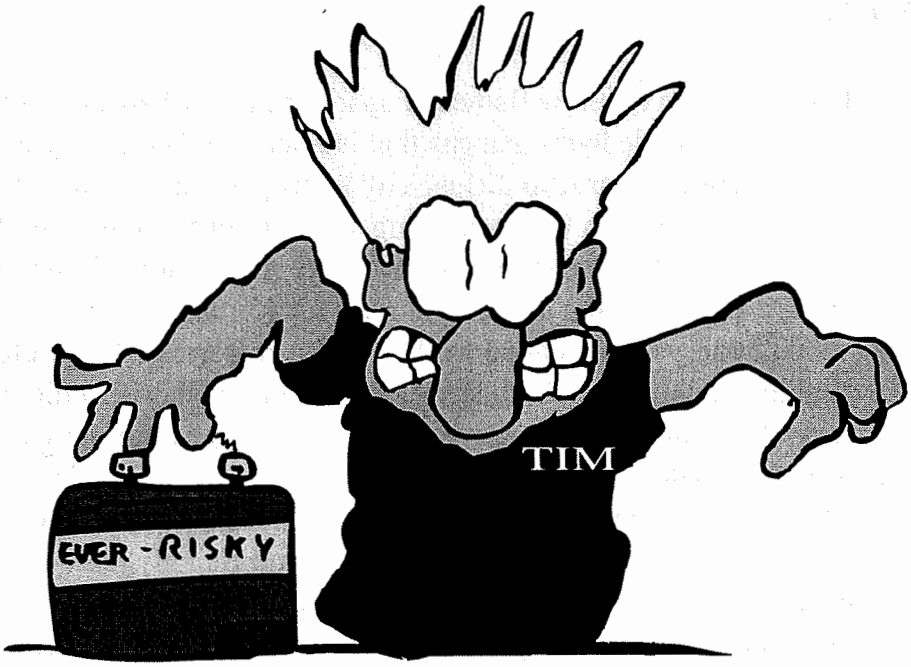
MDOT
Michigan Department of Transportation

BATTERY CARE



BATTERY

The battery acts as an electrical storage container. It receives charging from the alternator. It is used to start your engine and power electrical components.

Maintenance Requirements

There are generally three types of batteries: conventional vented cell, low maintenance, and maintenance-free.

- **Vented cell** batteries are obsolescent. These batteries have removable vent caps over each battery cell. The cells lose water through evaporation during charging and must be constantly monitored. Distilled water is frequently added, otherwise the battery fails.
- **Low-maintenance** batteries have gang vent covers, usually two. Since gases are not allowed to escape, they condense into water inside the battery.
- **Maintenance-free** batteries use plate materials that require low water usage. They are completely sealed and require no additional water. These batteries are the most preferable type.

Safety Tips

- Do not smoke or allow flames or sparks near any battery. They could ignite flammable hydrogen gas that is released. Work on your battery in a well-ventilated area to diffuse any hydrogen gas buildup. Always wear eye protection when charging a battery or working with battery caps since batteries contain sulfuric acid. If you are splashed with battery acid wash the area thoroughly for 15 minutes.
- When battery maintenance work must be performed, be careful not to simultaneously touch both terminals or cause a short circuit in any other way. Disconnect the negative cable or cover the terminal with an insulated material.
- When lifting a battery from the ground, squat down and lift with your legs, not with your back. The battery is surprisingly heavy. Furthermore, grab it by opposite corners. If it is squeezed on both ends, the internal pressure may force acid to burst through the vent caps (if so equipped).
- When reconnecting battery cables, always connect the black negative (-) wire LAST. This will minimize the possibility of sparks being created and igniting hydrogen gas that may be present. Likewise, when disconnecting the battery cables, disconnect the negative wire FIRST for the same reason.

Battery Care

Cleaning and Servicing

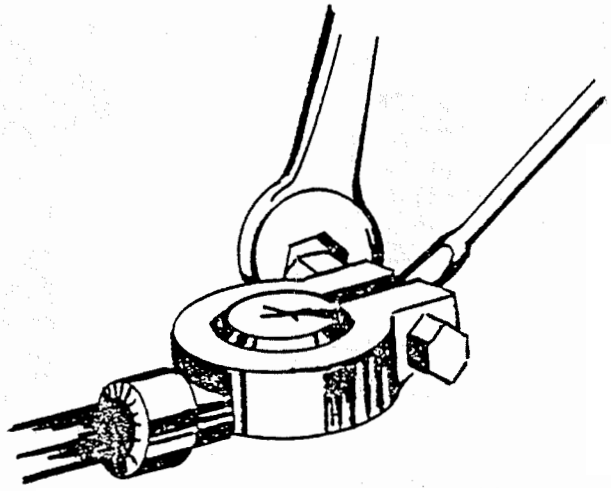
I. Tools and equipment:

