ACL 880 MEGOHMMETER

OPERATION MANUAL

Meter is warranted for one year from the date of purchase on parts and labor.
Calibration is recommended every twelve months.

NOTE: THIS MANUAL IS NOT TO BE SEPARATED FROM METER!

ACL 880 Megohmmeter

The ACL 880 Megohmmeter kit measures surface resistivity, resistance, temperature and humidity. It is designed to test conductive, dissipative, and insulative surfaces for electrical resistivity/resistance according to EOS/ESD, CECC, ANSI, ASTM and UL test procedures.

IDEAL FOR TESTING IN ACCORDANCE TO:

- ANSI/ESD STM2.1 Garments-Resistive Characterization
- ANSI/ESD STM4.1 Worksurfaces - Resistance Measurements
- ANSI/ESD STM7.1 Floor Materials – Resistive Characterization of Materials
- ANSI/ESD STM9.1 Footwear – Resistive Characterization
- ANSI/ESD SP9.2 Footwear – Foot Grounders Resistive Characterization
- ANSI/ESD STM97.1 Footwear/Flooring System – Resistance Measurement in Combination with a Person
- ANSI/ESD STM12.1 Seating – Resistive Measurement
- ESD TR53 Compliance Verification of ESD Protective Equipment and Materials

ACL 880 MEGOHMMETER INCLUDES:

- Tester
- Two 5-lb probes
- One shielded split cable 80” long (banana to banana)
- One shielded ground cable 80” long (banana to banana)
- 9-volt battery
- Foam-lined carrying case
- Certificate of calibration

TEST VOLTAGE AND LIMITS

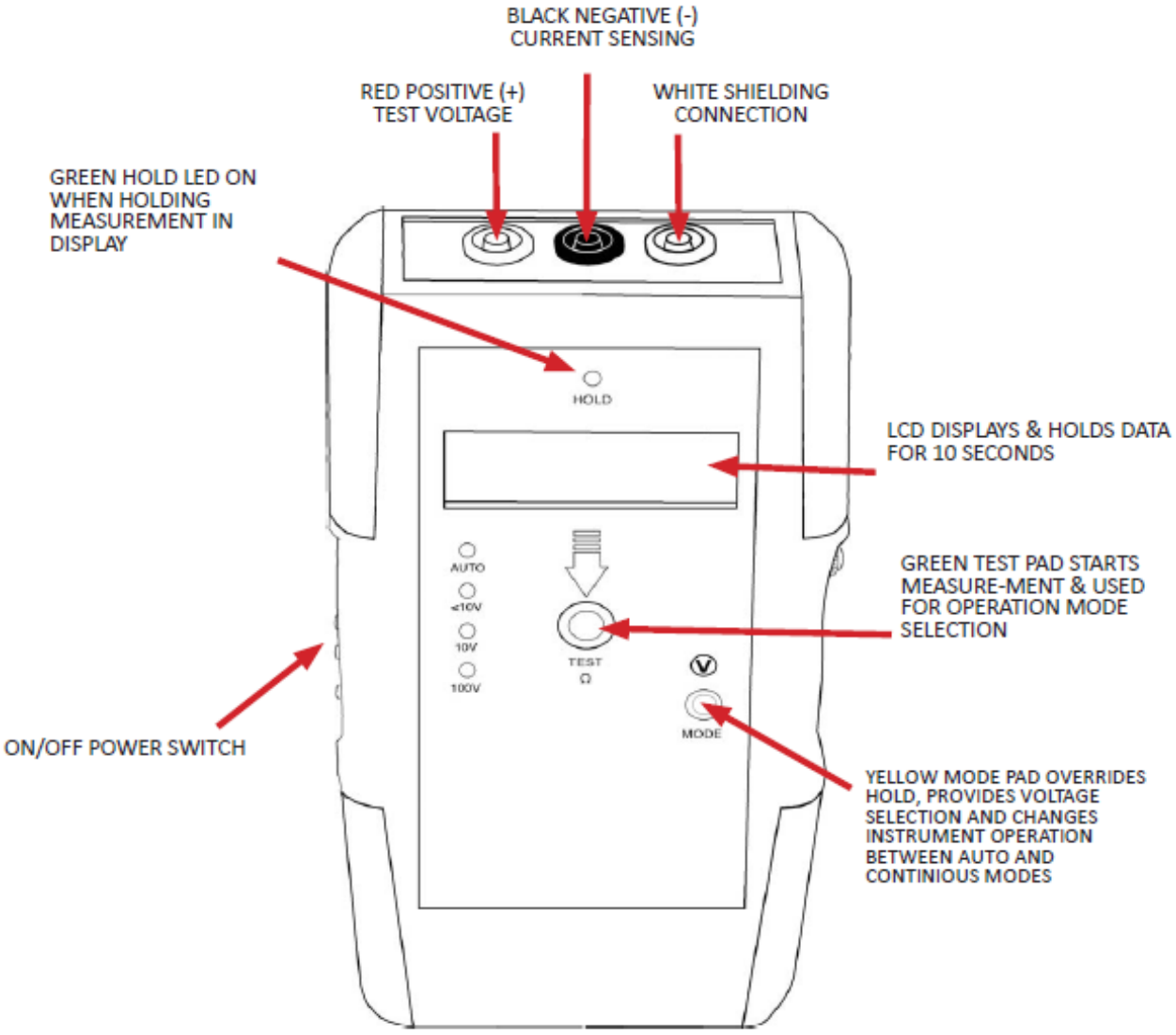
- <10 Volts Variable are applied from 1.0x10e3 to 9.9x10e3 ohms and provides audible continuity indication below 1.6 ohms.

