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OVERVIEW

The W&W Rapid Analyzer is a programmable battery tester and battery cyclers capable of testing a variety of battery chemistries such as; Lithium Ion, Lithium Polymer, Nickel Cadmium and Nickel Metal Hydride. Most mechanical shapes can be accommodated with a specially designed battery cup. See battery cup description for more information.

FEATURES

- Analyzes, condition and charges nickel cadmium and nickel metal hydride batteries.
- Analyzes and charge lithium Ion and lithium polymer batteries.
- Features a single button capable of multifunction and an easy to read display for a user interface.
- Auto condition cycle for nickel batteries and life cycle mode for all batteries.
- Fast 3-minute state of health analysis mode.
- Optional thermal printer for status and result printing.
- PC program available for more advance user interfacing and report generation.
- Embedded OEM parameters or user defined profiles in "Learn Mode".

Specifications

Battery Chemistries

Nickel Cadmium, Nickel Metal Hydride, Lithium Ion and Lithium Polymer.

Battery Voltage / Maximum Cell Number of Cells

Nickel Metal Hydride / Nickel Cadmium 1 to 12 Cells / 17 Volts Max

Lithium Ion / Lithium Polymer 1 to 4 Cells / 17 Volts Max

Charge Current Rate

Minimum 50 mA

Maximum 4000 mA (16 Watts max)

Discharge Current Rate

Minimum 50 mA

Maximum 4000 mA (16 Watts max)

Method of Charge Termination

Nickel Based Minus Delta V

Lithium Based Constant Current/ Constant Voltage (See section on Charge Method)

Input Voltage

100 VAC to 240 VAC, 50 Hz to 60Hz, Autorange

Connector – 3 position male IEC 320

FUSE

Metric (5x20mm) 4A/ 125 V

Dimension (Size)

1 Station Unit (L x H x W): 7" x 4.75" x 9"

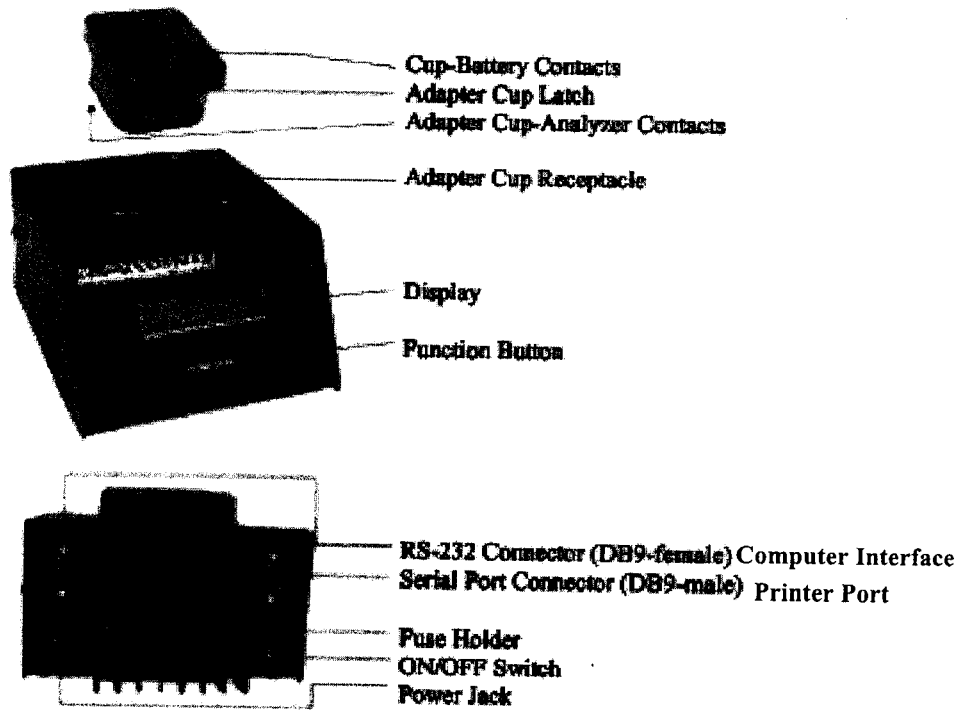
Weight (with cord)

5.35 lbs.

