

2007 Honda Element EX

2007-08 ENGINE Starting System - Element

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COMPONENT LOCATION INDEX

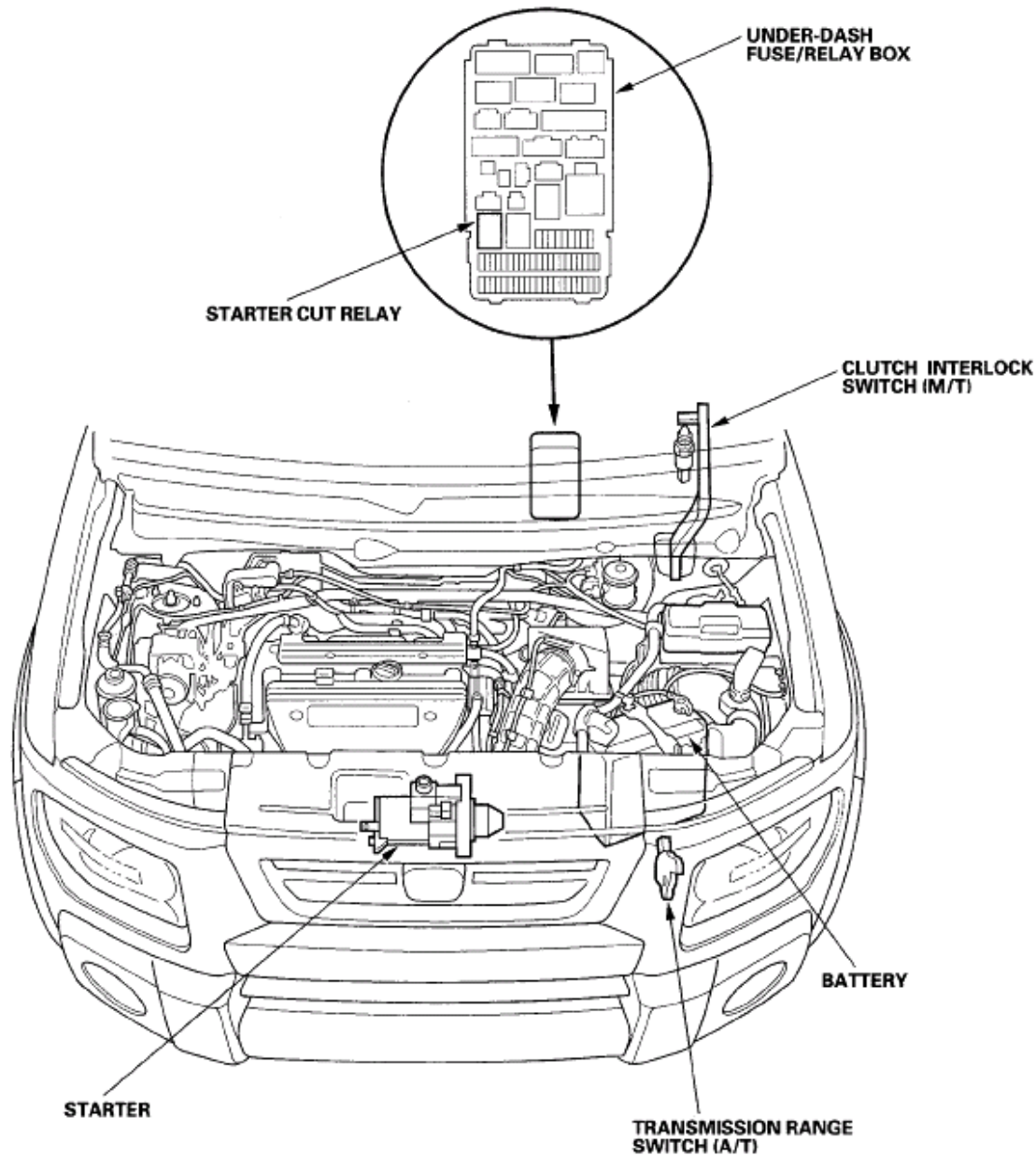


Fig. 1: Identifying Starting System Component Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

SYMPTOM TROUBLESHOOTING INDEX

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SYMPTOM TROUBLESHOOTING CHART

