INNOVATEST®
Advanced Hardness Testing Solutions

MANUAL
TIME 3100

USER MANUAL

FOR

TIME 3100

HARDNESS TESTING INSTRUMENT

Thank you for buying this advanced TIME® hardness testing instrument.

The product meets the applicable DIN, ISO-EN, ASTM and JIS standards.

Before using this instrument, read through this user manual carefully to use the product properly.

After reading, keep the manual in an easy-to-access place for referencing whenever needed.

Read the "Safety Cautions" and "User's Guide" thoroughly before usage, and properly operate the product.
In order to use the product safely, do not ignore visual cautions, warnings or safety symbols.
Please refer to the limited guarantee and responsibility issues in the TIME® guarantees conditions.

Contents

Make sure these signs and symbols are well understood before reading this manual or operating the instrument.

WARNING!

Ignoring this information and mishandling of the equipment can lead to severe bodily injuries and material damage.

- Do not modify this equipment. Doing so can cause fire and/or electric shock.
- Do not fabricate anything with the power cord, forcibly bend it, twist, or pull it, doing so can cause fires and/or electric shock.
- Do not disassemble this equipment. Doing so can cause electric shock. Contact our technical service department for checks, adjustments, or repairs inside the equipment.
- Do not operate the equipment at a voltage other than the power voltage that is indicated. Doing so can cause fires.
- Do not place a vase, or any container holding liquid, near this equipment.
- fires can occur if water gets inside the equipment.
- If water or other liquid does get inside the equipment, turn off the power to the equipment's main unit, pull the plug out of the socket, and call our company's technical service department.
- Always install grounding. If, by any chance a component gets damaged without grounding, electric shock can occur.
- Do not operate the equipment if there is ever any abnormality, such as signs of smoke, unusual smell.
- In such a case, turn off the power to the equipment's main unit, pull the plug out of the socket, and call our company's technical service department.
- Do not insert or unplug the plug with wet hands. Doing so can cause electric shock.
- Do not scratch or forcibly twist a cable.
- Continued use of a cable after it is scratched or twisted can cause fire and/or electric shock.
- Do not place the equipment in a high temperature and humidity location.
- When cleaning or checking the equipment, make sure the plug is pulled out of the socket for safety.
- Do not connect special attachments to this equipment that are not "TIME®" standard attachments, doing so can cause poor performance or defects.
- Do not use batteries other than the specified ones.
- Never open any of the panel or cover other than when unpacking or assembling.

1. General introduction

The TIME© 3100 Roughness Tester is a new generation of products developed by the TIME Group Inc., featuring high accuracy, a wide range of application, simple operation and stable performance. It is widely applicable on testing surfaces of all kinds of metals and non-metals. The hand-held unit with integrated pickup is especially suitable for use on production sites. Two bright OLED dot matrix readout displays can be viewed clearly by the operator from different angles. The operator will be notified when the battery voltage runs low.

2. Work Principle and Structure Features

2.1 Work principle

When the sensor driven by a driver is making a linear uniform motion along the testing surface, the stylus which touches with the work surface moves up and down along the work surface perpendicularly. Its motion is converted into electric signals, which are amplified, filtered and transformed into digital signals through A/D. The signals are then processed by CPU into Ra and Rz values before being displayed on the screen.

