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HRS-150X-Z	HRS-45X-Z	HRS-150/45X-Z

Nose Full Automatic Rockwell/Superficial Rockwell/Double Rockwell Indenter

Product introduction：

The fully automatic convex nose Rockwell hardness tester is a large platform Rockwell hardness tester. It adopts the principle of Rockwell measurement to test the hardness of carbon steel, alloy steel, cast iron, non-ferrous metal and engineering plastics. The nose Rockwell hardness tester adopts the advanced closed-loop sensor control technology in the world, and realizes the full automatic control and hardness testing process. The loading system uses a high precision force sensor and a central controller to form a closed loop to track and control the whole microsecond loading process. Widely used in measurement, mechanical manufacturing, metallurgy, chemical industry, building materials and other industries of testing, scientific research and production.

Product characteristics：

- The high-speed precision step control system can effectively avoid the overload of force measurement and greatly improve the loading speed.
- One-button operation, Z-axis automatically rising, loading, loading and unloading force values are integrated to achieve full automatic operation.
- High accuracy and wide measurement range
- Setting up upper and lower limits and alarming for overshoot
- Surface correction, automatic correction of cylindrical and spherical measurement results
- Special designed indenter extends horizontally to measure parts which can not be measured by ordinary hardness testers such as annular and tubular. Standard configuration can test the minimum inner diameter of 40mm, custom indenter can test the minimum inner diameter of 25mm.
- High repeatability and accuracy
- Easy to operate, Chinese-English interface can be switched (other language versions can be customized)
- It is easy to install and debug without installing weights.
- Initial test force of automatic lifting platform and automatic load can ensure the stable generation of force measurement.
- The curve display of the testing process can visually display the material characteristics and facilitate observation and learning.
- Setting Password Protection Setting Parameters
- Save more samples and test information
- Modular design, easy maintenance

Product promotion:

Fully automatic high-speed response closed-loop sensor loading system to achieve high-precision and fast testing and improve the control accuracy of actuator

The original system belongs to the millisecond control system. Step control cannot be achieved.

The system belongs to microsecond control system. It can realize high-speed step control. Step control accuracy can reach nanometer level!

Improve the comprehensive performance of equipment, improve the detection accuracy and speed of equipment

1. Enhance the ability to process analog signals of force sensors. Change eyes
2. Enhance the ability to process the whole digital signal. Changing core
3. Improve the accuracy of displacement measurement. Changing ears
4. Improve the accuracy of motor control. Change hands
5. Improve the man-machine interface. Change face

Setting up special management device QEI for displacement sensor

The original motherboard has no special management device. CPU must process displacement sensor signals in person throughout the loading process.

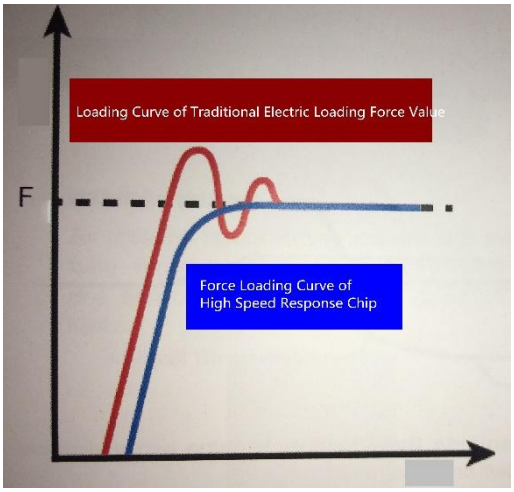
After setting up the special management device, the CPU only needs to read the data at the beginning and the end of the two time points. During the loading process, the CPU can centralize resource management sensors and load motors, which makes the control faster and more accurate.

Importing Japan High Precision Magnetic Grating Displacement Sensor

The in-situ displacement sensor is a grating displacement sensor made in China. There is a problem of poor consistency, which needs to be matched with equipment selection.

