

# PRS-801 Resistance System Set



# Features

## WIDE RANGE. ACCURATE. PORTABLE.

The widest range portable constant voltage resistance instrument in today's market, the PRS-801 is the choice of most ESD professionals. Why? Because the PRS-801 has an outstanding performance combination of measurement speed, wide range and accuracy.

Its constant test voltage system is extremely stable and consistent with lab level, bench top instruments.



## MEASUREMENT RANGE: THREE INSTRUMENTS IN ONE

The PRS-801's wide range offers the maximum flexibility in measurement applications. In effect, it is 3 instruments in one because it functions as:

### 1. A low resistance range instrument for measurements from 0.1 to $1.0 \times 10^4 \Omega$ .

Most competitive instruments do not measure accurately at or below  $1.0 \times 10^3 \Omega$ . Thus, the typical ESD practitioner must carry a DMM for low resistance checks of ground connections. To ensure field accuracy, the PRS-801CC Calibration Shunt is used to confirm and adjust the accuracy of its 0.1 to  $10 \Omega$  resistance range.

### 2. Wide range audit instrument to meet ANSI/ESD S20.20 and TR53 procedures from

$1.0 \times 10^3$  to  $1.0 \times 10^{11} \Omega$ . Measurement guidelines require accurate measurements from one decade below to one decade above the resistance requirements of a facility's ESD program. The PRS-801 easily exceeds this requirement by as much as 3 decades, depending on program requirements.

### 3. Precision high resistance measurement instrument for packaging to S541 Standards, material and product testing and acceptance verification.

Few competitive instruments can measure accurately up to or beyond  $1.0 \times 10^{11} \Omega$ , while the PRS-801 comfortably measures up to  $2.0 \times 10^{14} \Omega$ .

There are no audit instruments or laboratory bench top instruments that perform in the PRS-801's wide range.



## MEASUREMENT FLEXIBILITY

Connect to virtually any 2-wire fixture or electrode configuration.

The PRS-801's simple  $\frac{3}{4}$ -inch terminal spacing provides connectivity to a variety of electrodes and fixtures.

- Terminal design allows use of mechanically shielded or non-shielded banana plug leads
- BNC adapters with  $\frac{3}{4}$ -inch spacing mount directly to the PRS-801 terminals for measurements with wide range probes and fixtures
- An instrument reference allows use of a third wire instrument reference to minimize effects of extraneous fields on precision fixture measurements



## MEASUREMENT SPEED: ELECTRIFICATION PERIOD

The PRS-801 is one of the fastest measurement instruments in today's precision measurement market. Laboratory tests confirm the PRS-801 can measure from 0 to  $1.0 \times 10^{12} \Omega$  in 2.5 seconds. Thus, its specified electrification period (EP) is 8 seconds in accordance with ANSI/ESD STM 11.11 Surface Resistance of Planar Materials. Furthermore, its EP is automatically adjusted to insure a stable measurement is displayed.

## MULTIPLE MODES OF OPERATION

The PRS-801 has Automatic, Manual and Auto-Manual operational modes, plus exponential display or standard numeric display in  $\Omega$ , K $\Omega$ , M $\Omega$ , G $\Omega$  and T $\Omega$ . It's easy to use and read. Measurements are summarized in decades using multiple LED's from  $<10^3$  to  $>10^{14}$ , whose colors are user programmable to be RED, GREEN or YELLOW/ORANGE.



## HIGH QUALITY TEST LEADS

Prostat's 10-foot test leads supplied with each PRS-801 consist of hundreds of fine strands of copper that offer flexibility and accuracy. The outer insulation of each test lead is high grade silicon with an extremely high resistance to minimize measurement errors. These leads are designed for convenient audit measurements in the manufacturing environment up to  $1.0 \times 10^{12} \Omega$ .

The 30-inch high performance test lead harness is designed for PRS-801 precision high resistance measurements in the  $10^{11}$  to  $10^{14}$  range. It includes a shielded (-) negative test lead for accuracy and minimum electrical interference from personnel and equipment. The shield is connected directly to the PRS-801 instrument reference and fixture ground.



## CONSTANT TEST VOLTAGES

PRS-801 has three Test Voltages ranges that provide stable test references for repeatable measurements. In AUTO mode, the instrument automatically selects the proper test voltage for the resistance being measured.

