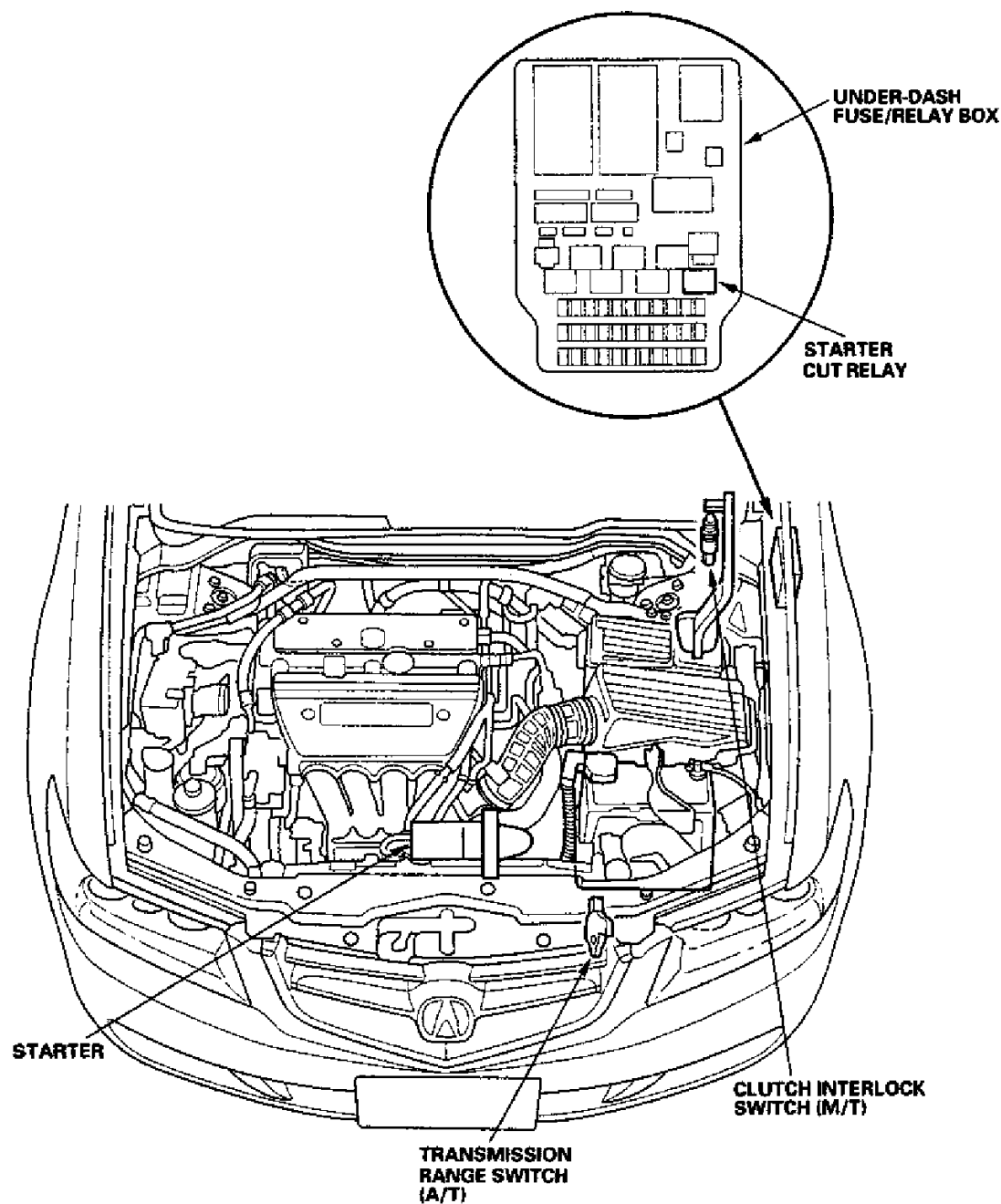




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Fig. 1: Identifying Component Locations

Courtesy of AMERICAN HONDA MOTOR CO., INC.

TROUBLE SHOOTING

STARTER CIRCUIT TROUBLE SHOOTING

NOTE:

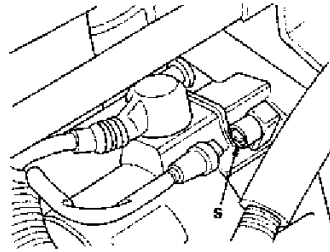
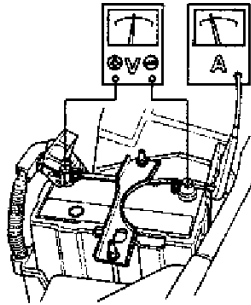
- Air temperature must be between 59° and 100°F (15° and 38°C) during this procedure.
- After this test, or any subsequent repair, reset the Engine Control Module (ECM)/Powertrain Control Module (PCM) to clear any codes.
- The battery must be in good condition and fully charged.

Recommended Procedure

Manufacturer recommends to use a starter system tester. Connect and operate the equipment in accordance with the manufacturer's instructions. For starter circuit trouble shooting procedure chart, see **Fig. 2** .

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1. Hook up the following equipment:
 - Ammeter, 0 – 400A
 - Voltmeter, 0 – 20 V (accurate within 0.1 volt)



Did the starter crank the engine?

YES – Go to step 7.

NO – Remove the starter, and repair or replace as necessary. ■

2. Connect the HDS to the data link connector (DLC).
3. Select PGM-FI, then INSPECTION, then ALL INJECTORS OFF function on the HDS.
4. With the shift lever in or (A/T) or clutch pedal pressed (M/T), turn the ignition switch to start (III).

Did the starter crank the engine normally?

YES – The starting system is OK. Go to step 11.

NO – Go to step 5.

5. Check the battery condition. Check electrical connections at the battery, the negative battery cable to body, the engine ground cables and the starter for looseness and corrosion. Then try cranking the engine again.

Did the starter crank the engine?

YES – Repairing the loose connection corrected the problem. The starting system is OK. Go to step 11.

NO – Check the following:

- If the starter will not crank the engine at all, go to step 6.
- If it cranks the engine erratically or too slowly, go to step 8.
- If it won't disengage from the flywheel or torque converter ring gear when you release the key, check the following:
 - Solenoid plunger and switch malfunction
 - Dirty drive gear or damaged overrunning clutch

6. Make sure the transmission is in neutral, then disconnect the BLK/WHT wire from the starter solenoid S terminal. Connect a jumper wire from the battery positive terminal to the solenoid terminal.

7. Check the following items in the order listed until you find the open circuit:

- The BLK/WHT wire and connectors between the under-dash fuse/relay box and the ignition switch, and between the under-dash fuse/relay box and the starter.
- The ignition switch.
- The transmission range switch and connector (A/T) or the clutch interlock switch and connector (M/T).
- The starter cut relay.

8. While cranking the engine, check the cranking voltage and current draw.

Is cranking voltage greater than or equal to 8.5 V and current draw less than or equal to 380A?

YES – Go to step 9.

NO – Replace the starter, or remove and disassemble it, and check the following: ■

- Starter armature dragging
- Shorted armature winding
- Excessive drag in engine

9. Check the engine speed while cranking the engine.

Is the engine speed above 100 rpm?

YES – Go to step 10.

NO – Replace the starter, or remove and disassemble it, and check the following: ■

- Open circuit in starter armature commutator segments
- Excessively worn starter brushes
- Open circuit in commutator brushes
- Dirty or damaged helical splines or drive gear
- Faulty drive gear clutch

10. Remove the starter, and inspect its drive gear and the flywheel or torque converter ring gear for damage. Replace any damaged parts.

11. Select ECM/PCM reset to stop the ALL INJECTORS OFF function on the HDS.

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Fig. 2: Starter Circuit Troubleshooting Chart
Courtesy of AMERICAN HONDA MOTOR CO., INC.

SYMPTOM TROUBLESHOOTING

For symptom troubleshooting chart, see **Fig. 3**.

Symptom	Diagnostic procedure
Engine does not start (does not crank)	1. Check for loose battery terminals or connections. 2. Test the battery for a low charge. 3. Check the starter. 4. Check the starter cut relay. 5. Check the transmission range switch (A/T). 6. Check the clutch interlock switch (M/T). 7. Check the ignition switch or wire.
Engine cranks, but does not start	1. Troubleshoot the immobilizer system. 2. Test the fuel pump. 3. Check for plugged or damaged fuel line. 4. Check for plugged fuel filter. 5. Check the throttle body. 6. Check for PGM-FI DTC's. 7. Check for low engine compression. 8. Check for damage or broken cam chain.
Hard starting	1. Test the fuel pump. 2. Check for plugged or damaged fuel line. 3. Check for plugged fuel filter. 4. Check for restricted three way catalytic converter (TWC) or exhaust system. 5. Check for PGM-FI DTC's.

