# *SURFOMETER*®

# SERIES 800

## 830-840 / 860K-870K



**PRECISION DEVICES INC.**

606 County Street

Milan, MI 48160: 734.439.2462

Web: www.predev.com

THE 800 SERIES



Always at the forefront of technological development in surface measurement systems, PDI introduces the completely modular Series 800.

All Series 800 models utilize the same basic hardware, with difference determined by the software installed.  Starting with the multiple parameter the units may be upgraded for future needs by sampling adding parameter modules.  Simplicity is also inherent in the operation of the instrument, with selected parameter, cutoff and system settings.  The display is full color, bright, and has a wide viewing angle, making it easy to read from any position.

THE AMPLIFIER

The Series 800 Amplifier is a sophisticated yet easy to use instrument with a modular surface texture program. All models feature a 7-inch diagonally measured full color display, a remote start switch port and lockout software.



Operation is at once simple, sophisticated and secure.  The instrument is configured by an easy-to-read set-up menu.  The user selects the proper settings for the cutoff, stroke length, Gaussian or the optional Rk Filter, and parameter functions.  Set the exact stroke length required or use the standard 5-cutoffs.  Once configured, the system operates by pressing the Start Button or through use of an optional remote start switch.

## SERIES 800 MODELS

| SKID-REFERENCED MODELS | PARAMETERS | SKIDLESS MODELS |
|---|---|---|
| MODEL 830 Multiple  Parameters | Ra, Rq, Rmax, R3z, Pc, Rz, Rz(DIN, Rz(ISO), Rv, Rt, Rp, Rpm, tp | Model 840 Multiple  Parameters |
| MODEL 860K Multiple Plus Rk Parameters | All the above, plus, Htp, Hsp, Sm, Rsk, Rku, Rk, Rpk, Rvk, Mr1, Mr2, Rpk* Rvk*, Vo, $\lambda$a, $\lambda$q, $\Delta$a, & $\Delta$q | Model 870K Multiple Plus Rk Parameters |

## Piloters/Motor Drives

The Skid-Referenced Piloter Systems are designed to measure normal I.D., O.D., and flat surfaces. The skid-referenced motor drive (piloter) contains a motor which moves the linkarm with the tracer across the surface to be sampled. The tracers have skid-pads which establish a reference line. The transducer translates the vertical motion of the diamond tip stylus in relation to the reference line. The piloter traverses at a speed of 0.100 in/sec (2.54 mm/sec) for the assigned travel length and can be set to acquire data in any direction. Our patented Lite-Touch Linkarm protects the tracer and surface from inadvertent damage and comes standard with each system, unless otherwise specified.

The skidless motor dive has an internal reference in the drive unit. Skidless instruments of the 800 series are designed to evaluate small difficult-to-reach areas that are not accessible by skid-type tracers. The motor drive is mounted on a granite base to minimize vibrations and to provide a level, stable surface for locating the workpiece. Stroke length is adjustable for the surface being measured. The drive may also be programed to acquire data in either direction.

The rotary piloter is designed to measure inside and outside diameters of parts such as balls, ball studs, and extruded tubing. The part is rotated across a stationary tracer, through an arc perpendicular to the lay. The drive, with proper tooling will trace parts with a range from 4.27 mm to 127.0 mm (0.1880 in to 5.000 in) inner or outer diameter. The amplifier will automatically adjust the speed of the rotary piloter, based upon the diameter of the measurement area, to attain a constant speed of 0.1 in/sec (2.54 mm/sec). The piloter is able to take readings in clockwise or counterclockwise directions. It is easy to use, and can be changed from one part to another in seconds. Special configurations are available upon request.

# SPECIFICATIONS & FEATURES

## *AMPLIFIER*

| | |
|---|---|
| Filters | Digital Spline Gaussian: Optional DIN 4776 (Rk) |
| Cutoff Values | 0.08 mm (0.003 in) 0.25 mm (0.010 in) 0.8 mm (0.030 in) 2.5 mm (0.100 in) |
| Pc Threshold Values | Adjustable from 0 um to 12.7 um (0 µin to 500 µin) |
| Wavelength Sensitivity | Cutoff to 2.5 µin (100 µin) |
| Dynamic Range | 150 µm (6000 µin) |
| Display | Full color 800 x 480 pixel TFT unit |
| Keypad | Sealed membrane |
| Serial Port | USB |
| Lockout Feature | Standard; software locks amplifier so settings cannot be changed |
| Remote Start Connector | Standard; allows for optional external START switch |
| Power Supply | Input: 120 +/- VAC,60hz |
| | Output: 12V DC, 1.2A |
| | Other options available |
| Temperature Range | Operation: 10°to 32°Celsius (50°to 90°Fahrenheit) |
| Relative humidity | 10% to 90% non-condensing |
| Physical Dimensions | 254 mm L x 228 mm W x 12 mm H (10 in L x 9 in W x 5 in H) |
| Weight | 3.2 kg (7 lbs 0 oz) |

