

# ANALYZER Ia, IIIa & VIa <sup>®</sup>

## USER'S MANUAL



***BATTERY  
ANALYZERS  
& CONDITIONERS***

MADE IN  
USA BY:  
**W & W Manufacturing Co.**

# ANALYZER Ia, IIIa & VIa - USER'S MANUAL

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# ANALYZER Ia, IIIa & VIa - USER'S MANUAL

## 1- SPECIFICATIONS

### **BATTERY CHEMISTRIES:**

Nickel Cadmium, Nickel Metal Hydride, Lead Acid and Lithium Ion chemistries.

### **METHOD OF END OF CHARGE DETECTION:**

Negative Delta (V), Time, dt/dT and temperature can be used in conjunction with each other to insure proper charge termination.

### **BATTERY RANGE:**

NiCd and NiMH: 1 to 12 cells

Lead Acid (9.999 amp max): 1 to 7 cells

Lithium Ion (certain chemistries): 1 to 4 cells .

### **CHARGE RATES AVAILABLE:**

(All are cup or adapter selected) 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400 and 1500 mA

### **DISCHARGE RATES AVAILABLE:**

(All are cup or adapter selected)

200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400 and 1500 mA.

**MAXIMUM CAPACITY DISPLAYED:** 9,999 mAh

### **INPUT VOLTAGE:**

100 VAC to 240 VAC, 50 to 60 Hz., Single phase, Auto-Ranging.  
Input Connector: 3 position Male IEC 320 Inlet.

### **SIZE:**

1 Station unit, (LxHxW) 6" x 3.5" x 8" (153 x 89 x 203mm)

3 Station unit, (LxHxW) 11.5" x 3.5" x 8" (292 x 89 x 203mm)

6 Station unit, (LxHxW) 23" x 3.5" x 8" (584 x 89 x 203mm)

### **WEIGHT:**

1 Station unit (3) lbs. (1.2 kg)

3 Station unit (5) lbs. (2.05 kg)

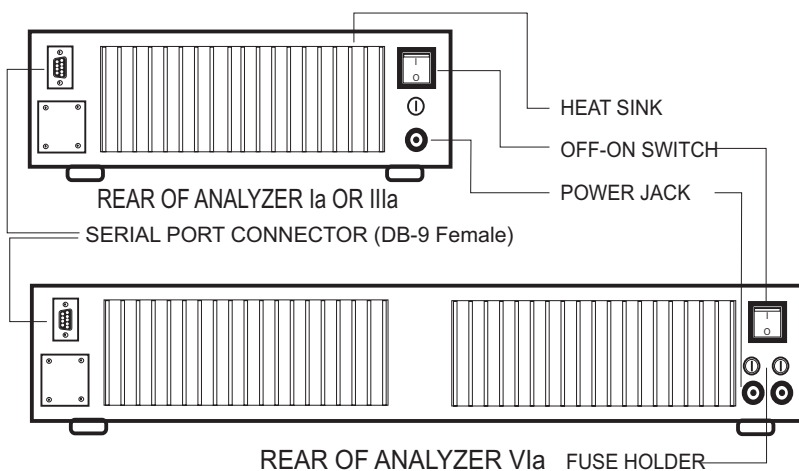
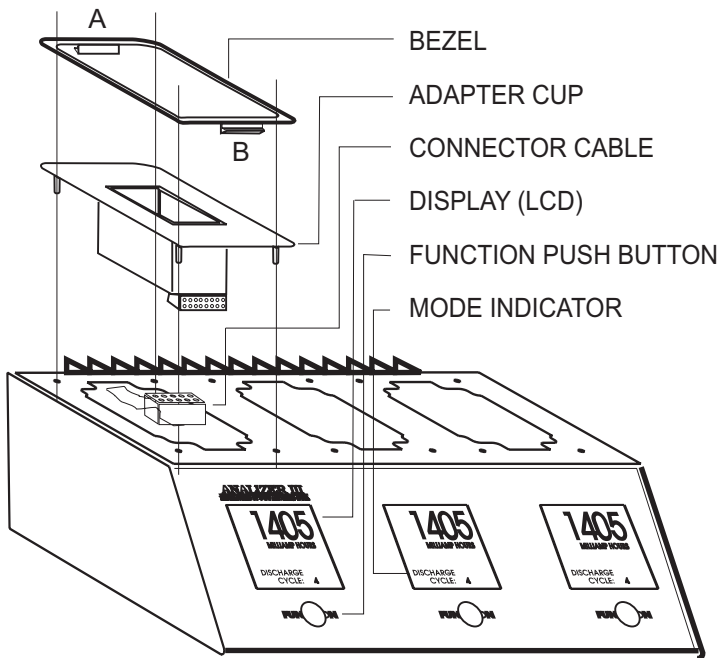
6 Station unit (10) lbs. (4.1 kg)

