Surface Roughness Platform

SHT-180

OPERATING INSTRUCTION MANUAL

SHANGHAI JUHUI INSTRUMENT MANUFACTURE CO.,LTD

Catalogue

1 Overview

The portable roughness meter is a new product, the equipment is suitable for laboratory and production field, measured a variety of surface roughness of machined parts, calculate the corresponding parameters according to the selected measurement conditions, measurement results clearly showed on the OLED display and graphics.

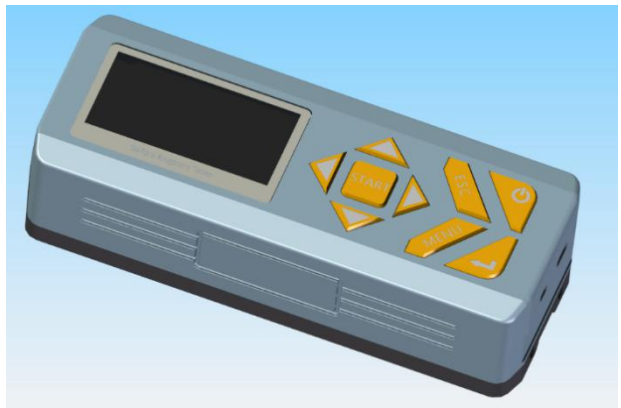


Figure 1-1 Roughness Tester Host

1.1 Characterisitics

- Parameters：Ra、Rq、Rsm、Rsk、Rz、Rt、Rp、Rv、Rc；
- high precision inductance sensor；
- GAUSS filter；
- Meet the standards ISO4287；
- 128×64 OLED，Yellow word；
- built-in lithium ion rechargeable battery and charging control circuit, high capacity, no memory effect, continuous working time is more than 20 hours；
- electromechanical integration design, small size, light weight, easy to use；
- with automatic shutdown, memory, and all kinds of information；
- optional surface sensor, small hole sensor, measurement platform, long pole and other accessories。

1.2 Instrument Parameters：

1、 Sensor

- testing principle： Inductance Type
- Measurement Range： 200 μ m
- stylus tip radius： 5 μ m
- stylus tip material： Diamond
- maximum recommended static measureing force： 4mN(0.4gf)
- conical stylus with spherical tip angle： 90°
- longitudinal guide head radius：45mm

2、 driving parameters

- Maximum driving trip： 15mm
- Drive speed： measuring sampling length = 0.25mm Vt=0.135mm/s
  sampling length = 0.8mm Vt=0.5mm/s
  sampling length = 2.5mm Vt=1mm/s
  backing V=1mm/s
- indication error： < ±10%

