



BATTERY/STARTER/GENERATOR SERVICE

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BATTERY

GENERAL INFORMATION

This first section will cover Battery replacement and service procedures only. For Battery diagnostic procedures, refer to Group 8A, Battery/Starting/Charging Systems Diagnostics.

Factory installed batteries (Fig. 1) do not have removable battery cell caps. Water cannot be added to the factory installed battery. Battery is sealed, except for small vent holes in the top. Chemical composition inside the battery produces an extremely small amount of gases at normal charging voltages. The factory installed battery is equipped with a test indicator that displays a colored ball to show battery state-of-charge.

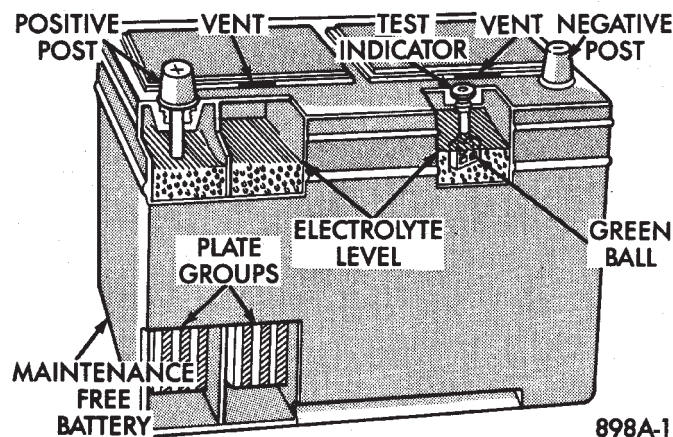


Fig. 1 Maintenance Free Battery—Typical

- Green Indicator = Full charge
- Black Indicator = Discharged
- Yellow Indicator = Battery replacement required.

BATTERY VISUAL INSPECTION AND SERVICE

- (1) Make sure ignition switch is in OFF position and all accessories are OFF.
- (2) Disconnect and remove the battery terminals from the battery posts. Remove negative battery cable first (Fig. 2).
- (3) Remove battery heat shield.

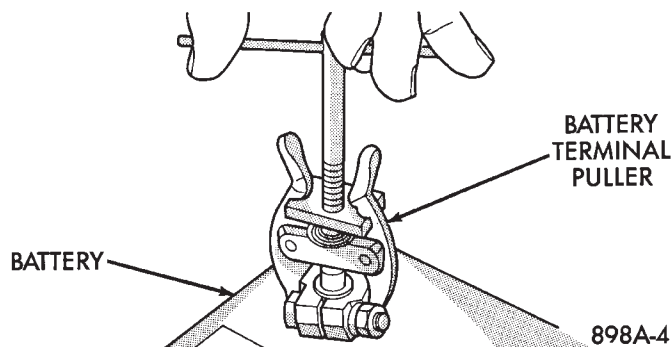


Fig. 2 Remove Battery Cables

WARNING: TO PROTECT THE HANDS FROM BATTERY ACID, A SUITABLE PAIR OF HEAVY DUTY RUBBER GLOVES, NOT THE HOUSEHOLD TYPE, SHOULD BE WORN WHEN REMOVING OR SERVICING A BATTERY. SAFETY GLASSES ALSO SHOULD BE WORN.

- (4) Remove battery hold down clamp (Fig. 3) and remove battery from vehicle.

CAUTION: Do not allow baking soda solution to enter vent holes, as damage to battery can result.

- (5) Clean top of battery with a solution of warm water and baking soda. Apply solution with a bristle brush and allow to soak until acid deposits loosen (Fig. 4). Rinse with clear water and blot dry with paper toweling. Dispose of toweling in a safe manner. Refer to the WARNINGS on top of battery.

- (6) Inspect battery case and cover for cracks or leakage. If leakage is present battery must be replaced.

- (7) Inspect battery tray (Fig. 3) for damage caused by acid from battery. If acid damage is present, it will be necessary to clean area with same solution described in Step 4.

