Leeb hardness tester

Operation manual

Catalogue

1 Overview

1.1 Product features

Based on the principle of measuring the Leeb hardness, it can be measured in a variety of metal materials.
Support for "forged steel (Steel)" material, when using the D/DC type impact device to test the "forged steel" specimen, it can be directly read HB, no manual check list.

Easily switch to the hardness of all formats (HL、HB、HRB、HRC、HRA、HV、HS), parallel conversion of the measured value of the hardness.
Using the big screen 128 x 64 graphics dot matrix LCD display, information is rich, intuitive.
All Chinese display, menu operation, easy to operate.
With bright backlight display, easy to use in the light gray environment.
RS232 communication interface, it can be convenient and fast data exchange and parameter setting of PC machine.
A host can be equipped with 7 kinds of different impact device, automatic identification of impact device type. No need to re calibrate the replacement.
It can store the maximum 600 groups (impact number 32 ~ 1) hardness measurement data. The data in each group include single measurement, mean value, measurement date, impact direction, number of times, material, hardness, etc..
It can be set in advance the hardness up, low limit, beyond the range of automatic alarm, easy to satisfy with the user's needs.
Fully sealed metal shell, compact, portable, high reliability, suitable for harsh operating environment, anti vibration, shock and electromagnetic interference.
Power supply uses 2 AA (five) ordinary alkaline batteries, can be continuous work for not less than 100 hours, with automatic dormancy, automatic shutdown and other energy-saving functions.
LCD has remaining battery indicator icon, prompting the user to change the battery in time.
Software calibration function with display value.
It can be equipped with powerful computer software, which has the functions of data transmission, storage management, statistical analysis, printing and testing report. It can meet the higher requirements of quality assurance activities and management.
Design according to the standard: 《Hardness tester technical conditions on the Leeb scale》JB/T 9378-2001

1.2 Main purpose and scope of application

1.2.1

Main application

Installed mechanical or permanent assembly parts.
Mould cavity.
Heavy work piece.
Invalidation analysis of pressure vessel, steam turbine generator set and its equipment.
Test space is very narrow artifacts.
Bearings and other parts.
Requires a formal original record of the test results.

Material distinction of metal materials.

Rapid test of multiple measurement sites in large scale workpiece.

1.2.2 Scope of application

Scope of application are shown in table 1 and table 2.

Table 1

Material	Hardness system	Impact device					
		D/DC	D+15	C	G	E	DL
Steel and cast steel	HRC	17.9～68.5	19.3～67.9	20.0～69.5		22.4～70.7	20.6～68.2
	HRB	59.6～99.6			47.7～99.9		37.0～99.9
	HRA	59.1～85.8				61.7～88.0	
	HB	127～651	80～638	80～683	90～646	83～663	81～646
	HV	83～976	80～937	80～996		84～1042	80～950
	HS	30.1～110.1	33.3～99.3	31.8～102.1		35.8～102.6	30.6～96.8
Forged steel	HB	143～650					
CWT、ST	HRC	20.4～67.1	19.8～68.2	20.7～68.2		22.6～70.2	
	HV	80～898	80～935	100～941		82～1009	
Stainless steel	HRB	46.5～101.7					
	HB	85～655					
	HV	85～802					
GC. IRON	HRC						
	HB	93～334			92～326		
	HV						
NC、IRON	HRC						
	HB	131～387			127～364		
	HV						
C . ALUM Cast Aluminum Alloys	HB	19～164		23～210	32～168		
	HRB	23.8～84.6		22.7～85.0	23.8～85.5		

BRASS Copper zinc alloy (brass)	HB	40～173					
	HRB	13.5～95.3					
BRONZE Copper tin alloy (bronze)	HB	60～290					
COPPER Pure	HB	45～315					

Table 2

No.	Material	Leeb hardness HLD	Intensityσb(MPa)
1	C Mild Carbon Steel	350～522	374～780
2	C High-carbon steel	500～710	737～1670
3	Cr chromium steel	500～730	707～1829
4	CrV chrome tangsten steel	500～750	704～1980
5	CrNi chrome-nickel steel	500～750	763～2007
6	CrMo chrome-molybdenum steel	500～738	721～1875
7	CrNiMo chromium nickel molybdenum steel	540～738	844～1933
8	CrMnSi steel	500～750	755～1993
9	SSST super-strength steel	630～800	1180～2652
10	SST stainless steel	500～710	703～1676

1.3 Specifications

	No.	Name	Qty	Remark
Standard configuration	1	Host	1 pc	
	2	D type impact device	1 pc	
	3	High Leeb hardness block	1 pc	
	4	Nylon brush A	1 pc	

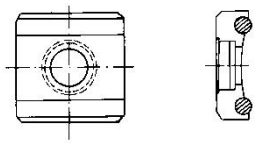
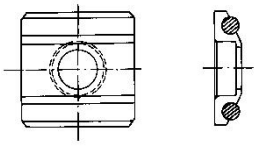
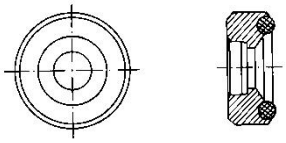
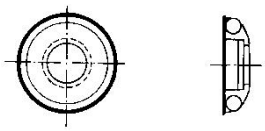
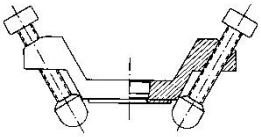
	5	Small supporting ring	1 pc	
Optional configuration	9	Nylon brush B		G type Impact device to use
	10	Different impact device		Show in table 3
	11	Shaped supporting ring		Show in table 4
	12			

Table 3

Shaped impact device		DC（D）/DL	D+15	C	G	E(need to import)
Impact energy Impact mass		11mJ 5.5g/7.2g	11mJ 7.8g	2.7mJ 3.0g	90mJ 20.0g	11mJ 5.5g
Ball head hardness: Ball head diameter: Ball head material:		1600HV 3mm Tungsten carbide	1600HV 3mm Tungsten carbide	1600HV 3mm Tungsten carbide	1600HV 5mm Tungsten carbide	5000HV 3mm Diamond
Impact device diameter: Impact device length: Impact device weight:		20mm 86(147)/ 75mm 50g	20mm 162mm 80g	20mm 141mm 75g	30mm 254mm 250g	20mm 155mm 80g
Maximum hardness test		940HV	940HV	1000HV	650HB	1200HV
Average roughness of specimen surface Ra:		1.6μm	1.6μm	0.4μm	6.3μm	1.6μm
Minimum weight: Direct measurement Need stable support Need to close coupled		>5kg 2～5kg 0.05～2kg	>5kg 2～5kg 0.05～2kg	>1.5kg 0.5～1.5kg 0.02～0.5kg	>15kg 5～15kg 0.5～5kg	>5kg 2～5kg 0.05～2kg
Test piece minimum thickness Dense coupling Minimum depth of hardened layer		5mm ≥0.8mm	5mm ≥0.8mm	1mm ≥0.2mm	10mm ≥1.2mm	5mm ≥0.8mm
Ball head indentation size						
Hardness 300HV	Indentation diameter Indentation depth	0.54mm 24μm	0.54mm 24μm	0.38mm 12μm	1.03mm 53μm	0.54mm 24μm

Hardness 600HV	Indentation diameter Indentation depth	0.54mm 17 μm	0.54mm 17 μm	0.32mm 8 μm	0.90mm 41 μm	0.54mm 17 μm
Hardness 800HV	Indentation diameter Indentation depth	0.35mm 10 μm	0.35mm 10 μm	0.35mm 7 μm	-- --	0.35mm 10 μm
Impact device application		DC type measuring hole or cylindrical tube; DL type measuring slender narrow slot or hole; D type for routine measurement	D+15 type contact surface is small, elongated, suitable for measuring the groove or concave surface	C type of impact force is small, the surface damage is very small, not to destroy the hardened layer, suitable for measuring small thin parts and surface hardening layer.	G type measuring large and rough cast forging.	E type measure very high hardness material.