Japanese high precision displacement sensors have high consistency. It is less affected by the environment. **Life expectancy can reach more than 150 million times.**

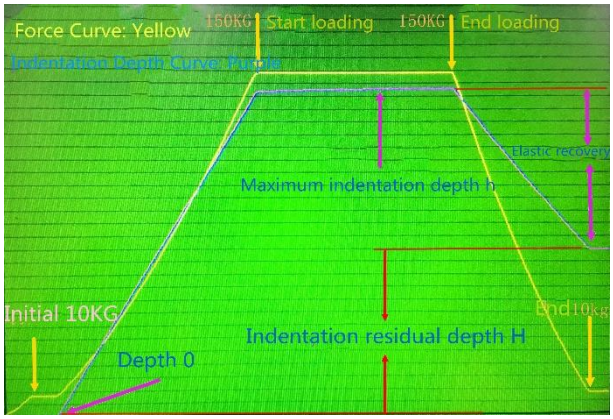
The loading process of the traditional electric Charlotte hardness tester is slow. If the loading speed is controlled within 8 seconds required by the national standard GBT230/T-91, the red curve in the figure will continue to overshoot and unload in the total test force F to approach the total F. The results are as follows: firstly, the hardness tester must slow down the speed of the test, which results in the detection



time being too long; secondly, the phenomenon of overshoot affects the accuracy of the test to a certain extent.

This equipment adopts more advanced and applicable central processing chip, which responds to the whole hardness test process at high speed. From the start to the end of each hardness test, the central processing chip will process 18,000-30,000 sets of data at super high speed. It takes 8 seconds for the traditional electric loading hardness tester to perform the loading action, which is shortened to 1.75 seconds (ISO6508-1:99 unifies the test force application time within 1-8 seconds). As shown in the blue curve in the figure, the speed of loading process reaches extreme speed, and the force value is smooth and no overshoot during loading to the total test force, which improves the loading speed and accuracy of the charged hardness tester.

Detailed explanation of curves

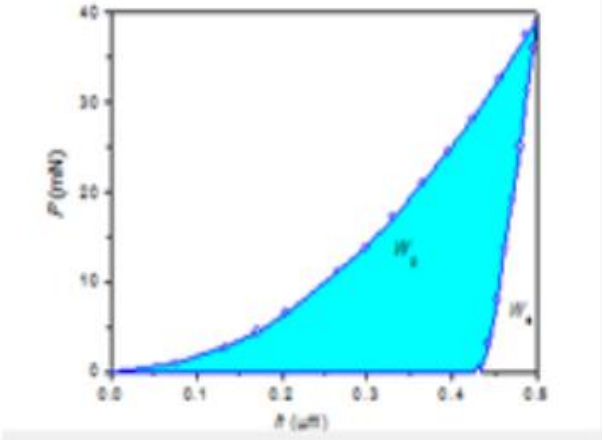


1. Force Value and Depth Curve

During the working process of the hardness tester, the main chip reads the data of pressure sensor and displacement sensor in real time, and converts the data into curves. The curve in the graph is the force and depth curves of 28.3 HRC hardness block.

2. Pressure-Depth Curve

Synchronized data of pressure and depth are derived in the process of testing, pressure-depth curve is automatically generated, and shadow area is obtained for elastic modulus research.

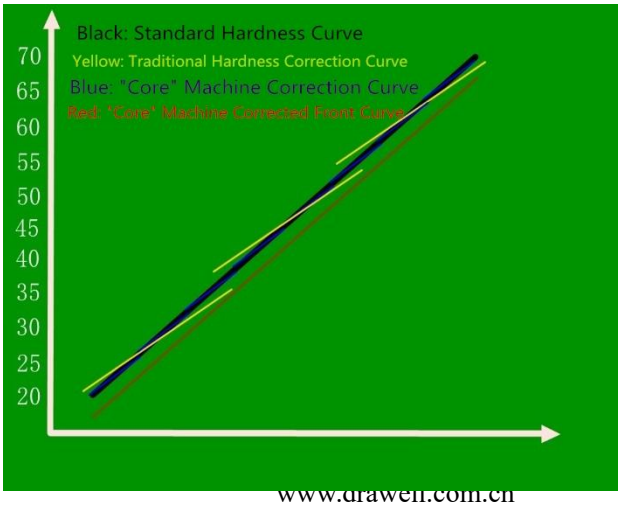


The vertical coordinate is pressure and the abscissa is depth.

