Charging System 812FJ

Student Manual

Charging System

Activity 7

Battery Description

Performance Objectives:
• Describe the design and construction of typical lead acid batteries.
• Describe the advantages of Low Maintenance and Maintenance-Free Batteries.
• Determine battery ratings.
• Identify safety precautions when handling batteries.

Tools and Materials:
• 12-Volt Battery
• Safety Goggles

References:
• Ford Starting and Charging System Diagnosis Reference Book
• 2003 Chevrolet Impala Service Manual Information

Reference Book:
• Read pages 2-1 to 2-6 in the Reference Book.

Review Questions:
• Answer the Review Questions on pages 2-8 and 2-9. **Do not write in the Reference Book**. **Use a separate piece of paper to record your answers.** (Answers are provided on page 2-10).

Service Manual Information:
• Read the Battery Description and Operation on Page 17 of the Service Manual Information.

Battery Construction:
Conventional lead-acid batteries are constructed of positive and negative plates, non-conducting separators, plate straps, battery case and electrolyte (sulfuric acid).

Low Maintenance and Maintenance-Free Batteries:
Low maintenance batteries and maintenance-free batteries offer the advantages of reduced gassing and water loss, and greater resistance to overcharge.

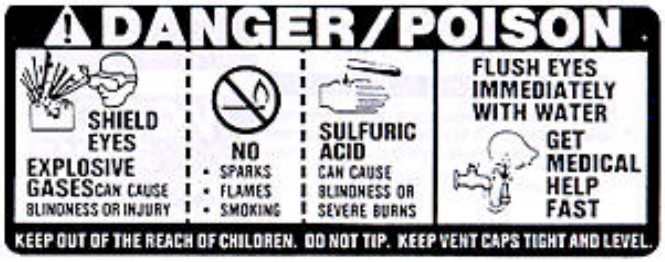
Absorbent Glass Mat (AGM) Batteries:
AGM batteries are similar in construction to lead-acid, maintenance-free batteries (as per pages 2-2 and 2-3 in the Reference Book). Absorbent glass mats are used as separators between the plates, and the needed electrolyte is absorbed and held by these glass mats. This eliminates the need for immersing the plates in a large quantity of electrolyte by effectively combining the separators and electrolyte. AGM batteries are resistant to high temperatures and vibration, and they can last up to twice as long as a wet-cell battery.

Hybrid Vehicle Batteries:
The current crop of hybrid vehicles (as of the time this is written) use either nickel metal hydride (NiMH) or lithium ion (Li-Ion) propulsion batteries. Hybrids and hybrid propulsion batteries are subjects that are beyond the scope of this course.

Battery Rating:
In North America, the Society of Automotive Engineers (SAE) has established two battery ratings:
- Reserve Capacity (RC)
- Cold Cranking Amps (CCA)

Both methods involve measuring the battery discharge current over a specified period of time. Each test provides a standard way to compare batteries in specific group sizes with regard to electrical load carrying capacity and cold cranking capacity. The Battery Council International (BCI) has also accepted these ratings as satisfactory battery measurement standards. Consequently, RC and CCA are often referred to as BCI ratings. You may come across other ratings, such as Cranking Amps or Marine Cranking Amps, but the BCI ratings are the accepted standard.

Safety Precautions:



Warning Label courtesy of the Battery Council International

Always use caution when handling batteries because the sulfuric acid can cause serious harm to your eyes, skin, and other parts of your body. Always wear goggles and protective gear when handling batteries. A charging battery produces explosive hydrogen gas. When charging batteries, always work in a well-ventilated area and avoid sparks, flames, or lighted cigarettes.

Complete the In-Shop Worksheet at this time.

In-Shop Worksheet

Activity 7

Battery Description

Tools and Materials:
• 12-Volt Battery
• Safety Goggles

Important: Because of the materials used in the manufacture of automotive lead-acid batteries, dealers and service shops that handle them are subject to regulations issued by OSHA, EPA, DOT, and various state or local agencies. Other regulations may also apply in other locations. Always know and follow these regulations when servicing or handling batteries.

Important: Wear safety goggles.

Note: Always use caution when handling a battery since battery gases (hydrogen) are EXPLOSIVE and the acid can cause severe burns.

Procedures:
• Put on the Safety Goggles.
• Examine the 12-Volt battery.

1. What type of terminals does the battery have?
   a. Tapered top terminals
   b. Side terminals
   c. Dual terminals
   d. L terminals (imports)
   e. Top stud terminals (truck)
   f. Top stud/post terminals (marine)

2. Is this a Low Maintenance, Maintenance Free, or Absorbent Glass Mat (AGM) battery?
   a. Low Maintenance
   b. Maintenance Free
   c. AGM
   d. None of these

3. Are the vent caps removable?
   a. Yes
   b. No

4. Are the BCI ratings listed somewhere on the battery?
   a. Yes
   b. No

5. Is there a BCI Warning Label (similar to the picture in the Safety Precautions section) somewhere on the battery?
   a. Yes
   b. No

Conclusion:
Maintenance Free batteries may be sealed or have "non-removable" vent caps. Under normal conditions, there is no need to add water to these types of batteries. BCI ratings are indicated as Reserve Capacity and Cold Cranking Amps.