

FOUR PROBE RESISTIVITY SET UP

(D.C./PULSE/A.C.)

Introduction: Precision four probe resistivity analyzer are available in 8 different regular models apart from tailor made (two/three point/four points) solutions virtually covering all industrial and research applications meeting all electrical, thermal, mechanical, and environmental specifications. These pulse resistivity analyzer has in-built variable frequency excitation, power source to measure high resistivity sample impedance measurement elimination polarization effect of samples with target electrode. These meters are first choice for online measurement of sample resistance (A.C./D.C.). These finds applications in generation, transmission/distribution, defense, electrical/mechanical m/c testing instrument, industrial electronics, railway, and avionics and solid state physical application like dielectrics characterization, switch gears, electrochemical, thermodynamical application, MEMS and many research and development activities. These precision instruments are compatible to any standard external current/voltage sensor and power source of specification as specified under.

Operating Principle: four probe set up includes namely 1.Target conductor 2. Connection between the target & conductor and the target electrode. To measure this resistivity Following technique is used...

Four point conductivity measurement system:

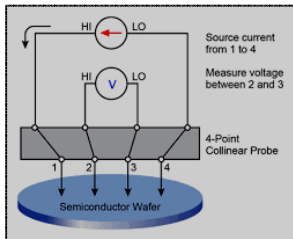
The 4-point method requires the insertion of four equally spaced and in-line electrodes into the test area. A known current from a constant current generator is passed between the outer electrodes. The potential drop (a function of the resistance) is then measured across the two inner electrodes.

V/I : current and potential drop t = sample thickness, s= distance between electrode, ρ= sample resistivity, pie = 3.14(nepier constant)

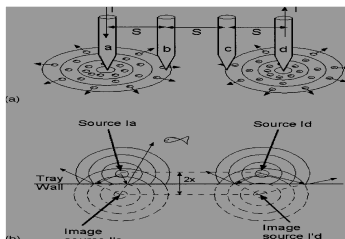
$$\rho = \frac{V}{I} \frac{\pi t}{\ln \left(\frac{\sinh \left(\frac{t}{s} \right)}{\sinh \left(\frac{t}{2s} \right)} \right)}$$

Benefits:

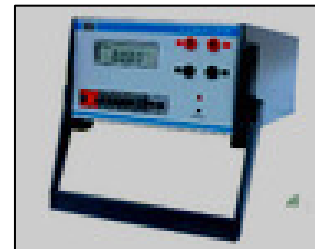
- High input impedance/Low input biased current /higher accuracy.
- 5-1/2/6-1/2 digit display /Consistent performance over large temperature/humidity range (70°C and 80 % RH)
- Scaled directly in nano ampere with repeatable accuracy.
- Auto/manual zero offset without drift.
- Auto drift tracking
- RS-32 interface/high sample rate – 2000 sample/second.
- Feed back current measurement technique.



four probe principle



conformal of current spread



source meter

Source D.C.(volt and ampere meter with source)

Model	Range volt	Range 10 ⁻⁹ /10 ⁻¹² /10 ⁻¹⁵ Ampere	Burdon count	Accuracy Restricted to Resolution	Resolution Quantified/ optional	Voltage/current source	INTERFACE
MLCHVEM-9999990101	10.0/5.0 -999999µV 1.0 mV-10.0Volts	05.0/01.0 -999999nA 1.0 mA-10.0Amp	< 10.0	99.99999%	5.0 µV /5nA	020.0volt/01.0 A	RS-232USB
MLCHVEM-9999990401	10.0/5.0 -999999µV 1.0 mV-20.0Volts	05.0/01.0 -999999nA 1.0 mA-20.0Amp	< 10.0	99.99999%	5.0 µV/5.0nA	020.0volt/01.0 A	RS-232/USB
MLCHVEM-9999990102	05.0/1.0 -999999µV 1.0 mV-10.0Volts	10.0/05.0 -999999pA 0.001 m.A-1.00Amp	< 10.0	99.99999%	2.0 µV/2.0 nA	040.0volt/01.0 A	RS-232/USB
MLCHVEM-9999990402	05.0/1.0 -999999µV 1.0 mV-20.0Volts	10.0/05.0 -999999pA 0.001 m.A-2.00Amp	< 10.0	99.99999%	2.0 µV /2.0nA	040.0volt/01.0 A	RS-232/USB
MLCHVEM-9999991002	05.0/1.0 -999999Nv 1.0 mV-99.9Volts	10.0/05.0 -999999pA 0.001 m.A-10.0Amp	< 10.0	99.99999%	5 nV/5pA	040.0volt/01.0 A	RS-232/USB
MLCHVEM-9999992002	05.0/1.0 -999999Nv 1.0 mV-199Volts	10.0/05.0 -999999pA 1.0 mA-199Amp	< 10.0	99.99999%	5 nV/5pA	040.0volt/01.0 A	RS-232/USB
MLCHVEM-9999992003	05.0/1.0 -999999Nv 1.0 mV-199Volts	10.0/05.0 -999999fA 0.0001mA-10.0 mA	< 10.0	99.99999%	5 nV/5fA	099.0volt/01.0 A	RS-232/USB

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General electrical & mechanical specification of Precision source meter:

Operating voltage : 220 volts, 1phase, 40-60 Hz

Output current/voltage: as in data sheet (linear/pulse) AC/DC

Voltage/current control accuracy: 99.9999% of set point or better for CC/CV

Ripple: 0.000001% of set point for voltage/0.000001% for CC or optional/ma be modified

Voltage regulation: Line: $\pm 0.01\%$ + 3.0 m.v. (for $\pm 10\%$ of input change)

/ Load: $\pm 0.01\%$ + 3.0 m.v. (for 10 to 100% of Load change)

Current regulation: Line: $\pm 0.05\%$ + 0.1 m.a. (For $\pm 10\%$ of input change)

/Load: : $\pm 0.05\%$ + 0.1 m.a. (for 10 to 100% of Load change)

Display Resolution: 1/5 micro or nanoVolt & 1/5 nano amps or 1/5 nV & 1/5 pico/femto -amp

Range (V/I): Voltage: 10^{-09} - 10^{-04} volt to 10^{-03} - 10^{-03} in five steps , least count- 5.0 nano volt

Current: 10^{-15} - 10^{-9} volt to 10^{-4} - 10^{+02} in five steps , least count- 1.0 micro/nano/ volt

Resistivity: 10^{+12} - to 10^{+06} volt to 10^{-4} - 10^{+02} oh m in five steps , least count- 1.0 ohm

Accuracy error: 0.0000001% of set volts for (CV mode/0.0000001% of set current (CC mode)

Step down ratio : 0-1000000 or option

Temperature coefficient of variation: < 10-9ppm

Control options 1.cascade feedback control with soft start / 3. Constant voltage mode

Display 5 1/2 & 6 1/2 digit LED display

Other option: D.C./A.C./PULSE (100-10000 Pulse/sec)

Protection : over voltage/short ckt

Option: These power supplies may offer in pulse mode.

Interface: RS-333/U.S.B.

Dimension of Precision Power Supplies