Table 4

Serial number	Code name	Model	Shaped support ring diagram	Remarks
1	03-03.7	Z10-15		Test outer cylindrical surface R10～R15
2	03-03.8	Z14.5-30		Test outer cylindrical surface R14.5～R30
3	03-03.9	Z25-50		Test outer cylindrical surface R25～R50
4	03-03.10	HZ11-13		Test inner cylindrical surface R11～R13
5	03-03.11	HZ12.5-17		Test inner cylindrical surface R12.5～R17
6	03-03.12	HZ16.5-30		Test inner cylindrical surface R16.5～R30
7	03-03.13	K10-15		Test outer sphere SR10～SR15
8	03-03.14	K14.5-30		Test outer sphere SR14.5 ～ SR30
9	03-03.15	HK11-13		Test inner sphere SR11～SR13
10	03-03.16	HK12.5-17		Test inner sphere SR12.5 ～ SR17
11	03-03.17	HK16.5-30		Test inner sphere SR16.5 ～ SR30
12	03-03.18	UN		Test outer cylindrical surface, Adjustable radius R10～∞

1.4

Working condition

Working temperature: －10℃～＋55℃;
Storage temperature: －20℃～＋75℃;
The relative humidity is less than 90%;
There is no vibration, no strong magnetic field, no corrosive medium and serious dust in the surrounding environment.

2. Structure characteristics and working principle

2.1 Structure features

2.1.1 Hardness tester

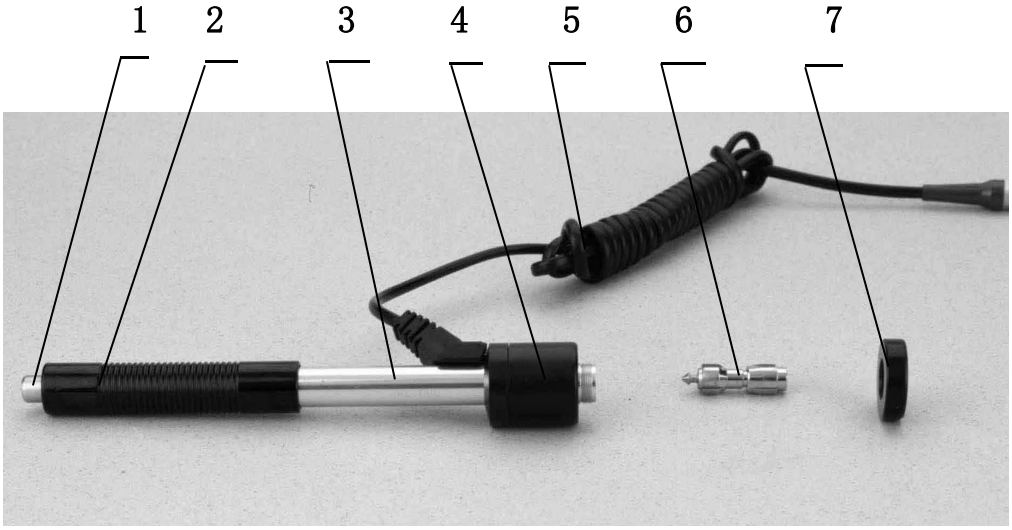
1. Host 2. Impact device 3. Keys 4. LCD screens

2.1.2 Host

硬度计侧视图和背面图

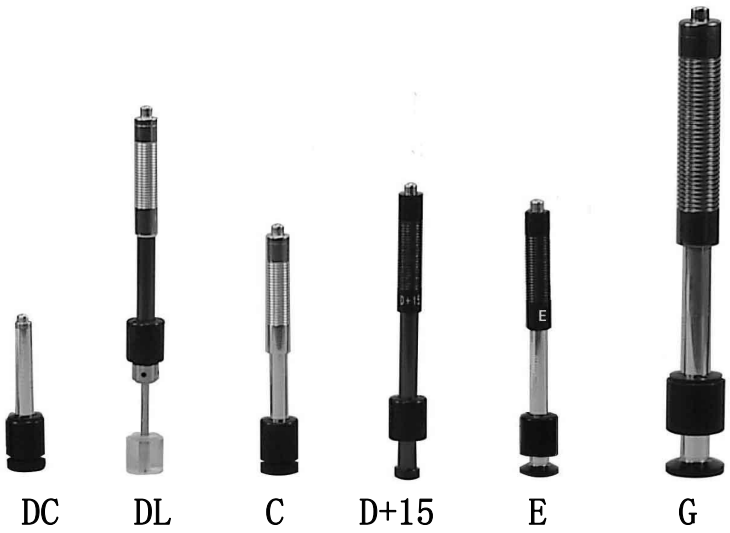
1. Shell 2. Battery cover 3. Labels

2.1.3 D type impact device



1 Release button 2 Load sets 3 Conduit 4 Coil unit 5 Conductor 6 Impact body 7 Support ring

2.1.4 Shaped impact device



2.2 Working principle

With the provisions of the quality of the impact body under the action of the elastic force, to a certain speed impact specimen surface, and with a punch from the specimen surface 1mm rebound velocity and impact velocity ratio of the calculation of the value of hardness.

The calculation formula is as follows:

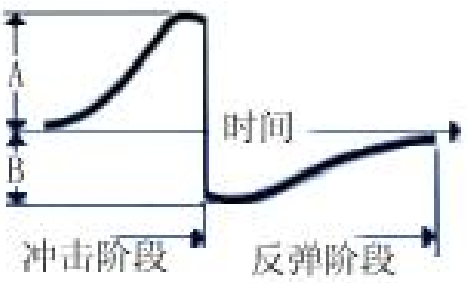
$$HL=1000\times VB/\ VA$$

Formula: HL - hardness value

VB - impact rebound speed

VA - impact velocity of impact body

Impact device output signal diagram is as follows:



3 Technical characteristics

3.1 Technical parameters

Measurement range: HLD (170 to 960) HLD
Direction: 360 degree vertical downward, oblique, horizontal, oblique, vertical upward
Hardness standard: HL, HB, HRB, HRC, HRA, HV, HS
Measurement of material: steel and cast steel, alloy tool steel, stainless steel, gray cast iron, ball graphite cast iron, cast aluminum alloy, an alloy of copper and zinc, brass and copper tin alloy (bronze), copper, wrought steel
Display: LCD, 128 x 64 graphics dot matrix LCD
Data storage: maximum 600 groups (impact number 32 ~ 1)
Working voltage: 2 * 1.5V common alkaline battery
Working time: about 100 hours (not on the back)
Communication interface: RS232
The value of the error and the value of the display are shown in Table 5.