- indication repeatability：< 6%

2 Know The Instrument

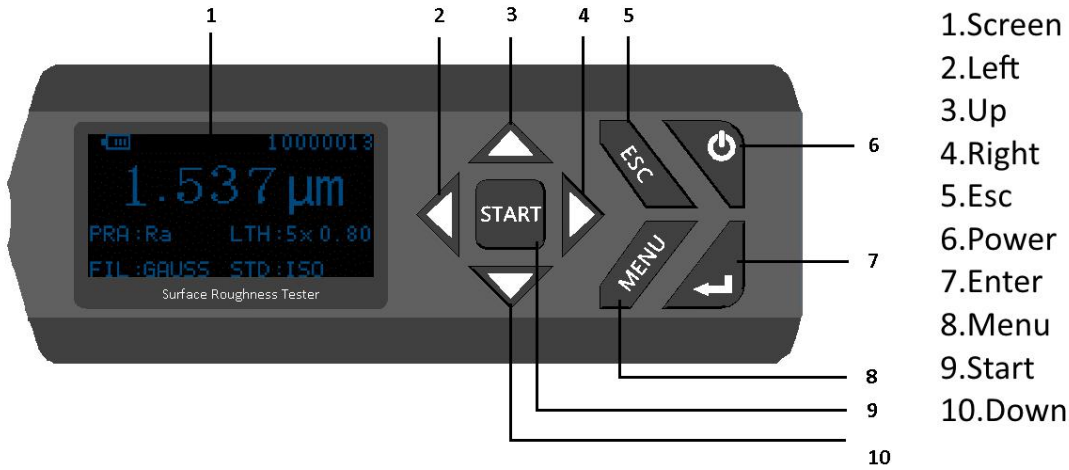


Figure 2-1 Roughness Tester Host

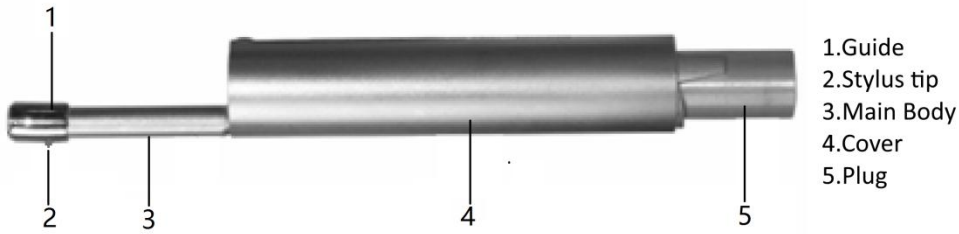


Figure 2-2 S100 Roughness Sensors

3 Basic interface

3.1 main interface

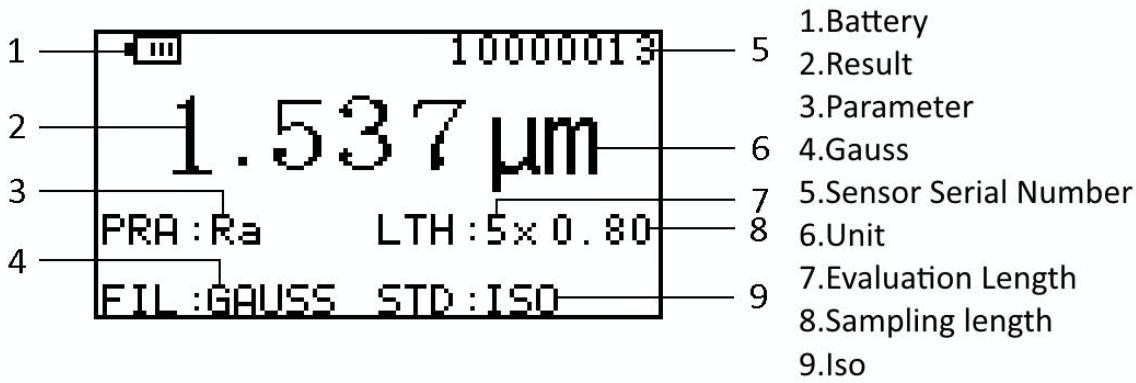


Figure 3-1 main interface

In the main interface，The following operations can be performed：

1、 Use MENU enter menu interface

2、 Use ◀ or ▶ can choose four setups such as Parameters、evaluation lenth，sampling lenth、unit in order，The selected object will turn black, highlighted，use ↵ change the selected setup，and use ESC Exit this interface.

3、 Use ▲ or ▼ Change the currently selected records，use ↵ Quickly into a single record all the parameters of the currently selected record interface， and use ESC exit。

4、 Use START the instrument will measure in the current setup，after meaure and updata the measurement data， return the main interface。

3.2 menu interface

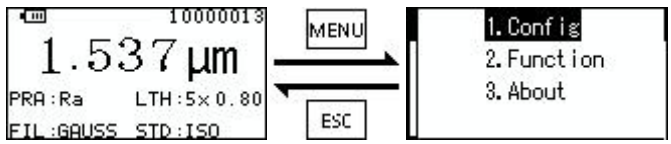


Figure 3-2 menu interface

In the menu interface，The following operations can be performed：

1、 use ▲ or ▼ select measurement setup、Function Selection、data management、software info，The selected object will turn black, highlighted；

2、 use ↵ into the selected interface.

3、 use ESC return the main interface.

3.3 Measurement setup interface

Figure 3-3 measurement setup interface

In the measurement setup interface，The following operations can be performed：

1、 Use ▲ or ▼ select parameter Parameters、sampling lenth、evaluation lenth、unit、language，five setups，The selected object will turn black, highlighted；

2、 Use ↵ To set values；

3、 Use ESC return the menu interface.

note：

- parameters may change in sequence：

  Ra → Rq → Rsm → Rsk → Rz → Rt → Rp → Rv → Rc，default is Ra；

- sampling lenth may change in sequence：0.25mm → 0.8mm → 2.5mm；default is 0.8mm
- evaluation lenth may change in sequence：1 → 2 → 3 → 4 → 5；default is 5
- language may change in sequence：chinese → English；default is chinese
- unit may change in sequence：metric → inch；default is metric

3.4 function interface

Figure 3-4 fanction interface

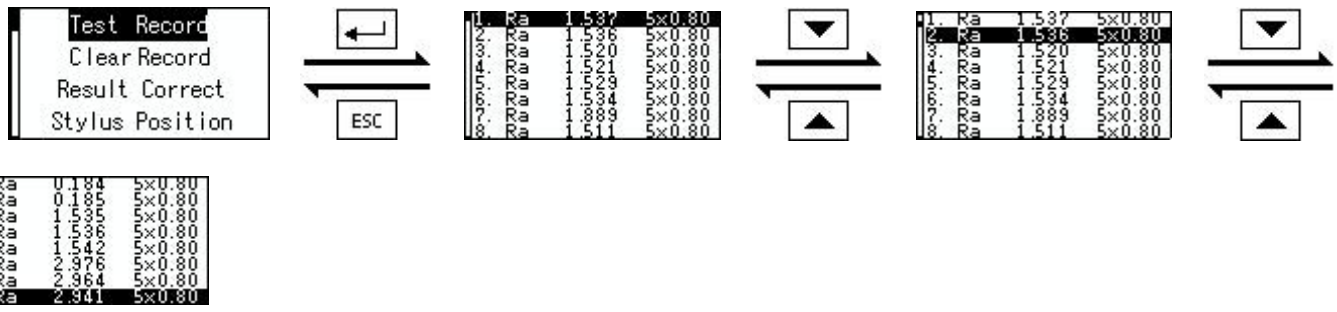
In the fanction interface，The following operations can be performed：

1、 use ▲ or ▼ select result correct、stylus position、time close、reset default,，five setups，The selected object will turn black, highlighted；

2、 use ↵ go into the selected interface；

3、 use ESC return the menu interface.。

3.4.1 function interface → test record interface



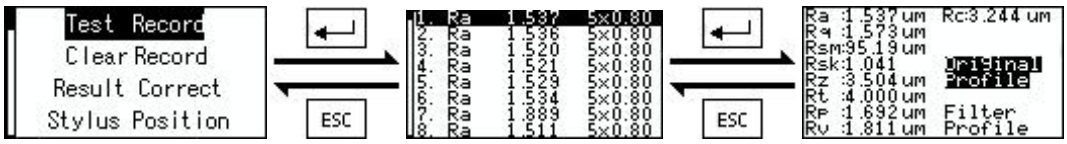
In the test record interface, The following operations can be performed：