Agency Approval

UL, CSA

Parts Overview



Rear of Rapid Analyzer I

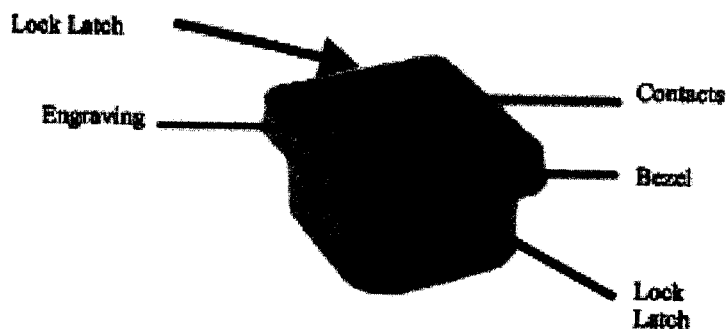
Understanding the Rapid Analyzer Adapter CUP

The “Adapter Cup” allow different batteries to be service by the Rapid Analyzer. Each “Adapter Cup” is made for a specific model battery produced by an OEM. There are 5 data profile locations within each “Adapter Cup”. The first four profiles store pre-stored battery information and can only be altered using an optional software interface. The type of data stored for example is chemistry (NiCd, NiMh, Lithium Ion and Lithium Polymer), capacity, impedance, charge current, and discharge current.

The fifth profile location is used for a user defined battery type of the same OEM model. To invoke this location and store data, use the “Learn Mode”. See the Section on “Learn Mode” in order to enter data.

Highlighted Features

- Physically accommodates battery pack in the analyzer
- Holds five different Muti -chemistry parameter profiles.
- Learn Mode profile location for user defined parameters of a unique battery.
- Locking Latch system cup interchange
- UP to 4 OEM battery pack’s profiles programmed in factory



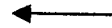
CUP Diagram

Getting Started

Power Up

- Connect the unit to the proper AC voltage and Turn-on power using the switch located in the rear of the unit.

CHARGER / ANALYZER
V3.20P Date: 2.09.03



ONCE THE UNIT HAS BEEN POWERED, THE DISPLAY SHOULD SHOW.

READY
INSERT BATTERY

You are now ready to service a battery. Placing the appropriate "adapter cup" in the analyzer will allow you to service an OEM battery. The cup contains pre-stored data e.g. chemistry type, capacity, impedance, charge rate and discharge rate for 4 battery types. There is a fifth data position in the "cup" reserved for user defined information during the Learn Mode. See "Learn Mode" for more information.

1. Place a battery in to the "adapter cup". In the display "Press Function to Proceed" should be displayed.

The analyzer should detect your battery and give chemistry and capacity options as the function button is pushed. See note below if this do not happen.

Note: If you do not see your chemistry during this process, remove the battery and reinsert it while pressing the function button. This operation will place you in the "Learn Mode". See "Learn Mode" to see what happens next.

2. Scroll through the menu until your battery appears (using the Function Button). When your battery appears, stop pressing the Function Button and wait until the display stop blinking. An acknowledgement beep will be heard and the display will also acknowledge your selection.

3. The display will now display a menu of "Test" e.g. 3 Minute Analysis, Charge Mode, Discharge Mode, Impedance Test, and Condition Cycles.

