AMT212 Leeb Hardness Tester

Instruction Manaul

AMTAST USA INC

Contents

1 General description

1.1 Features

- Color display (320×240 TFT) with adjustable backlight
- Converts to all common hardness scales (HV ,HB,HRC,HRB,HRA,HS), and real time display HL value.
- Probe plug and test. Support hot plug, the probe can be set automatically and automatic recognition function.
- Built in high capacity rechargeable lithium battery and charging control circuit. Continuous working period of no less than 150 hours.
- Instrument with automatic sleep, automatic shutdown and other power saving features.
- Menu operating, the operation is easy and convenient.
- With USB interface can be convenient, fast data exchange and parameter settings.
- Equipped with 7 types of impact devices which need not to be recalibrated when changing them, the system can identify the type of impact device automatically.
- Max 500 groups（impact times:32～1）of data can be stored at internal non volatile data storage.
- Upper and lower limit of hardness can be preset; When the tested value exceeds the limits, alarm will send out automatically to make convenient for the requirements of batch measurements.
- Test values software calibration function.
- Material of “cast steel” is added; HB values can be read out directly when D/DC impact device is used to measure “cast steel” work piece.
- Thermal printer integrated, convenient for in field printing.
- Software of PC can be installed according to the requirements of user, the function will be more powerful to satisfy the more strict demands of quality control and management.

1.2 Main Application and Testing Range

1.2.1 Main Application

- The assembled machinery and permanently installed parts
- Die cavity of molds
- Heavy work piece
- Failure analysis of pressure vessel, steam turbo-generator set and other equipment

- Narrow testing space where work piece installed
- Bearings and other parts
- Cases which require the test result with normalized original recording
- Material identification of the metal material warehouse
- Quick tests of large range and multipoint measuring positions for heavy workpiece

1.2.2 Testing Range

Testing range see table 1 and table 2.

Table 1

Material	Hardness method	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	32.2～99.5	33.3～99.3	31.8～102.1		35.8～102.6	30.6～96.8
Hammered steel	HB	143~650					
Cold work tool steel	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					

Table 1

Material	Hardness method	Impact device					
		D/DC	D+15	C	G	E	DL
Gray cast iron	HRC						
	HB	93～334			92～326		
	HV						
Nodular cast iron	HRC						
	HB	131～387			127～364		
	HV						
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 alloys)	HB	40～173					
	HRB	13.5～95.3					
Bronze (copper-aluminum/copper-tin alloys)	HB	60～290					
Wrought copper alloys	HB	45～315					

Table 2

No.	Material	HLD	Strength σ_b(MPa)
1	Mild steel	350～522	374～780
2	High-carbon steel	500～710	737～1670
3	Cr steel	500～730	707～1829
4	Cr-V steel	500～750	704～1980
5	Cr-Ni steel	500～750	763～2007
6	Cr-Mo steel	500～738	721～1875
7	Cr-Ni-Mo steel	540～738	844～1933
8	Cr-Mn-Si steel	500～750	755～1993
9	Super strength steel	630～800	1180～2652
10	Stainless steel	500～710	703～1676

1.3 Types and specification

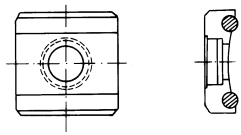
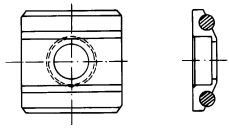
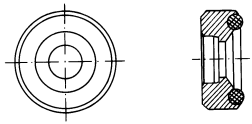
	No.			Remarks
Standard Delivery	1	Main unit	1	
	2	D type impact device	1	
	3	Small supporting ring	1	
	4	Nylon brush (A)	1	
	5	High value Leeb test block	1	
	6	Battery Charger	1	9V 1000mA
	7	Paper for printing	1	
	8	Communication cable	1	
	9	DataView Software	1	
Additional Optional Delivery	1	Nylon brush （II）		In case of choosing G type impact device
	2	Various non-conventional type of impact devices		See table 3
	3	Various non-conventional type of impact supporting ring		See table 4
	4			

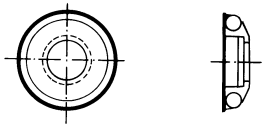
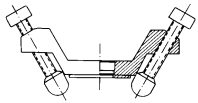
Table 3

Non conventional impact devices	DC(D)/DL	D+15	C	G	E
Impacting energy	11Mj	11mJ	2.7mJ	90mJ	11mJ
Mass of impact body	5.5g/7.2g	7.8g	3.0g	20.0g	5.5g
Test tip Hardness	1600HV	1600HV	1600HV	1600HV	5000HV
Diameter of test tip	3mm	3mm	3mm	5mm	3mm
Material of test tip	Tungsten carbide	Tungsten carbide	Tungsten carbide	Tungsten carbide	synthetic diamond
Impact device Diameter	20mm	20mm	20mm	30mm	20mm
Impact device Length	86(147)/ 75mm	162mm	141mm	254mm	155mm
Impact device Weight	50g	80g	75g	250g	80g
Max. hardness of workpiece	940HV	940HV	1000HV	650HB	1200HV