- (8) Clean battery posts with a suitable battery post cleaning tool (Fig. 5).

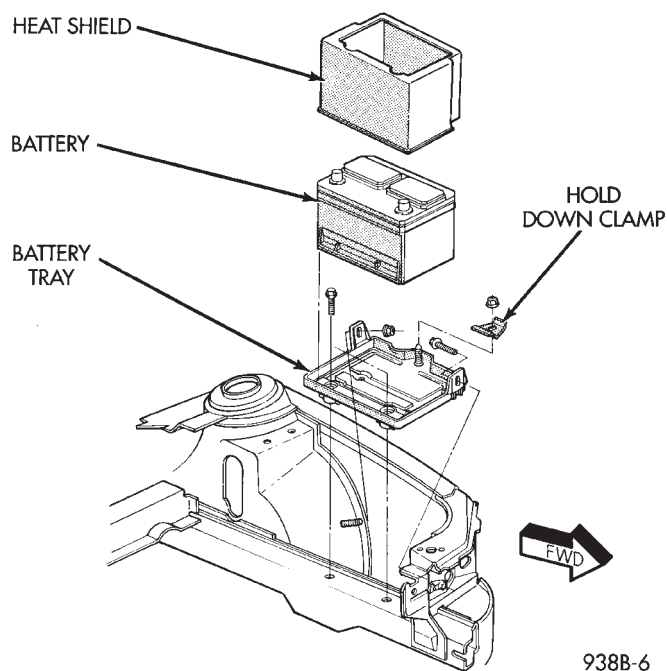


Fig. 3 Battery Heat Shield/Hold-Down/Tray

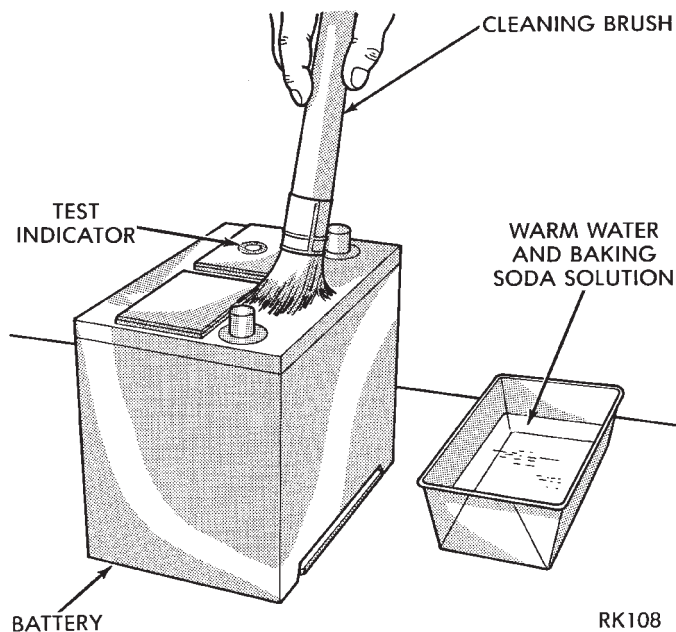


Fig. 4 Cleaning Battery

(9) Clean inside surfaces of battery terminal clamps with a suitable battery terminal cleaning tool (Fig. 6). Replace damaged or frayed cables and broken terminal clamps.

(10) Inspect battery for proper or damaged hold down ledge.

(11) Install battery in vehicle making sure that battery is properly positioned on battery tray (Fig. 3).

