Surface Roughness Tester

DB22-SRT232

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: Characteristics

The instrument adopts computer technology, in line with GB/T 6062 and ISO, DIN, ANSI and JIS standards, can be widely used in the production site, can measure the surface roughness of a variety of machined parts, according to the selected measurement conditions to calculate the corresponding parameters, all the measured parameters are clearly displayed on the LCD. When measuring the workpiece surface roughness, the sensor is placed on the workpiece measured surface, the driving mechanism inside the instrument drives the sensor along the measured surface to do isometric sliding, the sensor through the built-in sharp stylus to feel the roughness of the measured surface, at this time the roughness of the workpiece measured surface causes the stylus to produce displacement, the displacement of the inductance of the

sensor coil changes. Thus, an analog signal proportional to the measured surface roughness is generated at the output end of the phase-sensitive rectifier, and the signal enters the data acquisition system after amplification and level conversion. The DSP chip performs digital filtering and parameter calculation on the collected data, and the measurement results are displayed on the LCD. At the same time, it can communicate with the PC to realize data analysis statistics and printing.

* Multi-parameter measurement: Ra, Rz
* high-precision inductance sensor;
* Built-in lithium-ion rechargeable battery and charging control circuit, tolerance High quantity;
* Mechanical and electrical integration design, small size, light weight, use
* With automatic shutdown function. This table has two shutdown modes: one is manual shutdown, the other is automatic shutdown after 5 minutes of keyboard

operation;
* Built-in standard RS232 interface, can communicate with PC;
* It has the function of converting the British system.

2. Specifications and parameters

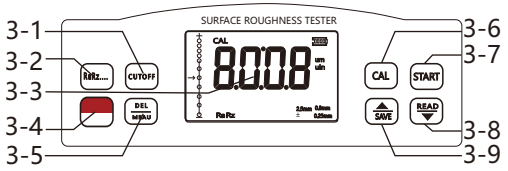
Monitor: Blue backlight, 4 - digit display, 10mm LCD
Measurement parameters: Ra, Rz
Measuring range:
Ra: 0.05-10.00um/1.000-400.0uinch
Rz: 0.020-100.0um/0.780-4000uinch
Accuracy: no more than ±10%
Indicating value variability: no more than 6%
Measurement principle: inductive radius: 10μm
Material: diamond
Force measurement: 16mN(1.6gf)
Angle: 90°
Longitudinal radius: 48mm

Maximum drive stroke: 17.5mm/0.7inch
Sampling length l(optional) : 0.8mm,
The 2.5 mm
Driving speed:
Measuring time
When sampling length =0.25mm, Vt=0.135mm/s
When sampling length = 0.8mm, Vt=0.5mm/s
When sampling length = 2.5mm, Vt=1mm/s Vt=1mm/s on return
Resolution: 0.001μm when the measurement value is < 10μm
0.01μm When 10μm≤ measured value < 100μm
0.1μm When the measurement value is ≥100μm
Evaluation length: 1~5 l optional
Power Supply: Built-in lithium-ion rechargeable battery 1 piece.
Working environment: Temperature: 0 ~ 50℃

Humidity: < 85% RH
Dimensions: 140×52×48mm
Net weight: about 420g
Standard accessories:
Portable case.....1
host.....1
Standard sensor.....1
Standard template.....1
Instruction manual.....1
screwdriver.....1
Adjustable support.....1
Sensor sleeve.....1
Optional accessories:
RS-232 on-line cable and software.....1

3. Panel and component description

3.1 Key Description



3-1 Sampling length selection key
3-2 Parameter selection key 3-3 display
3-4 Power switch 3-5 Delete/Menu key
3-6 Calibration key 3-7 Start button
3-8 Read/Down key 3-9 Save/Up key

