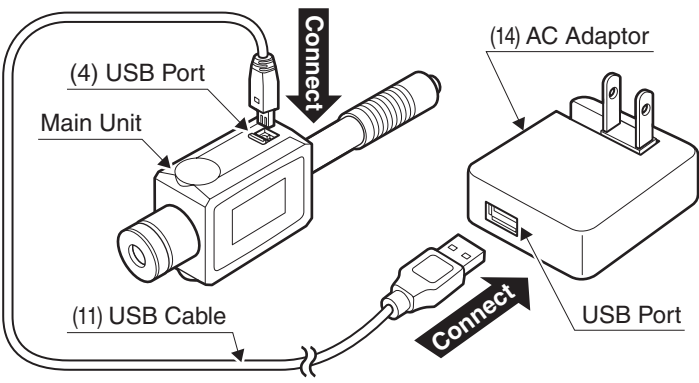


Charging the Main Unit

The Main Unit has a battery inside. Please re-charge the battery when the remaining level has become lower than 20% in accordance with the following procedure:

- ①Connect the accessory USB cable. Please insert the accessory USB cable into the USB port of the Main Unit and the adaptor.
- ②Connect the AC adaptor to the power receptacle. Connect the AC adaptor plug to a home power receptacle (AC 100 V).



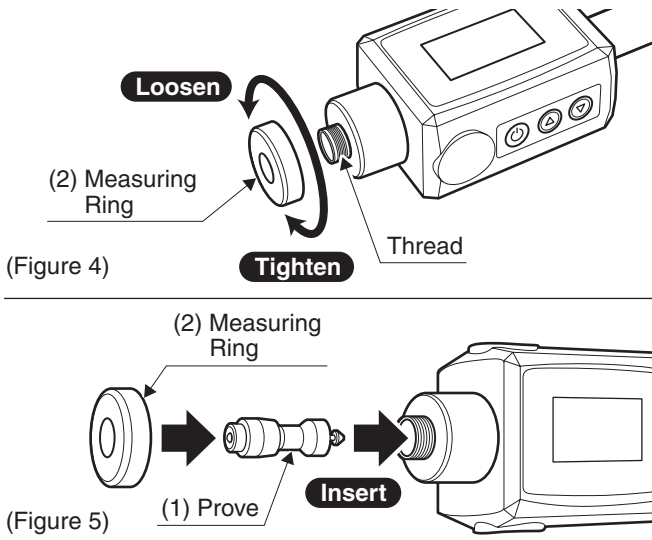
Output the measured data

The measured data can be output to a PC. Install the software in your PC to use in accordance with the attached “How to Use the Accessory Software”

Changing Measuring Ring, Cleaning inside Main Unit

The Measuring Ring can be changed to a Ring (S) to fit the object of measurement. If the Measuring Ring is removed, the inside of the unit can be cleaned. Please periodically clean it.

- ①Press the measuring button. Release the caught up Prove.
- ②Remove the measuring ring from Main Unit, and take out the Prove. The measuring ring can be removed by turning. (Figure 4) Please take out the Prove from inside.
- ③Clean the Main Unit. Please use the accessory cleaning brush to clean inside the Main Unit. Please clean the Prove as well, eliminate the dust from the Prove.
- ④Return the Prove, attach the Measuring Ring to the Main Unit. Insert the Prove in the Main Unit in the direction in (Fig. 5). Attach the Measuring Ring (S) on the thread of Main Unit.



List of Measuring Range with regard to Material and Unit / Specifications of Main Unit

Material of Measured Specimen	Unit	HL	HRC	HRB	HB	HS	HV
1. ST. & CAST ST.		300 ~ 900	20.0 ~ 68.0	38.4 ~ 99.5	80 ~ 647	32.5 ~ 99.5	80 ~ 940
2. CWT. STEEL		300 ~ 640	20.4 ~ 67.1	46.5 ~ 100.7	—	—	80 ~ 898
3. STAINLESS ST.		300 ~ 800	19.6 ~ 62.4	—	85 ~ 656	—	85 ~ 802
4. G. CAST IRON		360 ~ 650	—	—	90 ~ 334	—	—
5. N. CAST IRON		400 ~ 660	—	—	131 ~ 367	—	—
6. CAST ALUMINUM		174 ~ 560	—	—	20 ~ 190	—	—
7. BRASS		200 ~ 550	—	13.5 ~ 95.3	40 ~ 173	—	—
8. BRONZES		300 ~ 700	—	—	60 ~ 290	—	—
9. COPPER		200 ~ 690	—	—	45 ~ 315	—	—

