

## 1994 Jeep Wrangler SE

STARTER' '1994 ELECTRICAL Chrysler Corp. - Starter - Bosch & Mitsubishi

### TROUBLE SHOOTING

#### STARTER MOTOR NOISE

##### DIAGNOSING STARTER MOTOR NOISE

CONDITION	POSSIBLE CAUSE	CORRECTION
Very High Frequency Whine Before Engine Starts; Engine Starts OK.	Excessive distance between pinion gear and Flywheel/Drive Plate gear.	Shim starter motor toward Flywheel/Drive Plate.
Very High Frequency Whine After Engine Starts With Ignition Key Released. Engine Starts OK.	Insufficient distance between starter motor pinion gear and Flywheel/ Drive Plate runout can cause noise to be intermittent.	Shim starter motor away from Flywheel/Drive Plate. Inspect Flywheel/Drive Plate for damage; bent, unusual wear, and excessive runout. Replace Flywheel/Drive Plate as necessary.
A Loud "Whoop" After Engine Starts While Starter Motor is Engaged	Probable cause is defective overrunning clutch.	Replace starter motor.
"Rumble", "Growl", or "Knock" as Starter Motor Coasts to Stop After Engine Starts.	Probable cause is bent or unbalanced starter motor armature.	Replace starter motor.

### ON-VEHICLE TESTING

#### COLD CRANKING TEST

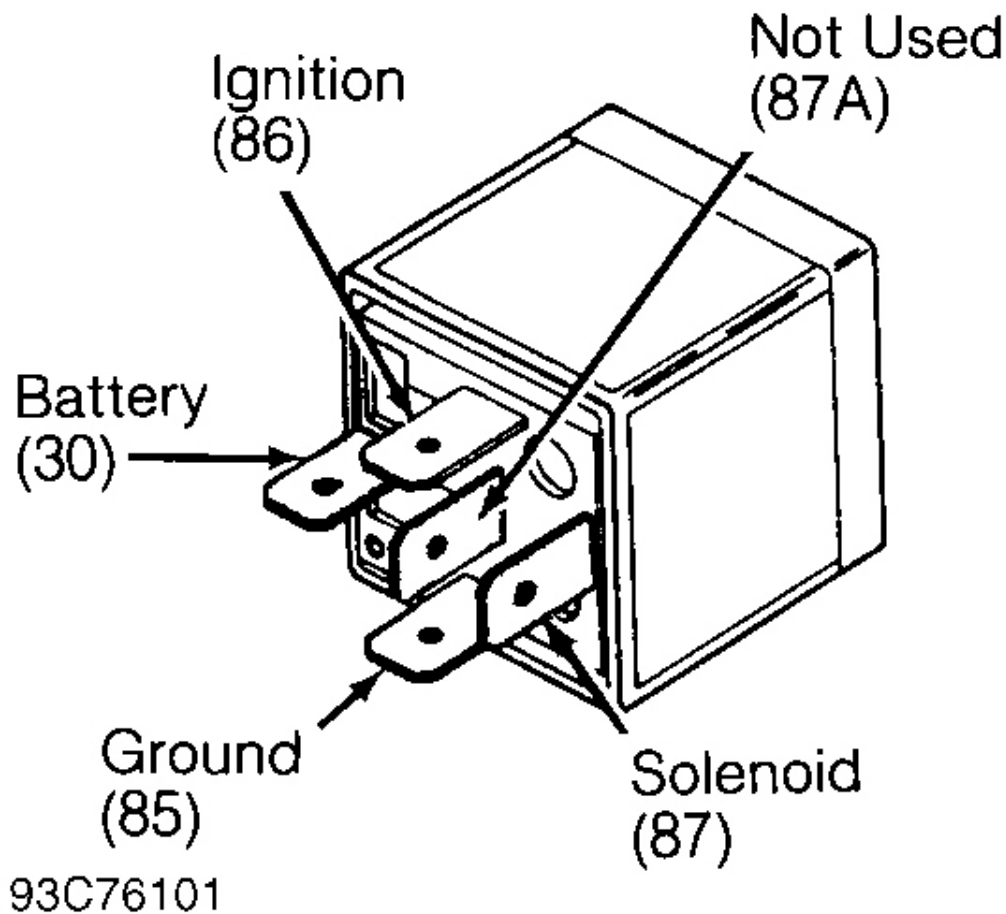
**NOTE:** Ensure battery is fully charged. A cold engine increases starter draw amperage.

