at HRC 30. (Based on an equivalence to the specification for HV1000 in ASTM E-384.)

- The allowable range of accuracy for the machine is based on the average of five tests in each area. They should be within 1.1 pts. of the test block value at HRC 60 and within 2.25 pts. at HRC 30.

- Refer to the section for Zero Set Key Function for instructions if the tester needs adjustment.

Section 4: Troubleshooting Guide

INACCURATE OR NON-REPEATABLE TEST RESULTS

-Check the test results on a Yamamoto or microhardness quality test block at various areas of the block. If the results are not acceptable, check the following:

-Make certain the specimen, mount, and test head are all tightened.

-Check the height of the specimen from the indenter. This should be between .030 and .060". If it is much higher, it can read high. If set too close to the specimen surface the indenter can have an impact effect and the results will lose repeatability.

-Check that the indenter area and shroud are clean. Any residue on the specimen in the area of the indenter or on the indenter it-self, must be removed.

-Make certain the specimen mount is holding the specimen in a level position. Be sure that each clip screw is positioned at an equal height.

-Check to see if the test head is perpendicular to the test surface. (This may be checked by wetting the top of the shroud, making a test and looking at the mark on the specimen. If it does not evenly surround the penetration, adjust the orientation of the test head.)

-See section for Zero Set Key Function for instructions if the tester needs adjustment.

THE INDENTER LEAVES A FOOTPRINT ON THE SAMPLE AFTER A TEST

-If there is a scuff or other mark left on the specimen, check to see if it will wipe away. If it does, clean the indenter/shroud area. If not, check to see if the test head orientation is perpendicular. (See Maintenance Section). If the test head is oriented accurately, and a mark is left on the specimen, call the factory.

CHECKS TO MAKE BEFORE CALLING THE FACTORY

- Check that any serial cable is properly connected at the hardness tester RS232 port

- Check that the Communications Setup under the Print button matches device that the data is being sent to

- Check that the hardness tester is sending test result data

- Contact **Newage Testing Instruments, Inc.** Technical Customer Service Team at:

Tel: 215-355-6900; Fax: 215-354-1803
www.hardnesstesters.com; newage.info@ametek.com

Section 5: Maintenance, Service & Repairs

51 MAINTENANCE

Clean the indenter area with a brush or lint-free rag and residue-free, non-water base cleaner to remove gums, oils, and particulate matter buildup.
(NO OTHER MAINTENANCE PROCEDURES ARE REQUIRED OR RECOMMENDED)

5.2 SERVICE

Call our Technical Customer Service Team to make arrangements for service. If it is necessary to send the Test Head and Digital Readout Unit back to the factory, see the following sections for instructions on moving and packing.

5.3 MOVING THE TESTER

The protective shield should be put over the indenter area before removing or working on the Test Head itself.

The Test Head should be kept in an upright position and shocks should be avoided. If the Test Head is removed for shipment, the shipping screw should be installed immediately after lifting the test head up from the base. (See the diagram below.) Do this before laying the test head over on its side. Two people may be required.

The other components should be disconnected and handled with normal care.
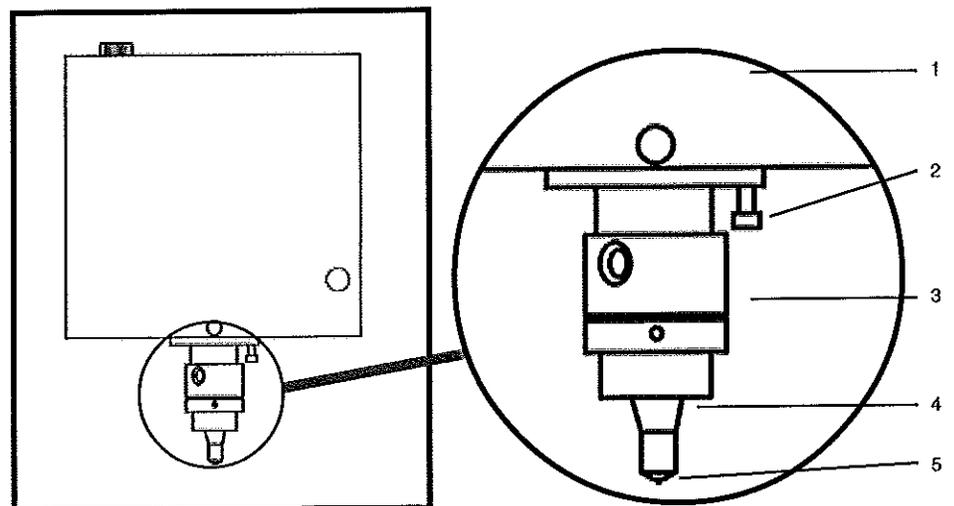
1 • TEST HEAD
2 • SHIPPING SCREW
   (Install before moving Test Head)
3 • HEAD LOCKING COLLAR
4 • INDENTER SHROUD
5 • DIAMOND INDENTER

VIEW OF INDENTER ASSEMBLY WITH PROTECTIVE SHIELD REMOVED.

5.4 PACKING

All components must be double-packed in wood or cardboard boxes with 2" minimum padding on all sides in each layer.

IMPORTANT: Failure to follow these procedures could result in damage to the tester and may void the warranty.

For Service call Newage Testing Instruments or your local Newage Representative.

NEWAGE
Testing Instruments, Inc.
An Ametek Company
820 Pennsylvania Blvd., Feasterville, PA 19053, USA
Tel: 215-355-6900; Fax: 215-354-1803
www.hardnesstesters.com; newage.info@ametek.com

APPENDIX A: SPECIFICATIONS

PERFORMANCE SPECIFICATIONS

Test cycle speed: 7 seconds for single test cycle with test specimen located under indenter; 20 seconds approximately including the table travel from camera to indenter and back.

& Repeatability: Within those prescribed by ASTM E18 for Rockwell Hardness Testing Systems (using test blocks calibrated for micro loads.)

Method of testing: Depth measurement similar to ASTM E18 but with non-standard loads and indenter. Readout values given correspond to Rockwell C values and are designated as HRC.

MAJOR COMPONENTS

Major components include:

- Newage MT-90 Test Stand
- Newage MT-90 Test Head
- Newage MT-90 Digital Readout Unit
- Metallurgical specimen holder (optional)
- All necessary cables

STANDARD ACCESSORIES

Standard accessories include: Two Rockwell C blocks, all connecting cables, tool assortment, accessory case and complete customized instruction manual.

APPENDIX W • ONE YEAR LIMITED WARRANTY

Should Newage Testing Instruments, Inc. equipment require service, we will repair or replace, at our option, any part or product which upon examination by a Newage service technician, shows to be defective in material or workmanship. This warranty is extended to the original purchaser only, for a period of one year (12 months) from owners date of purchase. Excluded from this warranty are any parts that are to be replaced as part of normal product operation, such as indenters.

This warranty IS NOT VALID IF THE INSTRUMENT HAS BEEN MODIFIED, MISUSED OR DAMAGED in any way. This includes damage caused by disassembly by any person other than an authorized Newage service technician.

Please read all operating instructions supplied with the instrument prior to operation.

Newage Testing Instruments, Inc. is not responsible in any way for losses, damage, or other form of consequential damage resulting from equipment failure or improper use.