1、 use ▲ or ▼ select test record,There are twenty test records. Record sorting is the last test result to record 1.The selected object will turn black, highlighted；

2、 use ↵ go into the selected interface；

3、 use ESC return the function interface.。

3.4.1.1 function interface → test record interface → all parameter of one record interface



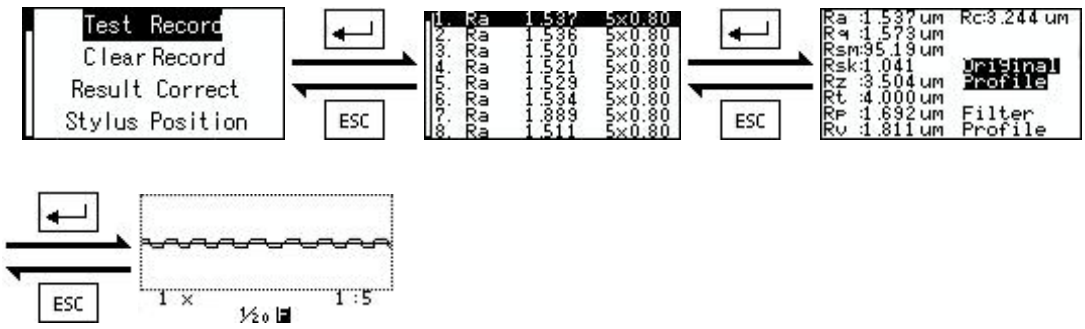
In the all parameter of one record interface, The following operations can be performed：

1、 use ▲ or ▼ select original curve、filter curve. The selected object will turn black, highlighted；

2、 use ↵ go into the selected interface；

3、 use ESC return the test record interface.。

3.4.1.2 function interface → test record interface → all parameter of one record interface → curve of one record interface



In the curve f one record interface, The following operations can be performed：

1、 use ▲ or ▼ can change the magnification of curve. The sequence of magnification is : **1x、2x、3x、4x、5x、10x、20x、30x、40x、50x** , ▲ is zoom in, ▼ is zoom out. The magnification is 1x by default；

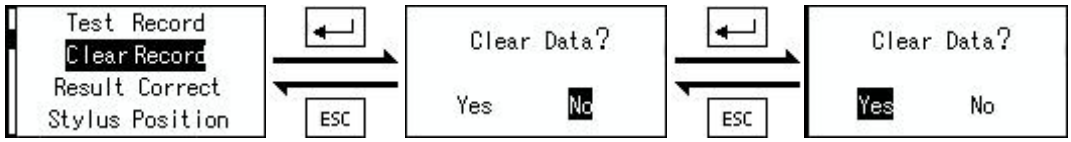
2、 use ◀ or ▶ , The sequence of the first sampling length, the second sampling length, the third sampling length, the fourth sampling length, the sampling length of the fifth sampling length, and the contour of the overall evaluation length can be shown in sequence .

3、 use ESC return the all parameter of one record interface.。

注：

- about the curve of evaluation length，Due to the sampling point too many，Screen pixels is limited，a lot of characteristics will lose in the whole curve，so the curve of evaluation length only show An overview of display on the whole test process。
- in the current record profile curve interface，1/10 Indicating the currently selected records，Indicating the original profile， Indicating the filter profile。

3.4.2 function interface → clear record interface



In the clear record interface，The following operations can be performed：

1、 in order to avoid the wrong operation， from the functioninterface to the clear record interface after use ↵，The default selection is to NOl botton，the next ↵ will back to the function interface，system will do nothing；

2、 Use ◀ can choose the YES botton，use ▶ can choose the NO botton again，while choose the YES botton，after use ↵，all records will be delete,，after that system will back to the main interface；

3、 Use ESC back the function interface。

3.4.3 function interface → result correct interface

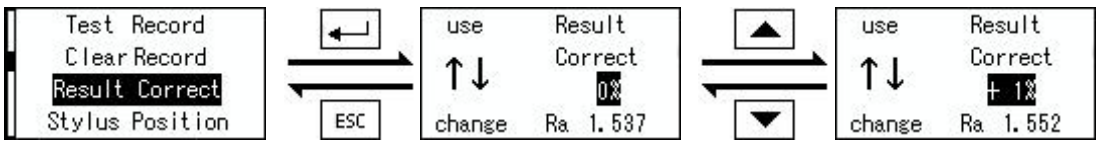


Figure 3-5 result correct interface

In the result correct interface，The following operations can be performed：

1、 use ▲ or ▼ can select -99%~+99%，▲ can Increase，▼ can decrease。

2、 use ESC return the function interface。

note：

in the result correct interface,while use ▲ and ▼ change the value，Displays the currently selected parameter at the bottom of the calibration value, and display the last test values（This display values for calibration more convenient

operation），The displayed value will change with change the calibration value，If the display value to near expectations，The next time the measurement results will be near to the expectations。The results of the main interface display will also change the display value for this（as shown in figure 3-6）。