1. Connect battery load/charging system tester to battery, and connect remote starter switch to starter relay. Set voltmeter selector to 18-volt position. Adjust ammeter reading to zero.
2. Disconnect coil wire from distributor cap. Attach coil wire to ground to prevent engine from starting. Crank engine, and note cranking voltage and amperage. Replace or repair starter if it is not to specifications. See STARTER SPECIFICATIONS table.

#### STARTER RELAY TEST

1. Remove starter relay from Power Distribution Center (PDC). Using an ohmmeter, check for continuity between terminals No. 30 and 87A. If no continuity exists, replace relay. See **Fig. 1**.
2. Check resistance between terminals No. 85 and 86. If resistance is not 70-80 ohms, replace starter relay.
3. Connect battery to terminals No. 85 and 86. Check for continuity between terminals No. 30 and 87. If no continuity exists, replace starter relay.





**Fig. 1: Identifying Starter Relay Terminals**

Courtesy of CHRYSLER CORP.

## SOLENOID TEST

### Continuity Test

1. Disconnect wire from solenoid field coil terminal (large terminal connected to starter body). Using an ohmmeter, test for continuity between field terminal and solenoid terminal (small terminal). Continuity should exist.
2. Test for continuity between solenoid terminal and solenoid housing. Continuity should exist. If continuity does not exist in either test, solenoid has open circuit. Replace solenoid.

### Functional Test

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1. With a fully-charged battery, connect a heavy gauge jumper wire between battery terminal and solenoid terminal wire connector at starter relay. If engine cranks, solenoid is okay.
2. If engine does not crank, check battery cable for voltage to starter solenoid BAT terminal. Jump starter relay terminals as in step 1), checking for voltage at solenoid terminal No. 50. Repair as necessary. If engine still does not crank, repair or replace starter.

## BENCH TESTING

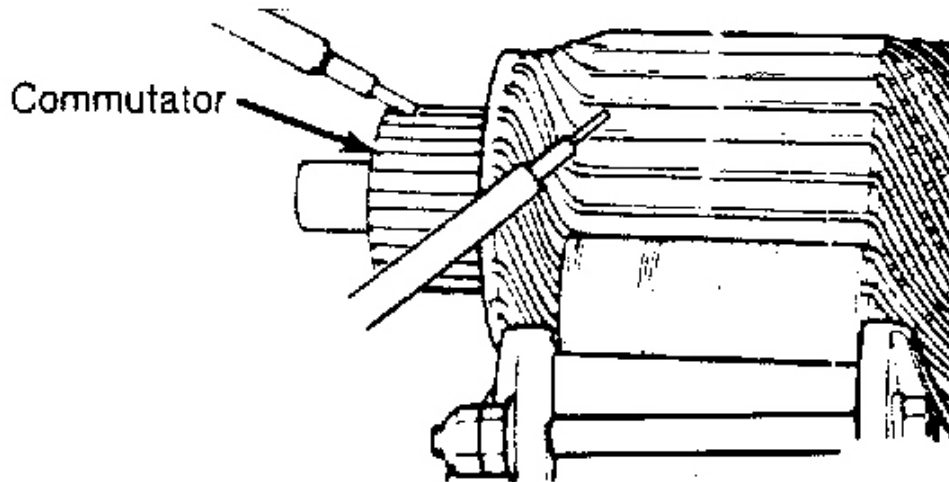
### ARMATURE TEST

#### Short Circuit

Place armature in a growler. While rotating armature slowly, hold growler's blade parallel to and touching armature core. Blade vibrates if armature is shorted. Replace shorted armature.

#### Ground

Using growler or a self-powered test light, touch one lead to armature shaft and other lead to each commutator bar. See **Fig. 2** . If light glows at any point during procedure, armature is grounded. Replace grounded armature.



