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MANUAL
SURFACE ROUGHNESS TESTER
PCE-RT 10

This Surface Roughness Tester is small in size, light in weight, easy to carry. Although complex and advanced, it is convenient to use and operate. Its ruggedness will allow many years of use if proper operating techniques are followed. Please read the following instructions carefully and always

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1. FEATURES

This instrument is compatible with four standards of ISO, DIN, ANSI and JIS and is widely used in production site to measure surface roughness of various machinery-processed parts, calculate corresponding parameters according to selected measuring conditions and clearly display all measurement parameters. When measuring the roughness of a surface, the sensor is placed on the surface and then uniformly slides along the surface by driving the mechanism inside the tester. The sensor gets the surface roughness by the sharp built-in probe. This roughness causes displacement of the probe which results in change of inductive amount of induction coils so as to generate analogue signal, which is in proportion to the surface roughness at output end of phase-sensitive rectifier. The exclusive DSP processes and calculates and then outputs the measurement results on LCD.

* Multiple parameter measurement: Ra, Rz
* Highly sophisticated inductance sensor.
* Small in size, light in weight and easy to use.
* Can communicate with PC computer for statistics, printing and analysing by the optional cable and the software for RS232C interface.

*Manual or automatic shut down. The tester can be switched off by pressing the Power key at any time. On the other hand, the tester will power.

Itself off about 5 minutes after the last key operation.

*Metric /Imperial Conversion

2. SPECIFICATIONS

Display: 4 digits, 10mm LCD, with blue backlight

Parameters: Ra, Rz

Display Range

Ra: 0.05-10.00um

Rz: 0.1-50.0um

Accuracy: Not more than ±15%

Fluctuation of display value: Not more than 10%

Sensor :

Test Principle: Inductance type

Radius of Probe Pin: 10μm

Material of Probe Pin: Diamond

Measurement Force of Probe: 16mN(1.6gf)

Probe Angle: 90°

Vertical Radius of Guiding Head: 48mm

Maximum driving stroke: 12.5mm/0.5inch

Cutoff length : 0.25mm / 0.8mm / 2.5mm optional

Driving speed:

sampling length = 0.25mm Vt=0.135mm/s

sampling length = 0.8mm Vt=0.5mm/s

sampling length = 2.5mm Vt=1mm/s

returning Vt=1mm/s

Resolution : 0.001um if reading < 10um

0.01um if 10um≤reading < 100um

0.1um if reading ≥100um

Evaluation length: 1~2 cut off optional
Power battery: 4x1.5vAA/UM 3
Operating conditions: Temp. 0~40℃
Humidity <80%
Size：128×80×30mm
Weight: about 280 g
Standard Accessories：
Carrying case
Main unit
Standard sensor
Standard sample plate
Operation manual
Screwdriver
Optional Accessories
Cable & software for RS232C