Table 5

No.	Impact device type	Standard Leeb hardness block	Indication error	Indication repeatability
1	D	760±30HLD 530±40HLD	±6 HLD ±10 HLD	6 HLD 10 HLD
2	DC	760±30HLDC 530±40HLDC	±6 HLDC ±10 HLDC	6 HLD 10 HLD
3	DL	878±30HLDL 736±40HLDL	±12 HLDL	12 HLDL
4	D+15	766±30HLD+15 544±40HLD+15	±12 HLD+15	12 HLD+15
5	G	590±40HLG 500±40HLG	±12 HLG	12 HLG
6	E	725±30HLE 508±40HLE	±12 HLE	12 HLE
7	C	822±30HLC 590±40HLC	±12 HLC	12 HLC

3.2 Size Weight

3.2.1 Dimension

132×82×33mm (Host).

3.2.2Weight

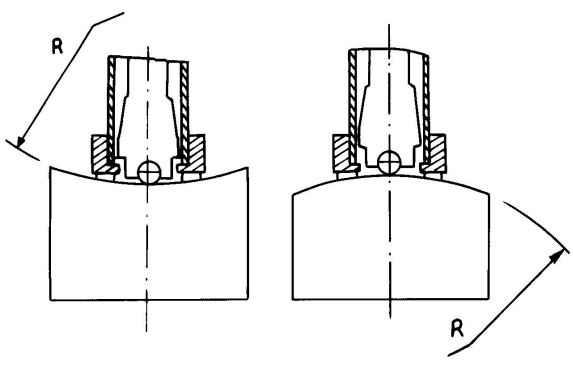
About 0.6kg (Host).

4 Using

4.1 Prepare and check before use

4.1.1 Required by the test sample surface

The surface of the specimen shall be in accordance with the relevant requirements of Table 3.
The sample surface temperature can not be too high, should be less than 120℃.
The sample surface roughness can not be too large, otherwise it will cause the measurement error. The surface of the sample must be exposed to metallic luster, and smooth, smooth, not oil.
The weight of the sample is required to be larger than 5kg, which is not required to support; the weight of the specimen, the specimen with the 2-5kg test, the test piece and the thin wall specimen are supported by the object. In the middle of the sample, the sample must be placed on a flat and solid plane, and the sample must be placed in a stable place, and there is no shaking.
Surface sample: the test surface of the specimen is preferably plane. When the surface curvature radius R is less than 30mm (DC, D+15, D, C, E, DL type impact device) and less than 50mm (G type impact device), should be used in the test of small supporting ring or shaped supporting ring.



Sample should be sufficient thickness, the minimum thickness of the specimen shall be in accordance with the provisions of table 3.

For a specimen having a surface hardened layer, the depth of the hardened layer shall be in accordance with the provisions of table 3.

Coupling

---For light weight sample, we must be closely coupled with the rigid body, and the two coupling surface must be flat, smooth and coupling agent dosage is not too much, the direction of the test must be perpendicular to the coupling plane;

---When the specimen is a large area of plate, long rod, bending parts, even though the weight and the thickness of the specimen may cause the specimen deformation and instability, the test values are not allowed. Therefore, it should be reinforced or supported on the back of the test point.

The magnetic sample should be less than 30 Gauss.

4.1.2 Instrument system Settings

Detailed setting method as 6.9.

4.1.3 Instrument measurement conditions set

Detailed setting method as 6.5.

4.2 Measurement

Before the measurement, the instrument can be tested by using the random standard scale. The error and repeatability of the instrument are not more than Table 5 provisions.

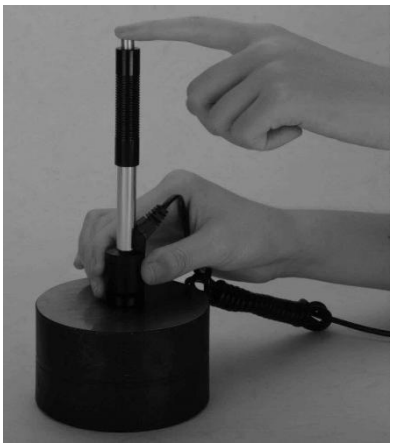
> Note: random block hardness value is to use calibration of measuring hardness tester, on the determination of vertical down 5 times, take the arithmetic mean as random hardness block hardness values.
> If the value exceed bid, users can use the calibration function.

4.2.1 Start

The impact device plug is inserted into the upper end of the instrument in the percussion device socket.

Press 【 ⏻ 】 key, at this time the power is connected, the instrument enters the measuring state.





4.2.2 Load-on

Push down the load cover to lock the impact body; for the DC type impact device, you can load the stick to the test surface, the DC type impact device inserted into the loading rod, until the stop position, this time to complete the load.

4.2.3 Location

Press the impact device supporting ring on the selected measuring direction on the surface of the sample, and the impact direction should be perpendicular to the test surface;

4.2.4 Measurement

Press the release button to test the upper part of the impact device. At this point, the specimen, impact device, operator are stable, and the direction of the force should be through the impact device axis.

Each measuring part of the sample is generally carried out in five experiments. Data should not exceed the average value ±15HL.

The distance between any two indentation or any one of the indentation center distance from the edge of the specimen shall be in accordance with the provisions of table 6.

For specific materials, the hardness value of the measured on the scale is more accurate than the other hardness values, and the corresponding conversion relationship must be obtained. The method is: the test of the same test sample with the same scale and the corresponding hardness tester. For each of the hardness values, in the three or more need to convert the hardness of the uniform distribution of the measured around 5 points on the measured hardness, using the average hardness and the corresponding hardness value respectively as a corresponding value, to make the hardness contrast curve, the curve should at least include three sets of data.

Table 6

Impact device type	The distance between the two indentation center (mm)	Edge distance from the center of indentation (mm)
	No less than	No less than
D、DC	3	5
DL	3	5
D+15	3	5
G	4	8
E	3	5
C	2	4

4.2.5 Read the measured value

The average value of a number of effective test points is used as a measurement test data.

4.2.6 Print output

Specific setting method is showing 6.3.3 and 6.6.

4.2.7 Press 【 ⏻ 】button shutdown

4.2.8 Test result representation method

The hardness value is shown on the front of the HL, and the type of the impact device is shown in the HL. For example, 700HLD shows that D type measured Leeb hardness value is 700.
For other hardness of the measured on the scale, the hardness of the symbol should be attached to the corresponding hardness before the sign of the hardness of the on the scale. For example, 400HVHLD said the Vivtorinox hardness value of the measured by the D type impact device was 400.
Note: the impact of different device types measured at different HL values, such as 700HLD≠ 700HLC.

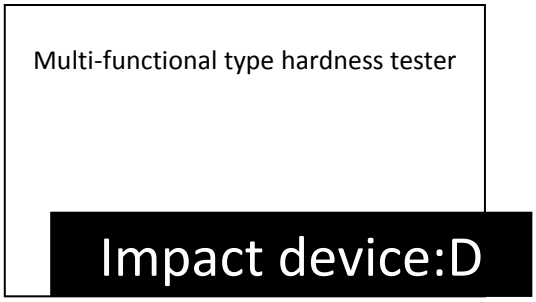
5 Special tips

The replacement of the impact device must be in the off state, otherwise it can not automatically identify the type of impact device, and may cause damage to the instrument circuit board.
Under normal circumstances, the current measurement value cannot be stored in the absence of a set of 【impact times】. If you want to store, you can press the 【average】 key to end the measurement in advance.
Press 【average】 key to end the measurement in advance, 【system settings】 menu in the 【automatic storage】, 【automatic transmission data】 and other functions are not up to the role.
D type and DC type impact device has a strength measurement function, so the use of other types of impact device, will not be modified 【hardness / strength】 set, if the D/DC type impact device is set to 【strength】, and replace for other impact device, 【hardness / strength】 set will be automatically modified for 【hardness】.
When set to 【intensity】, it will not be able to set up the system of hardness (the cursor will be skipped from the 【hardness value】).
Not all materials can be converted into all of the system, change the material after the hardness of the system will automatically resume as a HL. Therefore, set the measurement conditions to set up the first 【material】, and then set 【hardness value】.