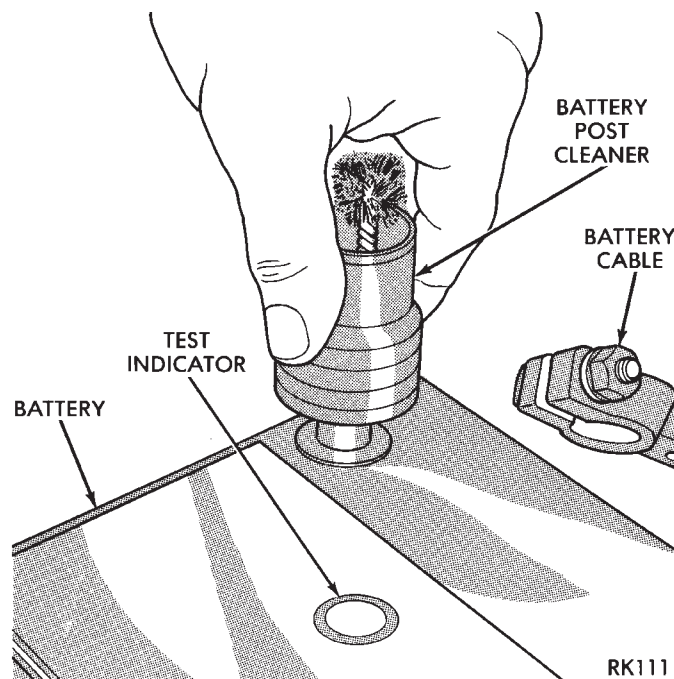


Fig. 5 Cleaning Battery Posts

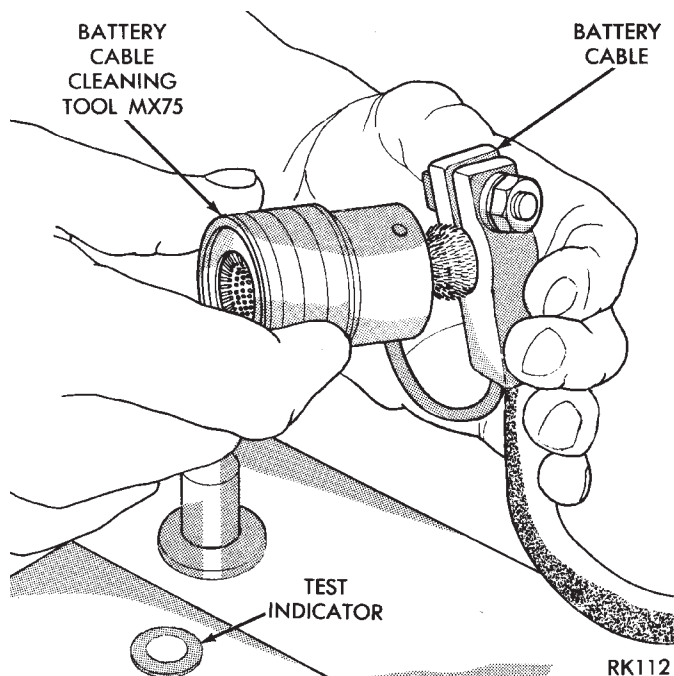


Fig. 6 Cleaning Battery Cable Terminal

(12) Install battery hold down clamp, making sure that it is properly positioned on battery.

(13) Place battery heat shield, over battery. The top inside surface of heat shield must be flush with top of battery.

(14) Connect battery cable clamps to battery posts making sure top of clamp is flush with top of post (Fig. 7). Install POSITIVE cable first.

(15) Tighten clamp nuts securely.

