

2005-08 ENGINE

Starting System - RL

COMPONENT LOCATION INDEX

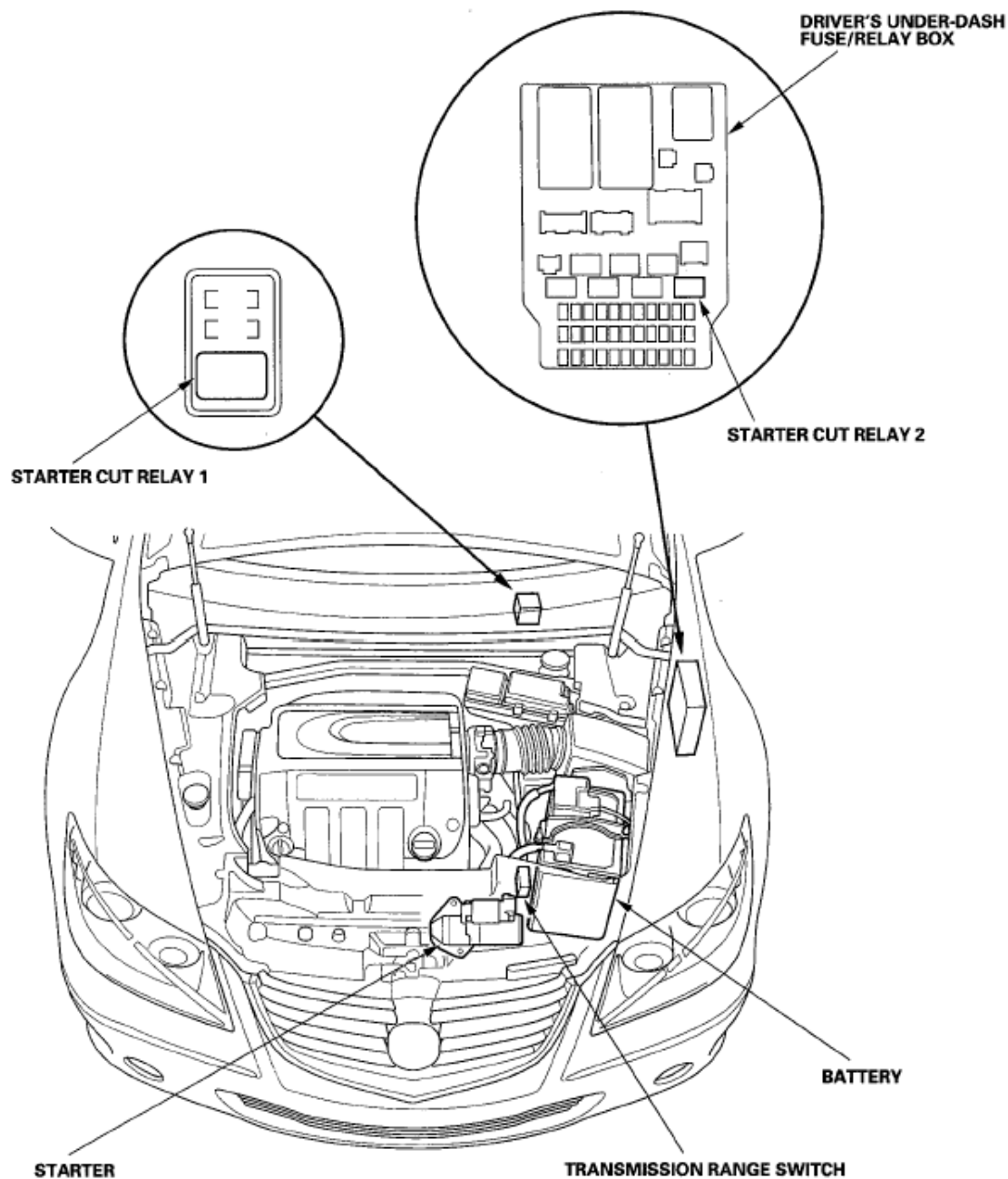


Fig. 1: Identifying Starting System Components Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