3. FRONT PANEL DESCRIPTIONS AND NAMES OF EACH PARTS

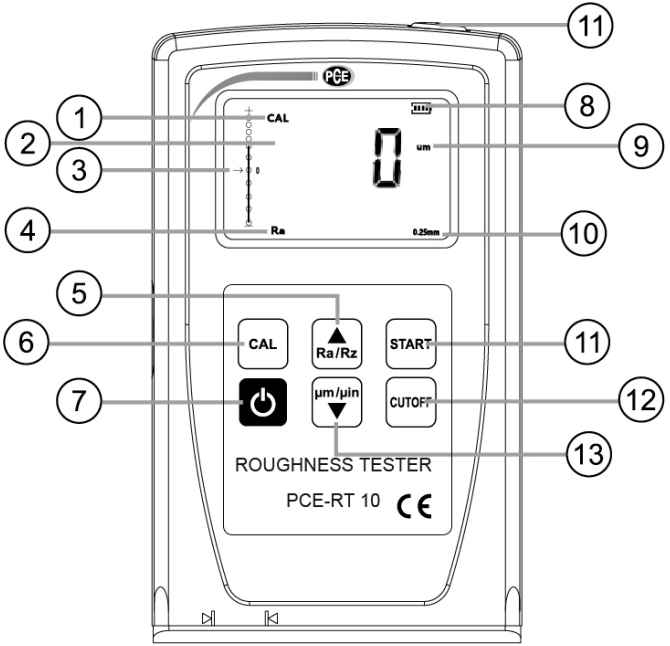


Fig. 3-1

1	Calibration
2	Measurement
3	Position pointer
4	Parameters
5	Parameter Key & Up Key
6	CAL Key
7	Power Key
8	Battery
9	Unit
10	Cutoff
11	Start Key
12	Cutoff Key
13	um/uinch Key & Down Key

4. MEASURING PROCEDURES

4.1 Preparations for measurement

A. Switch on to test if the battery voltage is normal.

B. The instrument automatically restores conditions of the last measurement before it is turned off since these conditions are automatically stored. Before taking measurement, preparations have to be made and checked.

C. To check if the parameter selected is right. If not, depress the key (Ra/Rq) to select.

D. To check if the cutoff length selected is right. if not, depress the key (CUTOFF) to select. For the recommended cut-off length, please see the table on page 11.

E. To check if the measurement unit selected is right. If not, just press the key (um/Uin) to switch between the metric system and the British system.

F. To clear the surface of the part to be measured.

G. Refer to Figure 4-1 and Figure 4-2 to place the instrument correctly, stably and reliably on the surface to be measured.

H. Refer to Figure 4-2, the sliding trail of the sensor must be vertical to the direction of process line of the measured surface.

I. Adjustable leg and sheath of sensor

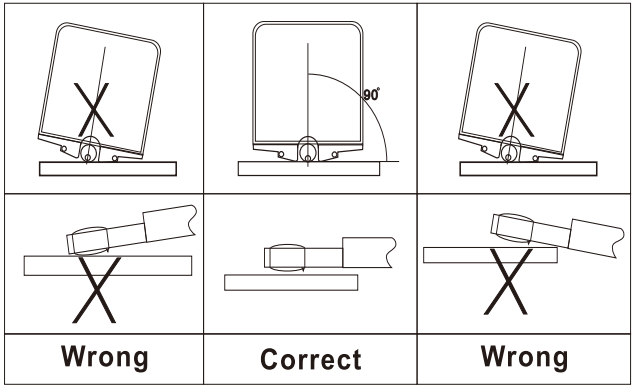


Fig.4-1

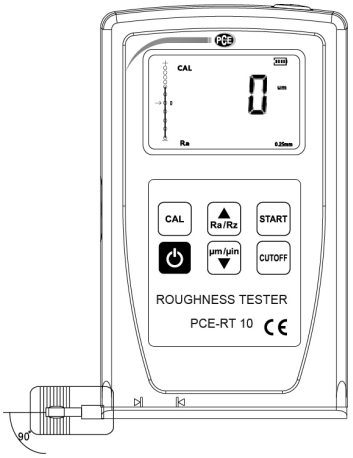


Fig.4-2

4.2 Measuring

After preparations is done, just press Start key to measureIf measuring conditions are not to be changed. Firstly,you will see the "—" on the display and the probe ismoving forward and sampling. Then you will see the probe stop sliding and move backward. The measurement result shows on the display after the probe stop moving. You can browse measurement values of different parameters once depressing the key (Ra/Rz).

5. HOW TO SET THE EVALUATION LENGTH

To set or browse the evaluation length, just depress the (CAL) key and not release it until 'LEN' showing on the display. It takes about 6 seconds from starting pressing the key CAL. Then change the evaluationlength to the desired length among 1~2Lby the key (Ra/Rz) or (μm/Uin). To save or quit, just press any key except the key (Ra/Rz) or (μm/Uin).

