



Modern Automotive Technology Chapter 30

Battery Service & Testing



North Montco
Technical Career Center

Learning Objectives

- Visually inspect a battery for obvious problems.
- Perform common battery tests.
- Clean a battery case and terminals.
- Charge a battery.
- Jump start a car using a second battery.
- Replace a defective battery.
- Describe safety practices to follow when testing and servicing batteries.

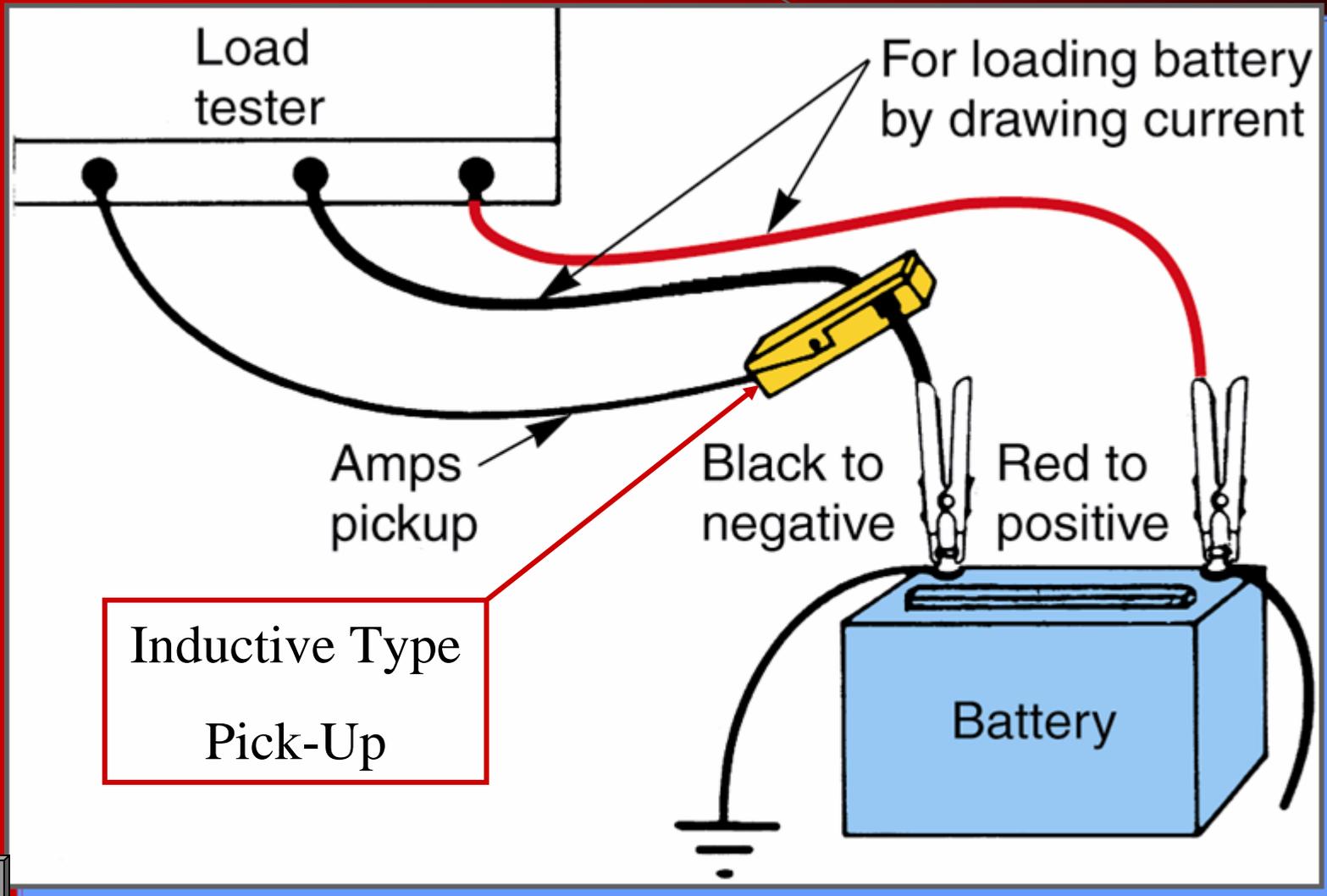


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1. An Inductive Type load tester uses a clip-on ammeter lead to sense field around outside of cables.
2. To Jump Start a vehicle with a dead battery, connect a charged battery to the discharged battery.