3.2Names of each parts

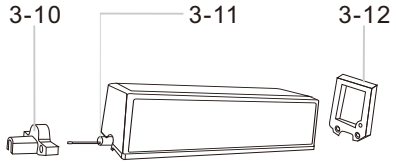


Fig. 3-2

3-10 Sheath of probe
3-11 Probe
3-12 Adjustable leg

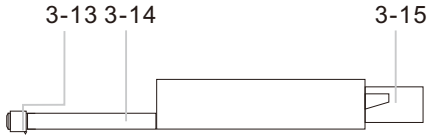


Fig. 3-3

3-13 Stylus
3-14 Protection sleeve
3-15 Socket

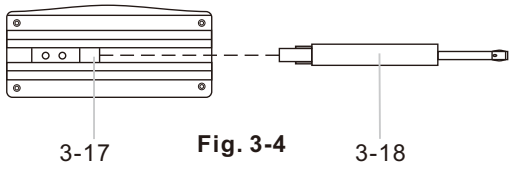


Fig. 3-4

3-17 Connection sheath
3-18 probe

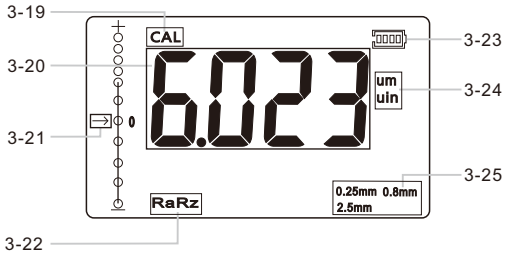


Fig. 3-5

3-19 Calibration
3-20 Measurement
3-21 Position pointer
3-22 Parameters
3-23 Battery
3-24 Unit
3-25 Cutoff

3.3installation and unloading of sensor

To install, hold the main part of the sensor by hand,push it into connection sheath at the bottom of the instrument as shown in Figure 3-4 and then slightly push to the end of sheath. To unload, hold the main partof sensor or the root of protective sheath and slowlypull it out.

A.The probe of the sensor is the main part of this instrument and requires close attention.

B.During installation and unloading, the probe should not be touched in order to avoid damage which can affect measurement results.

C.Connection of the sensor should be reliable during installation.

3.3Power adapter and charging of battery

When the battery voltage is too low (which is indicated
by the battery symbol on the screen), the instrument
should be charged as soon as possible. Follow the
indications shown in Figure 3-6. the power adapter
should be plugged into the power socket of the

connected to 100~220V 50Hz and charging of the battery will begin. Input voltage for power adapter is AC 100~220V with DC 5~7 V of output, about 300mA of charging current, charging time of up to 5.0 hours. This instrument uses a lithium ion chargeable battery. Charging can be fulfilled at any time without affecting the normal operation of the instrument.

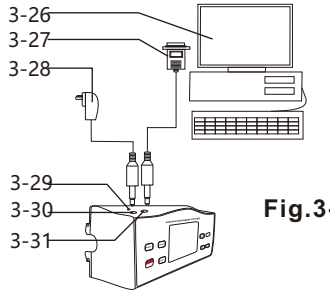


Fig.3-6

Connection of Power Adapter and USB

3-26 Computer
3-27 USB port to PC COM
3-28 Power adapter
3-29 DC power socket
3-30 Data cable socket

NOTES: See next page

A. Layout of connection lines should not affect measuring Part while charging.

B. The meanings of battery indicators are:
If battery voltage is normal, measurement can be carried out.
The black part inside prompt shows capacity of Battery; Indicates too-low voltage and battery should be charged as soon as possible; indicates that battery is full.

C. Relative high noises of the power source can affect measurement to weak signal to some extent when battery is being charged;

D. The back light of LCD will be on when charging even if the tester is still in the state of power off. The tester can monitor the process of charging itself.

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. Meanwhile, the second line of 2 digits on displayshows the groups stored in the memory. Before takingmeasurement, preparations have to be made and checked.
C. To check if the cutoff length selected is right. if not,Depress the CUTOFF to select. For the recommended

cutoff length, please see the table in 10.7on page 13.
D. To check if the measurement unit selected is right. If not, depress the key um/in to switch between the metric system and the British system.
F. To check if the parameter selected is right. If not,depress the key RaRz to select. This step is very important.
G.To clear the surface of the part to be measured;
H. Refer to Figure 4-1 and Figure 4-2 to place the instrument correctly, stably and reliably on the surface to be measured.
I. Refer to Figure 4-2 , the sliding trail of the sensor must be vertical to the direction of process line of themeasured surface.
J. Adjustable leg and sheath of sensor When the measured surface of the part is smaller than the measured surface of the part is smaller than the bottom surface of the instrument, the sheath of sensor and adjustable leg can be used for auxiliary support to complete measurement. (as shown in Figure 4-3)