Symptom	Diagnostic procedure	Also check for
Engine does not start (does not crank)	<ol style="list-style-type: none"> 1. Check for loose battery terminals or connections. 2. Test the battery for a low charge (see <u>BATTERY TEST</u>). 3. Check the starter (see <u>STARTER SYSTEM CIRCUIT TROUBLESHOOTING</u>). 4. Check the starter cut relay (see <u>POWER RELAY TEST</u>). 5. Check the transmission range switch (A/T) (see <u>TRANSMISSION RANGE SWITCH TEST</u>). 6. Check the clutch interlock switch (M/T) (see <u>CLUTCH INTERLOCK SWITCH TEST</u>). 7. Check the ignition switch or wire (see <u>TEST</u>). 	Poor ground at G101 (A/T) or G502 (M/T)
Engine cranks, but does not start	<ol style="list-style-type: none"> 1. Check for PGM-FI DTCs (see <u>GENERAL TROUBLESHOOTING INFORMATION</u>). 2. Check the fuel pressure (see <u>FUEL PRESSURE TEST</u>). 3. Check for a plugged or damaged fuel line (see <u>FUEL LINE INSPECTION</u>). 4. Check for a plugged fuel filter (see <u>FUEL FILTER REPLACEMENT</u>). 5. Check the throttle body (see <u>THROTTLE BODY TEST</u>). 6. Check for low engine compression (see <u>ENGINE COMPRESSION INSPECTION</u>). 7. Check for a damaged or broken cam chain. 	Fuel level in tank
Engine is hard to start	<ol style="list-style-type: none"> 1. Check for PGM-FI DTCs (see <u>GENERAL TROUBLESHOOTING INFORMATION</u>). 2. Check the fuel pressure (see <u>FUEL PRESSURE TEST</u>). 3. Check for a plugged or damaged fuel line (see <u>FUEL LINE INSPECTION</u>). 4. Check for a plugged fuel filter (see <u>FUEL FILTER REPLACEMENT</u>). 	
Engine cranks slowly	<ol style="list-style-type: none"> 1. Check for loose battery terminals or connections. 2. Test the battery for a low charge (see <u>BATTERY TEST</u>). 3. Check the starter for binding (see <u>STARTER SYSTEM CIRCUIT TROUBLESHOOTING</u>). 4. Check for excessive drag in the engine. 	

