

SIGNATONE

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Pro4 Resistivity Test System



The Pro4 provides simple answers to sheet and bulk resistivity measurements. Since 1968, Signatone has offered an inline four point probing solution. To make the measurements, the user lowers the four-point probe head onto the sample then selects the *Test* button in the software. The computer automatically controls the Keithley 2400 series and steps through a number of current settings to find the ideal current for accurate readings. A V/I measurement is taken and recorded. The system uses the Dual Configuration test method of [ASTM Standard F84-99](#) to compensate for errors in probe spacing and errors caused by proximity to the edge of the conducting layer. NIST traceable calibration standards are available for purchase with the system. Proper use of the standards and the calibration procedure insures the specified system accuracy of better than 1%. The standard range of the system is 1 mili-ohm to 800K ohm per square when used with the Keithley 2400 series source meter. Other Keithley meters are available offering 1m Ω to 300M Ω ranges (*see page 3*).

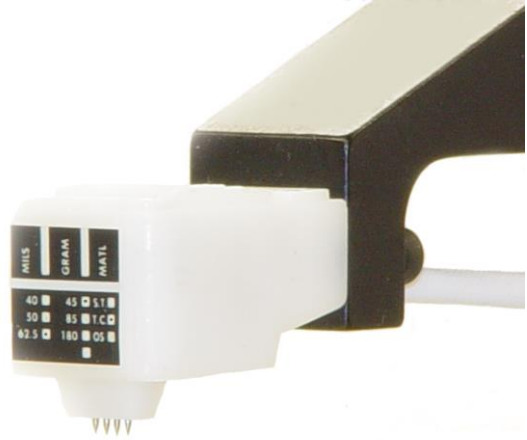


The Pro4 system includes four components; Keithley 2400 (if this option is purchased from Signatone), four-point probe head, Pro4 software, and Pro4 stand. The Pro4 stand includes proprietary components that will only work with Signatone's Pro4 control software.

Four Point Probe heads

The SP4 is a low cost disposable inline probe made of Delrin and used in most applications. Several choices are available for configuration to your specific application. The three spacings available are .040, .050 and .0625 inches. The three pressures available are 45, 85, and 180 grams. Tips are made of Tungsten Carbide or Osmium and a choice of .0016, .005, .010 inches radius. The Pro4 includes two bayonet type quick disconnects to make changing the probe head easy.

The SP4 probe head is designed for use with Lucas/Signatone and other resistivity probing systems for the measurement of thin films and materials. The SP4 head has several configuration parameters permitting users to define the probe head best suited to their application.



Spacing between tips

- 0.0625 inches (62)
- 0.050 inches (50)
- 0.040 inches (40)

Pressure on each probe tip

- 45 grams (045)
- 85 grams (085)
- 180 grams (180)

Probe tip material

- Osmium (O)
- Tungsten Carbide (T)

Tip radius

- 0.0016 inches [0.04mm] (R)
- 0.005 inches [0.125mm] (F)
- 0.010 inches [0.250mm] (B)

Pro4, SP4 Connector Style

- 9 pin D sub with 15" wire (Y)

Ordering Model Maker Information

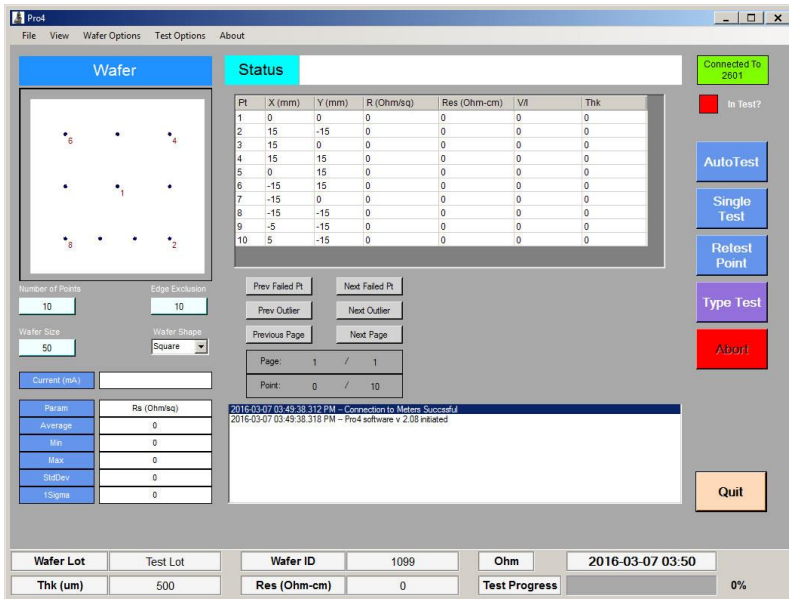
SP4-[Spacing][Pressure][Material][Radius][Termination]