2.2 Structural features

2.2.1 Basic setup : (see Figure 1)

Main Unit	1 unit
Charger	1 piece
Standard specimen	1 piece

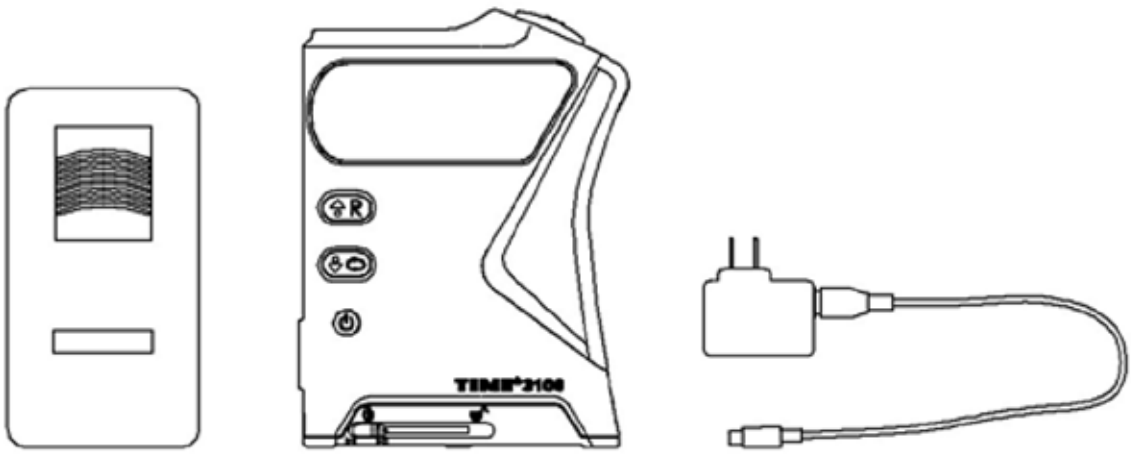


Figure 1 : Specimen Main Unit Charger

2.2.2 Structure of the main unit (see Figure 2)

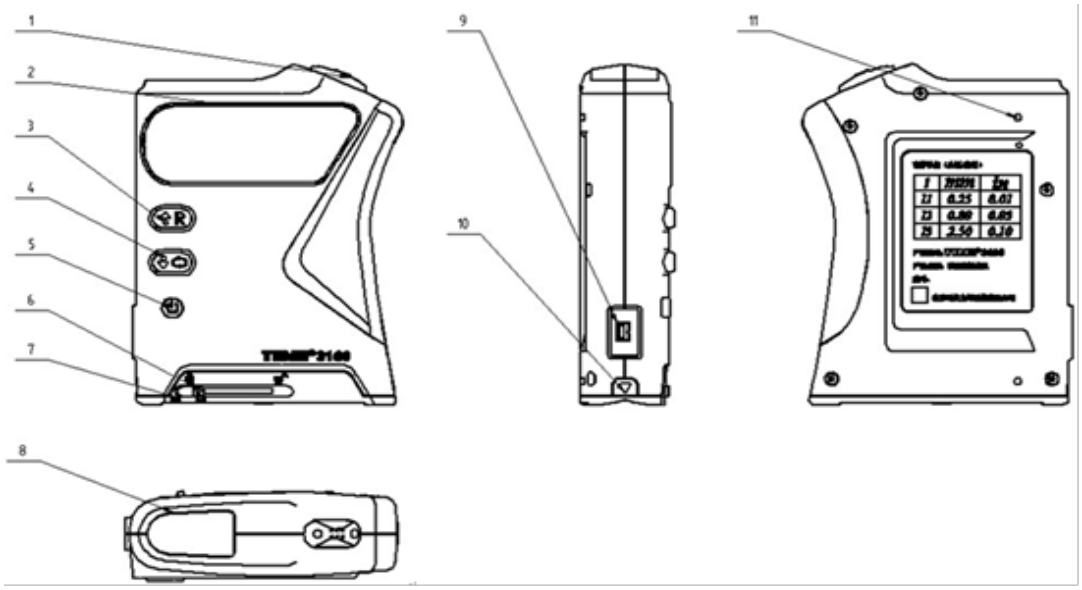


Figure 2

1. Start button
2. LCD display
3. Select button 1
4. Select button 2
5. On/off switch
6. Button for protective sheath
7. Testing area
8. LCD display
9. Charging socket
10. Stylus mark
11. Reset