## *PILOTERS/MOTOR DRIVES*

### *LINEAR*

| | |
|---|---|
| Adjustable Stroke Length | Skid-referenced: 1.27mm to 30.48 mm (0.050 to 1.2 in) |
| | Skidless: 0.8mm – 12.7mm (0.03 – 0.50 in) |
| Piloter Speed | 2.54 mm/sec (0.100 in/sec) |
| Set Start Point | Set the exact START of the piloter to a selected position |
| Dimensions & Weight | Skid-referenced: 235 mm L x 82.5 mm W x 95.3 mm H (8 in L x 3¼in W x 4¾in H) |
| | Weight: 2.5 kg (4 lb 10 oz) |
| | Skidless: 235 mm L x 146 mm W x 121 mm H (9 ¼ in L x 5 ¼in W x 5 in H) |
| | Weight: 84 kg (185 lb) with granite base |

*ROTARY*

| | |
|---|---|
| Diameter Range | Standard: 4.27 mm to 127.0 mm (0.188 to 5.00 in) |
| Piloter Speed | Automatically set by entering part diameter into amplifier |
| Set Start Point | Set the exact START point of the piloter to a selected position |
| Dimensions & Weight | Based upon part configuration |

*TRACER*

| | |
|---|---|
| Detection Method | Moving Coil |
| Stylus Material | Diamond |
| Stylus Tip Radius | Standard 10 μin (0.0004 in)  Optional 5 μin (0.0002 in) and 2.5 μin (0.0001 in) |
| Stylus Force | 0.016 N (1.6 gf) or less |

*PRECISION REFERENCE STANDARD*

| | |
|---|---|
| 3-Patch Master | Consist of Calibration, Linearity and Diamond Stylus Condition Patches traceable to N.I.S.T. |

# Surface Roughness Terminology & Parameters

**Sampling Length, *l*,** is the nominal wavelength used for separating roughness and waviness. Also known as Cutoff Length or Cutoff.

**Evaluation Length, *L*,** is the length over which the values of surface parameters are evaluated. It is recommended that the evaluation length consist of five sampling lengths although it may comprise any number of sampling lengths. Also known as Assessment Length.

**Mean Line, *M*,** is the reference line about which the profile deviations are measured. The mean line of the roughness profile is usually established by analog or digital filters with the selected cutoff corresponding to the roughness sampling length.

**Profile Peak** is the point of maximum height on a portion of a profile that lies above the mean line and between two intersections of the profile with the mean line

**Profile Valley** is the point of maximum depth on a portion of a profile that lies below the mean line and between two intersections of the profile with the mean line.

**Profile Irregularity** is a profile peak and the adjacent profile valley

**Maximum Profile Peak Height, *Rp*,** the distance between the highest point of the profile and the mean line within the evaluation length.

**Average Maximum Profile Peak Height, *Rpm*,** is the average of the successive values of Rpi calculated over the evaluation length.

**Maximum Profile Valley Depth, *Rv*,** is the distance between the deepest valley of the profile and the mean line within the evaluation length.

**Ra, Rq**
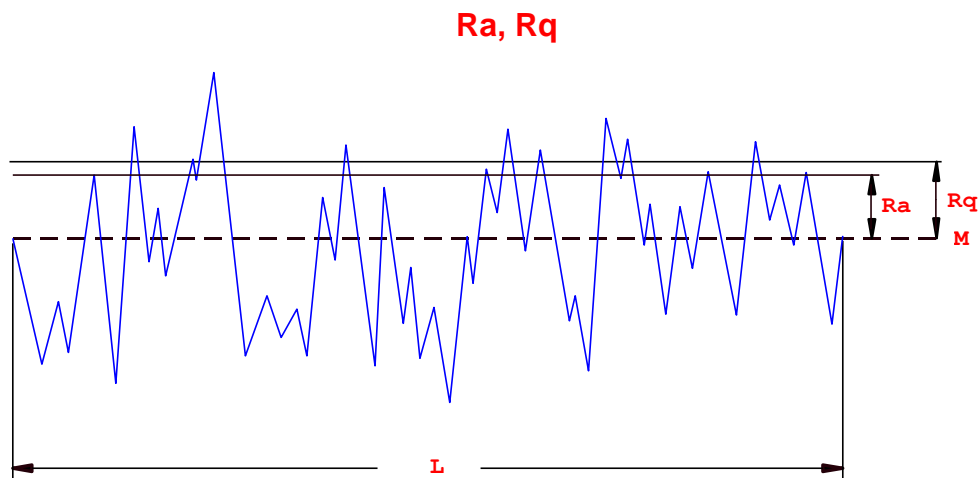


**Roughness Average, *Ra*,** is the arithmetic average of the absolute values of the profile heights over the evaluation length.