**AGENCY APPROVALS:** UL, CSA, CE, TUV

**All Specifications are subject to change without notice**

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## 2- IDENTIFYING PARTS OF YOUR ANALYZER



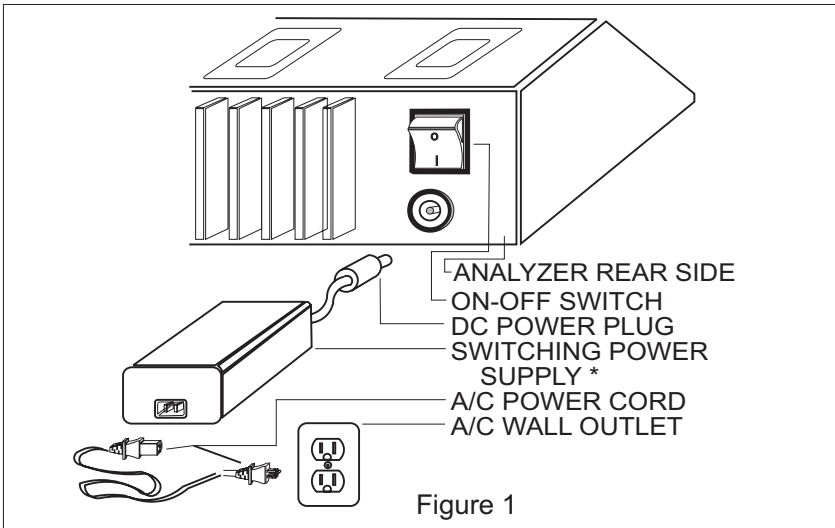
# ANALYZER Ia, IIIa & VIa - USER'S MANUAL

## 3- GETTING STARTED

Carefully unpack the Analyzer Ia, IIIa or VIa. You will have the following accessories:

	AN Ia	AN IIIa	AN VIa
A/C Power Cord _____	1 _____	1 _____	2 _____
Switching Power Supply _____	1 _____	1 _____	2 _____
User's Manual _____	1 _____	1 _____	1 _____
Warranty Card _____	1 _____	1 _____	1 _____
Adapter Cup Instructions _____	1 _____	3 _____	6 _____

- A) Place the ON-OFF switch in the OFF position (figure 1).
- B) Insert the DC POWER PLUG into the Analyzer as shown in figure 1.
- C) Insert the A/C Power cord into the switching power supply. See figure 1.
- D) Plug the other end of the A/C power cord into A/C outlet as shown in figure 1.



### **Switching on the Analyzer Ia, IIIa or VIa**

Switch on the Analyzer with the "ON-OFF" switch located on the rear of the Analyzer (See figure 1). The Analyzer will perform a self test. During the self test the displays will show each element of the displays. At the end of the self test, each display will indicate "READY".

