MITECH POCKET SURFACE ROUGHNESS TESTER MR100
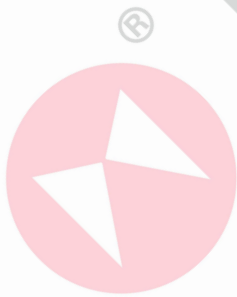
User's Manual

MITECH CO.,LTD.

www.ponpe.com

CONTENTS

1. Overview

1.1 Introduction

This instrument is a sensor & host integration pocket instrument. It is suitable for carrying, can do fast measurement and testing on site. With features of highly measurement accuracy, widely measurement range, portable size, easy operation, stable working, it can be widely used for surface detection of various metal and nonmetal processing.
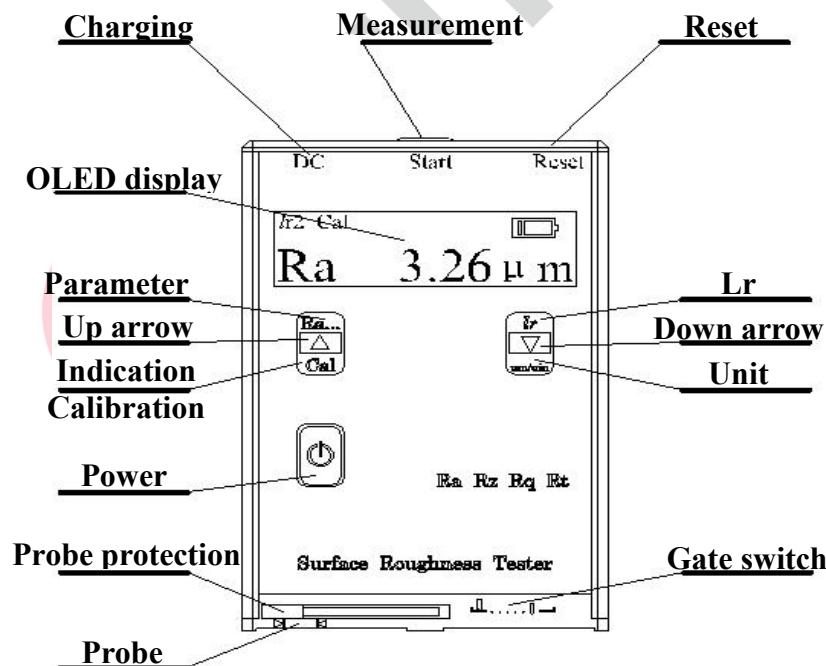
1.2 Measurement Principle

Start the instrument and do the measurement after placing the instrument on the surface of the work-piece. The inside precision driven component of instrument drive the probe slide straightly along the surface of the workpiece while the probe with its sharp stylus detecting the surface of the workpiece. At the same time the workpeice surface roughness will make the stylus displacement along vertically. This displacement makes the probe piezoelectric wafer deform and output electric signal. After amplified and level translated, this signal will go to the data acquisition system.DSP chip will conduct digital filtering and parameter calculation for the collected data. And the measurement results will be displayed on the OLED display screen.

1.3 Function & Features

- Measurement parameters: Ra, Rq, Rz, Rt.
- Using high-precision piezoelectric crystal transducer.
- Mechatronics design, smaller and lighter.
- 128×32 OLED dot matrix LCD displays clearly without backlight.
- Using DSP chip execute control and data processing.
- Built-in lithium polymer rechargeable battery and charging protection circuit.
- Probe head protection gate.
- Mini-USB charging interface, available for phone charger.

1.4 Names of Parts

Front Sight

Lr   **Indication**   **Battery**

lr2 Cal

$$Ra \quad 3.26 \, \mu m$$

Parameter   **Value**   **Unit**

OLED Display
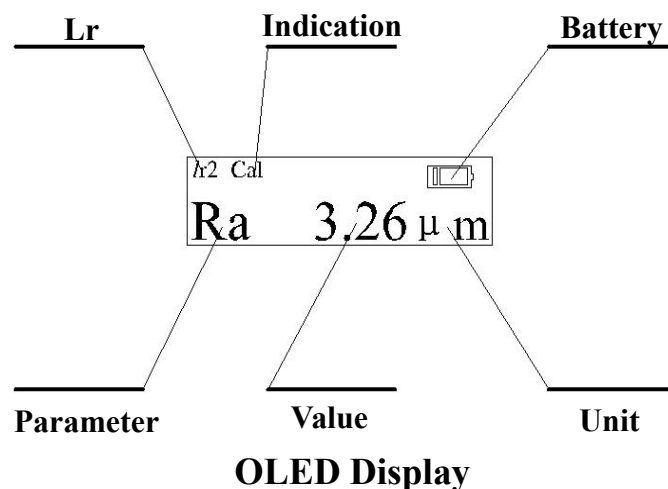
1.5 Keypad Definitions

Ra...
△
Cal

Multifunction key, functions as follows:
① Press once to switch a parameter while measuring.
② Press 3 seconds to enter the indications calibration status.
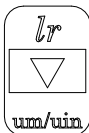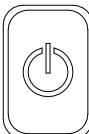③ Press once to switch a digit while indication calibrating.

lr
▽
um/uin

Multifunction key, functions as follows:
① Press once to switch a Lr while measuring.
② Press 3 seconds to change a unit of measurement.
③ Press once to switch a value while indication calibrating.