Mean roughness of workpiece surface of the Ra		1.6 μ m	1.6 μ m	0.4 μ m	6.3 μ m	1.6 μ m
Min. weight of sample Measure directly Need support firmly Need coupling tightly		 >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
Min. thickness of sample coupling tightly Min.layer thickness for surface harden		5mm ⩾0.8mm	5mm ⩾0.8mm	1mm ⩾0.2mm	10mm ⩾1.2mm	5mm ⩾0.8mm
Size of tip indentation						
Hardness 300HV	Indentation diameter	0.54mm	0.54mm	0.38mm	1.03mm	0.54mm
	Indentation depth	24 μ m	24 μ m	12 μ m	53 μ m	24 μ m
Hardness 600HV	Indentation diameter	0.54mm	0.54mm	0.32mm	0.90mm	0.54mm
	Indentation depth	17 μ m	17 μ m	8 μ m	41 μ m	17 μ m
Hardness 800HV	Indentation diameter	0.35mm	0.35mm	0.35mm	--	0.35mm
	Indentation depth	10 μ m	10 μ m	7 μ m	--	10 μ m
Available type of impact device		**D:** General test **DC:** Hole or hollow-cylindrical test **DL:** Slender narrow groove or hole test	**D+15:** groove or reentrant surface	**C:** small, light, thin parts or surface of hardend layer	**G:** large, thick, heavy or rough surface steel	**E:** super high hardness material

Table 4

No.	Code	Type	Sketch of non conventional supporting ring	Remarks
1	03-03.7	Z10-15		For testing cylindrical outside surface R10～R15
2	03-03.8	Z14.5-30		For testing cylindrical outside surface R14.5～R30
3	03-03.9	Z25-50		For testing cylindrical outside surface R25～R50
4	03-03.10	HZ11-13		For testing cylindrical inside surface R11～R13
5	03-03.11	HZ12.5-17		For testing cylindrical inside surface R12.5～R17
6	03-03.12	HZ16.5-30		For testing cylindrical inside surface R16.5～R30
7	03-03.13	K10-15		For testing spherical outside surface SR10～SR15
8	03-03.14	K14.5-30		For testing spherical outside surface SR14.5～SR30

9	03-03.15	HK11-13		For testing spherical inside surface SR11～SR13
10	03-03.16	HK12.5-17		For testing spherical inside surface SR12.5～SR17
11	03-03.17	HK16.5-30		For testing spherical inside surface SR16.5～SR30
12	03-03.18	UN		For testing cylindrical outside surface, radius adjustable R10～∞

1.4 Operating conditions:

Ambient temperature: -10℃～40℃

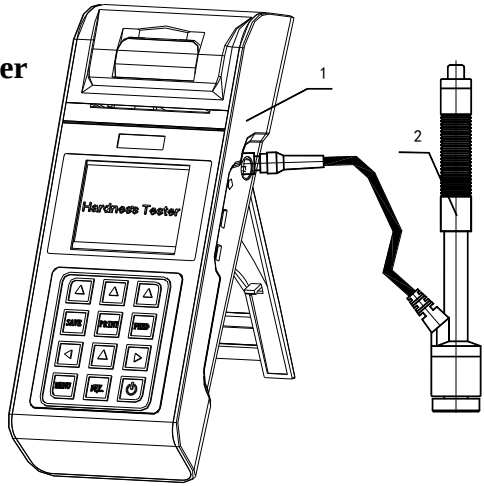
Relative humidity: ≤90%

No vibration, no strong magnetic field and no corrosive medium and heavy dust in ambient environment.

2 Structure features and Testing principle

2.1 Structure features

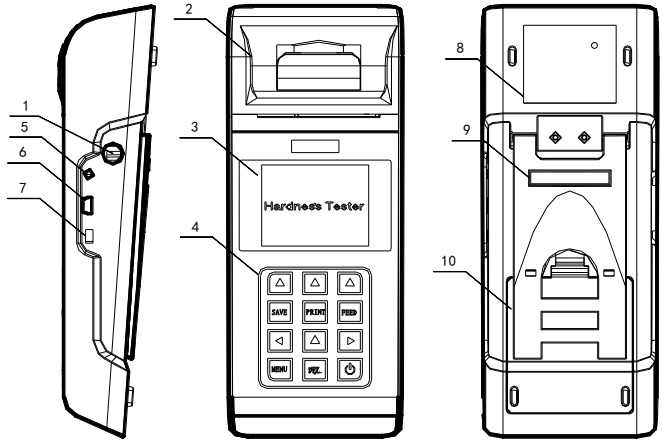
2.1.1 Hardness Tester



1: Main unit

2: Impact device

2.1.2 **Main unit**



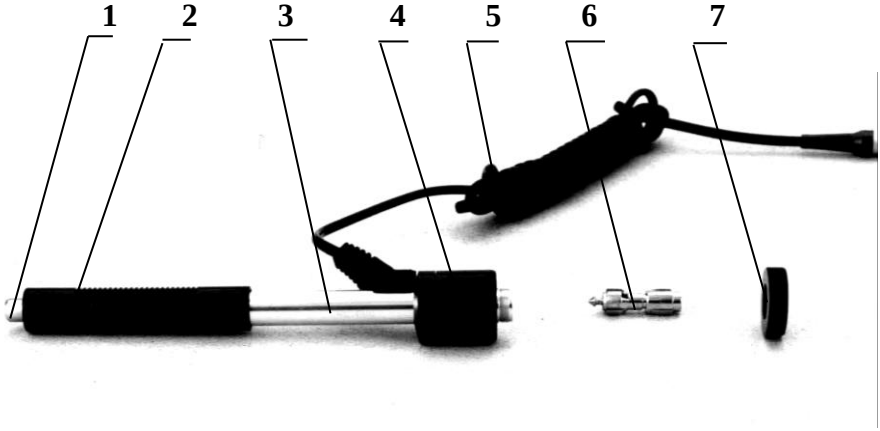
1: Socket of impact device 2: Paper compartment cover

