Leeb Hardness Tester

Code: 86253

User Manual V1.08

Please read this manual carefully before using and reserve it for reference.

I. Product Introduction

The Leeb hardness tester detects hardness based on the Leeb hardness measurement principle and can measure the hardness of a variety of metal materials. The tester adopts advanced digital probe technology, digital signal processing is done directly on the probe, which is not easily disturbed and provides excellent testing accuracy. The probe has a built-in direction sensor, which automatically compensates for the measurement error in different impact directions. The instrument has a variety of built-in hardness systems, which can be converted between Leeb (HL), Vickers (HV), Brinell (HB), Shore (HS), Rockwell (HRA), Rockwell (HRB), Rockwell (HRC) and tensile strength (σb). The instrument can connect with impact devices D, DL, DC and C.

- Impact device D is suitable for assessing the hardness of common metal materials.
- Impact device DL is suitable for hardness measurement of slender and narrow grooves, tooth surfaces and the bottom of inner holes.
- Impact device DC is suitable for testing the hardness of inner holes and narrow parts with short size.
- Impact device C is ideal for measuring the hardness of surface hardening layers and parts with small masses or thin thickness with small impact force.

Standards for the product:

- *GB/T 17394.1-2025 Metallic materials-Leeb hardness test-Part 1: Test method*
- *GB/T 17394.2-2022 Metallic materials-Leeb hardness test-Part 2: Verification and calibration of hardness tester*
- *GB/T 17394.3-2022 Metallic materials-Leeb hardness test-Part 3: Calibration of reference blocks*
- *GB/T 17394.1-2025 Metallic materials-Leeb hardness test-Part 1: Test method (including conversion tables)*
- *JJG 747-1999 Verification regulation of Leeb hardness tester*

II. Parameters

Probe	Impact device D/ Impact device DC / Impact device DL/ Impact device C
Hardness Scales	HL, HV, HB, HS, HRA, HRB, HRC
Measurement Range	**Impact device D/DC:** HLD: (170-960), HV(83-976), HB(30-651), HRC(17.6-68.5), HS(26.4-99.5), HRB(13.5-100), HRA(60-85.8) **Impact device DL:** HLDL(170-960), HV(194-976), HB(140-651), HRC(19.8-68.5),

	HS(26.4-99.5), HRB(59.6-99.6), HRA(60-85.5) **Impact device DL:** HLC(170-960), HV(80-996), HB(80-683), HRC(20-69.5), HS(31.9-102.3)
Resolution	1HL
Accuracy	±12 HL, ±6 HL (typical)
Repeatability	6HL (factory standard)
Display	240 * 16 dot matrix LCD
Power Supply	2 AA alkaline dry batteries
Host Size	142*72*28 mm
Probe Size	148*31*25 mm
Weight	247g
Operating Temperature Range	0℃~50℃, 0~85%RH(no condensation)
Storage Temperature Range	-10℃~60℃, 0~85%RH(no condensation)
Supply Voltage	DC3V
Operating Current	20mA
Operating Power Consumption	60mW

III. Features

1. Probe plug-in design, support different Leeb hardness tester impact devices.
2. The tester uses advanced digital probe technology, digital signal processing directly on the probe to complete, which is not easy to interfere with and provides excellent test accuracy.
3. Built-in direction sensor, automatically compensates for the measurement error of different impact directions.
4. Providing a variety of hardness scales to switch, no more tedious manual check table
5. QC inspection, the tester can set upper and lower limits to determine whether the incoming material is qualified and achieve rapid detection of incoming material.
6. Statistics function, the tester can automatically count the maximum value, minimum value, and average value of the last 9 measured values.
7. Users can calibrate the standard parts to eliminate the error.

8. It can print the measurement data after connecting Bluetooth printer.
9. Built-in Bluetooth function, it can connect to the mobile APP and realize measurement data sharing.
10. Low power consumption, powered by 2 AA alkaline batteries and it can work continuously for more than 100 hours.

IV. Operation

1. Power on/off

Power on:

Short press Enter button, the version and the serial number of the instrument host and probe are displayed on the screen at the same time after powering on, and then the instrument will enter the measurement interface and the measured values before powering off are displayed.

Power off:

Long press the Enter button to shut down the tester or click the “Shutdown” option in the menu, the instrument will automatically shut down when the time without any operation is longer than the auto-shutdown time.