- 10 Volts ± <0.5V (±<5% Constant Voltage, i.e., Under Load) applied from 1.0x10e4 to .99x10e5 ohms.

- 100 Volts ± <5V (±<5% Constant Voltage, i.e., Under Load) applied from 1.0x10e6 to 1.0x10e12 ohms.

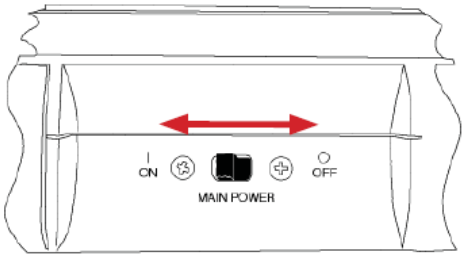
INTRODUCTION

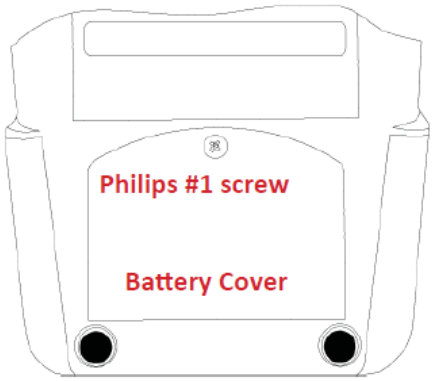
The ACL 880 Megohmmeter is a dependable and easy-to-use audit kit for conductive and dissipative surfaces. This meter is designed to be used in all facets of material production including engineering, maintenance, quality control, incoming inspection, manufacturing, research, or sales departments for the testing of anti-static mats, floor finishes, paints, wrist straps, smocks, footwear, bags and containers.



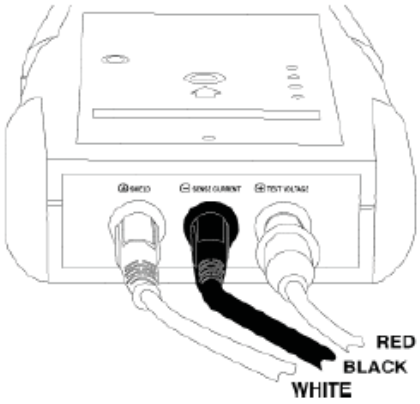
PREPERATION

1. Battery
   a. Turn main power to off when installing 9v battery.
   b. Unscrew battery compartment with Phillips #1 screwdriver.
   c. Replace battery and reattach cover.





2. Install test leads or special fixtures according to colored sequence.



Test Lead Connections:

White = Shield
Black = Current Sensing
Red = Test Voltage

Leads are connected to the Positive (+) and Negative (-) receptacles for resistance instrument measurements. The black sensing lead incorporates shielding; the shield is connected to the instrument via the white banana plug and receptacle. Receptacles are separated by ¾ inch spacing to accommodate dual banana plug connectors. These connectors are used for microprobes resistance measurement fixtures.

Leads supplied with the ACL 880 are specially designed for this instrument. They have superior outer insulation and a high number of stranded conductors to minimize measurement errors.

Be aware that other leads may not provide similar performance and will require recalibration of the Null point to improve measurement accuracy.

