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ISHR-T100

**MOTORIZED DIGITAL ROCKWELL
HARDNESS TESTERS (DOLPHIN-NOSE TYPE)
OPERATION MANUAL**



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1. Instruction

1) ISHR-T100 dolphin-nosed digital Rockwell hardness tester adopts large-screen touch display and the operation panel adopts the menu-type structure. It has good reliability, operability and directness.

2) Hardness tester can measure Rockwell hardness, it has 15 kinds of scales: HRA、HRB、HRC、HRD、HRE、HRF、HRG、HRH、HRK、HRL、HRM、HRR、HRP、HRS、HRV

3) The specially designed pressure head is extended horizontally, which can measure the parts that are unable to be measured by the general hardness tester, such as ring and tube, with the minimum test inner diameter of 25mm

4) Touch screen, easy to operate; do not need to install the weight, no debugging needed; electric loading, with closed-loop system; auto-load initial load and main load.

5) Automatic correct high, medium, low hardness value; the test force is modified automatically, and the precision of force is improved by an order of magnitude; set password to protect settings parameters; more sample and test information;

6) The measured data is stored as EXCEL in the U disk, easy to edit and process, modular design is adopted for convenient maintenance.

7) Carried standard: GB/T230-2009、JJG112-2013、ISO6508

2 .Technical specification

Initial load of Rockwell	10kgf(98.07N)
Total load of Rockwell	60kgf(588N) 100kgf(980N) 150kgf(1471N)
Rockwell hardness scale	HRA、HRB、HRC、HRD、HRE、HRF、HRG、HRH、HRK、HRL、HRM、HRR、HRP、HRS、HRV
Rockwell test range	HRA:20-88、HRB:20-100、HRC:20-70、HRD:40-77、HRE:70-100、HRF:60-100、HRG:30-94、HRH:80-100、HRK:40-100、HRL:100-120 HRM:85-115、HRR:114-125
Dwell time	0-99s
Resolution of hardness value	0.1HR
Load value error	<1.0%
Data output	LCD display

Data storage	Save as EXCEL in U disk
Scale conversion	Superficial Rockwell, Brinell, Vickers
Carried standard	BSEN 6508, ISO 6508, ASTM E18, GB/T230
Max.height of specimen	300mm
Distance of indenter to outer wall	250mm
Size	720×260×840mm
Weight	80kg
Power supply	AC220±5%,50~60Hz

1. Superficial Rockwell hardness test scale, indenter, test force and application range (table 1)

Test scale	Indenter type	Preliminary test force	Total test force	Application range
HRA	diamond indenter	98.07N (10kg)	60kgf(588.4N)	Carbide, carbide surface hardening steel, hardened steel plate
HRD			100kgf(980.7N)	Thin steel plate, surface hardened steel
HRC			150kgf(1471N)	Hardened steel, Quenched and tempered steel, chilled cast iron
HRF	60kgf(588.4N)		Cast iron, aluminum, magnesium alloy, bearing alloy, annealed copper alloy, thin soft steel plate, etc.	
HRB	Ball indenter φ1.5875mm (1/16 inch)		100kgf(980.7N)	Mild steel, aluminum, copper alloys, malleable cast iron, annealed steel
HRG			150kgf(1471N)	Phosphor bronze, beryllium copper and malleable iron
HRH			60kgf(588.4N)	Aluminum, zinc, lead, etc.
HRE	Ball indenter φ3.175mm (1/8 inch)		100kgf(980.7N)	Bearing alloy, tin, hard plastic and other soft materials
HRK			150kgf(1471N)	
HRL	Ball indenter φ6.35mm (1/4 inch)		60kgf(588.4N)	Hard plastic, hard rubber, aluminum, tin, copper, mild steel, synthetic resin and friction materials.
HRM		100kgf(980.7N)		
HRP		150kgf(1471N)		
HRR	Ball indenter	60kgf(588.4N)		

HRS	φ12.7mm (1/2 inch)	100kgf(980.7N)
HRV		150kgf(1471N)

2. Hardness tester indication tolerance (Rockwell hardness test usually use A/B/C three type scale)(table 2)

Test scale	Hardness range of standard block	Indication tolerance
HRA	(20~75)HRA	±2HRA
	(>75~88)HRA	±1.5HRA
HRB	(20~45)HRB	±4HRB
	(>45~80)HRB	±3HRB
	(>80~100)HRB	±2HRB
HRC	(20~70)HRC	±1.5HRC
HRD	(40~70)HRD	±2HRD
	(58~69)HRE	±2..2HRE
HRE	(>70~94)HRE	±2HRE
	(>90~100)HRE	±2HRE
HRF	(60~90)HRF	±3HRF
	(>90~100)HRF	±2HRF
HRG	(30~50)HRG	±6HRG
	(>50~75)HRG	±4.5HRG
	(>75~94)HRG	±3HRG
HRH	(80~100)HRH	±2HRH
HRK	(40~60)HRK	±4HRK
	(>60~80)HRK	±3HRK
	(>80~100)HRK	±2HRK
HRL	(100~120)HRL	±1.2HRL
HRM	(85~110)HRM	±1.5HRM
HRR	(114~125)HRR	±1.2HRR

3. Installations

3.1 operational conditions

3.1.1 Room temperature within 10 to 30°C;

3.1.2Relative room humidity(Room relative humidity) inferior to 65%.

