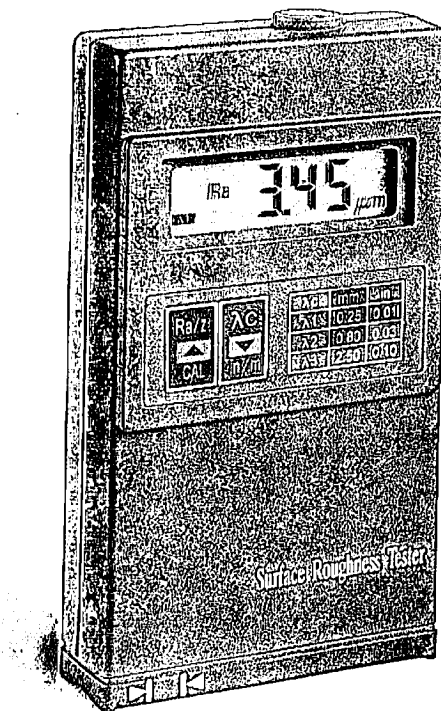


SURFACE ROUGHNESS GAGE

Model No. SRG-1000

INSTRUCTION MANUAL



Manual should be read prior to operation!

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1) GENERAL

The Phase II model # **SRG-1000** Mini Surface Roughness Tester is a new generation of product developed for the Phase II Metrology Group that features high accuracy, a wide range of application, simple operation and stable performance. It is widely applicable in testing surfaces of all kinds of metals and non-metals. Integrating the sensor with its mainframe, its a hand-held set especially suited for use on any production site.

2) WORK PRINCIPLE AND STRUCTURE FEATURES

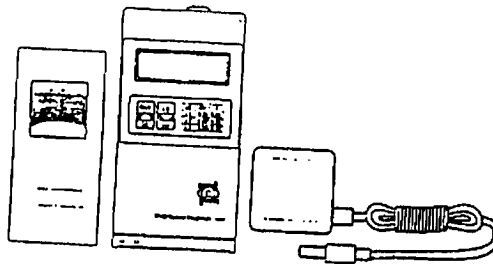
2.1) WORK PRINCIPLE

When the sensor driven by a driver is making a linear uniform motion along the test surface, the contact stylus being perpendicular to the work surface, moves up and down with the work surface. Its motion is converted into electric signals, which are amplified, filtered and transformed into digital signals through a/d. the signals are then processed by the CPU into **Ra** and **Rz** values before being displayed on the screen.

2.2) STRUCTURAL FEATURES

2.2A) BASIC SETUP: FOR OUTWARD APPEARANCE, SEE FIGURE 1.

| | |
|-----------------------|--------|
| MAINFRAME | 1 UNIT |
| BATTERY CHARGER | 1 UNIT |
| STANDARD SAMPLE BLOCK | 1 UNIT |