3: TFT display 4: Keypad 5: Power jack

6: Socket of USB 7 Battery switch 8 Product label

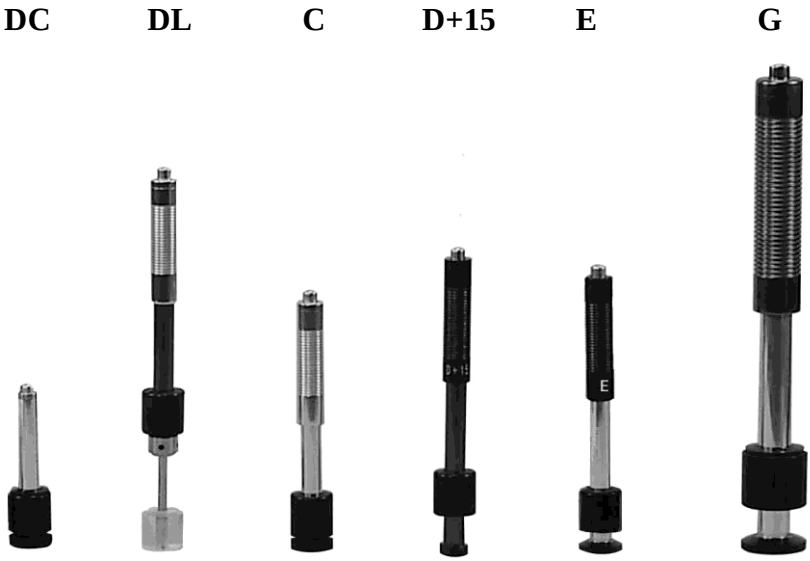
9 Serial Number 10.Battery compartment cover

2.1.3 D type impact device



1: Release button 2: Loading sheath 3: Guide tube 4: Coil part
5: Connection cable 6: Impact body 7: Support ring

2.1.4 Non conventional types of impact devices



2.2 Testing principle

Let a impact body whose weight is definite rush into the surface of sample, the hardness value comes from the rate of rebound velocity and rush velocity at 1mm distance from testing surface. The calculation formula is following:

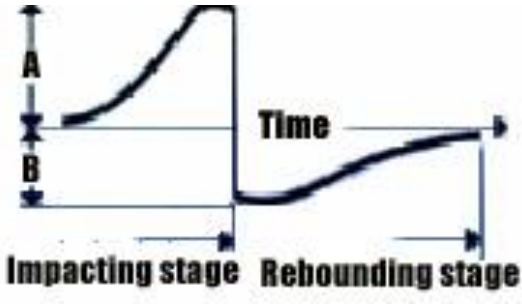
$$HL=1000\times VB/\ VA$$

In which: HL——Leeb hardness value

VB——Rebounding velocity of the impact body

VA——Impacting velocity of the impact body

Output signal diagram of the impact device is as following.



3 Technical capabilities

3.1 Specifications

- Measuring range: HLD (170-960)，HRC (17.9-69.5)，HB (19-683)， HV (80-1042)，HS (30.6-102.6)，HRA(59.1-88)，HRB (13.5-101.7)
- Measuring direction: 360°
- Hardness scale: HL, HB, HRB, HRC, HRA, HV, HS
- Display: TFT, 320×240 matrix
- Printing paper: width is （57.5±0.5）mm, diameter is 30mm
- Data memory: 500 groups （impact times: 32～1）
- Range of upper and lower limit: the same as measuring range
- Working Battery : 7.4V LithiumIon
- Battery charger: 9V/1000mA
- Full Charger power time:3～5 hour.
- Continuous working period: approx. 150 h
- Communication interface: USB
- Accuracy and repeatability of displayed value, see table 5.

3.2 Dimension size and weight

3.2.1 Dimension 209×85×45㎜ (main unit)

3.2.2 Weight approx. 0.6kg (main unit);

Table 5

No.	Type of impact device	hardness value of standard Leeb hardness block	Error of displayed value	Repeatability of displayed value
1	D	760±30HLD	±6 HLD	6 HLD
2	DC			
3	DL			
4	D+15			
5	G			
6	E			
7	C			

4 Testing

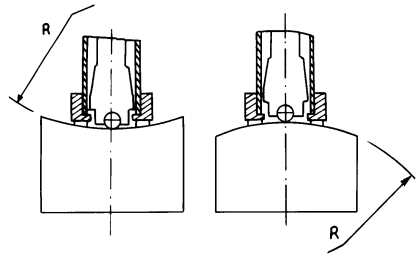
4.1 Preparation and Inspection prior to testing

4.1.1 The preparation of workpiece surface

The preparation for workpiece surface should comply with the relevant requirements specified in table 3

- During the preparation for sample, the affect to surface hardness of sample caused by overheating, cold processing and etc. should be avoided as far as possible.
- If the surface to be tested is too rough, measuring error will appear. So the surface of the sample must have metallic luster and the surface must be flat, smooth and have no oil dirt.
- Curved surface: it is better that the testing surface of workpiece is plane. When the curvature radius R of the curved surface to be tested is less

than 30mm (for D, DC, D + 15, C, E and DL type impact device) and less than 50mm (for G type impact device), a small support ring or non conventional support ring should be used.