- A. Full face shield
- B. Rubber gloves
- C. Rubber apron
- D. Bristle brush
- E. Wire brush
- F. Screwdriver
- G. Battery clamp puller
- H. Combination end wrenches
- I. Baking soda and water solution (two tablespoons of baking soda to one pint of water), or a commercial brand battery cleaning product
- J. Battery anti-corrosion paste
- K. Shop towels

II. Procedure:

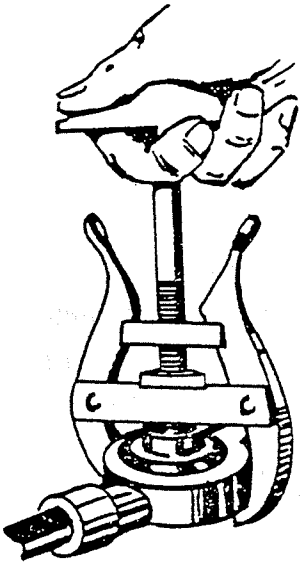
- A. Disconnect battery cables from the battery posts. (NOTE: Always disconnect the grounded battery cable first to avoid short circuits. Use care to avoid twisting the battery cable post.)

  1. Pry clamp open.



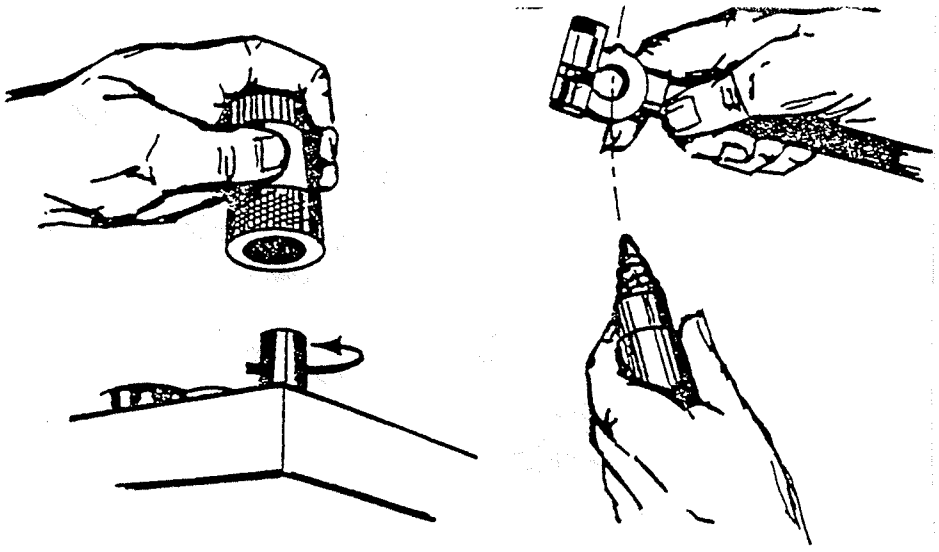
Cleaning and Servicing (continued)

2. Pull cable off



B. Clean battery clamps and battery posts

(NOTE: Battery posts and inside of battery cable clamps must be clean and bright.)



Cleaning and Servicing (continued)

C. Remove loose dirt and corrosion particles from top of battery

D. Brush cleaning solution on battery, battery post, clamps, and battery hold-down
(NOTE: Keep solution from entering the battery through the vent holes in the vent caps, if your battery is so equipped)

E. Wash away residue with clean water
(NOTE: remove all residue that may have lodged around battery, or parts of the vehicle.)

F. Reconnect battery cables to the battery posts
(CAUTION: Always reconnect the power cable first and the ground cable last.)

H. Spread a coating of battery anti-corrosion paste over the cable clamps and terminals

I. If applicable:
1. Remove vent caps
2. Check electrolyte level in all cells
3. Add water if necessary to bring electrolyte put to proper level (NOTE: Do not overfill)

Battery Removal and Replacement

I. Procedure:

A. Disconnect battery cables from the battery posts.
(NOTE: Always disconnect the grounded battery cable first to avoid short circuits. Use care to avoid twisting the battery cable post.)