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## 4- OPERATION INSTRUCTIONS

### IMPORTANT - READ BEFORE CONTINUING.

1. In order to erase and prevent the memory effect of Ni-Cd battery packs, W & W Analyzer/Conditioner has 8 different modes of operation. All these operation modes are not necessarily for other battery pack chemistries like Ni-MH, Li-Ion and Lead Acid. Therefore, we suggest using the W & W Analyzer operation modes according to the following table:

**\*Important:** None of the W & W Operation Modes will harm any battery pack.

### W & W Operation Modes and Batteries Chemistries

CHEMISTRY	W & W ANALYZER MODES							
	Charge	Discharge	C1	C2	C3	C4	Auto	Condition
Ni-Cd	✓	✓	✓	✓	✓	✓	✓	✓
Ni-MH	✓	✓	✓	X	X	X	✓	✓
Li-Ion	✓	✓	✓	X	X	X	✓	X
Lead Acid	✓	✓	✓	X	X	X	✓	X

✓ - Use

X - Not Suggested

2. E02 - Indicates that the battery is out of acceptable voltage range for that battery, either too high or too low. If the battery is new or has not been used for a couple of months, an E02 may occur during the charge or cycles modes. In that situation, it is recommended to put the battery in the Analyzer, in the CHARGE mode. This may have to be repeated two or three times. Once you have completed a Charge mode, it is recommended to condition the battery by placing it in the Analyzer in the cycle three mode. If the battery has been used on a regular basis and the E02 is displayed, then the battery in all probability has a shorted cell or cells within it. It is recommended that you repeat the Cycle 3 mode one more time to ensure that you are not discarding a good battery. Should the E02 appear again, then discard the battery or return it to the manufacturer if it is still under warranty.

3. If the display continues to show "READY" after the battery has been placed in the Analyzer Cup, either

- A. The battery has been placed in the Analyzer such that the contacts of the battery are not making contact with the contacts of the Analyzer. In this case simply reverse the battery and place in the Adapter Cup according to the Battery Specification Sheet, or
- B. If the battery has been correctly positioned in the cup then the battery is open and should be properly disposed of.

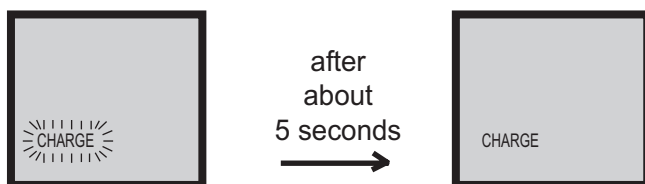
# ANALYZER Ia, IIIa & VIa - USER'S MANUAL

## 5- CHARGE MODE

### **WILL FULLY CHARGE THE BATTERY.**

\*REFER TO THE "ADAPTER CUP" BATTERY SPECIFICATION SHEET FOR ANALYZER Ia, IIIa & VIa FOR PROPER INSTALLATION OF THE BATTERY INTO THE ANALYZER.

Install the battery in the "Adapter cup". The display associated with that "Adapter cup" will now display a flashing "**CHARGE**"; after 5 seconds, the flashing "CHARGE" stop flashing.



Once the battery is fully charged, the display will show a flashing "READY" along with a flashing "CHARGE" indication.



The battery may be left in the Analyzer after it has been fully charged. In this situation, the battery will be in the trickle charge state until the battery is removed from the Analyzer. When the battery is removed from the Analyzer, after it has been charged, the display will then read "READY".



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## 6- DISCHARGE MODE

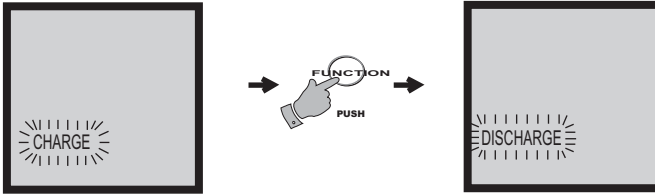
**\*DISCHARGE THE BATTERY TO 1V/CELL AND LEAVE IT IN THE DISCHARGED STATE.**

During the discharge mode of operation, the display will show the capacity of the battery in mAh. This function is very important when evaluating a BATTERY CHARGER to see whether it is functioning properly.