- workpiece supporting
  —— Support is not necessary for heavy test workpiece
  —— The workpiece with medium weight must be placed on flat and solid plane, and it must be placed stably without any shaking.
- Enough thickness of workpiece is necessary, and the min. thickness should comply with the specification in table 3.
- As for test piece with hardened surface layer, the depth of hardened layer should comply with table 3.
- Coupling
  ——The workpiece with lightweight must be firmly coupled with the support; both coupled surface must be flat, smooth and the coupling agent should not be too much. The measuring direction must be vertical to the coupled surface.
  ——When the workpiece is a large area plate, long rod or bending piece, it can be deformed and become unstable even the weight and the thickness is heavy and the test value may not be accurate. So it should be reinforced or supported at the back of the workpiece.
- Self magnetism of workpiece should be less than 30 Gauss.

4.1.2 System setting of tester

Specific procedures for setting, refers to 6.9.

4.1.3 Measuring condition setting of tester

Specific procedures for setting, refers to 6.5.

4.2 Testing

- A standard hardness block should be used to check the the tester prior to the testing; and the reading value error and repeatability should not be more than the specification in table 5.

Note: the hardness value of standard hardness test block can be measured via a Leeb hardness tester which had been calibrated; five times of measuring should be carried out in direction of vertical down and the arithmetic mean of five values should be used as the hardness value of standard hardness test block. If the value exceeds the standard range, it can be calibrated via user calibration function.

4.2.1 Start-up

- Insert the impact device plug into the socket of impact device located on the right of the tester.
- Press 【 ⏻ 】 key to turn on the power, then the tester enters into the measuring status.

4.2.2 Loading

- Push down the loading sheath to lock the impact body; for DC type impact device, the loading bar can be attracted on testing surface and insert DC type impact device into loading bar until the stop position, then loading has been finished.
- Press tightly the support ring of impact device on the surface of test sample, the direction of impact should be vertical with testing surface.



4.2.3 Testing

- Press down the release button on the top of the impact device to make a test. At this point, the test sample, impact device and the operator are all required to be stable; and the force direction should comply with the axis of the impact device.
- Five measurements should be carried out per measuring position of test sample. The divergence of data should be not exceeds ±15HL of mean value.
- Distance between any two indentations, or the distance between any indentation center and the edge of test sample should be in accordance with the specification of table 6.
- For any special material, a comparative test must be performed to obtain relevant conversion relation if Leeb hardness value accurately conversing to other type of hardness value is required. Procedures are as following: tests are made on the same test sample via Leeb hardness tester which recalibrated well and relevant hardness meter respectively; for each hardness value, five points which uniformly distributed around hardness indentation should be chosen to make tests, and tests for three (at least) indentations should be made; the mean value of Leeb hardness and the mean value of relevant hardness will be act as relevant values respectively to make a comparative hardness curve. Three groups corresponding data should be included at least in comparative curve.

Table 6

Type of impact device	**The distance of two indentations center**	**The distance between indentation center and edge of test piece**
	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

4.2.4 Read measured value

4.2.5 Print out result

For specific setting method, see 6.3.3 and 6.6.

4.2.6 Press 【 ⏻ 】 key to turn off

4.2.7 The processing of testing results

The mean value of five valid testing points can be served as a testing data of Leeb hardness.

4.2.8 The express of testing results

- Hardness value will be displayed ahead of HL (the symbol of Leeb Hardness), and type of impact device will be displayed back of HL. For example, 700HLD expresses that the Leeb hardness is 700 by means of the measurement made by D type impact device.
- For other type hardness which changed from Leeb Hardness value, corresponding hardness symbol should be added ahead of Leeb hardness symbol. For example, 400HVHLD expresses that the Vickers hardness value is 400, which changed from Leeb hardness value measured by D type impact device.

  Note: HL values which measured by various impact devices are various. For example: 700HLD≠700HLC.

5 Special prompts

- Replacing impact device must be performed under the condition of turn off, otherwise the impact device type can not be identified automatically, and even it is possible to cause the damage of circuit board of the tester.
- In normal condition, the current measured value can be printed or stored if the 【Impact times】 value which had been set is not satisfy. If the printing and storing are required at this point, 【Average】 key can be press down to finish measurement, then printing can be carried out.
- The functions of 【Auto Save】, 【Auto Print】, and 【Auto Trans.】 will be inactive in case of pressing down 【Average】 key to finish measurement in advance.
- Only D and DC type impact device have strength measuring function so that 【Hard/σ_b】 setting can not be changed if other type impact devices are used; if the setting has been changed into 【σ_b】 via D/DC type impact device, the 【Hard/σ_b】 setting will be changed into 【Hard】 when other impact devices had been installed instead of D/DC type impact device.
- When 【σ_b】 has been set, hardness scale will not been set (cursor will skip off 【Hardness Scale】).
- Not all materials can be changed into every hardness scale, hardness scale will return to Leed hardness (HL) automatically after material has been changed. So 【Material】 will be set firstly when setting measurement parameters, and 【Hardness Scale】 should be set subsequently.