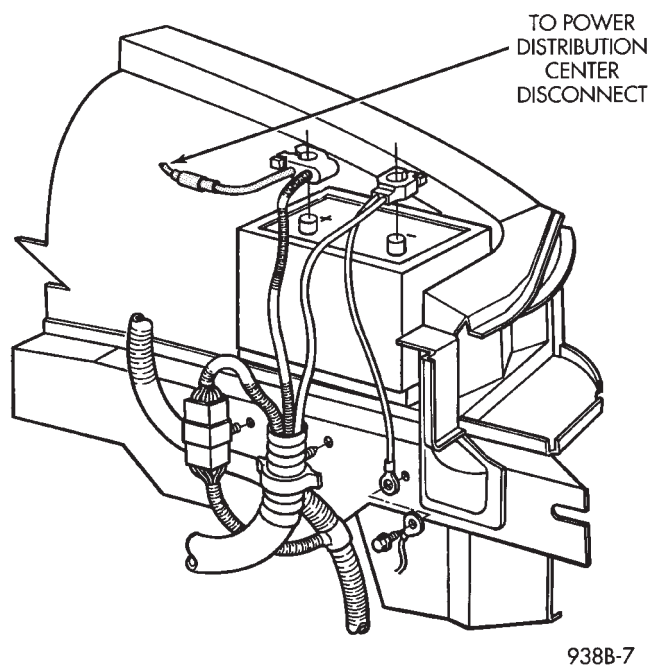


Fig. 7 Battery Cables Disconnected

STARTER

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GENERAL INFORMATION

This section will cover STARTER replacement and service procedures only. For starter diagnostic procedures, refer to Group 8A, Battery/Starting/Charging Systems Diagnostics.

STARTING SYSTEM

The starting system has:

- Ignition switch
- Starter relay
- Neutral starting and back up switch
- Wiring harness
- Battery
- Starter motor with an integral solenoid

MELCO STARTER

The Melco is a permanent magnet starter motor is available on 3.5L engine. A planetary gear train transmits power between starter motor and pinion shaft. The fields have six permanent magnets.

NIPPONDENSO STARTERS

- A Nippondenso reduction gear-field coil starter motor is available on 3.3L engine.

SUPPLY CIRCUIT AND CONTROL CIRCUIT

Both starter systems consists of two separate circuits:

- A high amperage supply to feed the starter motor.
- A low amperage circuit to control the starter solenoid.

For additional information on starter motor supply and control circuits, refer to Group 8A, Battery/Starting/Charging Systems Diagnostics.

MELCO STARTER—3.5L ENGINE REPLACEMENT

- (1) Disconnect negative battery cable (Fig. 1).
- (2) Raise vehicle.
- (3) For easier servicing, do not remove the wiring from starter at this time.
- (4) Remove three bolts attaching starter to engine (Fig. 2).

