



MIDAS

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How to Charge, Inspect & Test a **BATTERY**



This workshop procedure guide contains:

Step-by-step instructions on how to inspect, test and charge a battery.

Personal safety:

Whenever you perform a task you must use personal protective clothing and equipment that is appropriate for the task. Among other items, this may include:

- Work clothing, such as overalls and steel-capped footwear.
- Eye protection, such as safety glasses and face masks.
- Ear protection, such as earmuffs and earplugs.
- Hand protection, such as rubber gloves and barrier cream.
- Respiratory equipment, such as face masks and valved respirators.

TIPS ON CHARGING A BATTERY

Safety check:

- Make all connections between the battery charger and the battery that is to be charged, before connecting to the power supply or turning "ON" any switches.
- Never charge a 'frozen' battery.
- Make sure that the voltage used to charge the system never exceeds the system design while charging. For instance if you connect two 12 volt batteries in 'series' for charging you should use the 24 volt setting on the charger, however if you connect the same two batteries in 'parallel' you should only use the 12 volt setting on the charger.
- Never allow a spark or flame to get near the battery.
- Always use the markings on the battery to determine the positive and negative terminals. Never use the colour of the cables to determine the positive or negative terminals.

Points to note:

- Slow charging a battery is less stressful on the battery than fast charging.
- Always remove the negative battery terminal while changing a battery, especially with today's electronically intensive cars.
- After charging the battery and reinstalling it, always clean the battery terminals and posts.

Charging a battery

1. Inspect the battery



Carry out a visual inspection of the battery to ensure there are no cracks or holes in the casing.

2. Connect the charger



Check that the charger is unplugged from the wall and turned off.



Connect the red lead from the charger to the positive battery terminal.



Connect the black lead from the charger to the negative battery terminal.
Turn the charger on.



Check the charger amperage output to ensure that the battery is charging correctly. A slow charger usually charges at a rate of less than 5 amperes.



A fast charger charges at a much higher ampere rate, depending on the original battery state of charge and should only be carried out under supervision.

3. Disconnect the charger



Once the battery is charged turn the charger off.



Disconnect the black lead from the negative battery terminal...



...and the red lead from the positive battery terminal.

4. Test the battery



Allow the battery to stand for at least 5 minutes before testing the battery.



Using a load tester or hydrometer, test the charged state of the battery.



TIPS ON INSPECTING & TESTING A BATTERY

Objective:

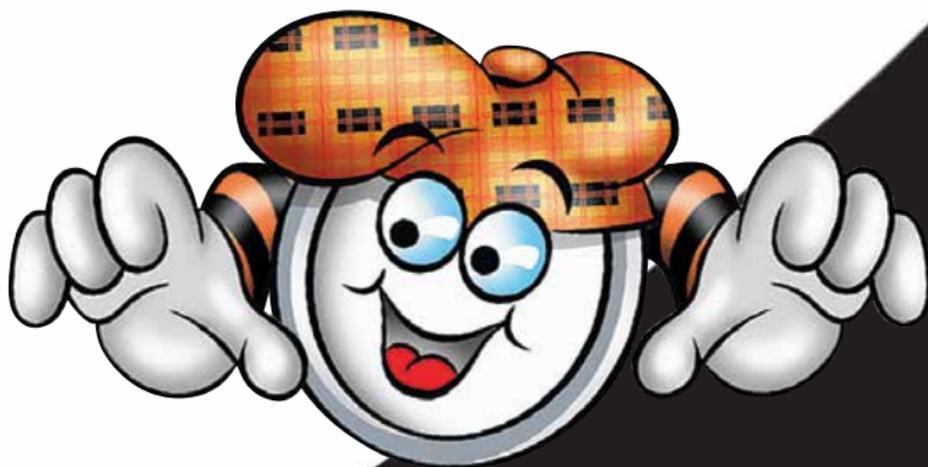
Inspect and test a battery.

Safety check:

- Make sure that the bonnet is secured with a bonnet stay rod.
- Always make sure that you wear the appropriate personal protection equipment before starting the job. Remember that batteries contain acid and it is very easy to hurt yourself even when the most exhaustive protection measures are taken.

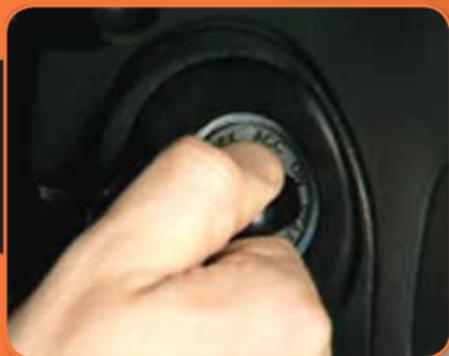
Points to note:

- Batteries come in many sizes and power ratings, so always check the rating of the battery you are servicing. The rating provides a testing benchmark for battery performance.
- The hydrometer used to measure the specific gravity of the electrolyte must be handled carefully and safely.
- Store the hydrometer in a safe receptacle before and after use. Small amounts of electrolyte in the hydrometer can leak out and damage the vehicle's paintwork.
- Do not remove electrolyte from one cell to another when testing; this will cause incorrect readings.
- Battery terminals are most commonly positioned on the top of each end of the battery casing but because of fitting and location arrangements, some vehicle manufacturers use batteries that have side terminals.



Inspecting & testing a battery

1. Check general condition



Switch on the ignition.