6 Detail Testing procedures

6.1 Start-up

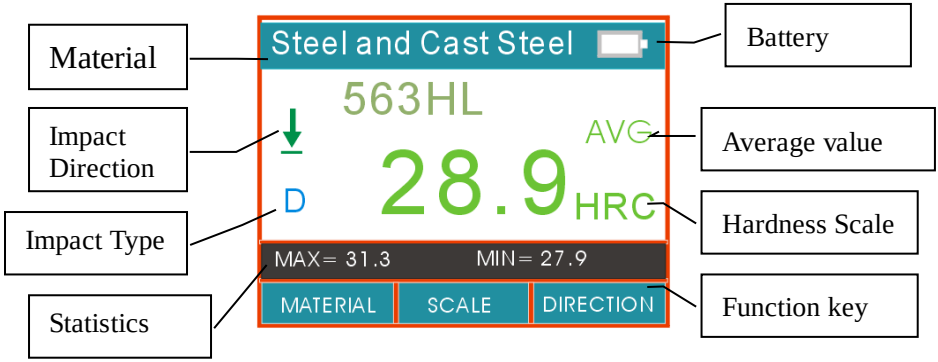
Press 【 ⏻ 】 key to turn on the tester, The screen will display the relevant information into the measurement state.

6.2 Turn On or turn off

Tester can be turn on or trun off by press 【 ⏻ 】 key in any display status.

6.3 Testing

The tester will enter the main display interface after turn on, as the following figure.



The measured values are displayed with big font in this interface, and multiple shortcut key operation functions supplied.

6.3.1 Explanation of the main display interface

Battery information: displaying rest capacity when no charging, and displaying charging degree when charging.

Impact direction: current impact direction.

Average value indicator: average value will be displayed when impact times setting has been achieved.

Hardness scale: the hardness scale of current measuring value.

Measured value: current single measured value (without average value indicator), current average value (with average value indicator). It expresses the value is more than conversion or measuring range when ↑ is displayed; and it expresses the value is lower than conversion or measuring range when ↓ is displayed.

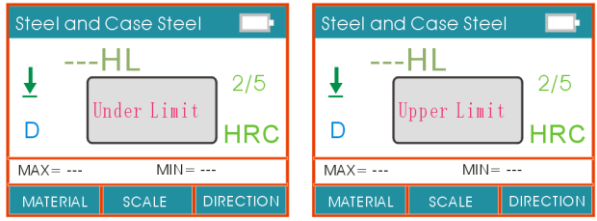
Material: material that has been set currently.

Impact times: impact times that has been finished will be displayed when measuring; Impact times that has been set will be displayed when impact

times is been set by shortcut key, and the times which corresponding to single measured value will be displayed when viewing single measured value.

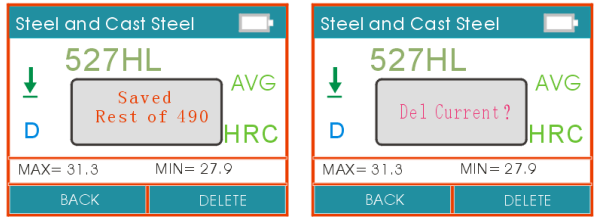
6.3.2 Testing procedures

Testing can be carried out under this interface status, and the current measured value will be displayed whenever one measurement is finished. The counting of impact times will add 1 per measurement is performed. The buzzer will send out a long sound provided that the value exceeds tolerance limit; and if the impact times which has been set is achieved. After 2 seconds waiting, average value will be displayed.

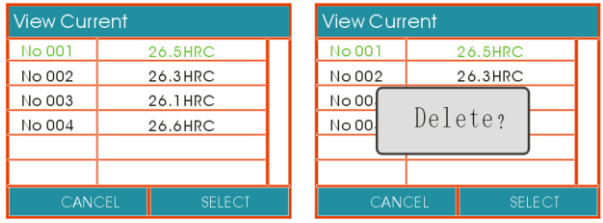


6.3.3 Key operation

- Press 【SAVE】 key to save current group data. The key can only be active after average value has been displayed; furthermore the save can be done only once.



- Press 【DEL】 key , the latest single measured value can be deleted.
- Press 【FEED】key, the printer feed.
- Press 【PRINT】key , print the current data, only in the average value before printing, can repeated printing
- Single measured value can be viewed by press 【↑】key,



- Press 【MENU】 key to enter main menu interface.