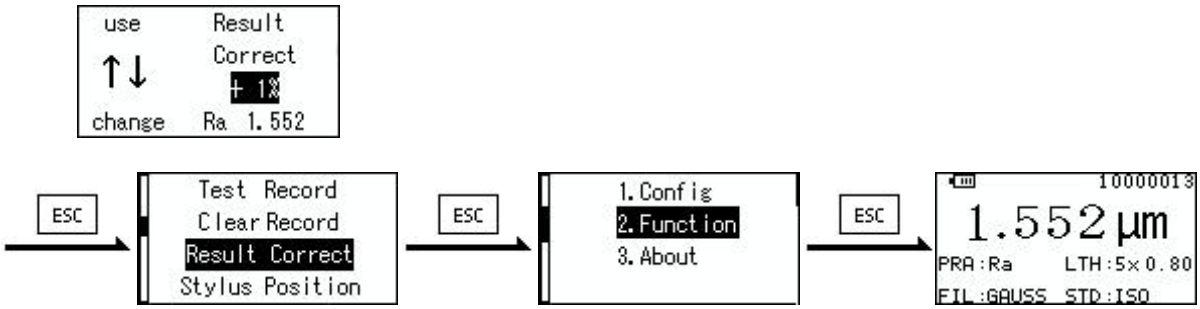


Figure 3-6　After the calibration value back to the main interface shown values change

3.4.4　function interface →► stylus position interface

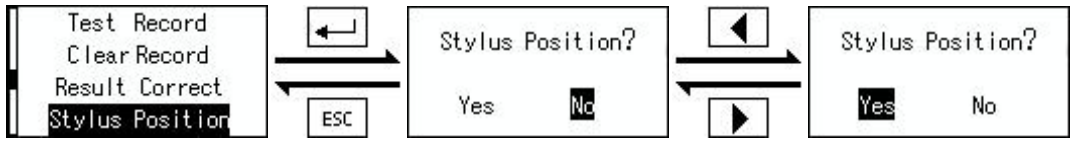


Figure 3-7　The stylus position interface

In the stylus position interface，The following operations can be performed：

1、 In order to avoid the wrong operation，from the functioninterface to the stylus position interface after use ↵，The default selection is to NOl botton，the next ↵ will back to the function interface；

2、 Use ◄ can choose the YES botton，use ►can choose the NO botton again，while choose the YES botton，after use ↵，Will measure according to the currently selected sampling length and the evaluation lenth，after the measurement,system will updata sensor stylus position，then back to the main interface；

3、 Use ESC back to the function interface。

note：

Can be measured as the stylus position calibration of measuring and planar, a normal measurement, but the measure will only calculate the stylus position, not as a measurement record。

3.4.5　function interface →► time close interface

Figure 3-8　time close interface

In the time close interface，The following operations can be performed：

1、 use ▲ ▼ can select never、1min、3min、5min、10min、30min；

2、 use ESC back the function interface。

3.4.6 function interface → reset default interface

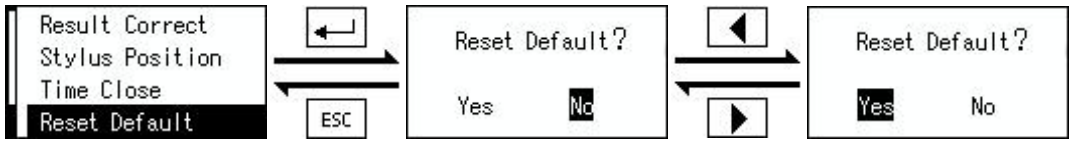


Figure 3-9 reset default interface

In the reset default interface，The following operations can be performed：

4、 In order to avoid the wrong operation， from the functioninterface to the reset default interface after use ↵，The default selection is to NOl botton，the next ↵ will back to the function interface，system will do nothing；

5、 Use ◀ can choose the YES botton， use ▶ can choose the NO botton again， while choose the YES botton，after use ↵，the memory chip will format, the 20 records will be empty，Instruments associated Settings back to the factory， after reset default system will back the main interface；

6、 Use ESC back the function interface。

3.5 software info interface

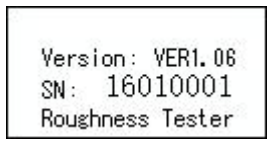


Figure 3-15 the software info interface

note：

- SN is The sensor serial number， have no sensor will show “no sensor”,if the sensor is on , The sensor serial number will show。
- NO is the host serial number。

4 Instrument operation

4.1 Power on

In shutdown mode，press down the power botton ⏻，instrument start up，enter the main interface。

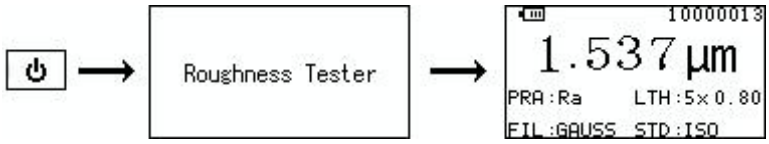


Figure 4-1 the start up process

note：must put battery switch at on。

4.2 power off

In power on mode，press down the power botton ⏻，instrument power off。

note：If long time do not use the equipment，must put battery switch at off。

4.3 The preparation for measurement

1、 Check the battery voltage；
2、 Clean the workpiece surface to be tested；
3、 Refer to Figure 4-2、Figure 4-3，The instrument correctly placed on the workpiece surface to be tested；
4、 Refer to Figure 4-4，the sensor movement must Vertical the surface lay of the workpiece to be tested.