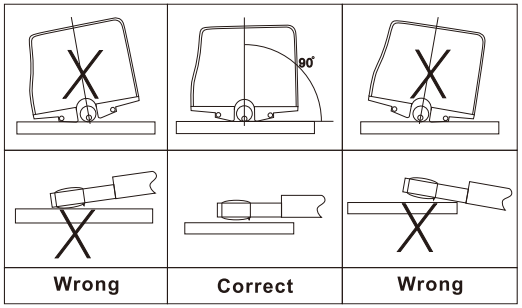


Fig.4-1

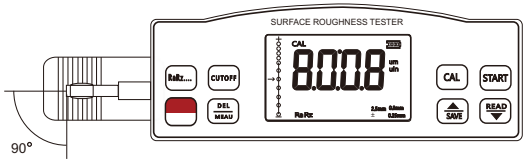


Fig.4-2

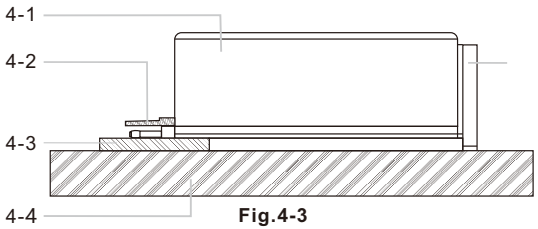


Fig.4-3

4-1 Roughness tester
4-2 Sheath of probe
4-3 Item to be measured
4-4 Working table
4-5 Adjustable leg

4.2 Measuring

After preparations is done, just press Start key to measure if measuring conditions are not to be changed. Firstly, you will see the '---' on the display and the probe is moving 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.

5.How to calibrate the tester

5.1To enter the calibration state, just depressing the key CAL, The calibration state is marked by'CAL'.
5.2Take a measurement based on the Standard sample plate. Contrast the measuring value with the value of standard sample plate based on the same parameter.
5.3Depress the key SAVE or READ to adjust the reading to the standard value.
5.4Just repeat 6.2 to 6.3 till the accuracy is ok.
5.5To quit, just press any key other than START key.
5.6 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.

6. Communicate With PC

This tester can communicate with PC computer by use

of the optional communicating cable and software. For detailed information, please seethe instructions with the optional software.

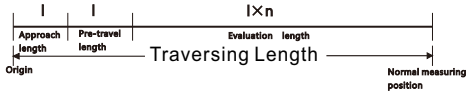
7. General Maintenance

*Avoid crashes, intensive vibration, heavy dust, humidity, grease stains and strong magnetic fields;
*The sensor is a precise part and should be protected carefully. It is ecommended to put it back in the box after each operation;
* Protect the standard sample plate belonging to the instrument carefully to avoid calibration faults caused by scratches.

8.References

8.1Central Line
This tester adopts minimum central line of least square algorithm.
8.2Traversing Length
l=sampling lenght

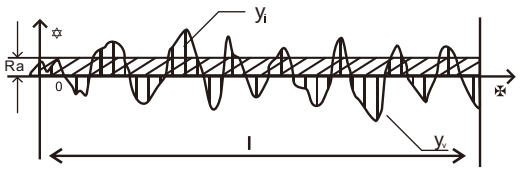
n=number of sampling lenght
lxn=evaluation lenght



8.3 Definition of roughness parameter

8.3.1 Ra arithmetical mean deciation of profile Arithmetic value of mean deciation of profile within sampling length.

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



8.3.2 Rz ten point height of irregularities

The average of the sum of five maximum profile peaks and the average of five maximum profile valleys withinthe sampling length.

$$Rz = \frac{\sum_{i=1}^{5}\frac{1}{2_i} + \sum_{i=1}^{5} y_V}{5}$$

8.4Fault Information

Err1 no data stored for browsing.

Err2 the Ra value of the standard sample is too small to be uses for calibration.Err3 the value is too small to continue to decrease.

8.5Code Standard Name

ISO4287	International Standard
DIN4786	German Standard
JISB601	Japanese Industrial Standard
ANSIB46.1	American Standard

8.6Cutoff Length Recommended

Ra (μm)	Rz (μm)	Cutoff length (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 > 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	