MIDTRONICS

PowerSensor MICRO700

HEAVY DUTY

ELECTRICAL SYSTEM ANALYZER

For testing 6- and 12-volt heavy-duty automotive, commercial, and marine batteries and 12- and 24-volt charging systems.

INSTRUCTION MANUAL

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CAUTION: Because of the possibility of personal injury, always use extreme caution when working with batteries. Follow all BCI (Battery Council International) safety recommendations.

WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and birth defects or other reproductive harm. **Wash hands after handling.**

TEST PREPARATION

- Clean the battery terminals with a wire brush before testing.
- At the start of the test make sure all vehicle accessory loads are off and the ignition is in the OFF position.

CONNECTING THE ANALYZER

IMPORTANT: To ensure accurate test results for Group 31 batteries, the clamps are designed to connect to lead stud adapters (provided with the Micro700) or to the lead bases of threaded studs. (See Figures 1 and 2 on the next page.) Never connect the clamps directly onto the threaded studs.

Testing Individual Batteries

Every battery in the pack should be disconnected before testing. If the analyzer detects that the batteries are connected at the start of the Battery Pack Test, it will remind you to disconnect the pack.

To connect to batteries with threaded studs:

1. Screw the negative (–) terminal adapter onto the negative stud, and the positive (+) adapter onto the positive stud.
2. Connect the red clamp to the positive (+) adapter.
3. Connect the black clamp to the negative (–) adapter.
4. For a proper connection, rock the clamps back and forth. Both sides of the clamp must be firmly connected before testing (Figure 1). If the message CHECK CONNECTION appears, clean the terminals and/or reconnect the clamps

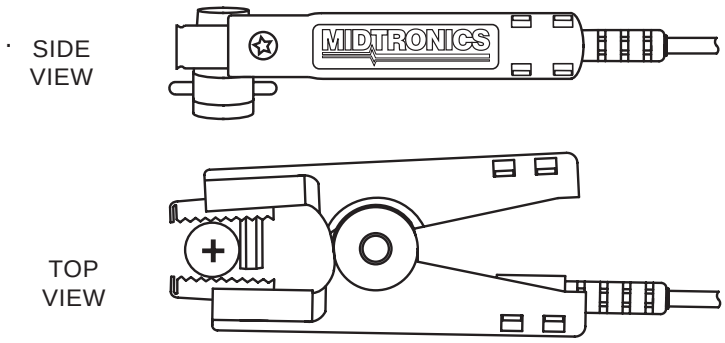


Figure 1. Clamp connection to stud adapter

Figure 2. Clamp connection to stud pad

Testing the Battery Pack

1. Connect the red clamp to the positive (+) lug on the battery at one end of the pack (Figure 3).
2. Connect the black clamp to the negative (–) lug on the battery at the other end of the pack.
3. For a proper connection, rock the clamps back and forth. Both sides of the clamp must be firmly connected before testing. If the message CHECK CONNECTION appears, clean the terminals and/or reconnect the clamps.

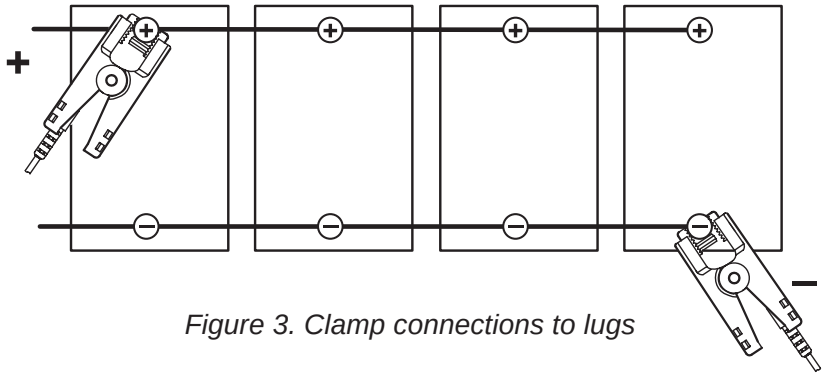
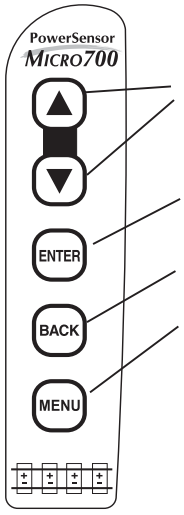


Figure 3. Clamp connections to lugs

USING THE KEYPAD



Press the ARROW buttons to scroll to menu choices. Press and hold to rapidly scroll through lists of battery rating values.