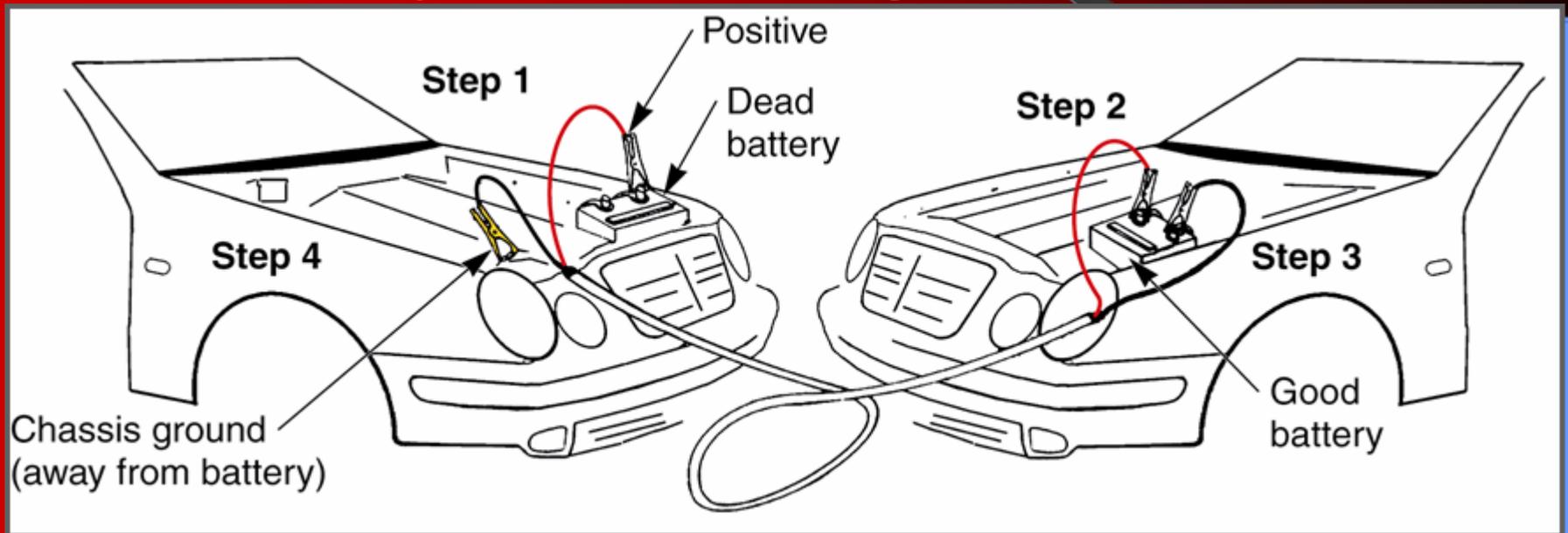
Inductive Type Load Tester





Jumper Cable Connection

Run the engine in the vehicle with the live battery while cranking the other one



1. Pos. Cable Dead Battery;
2. Pos. Cable Helper Car;
3. Neg. Cable Helper Car;
4. Body Ground, Dead Vehicle

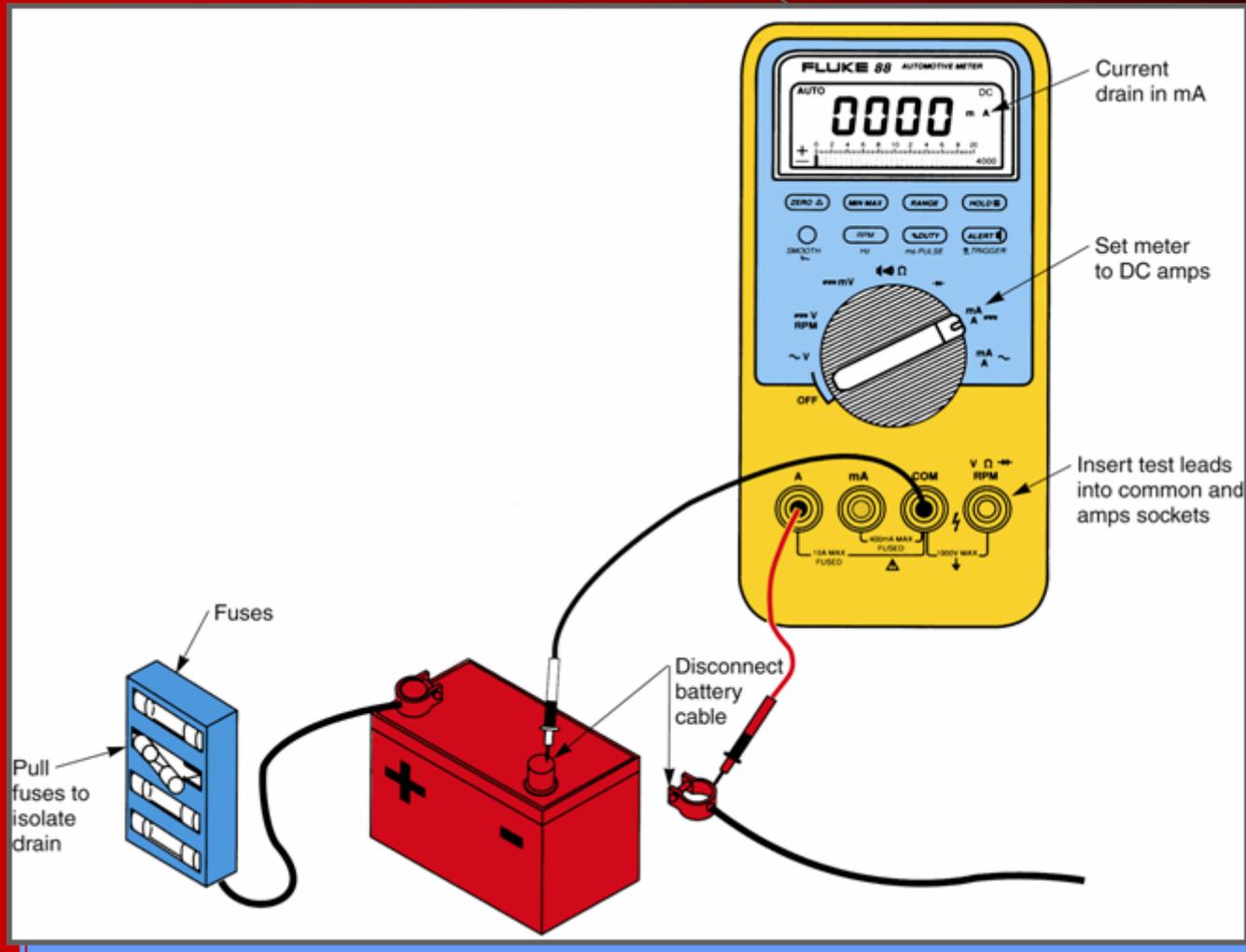
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3. A Battery Drain Test checks for abnormal current draw (parasitic loads) with the ignition key off.
4. A Battery Voltage Test is done with a voltmeter to determine the general state of charge and battery condition.



Battery Drain Test

Typically maximum 10 milliamps (mA)



Battery Voltage Test



This battery is about 75% charged



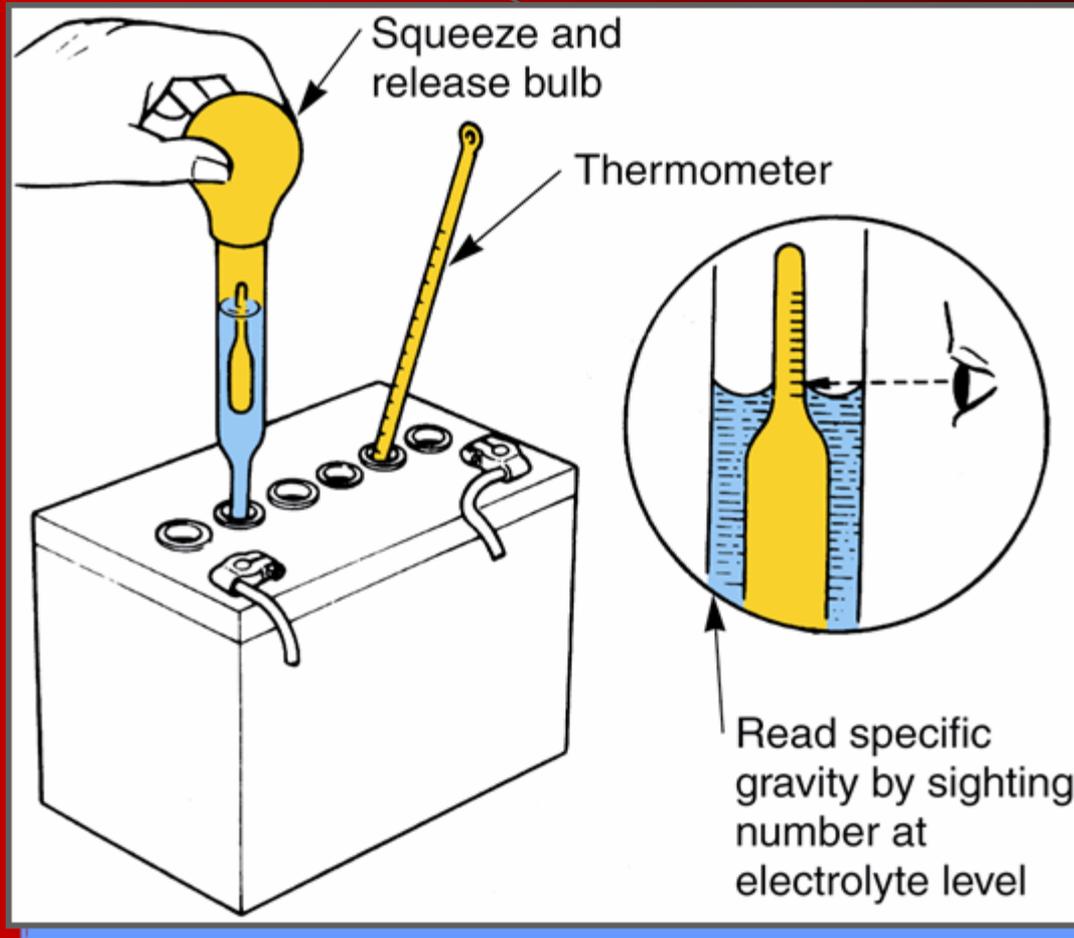
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5. A Hydrometer measures the specific gravity of a liquid.
6. Battery Terminal Test quickly checks for poor electrical connections between the battery cables and terminals.