CIRCUIT DIAGRAM

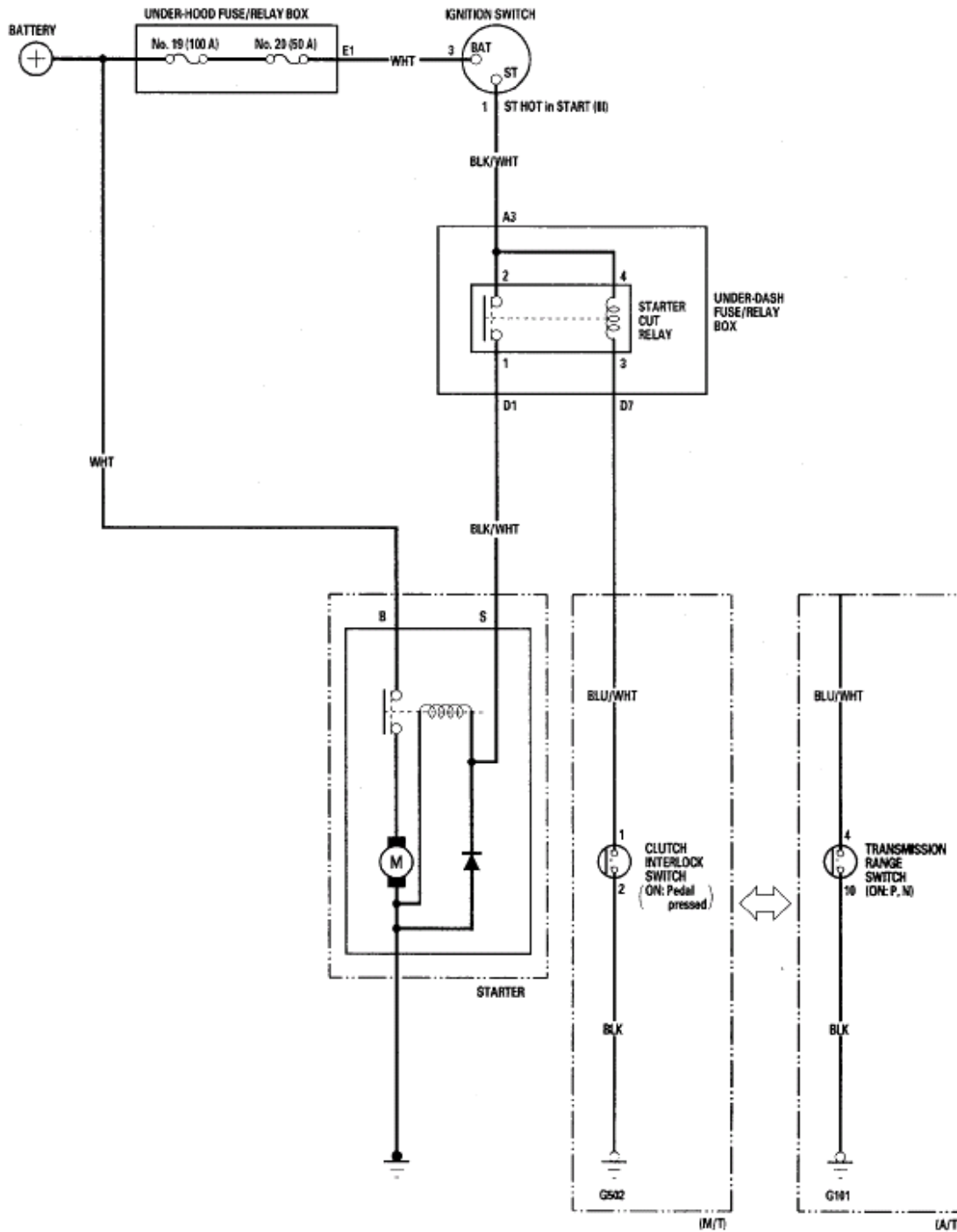


Fig. 2: Starting System Circuit Diagram
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

STARTER SYSTEM CIRCUIT TROUBLESHOOTING

NOTE:

- Air temperature must be between 59 and 100°F (15 and 38°C) during this procedure.
- After the inspection, you must reset the engine control module (ECM)/powertrain control module (PCM). Otherwise, the ECM/PCM will continue to stop the fuel injectors from operating.
- The battery must be in good condition and fully charged.

1. Hook up the following equipment:

- Ammeter, 0-400 A
- Voltmeter, 0-20 V (accurate within 0.1 V)

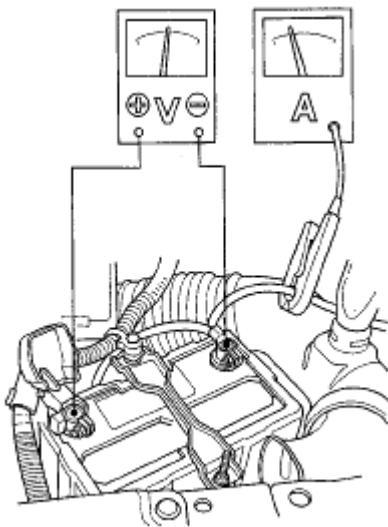


Fig. 3: Connecting Ammeter And Voltmeter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Connect the Honda Diagnostic System (HDS) to the data link connector (DLC) (see step 2 on **HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)**).
3. Turn the ignition switch ON (II).
4. Make sure the HDS communicates with the vehicle and the ECM/PCM. If it doesn't communicate, troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING**).
5. Select PGM-FI, INSPECTION, then ALL INJECTORS OFF on the HDS.
6. Set the parking brake, then with the shift lever in the N or P position (A/T) or the clutch pedal pressed (M/T), turn the ignition switch to START (III).

Does the starter crank the engine normally?

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

NO - Go to step 7.

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

Does the starter crank the engine?

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

NO - Based on the following symptoms, take the appropriate action:

- If the starter will not crank the engine at all, go to step 8.
 - If the starter cranks the engine erratically or too slowly, go to step 9.
 - If the starter does not disengage from the flywheel or torque converter ring gear when you release the key, replace the starter, or remove and disassemble it, and check for the following:
 - Starter solenoid and switch malfunction
 - Dirty drive gear or damaged overrunning clutch
8. Make sure the shift lever is in the N or P position (A/T) or neutral (M/T) and set the parking brake, then disconnect the connector from the solenoid S terminal. Connect a jumper wire from the battery positive terminal to the solenoid S terminal.

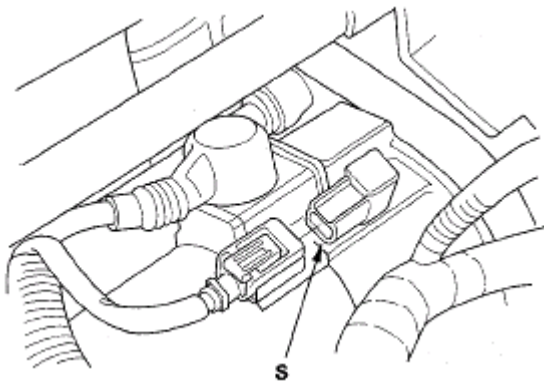


Fig. 4: Identifying Connector And Solenoid S Terminal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Does the starter crank the engine?

YES - Check the following items in the order listed until you find the open circuit:

- Check 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.
- Check the ignition switch (see **TEST**).
- Check the transmission range switch and connector (A/T) or the clutch interlock switch and connector (M/T).
- Check the starter cut relay (see **POWER RELAY TEST**).

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

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

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

YES - Go to step 10.