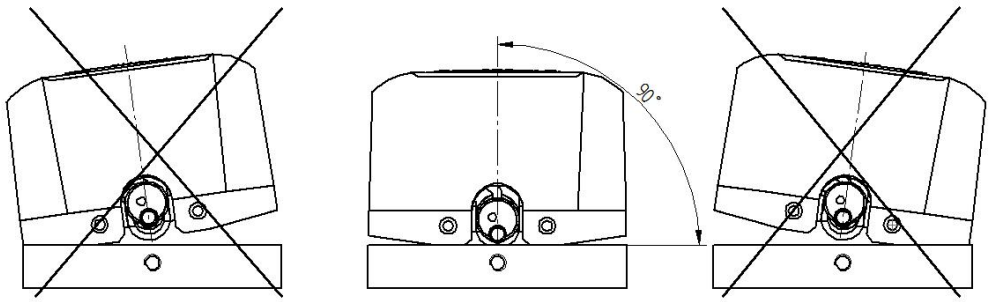


Figure 4-2 the Front View of measure

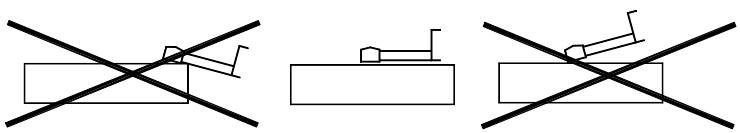


Figure 4-3 the side view of measure

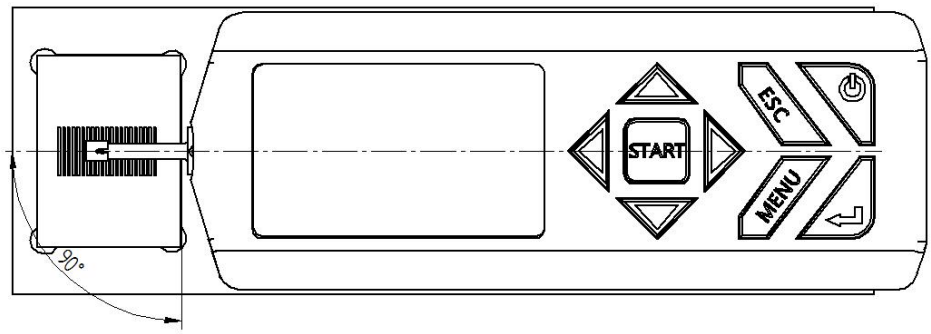


Figure 4-4 Measuring Direction

4.4 measure

in any interface ， press down the start botton START， instrument will measure according to the current operation，after measure system will back the main interface。

4.5 connection with sensor

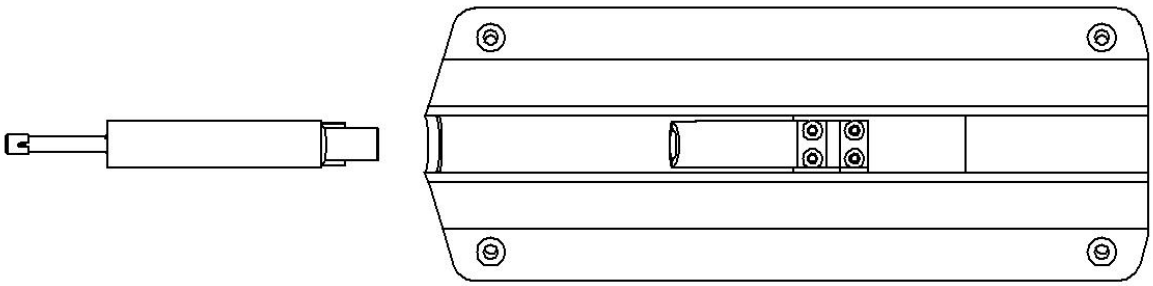


Figure 4-5 The host connected to the sensor

4.6 Check the stylus tip position

In the left side of the main screen display area of needle position, can observe the stylus tip position。

4.7 Look over the test data

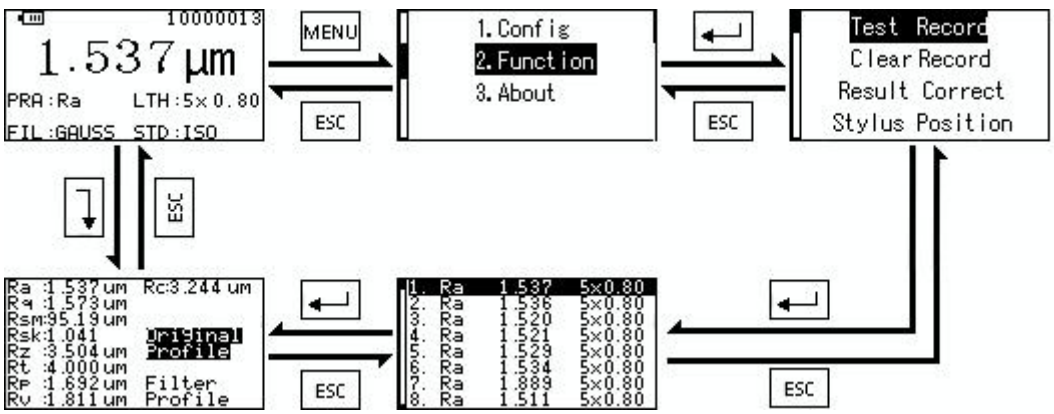


Figure 4-7 two way of look over the test data

The schematic can know ， two way can look over the test data：

1、 The main interface → the menu interface → the data management interface → the test data

interface → single record all the parameters interface

2、 **The main interface** → single record all the parameters interface

note：

- From the main interface,use [↵] go into single record all the parameters interface,then use [ESC] can back the main interface.but From the main interface,use [MENU] go into the menu interface， pass the data management interface and the test data interface， go into single record all the parameters interface， then use [ESC] can back the test data interface.