Press the ENTER button to make selections.

Press the BACK button to move back a step.

Press and hold the MENU button to make these options available:

- PRINT RESULT
- PRINTER SELECT
- VIEW RESULT
- VOLTMETER
- PERFORM TEST
- SET ADDRESS

When the analyzer's clamps are not connected to a battery or pack, it will turn itself off after 20 seconds (except while printing) if it detects you are not using the keypad. This helps prolong the life of the analyzer's internal battery. (Refer to the section "System Saver.")

OUT-OF-VEHICLE TEST

In the Out-of-Vehicle Test the Micro700 performs a conductance test on one or more batteries not connected to the vehicle. The analyzer measures open circuit voltage, cranking amps, and displays a decision on the battery's condition.

To begin testing, connect the Micro700 to the battery. The display will turn on and the analyzer will prompt you to enter your test parameters. Use the ARROW keys to scroll to your selection and press ENTER.

NOTE: The display will not turn on if you connect the clamps in reverse polarity (negative to positive and positive to negative).

1. Select the **BATTERY TYPE:**

   GROUP 31

   COMMERCIAL

   AUTOMOTIVE

2. Select the **BATTERY CHEMISTRY:**

   LEAD ACID

   AGM-SPIRAL

   AGM-OTHER

3. **CHOOSE TEST:**

   OUT-OF-VEHICLE
   Out-of-Vehicle tests individual batteries that are electrically disconnected from the vehicle. Although you can test more than one battery in succession, the analyzer stores for printing or viewing only the results and battery test code from the last battery that you test. The analyzer will delete the test results and code when you connect the clamps again.

4. **SELECT RATING, TEST USING:**

   CCA
   Cold Cranking Amps. The most common rating system for cranking batteries rated at 0 ºF (–17.8 ºC)

   CA
   Cranking Amps. Used in southern climates where some batteries are rated at 32 ºF (0 ºC).

   MCA
   Marine Cranking Amps. For marine batteries rated at 32 ºF (0 ºC).

   JIS
   Japanese Industrial Standard. A rating system combining numbers and letters, for example: 8D26.

5. **SET RATING, TEST USING** (or **SET JIS#**):

   Scroll to the rating specified on the battery (for example, 625 CCA). Press ENTER.

   If necessary, the analyzer will ask if the battery temperature is above or below 32 ºF or whether you are testing before or after charging. Refer to “Additional Features” for more information.

BATTERY TEST RESULTS

The Micro700 will display the open circuit voltage, cranking amps based on the units are based on rating system you selected, and one of five battery decisions. The analyzer also generates a battery code that you can view separately. Refer to “Viewing the Battery Test Code.”

GOOD BATTERY
The battery is in good condition. Return to service.

GOOD-RECHARGE
Fully charge the battery. Return to service.

CHARGE & RETEST
Fully charge the battery, remove the surface charge, and retest. Failure to fully charge the battery before retesting may cause false readings.

REPLACE BATTERY
A battery evaluated as “replace” may still start the vehicle, but it no longer measures up to its minimum standard and will fail soon.

BAD CELL-REPLACE
Replace the battery and retest to perform a complete system analysis

IMPORTANT: A REPLACE BATTERY result may mean a poor connection exists between the vehicle’s cables and the battery. After disconnecting the vehicle’s cables from the battery, retest the battery using the Out-Of-Vehicle Test before replacing.

Testing the Next Battery

The display will alternate between the test results and the message **CONNECT TO NEXT BATTERY**. If you want to retest the battery or test a new battery, connect the clamps and press ENTER when instructed. The analyzer will ask you to enter only the rating system and rating value before displaying the next result.

IMPORTANT: In the Out-of-Vehicle test the analyzer stores only the last test result and battery test code for printing or later viewing. They will be deleted when you connect the clamps again.

