3-10 3-11 3-12

Fig.1-1

3-10 Sheath of probe
3-11 Front panel
3-12 Adjustable leg

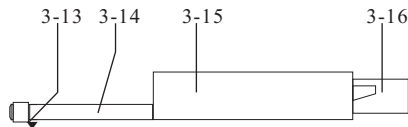3-13 3-14 3-15 3-16

Fig.1-2

3-13 Stylus
3-14 Protection sleeve
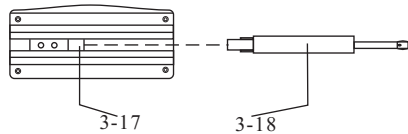3-15 Main body
3-16 Socket

3-17 3-18

Fig.1-3

3-17 Connection sheath
3-18 probe

| Wrong | Correct | Wrong |

Fig.2-1

Fig.2-2

4-1
4-2
4-3
4-4
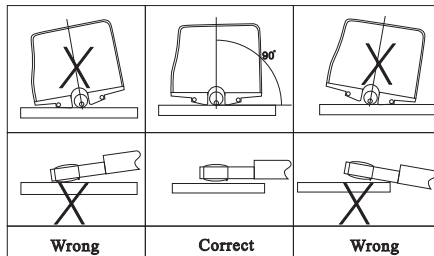4-5
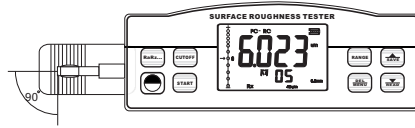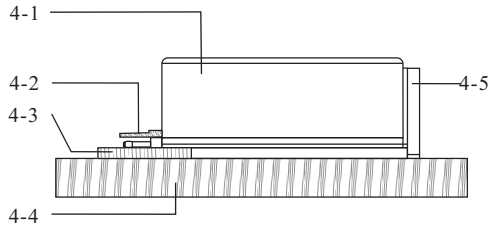
Fig.2-3

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

3-19
3-20
3-21
3-22
3-23
3-24
3-25
3-26
3-27
3-28
3-29
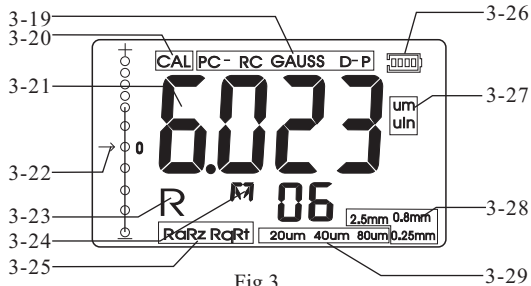
Fig.3

3-19 Filter
3-20 Calibration
3-21 Measurement
3-22 Position pointer
3-23 Browsing
3-24 Memory
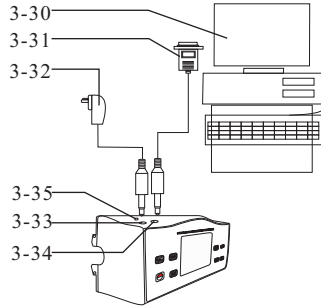
3-25 Parameters
3-26 Battery
3-27 Unit
3-28 Cutoff
3-29 Ranges

Fig.4

Connection of Power
Adapter and RS232C

3-30 Computer
3-31 RS-232 port to PC COM
3-32 Power adapter
3-33 DC power socket
3-34 RS-232 socket
3-35 Calibration hole

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	$>$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	

Fig.5

l=sampling length
n=number of sampling length
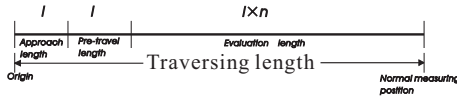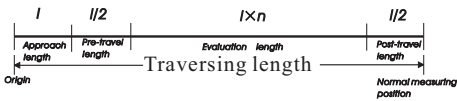*l×n=evaluation length*

Fig.6-1 RC filter

Fig.6-2 PC-RC filter

Fig.6-3 GAUSS filter

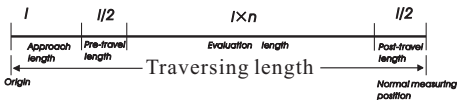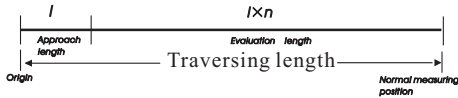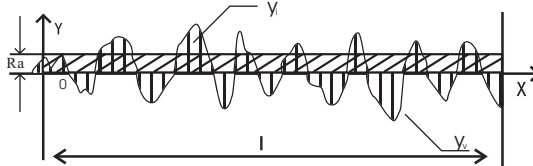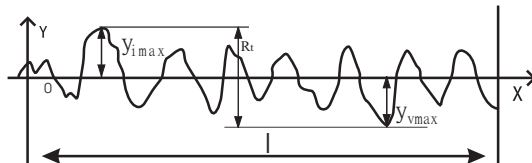Fig.6-4 D-P filter

