

PRECISION PULSE RESISTIVITY MEASUREMENT SET-UP

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

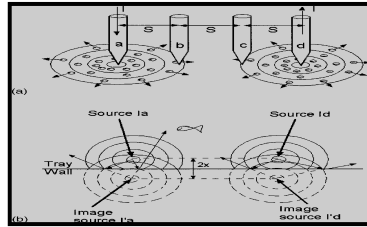
Introduction:

Precision pulse 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.

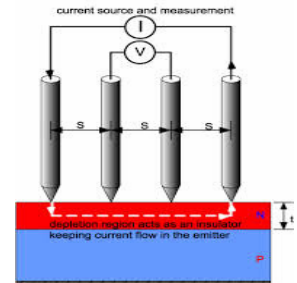
Operating Principle: Resistivity includes namely 1.Target conductor 2. Connection between the target & conductor and the target electrode. To measure this resistivity Following technique is used...



MPET-0009991



(four-point conductivity measurement profile)



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. The Model MPET-999990101 are calibrated to read directly in ohmcm
 V/I : current and potential drop
 t = sample thickness, s = distance between electrode
 ρ = sample resistivity, π = 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 micro ohm - ohm to giga micro-ohm range instrument repeatable accuracy.
- Auto/manual zero offset without drift. /Auto drift tracking
- RS-32 interface/high sample rate – 10,000 sample/second. / Feed back current measurement technique.
- Safety compliance-IE-1956 or as communicated/ inbuilt variable frequency excitation to get noise free reading in high resistivity area.
- Inbuilt climatically temperature/pressure compensated.

PULSE RESISTIVITY ELECTROMETER D.C./A.C. 999999x10⁻⁹<resesistivity<999999x10⁺¹² ohm.cm

| Model | Range Volt | Range Resistivity Ohm-c.m. | Pulse Frequency | Burdon Micro-volt | Accuracy limited to Resolution | Resolution quantified | Voltage/current source |
|-----------------|--|---|-----------------|-------------------|--------------------------------|-----------------------|------------------------|
| MPRA-9999990101 | 10.0/5.0 -999999Nv 1.0 mV-10.0Volts | 05.0/02.0 -999999 milli -ohm.cm 0009999-0999999 -ohm.cm | 0-50K.Hz | < 100 | 99.99999% | 1/2/5 counts | 0050 V/001.0 A |
| MPRA-9999990401 | 10.0/5.0 -999999Nv 1.0 mV-20.0Volts | 05.0/01.0 -0999999 micro.ohm. 0000.000-099.999 -k.ohm.cm | 0-50 k. Hz | < 100 | 99.99999% | 1/2/5 counts | 0100 V/001.0 A |
| MPRA-9999990102 | 05.0/1.0 -999999Nv 1.0 mV-10.0Volts | 05.0/02.0 -099.999 micro-ohm.cm 00.000-099.999 mega-ohm.cm | 0-50K.Hz | < 100 | 99.99999% | 1/2/5 counts | 0200 V/001.0 A |
| MPRA-9999990402 | 05.0/1.0 -999999Nv 1.0 mV-20.0Volts | 05.0/01.0 -999.999 micro.ohm. 0.000-999.999 -Giga-ohm.cm | 0-50 k. Hz | < 100 | 99.99999% | 1/2/5 counts | 0500 V/001.0 A |
| MPRA-9999991002 | 05.0/1.0 -999999Nv 1.0 mV-99.9Volts | 05.0/02.0 -999.999 milli -ohm.cm 000.000-99.9999 -k.ohm.cm | 0-50k.Hz | < 100 | 99.99999% | 1/2/5 counts | 1000 V/001.0 A |
| MPRA-9999992002 | 05.0/1.0 -999999Nv 1.0 mV-199Volts | 05.0/01.0 -999999 micro.ohm. 000.000-999.999 -mega.cm | 0-50 k. Hz | < 100 | 99.99999% | 1/2/5 counts | 3000 V/001.0 A |
| MPRA-9999992003 | 05.0/1.0 -999999Nv 1.0 mV-199Volts | 05.0/02.0 -999999 micro.cm 000000-999999 -giga.ohm.cm | 0-50 k. Hz | < 100 | 99.99999% | 1/2/5 counts | 5000 V/010.0m A |

Six digits after product code indicate count; next, two digits indicate voltage and last digit indicate. 01- nano amp/02-pico amp/03-femto amp.

MOTORON SEMICONDUCTORS CORPORATION

11, Shri Nagar Colony, Shakti Nagar Extension, Delhi-110053 .Tel: 011-33648181/33655454

motoronenergy@hotmail.com

PRECISION PULSE RESISTIVITY MEASUREMENT SET-UP

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

Specifications Of Ultra-precision High Current/Low voltage sources: **source range : upto 3.00000 amps at 20 and 30 volt**