NOTE: if you want to test up to 6 batteries in succession and store each test result and code for printing and viewing, use the In-Vehicle Battery Pack Test. When you start a new test by connecting to a battery after completing the Battery Pack Test, the analyzer will delete the last test result.

Battery Code (for Micro700BMP only)

To display the battery code and review the result of the last test:

1. Press and hold the MENU button.
2. Scroll to **VIEW RESULTS** in the Options menu and press ENTER.
3. Press the ENTER button three times to move past the test results to the battery code (9 characters including the hyphen).

IN-VEHICLE TEST

1. Select the **BATTERY TYPE:**

   GROUP 31

   COMMERCIAL

   AUTOMOTIVE

2. Select the **BATTERY CHEMISTRY:**

   LEAD ACID

   AGM-SPIRAL

   AGM-OTHER

3. **CHOOSE TEST:**

   IN-VEHICLE
   In-Vehicle tests the battery pack (up to 6 batteries) and individual batteries when they are connected to the vehicle. It also tests the starting and the charging systems.

4. **SELECT TEST:**

   BATTERY PACK
   Tests the condition of the battery pack and provides the option to test batteries individually.

FULL SYSTEM
Tests the battery pack, provides the option to test batteries individually, tests the starting system and the charging system.

STARTING SYSTEM
Tests the starting system only.

CHARGING SYSTEM
Tests the charging system only.

BATTERY PACK TEST

You can perform the Battery Pack Test by itself or within a Full System Test

The Micro700 can measure battery packs up to 3500 CCA. It is designed to give you a quick approximation of the pack's state of health and its capability to deliver current. The Battery Pack Test can only test the pack as a whole. The Micro700 does not determine the condition of an individual battery within the pack unless you disconnect the batteries from the pack and test them individually.

Several factors can skew test results such as the pack configuration, the age and type of battery cables, testing on steel bolts, and corrosion. To get a true determination of the battery pack, you must disconnect and test each battery by connecting to the stud pads or lead stud adapters.

IMPORTANT: The Micro700 will compensate for cable resistance and steel bolt connections. Because pack configuration, cable age, and corrosion are unpredictable, the Pack Test CCA result will always be less than that of the true pack CCA. You should always test the pack at the terminals leading off to the vehicle.

Performing the Micro700 Battery Pack Test on battery packs that have load-shedding technology, an isolated battery for accessories, or multiple cables going to the electrical system, can give misleading results.

1. Select the **NUMBER OF BATTERIES** in the pack (from 1 to 6).

2. Select the **BATTERY TYPE:**

   12 VOLTS

   6 VOLTS

3. Select the battery rating system and rating value as required in the Out-of-Vehicle Battery Test.

   If necessary, the analyzer will ask if the battery temperature is above or below 32 ºF or whether you are testing before or after charging. Refer to " Additional Features" for more information.

Battery Pack Test Results

The Micro700 will display the open circuit voltage, cranking amps (the units are based on rating system you selected) and a one of five battery conditions.

NOTE: The analyzer generates battery codes when you test individual batteries only.

GOOD BAT. PACK
Compensating for cable and connector resistance, the analyzer has determined that the battery pack is in good condition compared to its rating.

CHECK BAT. PACK
Compensating for cable and connector resistance, the analyzer has determined that the battery pack is in poor condition compared to its rating. Check the connections and test the batteries separately.

Testing Individual Batteries

At the end of the Battery Pack Test, the analyzer will give you the option to test the batteries individually. If you choose **YES**, the analyzer will prompt you through the steps of disconnecting, testing each battery, and reconnecting the battery pack. The analyzer will store the test result and battery code for each battery until you start a new test by connecting to a battery after completing the Battery Pack Test. Refer to "Battery Test Results" and "Battery Code" in the "Out-of-Vehicle Test" section.

If you choose **NO**, the analyzer will store the Battery Pack Test results. If you selected a Full System Test, the analyzer will proceed to the Starting System Test.