Hydrometer Check



Electrolyte is sulfuric acid. Do Not Drip on clothes, skin or a vehicles finish. Flush with cool water if any splashes in your eyes!

Battery Voltage Versus Specific Gravity

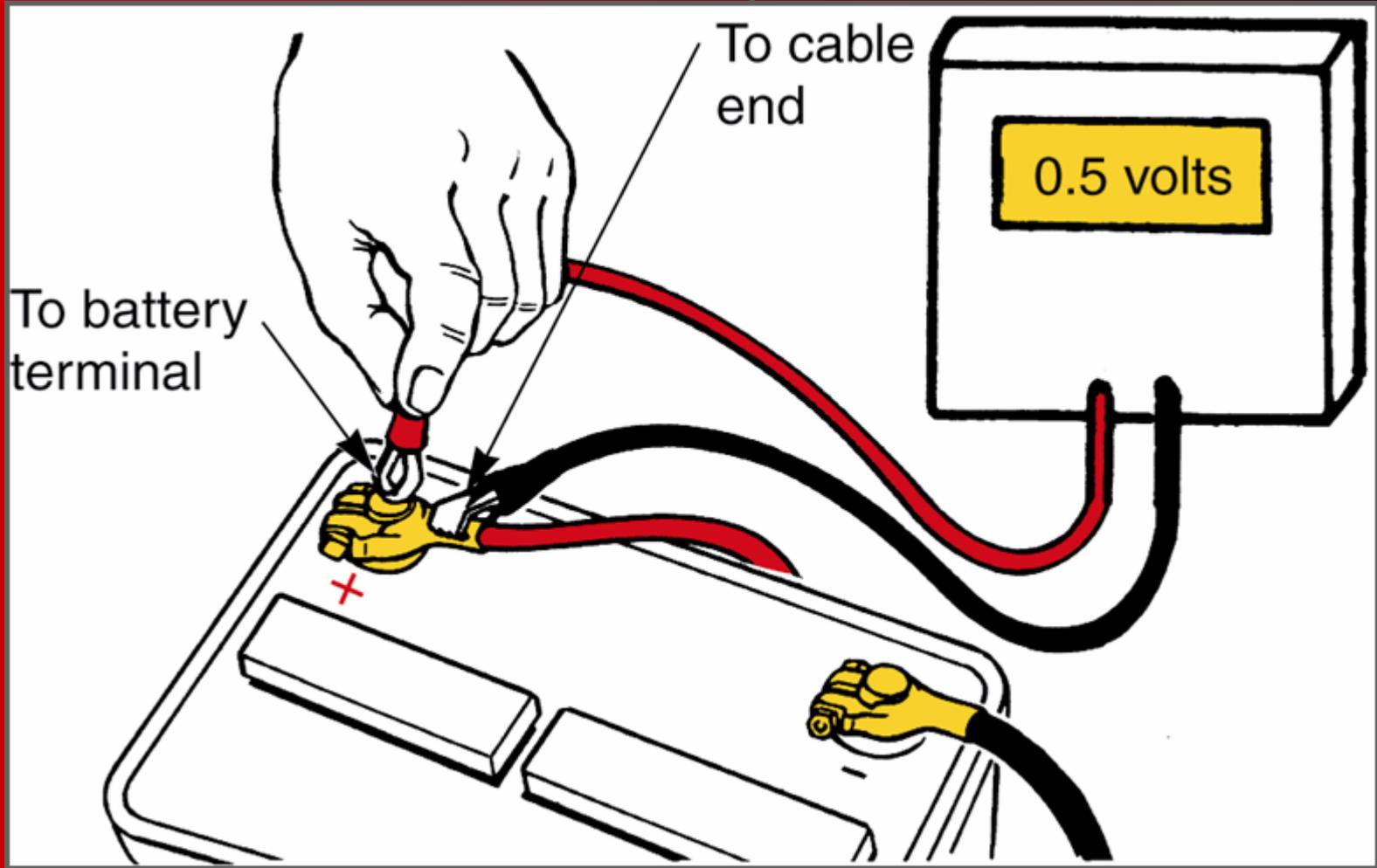
Battery Voltage					
Load on battery (Amps)	Specific Gravity (Percent charge)				
	1.265 (100%)	1.250 (95%)	1.230 (75%)	1.200 (50%)	1.175 (25%)
0	12.7	12.6	12.5	12.4	12.2
5	12.5	12.4	12.3	12.1	11.8
15	12.3	12.2	12.0	11.7	11.3
25	12.1	11.9	11.6	11.2	10.7

This is the range in which most vehicle batteries normally operate in customer service.

At 1.180 and below, starting will be unreliable and function of other circuits may be erratic.



Battery Terminal Test



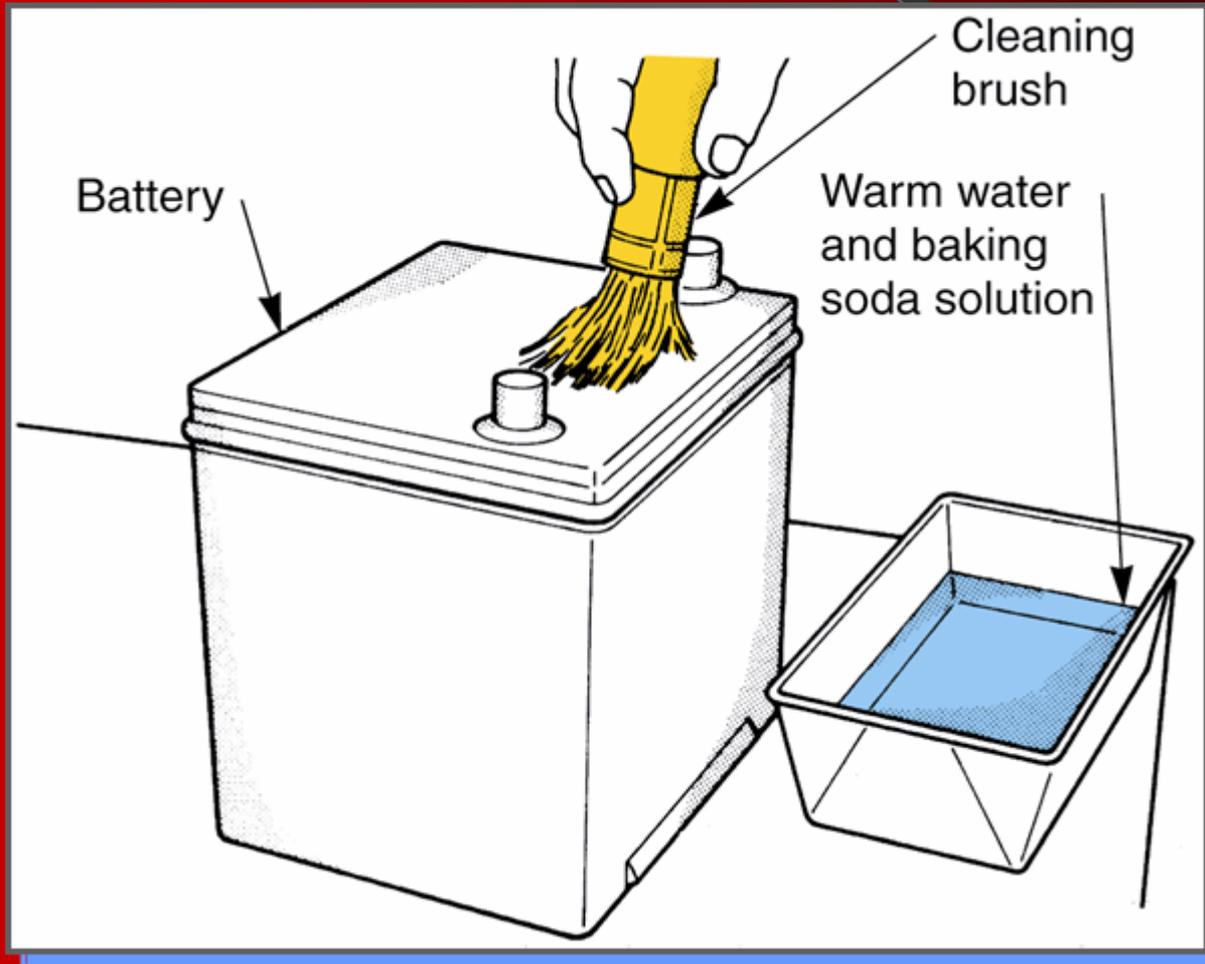
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7. A Dead Battery usually causes an engine not to crank and start.
8. A Battery Charger forces current back into a battery.