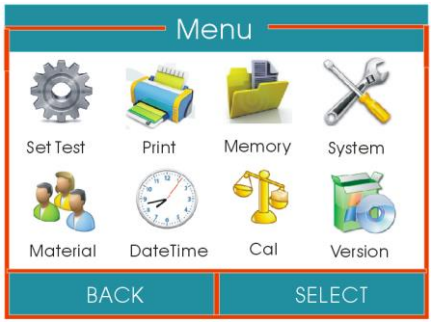
Shortcut key setting:

- Impact direction setting can be changed by press 【DIRECTION】 function key.
- Hardness scale setting can be changed by press 【SCALE】function key. Whenever press the key once, a circulating conversion among all hardness scales that available to current material and impact device will be performed. The hardness scale will be changed into Leeb hardness if the current setting is strength measurement.
- Material setting can be changed by press【MATERIAL】key. Whenever press the key once, the circulating conversion among all material setting will be performed, and hardness scale will be changed into Leeb hardness, therefore, material should be set firstly when measuring, then hardness scale should be set.

  Note: what is called "conversion" refers to the corresponding relationship of Leeb Hardness and other hardness for a certain material, which established on basis of abundant tests. According to the conversion relationship, the Leeb hardness value which measured will be changed into other hardness scale value automatically via calculating by hardness tester.

6.4 Menu structure diagram

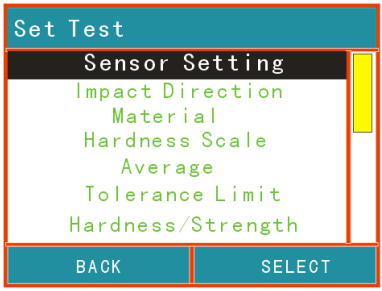
The parameter setting and additional function of equipment can both realized by menu operating. At the main display interface, pressing 【MENU】 key to enter the main menu.



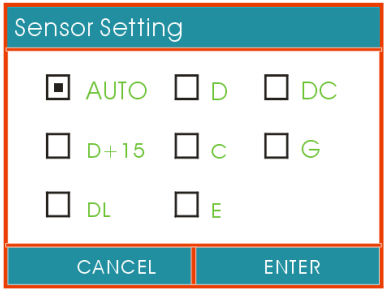
Main display

- Test Set
  - Sensor Setting
  - Impact direction
  - Material
  - Hardness scale
  - Average
  - Tolerance limit
  - Hardness/Strength
- Print Function
  - Print current
  - Print history
  - Print From Group
- Memory Manage
  - View All
  - View from group
  - Delete All
- System Set
  - Auto save: off
  - Auto print: off
  - Key sound: on
  - Warning sound: on
  - LCD Backlight: 80%
  - Display Standby: 60 Sec
  - Auto Poweroff: 5Min
  - Language English
  - Display HL ON
  - Del Max Error OFF
  - Load Default
- Material
- Date Time
- CAL
  - Sensor Type ： D
  - Times 5 No:1 ---HL
  - Real Value
- Version

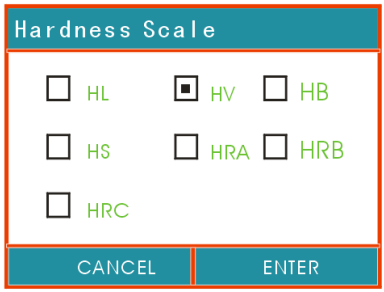
6.5 Measuring condition setting



6.5.1 Impact sensor setting



6.5.2 Hardness scale setting



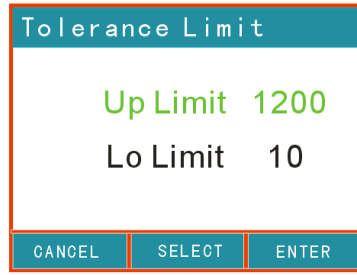
Note:

1. For the current selected impact device and material, only the hardness scale which can be conversed will be displayed; hardness which can be conversed will not be displayed.

2. Material should be chosen prior to the hardness scale.

3. After the material setting had been changed, hardness scale setting will return to HL.

6.5.3 Tolerance limit setting



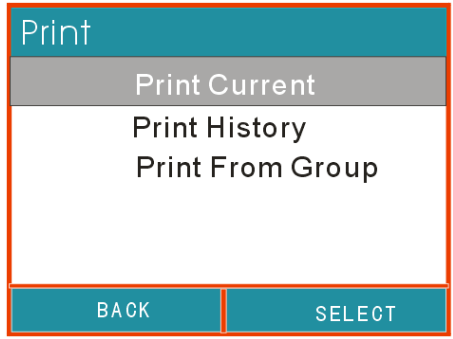
Note: 1. If the setting exceeds the measuring range, the tester will ask operator to reset.

2. Exchanging will be done automatically if the Min. tolerance limit is more than Max. tolerance limit.

6.5.4 Hardness/ σ_b setting

Note: Only D/DC type impact device is provided with the function of strength measuring. Therefore, the item can only be set to 【Hard】 if the impact device is not D or DC type.