STARTING SYSTEM TEST

You can perform the Starting System Test by itself or within a Full System Test

IMPORTANT: Make sure the battery or battery pack is in a good state of charge before the Starting System Test. If the result for the Battery Pack Test was **CHECK BAT. PACK**, or the result for any battery in the pack was **CHARGE & RETEST** or **REPLACE**, charge or replace the batteries before the Starting System Test. (As a reminder, the analyzer will display **RECHARGE AND/OR REPLACE BAT.** if any individual battery result in the pack test was not **GOOD BATTERY**.)

NOTE: If you test older model diesel engines in cold weather, pre-heating and post-heating of the glow plugs may skew the test results. Warm up the engine for 5 minutes and retest the vehicle.

1. **START ENGINE.**

2. Select the **STARTER TYPE:** (Full System Test only).

   AIR
   The vehicle has an air starter. This selection will bypass the starting (electrical) system test. You will be prompted to start the engine, and then press ENTER to continue. The Micro700 will proceed to the Charging System Test.

   CONVENTIONAL
   The vehicle has a conventional electrical starter. You will be prompted to start the engine. During the engine crank or starting cycle, the Micro700 will analyze the starter for proper operation.

Starting System Test Results

The Micro700 will display the cranking voltage of the starter and one of two decisions.

CRANKING VOLTAGE NORMAL
The starting system is showing normal starter draw.

CRANKING VOLTAGE LOW
The cranking voltage is below typical limits. Troubleshoot the starter electrical system using the manufacturer's recommended procedure. If you are performing a Full System Test, press ENTER to begin the Charging System Test.

Charge Code—Starting System (for Micro700BMP only)

The display will alternate between screens showing the test results and a 9-character charge code.

CHARGING SYSTEM TEST

You can perform the Starting System Test by itself or within a Full System Test. When the engine is running, the Micro700 will help you perform the procedure for a charging system analysis.

IMPORTANT: If you test older model diesel engines in cold weather, pre-heating and post-heating of the glow plugs may skew the test results. Warm up the engine for 5 minutes and retest the vehicle. (If the analyzer asks if the vehicle has glow plugs, see “Glow Plug Detection” in the “Additional Features” section.)

Check the belts to ensure that the alternator is rotating when the engine is running. If the belts are slipping or broken, replace the belts and retest. Check all connections to and from the alternator, especially the connection to the battery. If the connection is loose or heavily corroded, clean or replace the cable and retest.

1. Press ENTER at the prompt to begin the Charging System Test..

2. **The Micro700 displays real-time alternator output voltage.** Press ENTER to continue.

3. **Testing at rev.** The Micro700 will prompt you to rev the engine for 5 seconds. When it has detected the rev, it will collect data. If the analyzer does not detect a rev, it will prompt you to press ENTER to continue.

   ***IMPORTANT*:** In vehicles that idle at a high rpm after starting, the analyzer may detect the rev without prompting you. The test results will not be affected.

4. **Testing at idle.** The Micro700 will analyze the charging system output at idle for comparison to other readings.

5. **Diode ripple test.** The Micro700 will look for the amount of ripple from the charging system to the battery. Excessive ripple usually means one or more diodes have failed in the alternator or there is stator damage.

6. **Testing with accessory loads.** After the Diode Ripple Test, the Micro700 will ask you to:

    a. Turn on accessory loads (headlights, blower motor, defogger, etc.) of at least 40 amps.

    b. Test at idle with loads on.

    c. Rev engine for another 5 seconds with loads on.

    IMPORTANT: When asked to turn on the accessory loads, turn on the blower to high (heat), turn on the high-beam headlights and rear defogger. DO NOT use cyclical loads such as air conditioning or windshield wipers.

6. **Analyzing data.** The Micro700 will analyze all readings and provide the results of the Charging System Test.

Charging System Test Results

The Micro700 will display screens that alternate between the charging decision, a detail of any problem, load voltage measurements, an evaluation of diode ripple, and a charge code:

Charging System Decision

CHARGING SYSTEM NORMAL
The charging system is operating within a normal voltage range.

CHARGING SYSTEM PROBLEM
A problem was detected in the charging system:

NO CHARGING VOLTAGE
The alternator is not providing charging current to the battery (pack).

