ALPHA BATTERIES - CONDUCTANCE REFERENCE NOS.

DEEP CYCLE SERIES	Siemens/Mhos
DCS-33	725
DCS-50SAE	850
DCS-75BT	1200
DCS-100L	1400
UPS—HIGH RATE SERIES (AGM)	
UPS12-100	600
UPS12-140	950
UPS12-170	980
UPS12-200	1100
UPS12-270	1375
UPS12-310	1750
UPS12-370	1850
UPS12-475	2000
UPS6-620	4200
UPS-FLAME RETARDANT HIGH RATE SERIES	
UPS12-100FR	600
UPS12-140FR	950
UPS12-170FR	980
UPS12-270FR	1375
UPS12-310FR	1750
UPS12-370FR	1850
UPS12-475FR	2000
UPS6-620FR	4200
MPS PRODUCTS (AGM)	
MPS12-33	800
MPS12-50	980
MPS12-75	1200
MPS12-88	1300
MPS12-100	1400
TELECOMM—LONG DURATION SERIES (AGM)	
TEL12-125	2000
TEL12-30	800
TEL12-30/SLC	800
TEL12-45	900
TEL12-45/SLC	900
TEL12-70	1125
TEL12-80	1325
TEL12-90	1590
TEL12-105F	1325
TEL6-180	
ALPHACELL	
85GXL	600
165GXL	1000
180GXL/190 Gold-HP	1100
160A	1300
210GXL/215 Gold-HP	1200

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QS-9000 CERTIFIED

P/N: CTA-4000 AT

Celltron *Advanced* ™
Stationary Battery String Analyzer

Quick Reference Guide

Refer to instruction Manual for safety guidelines and complete instructions.

Model: CTA-2000/4000 AT

BUTTONS

Allows you to scroll up in a menu or number selections.

Allows you to scroll down in a menu or number selections.

Moves to the option you select or enters number selections.

Opens a menu with options to retest the jar or strap you just tested.

Turns the analyzer on and off.

PRE-TESTING

1. Determine a reference value.
2. Set the options in the UTILITIES menu.
3. Set the values in the SET PARAMETERS menu.

PREPARING TO TEST

1. Record the following about the jars:
   - power load
   - physical condition of the jars
   - site condition
   - jar rating
2. Identify jars and straps with a label to coincide with the analyzer labels.
3. Attach the cable to the DB-9 receiver at the top of the analyzer and tighten the screws.
4. Map out a testing pattern of the string.
5. Set the TEST BATTERY option from the main MENU.

TESTING

1. Attach the black clamp or probe tip to the black (-) terminal.
2. Attach the red clamp or probe tip to the red (+) terminal.
3. If you selected MANUAL START when you set values in the SET PARAMETERS menu, press **ENTER** to start testing.
4. Choose one of the following based on the type of testing you are doing:
   - ·If you are testing jars only, test the next set of jar posts if you have more than one set of posts or test the next jar in the string. Then follow step 8.
   - If you are testing jars and straps, follow steps 5–7.
5. Remove the red clamp or probe from the red (+) terminal.
6. Attach the red clamp or probe at the end of the strap above the black (-) terminal on the next jar.
7. Choose one of the following based on the number of posts on the jars:
   - If the jar has more than one set of posts, attach the black and red clamps or probes to the next set of posts on the jar.
   - If the jar has one set of posts, test the jar connected to the jar you just tested.
8. Repeat steps 1–4 and 5–7 until you are finished testing the string.

RETESTING

To retest a set of jar posts or a strap just after you test it, press **RETEST**.

To retest a set of jar posts or a strap after you test the entire string:
1. Remove the clamps or probes from the set of jar posts or strap.
2. Press **MENU** to turn on the analzyer and then press **RETEST**.
3. Scroll through the test results to find the set of jar posts or strap you want to retest and then press **RETEST**.
4. Follow the steps under "Testing" to retest the set of jar posts or strap.

PRINTING TEST RESULTS

1. Turn the printer on.
2. Place the infrared light on the analyzer in front of the infrared light on the printer.
3. Press **MENU** to access the main MENU.
4. Scroll to **PRINT RESULTS** and press **ENTER**.
5. Scroll to the name of the string you want to print test results for and press **ENTER**.