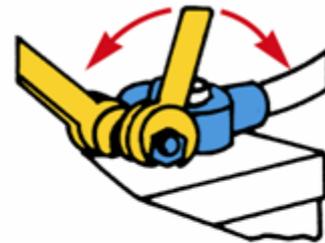
Battery Cleaning

Wash with baking soda and water, and do not let debris enter filler openings

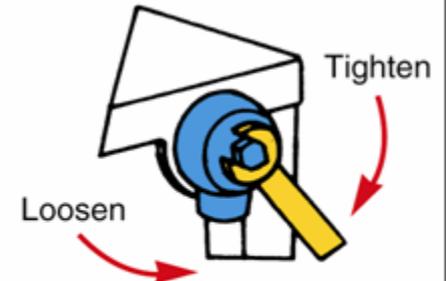


Removing Battery Cables

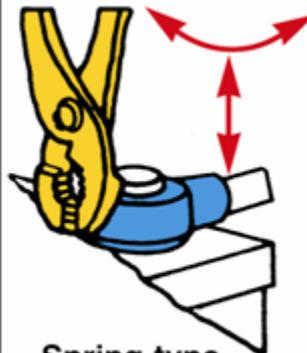
Different
methods of
removal



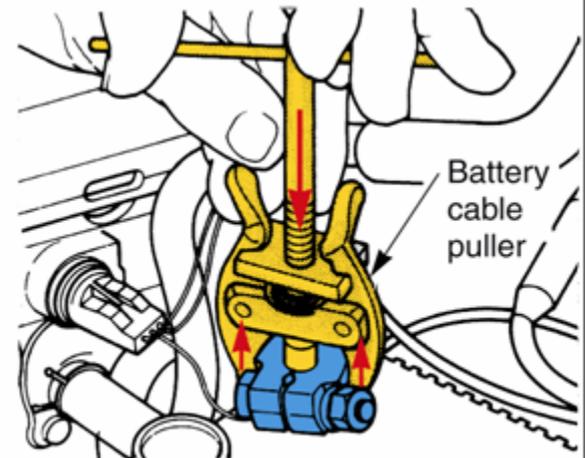
Bolted post-type
cable end



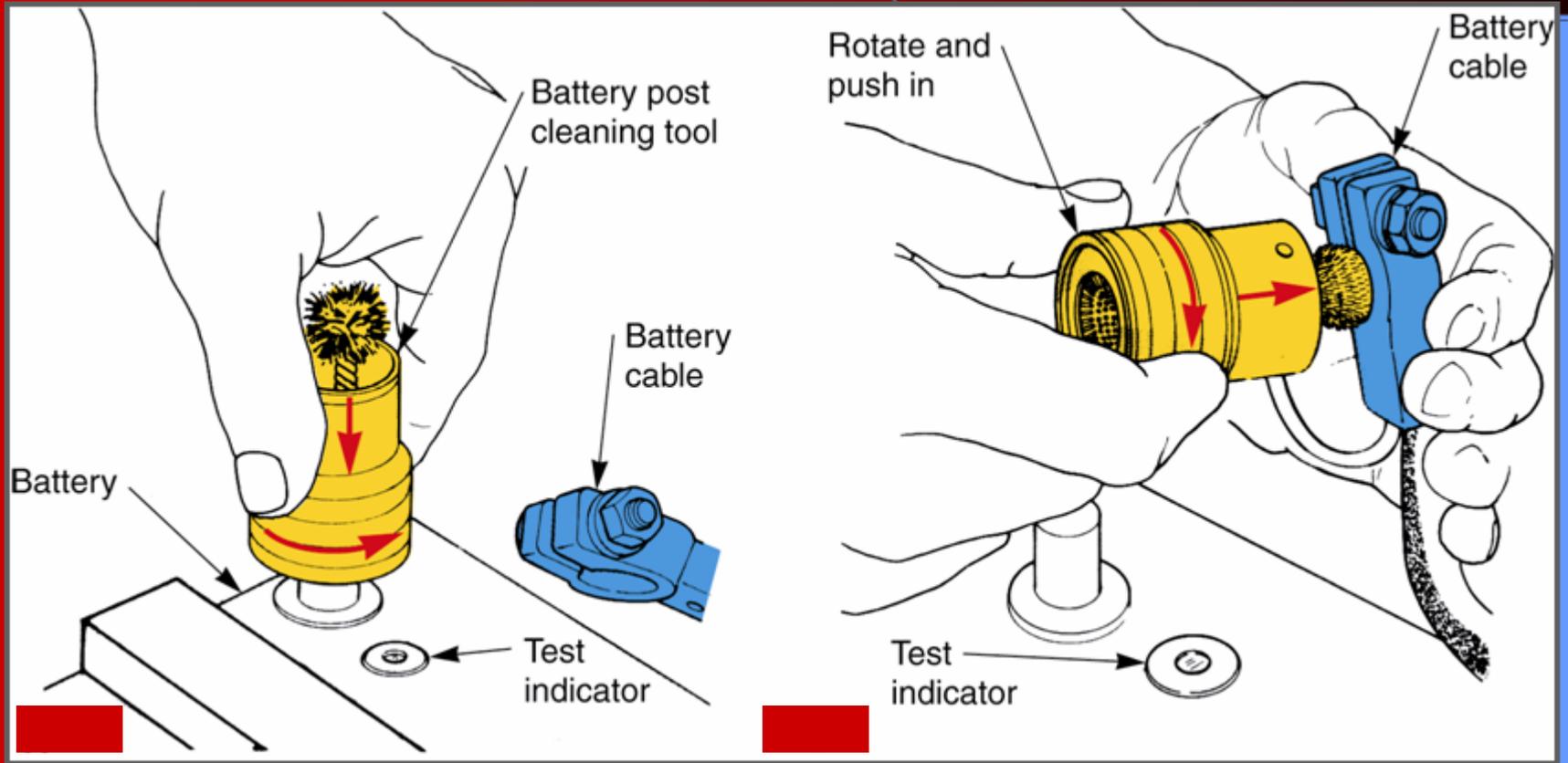
Loosen
Tighten
Side terminal
cable end



Spring-type
post cable end



Cleaning Battery Posts and Cable Ends