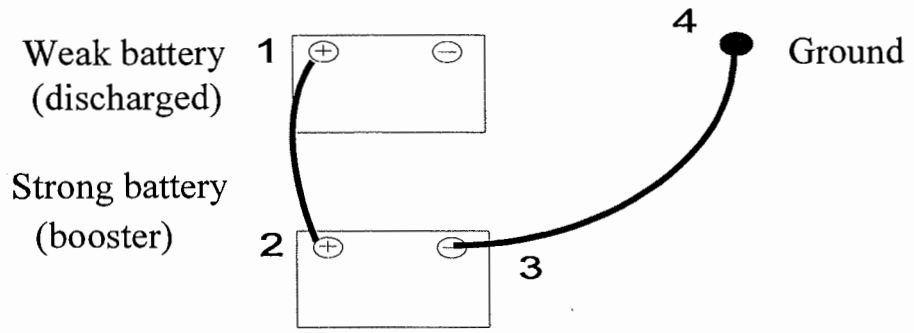
1. Pry clamp open
2. Pull cable off

B. Remove the battery hold-down
C. Remove the battery from the carrier
(NOTE: Use a suitable battery lift strap to lift the battery.)
D. Inspect the battery carrier for dirt or corrosion
(NOTE: Clean with cleaning solution as required.)
E. Check battery cables for worn or frayed insulation
F. Clean the inside of battery cables until bright
G. Set the battery into place using a lift strap
(NOTE: Position the battery to allow for correct battery cable attachment.)
H. Install the battery hold-down clamp or strap and tighten securely
I. Reconnect battery cables to the battery posts
(NOTE: Always reconnect the power cable post first and the ground cable last.)
J. Tighten the battery cable clamps securely
(NOTE: Use care to avoid twisting the battery cable post.)
K. Spread a coating of battery anti-corrosion paste over the cable clamps and terminals

Jumping a Discharged Battery

On occasion, you may find it necessary to give a jump start or receive one. Great care must be taken so as not to damage the vehicles or cause personal injury. If you must jump start an engine with a discharged battery, use the following procedure:

1. Be certain the batteries of both vehicles have the same *polarity* (usually a negative *ground*) and the same voltage rating (usually 12 volts). If they do not, the jump start procedure cannot be used.
2. Park the vehicle with the discharged battery on level ground with the key OFF, the parking brake engaged, and the transmission in PARK (for automatic) or REVERSE (for manual). Raise the hood. Turn the heater fan motor on HIGH, but keep all other electrical accessories and lights OFF to prevent voltage surges from damaging them. See your owner's manual for possible additional directions.
3. Inspect the weak (discharged) battery to be certain it can accept a jump start. Remove any corrosion it if is present. If the discharged battery's cells can be accessed and the weather is cold, confirm that the *electrolyte* inside is not frozen. Do not disconnect the discharged battery; that may harm the electrical system. If the discharged battery is cracked, leaks fluid, or has loose terminals, it should not be jumped. Instead, replace with a new battery. Do not smoke or bring any type of flame near the battery.
4. Place the vehicle with strong (booster) battery near discharged battery. The vehicles MUST NOT touch. Turn all electrical switches OFF, except keep the heater fan switch on HIGH. First attach one end of the red jumper cable to the positive (+) of the **discharged** battery, then the other end to the **booster** battery's positive (+) terminal.
5. Connect the black jumper cable to the **booster** battery's negative(-) terminal. Lastly, attach the remaining end of the jumper cable to the engine block or frame of the vehicle with the **discharged** battery. **Do not attach it directly to the discharged battery because any resultant sparks could cause an explosion.** Make the attachment on a ground connection as far away from the discharged battery as possible.



Jumping a Discharged Battery (cont.)

6. Start the booster battery's engine. Let it idle.
7. Try to start the discharged battery's engine. Do not crank the engine more than 5 seconds at a time; long cranks can weaken a good battery. Wait about 30 seconds and try again. Once started, let it idle too. Racing either engine will not charge the weak or dead battery any faster. If the dead vehicle does not start after 3 or 4 attempts, the battery is not the problem.
8. Disconnect the cables immediately after starting the second vehicle, especially if one of the batteries is sealed (maintenance-free). Disconnect the cables in the exact reverse order in which they were connected. This means the negative cable on the engine or vehicle frame of the discharged battery is disconnected first. The remaining end of the negative jumper cable is disconnected second. Next, the booster battery's red jumper cable is disconnected. Lastly, the discharged battery's red jumper cable is disconnected.