**RMS Roughness, *Rq*,** is the root mean square average of the profile heights over the evaluation length.

## Rt, Rti, Rz, Rz(DIN), Rmax
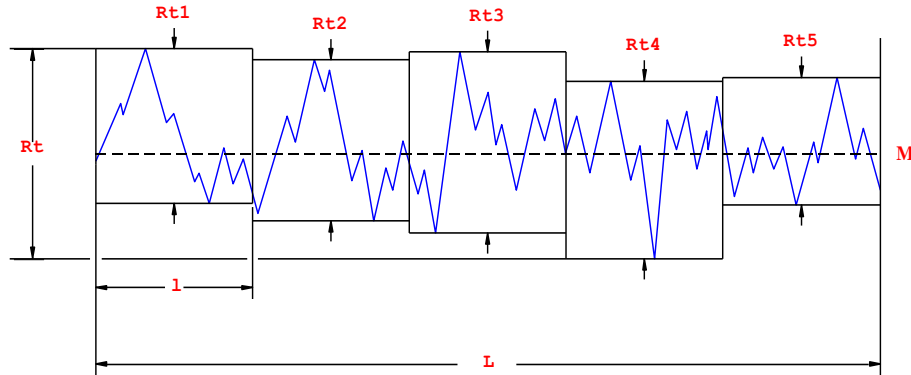


**Maximum Height of the Profile, *Rt,*** the vertical distance between the highest and lowest points of the profile within the evaluation length.

**Maximum Heights within a Sampling Length, *Rti,*** the vertical distance between the highest and lowest points of the profile within a sampling length.

**Average Maximum Height of the Profile, *Rz,*** is the average of the successive values of Rti calculated over the evaluation length.  This parameter is the same as Rz(DIN) when there are five sampling lengths within the evaluation length.

**Maximum Roughness Depth, *Rmax,*** is the largest of the successive values of Rti calculated over the evaluation length

## Rp, Rpm, Rv
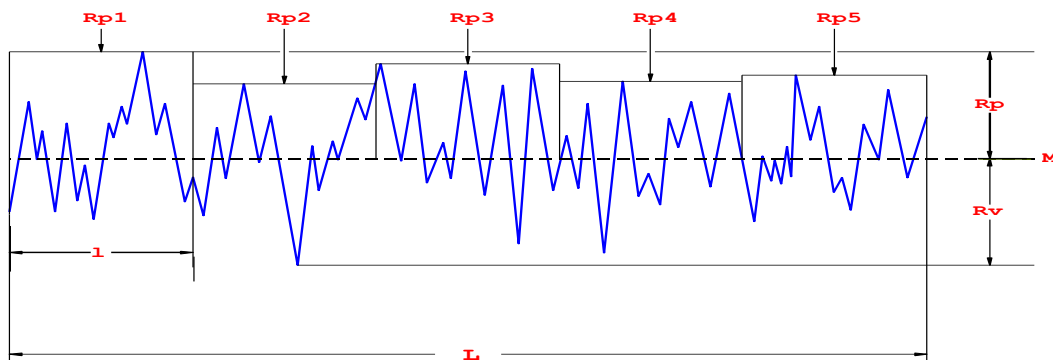


**Maximum Profile Peak Height, *Rp,*** the distance between the highest point of the profile and the mean line within the evaluation length.

**Average Maximum Profile Peak Height, *Rpm,*** is the average of the successive values of Rpi calculated over the evaluation length.

**Maximum Profile Valley Depth, *Rv,*** is the distance between the deepest valley of the profile and the mean line within the evaluation length.

# Rz(ISO)
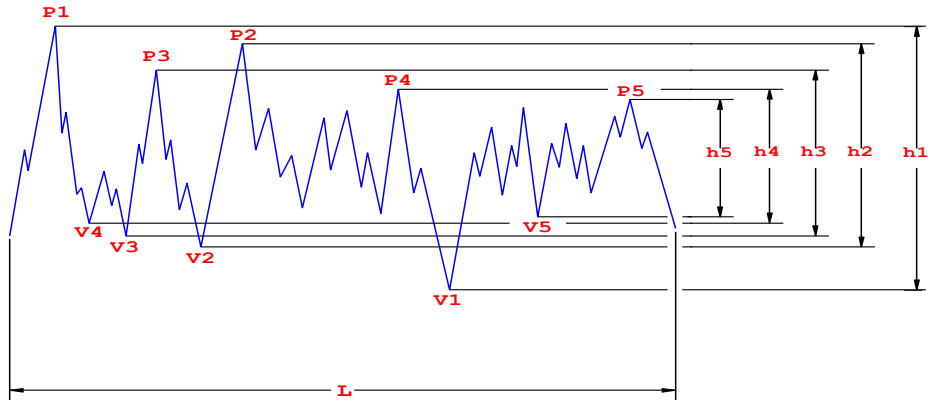


**Ten Point Height of Irregularities, *Rz(ISO)*,** is the average value of the absolute values of the heights of five highest profile peaks and the depths of five deepest valleys within the evaluation length.

*For additional roughness parameters terminology, please visit our website at*
*www.predev.com.*