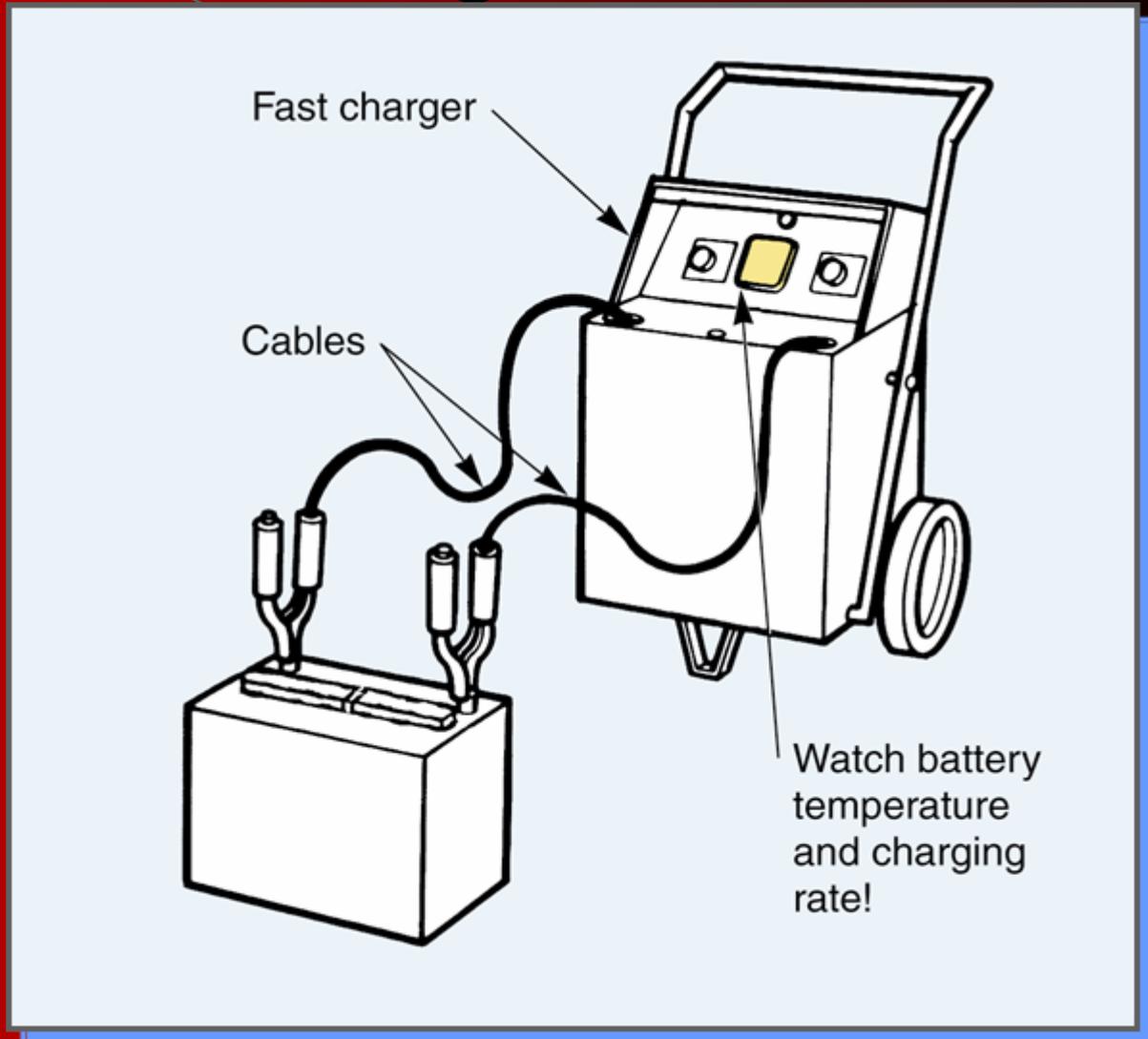
Rotate female end
of brush on post

Use male end of
brush on cable end



Fast Charger

- Forces high current flow into battery
- Allows engine start from a low battery in a few minutes



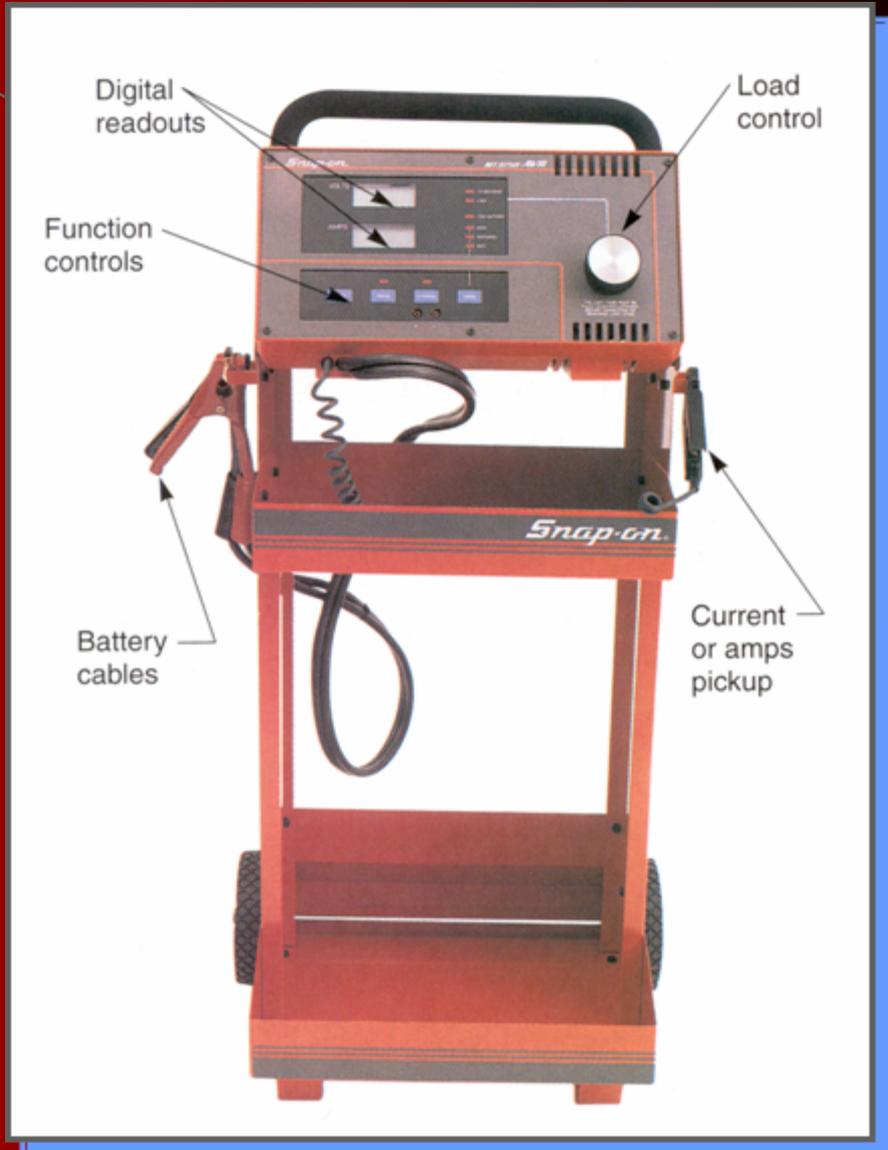
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9. A Battery Load Test tests the battery under full current load.
10. A Battery Leakage Test determines whether current is discharging across the top of the battery case.