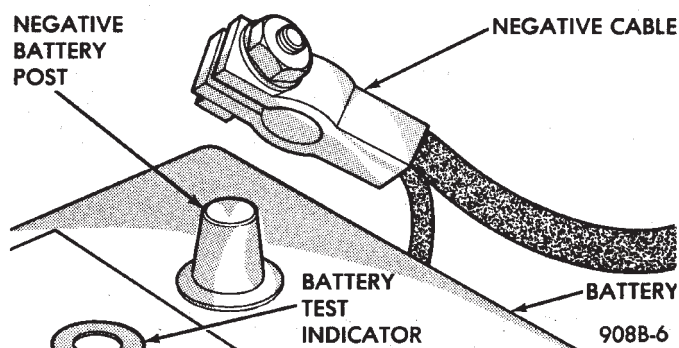


Fig. 1 Remove or Install Battery Cable

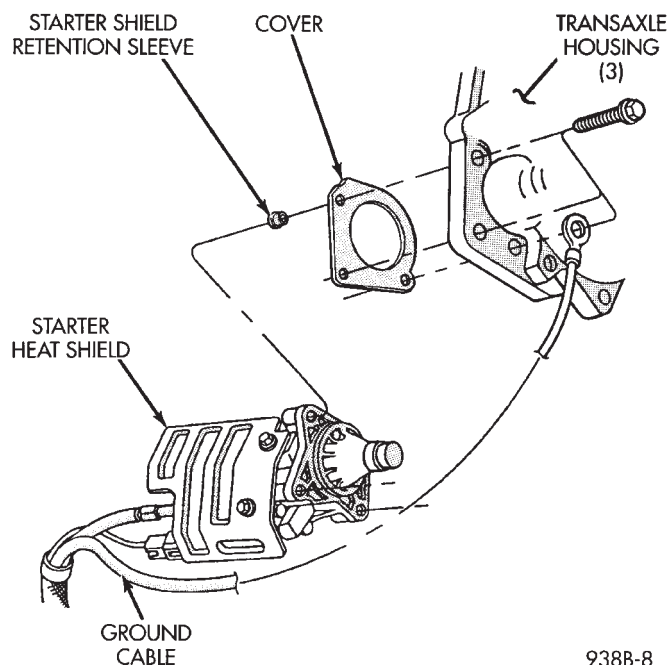


Fig. 2 Starter—3.5L Engine

(5) Remove starter/starter solenoid assembly from engine. Position the starter to gain access to the wiring connectors.

(6) Remove the positive battery cable nut and wiring terminal nut (Fig. 3).

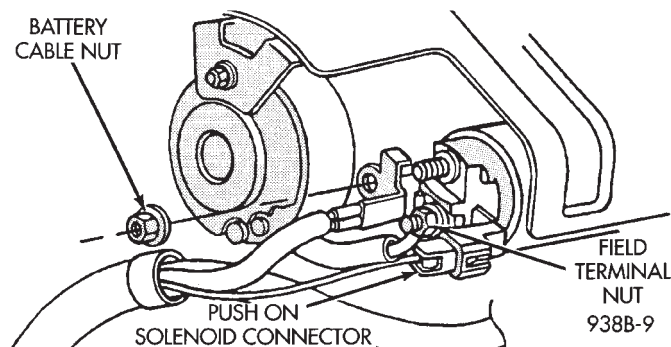


Fig. 3 Wire Terminal Connection

- (7) Disconnect push on solenoid connector.
- (8) Remove the starter from vehicle.
- (9) For installation, reverse above procedures. Clean corrosion/dirt from the cable and wire terminals before installing wiring to the solenoid.

MELCO STARTER SOLENOID REPLACEMENT

- (1) Disconnect field terminal (Fig. 3).
- (2) Remove wire terminal and battery cable nuts.
- (3) Remove two solenoid mounting screws (Fig. 4).

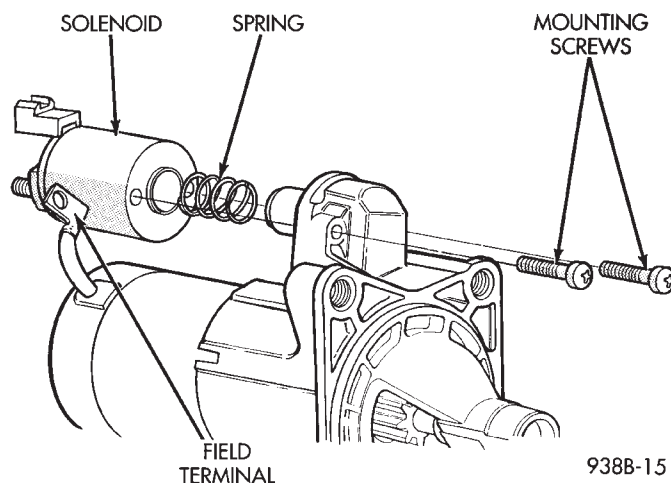


Fig. 4 Solenoid Mounting Screws

(4) Remove the solenoid and spring from the starter.

(5) For installation, reverse above procedures.

NIPPONDENSO STARTER—3.3L ENGINE REPLACEMENT

- (1) Disconnect negative battery cable (Fig. 1).
- (2) Raise vehicle.
- (3) For easier servicing, do not remove the wiring from starter at this time.
- (4) Remove three starter attaching bolts from engine/transaxle (Fig. 5).
- (5) Remove starter/starter solenoid assembly from engine. Position the starter to gain access to the wiring connectors.
- (6) Remove the positive battery cable and wiring terminal nut (Fig. 6).
- (7) Disconnect push on solenoid connector.
- (8) Remove the starter from vehicle.
- (9) For installation, reverse above procedures. Clean corrosion/dirt from the cable and wire terminals before installing wiring to the solenoid.