6.HOW TO CALIBRATE THE TESTER

6.1 To enter the calibration state, just depressing the key (CAL), The calibration state is marked by "CAL".

6.2Take a measurement based on the Standard sample. Contrast the measuring value with the value of standard sample plate based on the same parameter.

6.3Depress the key (Ra/Rz) or (μm/Uin) to adjust the reading to the standard value.

6.4Just repeat 6.2 to 6.3 till the accuracy is ok.

6.5To quit, just press any key other than "START" key.

6.6 The instrument has been thoroughly tested before delivery to ensure that the display value error is less than 10%. The user is recommended not to use the calibration function too often.

7. COMMUNICATE WITH PC

This tester can communicate with PC computer by use of the optional communicating cable and software. For detailed information, please see the instructions with the optional software.

8. GENERAL MAINTENANCE

8.1 Avoid crashes, intensive vibration, heavy dust, humidity, grease stains and strong magnetic fields.

8.2 The sensor is a precise part and should be protected carefully. It is recommended to put it back in the box after each operation.

8.3 Protect the standard sample plate belonging to the instrument carefully to avoid calibration faults caused

by scratches.

9. REFERENCES

9.1 Central line

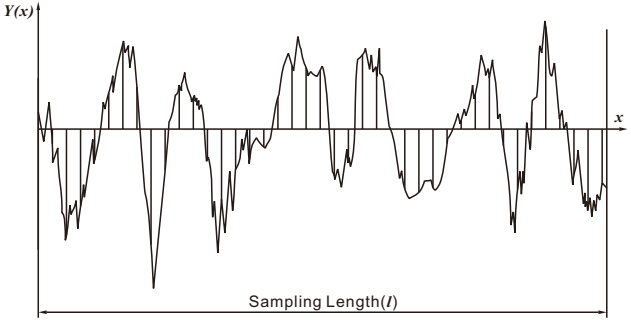
This tester adopts minimum central line of Least Square Algorithm.

9.2 Definition of roughness parameter

9.2.1 Ra arithmetical mean deviation of profile

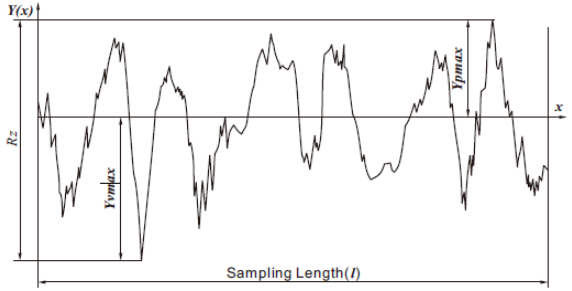
Arithmetic value of mean deviation of profile within sampling length.

$$Ra = \frac{1}{l}\int_0^l |Y(x)|dx$$



9.2.2 Rz maximum height of profile

Sum of height of the largest profile peak height ***Ypmax*** and the largest profile valley depth ***Yvmax*** within a sampling length.

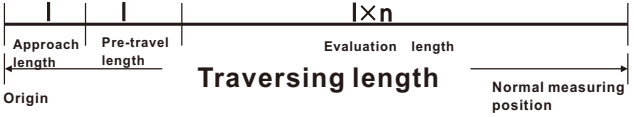


9.3 Code Standard Name

ISO 4287 International Standard
DIN 4768(2010-07-00) German Standard
JIS B601 Japanese Industrial Standard
ANSI B46.1 American Standard

9.4 Traversing length

L=sampling length
n=number of sampling length
l x n=evaluation length



10. BATTERY REPLACEMENT

10.1 When it is necessary to replace the battery, i.e battery voltage less then approx 5v, the battery symbol '▭' will appear on the Display.

10.2 Slide the Battery cover(3-6)away from the instrument and remove the

batteries.
10.3 Install the batteries (4x1.5v AA/UM 3) correctly into the case.

Cutoff length recommended

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