6 Detailed operation

6.1Start

Press【 ⏻ 】button to start, instrument display:



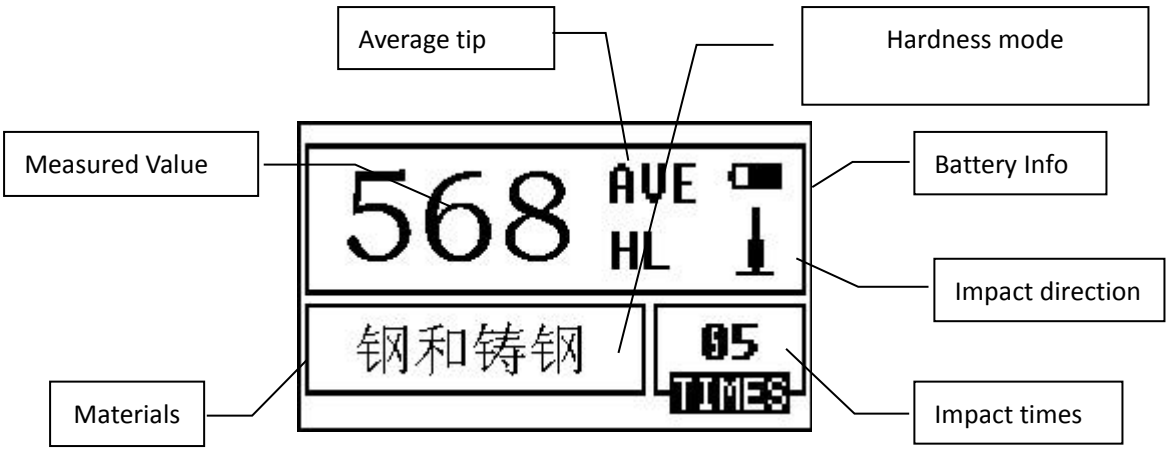
The instrument will detect the type of impact device and display, please pay attention to the observation is correct, and then enter the main display interface.

6.2 Shutdown

In any display condition press【 ⏻ 】button all can be turned off.

6.3 Measurement

Automatically enter the main display interface when start, as shown in the following diagram:



6.3.1 Contents note

Battery information: displays the remaining capacity.
Impact direction: current direction.
Average value: when the impact number is reached, the average value is displayed.
Hardness: the hardness of the current measurement system.
Measured value: the current single measurement (no mean value), the current average (with a mean value).

Indicates ↑ that the range of conversion or measurement is more than the conversion or measurement range. Indicates ↓ shows below the conversion or measuring range.

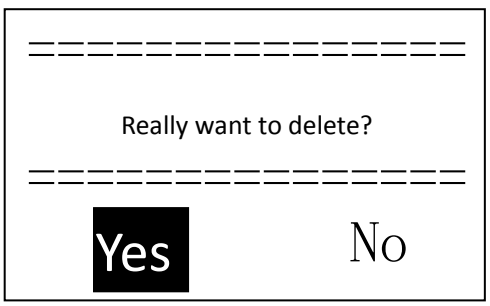
Material: current setting material.
Impact times: the number of times when the impact number is displayed, the number of times when the impact is displayed, and the corresponding number of times when viewing a single measurement.

6.3.2 Measuring operation

In the main interface can be measured, each completed a measurement and display the measured value; impact number counting increases 1; if beyond the tolerance limit, the buzzer of nights; after reaching a set number of shocks, the short buzzer Ming twice, waiting for 2 seconds after the buzzer short sound displays the average value.

6.3.3 Keys operation

Press【storage】key to store the current set of data, which is valid only after the display, and can only be saved 1 times.
Press【delete】the key to delete the last single measurement, but the following display interface to confirm:



Press【◄】【►】button, move the cursor to【Yes】press【confirm】button can confirm delete last single measurements.
Press【◄】【►】button, move the cursor to【No】press【confirm】button can cancel the delete operation.
Regardless of the cursor position, press the【Cancel】button to cancel the operation.

Press【 ▲ 】or【 ▼ 】button can browse a single measured value, then press【cancel】button resume shows average or the last measured value, press【 ▲ 】or【 ▼ 】button browse through a different order.

Press【Average】button can not reach the set ends when measuring the impact times, showed that the average.

Press【Backlight】button can switch the LCD backlight.

Press【confirm】button can enter the main menu.

Shortcut keys:

Press【direction】button can change the direction of impact settings.

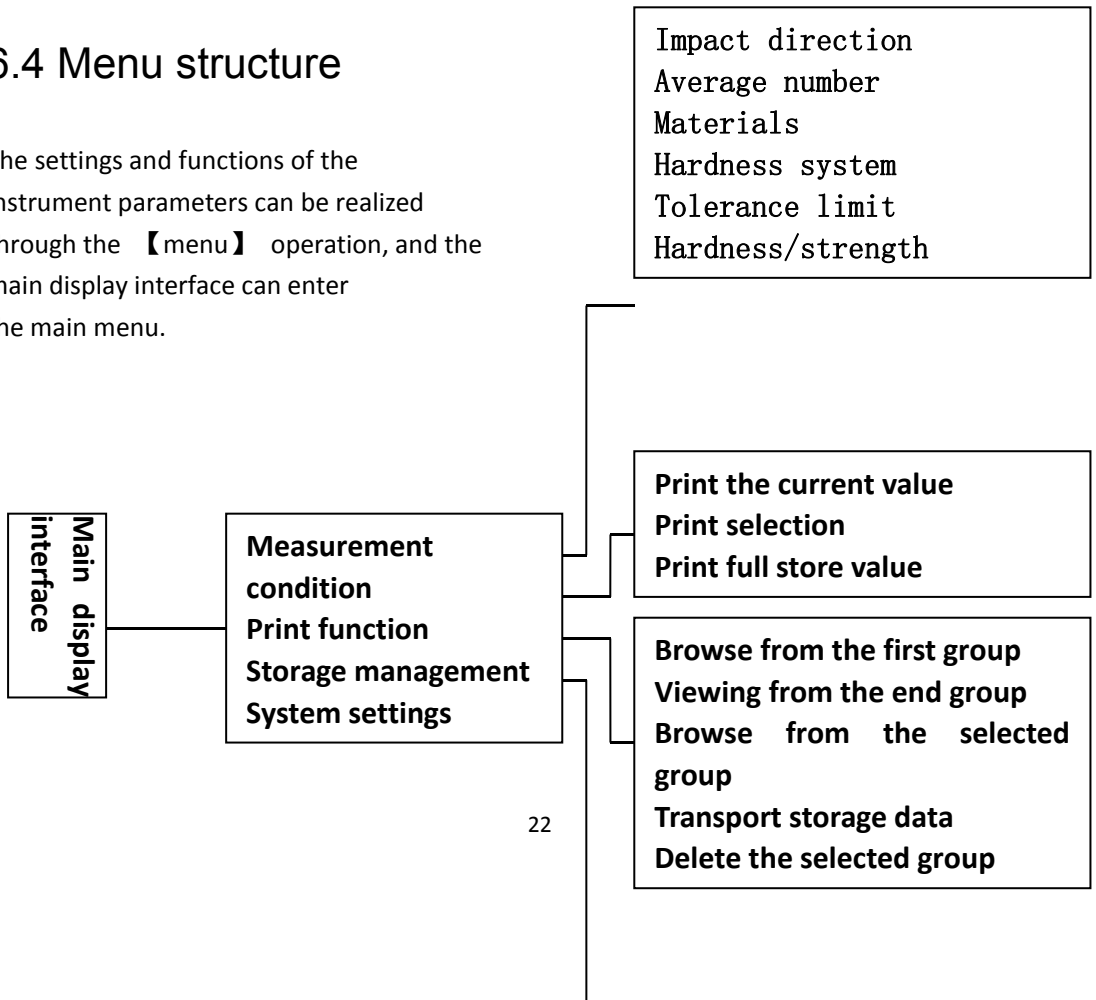
Press【Unit】button can change the hardness of the setting, every time in the current material and the impact device can be converted to a variety of hardness between the cycle, and display the corresponding conversion value of the corresponding hardness, if the current setting for intensity measurement, will be converted to Leeb.