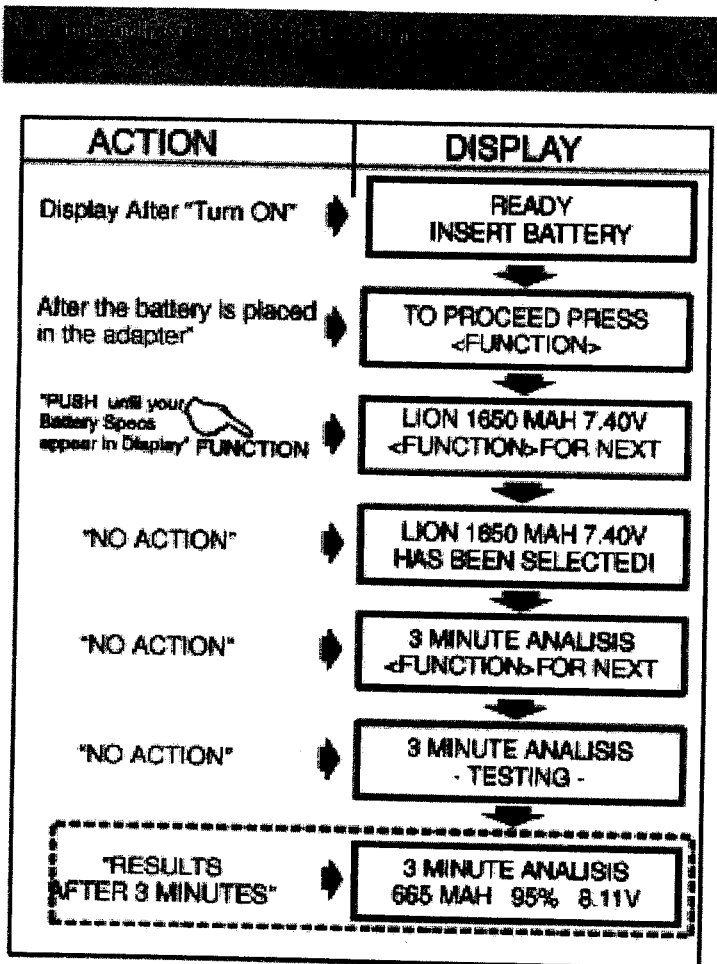
As you press the Function button the display should scroll through the menu of "Tests". When the test you want to select appears in the display just simply stop pressing the function button and wait until the display stop blinking. Once the display stops blinking, an acknowledgement beep will be heard along with a visual of test Selected in the display.

4. The test you selected will now start. Results will be displayed upon completion and if you have the optional printer attached a print out will also be printed upon test completion.

3 Minute Analysis

This is an advance proprietary algorithm capable of determining the health of a battery. Specially stored parameters allow the Rapid analyzer to identify a battery's capable capacity and display both percentage % of rated capacity and mAh. Batteries that have a low state of charge when placed on the Rapid Analyzer for 3-Minute Analysis will require a small charge up for 10 minutes before analyzing. Up to 3 attempts to recover the charge will be tried before a message displayed "Discard the Battery". Even batteries that do not have pre-stored parameters can be analyzed but will first be required to go through the "Learn Mode". Note, first a good battery must be learned before it can be analyzed. See "Learn Mode" for more information.

Mode 3 Minute Test (continuation)



Charge Mode

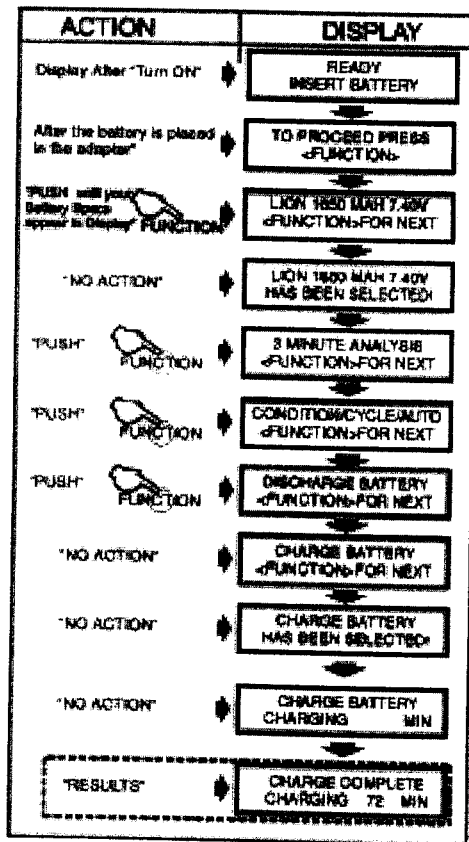
The Rapid Analyzer applies two types of charger algorithms to two types of chemistries. For Nickel based battery chemistries, a constant current of 1C (changeable with software option) is applied until the battery voltage peaks and descends negative. A top off current or 0.1C (Trickle Charge) is then applied for several hours to bring the total charge to 100%.

Lithium batteries are charged with a different algorithm. The Rapid Analyzer applies a constant current of 1C until the battery pack voltage equals between 4.1 and 4.2 Volts (the exact voltage depends on the pack manufacturer's specification). Upon reaching the predetermined voltage, the voltage is then held constant allowing the current to fall towards zero.

The rate at which the battery is charging is called a C rate. 1C is the charge current amount of the battery divided by battery capacity. For example: the capacity of a battery is 1200mA-Hr and the charge current is 1200 mA, 1C. If the charge current is reduced to 120 mA, then the C rate is 0.1C.