STARTER RELAY

For electrical diagnostics, when checking the starter circuits, refer to the Starter Relay Tests in Group 8A, Battery/Starting/Charging Systems Diagnostics.

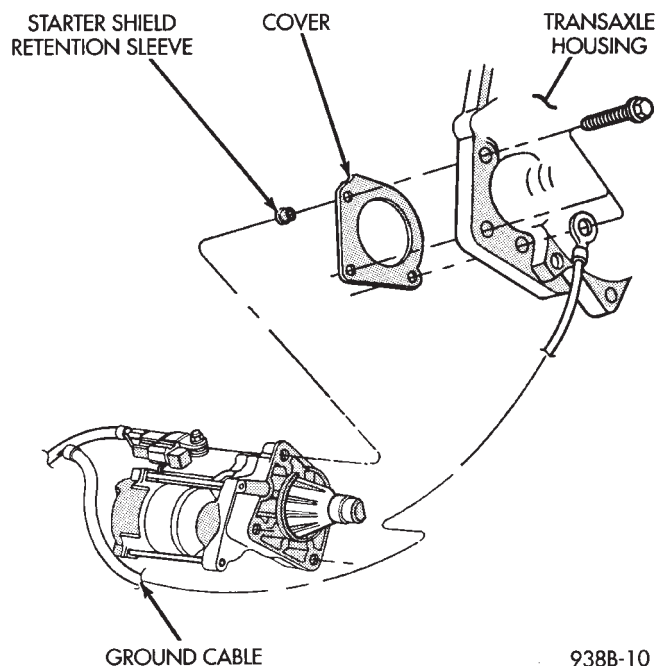


Fig. 5 Starter—3.3L Engine

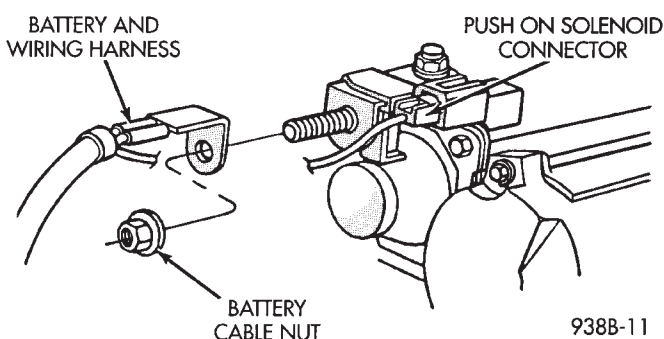


Fig. 6 Wire Terminal Connections

NEUTRAL STARTING AND BACK-UP SWITCH

For removal and installation of switch, refer to Neutral Starting and Back-up Switch Replacement in Group 21, Transaxle.

GENERATOR

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GENERAL INFORMATION

This section will cover generator replacement only. Information covering generator on-vehicle testing and diagnosis can be found in Group 8A, Battery/Starting/Charging Systems Diagnostics. The same Nippondenso 90 amp generator is used on both the 3.3L and the 3.5L engines.

These generators are not intended to be disassembled for service. It must be replaced as an assembly.

GENERATOR REPLACEMENT—3.3L ENGINE

- (1) Disconnect negative battery cable (Fig. 1).
- (2) Disconnect the generator field circuit plug.
- (3) Remove the B+ terminal nut and wire (Fig. 2).
- (4) Loosen adjusting T-bolt, but do not remove (Fig. 3).
- (5) Loosen pivot bolt, but do not remove.
- (6) Remove the generator drive belt. Refer to Group 7, Cooling System.
- (7) Remove adjusting T-bolt.
- (8) Remove pivot bolt, being careful not to lose spacer.