**Fig. 2: Testing Starter Armature For Ground**  
Courtesy of CHRYSLER CORP.

## **DRIVE CLUTCH CHECK**

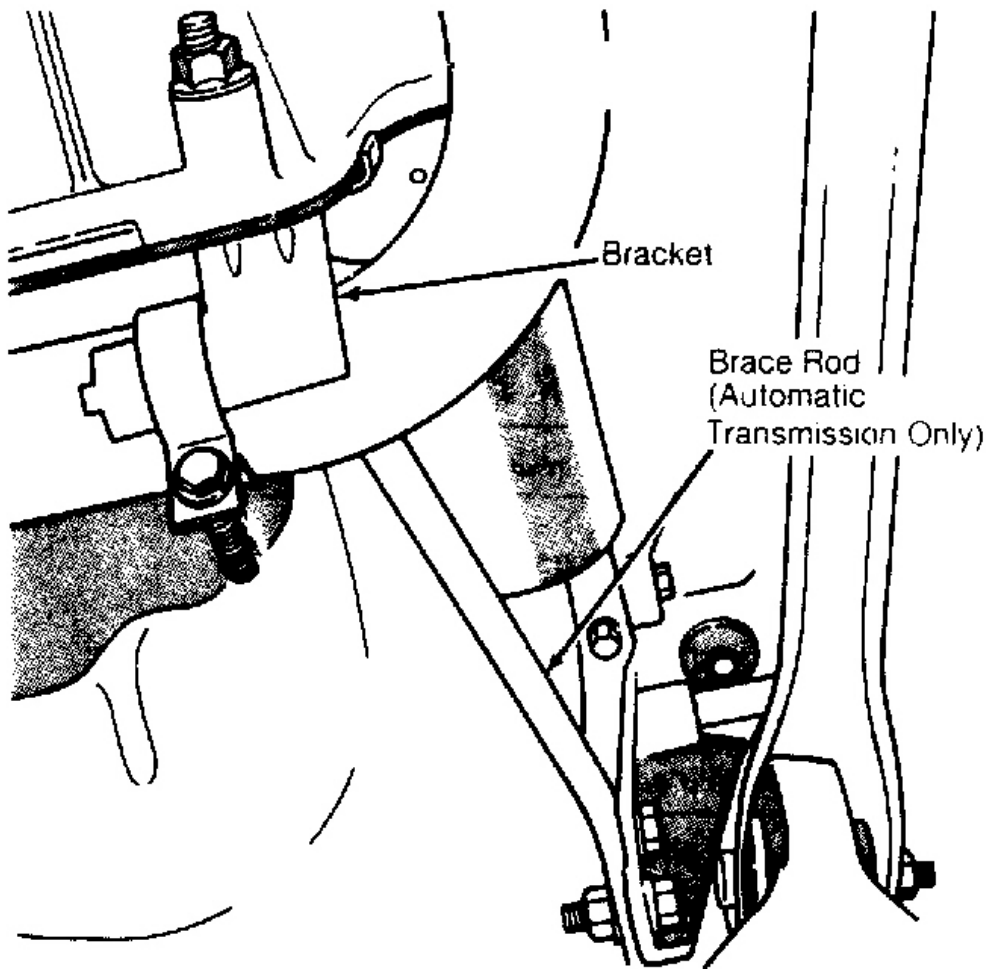
While holding drive clutch housing, rotate pinion. Drive pinion should rotate smoothly in only one direction (pinion should engage and lock in opposite direction). If drive unit does not operate properly or if pinion is worn or burred, replace drive clutch.

## **REMOVAL & INSTALLATION**

### **STARTER**

#### **Removal & Installation (2.5L)**

1. Disconnect negative battery cable. Remove exhaust pipe clamp from bracket. See **Fig. 3** . With automatic transmission, remove nut and bolt from forward end of brace rod (if equipped). Remove brace rod and bracket.
2. With manual transmission, remove nut, bolt and bracket from bellhousing. On all models, disconnect battery cable and solenoid feed wire from starter solenoid. To install, reverse removal procedure.