NO - Replace the starter, or remove and disassemble it, and check for these problems:

- Excessive drag in the engine
 - Shorted armature winding
 - Drag in the starter armature
 - Open circuit in starter armature commutator segments
 - Excessively worn starter brushes
 - Open circuit in starter 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 (see **ECM/PCM RESET**) to cancel ALL INJECTORS OFF on the HDS.

CLUTCH INTERLOCK SWITCH TEST

M/T

1. Disconnect the clutch interlock switch 2P connector (A).

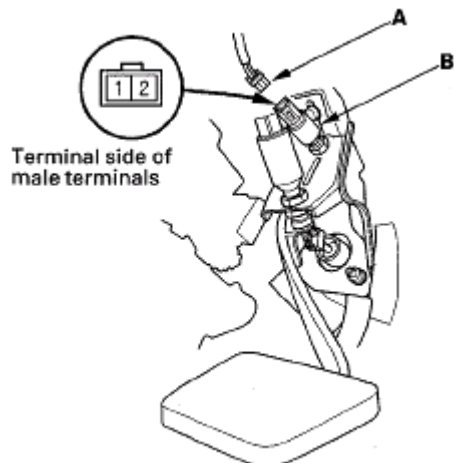


Fig. 5: Identifying Clutch Interlock Switch 2P Connector

Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Remove the clutch interlock switch (B).
3. Check for continuity between the terminals according to the table.
 - If the continuity is not as specified, replace the clutch interlock switch.
 - If OK, install the clutch interlock switch, and adjust the pedal height (see **CLUTCH PEDAL, CLUTCH PEDAL POSITION SWITCH, AND CLUTCH INTERLOCK SWITCH ADJUSTMENT**).

Terminal	1	2
Clutch Interlock Switch		
PRESSED	○	○
RELEASED		

Fig. 6: Identifying Clutch Interlock Switch Continuity Chart
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

STARTER PERFORMANCE TEST

1. Make a connection for this test using the thickest (gauge) wire possible (preferably the same gauge as used on the vehicle).

NOTE: To avoid damaging the starter, never leave the battery connected for more than 10 seconds.

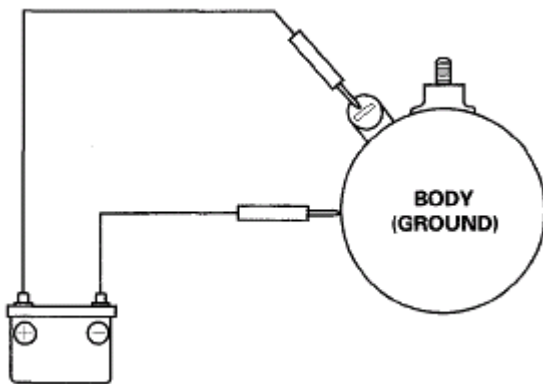


Fig. 7: Connecting Battery Terminal From Starter
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. If the starter pinion moves out, it is working properly.
3. Disconnect the battery terminal from the starter as shown. If the pinion retracts immediately, it is working properly.

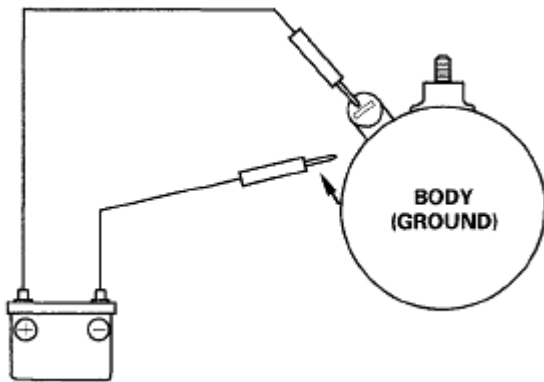


Fig. 8: Disconnecting Battery Terminal From Starter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Clamp the starter firmly in a vise.
5. Connect the starter to the battery as shown, and confirm that the motor starts and keeps rotating.

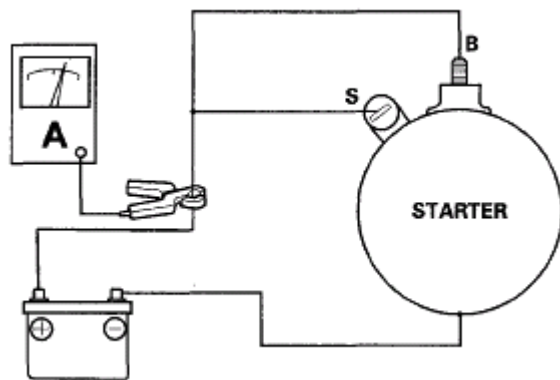


Fig. 9: Connecting Starter To Battery
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the electric current meets the specification when the battery voltage is at 11.5 V, the starter is working properly.