To select the Rapid Analyzer's Charge Mode follow the directions below:

Settings and Result



Trickle Charge

A small maintenance charge is applied to nickel batteries after a charge has been completed. Batteries will self-discharge when not being charged, a trickle charge 0.1C is used to compensate for the self-discharge.

The results can be printed on an optional printer with a result displayed as shown:

Nickel Metal Hyd Battery Selected
CELL COUNT = 6
CAPACITY (mahr) = 1250

BATTERY CHARGE
ENDING VOLTAGE = 5.976

Discharge Mode

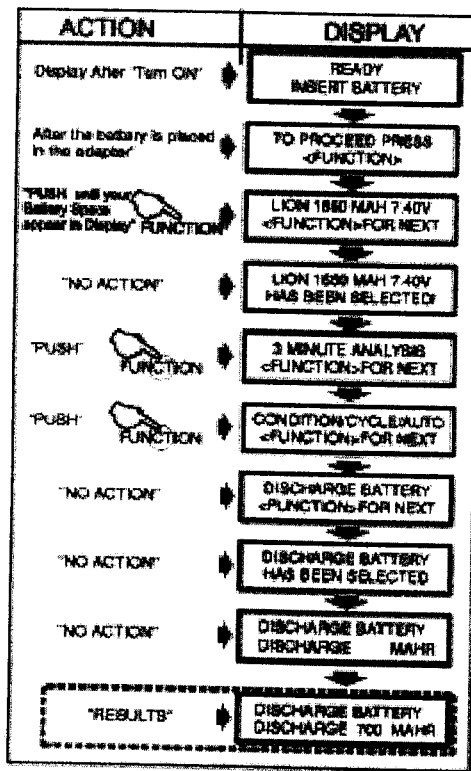
The Rapid Analyzer is capable of a single discharge cycle by selecting Discharge Mode.

In the normal discharge mode a constant pre-stored load current (C/5) is applied to the battery until 1 volt per cell has been reached. The result of the measurement is displayed as a percent of capacity. The capacity of a Battery is defined as the amount of current over time. So the discharge result shown by the Rapid Analyzer is also given in mA-H, the amount of current discharged over time.

The rate at which the battery is discharge is called a C rate. 1C is the discharge current amount of the battery divided by battery capacity. For example: the capacity of a battery is 1200mA-Hr and the discharge current is 1200 mA, 1C. If the discharge current is reduced to 120 mA, then the C rate is 0.1C.

Use the following procedure to select the discharge mode:

Settings and Result



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The results can be printed on an optional printer with a result displayed as shown in this example:



Nickel Metal Hyd Battery Selected
CELL COUNT = 6
CAPACITY (mahr) = 1250

BATTERY DISCHARGE
ENDING VOLTAGE = 5.976
DISCHARGE CURRENT = .246
DISCHARGE TIME = 65
PERCENT CAPCITY (%) = 90

Condition Cycle Mode

This battery-servicing tool is used to automatically bring a nickel cadmium battery back to 80% of rated capacity after suffering extended periods of overcharge, a condition sometimes called "Memory". The actual name for this condition is voltage depression. Usually deep discharging the battery will restore the battery back to normal capacity such as the discharging and charging cycle used in the Rapid Analyzer. Nickel Metal Hydride and Lithium Ion batteries do not suffer from voltage depression, but they will not be harmed if the Conditioning cycle is applied to them. To select the condition cycle follow the instructions below.