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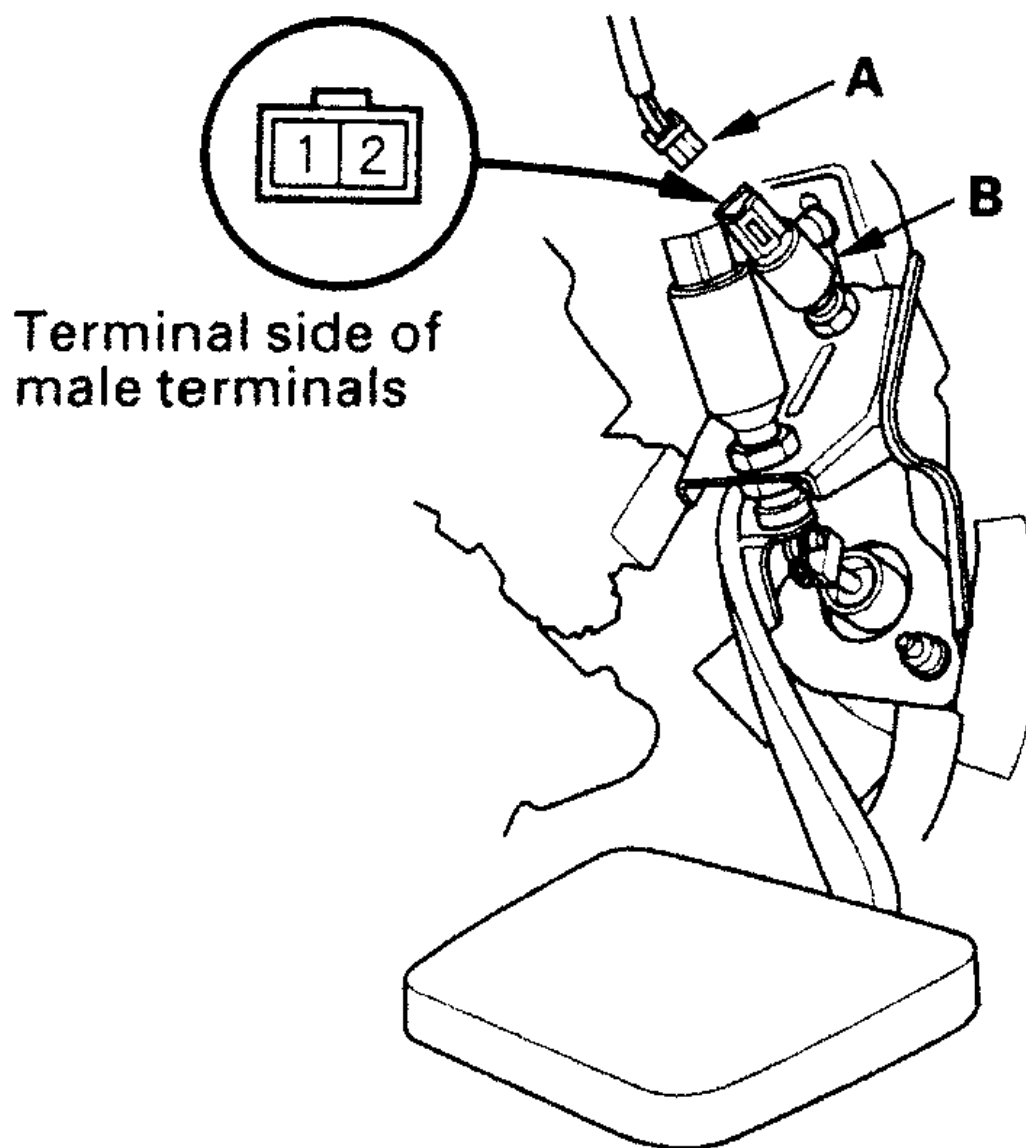
Fig. 3: Symptom Troubleshooting Chart

Courtesy of AMERICAN HONDA MOTOR CO., INC.

ON-VEHICLE TESTING

CLUTCH INTERLOCK SWITCH TEST

1. Disconnect the clutch interlock switch 2 pin connector (A). See **Fig. 4**.
2. Remove the clutch interlock switch (B).
3. Check for continuity between the terminals according to the table. See **Fig. 5**. If the continuity is not as specified, replace the clutch interlock switch. If OK, install clutch interlock switch and adjust the pedal height. See appropriate CLUTCHES article in TRANSAXLE/TRANSMISSION.



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Fig. 4: Disconnecting Clutch Interlock Switch 2-Pin Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Terminal	1	2
Clutch Interlock Switch		
PRESSED		
RELEASED		

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Fig. 5: Checking Continuity Between Terminals
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

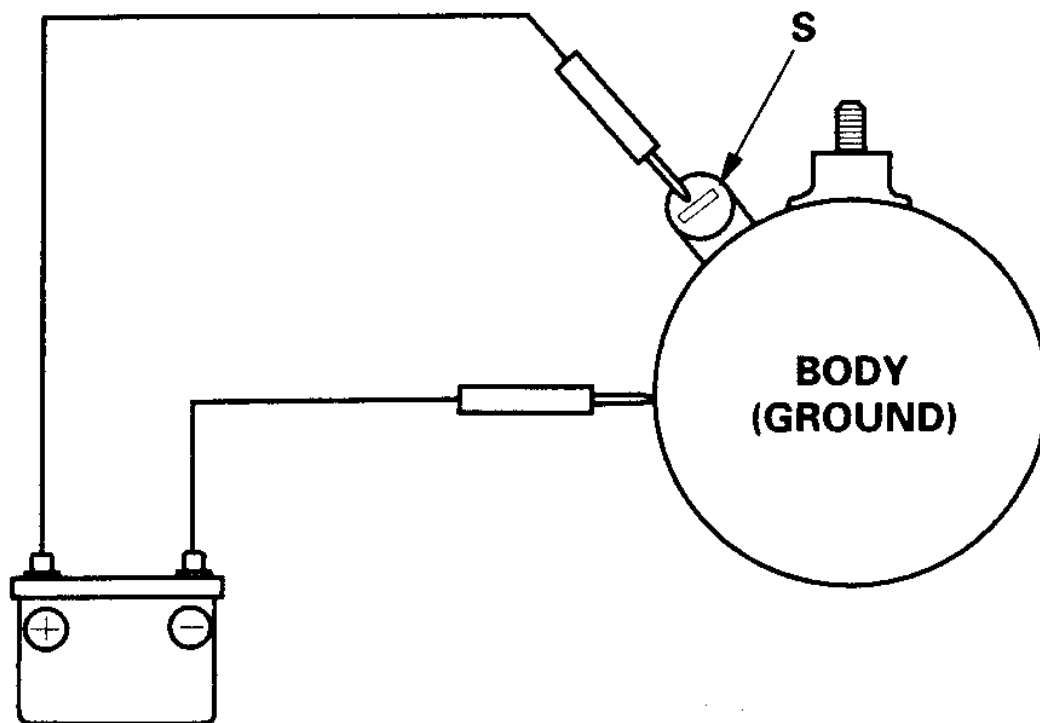
SYSTEM TESTS

STARTER PERFORMANCE TEST

1. Connect the battery to the starter by using as heavy a wire as possible (preferably equivalent to the wire used for the vehicle). To avoid damaging the starter, never leave the battery connected for more than 10 seconds. If the starter pinion moves out, it is working properly. See **Fig. 6**.
2. Disconnect the battery from the body. See **Fig. 7**. If the pinion retracts immediately, it is working properly.
3. Clamp the starter firmly in a vise.
4. Connect the starter to the battery, and confirm that the motor starts and keeps rotating. See **Fig. 8**.
5. If the electric current and motor speed meet the specifications when the battery voltage is at 11.5 V, the starter is working properly. See **STARTER PERFORMANCE TEST SPECIFICATIONS**.

STARTER PERFORMANCE TEST SPECIFICATIONS

Application	(1) Maximum Amps @ Minimum RPM
Starter	80 @ 2300
(1) Battery voltage must stay at 11.5 volts or more during test.	

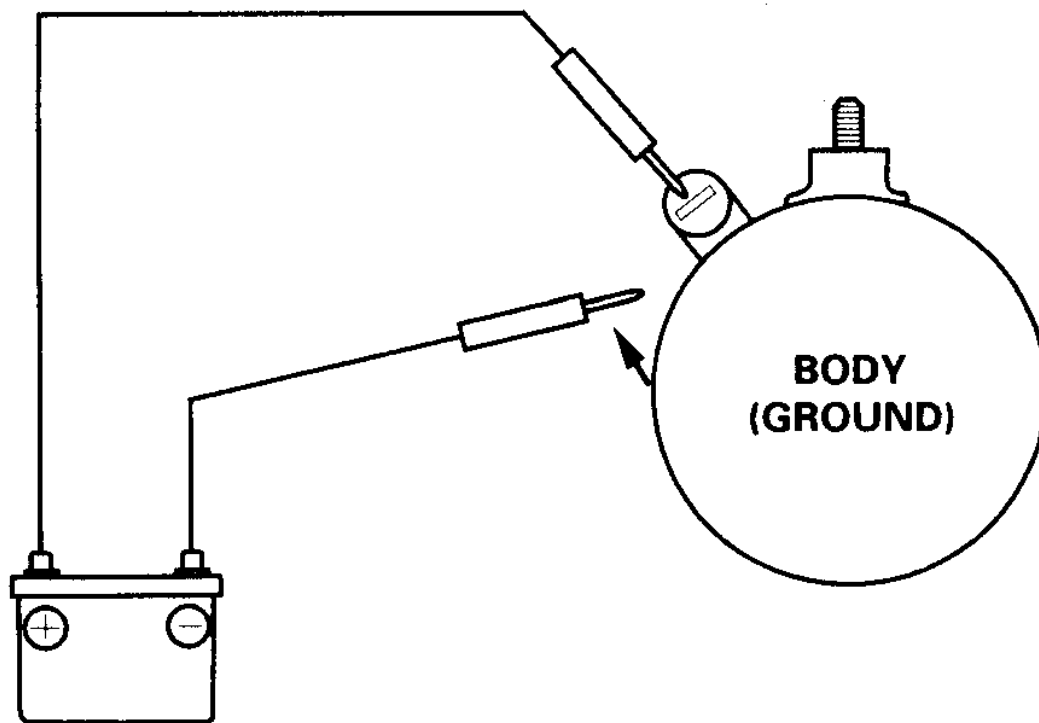


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Fig. 6: Connecting Battery To Starter