Specification

Electric Current: 80 A or less

STARTER REMOVAL AND INSTALLATION

REMOVAL

1. Make sure you have the, anti-theft code for the audio system.
2. Disconnect the negative cable from the battery.
3. Remove the intake manifold (see **REMOVAL**).

4. Disconnect the starter cable (A) from the B terminal, and disconnect the connector (B) from the solenoid S terminal.

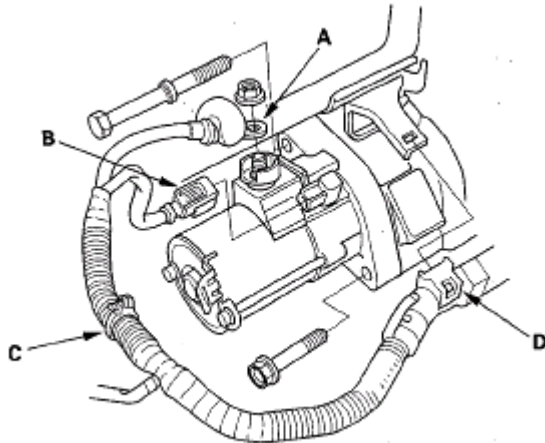


Fig. 10: Identifying Starter Cable From B Terminal
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the harness clamp (C) and the harness holder (D).
6. Remove the two bolts holding the starter, then remove the starter.

INSTALLATION

1. Install the starter, then install the harness holder (A) and the harness clamp (B), connect the starter cable (C) to the B terminal, and the connector (D) to the solenoid S terminal. Make sure the crimped side of the ring terminal faces away from the starter when you connect it.

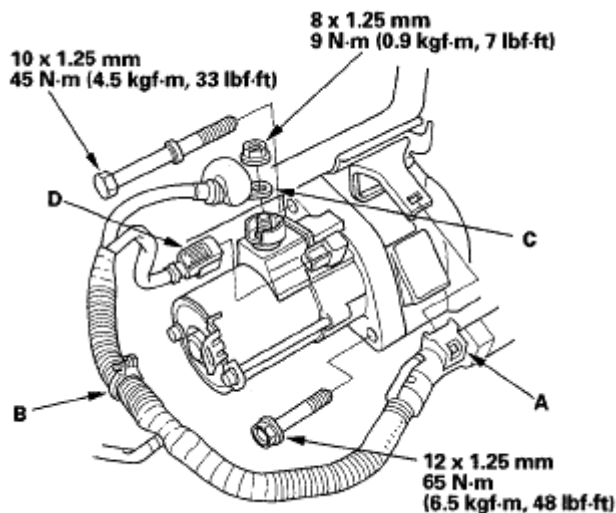


Fig. 11: Identifying Starter, Harness Holder And Harness Clamp With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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2. Install the intake manifold (see **INSTALLATION**).
3. Connect the negative cable to the battery.
4. Start the engine to make sure the starter works properly.
5. Enter the anti-theft code for the audio system.
6. Do the power window control unit reset procedure (see **RESETTING THE POWER WINDOW CONTROL UNIT**).
7. Set the clock.