3.1.3In an environment without any shock or vibration and surrounding without any corroding agent;

3.2 Unpacking

3.2.1Pull out the nails and open the box cover, take out the accessories kit.

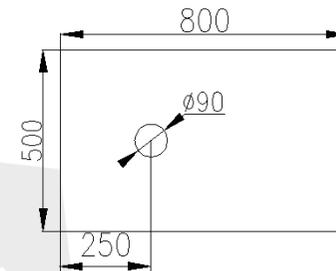
3.2.2 Lift the instrument box, screw out the two M10 bolt at the bottom with wrench and separate hardness from bottom plate,then take out the hardness tester (safety first).

Caution: when lift the hardness tester, do not use your hands to lift the part of indenter, should lift the bottom of the hardness tester.

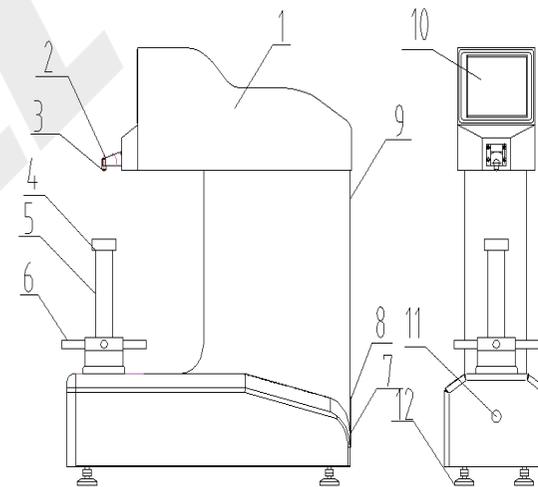
Caution: Necessary operation before removing the top cover: pull off the touch screen, pull out the connection wire at the back end of the touch screen, put the touch screen on the side smoothly, then you can remove the top cover and remove the rubber band tied tightly to the displacement sensor, so that the displacement sensor can move up and down freely without other contact.After completion, install the upper cover, connect the connection line of the touch screen, and install the touch screen

3.3 Installation

Place the instrument on a stable working table, install the horizontal screw and adjust it to the horizontal, must be solid with the table and no shaking. Open a hole at the appropriate position on working table (see Fig.1) in order to make the lifting screw(5) could work(Fig 2).



(Fig 1)



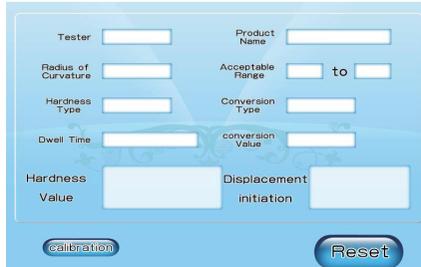
(Fig 2)

- 1 upper cover 2 indenter screw 3 indenter 4 testing table 5 lifting screw
- 6 wheel 7 U disk socket 8 power switch 9 back cover 10 display 11
- scram button 12 horizontal screw

4. Operator panel and menu description

4.1. Connect the power, plug the U disk, open the switch, the main screen is on.

Caution: if the main screen is not on, the scram button(11) maybe turn off , clockwise to turn on the power. Main screen's light is on, as shown in fig 3



(Fig 3)

“Tester, sample name, qualification range, stress, dwell time, conversion”Those text box on the right side of the text is clicked for information entry. The operation method is as follows: the single point with finger and entered into the corresponding input interface.

4.2. Information input

4.2.1 Input operator and sample

Click the textbox to the right of “Operator”and” Sample” .Then turns out a keyboard in the screen. Input the name of Operator and Sample and click “OK”. If don’t want to change the name,click “ESC”. As shown in figure 4.



(Fig 4)

4.2.2 Curvature radius

If test arc surface, click the radius of curvature , input

the radius in the numeric keypadas shown in Fig 5, click , turn back to the main interface.



(Fig 5)

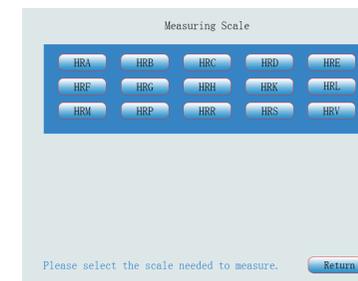
4.2.3 Tolerance

Click the text box to the right of “Tolerance” .Then input the number as shown in figure 6. And click “OK”, turn back to main interface.

4.2.4 Hardness type

Click Hardness type , turn out the menu of measurement scale, click the scale you need, turn to the main interface.