Sample Part Number: SP4-40085TRY

Pro4 Probe Stand

The Pro4 stand includes several features to assure accurate resistivity measurements. A lever arm with micro switch assures the probe head is moved straight up and down and current is not applied until the probe head has adequately contacted the sample. A fine 'Z' adjustment knob on the top raises or lowers the probe head a range of 20mm to set-up testing on the sample. A bayonet style quick mount allows for easy changing of the probe head. The sample to be tested is mounted onto a Delrin chuck and easily pushed to position. The stand is available in 100mm and 150mm configurations. The stand is pre-wired and ready to connect to the Keithley 2400 Source meter. (the K2400 is our standard range source meter, see page 3 for more meter options)





Pro4 Software

The Pro4 software manages the tests, displays results and allows printouts or export of the data. The user inputs the size and shape of the sample, edge exclusion and number of points to be tested. The user may also define pass/fail criteria and which parameter (Sheet Resistance, Resistivity, or V/I) to display. A graphic picture of the target probe points is displayed. Prompts tell user to move to the next position. Upon completion of testing all points, the average, standard deviation, 1-Sigma, minimum and maximum are prominently displayed. Upon completion, a summary report may be printed showing the data and pass/fail status.

Ordering Information

Pro4 software must be run on a computer with Windows 7 or newer OS. The computer must have an RS-232 port or USB port available. Signatone offers two computers to choose from, a laptop or industrial rack style computer with the Keithley meter mounted in the rack as well. Two SP4 probe heads are included in the system along with bayonet style mounts.



Pro4 model maker

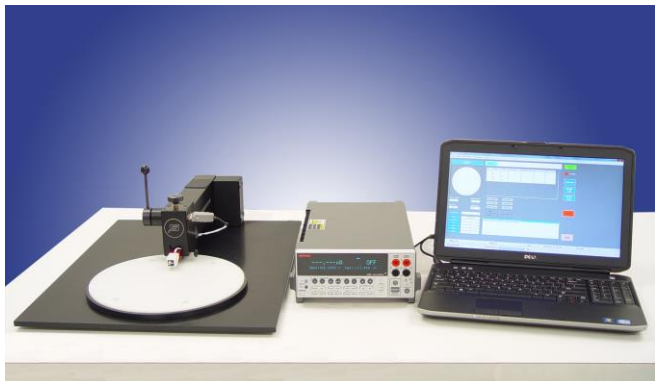
Pro4-[size][source meter][computer][p/n typing]