SYMPTOM TROUBLESHOOTING INDEX

2007 Acura RL

2005-08 ENGINE Starting System - RL

SYMPTOM TROUBLESHOOTING INDEX

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 BATTERY TEST). 3. Check the starter (see STARTER SYSTEM CIRCUIT TROUBLESHOOTING). 4. Check starter cut relay 1 and starter cut relay 2 (see POWER RELAY TEST). 5. Check the transmission range switch (see TRANSMISSION RANGE SWITCH TEST). 6. Check the ignition switch or wire (see TEST). 	Poor ground at G1, G2, G101, G102
Engine cranks, but does not start	<ol style="list-style-type: none"> 1. Check for PGM-FI DTCs. 2. Check the fuel pressure (see FUEL PRESSURE TEST). 3. Check for a plugged or damaged fuel line (see FUEL LINE INSPECTION). 4. Check for a plugged fuel filter (see FUEL PRESSURE REGULATOR REPLACEMENT). 5. Check the throttle body (see THROTTLE BODY TEST). 6. Check for low engine compression (see ENGINE COMPRESSION INSPECTION). 7. Check for a damaged or broken timing belt. 	
Engine is hard to start	<ol style="list-style-type: none"> 1. Check for PGM-FI DTCs. 2. Check the fuel pressure (see FUEL PRESSURE TEST). 3. Check for a plugged or damaged fuel line (see FUEL LINE INSPECTION). 4. Check for a plugged fuel filter (see FUEL PRESSURE REGULATOR REPLACEMENT). 	
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 BATTERY TEST). 3. Check the starter for binding (see STARTER OVERHAUL). 4. Check for excessive drag in the engine. 	
Multi-information display warning CHECK STARTING SYSTEM	Check for PGM-FI DTCs (see GENERAL TROUBLESHOOTING INFORMATION).	

CIRCUIT DIAGRAM

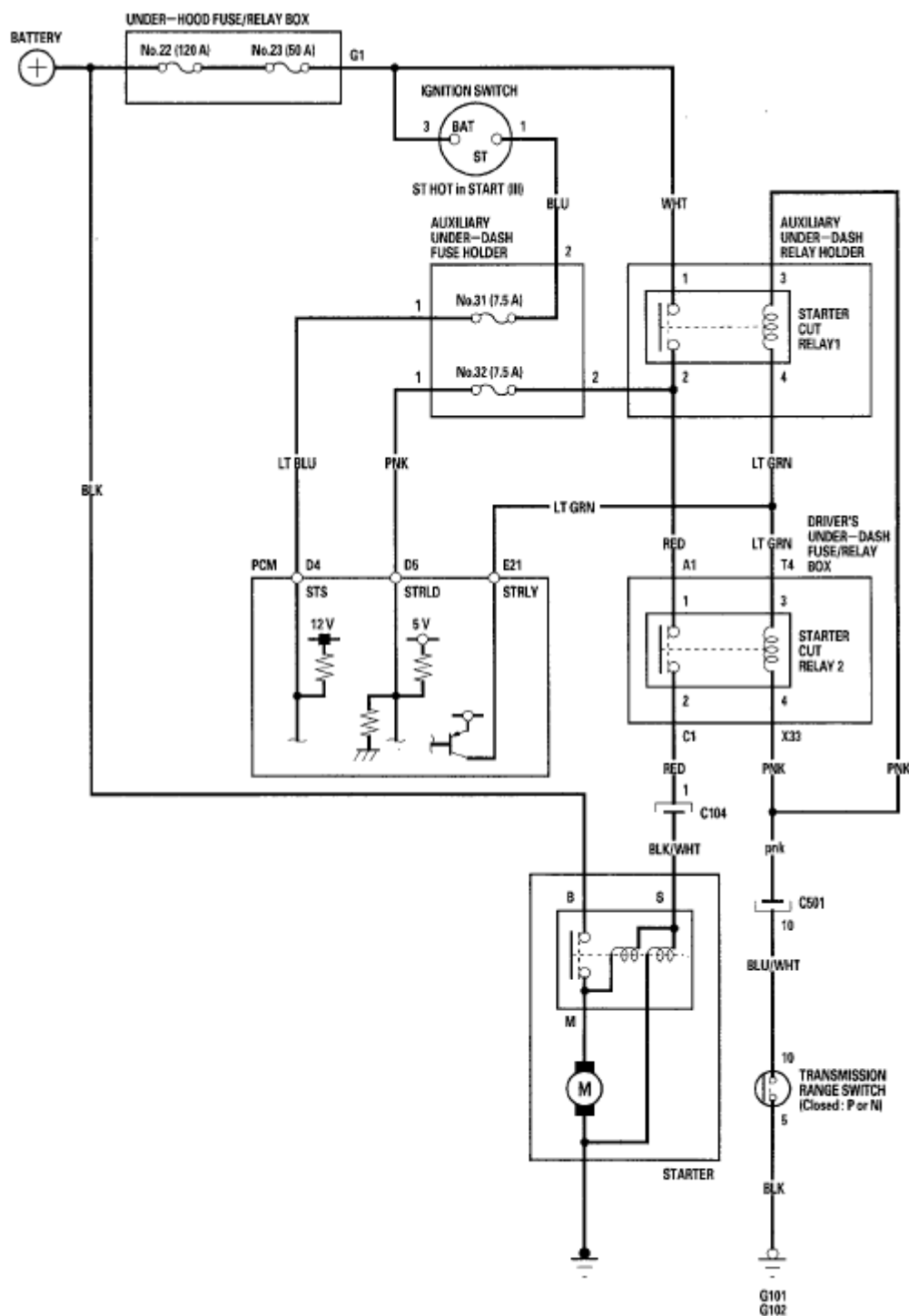


Fig. 2: Starting System Circuit Diagram
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

STARTER SYSTEM CIRCUIT TROUBLESHOOTING

NOTE:

- Air temperature must be between 59 and 100°F (15 and 38°C) during

this procedure.