LOW CHARGING VOLTAGE
The alternator is not providing sufficient current for the system's electrical loads or for charging the battery (pack).

HIGH CHARGING VOLTAGE
The voltage output from the alternator to the battery (pack) exceeds the normal limits of a functioning regulator and could overcharge the battery (pack) and decrease its life.

Load Voltage Measurements

LOAD OFF
Displays the measured voltage taken at idle with accessories off.

LOAD ON
Displays the measured voltage taken at idle with accessories on.

Alternator Ripple Evaluation

DIODE RIPPLE NORMAL
The alternator's rectifier is functioning within its normal operating range.

EXCESS RIPPLE DETECTED
One or more diodes of the alternator's rectifier may be defective.

DIODE RIPPLE NOT DETECTED
The analyzer is unable to detect diode ripple through the battery cables or the alternator is not spinning.

Charge Code—Charging System (for Micro700BMP only)

The display will alternate between screens showing the test results and a 9-character charge code.

ADDITIONAL FEATURES

TEMPERATURE COMPENSATION

If necessary, the analyzer will ask you to choose if the battery temperature is above or below 32 ºF. Use the ARROW buttons to select **ABOVE** or **BELOW** and press ENTER.

SURFACE CHARGE REMOVAL

If the analyzer detects surface charge during the In-Vehicle Test, it will prompt you to turn on loads to remove it. Follow the instructions on the display. When finished, press ENTER and testing will continue.

IMPORTANT: When asked to turn on the accessory loads, turn on the blower to high (heat), turn on the high-beam headlights and rear defogger. DO NOT use cyclical loads such as air conditioning or windshield wipers.

BEFORE AND AFTER CHARGE TESTS

If necessary, the analyzer will ask you if the battery has just been charged. At the **CHOOSE TEST** prompt, select **AFTER CHARGE** or **BEFORE CHARGE** and press ENTER.

GLOW PLUG DETECTION

If necessary during the Charging System Test, the analyzer will ask you if the vehicle has glow plugs.

If you select **NO**, the analyzer concludes the test and displays the charging system results. If you performed a Full System Test, press ENTER to view the results.

If you select **YES**, the Micro700 begins a 40-second countdown. The countdown allows post-heating of the glow plugs to finish so that the Micro700 can properly evaluate the charging system. If post-heating finishes within 40 seconds, the Charging System Test continues.

If post-heating does not finish, the test is concluded and the charging system results are displayed. If you conducted a full system test, press ENTER to review the test results.

SYSTEM SAVER

When the analyzer's clamps are not connected to a battery or pack, it will turn itself off after 20 seconds (except while printing) if it detects you are not using the keypad. This helps prolong the life of the analyzer's internal battery.

If the analyzer times out during a test, it will save the test sequence and data. You can reactivate the analyzer by pressing the MENU button or by reconnecting the battery clamps.

The analyzer will ask you if you want to continue the previous test. If you select **NO**, the analyzer will return to the Options menu or to the Test menu if the clamps were reconnected to the battery. If you want to continue the test, reconnect the battery clamps and select **YES,** then press ENTER.

OPTIONS MENU

To display the Options menu, press and hold the MENU button. To select an option, use the ARROW buttons and press ENTER.

IMPORTANT: The last test result in the analyzer's memory will be erased when you connect to a battery and start a new test.

PRINT RESULTS

The Micro700 prints the last test result using the IR output at the top of the analyzer and the Midtronics printer's IR receiver below the MODE button.

IMPORTANT: If you are using the Midtronics printer for the first time, charge the printer battery for 16 hours before beginning your test session. Refer to the printer manual for more information.

Turn on the printer and align the IR transmitter on the top of the analyzer with printer's IR receiver. Press the MENU button and scroll to **PRINT RESULTS**. When you are ready to print, press ENTER.

If the IR transmitter and receiver are not aligned, all the data may not print. Press MENU to cancel the print job. Verify alignment between the analyzer and printer, then try to print the test results again.

PRINTER SELECT

Select **IRDA** or **HP 82240B**. IRDA is compatible with the IRDA Mode setting in the Midtronics printer (P/N 182-003A). The IRDA Mode described in the printer's user guide is called IRDA PHYSICAL LAYER in the printer's self-test printout.