SAMPLE BLOCK MAINFRAME BATTERY CHARGER

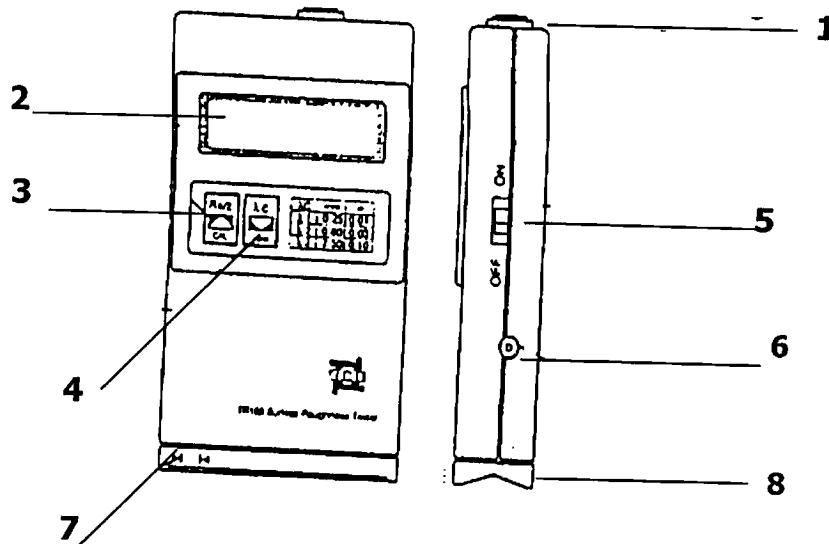


FIGURE 2: STRUCTURE OF MAINFRAME

- | | |
|------------------|--------------------------|
| 1) START BUTTON | 2) LCD SCREEN |
| 3) KEY PAD 1 | 4) KEY PAD 2 |
| 5) ON/OFF SWITCH | 6) CHARGING SOCKET |
| 7) STYLUS MARK | 8) STYLUS PROTECTIVE CAP |

3) MAJOR TECHNICAL PARAMETERS


| | |
|--|--|
| ROUGHNESS PARAMETER | Ra (ISO), Rz (DIN) |
| MEASURING RANGE | RA: 0.05-10.0 μ M RZ: 0.1 - 50 μ M |
| CUT-OFF LENGTHS | 0.0009IN., 0.03IN., 0.09IN. |
| FILTER | RC ANALOG |
| TRACING LENGTH | 0.23IN (6MM) |
| TRACING SPEED | 0.04IN/SECOND (1.0MM/SECOND) |
| ACCURACY | CONFORM ISO CLASS 3 |
| PICK UP STYLUS | PIEZO-ELECTRIC |
| TRACER TIP | DIAMOND, RADIUS 10 μ M +/- 2.5 μ M |
| OPERATING TEMPERATURE | 32-104 DEGREES F (0-40 DEGREES C) |
| POWER | 3.6V / 2X NIMH BATTERIES |
| CHARGER | 9V DC |
| CONTACT FORCE ON PROBE | <1.8 OZF (<50GF) |
| STATIC MEASURING FORCE OF SENSOR STYLUS | < 0.06OZF (<1.6GF) |
| DIMENSIONS | 4.9 X 2.8 X 1.0IN (125 X 73 X 26MM) |
| WEIGHT | 0.4LBS (200G) |


4) USE AND OPERATION

4.1) OPERATION:



SWITCH ON THE DEVICE.

After a "beep" sound, the device is ready to work. The large LCD display will show the measuring parameters and sampling length of the previous test. Before starting the sensor, choose the desired parameter **Ra** or **Rz** and proper sampling length **2.5**, **0.8** or **0.25** (for sampling length option, consult the appendix).

After switching on the device, press the keypad  and choose either **Ra** or **Rz**.

To choose the proper sampling length, press the keypad  (**0.25**, **0.8** OR **2.5**).

After the parameters and sampling lengths are taken, you may begin testing. Position the

 **1**  mark over the test area and press the start button, the sensor moves automatically. When the device beeps twice, the measurement has been completed and the results will reflect upon the LCD screen.

POINTS FOR ATTENTION:

While the sensor is in motion, you must keep the device even and steady so as not to affect the accuracy of the reading.

Before the sensor returns to the original position, the device will not respond to any operation until the measurement is completed.

4.2) CALIBRATION

When abnormal errors are found, the standard sample block may be used for calibration. The **Ra** values of the sample block used for calibration, range from 0.1 μM - 10 μM .

METHOD: with the tester in metric mode and the switch off, press the keypad "**Ra/Z CAL**" and switch on the device. When a beep sounds, release the button and the device enters its calibration mode. The upper left corner of the LCD screen should read "**CAL**". The value displayed is the **Ra** value of the calibration block. If you use another calibration block, you must press and hold the "**Ra/Z-CAL**" pad to let the **Ra** value increase to the standards value or push the "**AC/IN-MM**" button to decrease the value of the test block. Do this until you reach the specified designation of your test block. Then, set the instrument on the test block and press the start button. After the second beep sound is heard, the calibration has completed and the LCD screen will display the **Ra** value. At this time the new value has taken the place of the old value in the memory system. When the sensor returns to its original position, normal measurements can resume at this time.

*Standard sample block option: a test block with an **Ra** value ranging from 2.0 μM TO 4.5 μM IS recommended. User can choose a sample test block according to the scope of measurement used most often.

