

MIDTRONICS

Battery Management Innovation

MDX-645

Battery Conductance Analyzer

For 6 & 12-volt automotive starting batteries



INSTRUCTION MANUAL



INNOVATION



TECHNOLOGY



QUALITY



WORLDWIDE



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Safety Guidelines

Because of the possibility of personal injury, always use extreme caution when working with batteries.

Battery posts, terminals, and related accessories contain lead and lead compounds. Wash hands after handling.

Capabilities

The tester tests 6 & 12-volt regular flooded, AGM flat plate, AGM spiral, and GEL batteries. It displays the test results in seconds and features a built-in printer to provide customers with a copy of the results.

Additional features include the ability to:

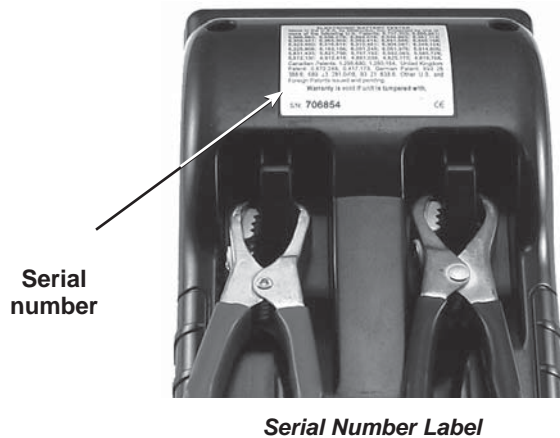
- test the Starting and Charging system
- test batteries from rated from 100 to 2000 CCA
- detect bad cells
- protect against reverse polarity
- test discharged batteries
- test multiple rating systems
- provide a multi-lingual user interface.



Registering Your MDX-Series Tester

Before using your tester, we recommend that you register it online to activate your warranty. Registration will also make it faster and easier for you to obtain technical support and service.

To register, log on at www.midtronics.com/warranty.html and have your serial number ready. The number is at the bottom of the label on the back of the tester.



Display and Keypad

When you first connect the tester to a battery, it functions as a voltmeter until you press the **ENTER** button.

IMPORTANT: If you connect the tester to a voltage source greater than 30 Vdc, you may damage the tester's circuitry.

The menu-driven display will then guide you step by step through the test process. Use the keypad buttons to scroll to and select options in the menu.

To turn off the tester when not connected to the battery, briefly press and hold the **MENU** button.

User Interface



1 **UP and DOWN Arrows**

Use these keys to choose test parameters and scroll to menu options.

2 **ENTER Button**

Use this button to make selections.

3. **BACK/PRINT Button**

Use this button to move to the previous screen or move back one space when creating custom headers. You can also use this button to printout test results using the built-in printer.

4 **MENU Button**

Use the MENU button to access the Main Menu options of the tester.

For information about the options, see "Options Menu".



Options Menu

Procedure

1. Press the MENU button to access the Options Menu.
2. Use the UP (▲) and DOWN (▼) arrows to move to the line you want to edit.
3. Press the ENTER button to make highlighted line editable.
4. Use the UP (▲) and DOWN (▼) arrows to select the character for that cursor location.
5. Press the ENTER button to move to the next location.
6. Press the MENU button to return to the Options Menu.

Option	Explanation
View/Print	Display the previous test result. Press the PRINT button to print the results.
QC Mode	A quick test to check battery inventory
Export Data	Export the last test result to an IR Reader program.
Perform Test	Begin the Battery Test procedure.
Language Selection	Select a language for the tester.
Set Address	Enter the address to display on the top of the printout. (Limit: 8 lines, 21 characters per line)
Time	Select 24-hour or AM/PM and set the time.
Date	Select the date format as well as set the correct date.
Counter	Clear or display battery and system test by results.
Contrast	Adjust the contrast setting of the tester display.
Temperature Units	Select the temperature units Degrees F or Degrees C
Voltmeter	Automatically test battery voltage when the clamps are first connected to the battery terminals. Press ENTER to continue testing the battery. Press BACK to return to the menu. (Default: ON)

Preparations Before the Test

Before connecting the tester, clean the battery posts with a wire brush and a mixture of baking soda and water. When testing side-post batteries, install and tighten lead terminal adapters.

IMPORTANT: Do not test at steel bolts. Failure to install terminal adapters or installing terminal adapters that are worn or dirty may result in inaccurate test results. To avoid damage, never use a wrench to tighten the adapters more than 1/4 turn.

If you are testing in the vehicle, make sure all accessory loads are off, the key is not in the ignition, and the doors are closed.