- Accuracy : within ±17HL
- Operating temperature range : 0 ~ 40°C
- Weih t : Main Unit...95g
- Total Weight...Approx. 4kg
- Capacity of Data Storage : Maximum number of storage 1486
- Auto Power OFF : Approx. 2 minutes
- Size of Main Unit : 160x43x26mm
- Power Source : 3.7 V Lithium Battery(Built in)
- Hours for Continuous Use : 16 hours from full charge
- Hours necessary for charging : Approx. 1 hour

How to Maintain / Store after Use

- Eliminate the dust or stain while use, using the dry waste cloth etc. If any foreign matter enters the clearance between the Prove and Main Unit, the smooth movement will not be possible.
- Put the product into the supplied container case and store it in a dry, cool, and dark place. Avoid moisture and direct sunlight. Keep anyone other than the product's administrator away from the storage place.

Niigata seiki Co., Ltd. 6-15-22, Tsukanome, Sanjo, Niigata, Japan, 955-0055 Tel. : +81-256-31-5660 Fax. : +81-256-39-7730 MAIL:intl.sales@niigataseiki.co.jp

Hardness Tester for Metallic Material (Rebound Type) LEEB HARDNESS TESTER

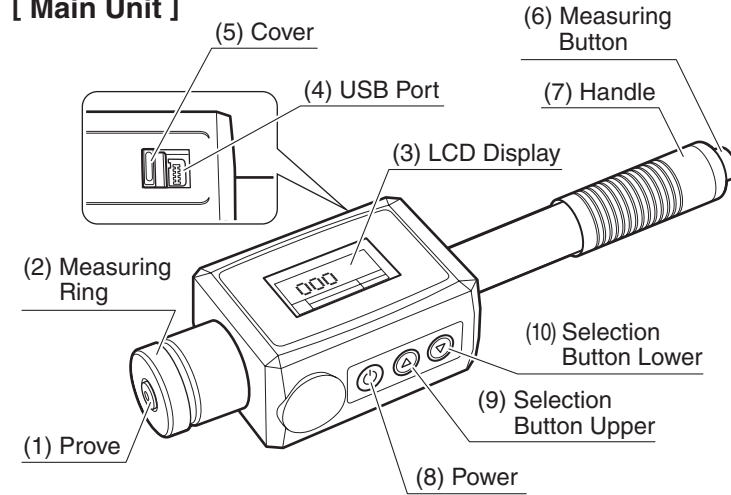
Thank you for your purchase of the Leeb Hardness tester. This product is a digital hardness tester that can measure the hardness of various metallic materials (carbon steel, cast steel, alloy tool steel, stainless steel, heat resistant steel, cast iron, ductile iron, cast aluminum alloy, brass, bronze, copper), which are not magnetized, by measuring the rebounding speed of the Prove after the impact on the surface of a specimen.

- For the safety of yourself and others, please read through this User Manual and follow its instructions carefully. Ensure that it is retained securely in a place where it can be readily accessed.
- When assigning or lending this product to a third party, make sure that it is accompanied by this manual.
- For questions regarding this product, contact us or the seller.

SAFETY NOTICE In this manual, the following symbols indicate: ⚠ Any action that can cause damage. ⛔ Any prohibited action. Ⓢ Any compulsory instructions.