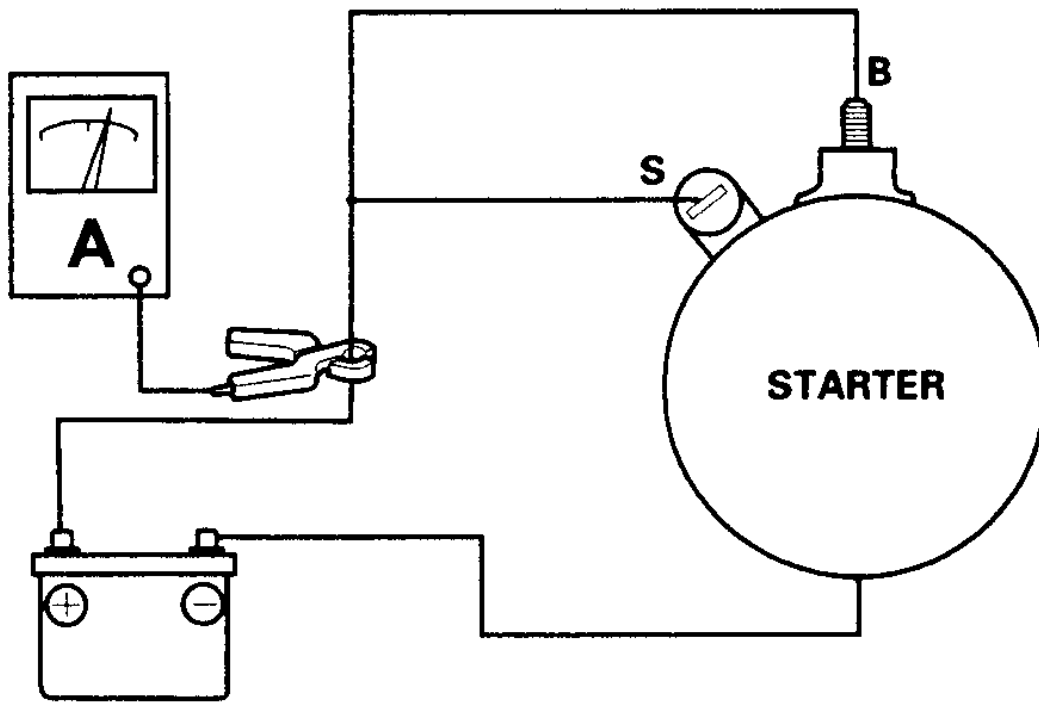
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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Fig. 7: Disconnecting Battery From Starter Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 8: Connecting Starter To The Battery With Ammeter
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

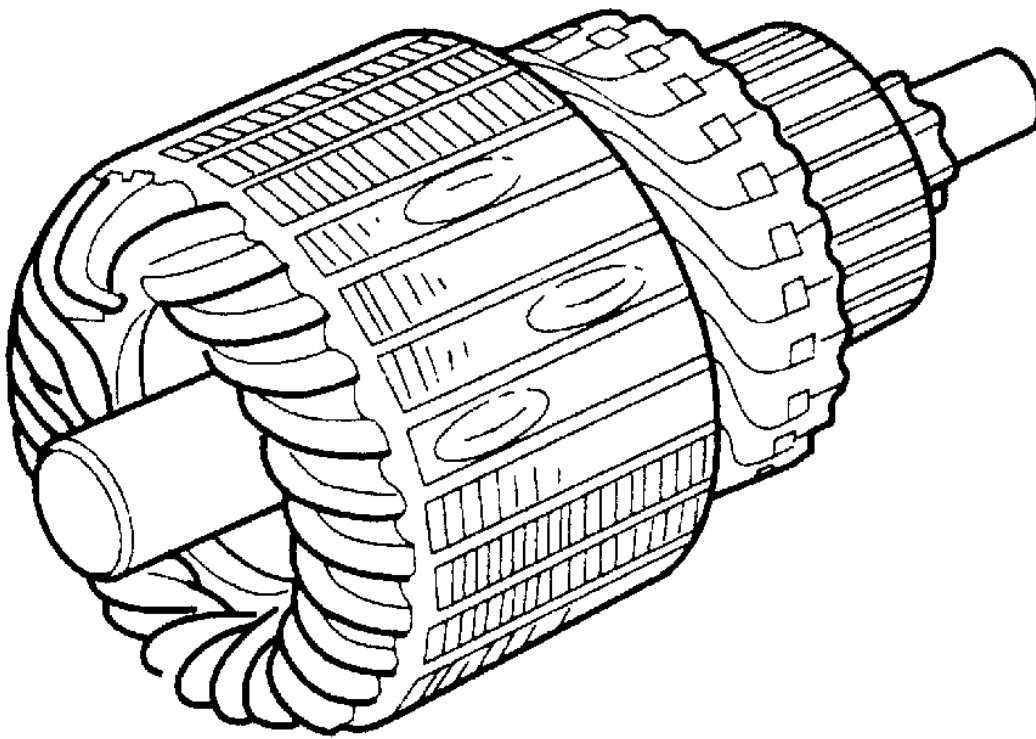
BENCH TESTING

ARMATURE TEST

1. Remove the starter. See **STARTER** under REMOVAL & INSTALLATION.
2. Disassemble starter. See **STARTER** under OVERHAUL.
3. Inspect the armature for wear or damage from contact with the permanent magnet. If there is wear or damage, replace the armature. See **Fig. 9**.
4. Check the commutator (A) surface. If the surface is dirty or burnt, resurface with emery cloth or a lathe within specifications, or recondition with # 500 or # 600 sandpaper (B). See **Fig. 10**.
5. Check the commutator diameter. See **Fig. 11**. See **STARTER SPECIFICATIONS**. If the diameter is below the service limit, replace the armature.
6. Measure the commutator runout. See **Fig. 12**. See **STARTER SPECIFICATIONS**. If the commutator runout is within the service limit, check the commutator for carbon dust or brass chips between the segments. If the commutator runout is not within the service limit, replace the armature.
7. Check the mica depth (A). If the mica is too high (B), undercut the mica with a hacksaw blade to the proper depth. Cut away all the mica (C) between the commutator segments. The undercut should not be

too shallow, too narrow, or V-shaped (D). See **Fig. 13** .

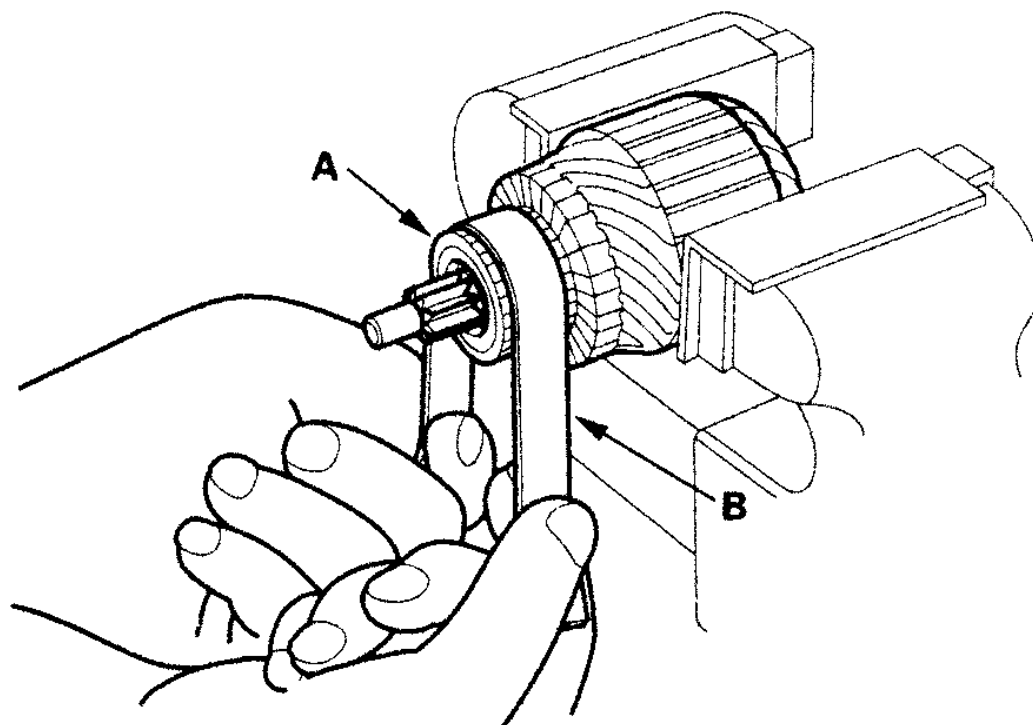
8. Check for continuity between the segments of the commutator. See **Fig. 14** . If an open circuit exists between any segments, replace the armature.
9. Place the armature (A) on an armature tester (B). Hold a hacksaw blade (C) on the armature core. See **Fig. 15** . If the blade is attracted to the core or vibrates while the core is turned, the armature is shorted. Replace the armature.
10. Check with an ohmmeter that no continuity exists between the commutator (A) and armature coil core (B), and between the commutator and armature shaft (C). If continuity exists, replace the armature. See **Fig. 16** .