4.8 Modify measuring parameters

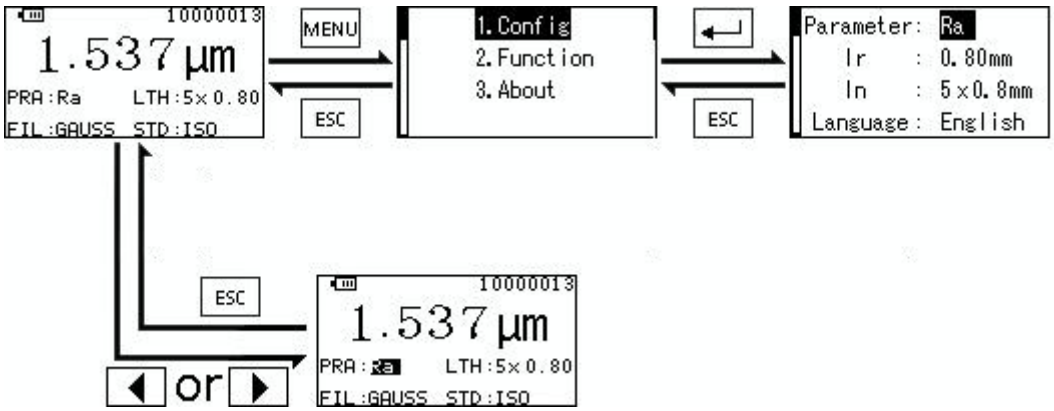


Figure 4-8 two way to modify measuring parameter

The schematic can know ， two way can modify measuring parameter：

1、 **The main interface → the menu interface → the measuring parameter interface**

2、 **The main interface** → use [◀] or [▶] select， use [↵] modify。

note：

- In the main interface ,use [◀] or [▶] can select the measuring parameters need to modify， use [↵] modify， then use [ESC] can go back the main interface；
- In the main interface,use [MENU] go into the menu interface，then go into the measuringparameter interface，can select the measuring parameters need to modify， use [↵] modify， then use [ESC] can go back the main interface。
- In the main interface four settings can be changed.in the measuring parameter interface five settings can be changed， language can change in the measuring parameter interface only.

4.9 The power adapter and battery switch

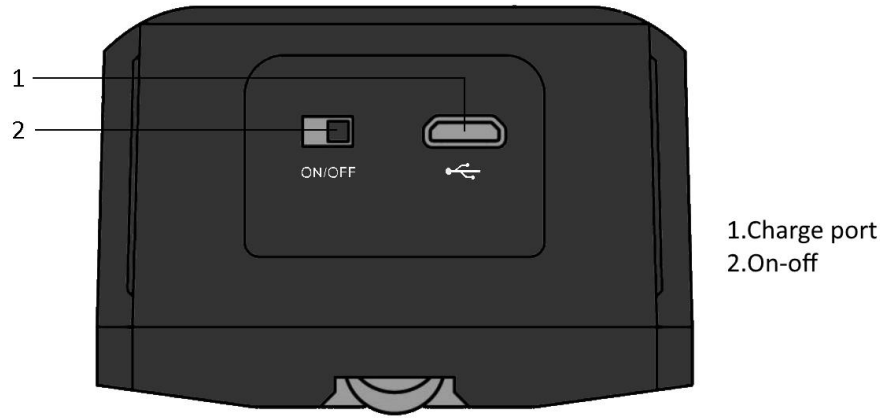


Figure 4-9 micro usb and battery switch

When the battery voltage is too low， the battery prompt on the OLED indicate the voltage is too low，Should recharge instrument as soon as possible。When charging，To be sure the tail of the battery switch atON，Insert the power plug of the ac adapter to the micro-usb，then connect the Power Adapter to220V 50Hz，charging started。Power Adapter input voltage is220v AC，output 5v DC， maximum charging current about 500mA，charging time about 4 hours。

note：

- the instrument can measuring at Charging status， but Should pay attention to aplug is put do not affect the measurement。
- While charging，Don't care about power on or power down，the battery switch must atON。
- Charging port is micro_USB，only can charge，not have data transmission。
- The battery voltage prompt：

indicate The voltage is normal，can do measurement；the black of the prompt indicate battery capacity,

indicate the voltage is low，should Charge as soon as possible；

indicate the battry is on charging；

indicate the battry is full，unplug the power supply；

4.10 height adjusting frame and Sensor protection

When the measured surface of the workpiece is smaller than the instrument's underside，can use height adjusting frame and Sensor protection，To complete the measurement（figure 4-10、4-11）。