3. Major Performance Indices

3.1 Major technical parameters

- Measurement parameters: Ra, Rz
- Traversed length (mm): 6
- Cutoff length (mm): 0.25, 0.80 and 2.5
- Evaluation length (mm): 1.25, 4.0 and 5.0
- Measuring range (μm):
  Ra: 0.05 – 6.5
  Rz: 0.1 – 50
- Tolerance: ±15%
- Repeatability: <12%
- Radius and angle of the stylus point:
- Radius: 10.0±2.5μm
- Angle: 90o(+5 o, -10 o)
- Stationary measuring force and its variations of the contact stylus:
- Stationary measuring force: ≤0.016N
- Variation of measuring force: ≤800N/m
- Pressure of the skid-dependent of the sensor : ≤0.5N
- OLED dot matrix indicator
- Battery: 3.7V Lithium battery
- Charger: input AC: 100-240V, 50/60Hz, output: DC: 5V, 1A
- Charging time: 3.5 hours
- Dimension: 116mm×86mm×30mm
- Weight: 200 g

3.2 Main functions

- Optional parameters: Ra, Rz;
- Optional cutoff length;
- Calibration function;
- Automatic testing of battery voltage
- Dual display on the front and top cover.

3.3 Environment for use

- Working conditions:
  Temperature: 0 – 40oC
  Relative humidity: < 90%
  No vibration; no corrosive media
- Storing conditions
  Temperature: -20~60 oC
  Relative humidity: < 90%
  Ventilation: Grade 3

4. Use and Operation

4.1 Preparation before operation

a. Open protective sheath:
The pickup stylus protective sheath should be closed, when the gauge is taken out of casing for the first time (Figure 3). Push the button and slide the protective sheath open (as Figure 4).

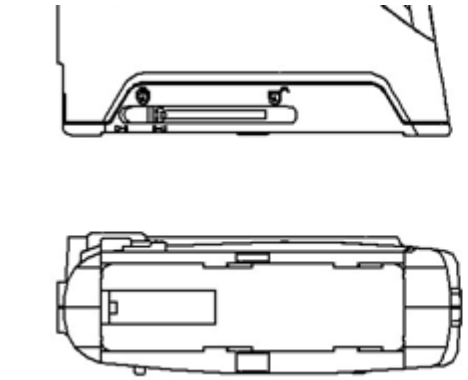


Figure 3 : Protective sheath closed

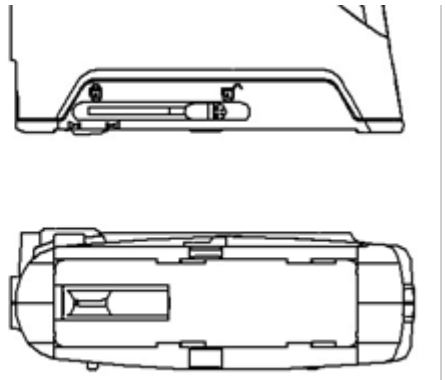
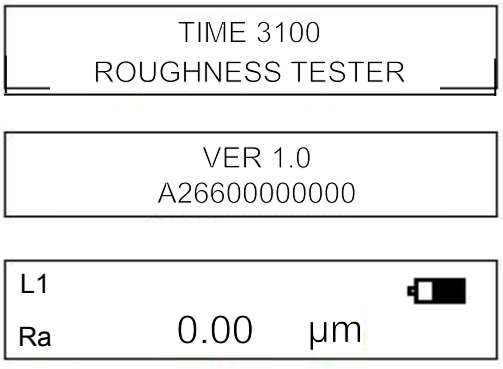


Figure 4 : Protective sheath opened

Show the location of button for stylus protective sheath (on or off) and the stylus status of being used or being protected. The button on the left means the pickup stylus protective sheath is closed and the stylus is protected. The button on the right means the pickup stylus protective sheath is opened and the stylus can be used.

b. Switch on:
After switching the device on, the display will show the model name, version number and serial number. Afterwards the user can enter the measuring status.



c.  Testing of battery voltage:
The black in the symbol shows the voltage capacity.

 Means low battery, the unit must be charged as soon as possible.

 Means the device is charging

4.2 Operation

After switching the device on, it will display the measuring parameters and cutoff length of the previous test. The tester is now ready for use. Before starting choose the desired parameter Ra or Rz and proper cutoff length 2.5, 0.8 or 0.25 After switching on the device, press the select button  and choose Ra or Rz, press select button  and choose L1, L2, L3 (0.25, 0.8., 2.5).