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Fig. 9: Identifying Armature

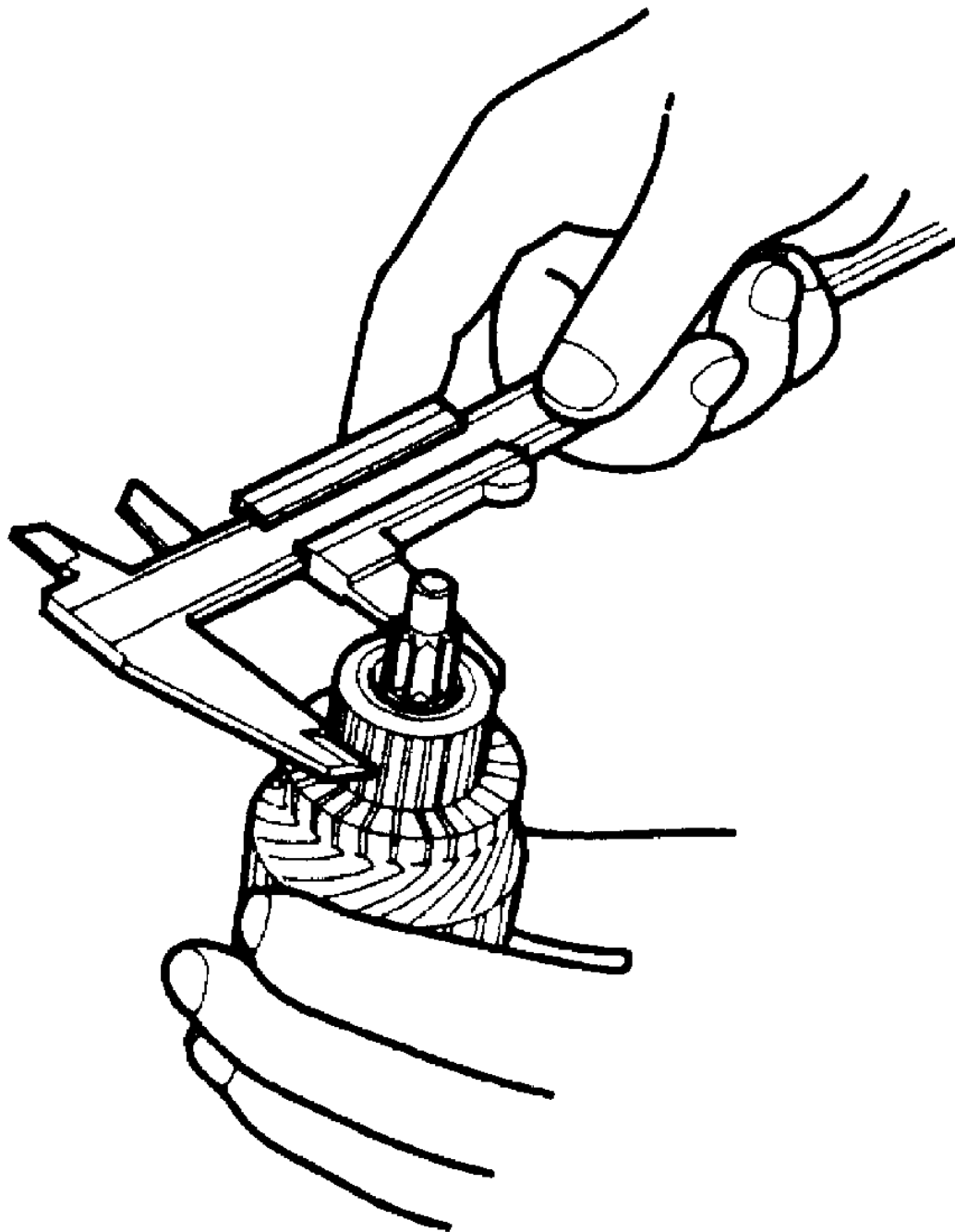
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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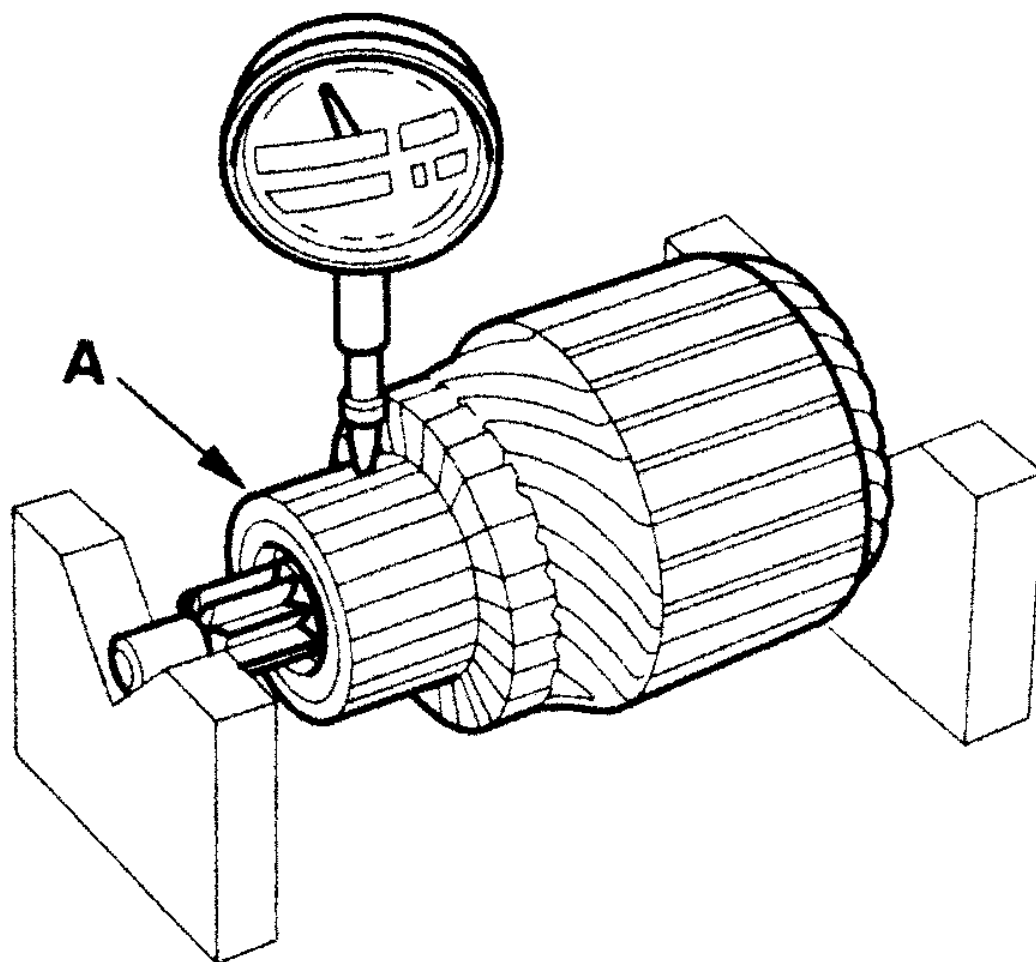
Fig. 10: Checking Condition Of The Commutator
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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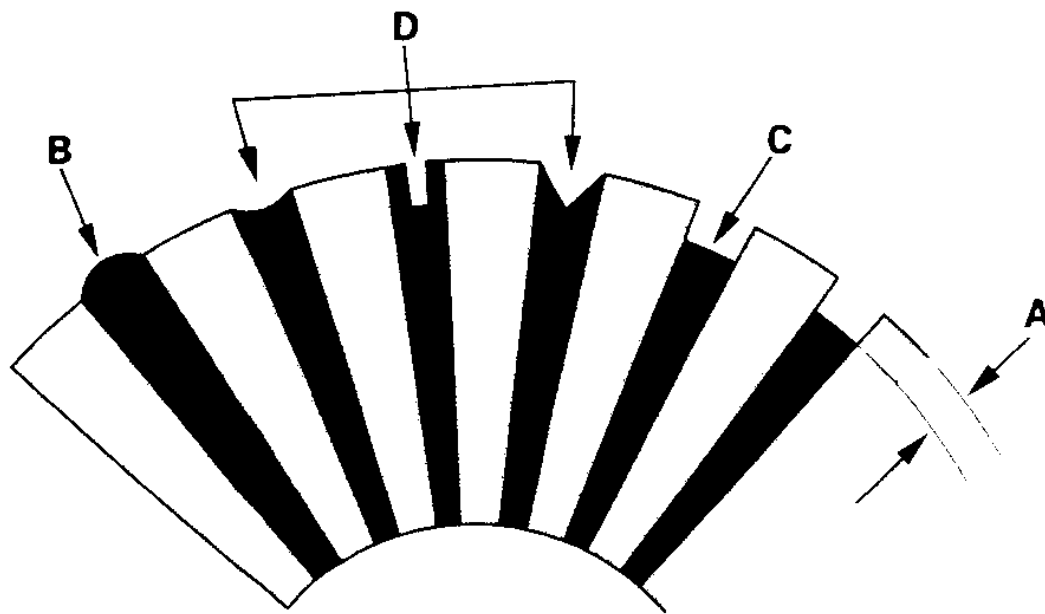
Fig. 11: Checking Commutator Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 12: Measuring Commutator Runout
Courtesy of AMERICAN HONDA MOTOR CO., INC.