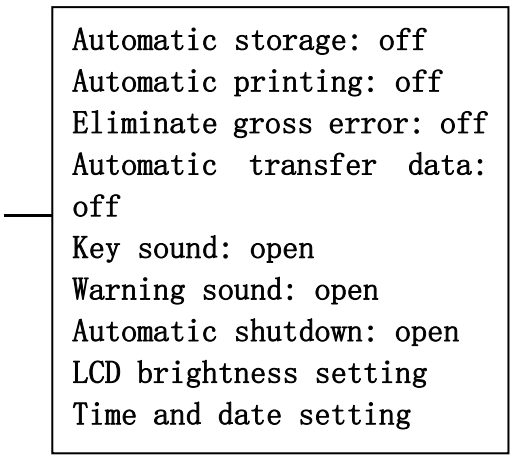
Press【material】button can change the material setting, every time according to the material in the cycle, and the hardness of the system to change the scale, so the measurement should be first set of material, and then set the hardness.

Note: the “conversion” is a kind of material, according to the scale of the hardness and the other on the basis of a large number of experiments to establish the corresponding relationship. According to this relationship, the hardness value of the measured value of the measured value of the measured value of the measured value of the measured value of the measured value of the hardness.

6.4 Menu structure

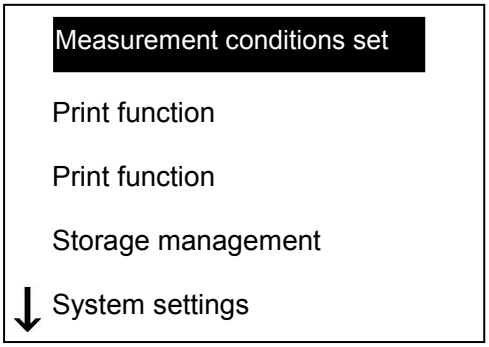
The settings and functions of the instrument parameters can be realized through the 【menu】 operation, and the main display interface can enter the main menu.





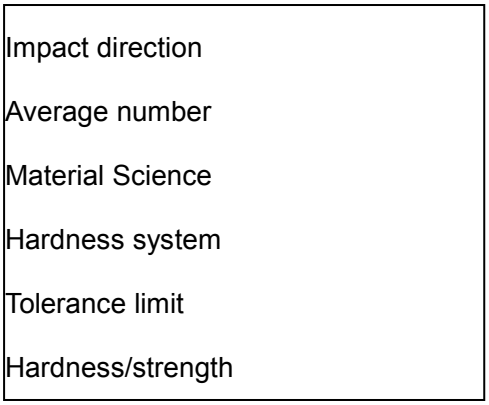
6.5 Measurement condition

Press 【menu】 button to enter the main menu in the main display interface.



Press【confirm】button to enter【Measurement conditions set】menu.

1. The symbol ↓ the lower left menu said this menu is not the end, press 【▼】 button can continue to look down, sign up on the left side of the ↑ menu said this menu is content, press 【▲】 button can continue to look at.

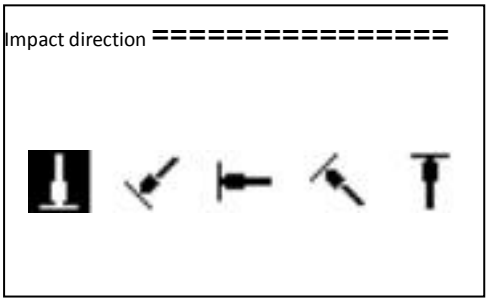


Press 【▲】【▼】button move the cursor to a set of conditions, press【confirm】button.

2. When the 【hardness】 is set to 【strength】, you can no longer choose the hardness system, so moving the cursor time standard will be from the 【hardness】 option to skip.
3. Only the D/DC type impact device has the intensity measurement function, so when

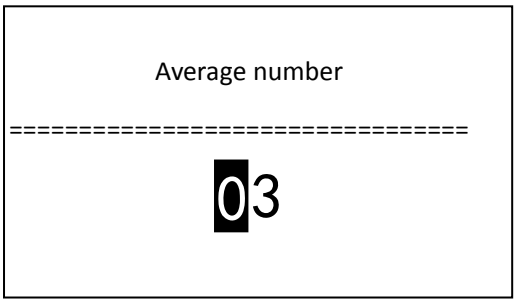
using other impact device, the cursor can not move to the【hardness / strength】of the option.

6.5.1 Impact direction setting



Press【◄】【►】button move the cursor to the desire to set direction.
Press【confirm】button complete the change.
Press【cancel】button cancel changes.

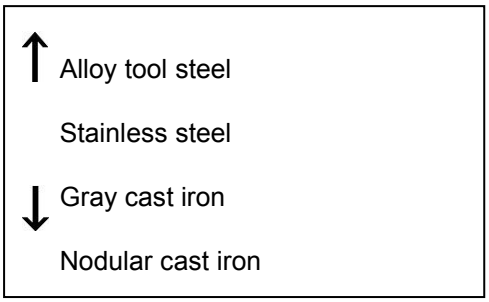
6.5.2 Average number Settings



Change the average number of times in the range of 1 to 32.
Press the key to modify the value, the cursor will automatically move to the right circle.
Press【confirm】button complete the change.
Press【cancel】button cancel changes.

6.5.3 Materials setting

6.5.3.1 【Hardness/strength】 set to the hardness will show the following optional materials: Steel and cast steel, alloy tool steel, stainless steel, gray cast iron, ball graphite cast iron, cast aluminum alloy, alloy of copper and zinc, brass, copper tin alloy (bronze), copper, wrought steel.



Press【▲】【▼】button move the cursor to the set of materials.
Press【confirm】button complete the change.
Press【cancel】button cancel changes.