After the parameters and cutoff lengths are taken, the measurement can start. Position the mark  (on the front) and  (on the side) over the test area, press the start button, the pickup moves automatically. When the device "buzzes" twice, the measurement has ended and the screen will display the measured value.

Points for attention:

- While the pickup moves, keep the device even and steady so as not to affect the accuracy;
- Before the pickup returns to its original position, the device refuses to respond to any operation until the measurement is completed.

Recommended cutoff length:

Cutoff length (mm)	Ra(μm)	Rz(μm)
0.25	>0.02~0.1	>0.10~0.50
0.80	>0.1~2.0	>0.50~10.0
2.50	>2.0~10.0	>10.0~50.0

4.3 Calibration

When abnormal errors are found, the standard specimen may be used for calibration. The Ra values of the specimen used for calibration range from 0.1μm – 3.5μm.
Calibration: when in the metric and switch-off state, press the select button  and switch on the device. When the device "buzzes", release the button and the device enters the calibration state, with "CAL" displayed on the upper of the screen. The value displayed is the Ra value of the calibration block.

If you use another specimen, press and hold the select button  to let the Ra value increase or hold the select button to let the Ra value decrease until the value of the specimen you use is displayed. Then, put the device on the specimen, press the start button  . The device will "buzz" twice, when the calibration has ended. The screen will display a calibrated Ra value. (At this time, the new value takes the place of the old and is stored up). Normal measurements can take place when the sensor returns to its original position.

- Standard specimen option: Specimen with the Ra value ranging from 2.0μm to 3.5μm is recommended. The user can choose a standard specimen which according to the scope of measurement is often used.
- Whenever the operator wants to stop the calibration, they can simply switch off the device. When the calibration ends and the screen displays "-E-", it indicates that the calibration has exceeded the limit and that the calibration is invalid. In this case, adjust the Ra value and do the calibration again.
- The user may calibrate with a value that is commenly used. This may increase the accuracy.

4.4 mm/in switching

Press and hold the select button for 5 seconds, the metric system will switch to the Imperial system.

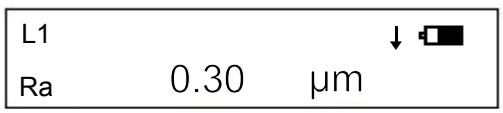
4.2 Limit settings

Press the select button for 5 seconds, then enter the limit setting as follows:

Upper limit	00.48	μm
Lower limit	00.35	μm

Press the start button to select the upper and lower limit setting.
Press the select button to increase the value and press the select button below that to decrease the value.
After entering the settings, press the start button for 5 seconds, then exit the limit setting.
When measuring the value > upper limit, the screen will display "↑" in the top of the screen.

When measuring the value < upper limit, the screen will display "↓" in the top of the screen.



4.6 Switch-off reminder

When the device is not being used, it “buzzes” every 30 seconds, after 3 “buzzing” sounds, the device will switch off automatically. The user can also press the on/off switch to switch off the device.

4.7 Low voltage alarm

When the screen displays the following icon : The battery is low and it needs to be charged.

4.8 Charging

Plug the charger into the socket of the device. The device takes about 3.5 hours to be fully charged. The screen will display the following icon : while charging.
Measurements can be carried out again when the device is finished charging.

4.9 Reset

Press the “reset” button when the device is showcasing abnormalities, then switch on again.

5. Maintenance and Repair

5.1 Maintenance

- Please avoid collision, heavy shocks, heavy dust, dampness, oil stain and strong magnetic field;
- Switch the device off after each use in order to save energy.
- The Pickup is the precision part of the device and particular care should be taken about. After each use, close the protective sheath and avoid any heavy shocks;
- A standard specimen provided with the device should be given special protection to avoid scratches that will cause the calibration to lose accuracy.

5.2 Repair

If any problems occur, the user should not try to dismantle and repair the tester. The device should be returned to the manufacturer for checking and repair, together with the warranty card, the specimen and an explanation concerning the issue

Please keep in touch with the marketing department of our company or our sales agents.

6. Non-warranty parts

1. Cover of the Device
2. Pickup
3. Battery
4. Keypad
5. Specimen

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