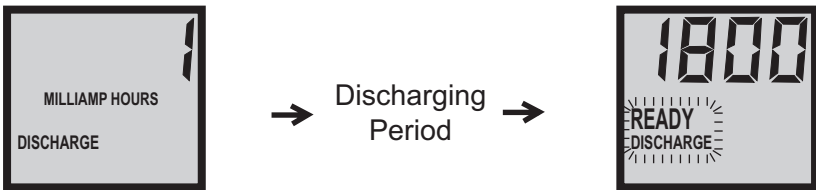
\*Refer to the Battery Specification Sheet for proper installation of the battery into the Analyzer.

Install the battery into the Adapter cup. The display associated with that Adapter cup will now display a flashing "CHARGE".

\*While the display is flashing press the "FUNCTION PUSH BUTTON" once. You will see a flashing "DISCHARGE".



After about five seconds, the display will stop flashing, and will show "MILLIAMPS" and "DISCHARGE".



At this time, the Analyzer will start discharging the battery, displaying the capacity of the battery that has been withdrawn from the battery in mAh. It should be noted that as the Analyzer continues to discharge the battery, the number displayed increases. This continues until the battery has been discharged to 1v/cell. At this point, the display will show a flashing "READY", the capacity of the battery in "mAh", and "DISCHARGE". The battery is now totally discharged. When the battery is removed from the Analyzer, after it has been Discharged, the display will read "READY".



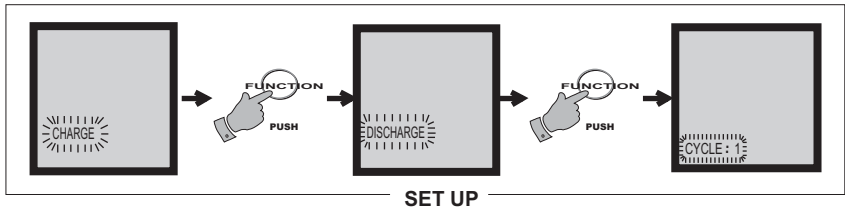
## 7- ANALYZE MODE (CYCLE 1)

**"CYCLE 1": Charge/Discharge/Recharge**, is used to evaluate the state of the battery, and gives you the actual capacity of the battery in mAh.

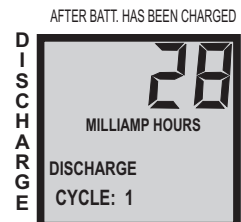
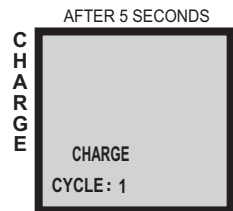
\*REFER TO THE BATTERY SPECIFICATION SHEET FOR ANALYZER Ia, IIIa & VIa for proper installation of the battery into the Analyzer.

\*Install the battery into the "Adapter cup". The display associated with that "adapter cup" will display a flashing "CHARGE".

\*While the display is flashing press the "FUNCTION PUSH-BUTTON" **twice**. You will see "DISCHARGE", then "CYCLE 1".



After 5 seconds, the display will stop flashing and will show "CHARGE" and directly below, "CYCLE 1". The Analyzer is now in the Charge state of Cycle 1. After the battery has been charged, DISCHARGE and CYCLE 1, as well as the MILLIAMP HOURS, appears on the display.



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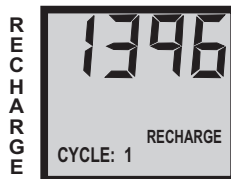
## 7-ANALYZE MODE

Continuation...

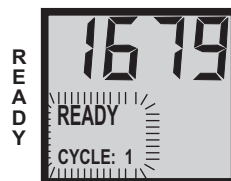
At this time the Analyzer will start discharging the battery and displaying the capacity of the battery that has been withdrawn from the battery in MILLIAMP-HOURS. It should be noted that as the Analyzer continues to discharge the battery, the number displayed increases. This will continue until the battery has been discharged to 1 volt/cell.

