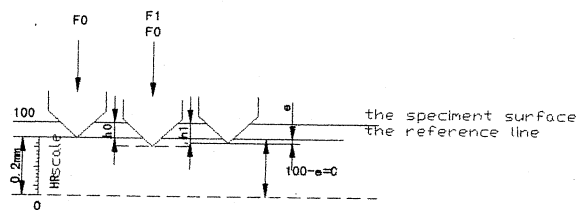
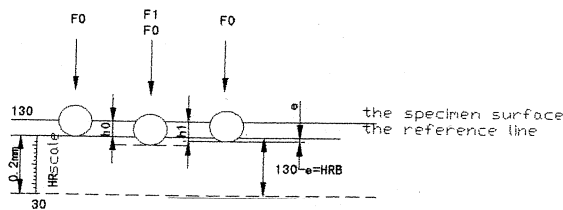


## I Brief Introduction to Rockwell Hardness Tester

The Rockwell Hardness Testing Method is as follows: The instrument produces an indentment on the specimen by using a conic diamand indenter or a ball steel indenter with diametre of  $\Phi$  1.588 mm with an initial test force ( $F_0$ ) and then the main test force ( $F_1$ ). After the total test force  $F$  ( $F_0+F_1$ ) is applied, it is necessary to let the test force dwell for a certain time. The difference ( $e$ ) between the indentment depth ( $h_0$ ) under the pressure of the main test force and the indentment depth ( $h_1$ ) under the pressure of the initial test force is taken as the lasting increased value. Every pressed depth of 0.002 mm is regarded as a Rockwell hardness unit. This kind of measurement is characterized by the rapid hardness test and a small indentment, and hence it is widely used to test the hardness of any metal piece.



The Testing Diagram(HRC,HRA)by using a Conic Diamand Indenter



The Testing Diagram(HRB)by Using a Ball Steel Indenter  $\Phi$  1.588mm

## II. The Rockwell Hardness Tester Formula, Scale, Indenters, Test Forces and Usage Field

### 2.1 The Test Formula

$$HRC(A) = (100 - e) / 0.002 \quad HRB = (130 - e) / 0.002$$

### 2.2 The Test Scale, Indenters, Test Forces and Usage Field (Table 1)

Scale	Indenter	Initial Test Force (N)	Total Test Force (N)	Usage Field
A	Diamand Indenter Conic Angle 120° Radius of the Top Spherical Surface 0.2 mm	98.07	588.4	Hard Alloys
D			980.7	Thin Steel sheets, Quenched Steel
C			1471	Quenched Steel, Stamping Hardened Steel, CastIron
F	Diameter of the steel Ball 1.5875 mm (1/16 inch)		588.4	Annealed copper Alloys, Thin and Soft Steel
B			980.7	Soft steel, Aluminium Alloys, Copper Alloys, Workable Cast Iron
G			1471	Pearlite Iron, Copper, Nickel, Zinc,Nickel Alloy
H	Diameter of the steel Ball 3.175 mm (1/8 inch)		588.4	Annealed Copper Alloys
E			980.7	Alluminium,Magnesium and Aluminium Alloy, Soft Steel,Cast Iron
K			1471	Aluminium,Zinc, Lcad,Bronze, Bismath Bronze
L	Diameter of the steel Ball 6.35 mm (1/4 inch)		588.4	Soft Matsls, such as Aluminium, Zinc, Lead
M			980.7	Tin, Plastics, Hardboard, etc.
P			1471	
R	Diameter of the Steel Ball 12.7 mm (1/16 inch)	588.4		
S		980.7		
V		1471		

There are a number of Rockwell Hardness Test Scales among which the commonly used are the Scales A, B, and C.

### III The Parameters of the Hardness Tester

3.1 The Initial Test Force: 98.07N, with a tolerance of  $\pm 2.0\%$

3.2.The Total Test Force: 588.4N, 980.7N, 1471 N with a tolerance of  $\pm 0.5\%$

3.3 The Specification of the Indenter

3.3.1 Rockwell Conic Diamand Indener

3.3.2 Ball Steel Diamand Indenter  $\Phi 1.5875$  mm

3.4 The Permitted Tolerances in the Indicated Values and the Repetitiveness

Scale	Hardness Field of Standard Blocks	Permitted Tolerance in the Indicatel Values	Repetitiveness Inferior to
A	20-40 HRA	$\pm 2.0$ HRA	2.0 HRA
	40-75 HRA	$\pm 2.0$ HRA	1.5 HRA
	75-88 HRA	$\pm 1.5$ HRA	1.0 HRA
B	20-45 HRB	$\pm 4.0$ HRB	3.5 HRB
	40-80 HRB	$\pm 3.0$ HRB	2.0 HRB
	80-100 HRB	$\pm 2.0$ HRB	1.5 HRB
C	20-30 HRC	$\pm 1.5$ HRC	1.5HRC
	30-55 HRC	$\pm 1.5$ HRC	1.2HRC
	55-70 HRC	$\pm 1.5$ HRC	1.0HRC

### 3.5 The Requirements for the Environment in the Working Room

The Temperature: 15°C-30°C

The Humidity: not superior to 70%

An environment without vibrating power supply nor corroding air

### 3.6 The Maximum Height of the Specimen 70mm

3.7 The Distance from the Center of the Indenter to the Instrument Body: 165 mm

3.8 The Dimension: 150mm (width) × 500mm (Depth) × 750 (Height)

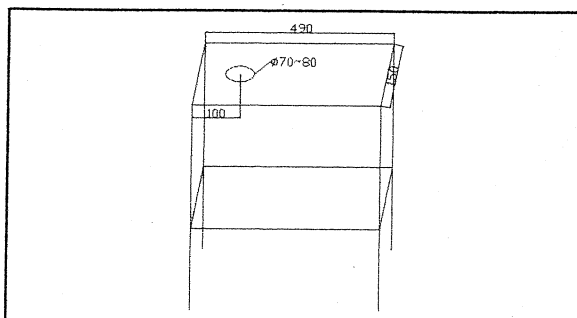
3.9 The Weight : 85 kg

## IV. Installment of the Hardness Tester

4.1 The working Table Required as that in the following Fig.

Height: the suggested height is 500 mm ( The operator is able to operate in the seating position.)

The table hole serves the ascending and descending lever.



- 1) Take off the packing cords, the anti-humidity bag and the cartoon box.

The precision of indicating the hardness value is already checked and regulated before the instrument is carried out of the factory . But there might be some tolerances caused during the transportation. The operator may regulate it on the basis of understanding the structure of the instrument.

The Method: After lifting off the upper cover, if the value indicated is too low, unscrew the screw M4 and turn clockwise the screw M8 a bit. Then fasten the screw M4 to test the indication until the indication is within the prescribed range. If the value indicated is too high, turn the screw M4 anticlockwise so as to make the long hand point at the position "C".

## XI Packing List

No.	Description	Quantity
1	120° Conic Diamand Indenter	1
2	Ball Steel Indenter $\Phi$ 1.5875mm	1
3	Steel Balls $\Phi$ 1.5875mm	5
4	Platform $\Phi$ 60	1
5	V-shaped Platform	1
6	Working Table	
7	Standard Blocks	
	HRB	1
	HRC	1
8	Weights	1 set
9	Inscription Manual	1
10	Qualification Certificate	1
11	Screw Driver in Cross Letter	1

Note:

Our company is always making efforts in the improvement of the quality of the Hardness Tester and in the innovation of its structure. In case the inscription manual is slightly different from the structure of the instrument, there will be no notice to be sent in advance. We hope you will pardon us for it.