4	For samples 10-100mm Pro4 stand
6	For samples 10-150mm Pro4 stand
L	S-303 stand for samples 10-300mm with stationary arm and sliding Delrin chuck
B	S-304 stand for samples 10-200mm with 200mm Ultem ambient chuck and X-Y digital positioning
U	S-305 stand for samples 10-300mm with stationary chuck and X-Y probe positioning
R	S-M90 or S-M40 positioner with components for mounting SP4 heads on a Signatone probe station
H	No Stand / break-out box with remote switch for use with S-HH4 "hand-held" SP4 head
00	Cabling for Keithley 2400 series, source meter not included
40	Keithley 2400 included- range: 1mili-Ω to 800KΩ
41	Keithley 2410 included- range: 1miliΩ to 800KΩ
M0	Cabling for Keithley 2601, 2602, 2611, 2612; source meter not included
M1	Keithley 2601B included- range: 1mili-Ω to 100Mega-Ω (most popular)
M2	Keithley 2602 included- range: 1mili-Ω to 100Mega-Ω
G0	Cabling for Keithley 2635 or 2636, source meter not included
G1	Keithley 2635 included- range 1mili-Ω to 300Mega-Ω (<i>requires dark box, call for quote</i>)
0	No computer included
N	Notebook computer included
D	Desk top computer with flat panel screen, mouse & keyboard included
R	Industrial rack computer with source meter mounted in rack, flat panel screen, keyboard & mouse.
P	P & N Type Testing Module
0	No P & N Type Testing Module

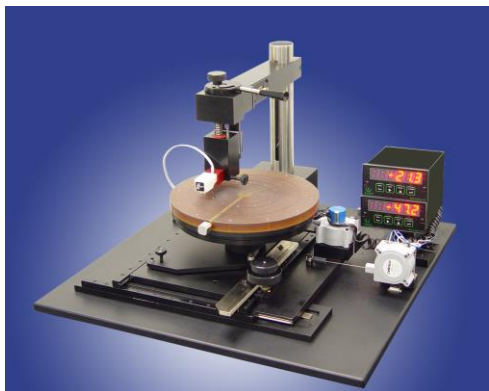
Example of most popular model configuration: **Pro4-4MIN0** ...includes Pro4 stand and software, 4" Delrin chuck, Keithley 2601B, Notebook computer, No P & N type testing module. Want to use an existing Keithley 2400 and PC in your lab? Send us an RFQ for our Pro4-4000 Send your request for quote to: sales@signatone.com

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Pro4 Options

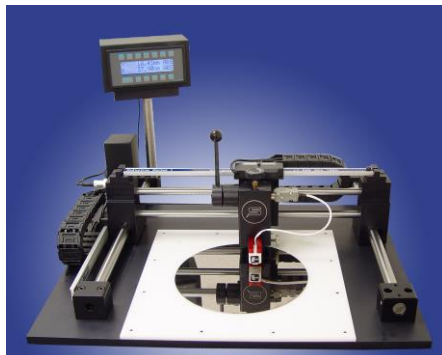
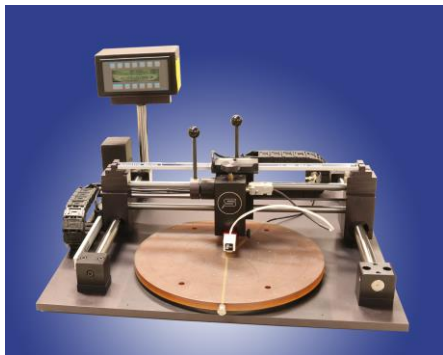


Pro4-L.... with S-303 stand and 300mm Delrin chuck. Smaller Delrin chucks are optional, please contact factory for details. Shown configuration is the Pro4-LM1N with Keithley 2601 source meter and Dell notebook computer displaying the Pro4 software. Our SP4, four point probe head is mounted to the linear lift with quick mount adapter.



Pro4-B.... with S-304 available with 150mm and 200mm Ultem chucks and 100mm, 150mm and 200mm hot chucks.

The S-304 stand includes a manual X-Y motion control stage with digital positioning. The S-304 was designed specifically for RS applications that require hot chucks for TCR testing.



Pro4-U.... with S-305 stand and 300mm Delrin chuck or an optional 300mm Ultem vacuum chuck with vacuum zones to hold 30mm to 300mm wafers (photo far left). The Pro4-U.... holds the wafer stationary while the four point probe head is moved in X-Y motion and includes digital positioning.



Pro4-R.... includes our S-M40 or S-M90 micropositioner with special four point probe mounting hardware. This set-up can be used on nearly all Signatone probe stations, manual or semi-automatic. Contact the factory for more information about this option.