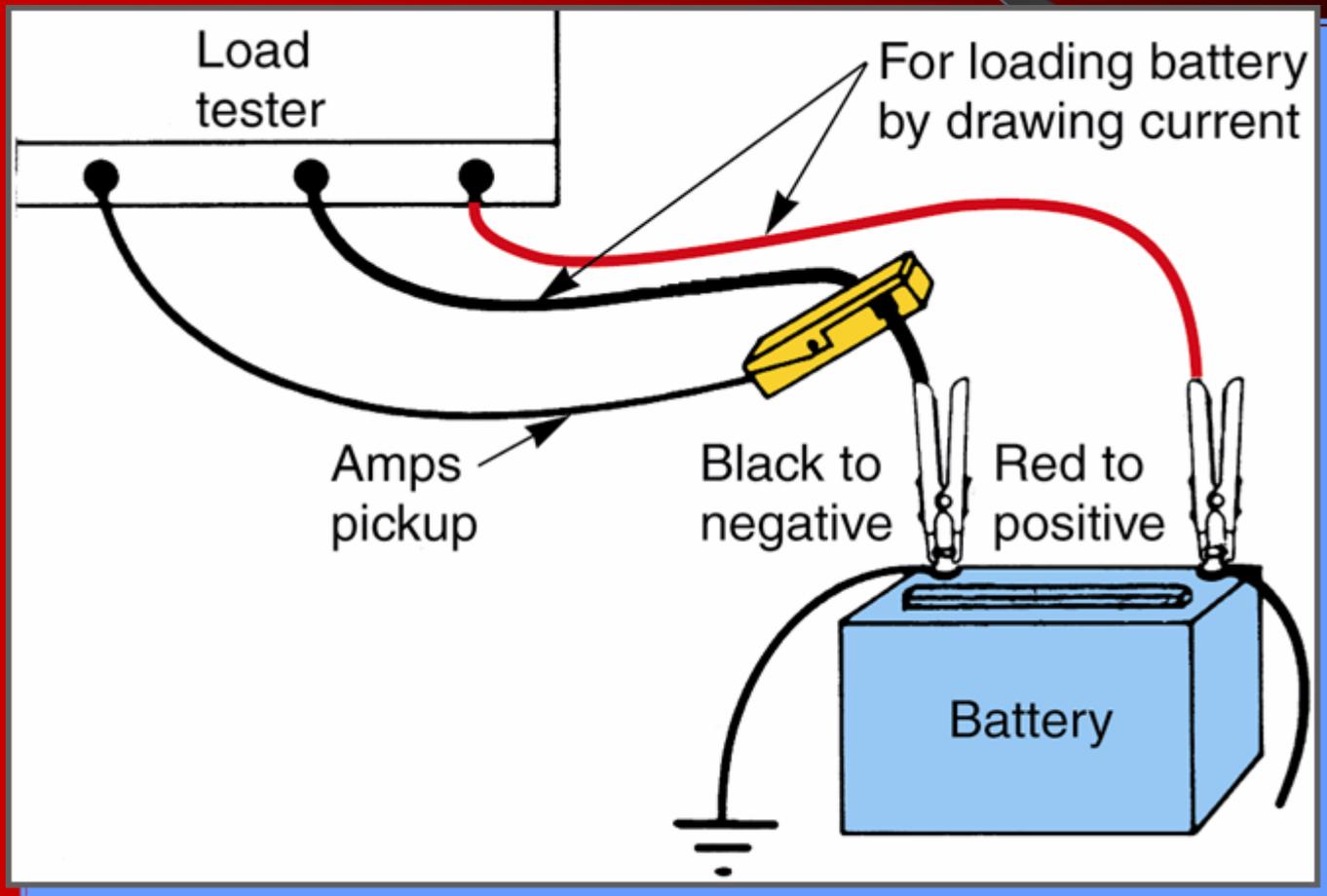
Load Tester

The most accurate method of determining battery condition

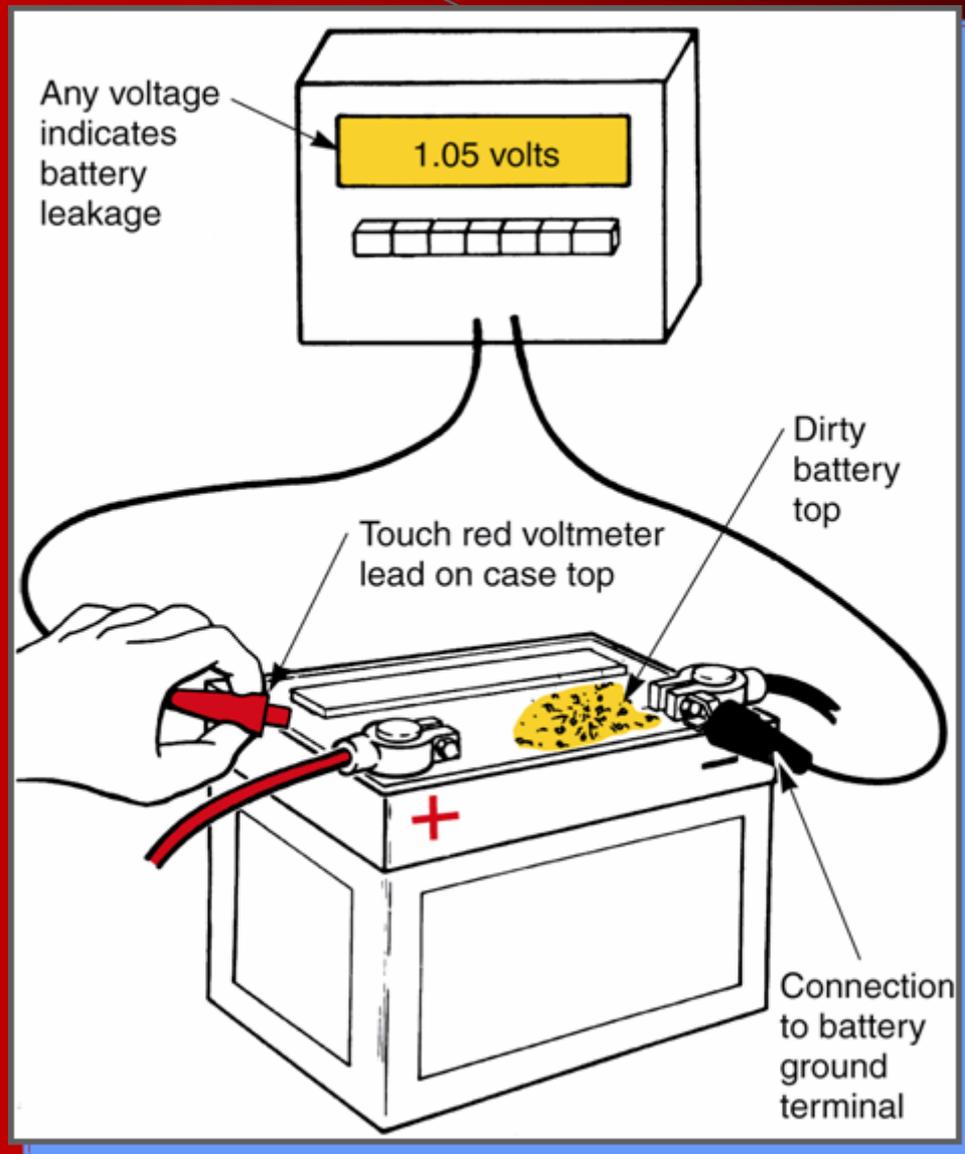


Load Tester Connection

Large cables load the battery by drawing current through the tester