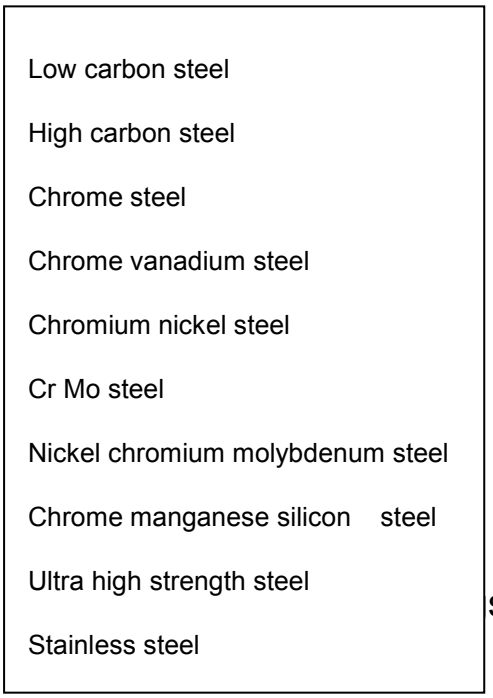
Note:

1. After changing the material setting,

the hardness is automatically restored to HL.

2. Select the hardness of the first choice of materials.

6.5.3.2 【hardness/strength】 set to the strength of the following optional materials:



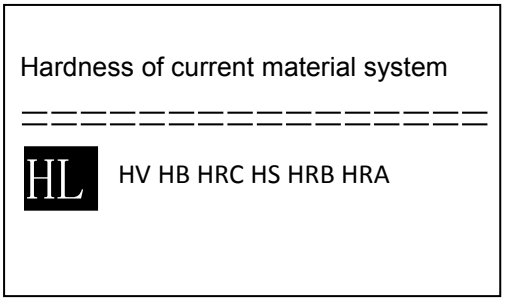
Press【 】【 】button Move the cursor to the set of materials.

Press【confirm】button complete the change.

Press【cancel】button cancel changes.

Notes: The symbol ↓ the lower left menu said this menu is not the end, press【 】button can continue to look down, sign up on the left side of the ↑ menu said this menu is content, press【 】button can continue to look at.

6 s



Press【 】【 】or【 】【 】button move the cursor to set the stiffness of the system.

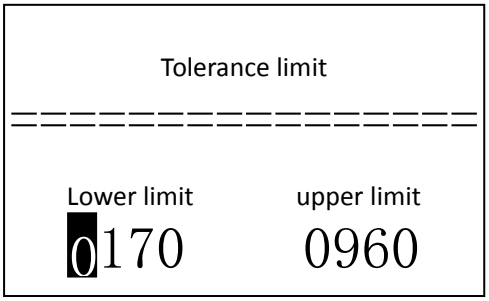
Press【confirm】button complete the change.

Press【cancel】button cancel changes.

Note:

1. Here only shows the current selection of the impact device and material can be converted to the hardness, can not be converted to the hardness of the system does not show.
2. Select the hardness of the first choice of materials.
3. After changing the material setting, the hardness is automatically restored to HL.

6.5.5 Tolerance limit settings



Press the key up and down to modify the value, the cursor will automatically move to the right circle.

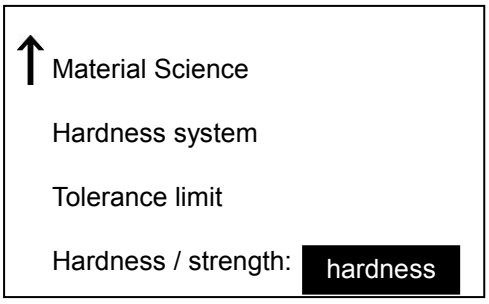
Press【confirm】button complete the change.

Press【cancel】button cancel changes.

Note:

1. If the setting is beyond the range of measurement, it will remind you to reset it.
2. Set limit is greater than the upper limit of automatic exchange.

6.5.6 Hardness/strength Settings



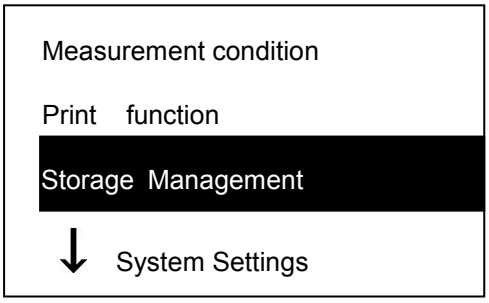
Press 【 confirm 】 button to select 【Hardness/strength】, the cursor is displayed in the hardness, strength of the switch.

Note:

Only the D - type and DC - type impact device has the strength measurement function, if the impact device is not D or DC, the setting can only be【Hardness】.

6.7. Storage Manager

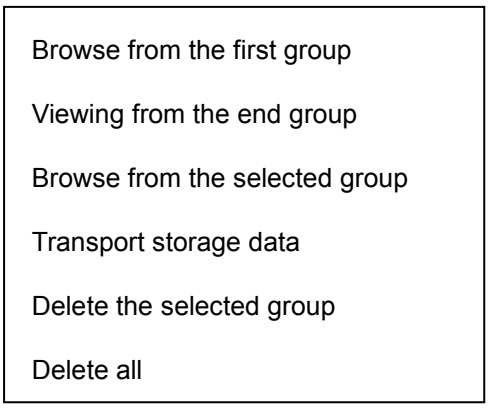
In the main display interface press 【menu】 button to enter the main menu.



Press【 】【 】button move the cursor to 【Storage Management】.

Press 【confirm】button to enter 【Storage Management】menu.

If there is no data in the memory, it will show “no data” then return.

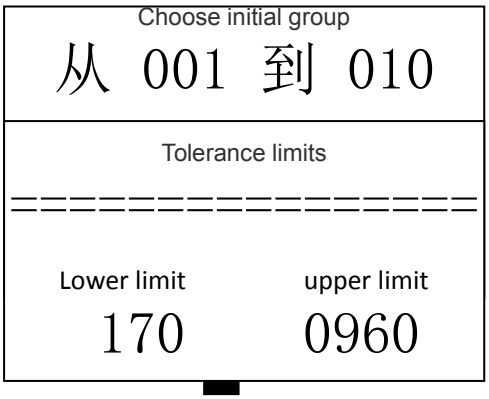


Press【 】【 】buton move the cursor to the required function on【confirm】button.

6.7.1 From the first set of browsing/browse from the bottom group

【From the first set of browsing】From the first set of display data storage.
【From the bottom group】Data from the last set of display memory.

6.7.2 Browse from the selected group

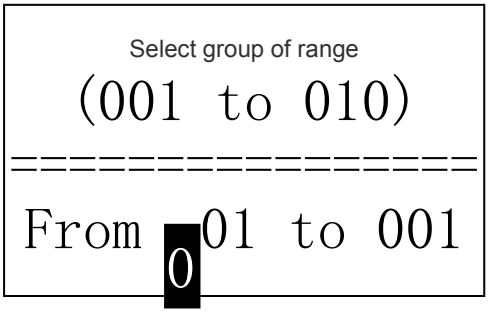


【 Browse from the selected group】will be a starting set of interface.
Press the key up and down to modify the value, the cursor will automatically move to the right circle
Press【confirm】button data from the input of the initial group began to show the memory.
Press【cancel】button cancel operation.

6.7.3 Transport storage data

Send the data in the memory to the RS232 port and print port in text way, the same function as 【Print all
the stored value】.