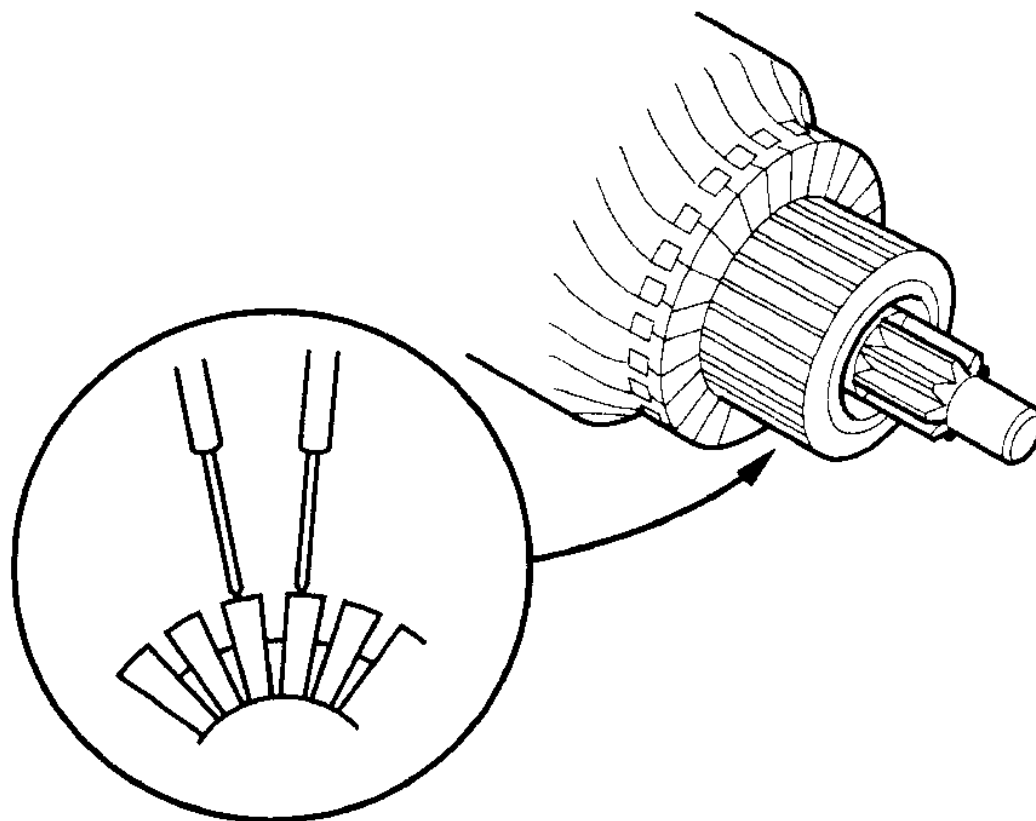
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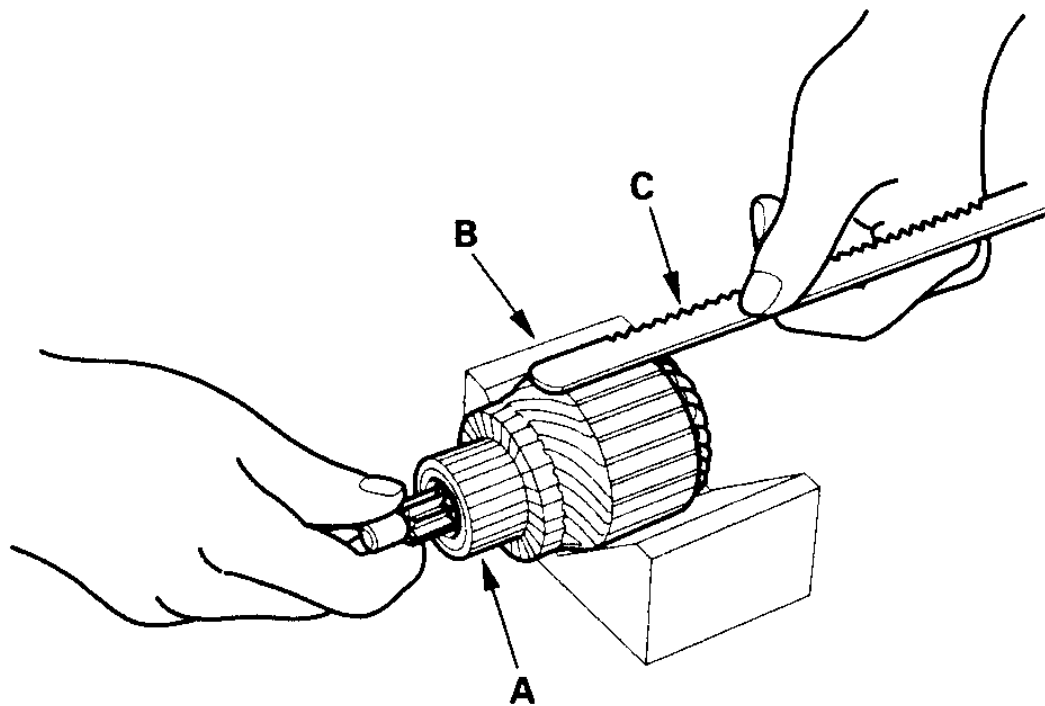
Fig. 13: Checking Mica Depth

Courtesy of AMERICAN HONDA MOTOR CO., INC.



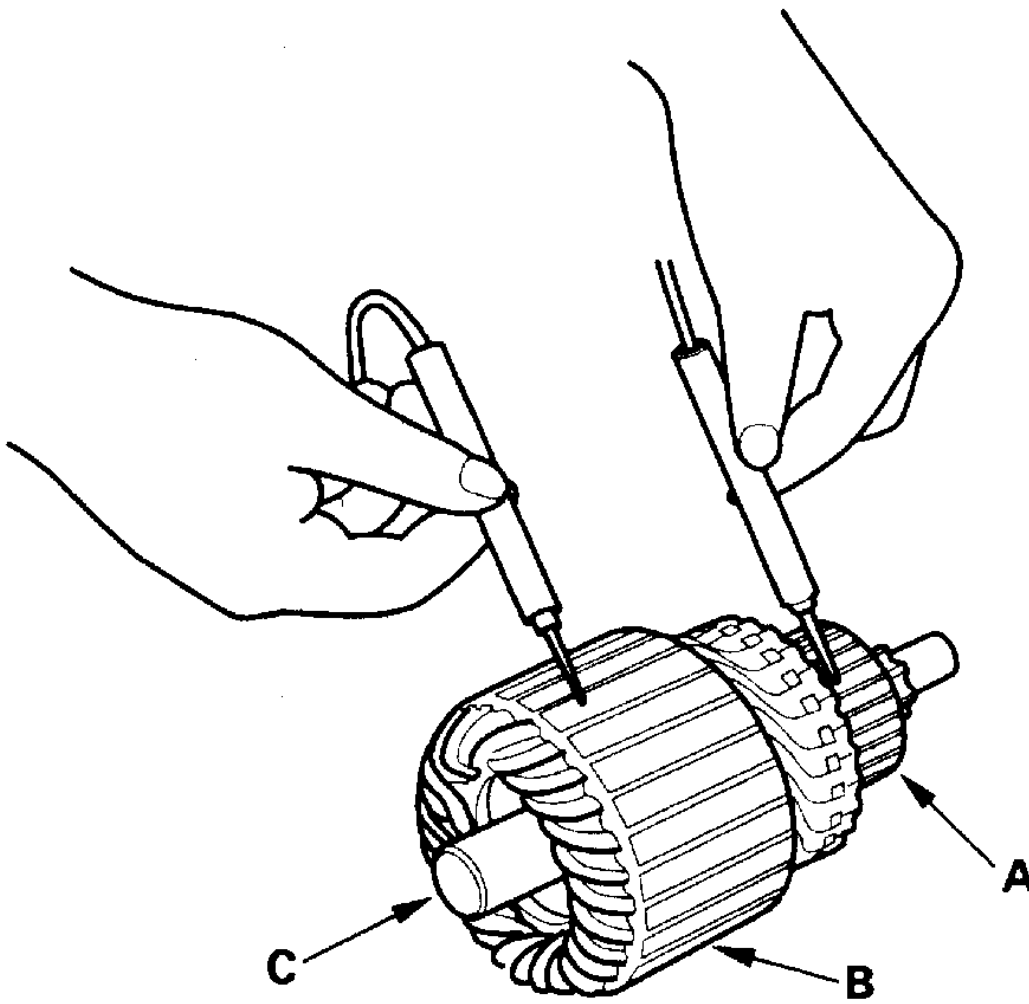
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Fig. 14: Checking Continuity Between Commutator Segments
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 15: Checking Armature On Armature Tester
Courtesy of AMERICAN HONDA MOTOR CO., INC.

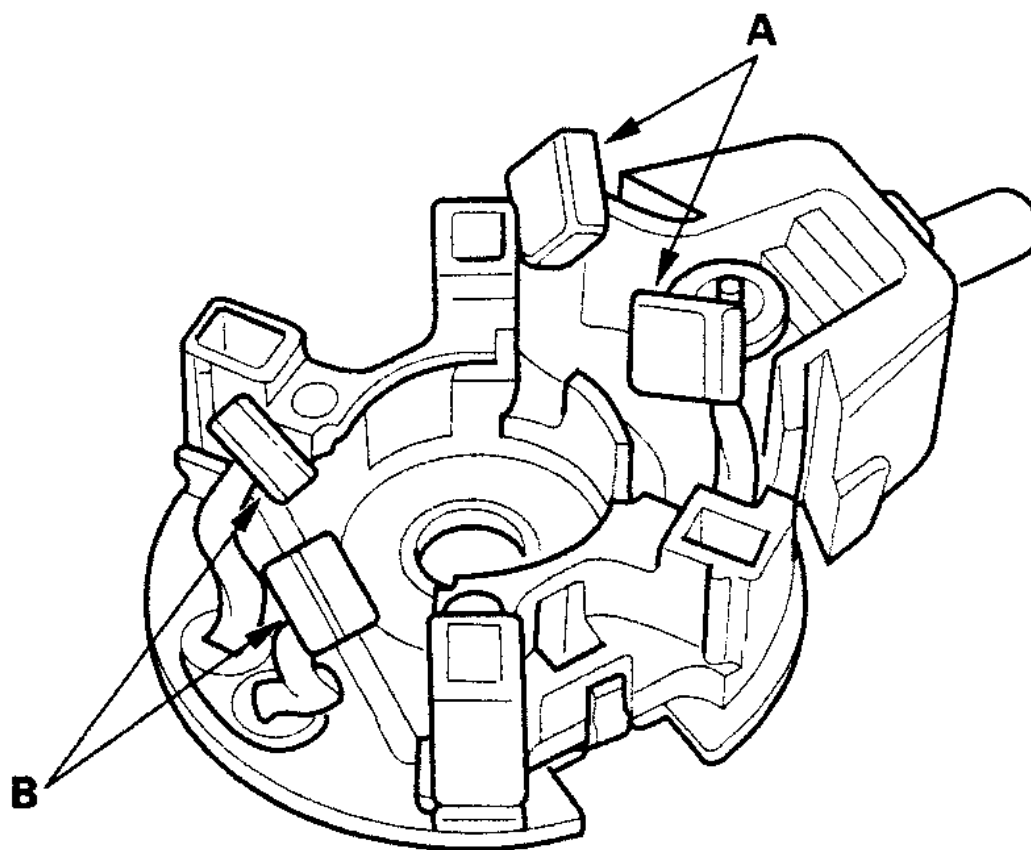


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Fig. 16: Checking Continuity Between Commutator, Armature Coil Core And Armature Shaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