| Model | Compliance voltage | Source Current | Accuracy limited to Resolution | Resolution quantified | Accuracy limited to Resolution | Stability/1.0 hour | Stability/24 hour |
|--------------|--------------------|----------------|--------------------------------|-----------------------|--------------------------------|--------------------|-------------------|
| MHCLS-200002 | 20.0000 | 2.00000 | 99.999% | 1/2/5 counts | 99.99999% | 3-10 count | 5-15 count |
| MHCLS-203002 | 20.0000 | 2.00000 | 99.999% | 1/2/5 counts | 99.99999% | 3-10 count | 5-15 count |
| MHCLS-200002 | 20.0000 | 3.00000 | 99.999% | 1/2/5 counts | 99.99999% | 3-10 count | 5-15 count |
| MHCLS-200002 | 20.0000 | 3.00000 | 99.999% | 1/2/5 counts | 99.99999% | 3-10 count | 5-15 count |
| MHCLS-300004 | 30.0000 | 2.00000 | 99.99999% | 1/2/5 counts | 99.99999% | 3-10 count | 5-15 count |
| MHCLS-300002 | 30.0000 | 2.00000 | 99.99999% | 1/2/5 counts | 99.99999% | 3-10 count | 5-15 count |
| MHCLS-302002 | 30.0000 | 3.00000 | 99.99999% | 1/2/5 counts | 99.99999% | 3-10 count | 5-15 count |
| MHCLS-300002 | 30.0000 | 3.00000 | 99.99999% | 1/2/5 counts | 99.99999% | 3-10 count | 5-15 count |
| MHCLS-303002 | 30.0000 | 3.00000 | 99.99999% | 1/2/5 counts | 99.99999% | 3-10 count | 5-15 count |

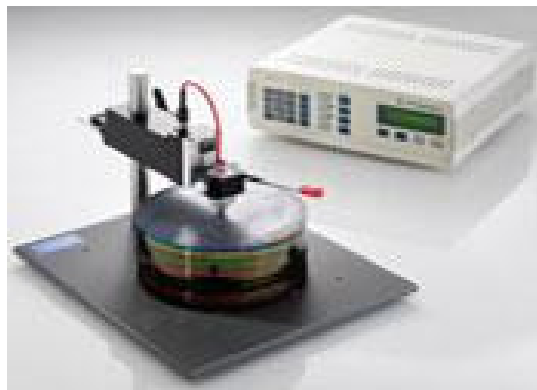
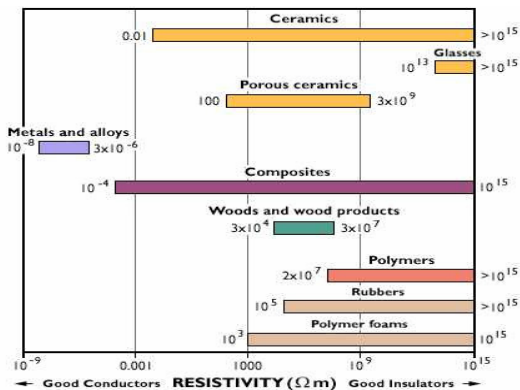
General electrical & mechanical specification of Precision Power source :

Operating voltage : 330 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 nV & 1/5 nano amps or 1/5 nV & 1/5 pico-amp or optional and may be altered based on time behaviour of signal
 Range (V/I): Voltage: 10^{-9} - 10^{-4} volt/ 10^{-4} - 10^{+1} volt least count- 5.0 nano amp
 Current: 10^{-13} - 10^{-07} amp/ 10^{-7} - 10^{-3} amp least count- 5.0 pico ampere or optional
 Resistivity: 10^{-13} - 10^{-07} ohm.cm/ 10^{-7} - 10^{-3} ohm.cm/ 10^{-3} - 10^{+2} ohm.cm
 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: $< 10^{-9}$ ppm
 Control options 1.cascade feedback control with soft start / 3. Constant voltage mode with external adjustment.
 Display $5_{1/3}$ & $6_{1/3}$ 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 Spllies

| | | | | | | | |
|--------------|----------|--------------|----------|--------------|----------|--------------|----------|
| MHCLS-001003 | 08X06X06 | MHCLS-013003 | 13x10x10 | MHCLS-050003 | 14X13X13 | MHCLS-300004 | 14X13X13 |
| MHCLS-003003 | 08X06X06 | MHCLS-013004 | 13x10x10 | MHCLS-050004 | 14X13X13 | MHCLS-300008 | 14X13X13 |
| MHCLS-006003 | 08X06X06 | MHCLS-013008 | 13x10x10 | MHCLS-050008 | 14X13X13 | MHCLS-400005 | 14X13X13 |
| MHCLS-006003 | 13x10x10 | MHCLS-013015 | 13x10x10 | MHCLS-100015 | 14X13X13 | MHCLS-400010 | 14X13X13 |
| MHCLS-006004 | 13x10x10 | MHCLS-013030 | 13x10x10 | MHCLS-100001 | 14X13X13 | MHCLS-800005 | 14X13X13 |
| MHCLS-013001 | 13x10x10 | MHCLS-035003 | 13x10x10 | MHCLS-100003 | 14X13X13 | MHCLS-800010 | 14X13X13 |
| MHCLS-001003 | 13X10X10 | MHCLS-013003 | 13x10x10 | MHCLS-050003 | 14X13X13 | MHCLS-150010 | 14X13X13 |

Three numerals after MHCLS indicates voltage of power supply and last three digit Indicates current. All dimensions are in inches.



Four point resistivity analyzer set-up

MOTORON SEMICONDUCTORS CORPORATION

11, Shri Nagar Colony, Shakti Nagar Extension, Delhi-110053 .Tel: 011-33648181/33655454

motoronenergy@hotmail.com