Always use supplied leads for best performance. Lead quality and length affect instrument accuracy. This is due to several factors such as insulation resistance, lead inductance and capacitance, as well as transmitted "noise" in the environment. To minimize the effect of noise and transmitted energy on measurement accuracy, the black sensing lead is shielded. Long 200 cm leads are supplied for auditing purposes where lead length is physically necessary. Long leads will allow the instrument to perform within its targeted performance.

RECOMMENDED USAGE

ACL 880 instruments and fixtures shall be operated at 65 – 90° Fahrenheit (18 – 32° Celsius), 10 – 60 % Relative Humidity. ACL 880 recommends making measurements using its instruments and fixtures in an environment of 72 – 76° Fahrenheit (22 – 24° Celsius), 25 – 35% Relative Humidity.

MODES OF OPERATION

1. Install leads and slide main power switch to **ON.** Wait for "*GO A*" to appear in display. AUTO mode (*GO A*) is the default operation mode. To switch to MANUAL mode *(GO C),* press the MODE pad and TEST pad simultaneously.

2. When using AUTO mode (*GO A*), the resistance range, test voltage and electrification period (EP) is automatically adjusted according to standard measuring protocol. See below for more information regarding EP. MANUAL MODE can be selected if a measurement is to be taken at a specific test voltage.

    a. To start measurement in *GO A*, press & release **TEST** pad. Measurement sequence is conducted automatically and ends when green **HOLD** LED illuminates. Yellow LED lights correspond to the voltage applied.

    b. Final measurement is displayed for 10 seconds then instrument resets for the next measurement.

    c. Use the **MODE** button to interrupt or clear measurement.

    d. Press **TEST** to restart the measurement.

3. When using **CONTINUOUS** mode (*GO C)*, the resistance range and test voltage are automatically adjusted according to standard measuring protocol. , The electrification period (EP) is disabled. See below regarding more information on EP. MANUAL MODE can be selected if a measurement is to be taken at a specific test voltage.

    a. To switch from *GO A* to *GO C*, press MODE pad and TEST pad simultaneously.

b. To start measurement in *GO C*, press & release **TEST** pad. Measurement sequence is conducted automatically and ends only when MODE pad is depressed and stops measurement. Green **HOLD** LED will illuminates. Yellow LED lights correspond to the voltage applied.

c. Final measurement is displayed for 10 seconds then instrument resets for the next measurement.

d. Use the **MODE** button to interrupt or clear measurement.

e. Press **TEST** to restart the measurement.

4. When using MANUALLY to select a specific test voltage, the meter can be used in either **AUTO** or **CONTINUOUS** modes by pressing the **MODE** pad before starting the measurement.

    a. Pressing the **MODE** pad will sequentially choose desired test voltage. Choose desired test voltage by corresponding illuminated LED.

        - From Auto, press once for <10v. The test voltage is manually set to vary from approximately 1 mv to less than 10 volts, depending on the resistance being measured.

        - From Auto, press twice for 10v. Measurements will be made at a constant test voltage of 10 volts ± <0.5 volts.

        - From Auto, press three times for 100v. Measurements will be made at a constant voltage of 100 volts ± < 2 volts.

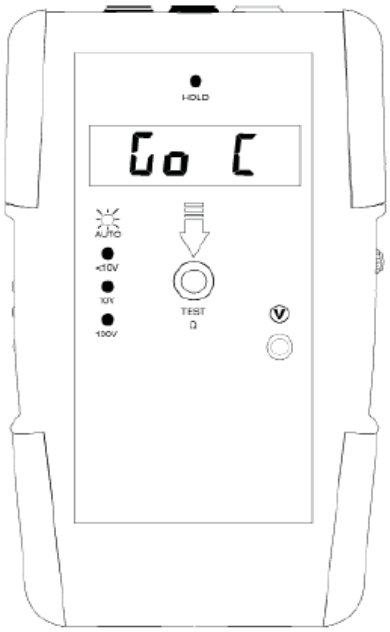
        - From Auto, press four times to return to **AUTO** mode.

    b. Press and release TEST pad to make measurement.

    c. Record the measurement within 10 seconds following the illumination of the green HOLD LED.

    d. Resistance measurement ranges in MANUAL MODE are as follows:
        - @<10 Volts (Variable): 1.0E3 to 1.0E9 Ohms
        - @10 Volts (Constant): 1.0E4 to 1.0E10 Ohms
        - @100 Volts (Constant): 1.0E6 to 1.0E12 Ohms