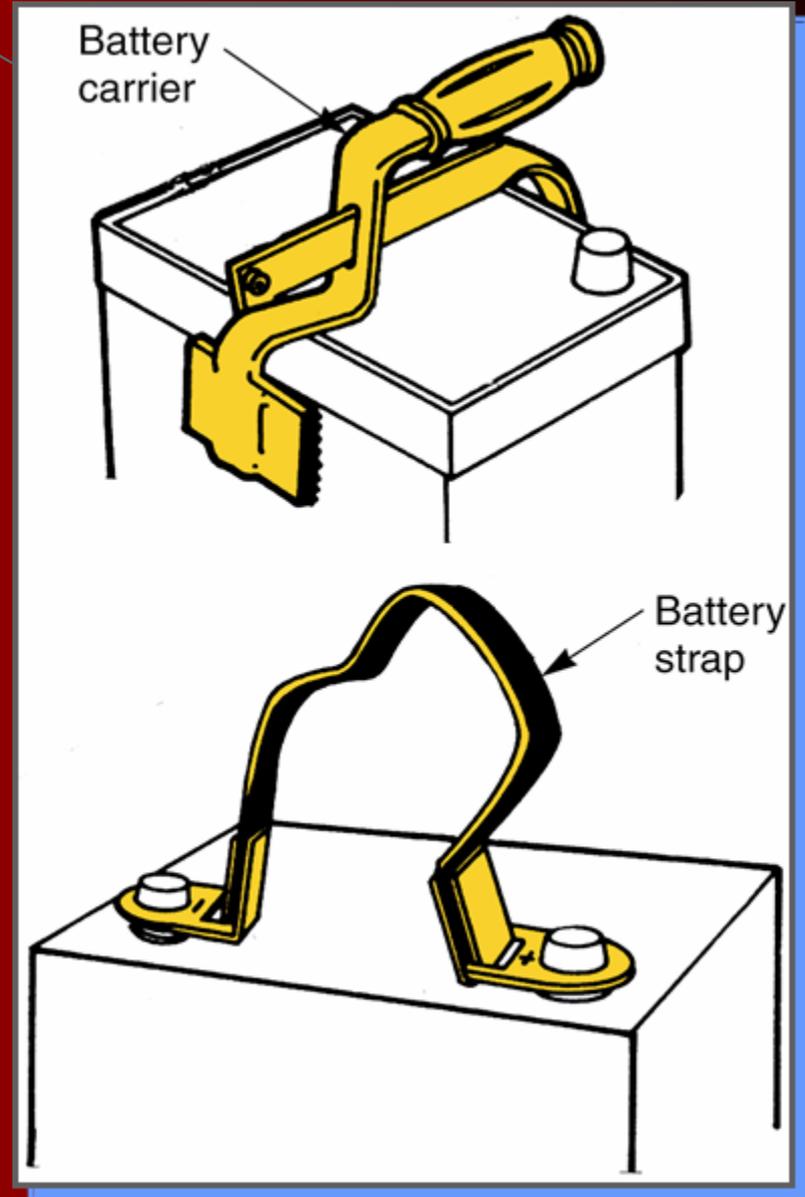


Battery Leakage Test



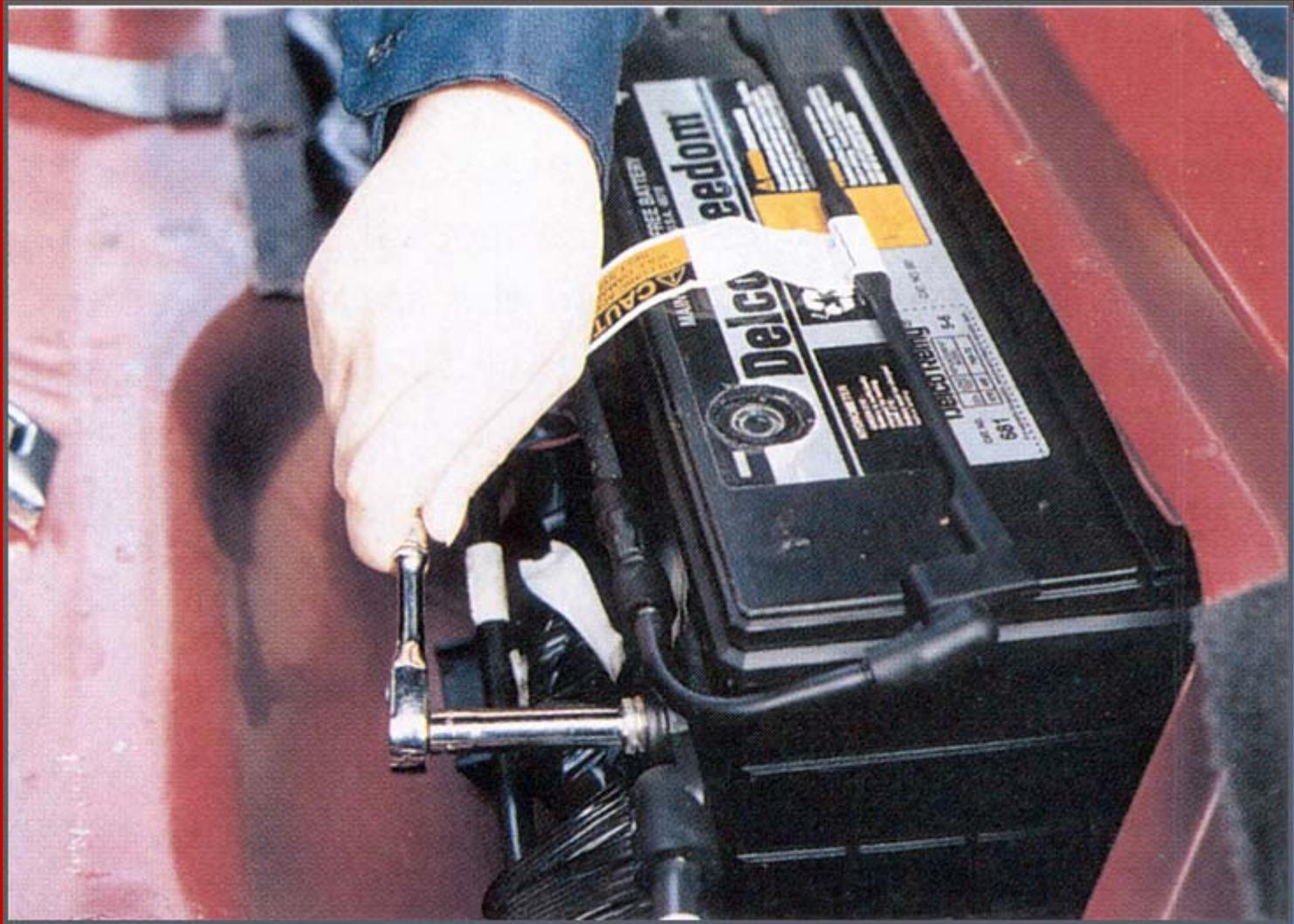
Battery Carriers

If you drop a battery,
acid could splash out,
causing eye or skin
injury

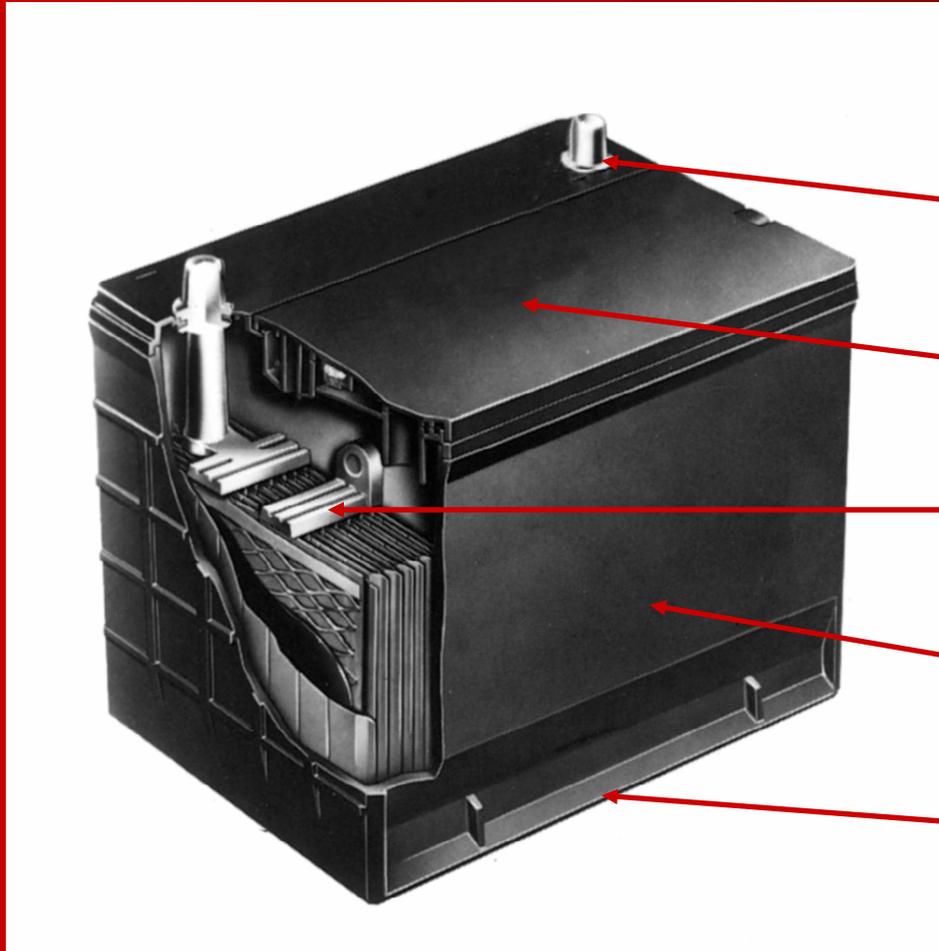


Battery Installation

