

# Digital Midtron<sup>®</sup>

## Battery Conductance Tester

### SPECIFICATIONS :

- This test set is designed to take conductance measurements exclusively on 6 and 12 Volt Lead/Acid batteries while either on line (float service) or off line
- Voltage and conductance (Siemens) measurements equivalent to the Midtronics' Micro Celltron (CTM-100 & 300)
- Test 6 and 12 Volt batteries
- Operating range:  
Voltage: 5.5V – 15.0V DC  
Amp Hour Range: approx. 5 Ah to 450 Ah  
Conductance: 0 – 3,200 Siemens
- Test results: DC Voltage and Conductance (expressed in Siemens) will be stored in internal memory after each test. By depressing the "Review" key, the last test result will be displayed for 15 seconds to allow time to manually record the test information
- Accuracy: +/- 2% across test range
- Voltmeter resolution: +/- 20 mV DC
- Calibration: Auto-calibration each test; no calibration required
- Power requirements: Unit is powered by the battery under test; one replaceable 9V alkaline battery used to power the display
- Operating Temperature range: 0° C to +40° C, 95% relative humidity, non-condensing
- Storage Temperature Range: -29° C to + 70° C, 95% relative humidity, non-condensing
- Over Voltage Protection: Fused protected to 60 V DC
- Fuse Specifications: 5mm x 20mm 1.25 Amp fuse
- Reverse Polarity Protection: Diode protected
- Test cables: Interchangeable interface. One standard #C065 DuraProbe cable set and spare probe tips provided with each tester – other interfaces available from Midtronics

## BATTERY TESTING AND OPERATION

### Automatic Battery Testing

The Digital Midtron Analyzer requires no setup or calibration. Each unit is shipped with the DuraProbe cable pre-installed and ready to test.

The Analyzer must have good contact with both the positive and negative battery posts before it will begin to process the test. The unit will then automatically begin upon the establishment of a good connection.

### Low Battery Voltage Message

If the battery being tested has a voltage under the appropriate specified limit (6.3 V or 12.6 V), the test set will sound a dual audible beep after completing the test indicating a low test voltage. If the battery being tested has a voltage below 5.5 V or 11.5 V, as appropriate, a "Low Voltage" error message will be displayed and the unit will not test. This indicates that the subject battery's state of charge is too low to be tested or has some other internal fault condition, which will prohibit a valid test result. Consult the battery manufacturer for recommendation on dealing with very low voltage or suspect batteries.

### Battery Test Results

Each test takes less than 10 seconds, and the test result is held in memory until the next test is completed. Each subsequent test overwrites the previous test result. Always record and report each test result per operating procedures. If any test results are suspect, simply re-test as many times as needed to verify the result.

<u>Batt. Temp</u> <u>Degrees F</u>	<u>Divide by</u>	<u>Compensated Example</u> <u>with 1400 Ref. Value</u>	<u>Result</u>
95°	0.930	$1400 \div 0.930 = 1505$	100%
86°	0.965	$1400 \div 0.965 = 1451$	100%
77°	1.000	1400	100%
68°	1.035	$1400 \div 1.035 = 1353$	100%
59°	1.070	$1400 \div 1.070 = 1308$	100%
50°	1.105	$1400 \div 1.105 = 1267$	100%
41°	1.140	$1400 \div 1.140 = 1228$	100%
32°	1.175	$1400 \div 1.175 = 1191$	100%

Example: For testing against a Reference Value of 1400

### Siemens:

If the battery temperature measures 77 °F, no compensation used. The battery should be measured against 1400. If it measures 50 °F, simply apply the following compensation formula:  $1400 \div 1.105$  (T-Comp Formula) = 1267 Siemens. A battery that measures at least 1267 Siemens 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, Midtronics recommends that they should all test within 20% of each other (+/- 10% of the average). Consult your battery supplier

for standards.

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. Variations in state of charge will cause variance in the conductance measurements.
3. Test all batteries to be installed against a known reference value from your battery supplier or as an average established with a Micro Celltron.
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.

Midtronics is actively working with our customers and battery manufacturers to establish a variety of battery reference conductance values. For the most current information, please visit our website at [www.midtronics.com](http://www.midtronics.com) or call 1-630-323-2800. These values can provide you with an initial starting point for battery testing. Remember that your results may vary depending on site conditions, temperature, etc. If you are finding consistently different results, we want to hear from you. Your input will help improve our reference database and the ability to aid both you and other customers.

#### Troubleshooting

If the test unit display does not illuminate:

- Check connection to the battery.
- Battery being tested may be too low (<1 volt) to power the tester.
- The Digital Midtron has a replaceable fuse on the top of the tester near the cable connection. If the tester will not operate, disconnect test set from the battery being tested. Test the fuse and replace if necessary with a 5mm x 20mm 1.25 Amp fuse. (4 fuses included)
- Replace the 9-volt battery with a new alkaline cell (located under the back panel with Serial Number label).

## Patents

This product is manufactured in the U.S.A. by Midtronics, Inc. and protected by one or more of the following U.S. Patents: 6,051,976, 6,037,777, 6,002,238; 5,945,829, 5,914,605, 5,831,435; 5,821,756; 5,757,192; 5,598,098; 5,592,093; 5,585,728; 5,574,355; 5,572,136; 5,343,380; 5,140,269; 4,912,416; 4,881,038; 4,825,170; 4,816,768; 4,322,685; Canadian Patents: 1,280,164; 1,295,680; United Kingdom Patent: 0,417,173; German Patent: 689 23 281.0-08; European Patent 0,548,266; and other U.S. and Foreign patents issued and pending. This product may utilize technology exclusively licensed to Midtronics, Inc. by Johnson Controls, Inc. and /or Motorola, Inc.

## Limited Warranty

This battery tester is warranted to be free of defects in materials and workmanship for a period of one year from date of purchase. Midtronics will, at our option, repair the unit or replace the unit with a remanufactured tester. This limited warranty applies only to Midtronics battery tester and does not cover any other equipment, static damage, water damage, overvoltage, dropping the unit or damage resulting from extraneous causes including owner misuse. Midtronics is not liable for any incidental or consequential damages for breach of this warranty. The warranty is void if owner attempts to disassemble the unit, or to modify the cable assembly.

## Service

To obtain service, purchaser must contact Midtronics Customer Service for a Return Authorization number, and return the unit to Midtronics freight prepaid, Attention: RA# \_\_\_\_\_. Midtronics will service the tester and reship, the next scheduled business day following receipt, using the same type carrier and service as received. If Midtronics determines the failure was caused by test set misuse, alteration, accident, or other abnormal operating condition or handling, the purchaser will be billed for the repaired product and unit will be returned. All freight charges will be prepaid and added to the repair invoice. Battery testers beyond the warranty period are subject to the repair charges in effect at that time. Optional re-manufacturing service is available to return the tester to like new condition. Out of warranty repairs will carry a 3-month warranty. Remanufactured units purchased will carry a 6-month warranty.



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