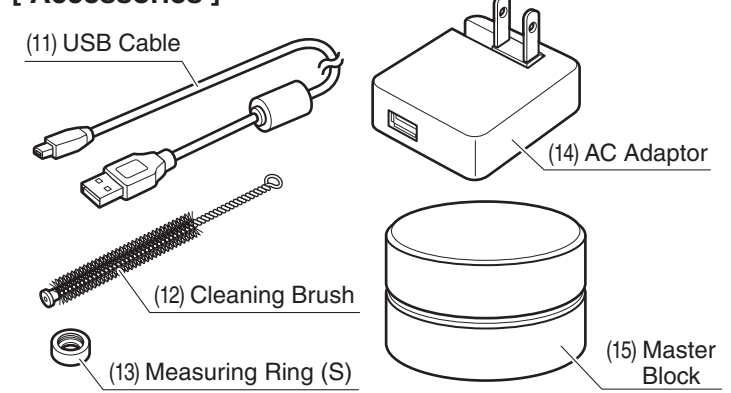
EXTERIOR FEATURES

[ Main Unit ]



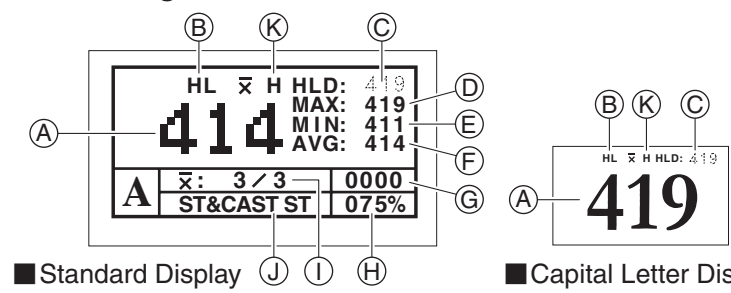
- (1) Prove ..... The gauge head used for impact measurement.
- (2) Measuring Ring ... Pressed to the specimen for measuring.
- (3) LCD Display ..... Measurements and Settings are indicated.
- (4) USB Port ..... The accessory USB cable is connected for charging or data output.
- (5) Cover ..... Cover for (4) USB port. Please close this while the port is not used.
- (6) Measuring Button ... Press this button to drop the Prove.
- (7) Handle ..... Pull this handle down to catch the Prove.
- (8) Power ..... Button for selecting power ON/OFF, and making the decision on setting.
- (9) Selection ..... Button for selecting a setting and to switch over between the measuring displays.
- (10) Selection ..... Button for selecting a setting and to delete the measurement just before.

[ Accessories ]



- (11) USB Cable ..... The cable connected to the Main Unit for charging or data output.
- (12) Cleaning Brush ... The brush for cleaning inside the Main Unit.
- (13) Measuring Ring (S)... Changed to suit the measuring object.
- (14) AC Adaptor ..... Connected via USB cable for charging the Main Unit.
- (15) Master Block ..... Standard master for calibrating the precision of Main Unit before every measurement.
- Dedicated Software ... Installed in a PC for writing out the measurements.
- Container Case ... The case for containing the Main Unit and accessories after use.
- User Manual ..... This document.

[ Measuring Screen ]



- (A) Measured conversion / average value
- (B) Converted Unit
- (C) Measurement
- (D) Maximum Value
- (E) Minimum Value
- (F) Average Value
- (G) Record Number
- (H) Remaining Battery Level
- (I) Number of Measurements / Total number of measurements
- (J) Measured Material
- (K) Over Upper / Lower limit (H)
- (L)

\*Press the “selection button upper” for switching over between Standard and Capital Letter Displays.

# Safety Precautions

It is important to observe all of the following instructions.

In order to forestall damages to users, other persons, and property, the instructions below must be strictly adhered to at all times in the manner that they are described.

The following set of indications classifies the degree of damage that can arise from improper use of the product or a lack of compliance with the instructions.

Items to be observed are marked by the following symbols:



Caution

This mark means that ignoring the instruction can cause injury or physical damage.



Denotes a “prohibition”: You MUST NOT do it.



Denotes a “requirement”: You MUST do it.



Caution



Read through this User Manual and follow the instructions.

- Any use of this product in a manner that is not described in this manual may cause an accident.



Use this product only for hardness measuring work.

- Any use of this product for purposes not described in this manual may cause damage, abrasion of the product, or unexpected accidents.