6.7.4 Delete Selected Group



【 Select group of range 】Will appear to remove the group range interface.
Press numeric key input values.
Press【confirm】button delete the selected groups.
Press【cancel】 key to cancel the operation.

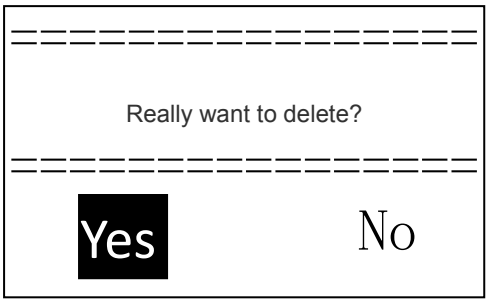
Note

1. If the number of sets of sets is out of the scope of the actual number is removed.
2. By the number of groups is not small, delete 1 ~ 5 groups can be set from 1 to 5 or from 5 to 1.
3. After delete, store the data group number will be re arranged.
4. When deleting data, especially when you delete a group number data, because data on the back of the shifting, may take up to 30 seconds of time, then please do not shut down, so as not to cause confusion in the data.

6.7.5 Delete All

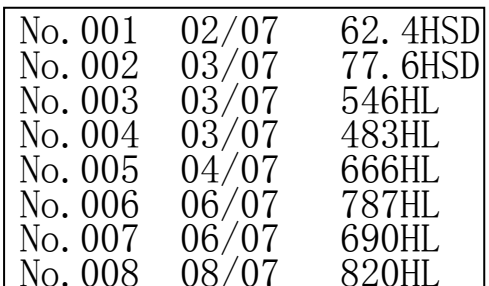
【Delete all】will delete all the data in the memory.

6.7.6 Confirm Delete



When the memory data is deleted, the confirmation interface appears.
Press【◄】【►】key move cursor to 【yes】then press【confirm】key can delete data
Press【◄】【►】key move cursor to【No】then press【confirm】key can cancel delete operation.
matter the cursor position, press【cancel】key also can cancel delete operation.

6.8 Browse interface

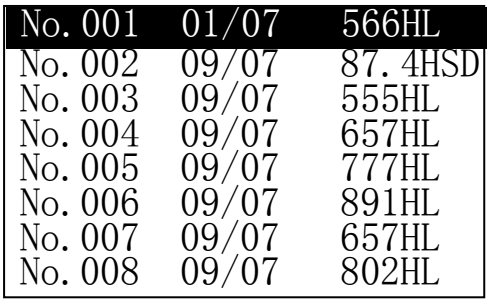


Each screen can display the number, date and average of the 8 sets of data.

Press【▲】【▼】key page turning.

Press【cancel】key exit the browse.

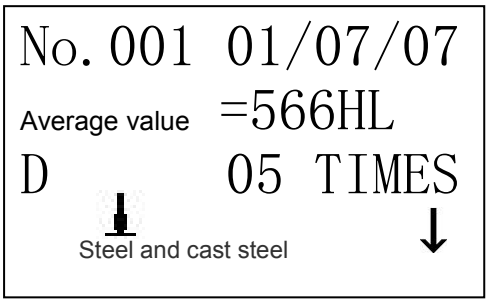
Press【confirm】key appears cursor, then see further details.



Press【▲】【▼】key choose this screen within the group.

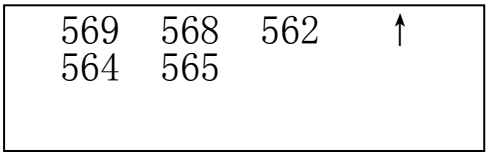
Press【cancel】key return to the previous view state.

Press【confirm】key to see this group of details.



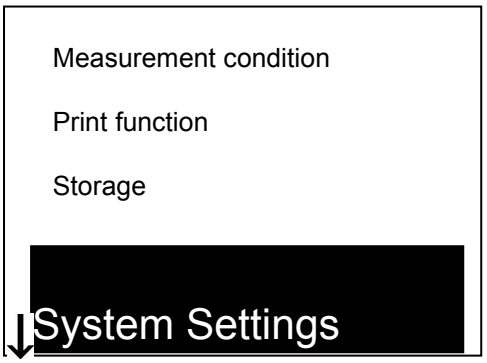
Press【▲】【▼】key to see the average value, measurement conditions or single measurement by page turning.

Press【cancel】key return to the previous view state.

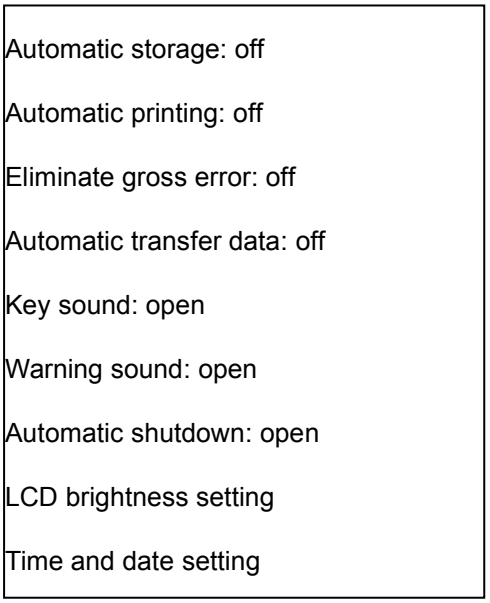


6.9 System Settings

In the main display interface press 【menu】 button to enter the main menu.



Press【 】【 】key move cursor to【system settings】.
Press【confirm】key to enter【system settings】menu.



Press【 】【 】key move the cursor to the project to be set.
Press 【 confirm 】 key directly change or corresponding changes into the interface. Press【exit】key to return.

【Automatic Storage】 【Automatic printing】 【Eliminate gross errors】 【Automatic data transmission】【Automatic data transmission】 【Key Sound】【Warning sound】【Auto Power -Off】all can use【confirm】key to choose【open】 or【close】.

【Automatic storage】set to【open】, current group data can be automatically stored after the measurement is finished.

【Automatic printing】set to【open】, it can be measured after the completion of the average value of the text of the current group data from the RS232 port to send, if the RS232 port is connected to the printer, then achieve print.

【Eliminate gross errors】set to【open】, it can be in complete set average number or press 【Average】key, in advance at the end of the eliminates automatically according to the rule of 3 б gross error, if there are data are eliminated, measurement to set the number of replenishment is needed.

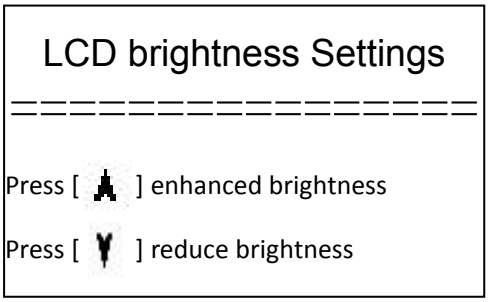
【Automatic data transmission】set to【open】, after the completion of the measurement, the current group data is sent to the PC by the method of the text.

【Key Sound】set to【open】, every time press the button, the buzzer will beep.

【Warning sound】set to【open】, when the measured value exceeds the tolerance limit, delete the data under the condition of the buzzer of nights.

【Auto Power -Off】set to【open】, when there is no key or measuring operation for 5 minutes, the instrument will automatically shut down.