Do not overtighten cable terminals



Battery Problems



Deteriorated cables

Dirty top

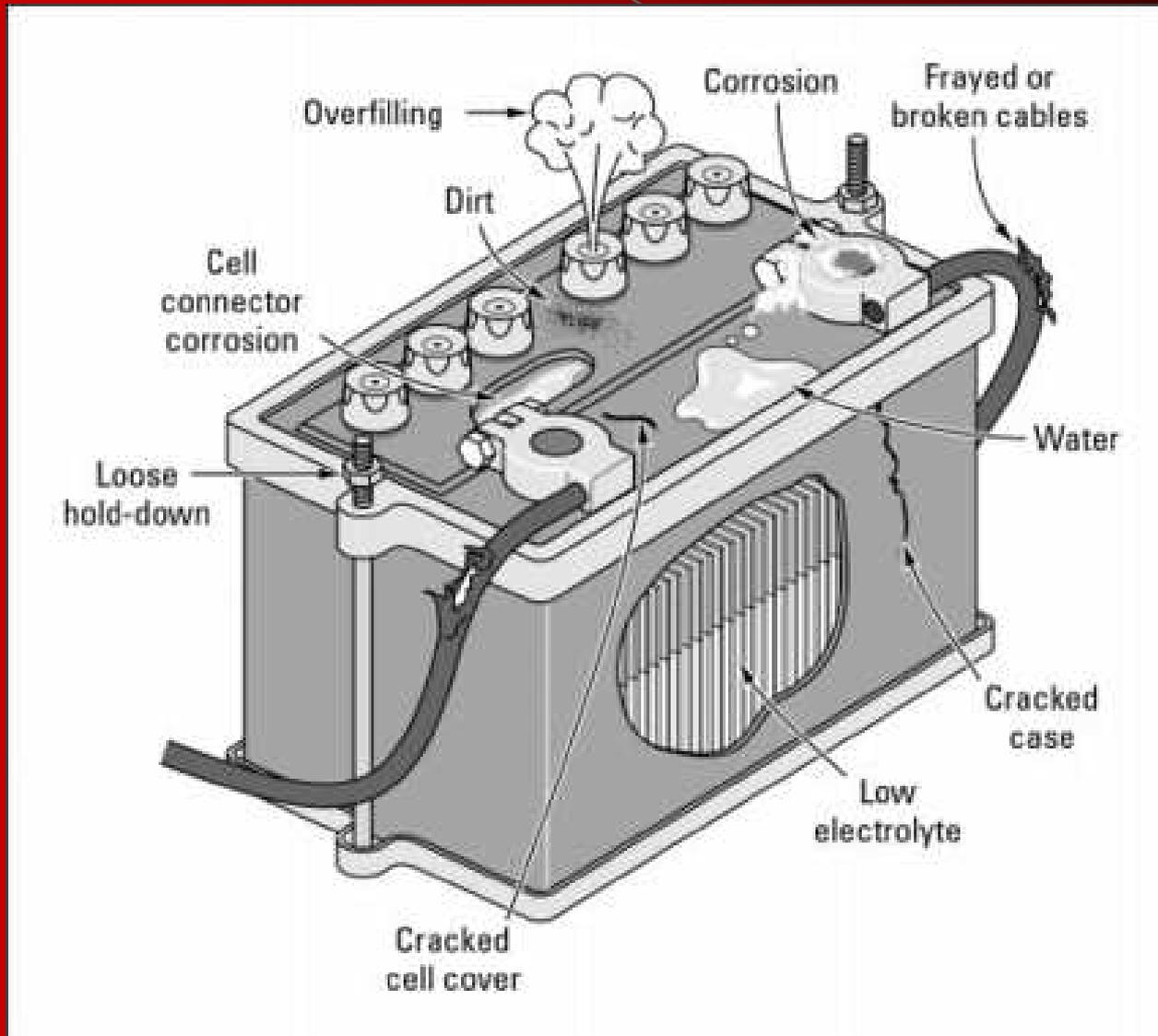
Low electrolyte

Damaged case

Loose hold-down



Battery Problems



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