2. Measurement

- **Impact device D/DL/C:**

Loading:

Push down the loading sleeve of the probe to lock the impact body.

Positioning:

Press the probe firmly against the surface of the object to be measured and keep it still.

Measurement:

Press the release button on the top of the probe to measure the hardness of the object.

- **Impact device DC:**

Loading:

Push the impact body from the bottom to the locking position with the push rod.

Positioning:

Press the probe firmly against the surface of the object to be measured and keep it still.

Measurement:

Press the release button on the top of the probe to measure the hardness of the object.
There are two measurement modes:

(1) Statistics mode

The interface of statistics mode is shown below (left). The instrument displays the maximum value, minimum value, and average value of current statistics as well as the number of valid data. The number of statistics is the last 9 valid measurement data, and when there are less than 9 data, the actual amount of data prevails.

(2) QC mode

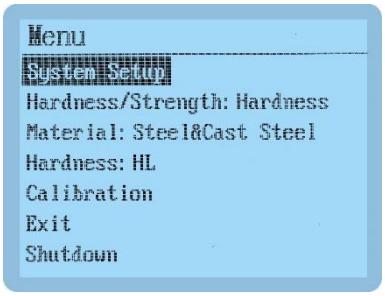
The QC mode interface is shown in the figure below (right), and the instrument judges whether the measured value is qualified according to the set upper and lower limits.



Statistics mode QC mode

3. Setup and Calibration

Press and hold the Enter button for 3 seconds in the off state or press the Enter button briefly in the measurement state to enter the Main Menu of the instrument with seven sub-options, press the ▲ and ▼ briefly to select [System Setup, Hardness/Strength, Material, Hardness, Calibration, Exit, Shutdown], short press the Enter button to confirm the selection.



(1) System Setup

- Language: Short press Enter button or Del button to enter the language option and press the ▲ or

▼ button to select the right language, then press Enter button to confirm your selection.

- Auto power off: short press the Enter button or Del button to enter the shutdown time selection, short press the ▲ or ▼ button to select the shutdown time, short press the Enter button to confirm.
- Mode selection: short press the Enter button or Del button to enter the mode selection interface, press Enter button to select the measurement mode, then short press the Enter button to confirm.
- Limit setting: Limit setting is only displayed in QC mode, short press the Enter or Del button to enter the limit setting interface, press ▲ or ▼ button to select [upper/lower limit/return] option, short press the Enter to confirm your option, short press Cal Del ▲▼ to modify the value, finally, short press the Enter button to confirm the whole setting.
- Restore factory settings: Press the Enter button briefly to enter the restore factory selection interface. Cal Del button can toggle the [Yes/No] option, press the Enter button briefly to confirm the option and return to the setting interface.

(2) Hardness/Strength

Short press Enter button to enter hardness/strength selection interface, and short press the ▲ or ▼ button to select [hardness/strength], then short press the Enter button to confirm the selection.

(3) Material

Short press the Enter button to enter the material selection interface, short press the Cal Del ▲▼ button to select the corresponding material, then press the Enter button to confirm the option and return to the setting interface.

(4) Hardness Unit

The hardness unit is only displayed in hardness measurement mode, press the Enter button briefly to enter the hardness unit selection interface, press the ▲ or ▼ to select the hardness unit, press the

Enter button briefly to confirm.

(5) Calibration

Short press the Enter button to enter the calibration interface, the screen prompts [Please measure the standard hardness block] and flashes, then you can measure the standard hardness block (single or multiple times). After measurement, the cursor moves to the actual value area, then press ▲ or ▼ button to adjust the actual value to the standard value of the hardness block. Short press the Enter button to end the adjustment, and press the ▲ or ▼ to select [Cancel]/[Back]/[Save] options.

- Select [Cancel] and press Enter button briefly to return to the calibration screen and wait for the measurement again.
- Select [Back], short press Enter button to not save the calibration data and exit the calibration screen.
- Select [Save], press Enter button briefly to save the current calibration data, and exit the calibration interface.

(6) Exit

Short press Enter button briefly to exit the main interface and enter the measurement interface.

(7) Power off

Short press Enter button to power off the instrument.

