

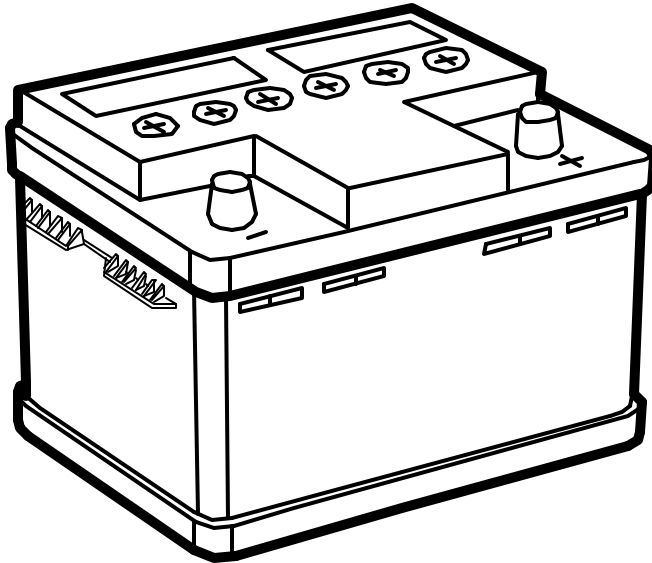
SERVICE INFORMATION

Bulletin Nbr: 311-1773 UTG. 2

Date:.....NOVEMBER 1998

Market: ALL

Long-term storage of hybrid batteries



D321-B602

Cars affected

All cars fitted with hybrid batteries.

Background

This SI replaces SI 311-1351 as well as the sections concerning batteries in SI 100-1482 and Service Manual 1 Service.

A new type of battery was introduced during the production of the model year 1997, a so-called hybrid battery. The biggest advantage of the hybrid battery is that the consumption of water has been reduced by up to six times, which means that the battery will normally not need to be topped up in between services.

However, it is necessary for both standard and hybrid batteries to be trickle charged during long-term storage so that they are not destroyed by undervoltage (deep discharge).

This SI describes the difference between standard and hybrid batteries and gives instructions for their maintenance.

Differences between standard and hybrid batteries

Standard battery (Antimony battery)

Positive and negative electrodes	Lead/Antimony alloy.
Cover	Screw plugs with ventilation holes formed as a labyrinth in the plugs.
Advantages	<ol style="list-style-type: none"> 1. Prevents flames entering the battery and causing explosions. 2. Withstands deep discharging (under 12 V without load) relatively well. 3. Prevents battery acid leaking out of the battery when it is tipped over.
Disadvantages	<p>High water consumption.</p> <ol style="list-style-type: none"> 3. Prevents battery acid escaping from the battery with breathing hoses above the plates (5-10 mm). <p>Storage time 6-8 months for disconnected battery.</p>

Hybrid battery

Positive electrode	Lead/Antimony alloy.
Negative electrode	Lead/Calcium alloy.
Cover	Airtight screw plugs with side-ventilation via a ceramic filter. The filter has three main functions:

Advantages

Lower water consumption (six times lower than a standard battery).

Storage time approx. 12 months for disconnected battery.

Larger fluid reserve above the plates (25-30 mm).

Battery acid does not escape together with charge gases.

The battery can be leant over without spilling battery acid.

Disadvantages

Not available dry-charged for after-sales.

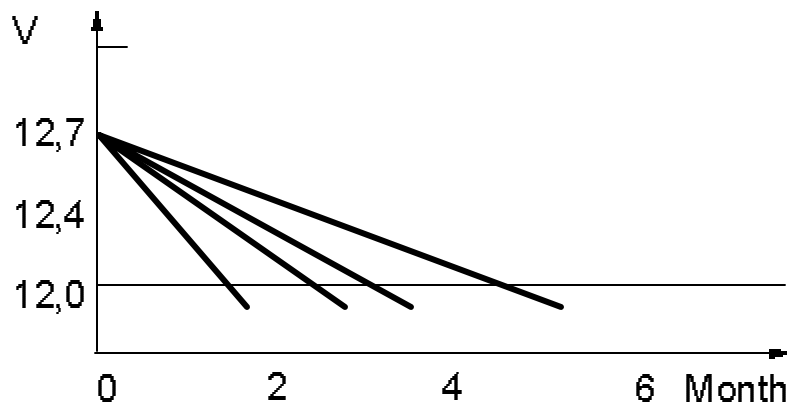
Ages somewhat faster than an antimony battery when deeply discharged.