STARTER OVERHAUL

DISASSEMBLY/REASSEMBLY

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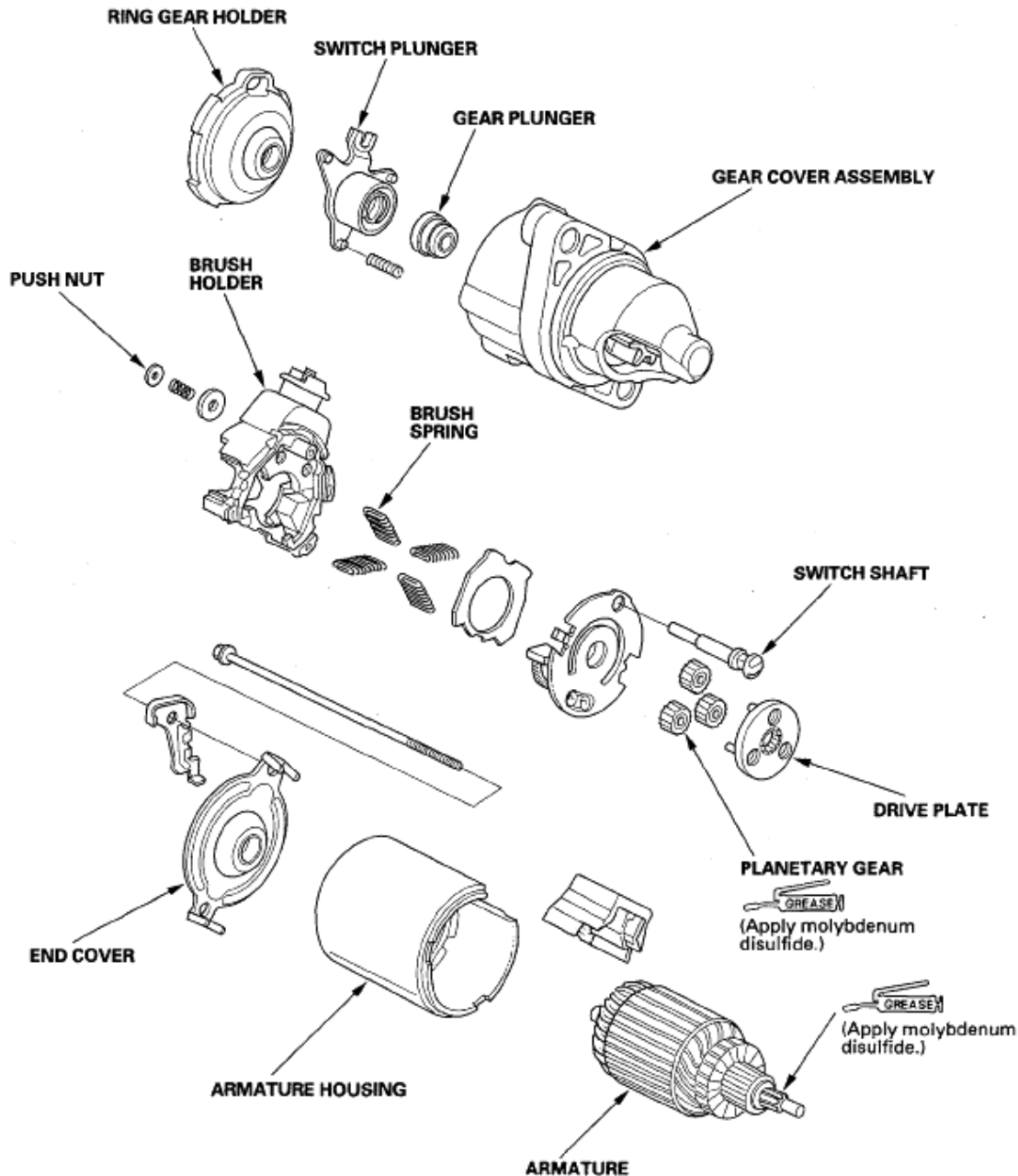


Fig. 12: Exploded View Of Starter Overhaul
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ARMATURE INSPECTION AND TEST

1. Remove the starter (see **STARTER REMOVAL AND INSTALLATION**).
2. Disassemble the starter as shown at the beginning of this procedure.
3. Inspect the armature for wear or damage from contact with the permanent magnet. If there is wear or damage, replace the armature.

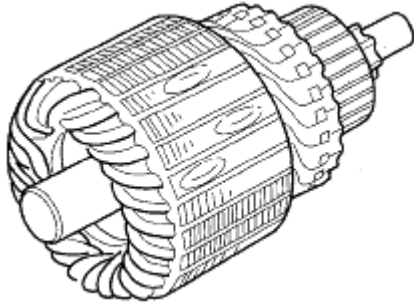


Fig. 13: Identifying Armature

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Check the commutator (A) surface. If the surface is dirty or burnt, resurface it with an emery cloth or a lathe to the specifications in step 5, or recondition with #500 or #600 sandpaper (B).

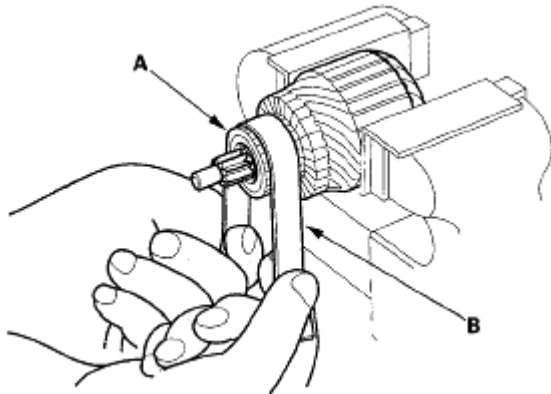


Fig. 14: Checking Commutator Surface

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Check the commutator diameter. If the diameter is below the service limit, replace the armature.

Commutator Diameter

Standard (New): 28.0-28.1 mm (1.102-1.106 in.)

Service Limit: 27.5 mm (1.083 in.)

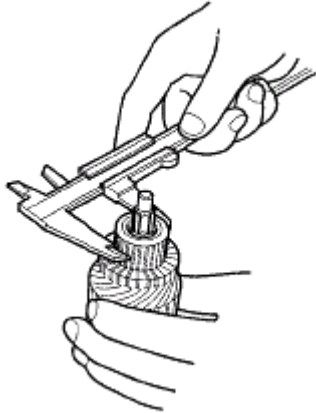


Fig. 15: Checking Commutator Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Measure the commutator (A) runout.
 - 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.