BRUSH HOLDER TEST

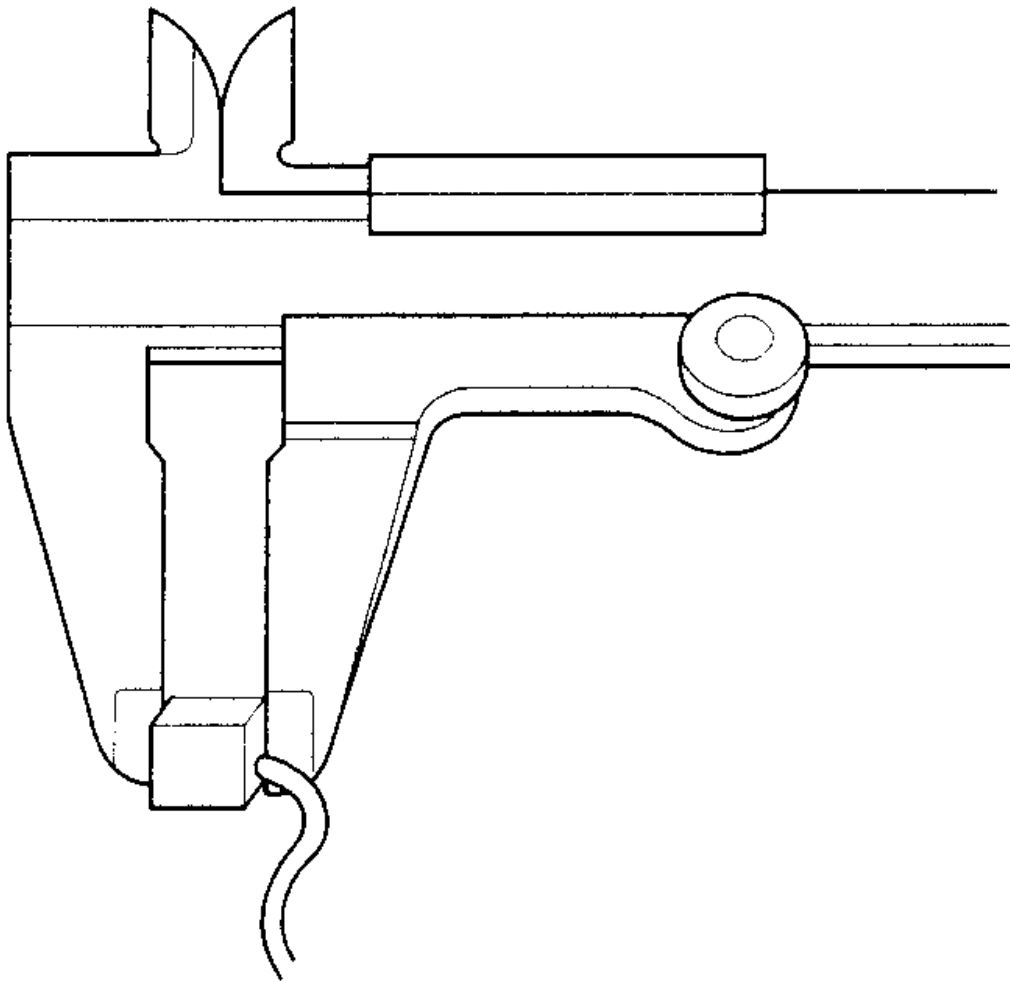
1. Using an ohmmeter, check that there is no continuity between positive brush (A) and negative brush (B). If there is continuity, replace the brush holder assembly. See **Fig. 17**.
2. Measure the brush length. If it is not within the service limit, replace the brush holder assembly. See **Fig. 18**. See **STARTER SPECIFICATIONS**.



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Fig. 17: Identifying Brush Holders

Courtesy of AMERICAN HONDA MOTOR CO., INC.



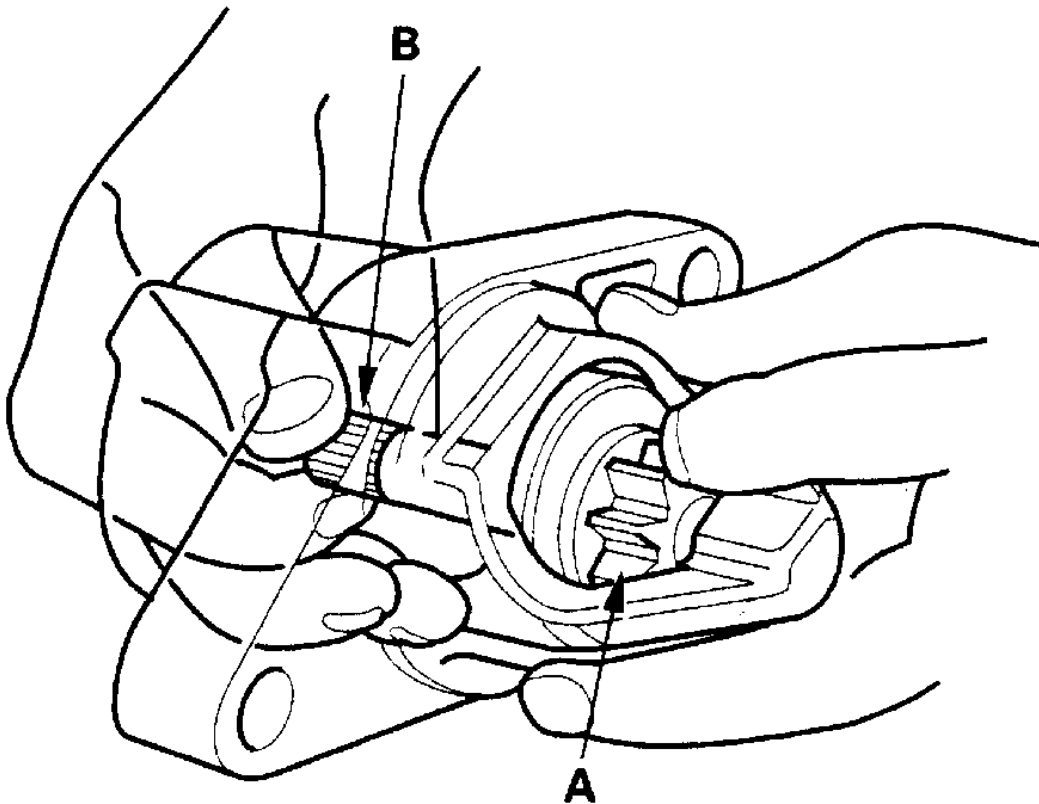
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Fig. 18: Measuring Brush Length

Courtesy of AMERICAN HONDA MOTOR CO., INC.

OVERRUNNING CLUTCH TEST

1. While holding the drive gear (A), turn the gear shaft (B) clockwise. See **Fig. 19** . Check that the drive gear comes out to the other end. If the drive gear does not move smoothly, replace the gear cover assembly.
2. While holding the drive gear, turn the gear shaft counterclockwise. The gear shaft should rotate freely. If the gear shaft does not rotate smoothly, replace the gear cover assembly.
3. If the starter drive gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately. Check the condition of the torque converter ring gear to see if the teeth are damaged.



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Fig. 19: Inspecting Overrunning Clutch
Courtesy of AMERICAN HONDA MOTOR CO., INC.