Fig.7

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

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

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

LiMiT

Manual Surface Roughness Tester

General information
Limit Surface Roughness Tester is small in size, leight weight and easy to use and operate. Probe is of diamond inductance type. Movement of probe by driven mechanism and with adjustable driving stroke. Memory for 7 measurments. Automatic off 5 minutes after latest key operation or manual off. Built-in lithium rechargeable battery. The instrument is compatible with standards ISO, DIN, ANSI and JIS.

Specification

Parameter			Ra, Rz, Rq, Rt
Range	Ra Rq	µm	0,025 – 16
	Rz Rt	µm	0,02 – 160
Accuracy			± 10 %
Profil digital filter			Gaussian, RC, PC-RC
Probe radius		µm	5
Probe force		Nm	4
Max driving stroke		mm	17,5
Cut off length		mm	0,25 - 0,8 – 2,5
Adjustable leg		mm	0 – 23
Dimension LxBxH		mm	150x55x50
Weight		g	420

Start   Push Ө button. Manual off push Ө button again.
The instrument restores setting from last measurment.

Setting   Select cutoff length. See fig 5. Press CUTOFF button for select.

Select Traversing length. Press RANGE button. See fig 6. Select L1, L2..L5 with ▲▼buttons. Confirm by press RANGE button.

Select filter. RC, PC-RC, GAUSS, D-P. See fig 6. Press DEL/MENY button for 3 seconds until FILT shows on the display. Select with ▲▼buttons. Confirm by press DEL/MENY button.

Select metric or imperial. Press DEL/MENY button for 8 seconds until UNIT shows on the display. Select with ▲▼buttons, um for metric or uin for imperial.

Select parameter Ra, Rz, Rq, Rt. Se fig. 7. Press RaR button.
Ra. Average deviation of profile within sampling length.
Rz. Difference between the average of 5 max peaks and average of 5 max valleys.
Rq. Root mean square of profile deviation.
Rt. Difference beetween max peak and max valley.

Operation   Check settings and battery capacity.
Clear the surface to be measured.. Place the instrument correctly, stably and reliably on the surface to be measured. Important that sliding trail direction is

2

vertical to the measured surface. Se fig 1,2,3. Adjust height of the leg on rear side. Check that the horizontal indicator on the display is in 0 position. Press START button. Read the value on the display. Make a test measurment before real measurment.

Memory 7 measurements can be memorized.
M shows on the display before measure is made. After measure is made shows Ħ on the display. To save result press ▲SAVE button.
Replace result. Press DEL/MENY button.
Browse to read saved result. Press ▼READ button.
R, number and value shows on the display.

Calibrate Press DEL/MENY button for 12 seconds until CAL shows on the display.
Make an measurement on a standard sample plate with known Ra value.
Adjust with ▲ ▼ buttons until the display shows same Ra value as the standard sample plate. Press DEL/MENY button to quit. Repeat measurement and calibration again until accuracy is acceptable against the standard sample plate.

Factory settings It is necessary to restore the factory setting after installed a new probe or the instrument don´t measure properly.   .
Press DEL/MENY button for 16 seconds until FAC shows on the display.
Make an measurement on a standard sample plate with known Ra value. The display shows different value. Use a screwdriver and adjust the resistance until the display shows same Ra value as the standard sample plate. See fig. 4, 3-35.
After that make a calibration as above.

PC connection Install the optional RS232C software and cable to the PC. See fig 4, pos 3-6.
Click the button of data collection, then click the button Begin /Continue.
To download the groups stored in the memory, just press ▼READ button.

Battery The instrument is provide with a built in lithium rechargeable battery. Recharge when battery symbol shows 1 staple. By 4 staples have battery full capacity.
See fig 4.

Maintenance The sensor part and diamond tip is perishable items and must be handled with care. It is recommended to put it back in the box after each operation.
Avoid scratches etc on the standard sample plate.
Avoid the instrument from contact of all kind of liquids, connection to voltage, strong magnetic fields, shocks, impacts, drops etc.
Use a dry rag or similar when cleaning the instrument.