Commutator Runout

Standard (New): 0.02 mm (0.001 in.) max.

Service Limit: 0.05 mm (0.002 in.)

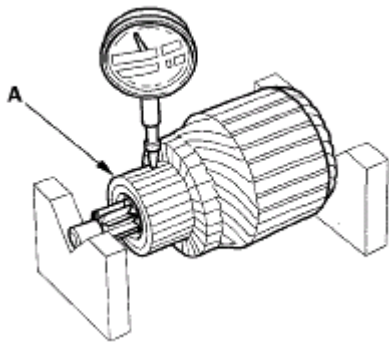


Fig. 16: Measuring Commutator Runout
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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).

Commutator Mica Depth

Standard (New): 0.40-0.50 mm (0.016-0.020 in.)

Service Limit: 0.15 mm (0.006 in.)

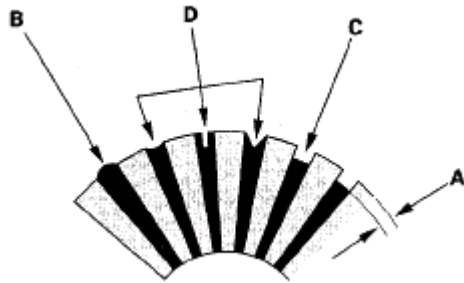


Fig. 17: Identifying Mica Depth

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Check for continuity between the segments of the commutator. If there is an open circuit between any segments, replace the armature.

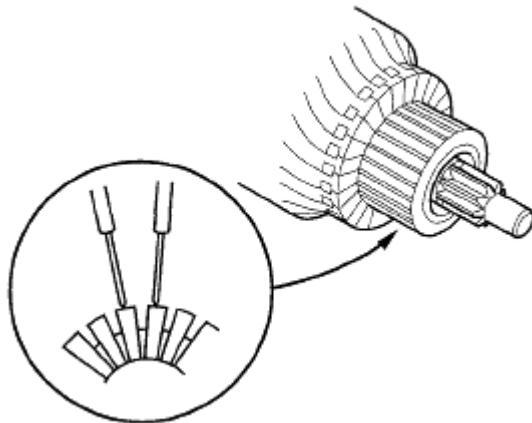


Fig. 18: Checking Continuity Between Segments Of Commutator

Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Place the armature (A) on an armature tester (B). Hold a hacksaw blade (C) on the armature core. If the blade is attracted to the core or vibrates while the core is turned, the armature is shorted. Replace the armature.

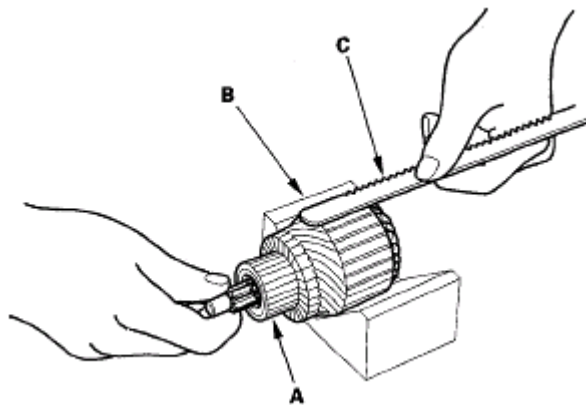


Fig. 19: Placing Armature On Armature Tester
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Use an ohmmeter to check for continuity between the commutator (A) and the armature coil core (B), and between the commutator and the armature shaft (C). If there is continuity, replace the armature.

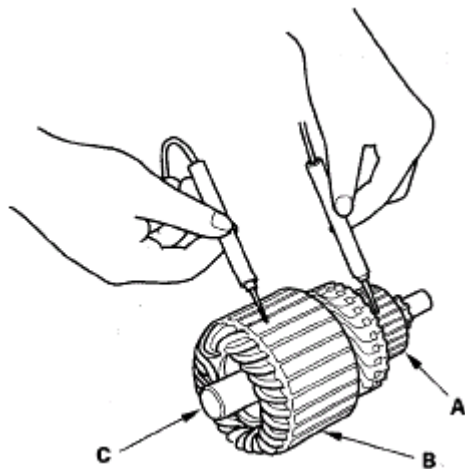


Fig. 20: Checking Continuity Between Commutator And Armature Coil Core
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Starter Brush Inspection

11. Measure the brush length. If it is shorter than the service limit, replace the brush holder assembly.

Brush Length

Standard (New): 11.1-11.5 mm (0.44-0.45 in.)

Service Limit: 4.3 mm (0.17 in.)