HP 82240B is compatible with the printer's HPIR Mode setting. The HPIR Mode setting described in the printer's user guide is called INFRARED 33kHZ ENCODED in the printer's self-test printout.

Refer to the IR/RS232 Thermal Printer User Guide included with the Midtronics printer.

VIEW RESULTS

Use the ENTER and BACK buttons to scroll through the last test results.

VOLTMETER

The Micro700 can also function as a voltmeter. The operating range of the voltmeter is 0 to 30 volts.

IMPORTANT: If the Micro700 is connected to a voltage source greater than 30 volts, the circuit board might be damaged.

To use the voltmeter function, press and hold the MENU button. Scroll to the VOLTMETER option and press ENTER.

Use the red and black clamps as probes. If the analyzer is connected in reverse polarity it will not detect voltage and will turn itself off.

To turn off the voltmeter function, disconnect from the voltage source and press the MENU button. To conserve its 9-volt battery, the analyzer will automatically shut off if 0 Vdc is detected for 20 seconds.

SET ADDRESS

This option enables you to include your shop name and address on test result printouts.

Scroll to the SET ADDRESS option and press ENTER. The analyzer will prompt you through each line of the name and address. Use the ARROW buttons to change characters. Use the ENTER and BACK buttons to move to the next or previous position.

PERFORM TEST

This option enables you to begin a new test without disconnecting from the battery.

TROUBLESHOOTING

DISPLAY PROBLEMS

If the display does not turn on:

- Check the connection to the vehicle battery or pack.
- The vehicle battery may be too low to power the analyzer (below 1 volt). Fully charge the battery and retest.
- The analyzer's 9-volt battery may need to be replaced. Follow the directions in "Replacing the Micro700 Battery" and replace the 9-volt battery (alkaline recommended).
- If the analyzer detects computer or ignition noise, it will display **SYSTEM NOISE**. Verify that all vehicle accessory loads are off and the ignition switch is in the OFF position. The analyzer will automatically retest when the system noise is no longer detected. If the **SYSTEM NOISE** message continues after several retest attempts, disconnect the battery cables and retest.
- Batteries that are very weak or that have just been charged may have enough electrical activity to affect test results. Should this occur, the analyzer will display **UNSTABLE BATTERY** and retest when the battery has stabilized. Fully charged batteries should stabilize quickly. Weak batteries should be fully charged, then retested.
- If troubleshooting does not solve the problem, call 800-776-1995 to obtain service. See "Patents, Limited Warranty, Service" for more information.
- If the analyzer does not power on when you press and hold the MENU button, replace the 9-volt battery.

PRINTING PROBLEMS

Status LED

When a printer fault occurs, the **STATUS LED** will flash. You can identify the fault by the number of sequential flashes:

Sequence	Condition	Solution
* * *	Paper out	Fit new paper
** ** **	Thermal head too hot	Allow head to cool
*** *** ***	Battery low	Recharge printer battery for 16 hours

Solutions

- If the IR transmitter and receiver are not aligned, all the data may not print. The infrared ports on the top of the Micro700 and on the front of the printer below the MODE button should be pointed directly at each other. The maximum distance for reliable transmission between the ports is 18 inches (45 cm). To realign, press MENU to cancel the print job. Verify alignment between the analyzer and printer; then try to print the test results again.
- If the analyzer displays PRINTING RESULTS, but the test results are not printing, press MENU to cancel. Turn off the printer and charge the printer battery for at least 15 minutes before attempting to print again.
- Make sure the printer is on. The printer turns itself off after 2 minutes of inactivity to conserve the battery. To turn the printer on, briefly press the MODE button. The green STATUS light should turn on. Make sure you are using the Midtronics printer provided with the Micro700. Other printers may not be compatible.
- Direct sunlight interferes with infrared data transmission/ receiving. If the printer is not receiving data, remove the printer and Micro700 from direct sunlight. If the printed characters are not clear or are partially missing, recharge the battery and reprint.