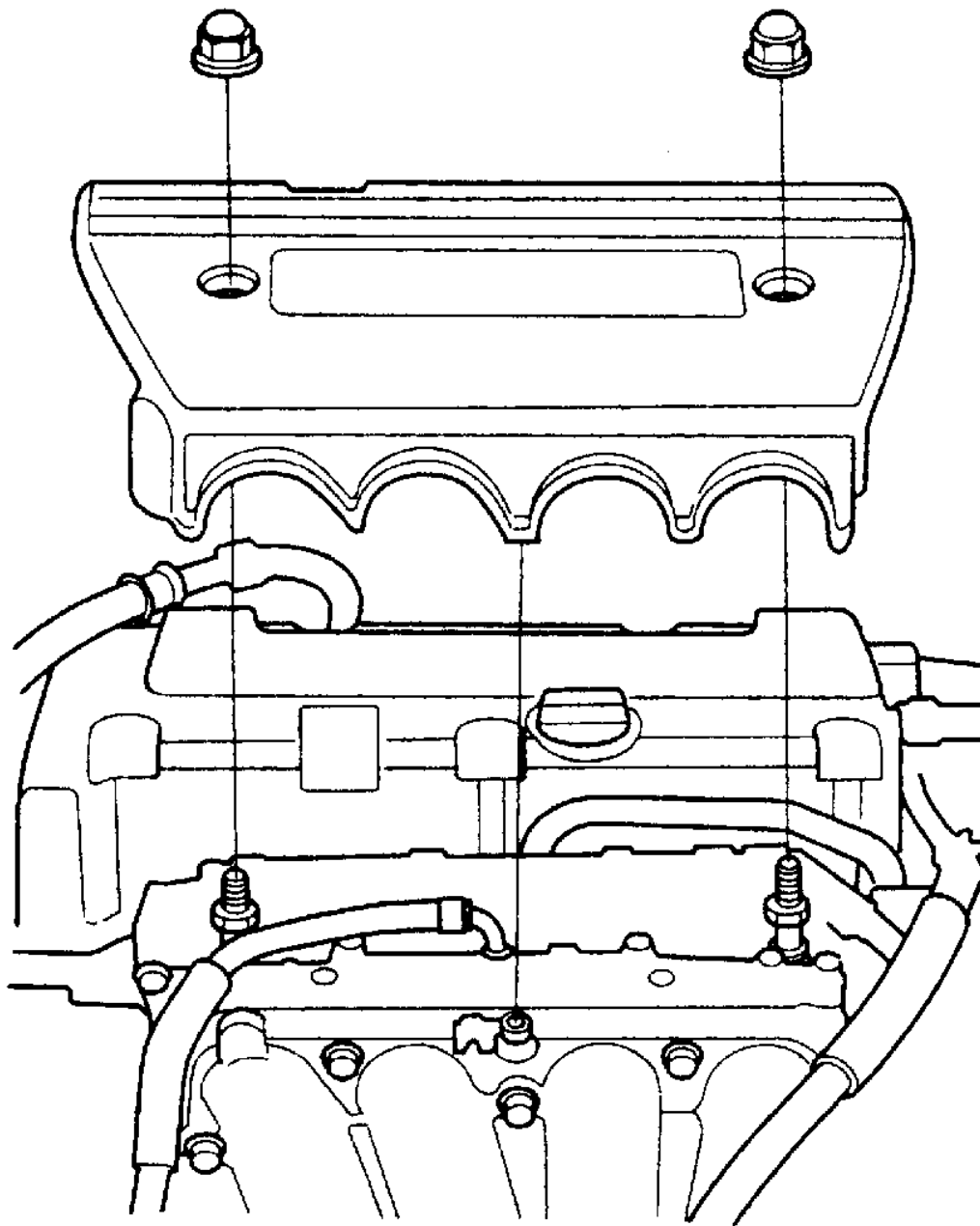
REMOVAL & INSTALLATION

STARTER

Removal

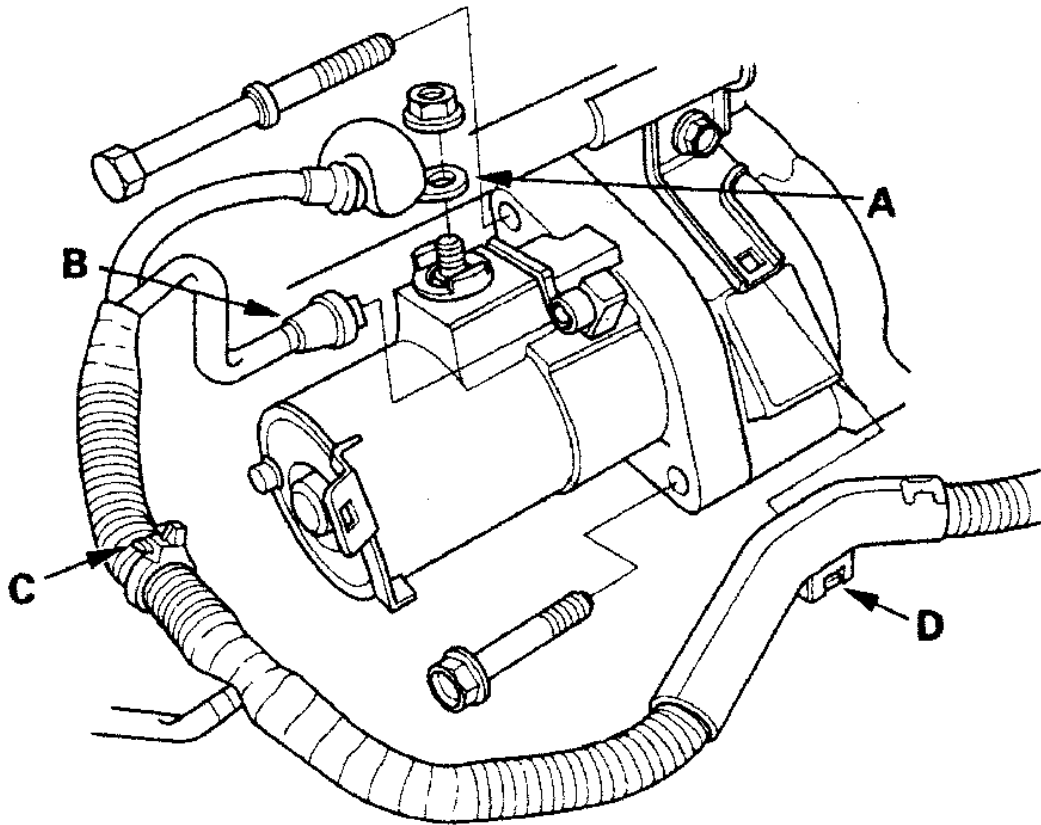
1. Ensure you have the anti-theft codes for the radio and the navigation system, write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable. Disconnect the positive cable.
3. Remove the intake manifold cover. See **Fig. 20** .
4. Disconnect the starter cable (A) from the "B" terminal. Disconnect the Black/White wire (B) from the "S" terminal.
5. Remove the harness clamp (C). See **Fig. 21** .
6. Remove the harness holder (D).

7. Remove the two bolts holding the starter. Remove the starter.



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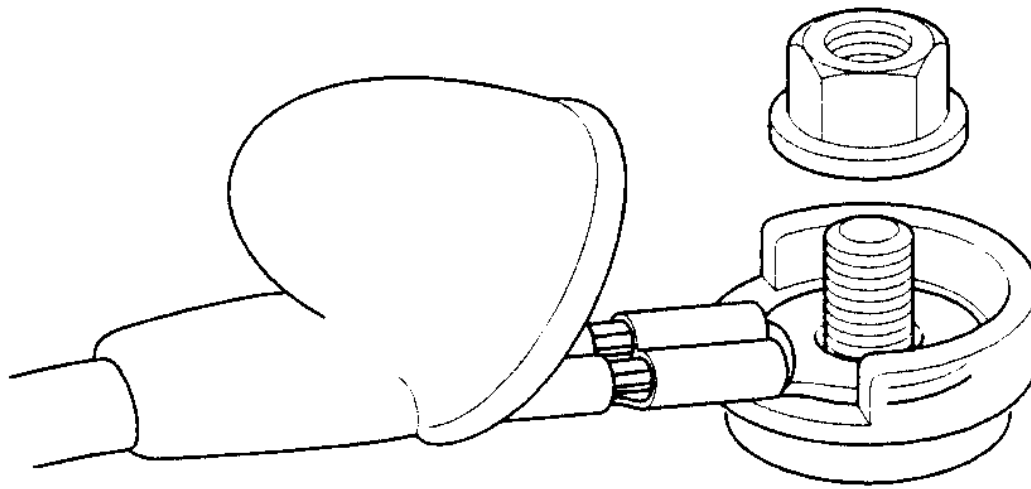
Fig. 20: Removing Intake Manifold Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.



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Fig. 21: Removing Harness Clamp And Holder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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Fig. 22: Positioning Crimped Side Of The Ring Terminal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Installation