**Fig. 3: Removing Engine Exhaust Clamp & Brace (2.5L)**  
Courtesy of CHRYSLER CORP.

**Removal & Installation (4.0L)**

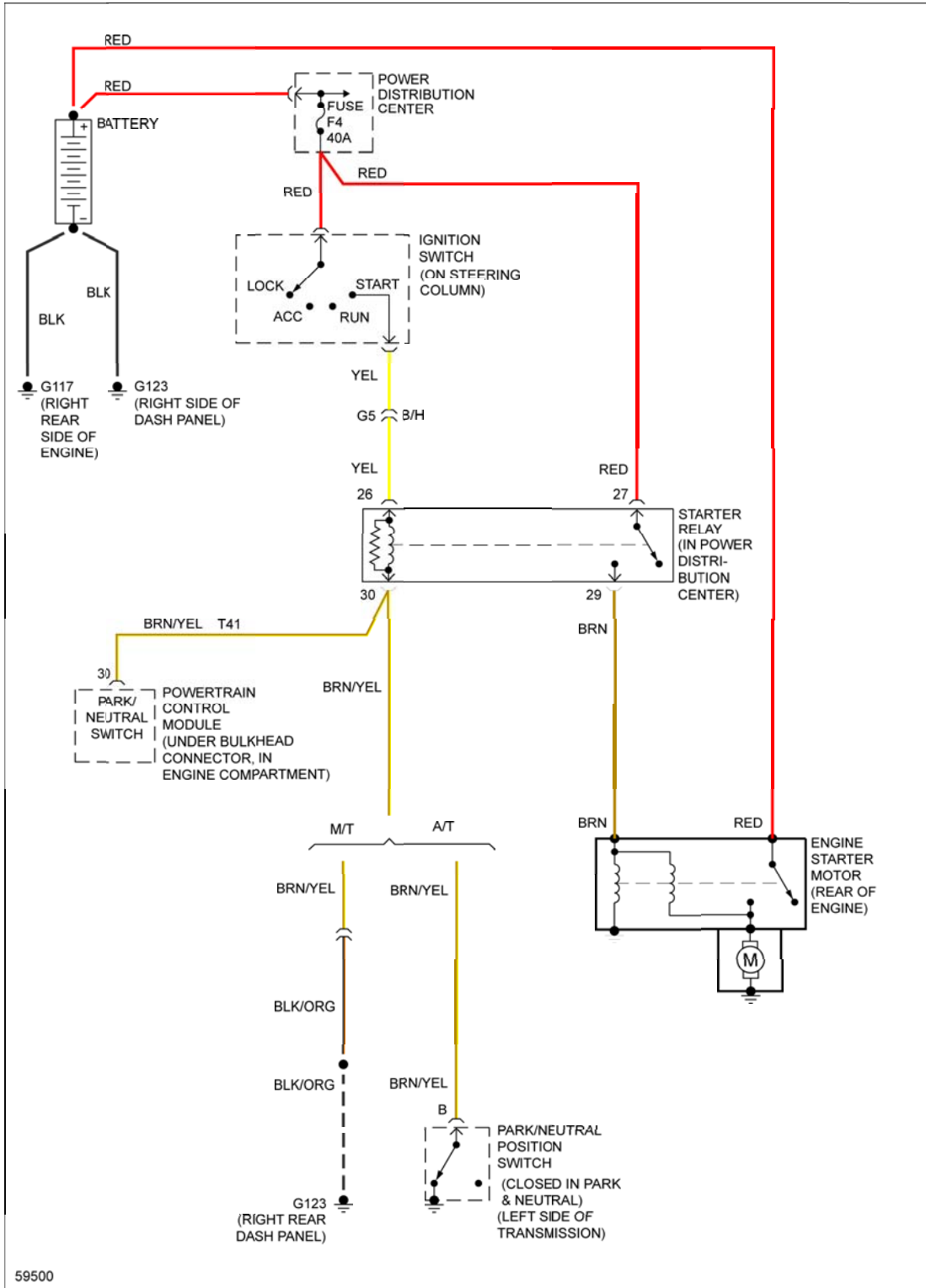
Disconnect negative battery cable. Raise and support vehicle. Disconnect starter battery cable and solenoid feed wire. Remove starter from flywheel housing. To install, reverse removal procedure.

**WIRING DIAGRAM**



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**Fig. 6: Starting System Wiring Diagram**