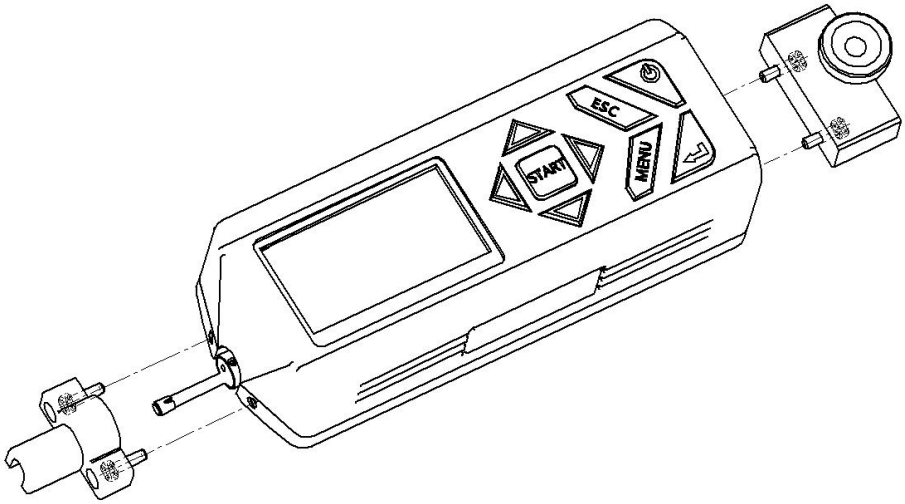


Figure 4-10 height adjusting frame and Sensor protection

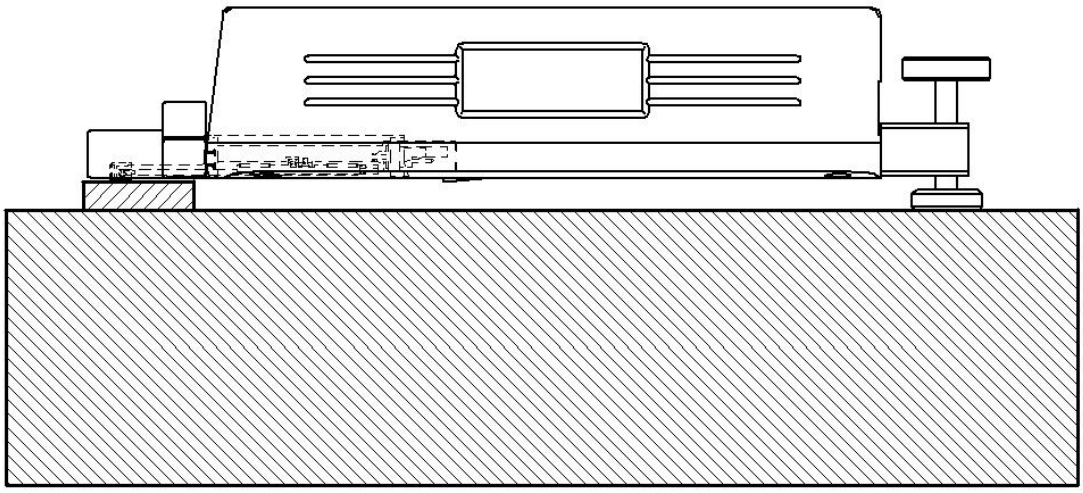


Figure 4-11

diagrammatic of height adjusting frame and Sensor protection

- In the figure, L not less than the measurement of drive travel， Avoid sensor in measuring dropped to parts to be tested out，The sensor is returned to resist workpiece caused failure。
- height adjusting frame lock matter is reliable。

4.11 Optional accessories

4.12 measurement platform

use TA serial measurement platform，Can easily adjust the position between the instrument and the workpiece to be measured， More flexible and stable operation, use scope is bigger, can measure roughness on the surface of the complex shape parts。While use TA serial measurement platform，Needle position can be adjusted more precisely, measuring more smoothly。 When measured on the surface of measured value Ra is small，Suggested Use measurement platform。

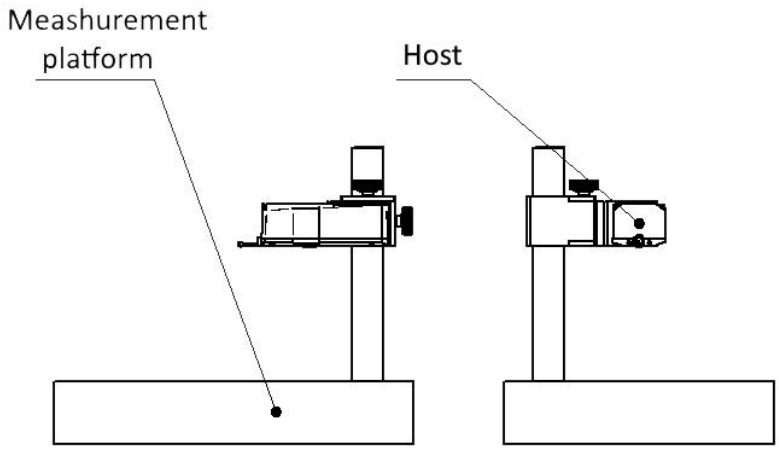


Figure 5-1 measurement platform

4.13 extension bar

Use extension bar，Can increase the sensor into the depth of the workpiece inside，extension bar length is 50mm。

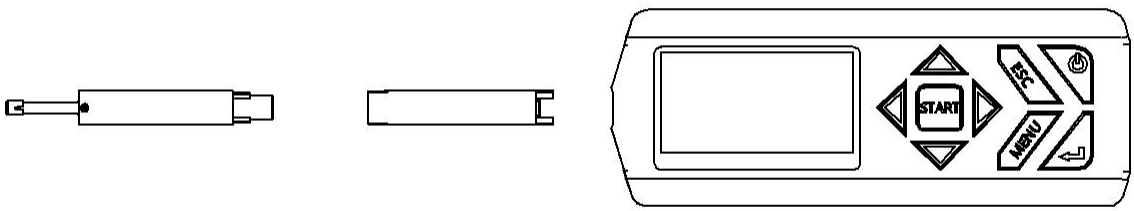


Figure 5-2 hos+ extension bar+sensor

5 Daily maintenance and maintenance

- avoid collisions, severe vibrations and heavy dust, moisture, oil, strong magnetic field, and so on .
- sensor is instrument precision components，need careful maintenance。After each use, put back the sensor in the box；
- the standard sheet need Carefully protect， scratch will cause the calibration instrument phrase。

6 Definition of roughness parameter

this roughness instrument meetISO4287， employ Gauss digital filter， parameteris define by ISO4287.