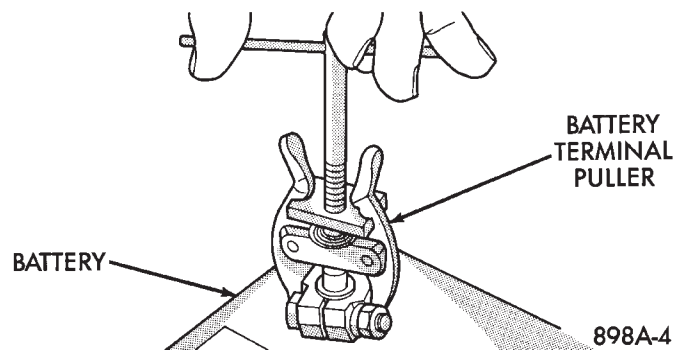
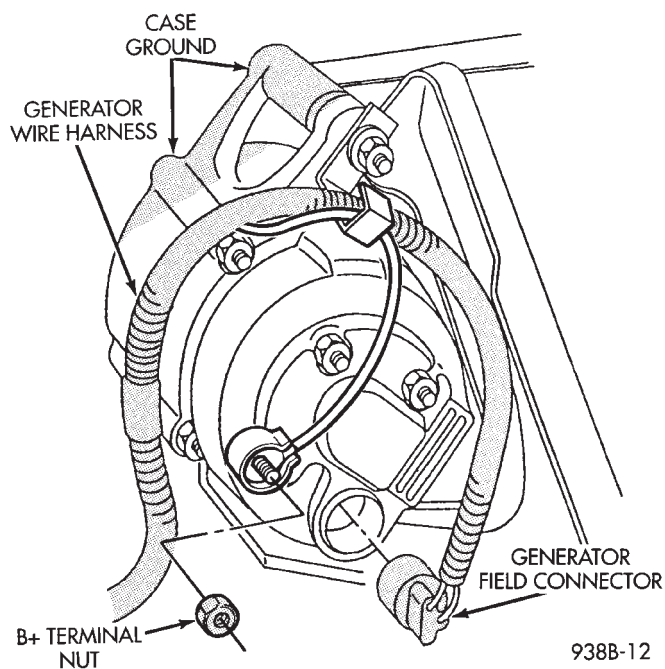
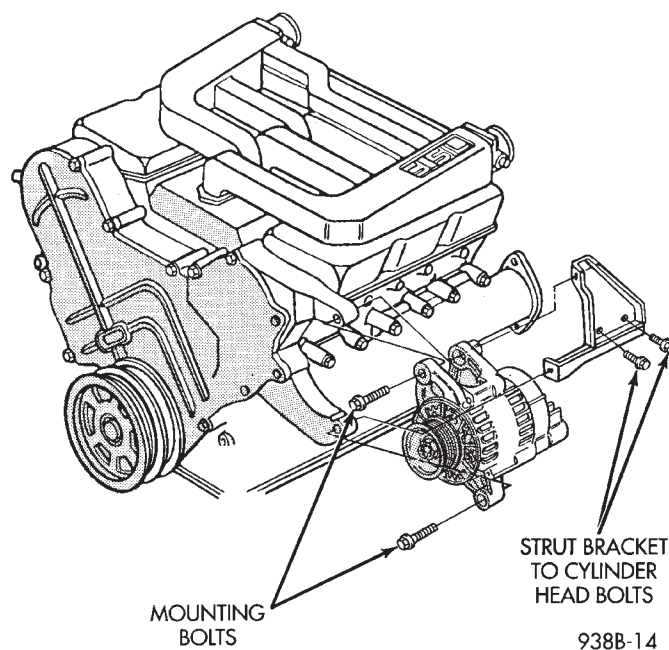
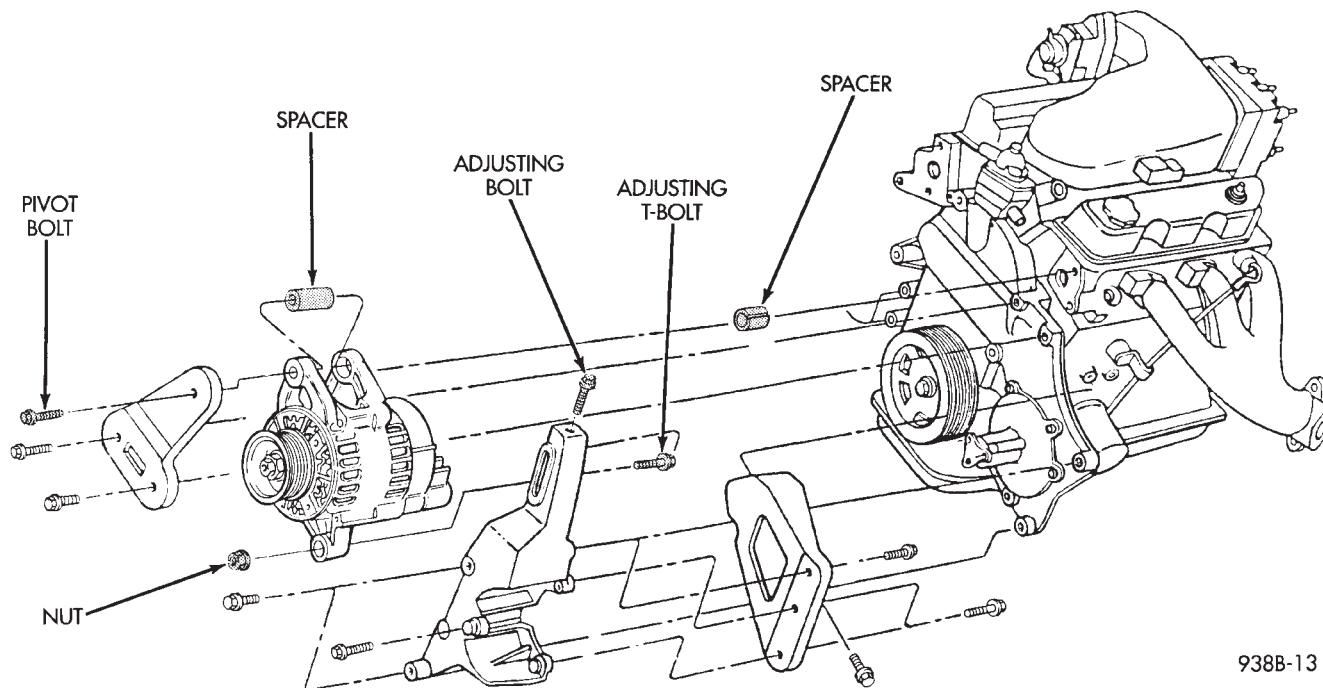


Fig. 1 Remove negative battery (-) Cable

- (9) Remove generator.
- (10) For installation, reverse above procedures. Tighten all fasteners to the proper torque. Refer to the Torque Specifications chart at the rear Group 8A.

GENERATOR REPLACEMENT—3.5L ENGINE

- (1) Disconnect negative battery cable (Fig. 1).
- (2) Loosen lower mounting bolt do not remove (Fig. 4).

**Fig. 2 Wire Terminal Connection****Fig. 4 Generator—3.5L Engine****Fig. 3 Generator—3.3L Engine**

- (3) Loosen pivot bolt, but do not remove.
- (4) Loosen belt adjustment bolt.
- (5) Remove the generator drive belt. Refer to Group 7, Cooling System.
- (6) Remove bracket.
- (7) Remove lower mounting bolt.
- (8) Remove pivot bolt.

- (9) Remove generator.
- (10) Disconnect the generator field circuit plug.
- (11) Remove the B+ terminal nut and wire (Fig. 2).
- (12) For installation, reverse above procedures. Tighten all fasteners to the proper torque. Refer to the Torque Specifications chart at the rear Group 8A.