Accurate hardness correction

For example, the standard hardness curve is a straight line, as shown in the black section.

The hardness of the traditional electric digital hardness tester can be automatically corrected as the yellow line in the figure. The hardness correction is generally divided into three sections, and the hardness is basically consistent with the standard hardness only near the calibration point. The



farther away from the calibration point, the greater the difference of the hardness value.

The original hardness curve of the machine is shown in the red section of the figure after further modification and upgrading of the control method of "Aolongxin". When the hardness of the whole range is corrected to a common coefficient, the hardness curve will be raised to the state that the standard hardness curve coincides with the hardness curve. It is concluded that the hardness of the standard hardness blocks of HRC24, HRC48 and HRC63 is tested without any interval correction after a common coefficient is given. The hardness errors of the standard hardness blocks are 0.9 HRC onHRC24, 0.2 HRC on HRC48, and0.8HRC on HRC63, respectively, and the hardness errors of the standard hardness blocks are 0.9 HRC, 48HRC and 63HRC respectively. The difference is 0.8 HRC.

Now the whole hardness interval is divided into more than eight hardness correction intervals, as shown in the blue line section. This correction method refines the whole hardness interval and simplifies and precisely the hardness correction of the electric digital hardness tester.

Technical parameters

Model	HRS-150X-Z	HRS-45X-Z	HRS-150/45X-Z
Rockwell initial test force	10kgf	3kgf	3kgf、10kgf
	98.07N	29.4N	29.4N、98N
Rockwell total test force	60kgf、100kgf、150kgf	15kgf、30kgf、45kgf	15kgf、30kgf、45kgf、60kgf、100kgf、150kgf
	588.4N、980.7N、1471N	147.1N、294.2N、441.3N	15kgf、30kgf、45kgf、60kgf、100kgf、150kgf
Rockwell scale	HRA HRB HRC HRD HRE HRF HRG HRH HRK HRL HRM HRP HRR HRS HRV	HR15N HR30N HR45N HR15T HR30T HR45T HR15W HR30W HR45W HR15X HR30X HR45X HR15Y HR30Y HR45Y	HRA HRB HRC HRD HRE HRF HRG HRH HRK HRL HRM HRP HRR HRS HRV HR15N HR30N HR45N HR15T HR30T HR45T HR15W HR30W HR45W HR15X HR30X HR45X HR15Y HR30Y HR45Y
Measuring 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:50-115 HRM:50-115	HR15N：70-94 HR30N：42-86 HR45N：20-77 HR15T：67-93 HR30T：29-82 HR45T：10-72	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:50-115 HRM:50-115、HRR:50-115、HR15N：70-94、HR30N：42-86、HR45N：20-77、HR15T：67-93、

	HRR:50-115 HRP:50-115 HRS:50-115 HRV:50-115		HR30T：29-82、 HR45T：10-72
Specification of indenter	Rockwell diamond indenter, Φ1.5875mm Steel ball indenter		
Executive standard	ISO 6508, GB/T230, JJG112, ASTM E18		
Scale conversion	HR、HB、HV、HK		
Hardness indication	LCD		
Date output	Built-in printer, RS-232 interface		
Maximum height of specimen	140mm		
Distance from the center of indenter to the body	150mm		
Power supply	AC90-240V 50-60Hz		
Shape size	700*260*700mm		
Machine net weight	About 150kg		

Standard configuration

No	Name	Quantity
1	Diamond indenter	1
2	Ø1.5875mm Steel ball indenter	1
3	Large, Medium, V type test-bed	3
4	Standard Rockwell hardness block	3
5	Fuse 0.5A	2
6	Power cord	1
7	Manual book	1
8	Product Qualification Certificate	1
9	Thermosensitive printing paper	1