ACL 880 in Auto Default Operation Mode



ACL 880 in Continuous Operation Mode

5. The **MODE** button performs four useful functions:

    a. Select mode of operation from AUTO (Go A) to Continuous (GO C) by pressing **MODE** pad and **TEST** pad simultaneously.

    b. Select manual test voltage for **AUTO**, or **CONTINUOUS** mode (see "Manual" section above).

    c. Bypass the automatic **HOLD** function and override displayed data by resetting the instrument for the next measurement. The existing measurement in the display will be discarded.

    d. Initiate ***CAL?*** function. Calibration function is only to be used by qualified ACL Staticide® trained technicians during calibration. Exit out of ***CAL?*** and *d*o not try to adjust.

ELECTRIFICATION PERIOD

Electrification Period (EP) is the time required for an instrument to make a measurement from zero (0) within 5% of 1.0x10e12 ohms at 100 volts, plus 5 seconds. The EP is used for resistance measurements equal to, or greater than 1.0x10e6 ohms. The 880 was designed to incorporate variable EP to allow fastest possible, accurate measurements. Typical EP up to less than 1.0x10e9 ohms is typically less than 8.0 seconds. However, measurement conditions in the factory environment vary considerably. To compensate for variables in materials and conditions,

the 880 makes many measurements each second and evaluates their consistency and stability. If necessary the 880 will automatically extend the measurement time (EP) to insure an accurate representation of the material under test.

The ACL 880 measurement process is quite fast and once a measurement is stable in the LCD, the operator may elect to use the stable displayed measurement. In this case the EP is manually determined by the operator. This is an efficient operating procedure for determining if the measurement is generally within the required range for the object being audited. In this case, the operator usually observes and confirms measurement stability, which results in faster audit measurements. However, if the measurement is of a critical nature, or being used for material qualification purposes, the full EP for that measurement should be employed, i.e., when the measurement is completed and displayed, and the Green LED comes **ON** as described below. If the operator desires the EP to be determined by the instrument in **AUTO/GO A** mode, the Green Hold LED illuminates when the appropriate measurement period for each measurement is reached. It takes into account the material variables seen during the measurement and adjusts the EP for optimal measurement accuracy.

Typical EP's for the ACL 880 instrument are:

1.0E3 to 1.0E9 ohms: Typically 2 to 8 seconds (Range Average ~6.0 seconds)
1.0E09 to 1.0E11 ohms: 7 to 10 seconds
>1.0E11 to 1.0E12 ohms: 10 to 25 seconds

These values are variable and based on the stability of the materials being measured, as well as the environmental conditions. For example, while the default EP for the ACL 880 instrument is 7.5 seconds, EP automatically adjusts to enhance measurement accuracy.

USER ADJUSTMENTS & MAINTENANCE

The primary user adjustments are limited and have been previously described in this manual, i.e., the Null adjustment to compensate for test lead resistance. There is no reason for the operator or unauthorized personnel to break the warranty seal and open the unit. The instrument's circuits and mechanical connections have been precisely installed and the instrument tested. Annual calibration includes measurement of test voltage under load and a series of functional resistance test measurements. A qualified calibration laboratory should make these measurements and adjustments if necessary.

WARRANTY INFORMTION

Limited Warranty & Limitation of Liability: Each ACL 880 product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is one (1) year and begins on the date of shipment. This warranty extends only to the original buyer or end-user customer and does not apply to fuses, disposable batteries or to any product which ACL'S opinion, has been misused, altered, neglected or damaged by accident or abnormal conditions of operation or handling. ACL Staticide warrants that software will operate substantially in accordance with its functional specifications for 90 days and that it has been properly recorded on non-defective media. ACL Staticide does not warrant that software will be error free or operate without interruption. ACL Staticide reserves the right to invoice Buyer for importation costs of repair/replacement parts when product purchased in one country is

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ACL Staticide expressly warrants that for a period of 90 Days from the date of repair, by ACL Staticide, instruments and products will be free of defects in material (parts) and workmanship (labor). If ACL Staticide receives notice of such defect during the warranty period, ACL Staticide will replace or repair at its expense such parts which it determines to be defective. Any defective part must be returned to ACL Staticide postage prepaid with proof of purchase date. This warranty does not apply to routine calibration of the instrument.

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