Use this product only in environments that are:

- Dry and free from contact with water.
- Not exposed to direct sunlight.
- Not accessible by children or individuals other than the user.
- Use of this product in an environment other than those described above can cause inaccuracy, damage to the product, accidents, or injury.



Treat this device with care.

- Shocks, including those suffered from falling or loading heavy materials, can result in inaccuracy or damage to the product, and therefore should be avoided.



Do not use for the materials easily get broken or a remaining dent may be problematic.

- A very hard Prove of HLD 1600 will be dropped onto the specimen to measure the hardness. It must be noted that a slight dent will remain on the specimen after measurement.



Do not use for a magnetized specimen or in a magnetized environment.

- This device measures the hardness by the rebounding speed of Prove after dropping. If the specimen or the environment is magnetized, it may influence the movement of Prove and spoil the precise measurement.



Do not hit without a specimen.

- If this device is hit without a specimen, it may cause a malfunction or reduced accuracy.



Do not disassemble in a way other than instructed in the maintenance manual or remodel.

- It may cause the reduced accuracy or failure of the product. The repair shall be discussed with your distributor or a sales agency.

## Preparation of a Specimen

Prepare a specimen for measuring in accordance with the conditions below:

### ①Mass : over 5 kg

- A specimen which weighs between 2–5 kg or a thin specimen which may easily be deformed shall be measured on a stable plate over 5 kg.
- A specimen which weighs less than 2 kg shall be stuck on a stable plate over 5 kg using some coupling media, such as Vaseline, to make no clearance with the plate.

### ②Surface Roughness : under R2 μm

- If it is rougher than R2 μm, the surface shall be ground finished.

### ③The radius of curvature of the surface : over 30 mm

### ④Surface Temperature : below 80°C

### ⑤Surface Hardness Test of Surface Hardened Material : Thickness of hardened layer over 0.8 mm.

### ⑥No magnetization on the surface

- A specimen with the residual magnetization shall be de-magnetized without fail.

### ⑦No paint on the specimen

- If the specimen is painted, please remove the paint layer.

### ⑧Shall not be used for the materials easily get broken or a remaining dent may be problematic.

- A very hard Prove of HLD 1600 will be dropped onto the specimen to measure the hardness. It must be noted that a slight dent will remain on the specimen after measurement.

## Power ON / OFF

●Power ON Press the Power Button . The power turns ON, and the measurement screen will be indicated in the LCD display.

●Power OFF Press the Power Button  for over 3 seconds. The power will be turned OFF, and the LCD display will be turned off.

## Hardness Test Procedure

The hardness of the work for measurement may not be uniform. Please measure at several spots and take an average value.

Please conduct the standard hardness test in accordance with the following procedure:

### ①Turn the power ON.

- Press the power button  to turn ON the power.

### ②Set up the material and the unit.

- Using the menu “3. MAT.& SCALE” of “Set Up Menu” below, set up the proper material and the unit for the specimen. After set up, choose “1. MEASUREMENT” and return to the measurement screen.

### ③Press the measuring ring to a specimen.

- Prepare a specimen that meets the conditions indicated in “Preparation of a Specimen,” and press the measuring ring to it.
  - The measurement shall be conducted on an area of the specimen where no dent or flaw is observed.

### ④Pull the handle down, and return it up. (Figure 1)

- When the handle is pulled down, the Prove inside is caught up. By returning the handle up as it is to pull up the Prove together.
  - Be sure to return the handle while holding it. If the handle is released when it is pulled down, it may spring up to cause the failure of the unit from the shock.