Diagnostic procedure

Trickle charging

All batteries, irrespective of type, will become discharged sooner or later and must be checked and charged at regular intervals if they are not to become unserviceable. A deeply discharged battery (under 12 V for more than 12 hours) that is recharged will work to start with but it will never regain full capacity and will soon cease to function.

The time it takes to discharge depends on the current consumption. The diagram shows that the battery voltage drops more slowly if the transport fuses are removed. The spread is due to car variant and battery size.



- With transport fuses removed
- _____ With transport fuses connected
- Lower limit for charging

Checking battery voltage

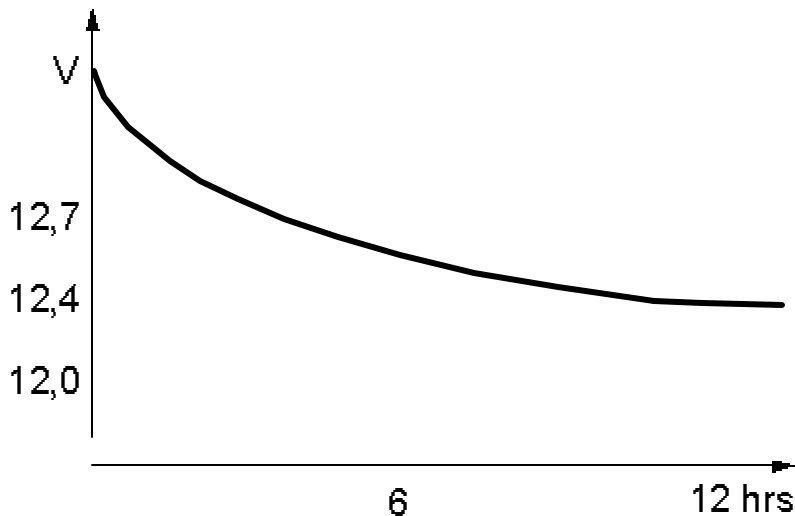
During final inspection at the factory, the battery is always checked to make sure its voltage exceeds 12.4 V. When a new car arrives at the import docks, importer's or dealer's, the battery condition must be checked by measuring its voltage and fluid level. If necessary, the battery must be topped up and recharged (see table below).

Check the battery condition subsequently every 40 days, until the car is sold. Top up the battery and recharge it as necessary.

When the transport fuses are removed, the battery will need to be recharged only every 90 days. Top up the battery and recharge it as necessary.

When the battery is being charged, from the generator while the engine is running or from a charger, it receives a slightly higher voltage level, see diagram below. When the charging current is cut off, the voltage level remains but drops slowly to normal level, which is reached after approx. 24 hours. It is this voltage level that indicates the condition of the battery (and is the one that preferably should be measured).

The diagram shows a typical voltage curve as a function of the time after charging. The values vary with the condition of the battery.



Note

Therefore, the battery voltage must be with the generator (i.e. the car has been running) or with a battery charger at the earliest

Depending on the voltage reading, the following steps must be taken:

Above 12.4 V	OK
Between 12.0 V and 12.4 V	Charge
Below 12.0 V	Replace

Charging batteries

Use a battery charger that delivers a charge current of approx. 4-8 A. Battery terminals and cover do not have to be removed.

Charge time 4-12 hours depending on the condition of the battery and the charge current. Follow the instructions for the battery charger.

Important

A so-called quick-charger must be used.