The charge light on the dash should light up, and go out when you start the engine. This indicates that the alternator is charging the battery.



Turn the engine off.



Switch on the vehicle headlights, then start the engine and see if the lights brighten significantly.



If they do, then this indicates that the alternator is charging the battery more than it is being drained by the lights.



If you do not have someone else to start the engine for you, judge the brightness by shining the lights onto a reflective surface such as a wall.



Check that the battery casing and the terminals are in good condition. This can generally be achieved with a visual inspection, however, since the battery may be located in a position where you cannot see all of it, you may have to remove it to complete the inspection, after performing any other on-car tests.

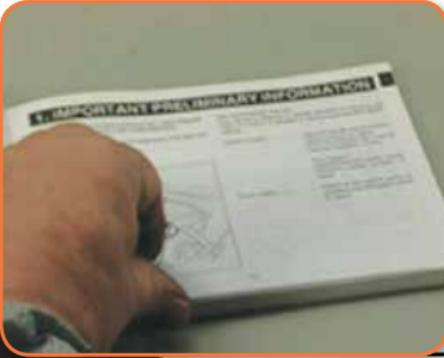
2. Check and adjust the fluid level



A sealed or low-maintenance battery has no removable cell covers, so you cannot adjust or test the fluid levels.



However, some of these do have visual indicators that provide information on the status of the charge and condition of the battery cells.



Each manufacturer provides details of these visual indicators so refer to these when undertaking an inspection.



If the battery is not a sealed unit, it will have removable caps or bars on top. Remove them and look inside to check the level of the battery fluid.



If the level is below the tops of the plates and their separators inside, add distilled water or water with a low mineral content until it just covers them. Be careful not to over fill the cells as they could "boil" over when charging.

3. Conduct a specific gravity test



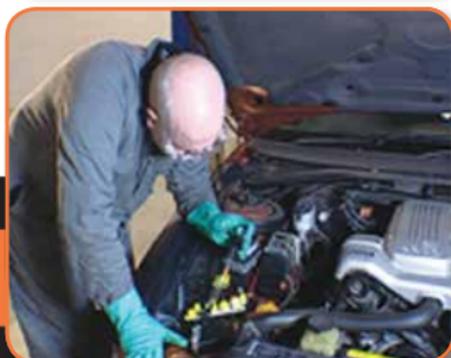
Test the specific gravity of each of the cells by using a hydrometer designed for battery testing. Draw some of the electrolyte into the tester and look at the float inside it.



The scale indicates the relative charge state of the battery by measuring how high the float sits in relation to the fluid level. A very low overall reading of 1150 or below indicates a low state of charge.

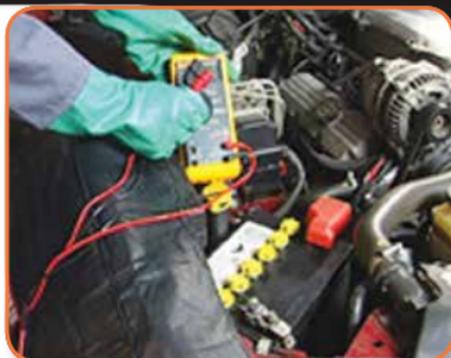


A high overall reading of about 1300 indicates a high state of charge.

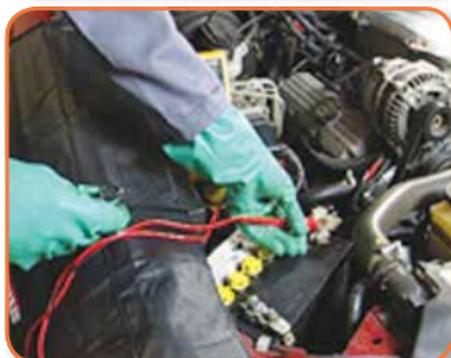


The reading from each cell should be the same. If one or two cells are very different from the rest that indicates there is something wrong with the battery.

4. Conduct a voltage test with a Multimeter



Select the Volts DC position on your multimeter and...



... attach the probes to the battery terminals (red to positive and black to negative).

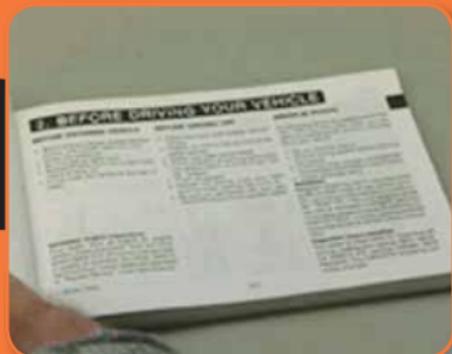


With all vehicle accessories switched off and with the battery at 21 degrees Celsius, the voltage reading should be approximately 12.6 volts if the battery is fully charged. This will be slightly lower at cooler temperatures.

5. Conduct a load test



Measure the continuous load capability of the battery with a load tester.



Refer to the manual of the particular tester for its operating instructions.



A load tester induces a high rate of discharge in the battery, like the load created by a cranking starter motor. A battery is rated in ampere hours, which means that it can supply a certain number of amperes for a specified length of time under continuous load.



Another measurement used is International Standard Cold Cranking Amps. Check the specifications for the battery you are testing. If it can meet these specifications under a load test then it is in good condition. There are different makes and types of load testers. Always use the equipment that manufacturers recommend for testing procedure.



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