6.9.1 LCD brightness Settings



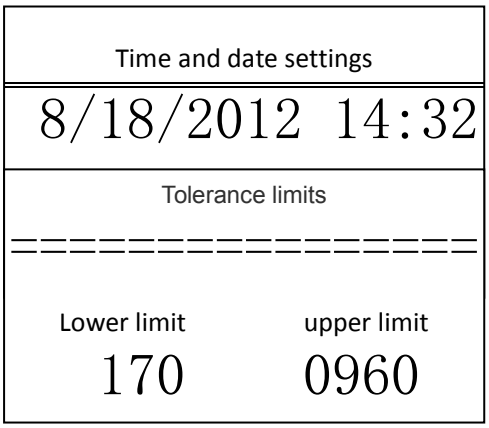
Press【 】key to enhanced brightness.

Press【 】key to reduce brightness.

Press【confirm】key to complete the change.

Press【exit】key to cancel changes.

6.9.2 Time and date settings



When you enter this interface, the current time is displayed on the screen, the date of the format is "month / day / year".

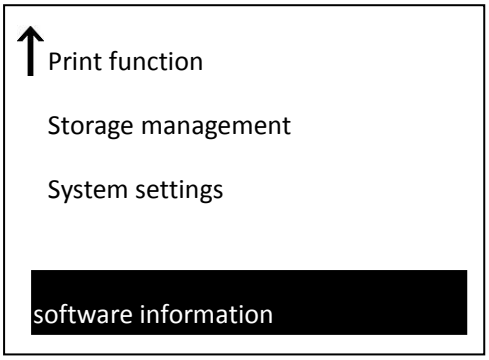
Press the key up and down to modify the value, the cursor will automatically move to the right circle.

Press【confirm】key to complete the change, change the current time date to the date set.

Press【cancel】key to cancel changes.

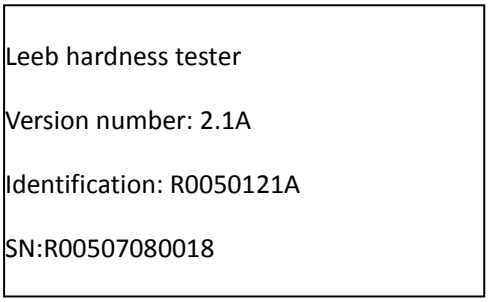
6.10 Software Information

In the main display interface press "menu" button to enter the main menu.



Press【 】【 】key move cursor to【software information】.

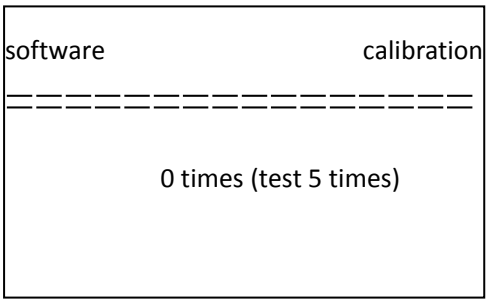
Press 【 confirm 】 key to enter 【 software information】.



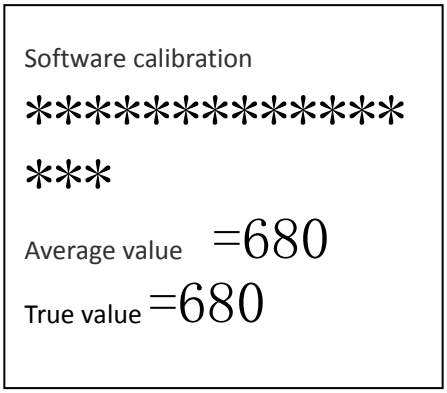
The interface displays information about the instrument and the embedded software.
Software version number and embedded software logo are likely to change with the software upgrade, without further notice.

6.11 Software calibration

Before using this instrument for the first time, the use of the first time after the use of the former must be used with a random on the scale of the scale of the instrument and the impact device calibration.
When a host with multiple types of impact device, each only need to be calibrated 1 times, the next time to replace the next change of different types of shock device does not need to re calibrate.
Press【confirm】key the same time press【 】key to start，To enter calibration software interface.



Impact the direction is set to【 】.
On the magnitude of the hardness block vertical downward measuring 5 points.



Measurement will be displayed after the completion of the average.

Press【 】【 】key input real value.

Press【confirm】key to complete the calibration.

Press【cancel】key 680 the calibration operation.

Calibration range is±15HL。

6.12 Backlight

Instrument LCD screen with backlight, and ease of use in dark conditions, the boot, you can at any time according to【 ☼ 】 key to turn off or turn on backlight

6.13 Auto power-off

The instrument has automatic shutdown function to save battery power. Specific Settings to see 6.9【system settings】.

【 Auto Power -Off】set to 【open】, if there is no measurement in 5 minutes, there is no any key operation, the instrument will automatically shut down, the LCD screen will flash show 20 seconds before shut down, this time press any key except【 ⏻ 】can make the LCD screen stop flashing and shutdown operation.

When the battery voltage is too low, the instrument will display the "power shortage"!" Then automatically shut down.

6.14 Battery replacement

In the host is equipped with 2 AA size alkaline batteries as power, battery capacity after use, the battery symbol  will flash show, this time need to replace the battery.

Battery replacement methods: off the instrument circular open the battery cover, remove the old battery replacement for the new battery.

Time and measuring conditions should be set up after the replacement of the battery.

7 Fault analysis and elimination

Fault phenomenon	Reason analysis	Elimination methods
Do not start machine	Battery depleted	Replace Battery
No measurement values	Probe line internal circuit turn off	Replace the probe line
Value is not accurate	Impact device ball head and wear	Replace the ball head
Deviation of measured value	Calibration value invalidation	Recalibration

8.3 Non warranty device

Shell (upper shell, lower shell,), battery

Impact ball head, support ring, probe wire, key film

9 Verification cycle

The test period of the hardness tester is generally not more than one year. The use of units according to the actual situation of daily inspection.

10 User instructions

Purchase the company's products from the using date, and within a year appear quality fault (non warranty parts except), please by "warranty card and copies of purchase invoices pieces and contact the company, free maintenance.

The warranty period of the product failure, repair fees prescribed by the company to sign.

Standard configuration of the choice of configuration (special sensor, extended cable, special software, etc.) by the company's relevant standards.

Arising from the user to disassemble the products, due to transportation, improper storage or not according to the product specification correct operation caused damage to the product, and unauthorized altering the warranty card, no proof of purchase, the company shall not be warranty.

11 Storage condition, transportation and notice

Storage should be away from the vibration, strong magnetic field, corrosive media, moisture, dust, should be stored at room temperature.
Under the condition of ensuring the original package, it can be carried out under the condition of three grade highway.

Warranty card	
Product Model	
Host number	
Impact device number	
Warranty phone	
User Profile	
Date of buying the machine	
Company Name	
Contact Address	
Contacts	
Contact number	
Invoice copy and paste	

Leeb hardness tester

Packing card

No.	Name	Qty	Unit	Remark
1	Hardness tester host	1	pc	
2	D type impact device	1	pc	
3	Small supporting ring	1	pc	
4	Nylon brush	1	pc	
5	Standard Leeb hardness block	1	pc	760±50HLD
6	AA (5) regular alkaline batteries	2	pc	
7	Operating Instruction	1	pc	
8	instrument container	1	pc	

Packing inspector: **____year____month_____day**