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Coding Information

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Title: Battery Testing & Diagnostics**Applies To: All Vehicles****CHANGE LOG**

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DESCRIPTION

Improper testing and diagnosis of suspected battery related issues creates unnecessary downtime and inconvenience for customers.

The symptoms may intuitively point to bad batteries. However, without proper testing, a confirmation of this suspicion cannot be made with certainty. If the cause is indeed battery related, proper diagnosis will determine how many batteries are bad – whether it's just one, or all, or any number in between. The standard practice is to replace only the failed part(s).

This article guides the technician in proper battery testing and diagnostic procedures to avoid making repairs that will result in a come-back, and will help minimize future battery-related downtime for the subject vehicle.

SYMPTOMS

The vehicle may have one or more of the following symptoms:

- No start
- Hard to start
- Low voltage on gauge
- Repeated jump starts
- If so equipped, load shed consistently activates sooner than normal
- If so equipped, excessive starts are experienced during auto-start/stop operation

TESTING & DIAGNOSTIC STEPS

Failure to properly and completely follow the instructions for use of the MidTronics battery tester can result in a false indication of a failed battery. This leads to an incorrect diagnosis and parts replacement, without determining the true root cause of the customer issue. The following steps are critical to proper battery evaluation and replacement.

1. Pre-Test Inspection

- a. Look for and correct loose cable connections, both at the batteries and at their connected components and grounds.
- b. Remove any corrosion with a battery cleaning spray, or baking soda/water paste. Then, rinse with clean water.

2. Pre-Test Charging

Charge batteries to at least 75% state of charge (about 12.6V) before testing. Testing batteries with a low charge can yield false results. If using an advanced test tool such as the Midtronics EXP, testing can commence without charging, unless prompted to do so by the test tool.

IMPORTANT: If charging AGM batteries, ensure that the charger is AGM compatible. Non-compatible chargers can damage AGM batteries.

3. Testing the Batteries

- a. Install stud adapters supplied with Midtronics tester.

IMPORTANT: Stud adapters **MUST BE USED** for all battery tests. Without them, the connection to the battery is not complete, and is likely to result in false results. The following is reprinted from Section 4 of the manual:

CAUTION: To ensure accurate test results for Group 31 batteries, the clamps are designed to connect to lead stud adapters or to the lead bases of threaded studs. Never connect the clamps directly onto the threaded studs. Do not test at the battery's steel bolts. To avoid damage, never use a wrench to tighten the adapters more than 1/4 turn. Failure to properly install lead terminal adapters, or using adapters that are dirty or worn, may cause false test results.

- b. Test batteries by carefully following the prompts on the Midtronics EXP tester. If in doubt about any of the prompts, refer to the Midtronics EXP [instruction manual](#) for clarification.

IMPORTANT: If the tester prompts for a "Charge and Retest", the batteries being tested **MUST BE CHARGED** to at least 75% (about 12.6V) before proceeding. Failure to do so will cause an inaccurate diagnosis, and may result in a "replace" indication for a battery that is actually good, or a "good" indication for a battery that should be changed.

- c. Record the Midtronics code for each tested battery.

4. Replacing Batteries

- a. Replace only the batteries that the tester has failed.

b. The technician must ensure that the open circuit voltage of the new battery is near the voltage of the remaining batteries in the pack, to avoid arcing and overheating of the terminals as the new battery is being installed. This may require that the remaining good batteries in the pack receive a boost charge, if the pack was partly discharged.

IMPORTANT: Replace bad batteries with the same part number as the remaining good batteries.

IMPORTANT: Do not mix battery types. AGM, flooded, or hybrid must be matched with the same.

IMPORTANT: Do not mix CCA (Cold Cranking Amp) or RC (Reserve Capacity) ratings.

IMPORTANT: For sleeper applications, do not use flooded batteries. Use only AGM or other Navistar approved parts.

5. Post-Test Checks

After the test, assure that no conditions exist that may lead to early battery failure

- Check and clean terminals for all batteries in the pack.
- There should be no grease directly on the battery terminals. Grease should be only on the exterior of the connection.
- Make sure all terminals are tight.

6. Verify system operation

From the Midtronics main menu, select and perform the System Test to verify batteries, cables, and charging system are operating properly. The system test is described in Section 5 of the Midtronics [instruction manual](#).

TOOLS REQUIRED

Tools	Qty.
MidTronics inTellect EXP battery and electrical diagnostic tester	1

WARRANTY INFORMATION

Warranty Claim Coding:

Group:	08550
Nouns:	710, 712

Standard Repair Time(s):

Step	Description	SRT Link	Hours
1-3,5-6	Test batteries, and System Test	A08-3145	0.5
4	Replace 1 battery	Model Dependent	0.4
4	Each additional battery	Model Dependent	0.1

Special Requirements:

Dealers: For each battery, test result codes generated by the Midtronics tester must be printed out and attached to the claim, or scanned and added as an attachment. Refer to [CTS-1100](#).

Fleets: Refer to fleet battery warranty policy.

BATTERY BASICS

Battery Functions

The primary functions of a battery:

- Supply power to the starter and ignition system, for engine cranking and starting.
- Supply the extra power required when load requirements temporarily exceed alternator capacity.
- Act as a voltage stabilizer by smoothing out temporary high voltages within the electrical system.

Battery Connections

The batteries are connected in parallel, and provide power via the positive battery cable to the starter solenoid "B" stud.

The negative battery terminals are also connected in parallel and are routed to ground via the starter motor's ground stud. The frame, engine block, and cab are also interconnected by ground cables to the battery ground.

Battery Interaction With Charging System

The alternator produces direct current (DC) to power the vehicle electrical system, and to charge the batteries. The supply routes from the alternator (+) terminal, to the battery feed stud.

Any output current above the draw of the vehicle electrical loads, is used to charge the batteries. The alternator charges the batteries through the (+) terminal to the "B" terminal of the starter solenoid, and through the battery cable to the battery positive terminal.

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