At this time the Analyzer will go into the recharge portion of Cycle 1, and the display will replace the word "DISCHARGE" with "RECHARGE".

After the battery is Recharged, the display will show a flashing READY, along with CYCLE 1 and the capacity of the battery in MILLIAMP HOURS. One should refer to the BATTERY SPECIFICATION SHEET FOR THE ANALYZER Ia, IIIa & VIa to see whether the battery meets minimum capacity levels. Typically the battery should be within 80% of the rated capacity after one year. When the battery is removed from the Analyzer, after CYCLE 1 has been completed, the display will read READY.



AFTER BATTERY  
HAS BEEN RECHARGED



# ANALYZER Ia, IIIa & VIa - USER'S MANUAL

## 8- TRAINING CYCLES MODE

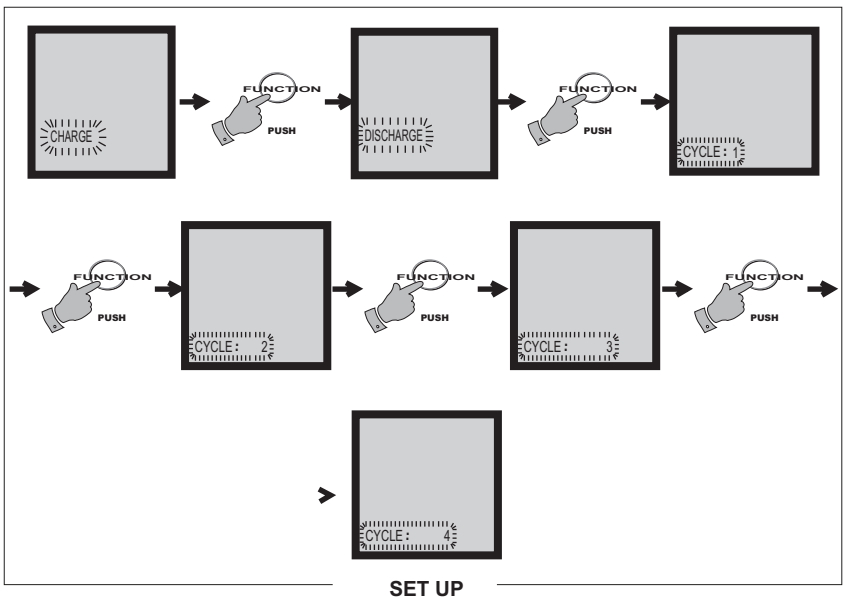
**CYCLE 2, CYCLE 3, and CYCLE 4** are just multiples of **CYCLE 1** and are intended to exercise (CONDITION) the battery, eliminating the "Memory effect" or "Voltage Depression", along with making the battery more efficient. At the end of each **DISCHARGE** portion of each **CYCLE** a new reading will appear in the display, giving the capacity for that particular **CYCLE** in mAh.

\*REFER TO THE BATTERY SPECIFICATION SHEET FOR ANALYZER Ia, IIIa & VIa for proper installation of the battery into the Analyzer.

\*Install the battery into the "Adapter cup". The display associated with that "adapter cup" will display a flashing "CHARGE".

\*While the display is flashing, press the "FUNCTION BUTTON" **three** times for **CYCLE 2**, **four** times for **CYCLE 3**, **five** times for **CYCLE 4**. Each time the **FUNCTION BUTTON** is depressed, the following sequence will be displayed:

**DISCHARGE, CYCLE 1, CYCLE 2, CYCLE 3, CYCLE 4.**



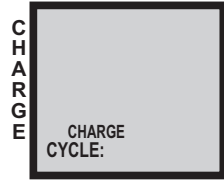
# ANALYZER Ia, IIIa & VIa - USER'S MANUAL

## 8- CONDITION MODE

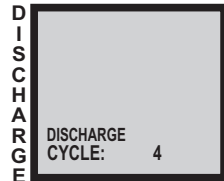
Continuation...