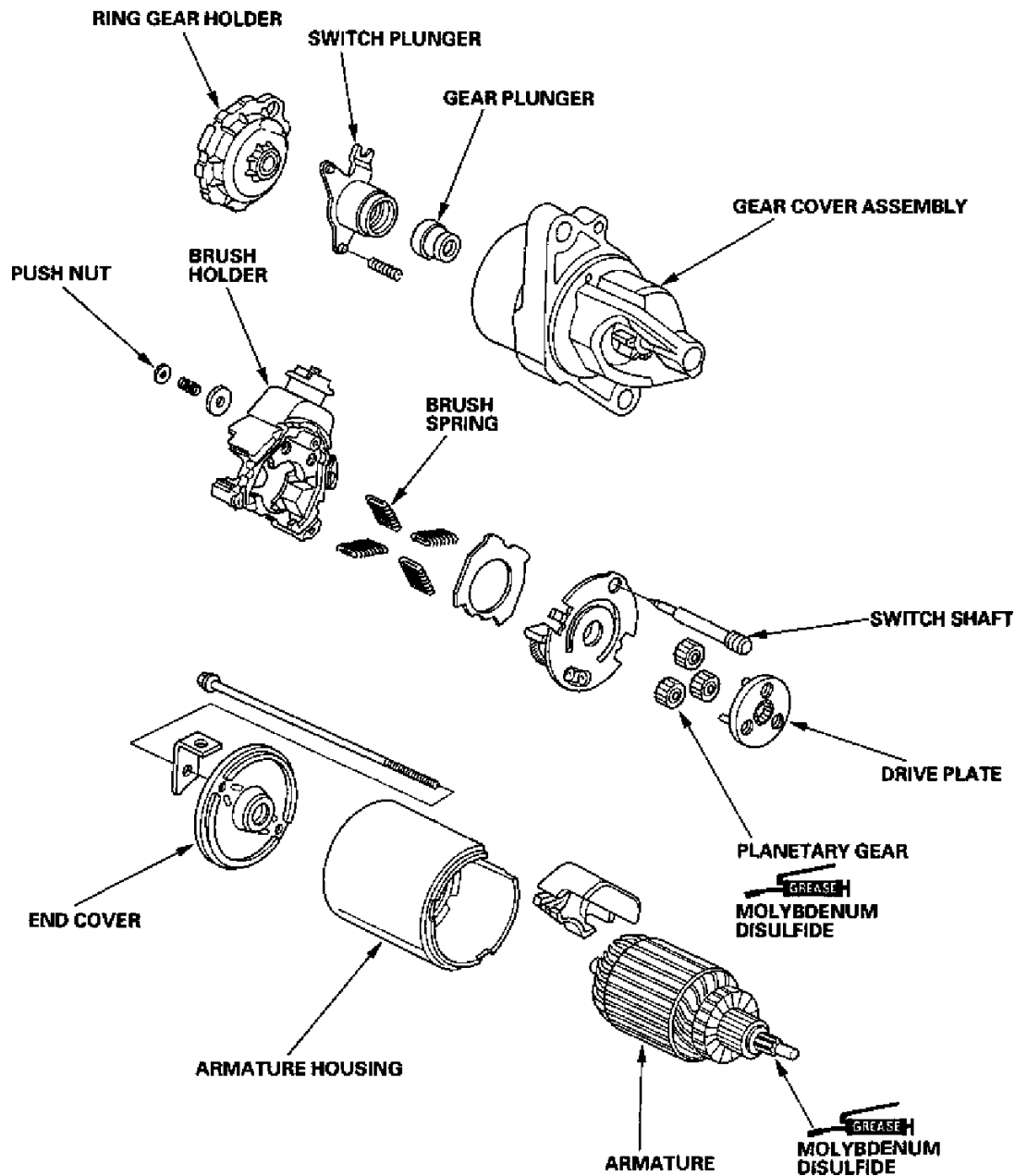
1. Install in the reverse order of removal. Ensure the crimped side of the ring terminal is facing out. See **Fig. 22**.
2. Connect the battery positive cable and negative cable to the battery.
3. Start the engine to ensure the starter works properly.
4. Enter the anti-theft codes for the radio and the navigation system, enter the customer's radio channel presets.
5. Set the clock.

OVERHAUL

STARTER

Disassembly

For disassembly, use exploded view of starter, see **Fig. 23**.

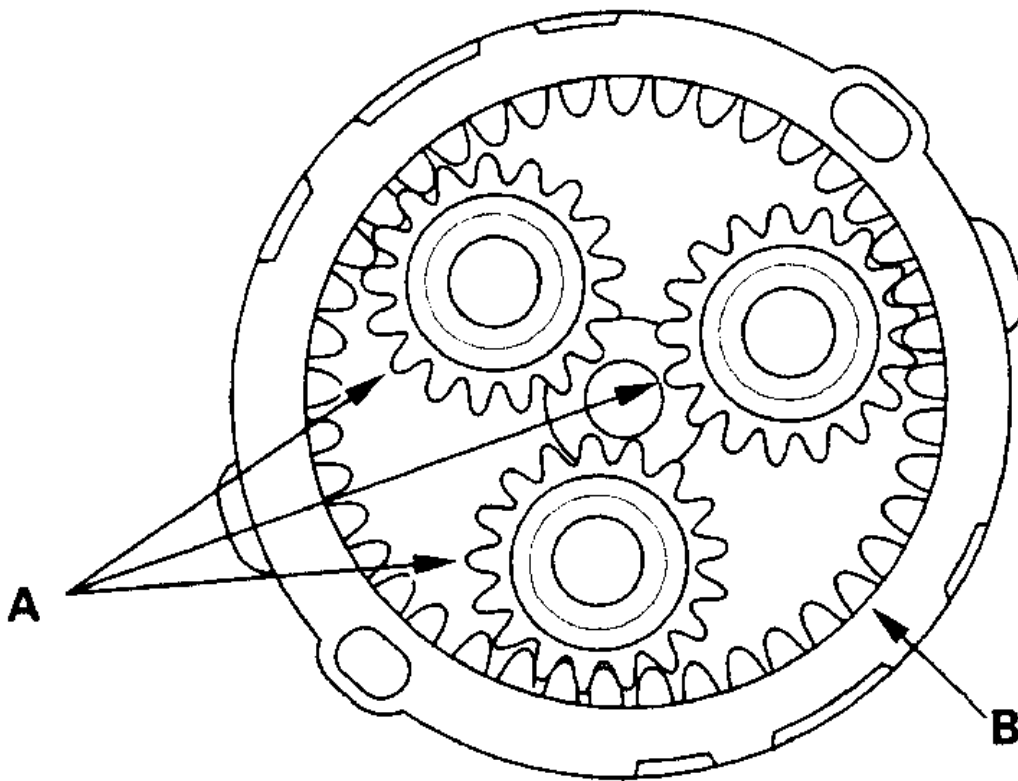


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Fig. 23: Exploded View Of Starter
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Planetary Gear

Check the planetary gears (A) and ring gear (B). Replace them if they are worn or damaged. See **Fig. 24**.



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Fig. 24: Identifying Planetary Gear Inspection

Courtesy of AMERICAN HONDA MOTOR CO., INC.

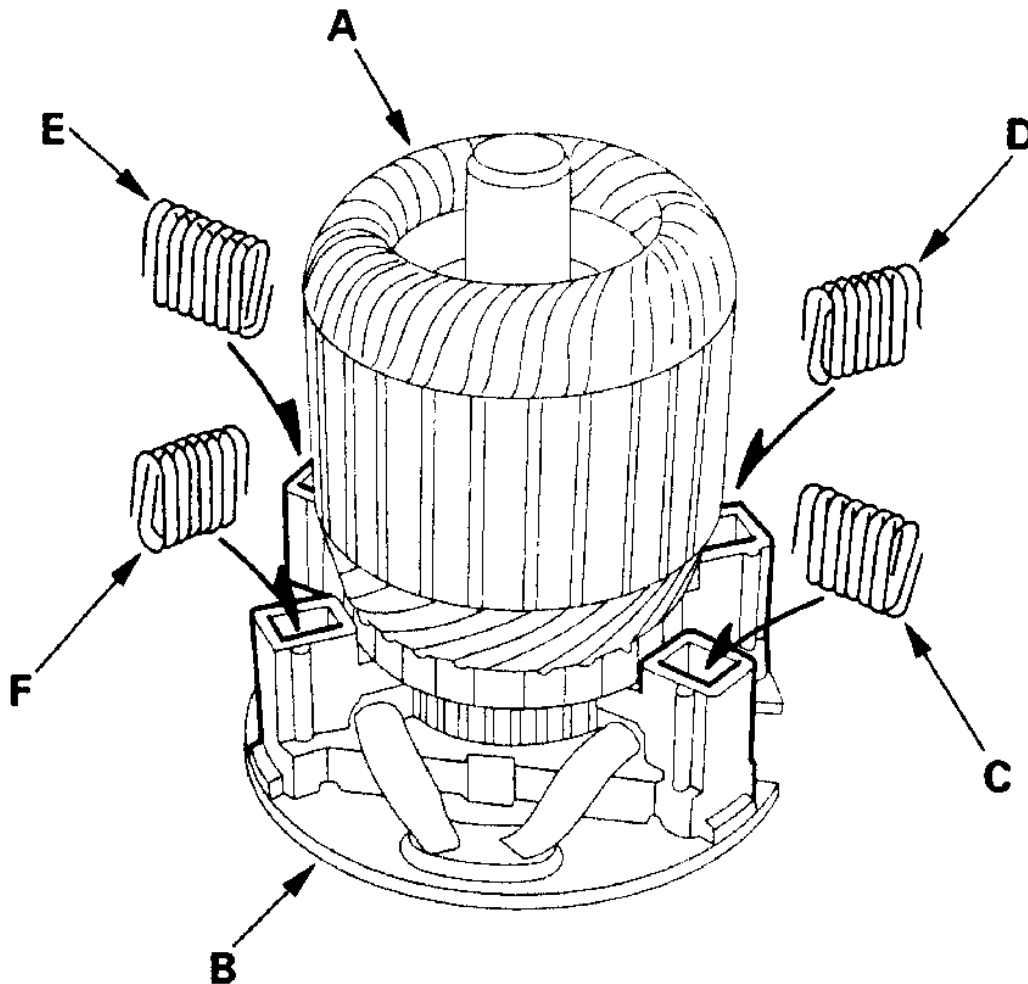
Reassembly

NOTE: To seat the new brushes, slip a strip of #500 or #600 sandpaper, with the grit side up, between the commutator and each brush, and smoothly rotate the armature. The contact surface of the brushes will be sanded to the same contour as the commutator.

1. Install the brush into the brush holder, and set the armature (A) in the brush holder (B). See **Fig. 25**.
2. While squeezing a spring (C), insert it in the hole on the brush holder, and push it until it bottoms. Repeat this for the other springs (D,E and F).

NOTE: Ensure the armature stays in the holder.

3. Install the armature and brush holder assembly into the housing.



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Fig. 25: Installing Brush Into The Brush Holder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

STARTER SPECIFICATIONS

For starter service specifications, see **SERVICE SPECIFICATIONS** in ACURA - TSX article in SPECIFICATIONS.

TORQUE SPECIFICATIONS

For starter torque specifications, see **TORQUE SPECIFICATIONS** in ACURA - TSX article in SPECIFICATIONS.

WIRING DIAGRAMS

For wiring diagram on 2004 TSX models, see appropriate SYSTEM WIRING DIAGRAM article in ELECTRICAL.