4. History Records

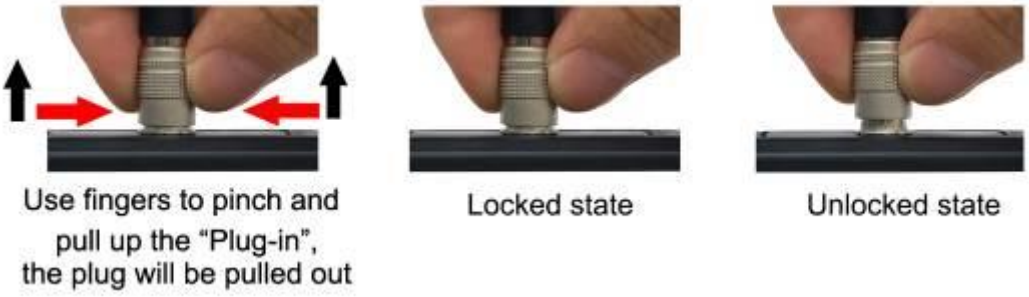
In the measurement mode, press ▲ or ▼ briefly to view the historical data in the browse interface. The instrument stores 9 sets of data totally, and the oldest recorded value is automatically deleted when there are more than 9 sets of data. Record 1 is the earliest test data, and so on backward. Recorded data is not lost when the instrument is turned off.

When pressing ▲ button to view the data, the data record number is increasing from the first one to the last one, when pressing ▼ button to view the data, the data record number decreases from the maximum to the minimum.

In the history view mode or measurement mode, press Del button briefly and the screen will show a data deletion prompt, press Enter button briefly to select [Yes] to delete all recorded data.

5. Aviation plug connection

When plugging out the probe, make sure not to violently rotate and pull the connector, but plug out the plug by the way as shown in the following diagram.



V. Bluetooth printing function

The instrument has built-in Bluetooth communication module, which can be connected to Bluetooth printer to print measurement data. Turn the DIP switch on the side of the Bluetooth printer to [ON], and long press the power button to turn it on. Short press Print, the printer icon will be displayed on the screen, and the [BLUETOOTH] blue indicator on the printer will be on continuously indicating successful connection and the printer will print the current measurement results. If the device is connected to the mobile APP, it will prompt whether to disconnect the APP connection. Select [Yes] to disconnect the APP and connect the printer.

Note: The instrument can only be connected with the Bluetooth printer provided by the manufacturer, other brands of printers are not guaranteed to be connected successfully.

VI. APP function

1. APP installation

APP supports Android operating system 7.0 and above, choose one of the following methods to install:

(1) Use a mobile browser or WeChat to scan the QR code on the cover, follow the prompts to download and install the APP.

(2) Search for "UT and HL" from the Google Play application market, download and install the APP as prompted.



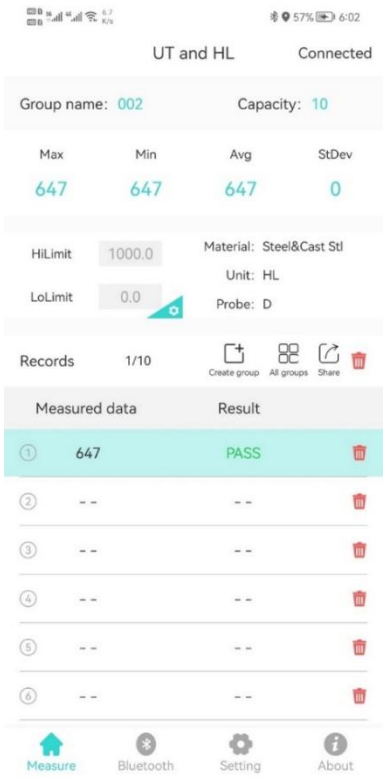
APP icon

Precautions:

During installation or after installation for the first time open the APP, mobile phone will prompt permissions Settings, the customer should be all set to allow, can appear otherwise APP can't search to the device, will not be able to use the APP.