Connecting the Tester

- Connect the red clamp to the positive (+) terminal and the black clamp to the negative (-) terminal.
- For a proper connection, rock the clamps back and forth. The tester requires that both sides of each clamp be firmly connected before testing. A poor connection will produce a CHECK CONNECTION or WIGGLE CLAMPS message. If the message appears, clean the terminals and reconnect the clamps.
- The preferred test position is at the battery terminals. If the battery is not accessible, you may test at the jumper post; however, the available power measurement may be lower than the actual value.



Battery Test

When you first connect the tester to the battery, it functions as a voltmeter until you press the **ENTER** button to start the test. This function can be turned off through the Options Menu

After you press **ENTER**, scroll to each parameter using the **UP** or **DOWN ARROW** button and press **ENTER** to select. If any messages appear during the test, see "Test Messages"

1. **BAT. LOCATION:** Scroll to and select IN VEHICLE or OUT OF VEHICLE for a battery not connected to a vehicle. Following an IN VEHICLE test you will be prompted to test the starting and charging systems.

IMPORTANT: The performance of the starting and charging systems depends on the battery's condition. It is important that the battery is good and fully charged before any further system testing.

2. **APPLICATION:** Scroll to and select AUTOMOTIVE, MOTORCYCLE, TRUCK.
3. **BATTERY TYPE:** Scroll to and select REGULAR FLOODED, AGM FLAT PLATE, AGM SPIRAL, or GEL where applicable.
4. **BATTERY STANDARD:** Scroll to and select the battery's rating system. Not all rating systems are available for each application.

Standard	Description	Range
JIS#	Japanese Industrial Standard, shown on a battery as a combination of numbers and letters.	26A17 thru 245H52
EN	Europa-Norm	100-2000
DIN	Deutsche Industrie-Norm	100-1200
SAE	Society of Automotive Engineers, the European labeling of CCA	100-2000
IEC	International Electrotechnical Commission	100-1200

5. BATTERY RATING: Scroll to and select the rating units. Hold down the **UP** or **DOWN ARROW** button to increase the scrolling speed.
6. Press **ENTER** to start test. After several seconds the tester displays the decision on the battery's condition and the measured voltage. The tester also displays your selected battery rating and the rating units.

Battery Test Results

Decision	Interpretation
GOOD BATTERY	Return the battery to service.
GOOD-RECHARGE	Fully charge the battery and return it to service.
CHARGE & RETEST	Fully charge the battery and retest. Failure to fully charge the battery before retesting may cause inaccurate results. If CHARGE & RETEST appears again after you fully charge the battery, replace the battery.
REPLACE BATTERY	Replace the battery and retest. A REPLACE BATTERY result may also mean a poor connection between the battery cables and the battery. After disconnecting the battery cables, retest the battery using the out-of-vehicle test before replacing it.
BAD CELL-REPLACE	Replace the battery and retest.
24 VOLT SYSTEM	24-volt system detected. Disconnect batteries and test individually.
READY TO INSTALL	Battery has just been activated and is ready to install in vehicle (Motorcycle only)
NEEDS CHARGE	Fully charge battery and retest using BEFORE DELIVERY. (Motorcycle only) Failure to fully charge the battery before retesting may cause false readings.



7. Press the ENTER (↵) button to proceed, with the starter test, BACK/PRINT to print the test results or MENU to return to the Options Menu.

NOTE: For an in-vehicle test, the display alternates between the test results and the message "PRESS ↵ FOR STARTER TEST."

See "Maintenance & Troubleshooting" in this manual for more information about the printer.

IMPORTANT: The tester retains the results of the last test only. When you start a new test, the last results are overwritten.



Test Messages

For a more decisive result, the tester may prompt you for additional information. The messages in the following table may appear before the tester can display a result.

Test Message	Interpretation
BAT. TEMPERATURE	Select ambient temperature above or below 0 °C
CHARGE STATE	Select before or after battery has been charged.
SURFACE CHARGE DETECTED	Remove the surface charge before it begins testing. Testing will resume after charge has been removed.
CHECK CONNECTION	One or both clamps are not making proper contact with the battery terminals.
ENGINE REV NOT DETECTED PRESS WHILE REVVING	Tester has not detected an increase in engine r.p.m.
REVERSE CONNECTION	Clamps are connected in the wrong polarity: positive to negative or negative to positive.
SYSTEM NOISE CHECK LOADS	In-vehicle testing. Tester has detected computer, ignition noise or parasitic drain. Make sure all vehicle loads are off including open doors and ignition switch.
UNSTABLE BATTERY	Out-of-vehicle. Weak battery, should be charged and retested.
WIGGLE CLAMPS	Clamps are not making good contact with battery terminals