6.6 Print function



6.6.1 Printing current value

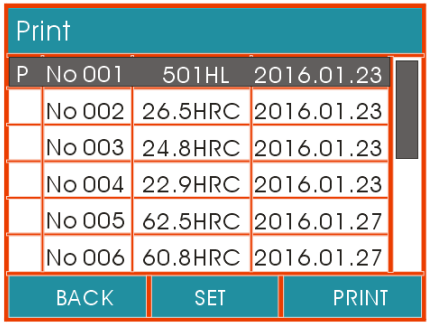
Note: Information about serial number and operator should be filled by manual.

```
        Portable
    Hardness Tester
----------------------
No.:

Operator:

Time:13:40:46
Date:08/28/2015
----------------------
Probe Type:  D
Impact direc.:+90 Deg
Mean Times:05
Material:Matl of Roller
----------------------
  51.4 50.9 51.5 51.6
  51.7
Average= 51.4HSD
----------------------
```

6.6.2 Print History

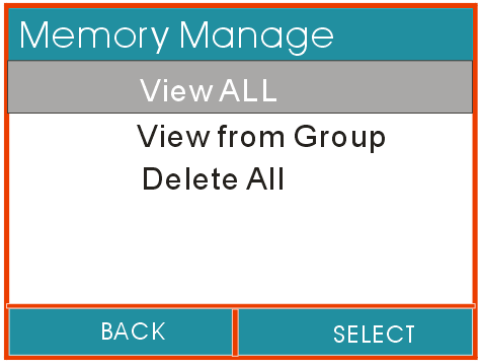


Press 【↑】【↓】key move cursor.
Press 【←】【→】key pageup and pagedown.
Press 【SET】key mark record. Can multiple choice.

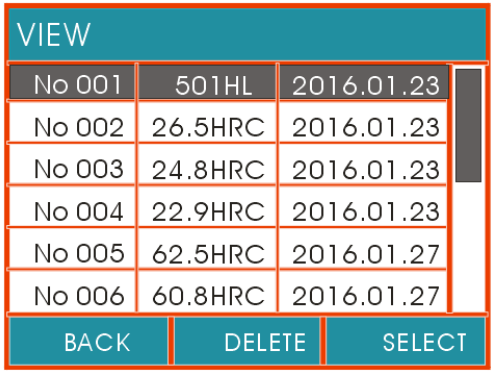
Note:

- ***Printing function is unavailable while charging.***
- ***Do not open the cover of the paper compartment during printing. Otherwise the instrument may not print normally.***
- ***Printing with paper that has been stored for over long period of time or of poor quality may reduce the print quality or even damage the printer.***

6.7 Memory manager

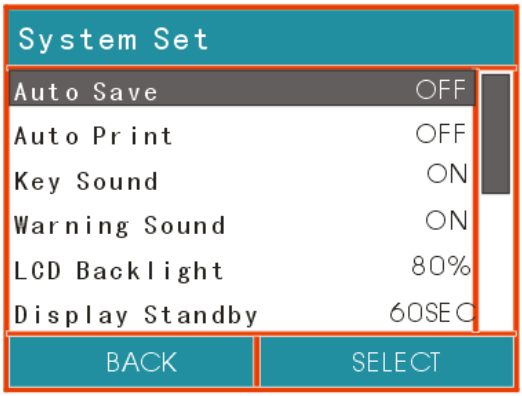


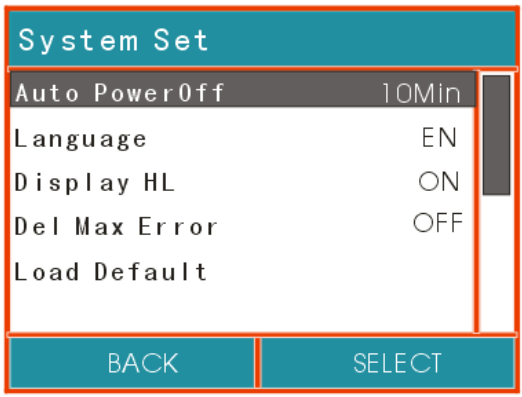
6.7.1 Viewing all



Press 【↑】【↓】key move cursor.
Press 【←】【→】key pageup and pagedown

6.8 System Set



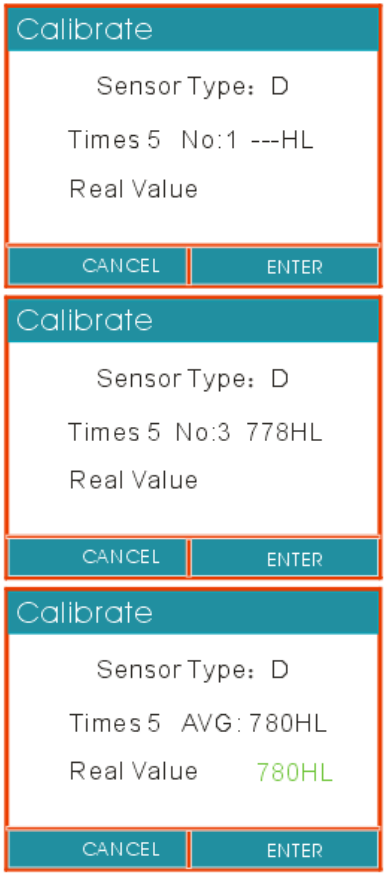


6.9 About software

The interface display instruments and embedded software information.

The software version number and embedded software identification may change with the software upgrade, we no longer notice.

6.10 Software calibration



The tester and impact device must be calibrated with a standard Leeb hardness test block prior to the first use, or reusing after a long term idle.

One time calibration is enough for each type of impact device which equipped with a main unit; recalibration is not necessary after the replacement of impact device later.

Five points should be measured vertically down on the Leeb hardness test block.

Average value will be showed after measuring.

Press【↑】【↓】key to input real value.

Press 【ENTER】 Key to finish calibration.