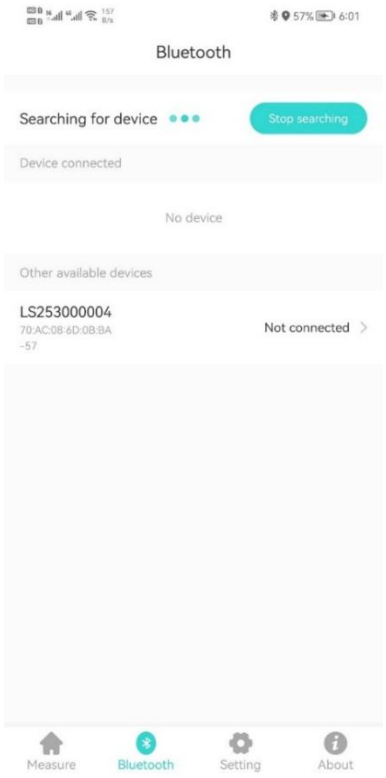
2. Device Connection

Start the instrument, open the APP software, the LOGO interface will be displayed first. After the LOGO is displayed for 3 seconds, the Bluetooth interface is entered if there is no bound Bluetooth device. Click "Start searching", the prompt " searching for device..." , and list the available Bluetooth devices found. Click the "Stop searching" button to stop searching for Bluetooth devices. Click the device that matches the SN of the instrument and wait for the device to connect. After the connection is successful, it will jump to the "Measure" interface. If the instrument is connected to the Bluetooth printer, it will prompt whether to disconnect the printer, select [Yes] to disconnect the printer and connect the APP.



Bluetooth interface

If the APP already has a bound Bluetooth device, the logo interface will stay for 3 seconds and automatically search for and connect the bound Bluetooth device. After successful connection, the app will automatically enter the "Measurement" interface.



Measurement interface

3. Measuring interface

(1) Bluetooth connection status

The APP is connected successfully, the upper right corner of the interface shows "Connected", and the APP is disconnected, showing "Not connected". When not connected, tap it, and the APP will automatically reconnect the bound device.

(2) Data group modification operations

Click the data group name, the interface pops up, you can modify the name. Click the quantity area to modify the amount of test data in the data group.

(3) Statistical information

The statistical information area displays the max. value, min. value, average value and standard deviation of the measured data.

(4) Upper and lower limit setting

Set the upper and lower limits, which are used to judge whether the measured value is qualified.

(5) Instrument information

Display instrument setup material, unit, connected probe type.

(6) Create groups

Click Create Groups icon to automatically save the previous group and generate a new group.

(7) All groups

Click All Groups icon to select a set of data for open and delete operations.

(8) Share

Click the Share icon, enter the file name first, choose one of the four file formats of PDF, PNG, CSV and TXT, and then share the file with your friends through QQ, WeChat, etc.

(9) Delete

Click the Delete icon and ask "Clear all historical records?", select “Cancel” to return, and select “OK” to delete all measured values. You can also delete a single record in the measurement list.

(10) Measurement records

Displays the total number of current groups and the number measured.

4. APP measurement

Every time the instrument measures, the measured value will be automatically uploaded to the APP, and the APP will display the measured value in the form of a list on the measurement interface and judge whether it is qualified or not.

5. Set up

Set the APP measuring sound, alarm sound and testing vibration, vibration alarm.

VII. Attentions

1. The surface of the test object shall not be too rough， and it needs to be flat, smooth, free of oil and grease, transmitting a metallic luster.
2. The minimum mass of the test object is 5Kg, and the minimum thickness is 25mm. For objects whose weight and thickness do not meet the requirements, the test must be coupled with solid bracing.
3. The maintenance of the impact device. After using the device about 1000-2000 times, the user needs to use a nylon brush to clean the instrument's conduit and impact body. When cleaning, the user needs to unscrew the support ring of the catheter first, then remove the impact body, insert the nylon brush into the catheter in a counterclockwise direction, then pull out the bottom and repeat five times, and finally put the impact body and support ring.
4. After use, the impact body should be loosened.

5. The use of various lubricants is strictly prohibited in the impact device.
6. When measuring, the distance between any two indentations should not be less than 3mm, and the distance between the center of the indentation and the edge of the object to be measured should not be less than 5mm.
7. When the device displays “Low Battery”, batteries should be replaced.

VIII. Packing list

No.	Product Name	Quantity	Unit
1	Leeb Hardness Tester Host	1	Set
2	Leeb Hardness Tester Probe	According to the numbers of probe ordered	
3	Bluetooth Printer	According to the numbers of printer ordered	
4	Standard Leeb Hardness Block	1	pcs
5	Nylon Brush	1	pcs
6	Small Support Ring	1	pcs
7	User Manual	1	pcs
8	Calibration Report	1	pcs
9	Plastic Case	1	pcs

IX. Service

1. The gauge has one-year warranty. If the gauge works abnormally, please send the whole gauge to our company for maintenance.
2. Provide users with spare parts and lifelong maintenance services.
3. Provide the users with the gauge calibration service.
4. Free technical support for the long term.