After 5 seconds, the display will stop flashing and will show "CHARGE" and depending on which CYCLE you choose, "2, 3 or 4" will appear directly below the CHARGE indication. The Analyzer is now in the Charge state. After the battery has been charged, the Analyzer will go into the Discharge state. The display will also show DISCHARGE and the CYCLE number you have selected. The "MILLIAMP HOURS" appears on the display as well. At this time the Analyzer will start discharging the battery and displaying the capacity of the battery that has been withdrawn from the battery in MILLIAMP HOURS. It should be noted that as the Analyzer continues to discharge the battery, the number displayed increases. This will continue until the battery has been discharged to 1 volt/cell. At this time the Analyzer will go into the Recharge portion of the Cycle #, and the display will show CHARGE instead of DISCHARGE. All other readings will be as they were prior to RECHARGE. Once the battery is recharged, the Analyzer will repeat the Cycle mode until it has completed the number of Cycles that were originally entered.

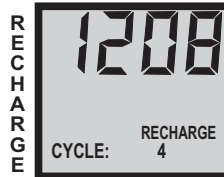
AFTER 5 SECONDS



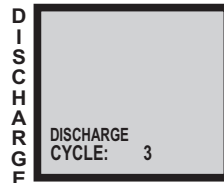
AFTER BATT. HAS BEEN CHARGED



AFTER BATT. HAS BEEN DISCHARGED



AFTER BATTERY HAS BEEN RECHARGED

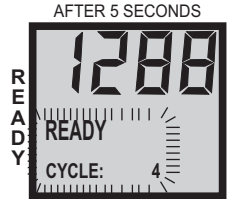


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## 8- TRAINING CYCLES MODE

Continuation...

At this time, the display will show a flashing READY, the last mAh reading and the number of Cycles completed. The Analyzer will now be in the trickle charge state. When the battery is removed from the cup, the display will read READY.



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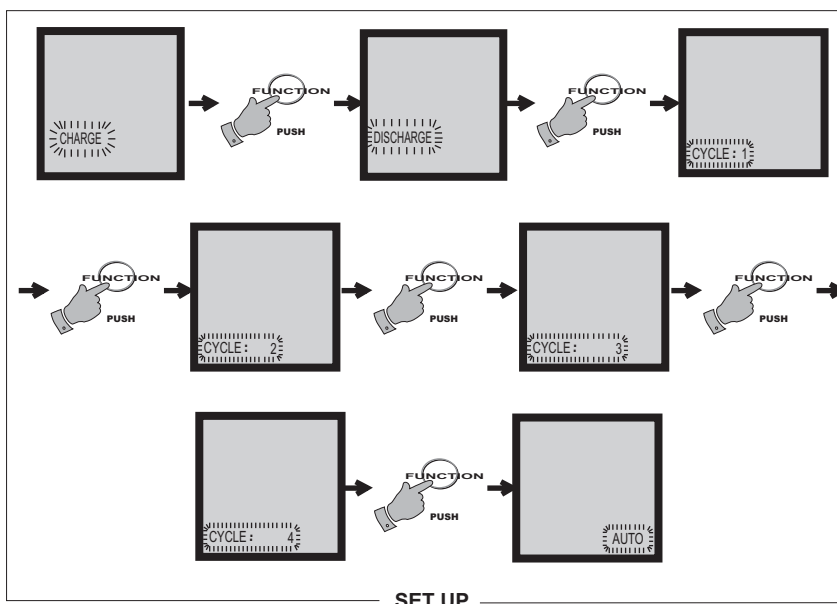
## 9- AUTO MODE

This function is intended for life testing, for qualifying new vendors of cells and batteries. The "Cycle" function is repeated until it is stopped manually. After each Cycle is completed, the display will show the capacity of the battery for that Cycle. This function is very useful when used in conjunction with our optional Computer Interface to form a Database to maintain a history of the evaluations.