Measurement scales as shown in fig 6



(Fig 6)

4.2.5. Conversion

Click “Conversion” and choose the scale. Scales as shown in fig 7:



(Fig 7)

4.2.6. Click dwell time , normally it is 5s, click “OK”, go back to the main screen.

5. Usage of hardness tester

5.1. Preparatory work

5.1.1 The surface of the specimen must be clean. There can't be dirty, oxide skin, pits or significant processing trace, must ensure that the test force is applied perpendicular to the specimen.

5.1.2 The minimum thickness of the specimen shall be more than 10 times the depth of the indentation. There can't be visual deformation traces on the back of specimen after testing.

5.1.3 Test pieces shall be stably placed on the test table, during testing can not move the specimen, and to ensure that the test force is applied vertically on the specimen.

5.2. Operation sequence of hardness tester.

According to the hardness of materials (table 1), select test scale (follow

tips choose indenter)

5.2.1 For example: test the hardness of HRC

1) 5.2.1.1 Push the diamond indenter (3) towards the spindle hole, snapping the bearing surface, the flat face of the indenter towards indenter screws (2), slightly tightened.

5.2.1.2 Turn on the power switch, the screen reach to operating interface.

5.2.1.3 Click hardness type , choose HRC; if need to change hardness, click conversion type.

5.2.1.4 Click dwell , choose 5s, click , turn back to the main interface

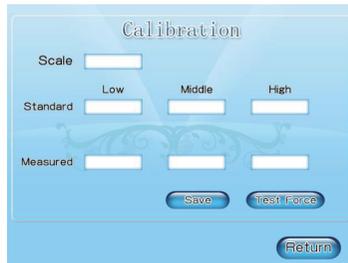
5.2.1.5 Clean the oil on the test table (4), install it into the hold of screw (5), put the specimen on the test table, rotate the wheel (6) slowly up the test table, when the top of indenter touch the surface of specimen, the displacement measurement box at the bottom right of the screen has a number change, at this time keep raising the test table, when the number in the box is close to 600, slowly raise the test table, when number reach 600-650, there is a warning tone, then stop to raise. Machine automatically loads, dwell, unloads, after unloading, the hardness value is displayed on the screen. According to the requirements of the appraisal procedure, the first point of the test is not recorded, and the hardness value is recorded from the second point. The average value of the hardness value should be measured at 3-5 points.

Note: if the number of rising test station reaches 600 ~ 650, the instrument will be loaded automatically. If the number is higher than 650, the instrument will

alarm automatically. It should be returned to the test station and re-operated.If the number does not return to zero after returning to the test table, click "reset".

5.3.Regulation of Hardness Displaying Value

3.1 5.3.1The precision of the hardness displaying value of the hardness tester is just calibrated before the instrument is turned out of the factory. If a deviation is caused due to the transportation or according to the various requirements of the client, the hardness value may be revised by pressing input keys. The method is :click calibration on the main interface, turn out the interface as fig 8



(Fig 8)

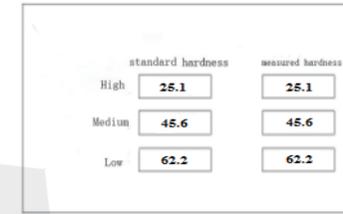
5.3.2 Put the standard test block on the test table.

5.3.2.1Enter standard hardness value into box behind "standard hardness value"

5.3.2.2Enter the same value into the box behind " measured hardness value"

For example:hardness value of test block are 25.1HRC、 45.6HRC、 62.2HRC

Input high,medium,low value according to the fig 9, click save calibration



(Fig 9)

((If only calibrate high hardness , as long as change the number of high hardness , the other two do not change.))

3.2.3Test of high, medium and low hardness value of each block at least test 3 points to take the average value and record, such as the measured average value of **24.5、 44.1、 61.1**

3.2.4Input the data as Fig.10,click "save" to save data.



(Fig 10)

5.3.2.5If the actual test hardness is still lower than the standard hardness value of 0.5, then the "measured hardness value" in the box to reduce the number of 0.5.

5.3.2.6If the actual test hardness is still higher than the standard hardness value of 0.5, then the "measured hardness value" in the box to reduce the number of 0.5.click "save" to save it.

5.3.2.7 If there are only high, low hardness blocks, then the medium number please do not change, it's factory calibrated.

6. Maintenance and precautions of hardness tester

6.1 It is necessary to abide operate specification, need to calibrate the instrument with standard block before and after testing. If the machine is not often used, it needs several test on the standard block after starting the machine, when the results are stable, then can test the specimen.

6.2. It is forbidden to rotate the handwheel during testing, loading, dwell, unloading. Standard block only can be used on the working table, the distance between two indentations and middle of indentation to the edge is not less than 3mm, the lifetime is 2 years

6.3. The machine need to keep clean, put a dust cover over it after testing. Spread anti-rust oil on the test block and ball indenter after testing

6.4. The instrument should do periodic inspection, at least one time per year to ensure the accuracy of hardness tester.

6.5. Troubleshoot

Table 3

phenomenon	Possible causes	Troubleshooting
Boot, screen do not react	1 Power do not supply 2 Blown fuse	1 check power supply 2 replace fuse(the spare)
Boot, Key failure	The instrument is in a state of non working	Boot, and wait a moment