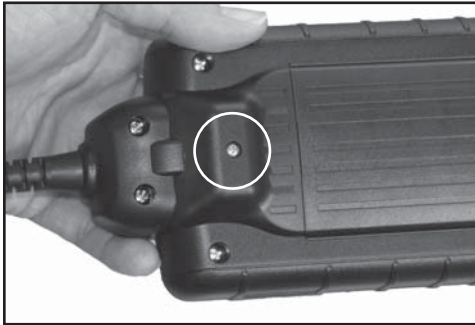
Error Messages

Error Message	Interpretation
CONNECT TO 12V BATTERY	Tester is not connected to the battery
LOW INTERNAL AA BATTERIES. REPLACE AA BATTERIES SOON!	Internal AA batteries are low and need to be replaced. See "Maintenance & Troubleshooting" section.
NON 12 VOLT SYSTEM DETECTED	System being tested is not 12-volts.
QC DATA MEMORY FULL PRINT RESULTS OR CLEAR MEMORY.	QC mode memory is full. Select QC mode from the Options Menu to clear the memory.

Maintenance & Troubleshooting

Changing The Cable Assembly

1. Identify the circled screw.



2. Remove the screw.



3. Grasp the housing and firmly pull the cable assembly from housing.



4. To attach a new cable, align the cable and tester housings and push together. Insert the screw and tighten.



Troubleshooting the Display

If the display does not turn on:

- Check the connection to the vehicle battery.
- The vehicle battery may be too low (below 1 volt) to power the analyzer. Fully charge the battery and retest.
- The analyzer's AA batteries may need to be replaced. (alkaline recommended).
- If the analyzer does not power on when you press and hold the **MENU** button, replace the AA batteries.

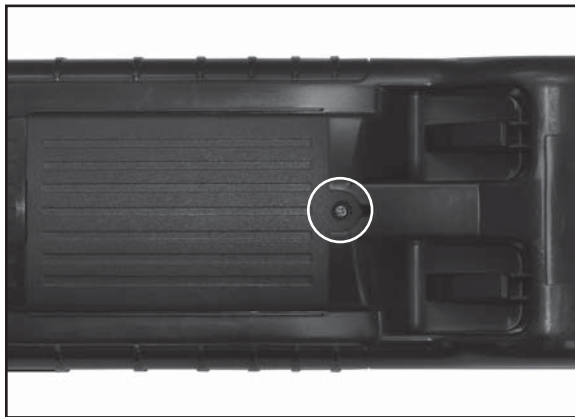
Replacing the Battery

The tester can test down to 5.5 volts when the unit's internal batteries are not functioning. The tester displays LOW INTERNAL AA BATTERIES, REPLACE AA BATTERIES SOON! when the internal AA batteries need to be replaced.

NOTE: Setup information will be retained while you change the internal batteries.

Use the following procedure to remove and replace the internal AA batteries.

1. Turn the tester face down.
2. Remove the screw securing the battery compartment cover using a small Phillips screwdriver.



3. Lift the door off and remove the discharged battery.
4. Insert fresh AA batteries making sure the positive and negative terminals are positioned correctly.
5. Reposition the cover and tighten the screw.

Patents

The MDX-Series is made in the U.S.A. by MIDTRONICS, INC. and is protected by one or more of the following U.S. Patents: 6,323,650; 6,316,914; 6,304,087; 6,249,124; 6,163,156; 6,091,245; 6,051,976; 5,831,435; 5,821,756; 5,757,192; 5,592,093; 5,585,728; 5,572,136; 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 patents: 0,417,173; 0,672,248; German patents: 689 23 281.0-08; 693 25 388.6; 93 21 638.6; 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 two years from the 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 testers and does not cover any other equipment, static damage, water damage, overvoltage, dropping 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 modify the cable assembly.

Service

For service, contact Midtronics for a Return Authorization number, and return the unit to Midtronics freight prepaid, If Midtronics determines that the failure was caused by misuse, alteration, accident, or abnormal condition of operation or handling, purchaser will have the option of purchasing a replacement tester or the unit will be returned freight collect. Battery testers beyond the warranty period are subject to the repair charges in effect at that time.



www.midtronics.com

Corporate Headquarters

Willowbrook, IL USA
USA Toll Free: 1.800.776.1995
Phone: 1.630.323.2800
Fax: 1.630.323.2844
E-Mail: net2@midtronics.com

Canadian Inquiries

Toll Free: 1.866.592.8053
Fax: 1.630.323.7752
E-Mail: canada@midtronics.com

Midtronics b.v.

European Headquarters
Serving Europe, Africa, the Middle
East and The Netherlands
Phone: +31 306 868 150
Fax: +31 306 868 158

E-Mail: info-europe@midtronics.com

Midtronics China Office

China Operations
Shenzhen, China
Phone: +86 755 8202 2037
Fax: +86 755 8202 2039
E-Mail: chinainfo@midtronics.com

Asia/Pacific (excluding China)

Contact Corporate Headquarters at
+1.630.323.2800 or
E-Mail: asiapacinfo@midtronics.com