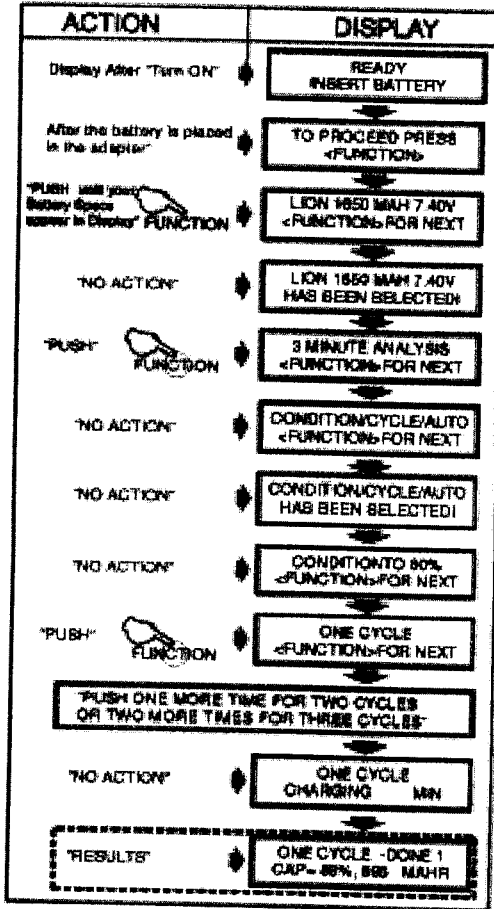
Setting and Results

ACTION	DISPLAY
Display After "Turn ON"	READY INSERT BATTERY
After the battery is placed in the adapter	TO PROCEED PRESS <FUNCTION>
"PUSH" and your Battery Spanner  reaches Display FUNCTION	NICD 700 MAH 7.20V <FUNCTION> FOR NEXT
"NO ACTION"	NICD 700 MAH 7.20V HAS BEEN SELECTED
"PUSH"  FUNCTION	3 MINUTE ANALYSIS <FUNCTION> FOR NEXT
"NO ACTION"	CONDITION CYCLE AUTO <FUNCTION> FOR NEXT
"NO ACTION"	CONDITION CYCLE AUTO HAS BEEN SELECTED
"NO ACTION"	CONDITION TO 80% <FUNCTION> FOR NEXT
"NO ACTION"	CONDITION TO 80% HAS BEEN SELECTED
"NO ACTION"	CONDITION - PASS 1 CHARGING
"RESULTS"	CONDITION TO 80% CAP = 88%, 618 MAH/7A

Manual Condition Mode

This mode like the Condition Mode will cycle a battery through a charge and discharge cycle only with one exception, selecting this mode goes through one cycle at a time. Select 1, 2 or 3 cycles and the Rapid Analyzer will on cycle the selected test and display the capacity (in percentage of rated capacity and mAh). To select the condition cycle, follow the instructions below.

Settings and Results

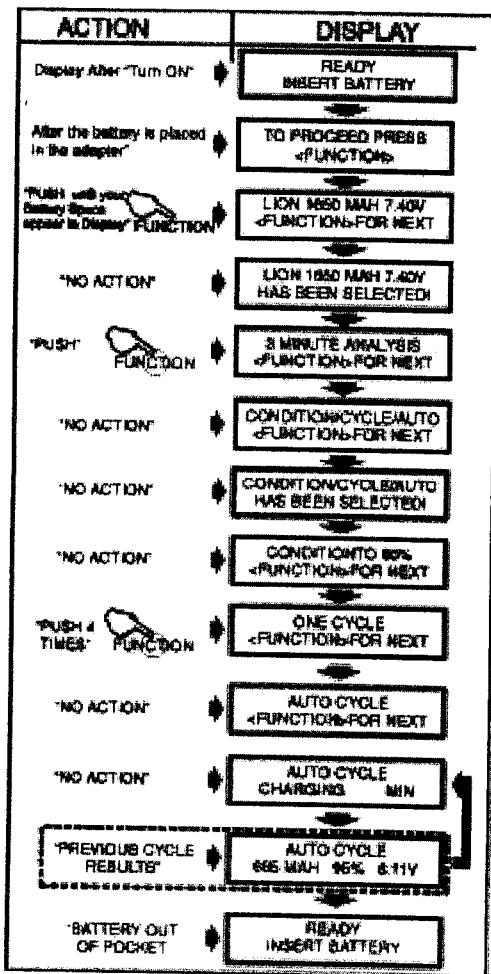


Auto Cycle Mode

Life cycle testing can be accomplished choosing this test. Battery performance for multiple cycles can be evaluated as long as the battery is not removed. Charge and discharge cycles are performed with 10-minute rest in between charge and discharge.

An example of how this test can be used is the following: A manufacturer states that a NiMH battery will achieve 300 cycles through its life (life can be defined as 300 cycles). The 300 cycles can be verified provide that the discharge rate is adjusted per the manufacturer's test requirements. Note: Battery Cycle Life is very dependent on the discharge rate and environmental temperature.

To select this test, follow the process below.



Learn Mode

This mode when selected will allow battery parameters to be created for new battery models. A battery "Adapter Cup" holds a total of 5 battery profiles for parameter storage; four are preprogrammed with OEM information for a particular battery series. The fifth profile can be modified by the "Learn Mode". During entry into the "Learn Mode", Battery Chemistry, Capacity, and the number of Cells are prompted for data entry. Follow the Directions below to enter data for the Learn Mode.