\*REFER TO THE BATTERY SPECIFICATION SHEET FOR ANALYZER Ia, IIIa & VIa for proper installation of the battery into the Analyzer.

\*Install the battery into the "Adapter cup". The display associated with that "adapter cup" will display a flashing "CHARGE".

\*While the display is flashing press the "FUNCTION PUSH BUTTON" six times. Each time the FUNCTION PUSH BUTTON is depressed, the display will read DISCHARGE, then CYCLE 1, then CYCLE 2, then CYCLE 3, then CYCLE 4 and **AUTO**.



## **9- AUTO MODE**

Continuation...

The following sequence will occur:

"Charge/Discharge/Recharge". The Analyzer will now repeat this procedure until the battery is removed from the Analyzer. During this process the Analyzer will display the capacity of the battery after each Discharge phase. To determine how many Cycles have been performed, simply depress the FUNCTION PUSHBUTTON located below the display. The number of Cycles that has been completed will be displayed. Release the FUNCTION PUSH BUTTON and the Analyzer will resume the AUTO function state. When the battery is removed from the Analyzer, the display will read READY.

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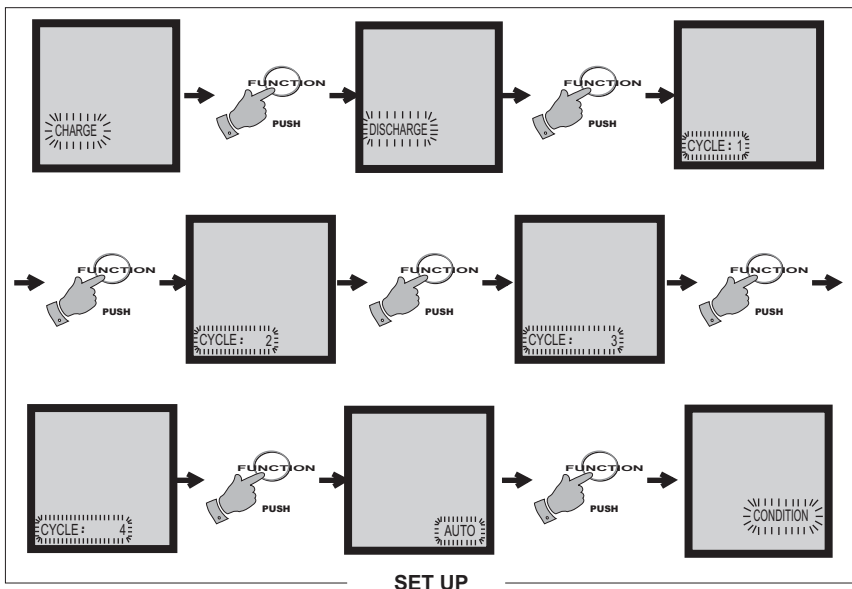
## 9- CONDITION MODE

Condition Mode is meant to be used with Ni-Cd batteries only. It is used to condition new batteries, long time stored batteries or deeply discharged batteries.

\*Refer to the battery specification sheet for Analyzer Ia, IIIa or VIa for proper installation of the battery in the Analyzer.

Install the battery into the Adapter Cup. The display associated with the "Adapter Cup" will display a flashing CHARGE. While the display is flashing press the Function Button seven times for Condition. Each time the function button is depressed the following sequence will be displayed:

DISCHARGE, CYCLE 1, CYCLE 2, CYCLE 3, CYCLE 4, AUTO, AND CONDITIONING.





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## **9- CONDITION MODE**

Continuation...

After 5 seconds, the display will stop flashing CONDITION and DISCHARGE will appear on the left below CONDITION. The Analyzer is now discharging, and the display will show the capacity of the battery that has been withdrawn from the battery in mAh. It should be noted that as the Analyzer continues to discharge the battery, the number displayed increases. This continues until the battery has been discharged to 0.5 v/cell.



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