DOWNLOADING TEST RESULTS

To download test results to your PC, refer to the *Infrared Receiver and Celltron inFORM™ Battery Management Software* instruction manual.

CONDUCTANCE AND BATTERY STATE OF HEALTH

All batteries have an electrical signature or "Reference Conductance Value" which can be associated with a Model Number. Reference Conductance Values may or may not be provided by the battery manufacturers. In general, higher measured conductance equals higher typical battery discharge performance.

Batteries will age and wear out when placed in normal float service. Issues affecting the actual battery life include the number and depth of battery discharge cycles, the float charge condition, and any sustained high temperature operation. Deviations from manufacturers' recommendations will cause both the battery capacity and measured conductance to decline. When battery conductance has dropped by 30% to 40% from initial installed value or from a valid reference value, it is likely that the cell is below acceptable service condition.

Example:

· Measured Conductance in three stages of battery life

New Battery	Marginal Battery	Typical Failure
1000 Siemens	>700 Siemens	<550 Siemens

Each user must determine the exact battery failure and replacement criteria based on guidelines consistent with company approved business objectives and battery manufacturers' instructions.

Developing a Reference Conductance Value

If test history or an established battery reference value are unavailable, one can easily be developed. Simply test a representative number (30 or more are recommended) of healthy new batteries, fully charged and on-line in float service.

While some variance can be expected, typical values among VRLA batteries are:
New cells: 10% deviation (±5% from population average)
Mid-service: 20% deviation (±10% from population average)
Failed cells: 30% deviation (30% or more below cell average)

Test Probe Placement

Test probe placement is CRITICAL and will affect measured results. The Digital Midtron Analyzer is a sensitive electrical instrument and placing the test probes on battery connectors, bolts, washers or other hardware may cause false test results. ***We recommend that test probes always be placed directly on the lead battery posts for the most consistent test results.*** A **"Check Connection"** message is an indication of poor battery contact.

Move the probes to a better angle and press firmly with both leads to break any surface oxidation and complete the test circuit with all four contacts. Good electrical contact is required for proper test set operation.

Battery Temperature

Battery temperature will affect measured battery conductance. Never condemn a battery without verifying that the low measurement is not temperature related. Cold batteries will not provide their rated power and this factor should be considered when provisioning battery installations.

Temperature Compensation

A digital Infrared Temperature sensor is available (Alpha pn# 189-048-10) to quickly measure battery temperature. This allows the operator to compensate for cold battery performance by simple application of the following conversion formula to the Conductance Reference Value:

Battery Temperature	*Multiply%Ref. Value by*
35 °C (95 °F) or warmer	0.930
30 °C (86 °F)	0.965
25 °C (77 °F)	1.000
20 °C (68 °F)	1.035
15 °C (59 °F)	1.070
10 °C (50 °F)	1.105
5 °C (41 °F)	1.140
0 °C (32 °F) or colder	1.175

Example: For testing against a Reference Value of 1100 Siemens:
If the battery temperature measures 77 °F, no compensation is used. The battery should be measured against 1100.
If it measures 50 °F, simply apply the following compensation formula: 1100 ÷ 1.105 (T-Comp Formula) = 995 Siemens. A battery that measures at least 995 Siemens, or 90% of reference value, still has 100% relative conductance, and the reduced test value should be expected.

Compensation should only be used with batteries between 32°F to 95°F for reliable results.

Off-Line Testing - Testing Before Installation

1. If the batteries are new and healthy, Alpha recommends that they should all test within 20% of each other (+/- 10% of the average).
2. The Analyzer will also display open circuit voltage. This allows the operator to remove any battery that is not in a full state of charge for charging/further testing. Variances in state of charge will cause variance in the conductance measurements.
3. Test all batteries to be installed against a known reference value.
4. Retest any batteries outside of +/- 10% of the average
5. Look for physical problems on any questionable batteries.
6. Finally, remove any questionable batteries for further testing before installing.

On-Line Testing – New Healthy, Batteries

1. Any battery that is 30% or more below the string/system average should be considered questionable
2. Retest to verify any variance.
3. Look for physical evidence of problems; bulging, leaking, etc.
4. Finally, remove the battery off-line for further testing to verify replacement is necessary.