⏻

Power switch:
Press and hold for 3 seconds to boot, long press again to shut down.

1.6 Standard Configuration

Name	QTY
Main Unit	1
Calibration Model	1
Power Adapter	1

Notes:
The list above just for reference, real objects and quantity are according to the packing list.

1.7 Power On/Off

Press and hold the power key for 3 seconds to boot, long press again will shut down.

1.8 Battery Charge

The instrument will beep when the battery is low. Be sure to use standard charger or standard phone charger to charge the instrument.
The battery level graphics will change when being charged. Pull out the charger in time when fully charged. Typically, the charging time is about 3 hours. You can charge about 12 hours for the first time, after that you can normally recharge. Do not charge for a long time.
Do not use fake chargers to charge the instrument.
The charging voltage must not be higher than 5V and the charging current cannot exceed 1A.

2. Measurement Operations

2.1 Preparation

The probe protective door at the bottom of the instrument should be closed before used shown as below figure.

Push the probe protective door to right side to expose the probe for measurement shown as below figure.

You can read the using and protect state of the probe from the probe protective door switch like . Close the probe protective door in time after finished measurement because the probe is the most important precision component which will affect the instrument accuracy, it needs additional protection.

2.2 Indication Calibration

The indication of the instrument needed to be calibrated using the standard model before measurement. The roughness value measured by the instrument should be in the range of qualified. You can use the indication calibration function to revise and improve measurement precision if the difference between indication value and true value exceeds the predetermined error range or you want higher measurement precision.
Procedures as follows:

① Press the parameter key to enter the indication calibrate status, "Cal" showed at upper left corner of the display, and the rightmost digit in reverse color.

$$lr2 \quad Cal$$
$$Ra \quad 3.26 \mu m$$

② Input the values shown on the model label, press the parameter key to move digit, press the Lr button to change value.

③ Put the instrument on the reticle area of the model, and then press the blue button at the top of the instrument to start measure. The instrument will record the indication error and correct automatically. Measure again until indication value meets the requirements, and then press parameter key to exit the indication calibration status.

2.3 Parameter Setting

① Measurement parameter selection
The instrument can measure four roughness parameters: Ra, Rz, Rq, Rt4. Press parameter selection button to select parameters you need.

② Lr selection
The instrument has three Lr values to choose: 0.25mm, 0.8mm, 2.5mm. Choose Lr value on the basis of the surface roughness of the workpiece.
Refer to the following range to select:

Ra(μm)	Lr(mm)
Ra<0.2	0.25
0.2<Ra<2	0.8
Ra>2	2.5

2.4 Measure

After selecting the measurement parameters and Lr, you are ready to measure. Make the measuring

indication area of the instrument align with the measured region of the work-piece, and then press the start button at the top of the instrument softly to start measure. The total route is 6mm.

Notes:

① **When the probe is moving, make it as steady as possible to avoid affecting the measurement precision.**

② **The instrument will not do response to any measure operation before the probe back to the original place. It only can permit new measurement until completing the last measurement.**

2.5 Unit Transform

The instrument has two kinds of unit system—mm and inch. Press Lr button to switch.

2.6 Automatic-Off Screen

The instrument will automatically turn off the screen and enter the power saving mode if no operation within three minutes. Press any key at any time to wake up.

2.7 Low Battery Prompt

When the battery is low, there will be a beep to remind the user to charge.

2.8 Reset

When it met an error and not able to work no longer, you can press the reset button to restore factory settings and then restart.

3. Maintenance and service

3.1 Maintenance

① Avoid collisions, severe vibration, heavy dust, moisture, oil, strong magnetic field and so on.

② After each measurement completed, please turn off the power in time to preserve battery power and the battery should be charged in time.

③ 3 hours' charging is best for the instrument. To prevent battery damage, you should not overcharge.

④ The probe is one of the most precise components to be used carefully. Please close the probe protect door softly after using to avoid probe damage caused by vibration.

⑤ The standard model should be carefully protected to avoid precision lose caused by scratch. Please package the model in time after measuring.