- Verify that a communications protocol selected in the printer setup is compatible with the printer type selected in the Micro700 Options menu.
- If you are unable to print after ensuring the analyzer is functioning, the printer is on, the battery is good, and the IR transmitter and receiver are aligned, check the printer manual for further instructions or call Midtronics at 800-776-1995 for assistance.

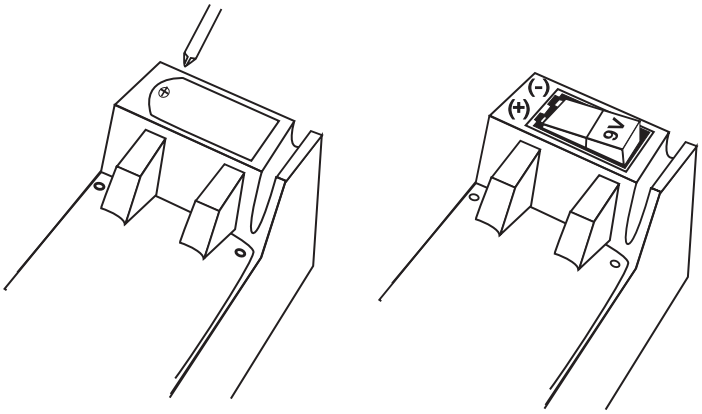
REPLACING THE MICRO700 BATTERY

The Micro700 uses a 9-volt battery (alkaline recommended) to allow testing of batteries down to 1 volt and supply power while the Options menu is active. When the internal battery requires replacing, the analyzer will display **LOW INTERNAL BATTERY, REPLACE**. Change the battery as soon as possible.

NOTE: The analyzer will retain setup information while you change the 9-volt battery.

IMPORTANT: The Micro700 can test down to 5.5 volts when the internal 9-volt battery is not functioning.

1. Remove the cover to the battery door using a small screwdriver.
2. Insert a 9-volt battery. Make sure the positive and negative terminals are positioned correctly.
3. Put the back cover and tighten the screw.



PATENTS

Made in the U.S.A. by Midtronics, Inc. and is protected by one or more of the following U.S. Patents: 6,469,511; 6,456,045; 6,445,158; 6,441,585; 6,392,414; 6,323,650; 6,316,914; 6,310,481; 6,304,087; 6,249,124; 6,225,808; 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: 1,295,680; 1,280,164. United Kingdom Patents: 0,672,248; 0,417,173. German Patents: 693 25 388.6; 689 23 281.0-08; 93 21 638.6. European patents: C382.13-0040 WO; C382.13-0033 EP; C382.13-0018 EP. 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 Midtronics Micro700 battery analyzer is warranted to be free of defects in materials and workmanship for a period of 1 year from date of receipt. Midtronics will, at our option, repair the unit or replace the unit with a remanufactured analyzer. This limited warranty applies only to the Midtronics Micro700 battery analyzer 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 should contact Midtronics for a Return Authorization number, and return the unit to Midtronics freight prepaid, Attention: RA# _____. Midtronics will service the analyzer and reship the next scheduled business day following receipt, using the same type carrier and service as received. If Midtronics determines that the failure was caused by misuse, alteration, accident, or abnormal condition of operation or handling, purchaser will be billed for the repaired product and it will be returned freight prepaid with freight charges added to the invoice. Battery analyzers beyond the warranty period are subject to the repair charges in effect at that time. Optional remanufacturing service is available to return the analyzer to like-new condition. Out-of-warranty repairs will carry a 3-month warranty. Remanufactured units purchased from Midtronics are covered by a 6-month warranty.

Midtronics, Inc.
7000 Monroe Street
Willowbrook, IL 60527
U.S.A.
Phone: 630.323.2800
Fax: 630.323.2844
ISO 9001 Certified

Midtronics Canada, Inc.
54 Ferris Drive
P.O. Box 746
North Bay, Ontario
P1B 8J8 Canada
Phone: 705.476.9228
Fax: 705.476.9255
ISO 9001:2000 Certified

Midtronics b.v.
Lage Dijk-Noord 6
3401 VA IJsselstein
The Netherlands
Phone: +31 306 868 150
Fax: +31 306 868 158
ISO 9001:2000 Certified

www.midtronics.com
Toll free in North America: (800) 776-1995

QS - 9000
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