پترو فرهان گستر جنوب

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SURFACE ROUGHNESS TESTER
AR-132C

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 keep this manual within easy reach.

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 USB 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.

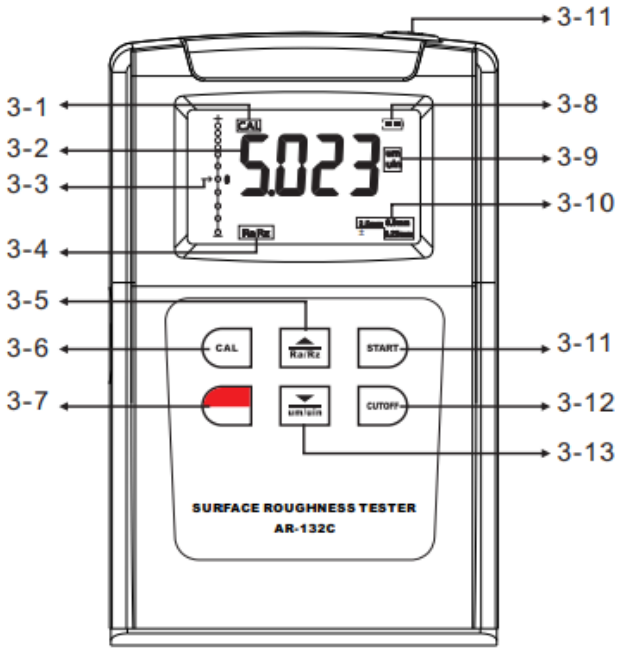
Itself off about 5 minutes after the last key operation.
*Metric /Imperial Conversion

2. SPECIFICATIONS

Display: 4 digits, 10mm LCD, with blue backlight
Parameters: Ra, Rz
Display Range
Ra: 0.05-10.00μm/1.000-400.0μinch
Rz: 0.020-100.0μm/0.780-4000μinch
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
Measuring range ≤1
sampling length = 0.8mm Vt=0.5mm/s
Measuring range ≤2.5
sampling length = 2.5mm Vt=1mm/s

Resolution : 0.001μm if reading < 10μm
0.01μm if 10um ≤ reading < 100μm
0.1μm if reading ≥ 100μm
Evaluation length: 1~2L optional
Power Supply: 4x1.5V AA Um-3 Battery
Operating conditions: Temp. 0~50°C (32~122°F)
Humidity <80%RH
Size: 128x80x30mm (5.0x3.1x1.2inch)
Weight: about 270g (9.52oz)
Standard Accessories:
Main unit
Standard sensor
Standard sample plate
Screwdriver
Operation manual
Carrying case
Optional Accessories
USB cable & software
Bluetooth adapter & software

3. FRONT PANEL DESCRIPTIONS AND NAMES OF EACH PARTS

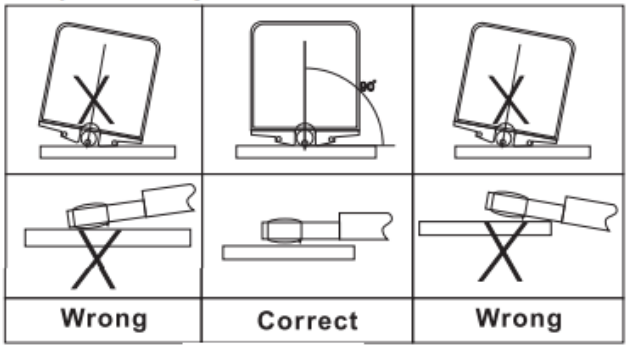


3-1	Calibration
3-2	Measurement
3-3	Position pointer
3-4	Parameters
3-5	Parameter Key & Up Key
3-6	CAL Key
3-7	Power Key
3-8	Battery
3-9	Unit
3-10	Cutoff
3-11	Start Key
3-12	Cutoff Key
3-13	um/uinch Key & Down Key

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 to select.

D. To check if the cutoff length selected is right. if not, depress the key to select. For the recommended cut-off length, please see the table in 10.7on page 13.
E. To check if the measurement unit selected is right. If not, just press the key 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



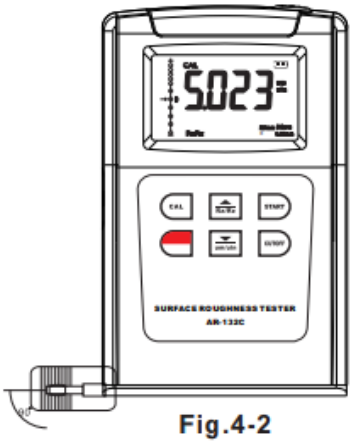


Fig.4-2

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 .

5.How to calibrate the tester

To set the measurement length, simply press the CAL key or hold down the CAL key until "LEN" appears on the display, then release. The screen will display the current length value (L).
Next, use the ▲ (Up) or ▼ (Down) keys to adjust the value. To save and exit, press any key other than ▲ or ▼.

6.How to calibrate the tester

6.1 Measurement on the Standard Sample Perform measurements on the standard sample and compare the results with the standard values. If the deviation exceeds 10%, restore the device to factory settings.

6.2 Adjusting the Calibration Potentiometer Use a screwdriver to adjust the first calibration potentiometer (located near the charging port on the front panel). After each adjustment, take a measurement until the correct value is achieved.

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.

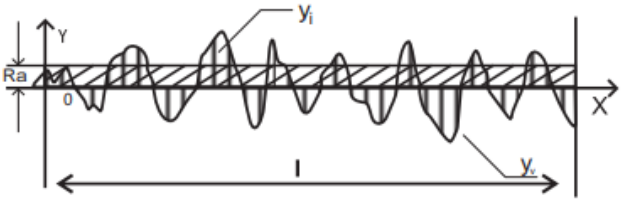
8. GENERAL MAINTENANCE

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.

$$Ra = \frac{1}{n}\sum_{i=1}^{n}|y_i|$$



9.2.2 Rz ten point height of irregularities
The average of the sum of five maximum profile peaks and the average of five maximum profile valleys within the sampling length.

$$Rz = \frac{\sum_{i=1}^{5} y_i + \sum_{i=1}^{5} y_v}{5}$$

9.3 Code Standard Name

ISO 4287 International Standard
DIN 4768 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 4) correctly into the case.

Cutoff length recommended

Please see the table on page 13.

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	