<10V: 0.1 to  $9.99 \times 10^3 \Omega$

<10V is variable across this range from 0.1 mV to 9.99V

10V – Constant Voltage under Load

Constant at  $1.0 \times 10^4$  to  $9.99 \times 10^5 \Omega$

Target calibration is to within  $\pm 0.01V$ , and always within  $\pm 1\%$

100V – Constant Voltage under Load

Constant at  $1.0 \times 10^6$  to  $2.0 \times 10^{14} \Omega$

Target calibration is to within  $\pm 0.01V$ , and always within  $\pm 0.1\%$

to the spreadsheet at the conclusion of each measurement. The Spreadsheet cursor automatically moves to the next data entry cell in preparation for the subsequent measurement.

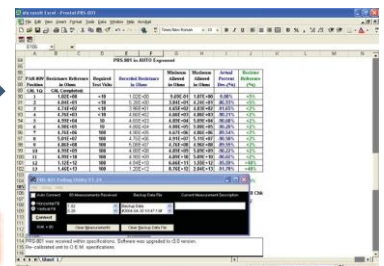
- Once as many as 80 data points are stored in the PRS-801's memory, they can be downloaded to a spreadsheet at a later time. Each data point will be placed in its own spreadsheet cell.
- When PROSTAT CONNECT is used, a backup Text file is maintained for every measurement set, its date, time and location should you desire.
- The PROSTAT CONNECT utility is now compatible with 32-bit and 64-bit version of Windows from XP all the way to Win8.



## DIRECT DATA DOWNLOAD WITH INCLUDED SOFTWARE

Not only does the PRS-801 make accurate measurements quickly, it documents measurement data immediately or in batch downloads to your Excel® Spreadsheet program. This minimizes transposition mistakes and speeds up precision measurements. The included PROSTAT® CONNECT software is easy to load and use. The PRS-801 connects to your computer's USB port via an optional COM/USB adapter.

- In the Auto Connect mode, you can control the PRS-801 measurement sequence so that each data point is downloaded



## WHAT'S INCLUDED

- PRS-801 Resistance Meter
- PRS-800LB 10 foot Silicone Test Lead - Black
- PRS-800LR 10 foot Silicone Test Lead - Red
- PRS-801CIC Computer Input Cable
- PRS-801SSL Shielded Test Lead
- PRS-801TVL High Resistance Voltage Test Lead
- PRS-801CC Calibration Shunt
- PTB-915 Audit Test Bed
- PRS-801BC Bulldog Clip
- PSI-870MAC Metal Clip (2)
- PRS-801CON USB 2.0 to RS232 Serial DB9 Converter
- Software
- User Manual

# Technical Specifications

## RANGE

Resistance from 0.1 (1.0E-1) $\Omega$  to 200 Tera  $\Omega$  (2.0E+14 $\Omega$ ). Maximum resistivity with ANSI/ESD STM S11.11 concentric ring 2.0E+15  $\Omega$ /square.

## TEST VOLTAGES

### Automatic Mode (Default):

0.01V to 10V Variable 1.0E-1 to 1.0E+4 $\Omega$

### Constant Voltage:

10V:  $\pm$  <0.2V 1.0E+4 to <1.0E+6 $\Omega$

100V:  $\pm$  <2.0V 1.0E+6 to 2.0E+14 $\Omega$

### Manual Mode:

0.01V to 10V Variable 1.0E-1 to <1.0E+5 $\Omega$

10V:  $\pm$  <0.2V 1.0E+2 to 1.0E+9 $\Omega$

100V:  $\pm$  <2.0V 2.0E+5 to 2.0E+14 $\Omega$

## ACCURACY

### Overall:

$\pm$  <5% at ambient conditions (at 23°C and 30% Rh)

### Nominal Range Tolerances:

1.0E-1 to 1.0E+1 $\Omega$ :  $\pm$ 5% corrected for test lead resistance

1.0E+1 to 1.0E+12 $\Omega$ :  $\pm$ 2.0% with 10' test leads

1.0E+12 to 2.0E+14 $\Omega$ : <30% or  $\pm$ 0.25

decade with grounded, shielded leads

## DISPLAY

Multi-function 2-5/8"  $\times$  1-5/8" Liquid Crystal Display with 1/2" digit height