### ⑤Press the measuring button. (Figure 2)

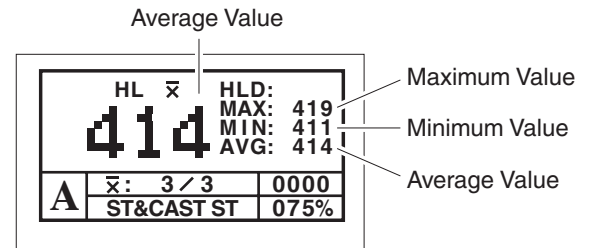
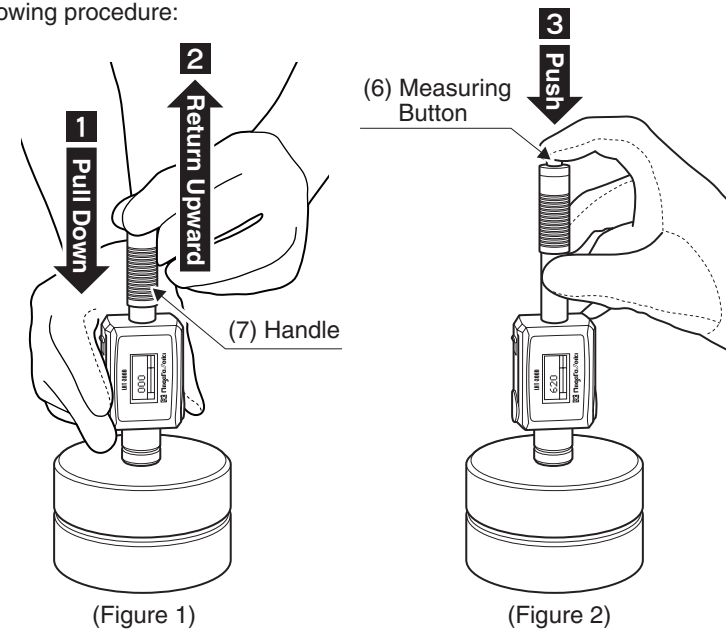
- Press the measuring button while the ring is pressed to the specimen. The Prove will drop and hit the specimen; then its hardness is measured by the rebounding speed.
  - When pressing the measuring button, please be careful not to lower the handle. It may result in improper precision.

### ⑥Repeat④~⑤for designated times.

- To acquire the average value, repeat the measurements for the designated times. The number of measurements can be changed in section 2 “AVG. TIMES” in “Set Up Menu”





### ⑦The measurements are displayed. (Figure 3)

- Average, Maximum and Minimum values will be displayed in the LCD display.



(Figure 3)

## Set Up Menu

If the power ON button  is pressed while the power is ON, the display will show the screen for the selection of the set up menu. In the selection menu, the selection button   will be used for selection of an item and change of a value, and the power button  will be used for the decision on the item.



1. MEASUREMENT Return to the measurement screen.



2. AVG. TIMES Change the number of measurements to acquire the average value. The number can be chosen between two to eight times.

3. MAT. & SCALE Change the material and the measuring unit for the specimen.

Back Side: The list of measurable range with regard to the material and the unit.

When a material is selected, the applicable units are displayed: please select an appropriate one for your purpose.

4. TOLERANCE Tolerance set up function. Selection button “Up”  for changing the value, “Down”  for moving the decimal point. If the measurement exceeds the range, “H” will be displayed, if it falls below the range, “L” will be displayed.

5. LOCATION Set up the number for starting storage of the measured data. Any number can be chosen for starting storage. Change the value using the selection button “Up”  and move the decimal point using the selection button “Down” .

6. MEMORY The storage type of measured data can be selected as well.

1. SEQ. STORE 1.AUTO STORE → The data will be stored in sequence from the number selected in “5.LOCATION”  
2.CLOSE STORE → The measured data will not be stored.

2. BATCH STORE The 12 separate groups of data can be stored with 99 measurements per group. For example, if a lot number (group) “2” is selected, the measured data number 100–199 will be stored.

3. CLEAR MEMORY The measured data in Main Unit will be deleted.

7. DATA OUTPUT The measured data will be output to a PC. Attachment:How to use the accessory software.

1. SEQUENCE Designate the range of the data number to be output, and output the measured data in the designated range.  
2. BATCH The measured data of the lot number designated in “BATCH STORE” of section “6 MEMORY” will be output.

8. CALIBRATION The measuring error will be corrected by the input of error value confirmed by the “Confirmation of Precision” in the left side of the page.

9. CONTRAST Adjust the contrast of the display.

10. DEFAULT Resume all the various settings to the original.