Press 【CANCEL】 key to cancel calibration.

Calibration range is ±50HL.

6.12 Turn off the power automatically

- Auto turn off function is supplied to save the energy of battery.
- If neither measurement nor any key operation is performed within 5 minutes, the tester will turn off automatically.
- In case of too low battery voltage, "  " will be displayed and turn off automatically.

6.13 Battery Charge

When the battery capacity runs out,Battery symbol will flash  . At this point, we need to recharge the battery.

The instrument uses a 7.4V LithiumIon battery pack as its power source. When the battery pack almost runs out, the battery symbol on the display will glint  . It needs charging as soon as possible. Try to drain your battery pack as fully as possible before it is charged for longest battery service.

- Plug the power adapter into the mains supply power socket and then plug the charger connector into the power jack of the instrument. If the instrument is in power off condition, it will turns on automatically after the charger plug is inserted into the power jack. The battery symbol will alternately shows between  and  when charging. The more of the dark part indicates the more close to full capacity.
- When the battery is fully charged, the battery symbol on the display will glint  .
- Please use the configured AC-DC adapter to charge the battery pack.

Warning: When the battery pack is being charged, printing or paper feeding is unavailable.

6.14 Battery Replacement

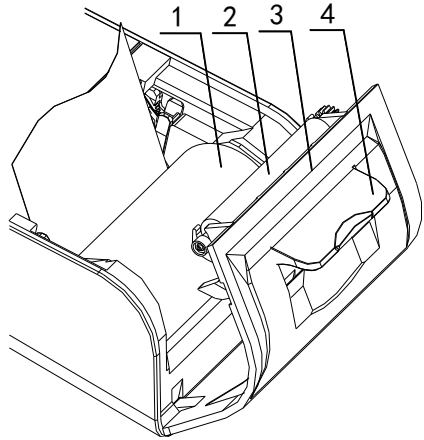
When the battery pack fails to be charged, the user should replace the batteries following the program below:

- Power down the instrument.
- Take off the battery compartment cover and take out the battery pack.
- Insert the connection plug of the new battery pack into the socket on the circuit board.
- Reset the battery cover.
- Turn on the instrument to check.

Warning: Please pay much attention to the polarity of the battery during battery replacement

6.15 Paper Loading

- Instrument designed a dedicated mechanism for opening the paper compartment cover. Pull this mechanism with the fingers, you can easily open the paper compartment cover.
- According to the illustration, put the paper into the paper compartment with attention to the paper direction. If the paper is misplaced, the instrument will fail to print.
- Pull a trip of paper out of the compartment.
- Make sure that the paper is well in place and close the paper compartment cover.



1.Paper 2.Paper Roller 3 Paper Compartment Cover
4 mechanism of Open the Cover

6.16 The connection of data communication cable

Insert one connection plug of the transmission cable into the USB socket on the right side of main unit, and insert the another plug into the USB port on the back of computer box. Refer to the manual of the DataPro software for detailed information.

7 Trouble shooting

Failure	Cause	Solution
Failure in starting	Battery empty	Replace battery
No **measuring value**	Probe cable open circuit	Replace Probe cable
Value is inaccurate	Calibration data lose	over again Calibration
Charge failure	Battery failure	Replace the battery with a new pack

8 Maintenance

8.1 Impact device

- After using the impact device for 1000-2000 times, use the nylon brush provided to clean the guide tube and the impact body of the impact device. To clean the guide tube, unscrew the support ring and then take out the impact body, spiral the nylon brush in the counter-clock direction into the guide tube. When the brush reaches the bottom, draw it out. Repeat this action for 5 times and mount the impact body and the support ring.
- Remember to release the impact body after use.
- Any lubricating agent is absolutely banned to use inside the impact device.

8.2 Standard maintenance procedures

- If the error is > 2HRC when using standard Rockwell hardness block to test, maybe the test tip is disabled. Changing the test tip or impact body should be considered.
- If other abnormal phenomena occur, user should not disassemble or adjust any part which used for fixing. You can return the hardness tester to the service department of our company.

9. Notice of Transportation and Storage.

The tester should be stored in room temperature, away from vibration, strong magnetic field, corrosive medium, dampness and dust.

10. Non-warranty part

1 Sheath of Main Unit 2 Panel 3 Impact body
4 Support ring 5 Probe cable 6. Battery.

Warranty Card	
Products Type:	Leeb Hardness Tester
Main unit No:	
Impact device No:	
Service phone code	
Consumer information	
Purchasing date:	
Corporation name	
Corporation address	
Consumer name	
Consumer phone code	
Malfunction description:	

Qualified Certificate

Products Name:: Leeb Hardness Tester

Products Type:_____

Main unit No:_____

Impact device No:_____

The product accords with the technical criteria and is allowed to sell.

Quality Check Engineer:_____

Inspection date:_____

Leeb Hardness Tester
Packing List

No	Appellation	Num	
1	Main unit	1	
2	D type impact device	1	
3	Small supporting ring	1	
4	Nylon brush (A)	1	
5	High value Leeb test block	1	
6	Instruction Manual	1	
7	Battery Charger	1	
8	Paper for printing	1	
9	Communication cable	1	
10	Box Of instrument	1	
11			
12			
13			
14			
15			
16			
17			

Release date_____