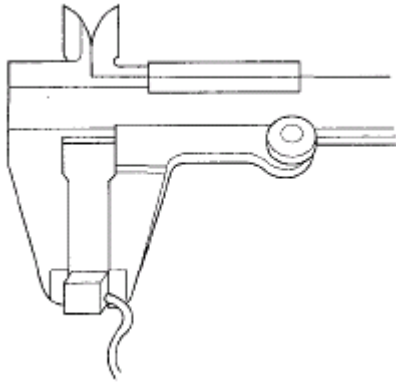


Fig. 21: Measuring Brush Length

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Starter Brush Holder Test

12. Check for continuity between the (+) brushes (A) and (-) brushes (B). If there is continuity, replace the brush holder assembly.

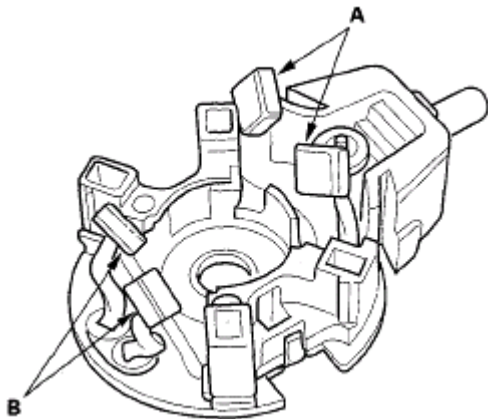


Fig. 22: Checking Continuity Between Brushes

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Planetary Gear Inspection

13. Check the planetary gears (A) and internal ring gear (B) for wear or damage. Replace them if they are worn or damaged.

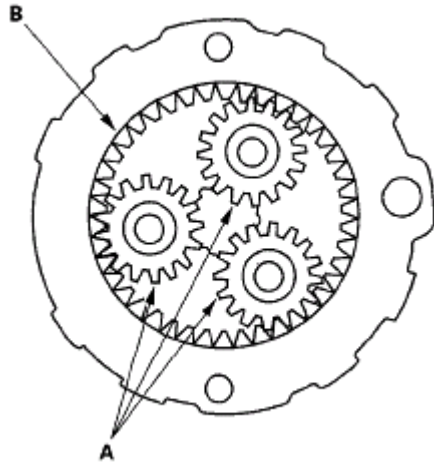


Fig. 23: Identifying Planetary Gears And Internal Ring Gear
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Overrunning Clutch Inspection

14. While holding the drive gear (A), turn the gear shaft (B) counterclockwise. Check that the drive gear comes out to the other end. If the drive gear does not move smoothly, replace the gear cover assembly.

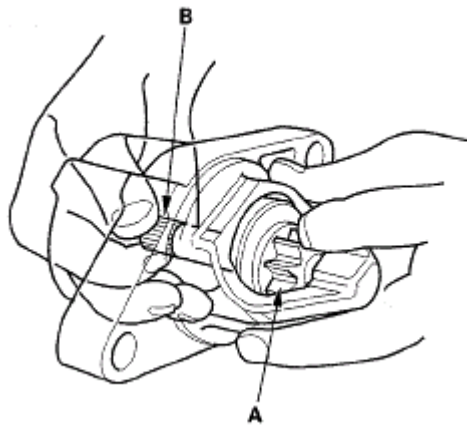


Fig. 24: Identifying Gear Shaft
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. While holding the drive gear, turn the gear shaft clockwise. The gear shaft should rotate freely. If the gear shaft does not rotate smoothly, replace the gear cover assembly.
16. 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 starter drive gear teeth are damaged.

Starter Reassembly

17. Install the brush into the brush holder, and set the armature (A) in the brush holder (B).

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.

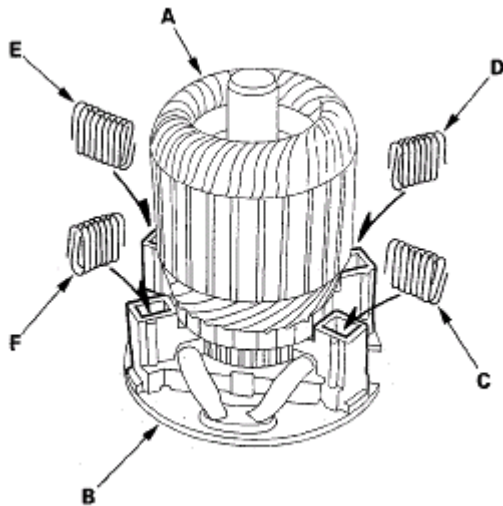


Fig. 25: Identifying Brush To Brush Holder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. 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 three springs (D, E, and F).
19. Install the armature and brush holder assembly into the housing.

NOTE: Make sure the armature stays in the holder.