6.1 arithmetical mean deviation of the assessed profile

Ra

arithmetical mean of the absolute ordinate value Z(x),within a sampling lenth.

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

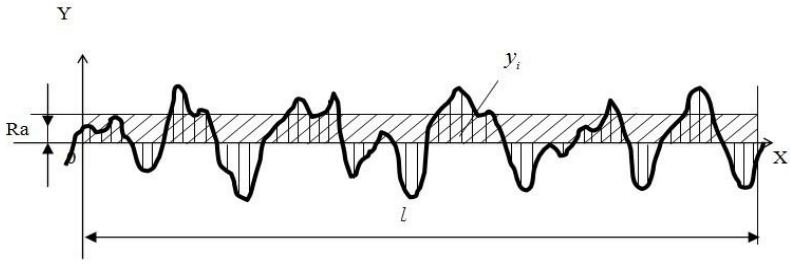


Figure 7-1 diagram of Ra

6.2 Root mean square deviation of the assessed profile

Rq

Root mean square value of the ordinate values Z(x) within a sampling length.

$$Rq = \left(\frac{1}{n}\sum_{i=1}^{n} y_i^{\,2}\right)^{\frac{1}{2}}$$

6.3 Mean width of the profile elements

Rsm

Mean value of the profile element widths Xs within a sampling length

$$Rsm = \frac{1}{n}\sum_{i=1}^{i=n} Xsi$$

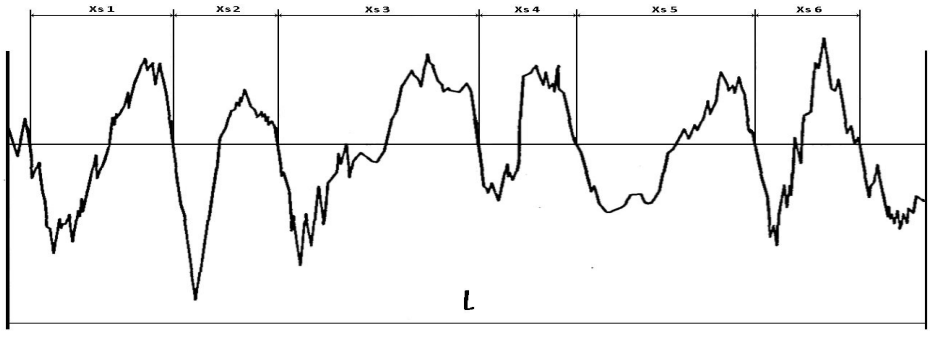


Figure 7-2 Mean width of the profile elements

6.4 Skewness of the assessed profile

Rsk

Quotient of the mean cube value of the ordinate value Z(x) and the cube of Rq respectively, within a sampling length.

$$R_{Sk} = \frac{1}{R_q^3} \times \frac{1}{n} \sum_{i=1}^{n} (y_i)^3$$

6.5 Maximum height of profile

Rz

Sum of heightof the largest profile peak height Zp and thelargest profile valley depth Zv within a sampling length.。

6.6 Total height of profile

Rt

Sum of the height of the largest profile peak height Zp and the largest profile valley depth Zv within the evaluation length.

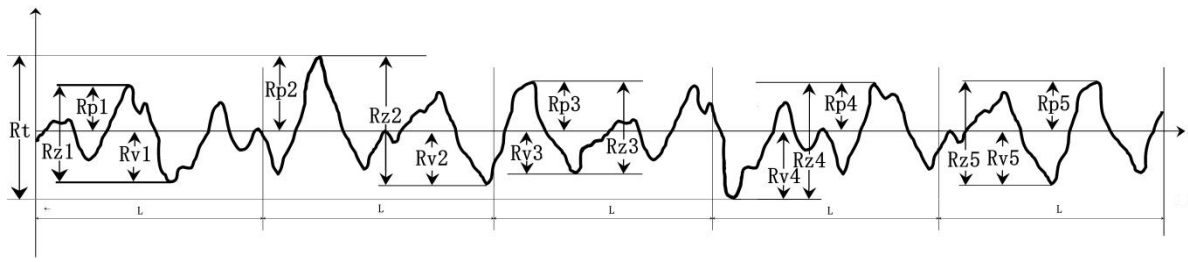


Figure 7-3 Rz、Rt、Rp、Rv

6.7 Maximum profile peak height

Rp

Largest peofile peak height Zp within a sampling length.

6.8 Maximum profile valley depth

Rv

Largest peofile valley depth Zv within a sampling length.

6.9 Mean height of peofile elements

Rc

Mean value of the profile element heights Zt within a sampling length.

7 Standard Configuration

name	number
sensor	1
host	1
standard sheet	1
Power Adapter	1
plug	1
Sensor sheath	1
Height adjusting frame	1

WARRANTY REGISTRATION CARD	
Product model	
Host ID	
Impact device number	
Warranty telephone	
Userinfo	
Date of purchase	One year warranty(From the time of purchase,the attachment /vulnerable parts are excluded)
Unit name	
Contact Address	
CONTACTS	
Contact number	
Copy of invoice copy	

Model No		SHT-180	
Serial No			
CONCLUSION			
TEST CONDITIONS			
TEMP		25 ℃	
HUMIDITY		40% RH	
Standard Ra(um)	Reading Ra(um)	Qualified Ra(um)	Notes
0.080		0.72-0.088	
0.10		0.09-0.11	
0.44		0.396-0.484	
1.60		1.44-1.76	
3.2		2.88-3.52	