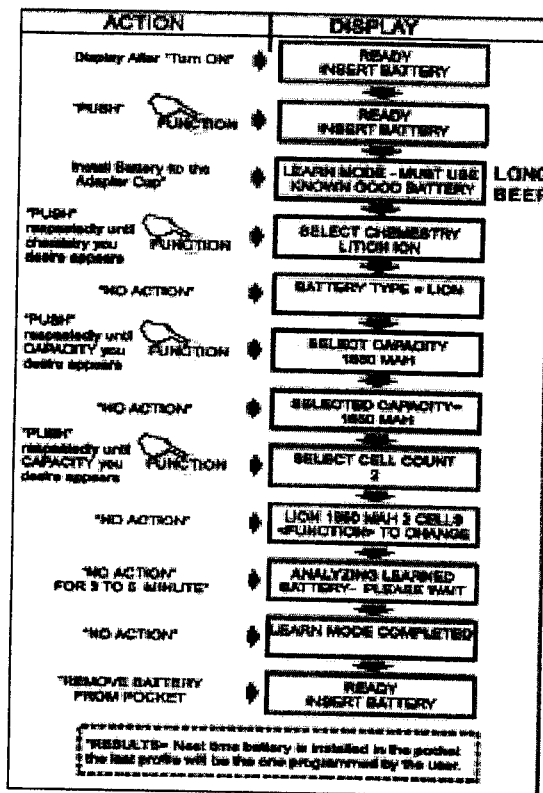
Data Range

Chemistry (Lithium Ion, Nickel Cadmium, and Nickel Metal Hydride)
 Capacity 50 – 4000 mAH
 # Of Cells 1-12

Learn Mode Precautions

A good battery must be used to calibrate a new battery's profile. Original Equipment batteries have unique profiles that should not be used when testing non-OEM batteries. For each new non-OEM battery, create a new profile. These values can not be manually entered, only chemistry, capacity, and number of cells can be entered. (The acquired parameters during the learning phase are used in tests such as the 3-Minute Analysis).

Mode Learning Mode (continuation)



Impedance Test

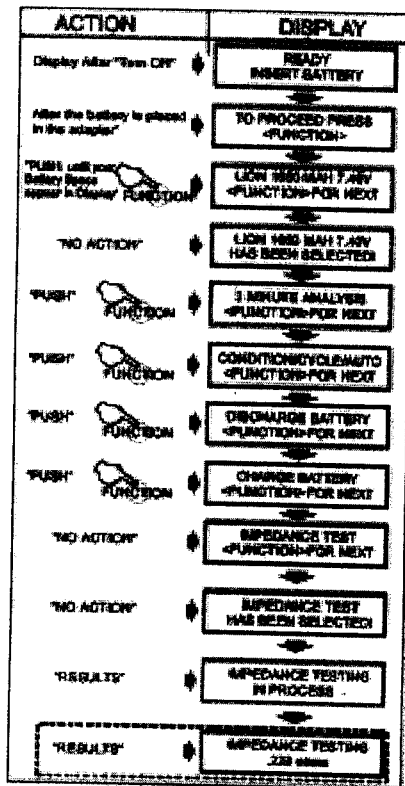
Impedance of a battery can be a good indicator of degradation of battery performance. In general, the lower the impedance number the better the battery performance during discharge. As a battery ages the impedance starts to rise indicating possible problems with the electrolyte, separator, contact corrosion, or metal interfaces, all impact the impedance.

The initial impedance of a new battery should be recorded and compared through the life of a battery and a determination can be made to remove the battery from service when the impedance rises too much out of range.

The Rapid Analyzer produce impedance results within a few seconds of testing and displays the amount in Ohms in the display or on a printout when an optional printer is used.

Follow the directions below for Impedance testing.

Settings and Result



Safety and Operating Environment

- Always use a grounded AC outlet to power the Rapid Analyzer
- Keep the Rapid Analyzer at least a one-foot away from any object to allow for proper ventilation.
- Do not Analyze Batteries outside the recommended temperature ranges. For good and consistent results, 25°C (room) is recommended. Allow batteries to stabilize to room temperature before analyzing.
- Do not exceed the battery manufacture's recommended voltage, charge current and discharge current.