3.2 Service

If the instrument is out of order, the manufacturer is responsible for repair. You cannot disassemble or repair by yourself. When sending back the faulty instrument to the manufacturer for repair, you should attach the warranty card and the calibration model as well, and explain the symptoms. Please keep in touch with our sales department or agency

4. Technical Parameters and Features

4.1 Main Technical Parameters

- Measurement parameters(µm): Ra, Rz, Rq, Rt.
- Stroke length(mm): 6.
- Lr(mm): 0.25, 0.80, 2.5.
- Access length(mm): 1.25, 4.0, 5.0.
- Measurement range(µm): Ra: 0.05 ~ 10.0, Rz: 0.1 ~ 50.
- Indication error: ±15%.
- Indication variation: ＜12%.
- Probe tip's arc radius and angle: 10.0±2.5 µm, 90°.
- Measuring force and change rate: ≤0.016N, ≤800N/m.
- Sensor head pressure: ≤0.5N.
- Battery: 3.7V Lithium-polymer battery.
- Charger: DC 5V, 500mAh.
- Dimensions: 105 mm×70 mm×24 mm.
- Net Weight: 200g.

4.2 Main Functions

① Optional measurement parameters: Ra, Rz, Rq, Rt.
② Optional for Lr.
③ Calibration function.
④ Automatically detect battery voltage and alarm.
⑤ Work while charging.

4.3 Working Conditions

① Working conditions
Temperature: 0 ～40 °C
Relative humidity: < 80%.
No vibration, no corrosive media around
② Storage conditions
Temperature: -20 ～60 °C
Relative humidity: <90%.
③ Transport conditions
Circulation condition: Third level.

5. Parameter Definition

5.1 Arithmetical Mean Deviation of Profile--Ra

The arithmetic mean of the vertical coordinate value Z(x)'s absolute value of within a sampling length.
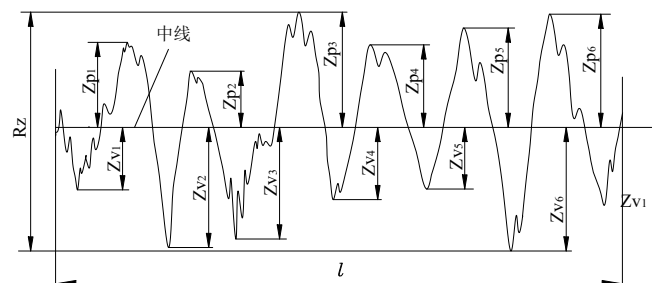
$$Ra = \frac{1}{l}\int_0^l |Z(x)|dx$$
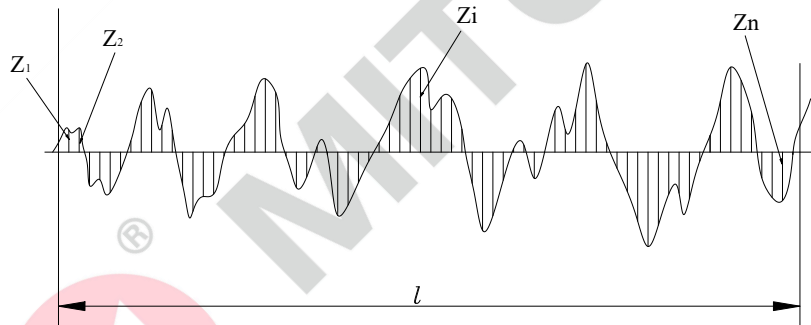
5.2 Root Mean Square Deviation of Profile--Rq

The root mean square value of the vertical coordinate value Z(x) within a sampling length.

$$Rq = \sqrt{\frac{1}{l}\int_0^l Z^2(x)dx}$$

5.3 The Maximum Height of Profile--Rz

The peak and valley value within a sampling length.

5.4The Total Height of Profile --Rt

The peak valley value within the access length.

6. Lr Recommendation Form

Ra (μm)	Rz (μm)	Value(mm)
>5~10	>20~40	2.5
>2.5~5	>10~20	
>1.25~2.5	>6.3~10	0.8
>0.63~1.25	>3.2~6.3	
>0.32~0.63	>1.6~3.2	
>0.25~0.32	>1.25~1.6	0.25
>0.20~0.25	>1.0~1.25	
>0.16~0.20	>0.8~1.0	
>0.125~0.16	>0.63~0.8	
>0.1~0.125	>0.5~0.63	
>0.08~0.1	>0.4~0.5	
>0.063~0.08	>0.32~0.4	
>0.05~0.063	>0.25~0.32	
>0.04~0.05	>0.2~0.25	
>0.032~0.04	>0.16~0.2	
>0.025~0.032	>0.125~0.16	
>0.02~0.025	>0.1~0.125	

User Notes

Warranty：

The product is guaranteed for one year after purchasing. Log www.mitech-ndt.com or follow our company official public platform to register for maintenance. Please fill the blanks as required, if the product is not registered for maintenance, it will follow the date of manufacturer.

When applying for maintenance, please visit our official website www.mitech-ndt.com or official accounts, submit "online reporting to repair" sheet.

In accordance with the international relevant regulations, the following are not within the scope of free warranty.

● Damage caused by man-made or improper keeping;

● Self-dismantle or non-special repair shop dismantle;

● Do not follow the requirement of service registration or warranty expired;

● Consumable parts.

Service Promise：

● MITECH users have lifelong maintenance service.

● Free maintenance, inspection, software upgrade and etc.