Displays 3-1/2 digits in  $\Omega$ , or 1.0EXX in exponential format

$\Omega$  Display indicators:  $\Omega$ , K $\Omega$ , M $\Omega$ , G $\Omega$  and T $\Omega$ . Includes 19-segment analog scale (1-10 with 0.5 indication) with  $\times$ 1,  $\times$ 10, &  $\times$ 100 multipliers

Number of Data Points in Memory (0-80)

Automatic Electrification Time (seconds), or time required to manually obtain steady state measurement

Displays data HOLD, BATTERY status, MIN, MAX, AVG, REC and Test Voltage (<10, 10, or 100V)

## LED INDICATORS

14 color LEDs from <10E-3 to >10E+14 $\Omega$ . Colors (red, green, yellow/orange or blank/OFF)

## TIMER

Time measurements in seconds up to 99 seconds (displayed on LCD)

## MEMORY

Register stores up to 80 data points (MEM # displayed after RESET)

## RS-232 OUTPUT

Digital format: exponential power followed by integer

## ELECTRIFICATION

### Resistance Range Electrification Period

0.1 $\Omega$  to <1.0E+6 $\Omega$  <3.0 seconds

1.0E+6 $\Omega$  to <1.0E+12 $\Omega$  8.0 seconds

1.0E+12 $\Omega$  and greater 15.0 seconds

*Note: Electrification period varies based on conditions and material stability.*

## POWER

Two 9-VDC alkaline batteries

Nominal battery life 25 hours in Automatic

Greater than 35 hours in Automatic Manual

## DIMENSIONS

4.0" wide  $\times$  6.0" long  $\times$  2.0" deep

## WEIGHT

22 ounces, with batteries

## OPEN CIRCUIT CURRENT (I)

<4 ma @ 100V

## RESISTANCE RANGE SELECT

2 Triangular Arrow Buttons: UP and DOWN  $\bar{\cdot}$

Select Resistance Range in single decades in Manual and Automatic/Manual modes.

## TEST VOLTS

Manual selection of <10, 10 or 100V in Manual Mode

## RECORD/RECALL

Turns Memory Register ON if OFF

Provides access to all data in Memory Register

Calculates and Displays Minimum, Maximum and Average of data stored in Memory Register

## CLEAR

Erases all data in Memory Register; if in HOLD mode, discards the most recent Held Value

## ON/OFF

Power-up, perform functional and battery tests

Power down if ON

## BATT. TEST

Displays GOOD on LCD if acceptable voltage or Lo if unacceptable

## RESET

Enters (saves) data into Memory Register, Clears HOLD and Display

## TEST

Begins measurement sequence

## BATTERY BUSS CUT OFF

ON/OFF Switch isolates batteries from instrument circuits for storage & transport

## USEFUL MODES OF OPERATIONS

### Auto Mode:

The instrument automatically selects and adjusts test voltage, resistance range, electrification period, then displays and Holds the measurement. The displayed measurement is the average of eight consecutive measurements, all within  $\pm$ 5% of each other. The measurement is "saved" in the Memory Register by pressing RESET. The instrument is now ready for the next measurement.

### Manual Mode:

Allows operator to select resistance decade, test voltage and electrification period (EP)

### Automatic Manual:

Same as Auto Mode with following exceptions:

- Allows operator to select starting resistance decade
- Always starts measurement from the last measurement value without resetting to zero. This extends battery life and speeds up measurement sequence.

## DATA LOG & CALCULATION

In RECORD mode, the PRS-801 stores up to 80 measurements, and on demand will calculate and display the Minimum, Maximum and Average measurements stored in the register. Using its RS-232 output and cable accessory, the PRS-801 will communicate with computer serial ports. The instrument is supplied with the new PROSTAT<sup>®</sup> Audit Program on a 3-1/2 inch disc, which contains spread sheet templates for recording ESD Audit Program Data in Excel<sup>®</sup> software. The PRS-801 computer output and Program disk are compatible with the Semtronics SCCN<sup>®</sup> ground monitoring system.

## USAGE RECOMMENDATION

Designed for Intermittent use. Not intended for continuous use or production applications.