* After entering the calibration state and the operator wants to stop the procedure, just switch off the tester. When the calibration ends and the screen displays "-E-", it indicates that the calibration has exceeded the limit and the reading is invalid. Then, the **Ra** value may be readjusted and calibration repeated.

4.3) CONVERTING IN/MM

Press and hold the "**AC-IN/MM**" keypad for about 5 seconds. The system will convert from metric to english

4.4) BATTERY SAVE REMINDER

When the tester lies idle, it will give a beep sound every 30 seconds to remind you to turn off the tester in order to save the batteries.

4.5) LOW VOLTAGE INDICATOR

When the batteries are low, the lcd screen will display "BAT". This is your indication that the batteries need to be recharged. If the screen displays "BAT" and gives off the beep sound, that indicates that the batteries have reached there lowest limit. The tester must be recharged before further usage.

4.6) RECHARGING

Plug the charger into the socket of the tester a full recharge should take between 10-15 hours. Do not exceed this time! Batteries can be damaged. If needed, the tester can function while charging.

5) MAINTENANCE AND REPAIR

5.1) MAINTENANCE

Avoid collision, violent shock, heavy dust, dampness, oil and a strong magnetic field. The Piezo-electric pick up stylus with diamond tip is extremely sensitive and accurate. After each use, make sure that the supplied protective cover goes on this tip after each use. Damage to this tip will result in false and erroneous readings.

5.2) REPAIR

ALL REPAIRS MUST BE DONE THROUGH THE PHASE II SERVICE DEPARTMENT.

A return authorization number must is mandatory in order for a defective tester to be accepted for repair and/or replacement. All testers must be accompanied by your warranty card or serial number. Complete description of problem and a contact person for authorization of repairs must be supplied as well.

ANY ATTEMPT AT HOME REPAIR WILL AUTOMATICALLY VOID THE STATED WARRANTY! NO EXCEPTIONS!

APPENDIX: RECOMMENDED SAMPLING LENGTH.

| Ra (µm) | Rz (µm) | SAMPLING LENGTH |
|-----------------|----------------|------------------------|
| >40 - 80 | >160 - 320 | 8 |
| >20 - 40 | >80 - 160 | 8 |
| >10 - 20 | >40 - 80 | 8 |
| >5 - 10 | 20 - 40 | 2.5 |
| >2.5 - 5 | >10 - 20 | 2.5 |
| >1.25 - 2.5 | >6.3 - 0 | 0.8 |
| >0.63 - 1.25 | >3.2 - 6.3 | 0.8 |
| >0.32 - 0.63 | >1.6 - 3.2 | 0.8 |
| >0.25 - 0.32 | >1.25 - 1.6 | 0.25 |
| >0.20 - 0.25 | >1.0 - 1.25 | 0.25 |
| >0.16 - 0.20 | >0.8 - 1.0 | 0.25 |
| >0.125 - 0.16 | >0.63 - 0.8 | 0.25 |
| >0.1 - 0.125 | >0.5 - 0.63 | 0.25 |
| >0.08 - 0.1 | >0.4 - 0.5 | 0.25 |
| >0.063 - 0.08 | >0.32 - 0.4 | 0.25 |
| >0.05 - 0.063 | >0.25 - 0.32 | 0.25 |
| >0.04 - 0.05 | >0.2 - 0.25 | 0.25 |
| >0.032 - 0.04 | >0.16 - 0.2 | 0.25 |
| >0.025 - 0.032 | >0.125 - 0.16 | 0.25 |
| >0.02 - 0.025 | >0.1 - 0.125 | 0.25 |
| >0.016 - 0.02 | >0.08 - 0.1 | 0.08 |
| >0.0125 - 0.016 | >0.063 - 0.08 | 0.08 |
| >0.01 - 0.0125 | >0.5 - 0.063 | 0.08 |
| >0.008 - 0.01 | >0.04 - 0.05 | 0.08 |
| >0.0063 - 0.008 | >0.032 - 0.04 | 0.08 |
| <0.0063 | <0.032 | 0.08 |