- After this inspection, you must reset the powertrain control module (PCM). Otherwise, the PCM will continue to stop the fuel injectors from functioning.
- The battery must be in good condition and fully charged.

1. Remove the battery trim (see step 2 under **UPPER FENDER TRIM REPLACEMENT**).
2. Hook up the following equipment:
 - Ammeter, 0-400 A
 - Voltmeter, 0-20 V (accurate within 0.1 volt)

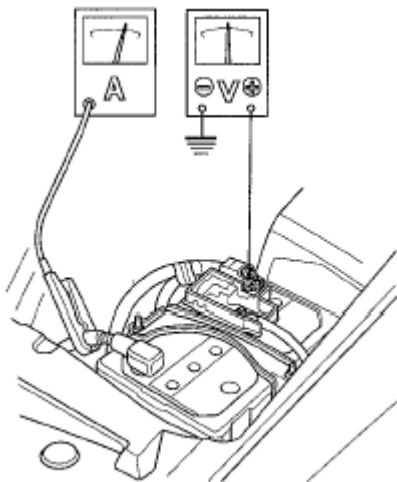


Fig. 3: Connecting Ammeter And Voltmeter To Battery
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Connect the HDS to the data link connector (DLC) (see step 2 under **HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)**).
4. Turn the ignition switch ON (II), and select PGM-FI, INSPECTION, then ALL INJECTORS OFF on the HDS.
5. Set the parking brake, then with the shift lever in the N or P position, turn the ignition switch to START (III).

Did the starter crank the engine normally?

YES -The starting system is OK. Go to step 12.

NO -Go to step 6.

6. 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.

Did the starter crank the engine?

YES -Repairing the loose connection corrected the problem. The starting system is OK. Go to step 12.

NO -Check these items:

- If the starter will not crank the engine at all, go to step 7.
 - If the starter cranks the engine erratically or too slowly, go to step 9.
 - If the starter does not disengage from the torque converter ring gear when you release the key, replace the starter or remove it, and check for the following:
 - Solenoid plunger and switch malfunction
 - Dirty drive gear or damaged overrunning clutch
7. Make sure the shift lever is in the N or P position, 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.

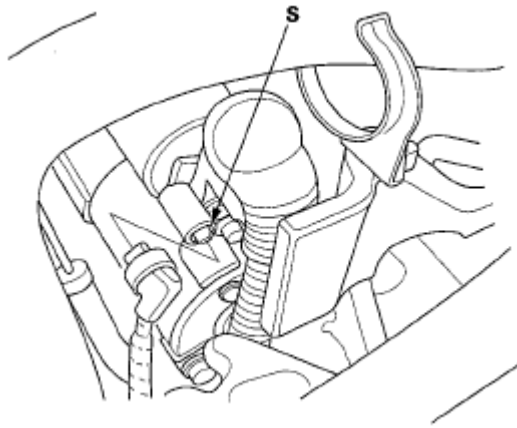


Fig. 4: Identifying Starter Solenoid S Terminal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Did the starter crank the engine?

YES -Go to step 8.

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

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

NOTE: **After the open circuit or high resistance in the circuit is found and repaired, go to step 12.**

- The WHT wire and connectors between the auxiliary under-dash relay holder and the under-hood fuse/relay box.
- The RED wire and connectors between the driver's under-dash fuse/relay box and the auxiliary under-dash relay holder.
- The RED wire, BLK/WHT wire, and connectors between the driver's under-dash fuse/relay box and the starter.
- The ignition switch (see **TEST**).
- The transmission range switch and connector (see **TRANSMISSION RANGE SWITCH TEST**).

- Starter cut relay 1 and the starter cut relay 2 (see **POWER RELAY TEST**).

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

Is the cranking voltage greater than or equal to 7.7 V and is the current draw less than or equal to 400 A?

YES -Go to step 10.

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

- Drag in the starter armature
- Shorted armature winding
- Excessive drag in the engine

10. Check the engine speed while cranking the engine.

Is the engine speed above 100 rpm?

YES -Go to step 11.

NO -Replace the starter, or remove and disassemble it, and check the following until you find the problem:

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

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

12. Select PCM reset (see **PCM RESET**) to cancel ALL INJECTORS OFF on the HDS.

13. Reinstall the battery trim (see step 2 under **UPPER FENDER TRIM REPLACEMENT**).

STARTER SOLENOID TEST

1. Make sure you have anti-theft codes for the audio system and navigation system. Make sure the ignition switch is OFF.
2. Remove the battery trim (see step 2 under **UPPER FENDER TRIM REPLACEMENT**).
3. Disconnect the negative cable from the battery.
4. Disconnect the starter cable (A), BLK/WHT wire (B), and motor cable (C).

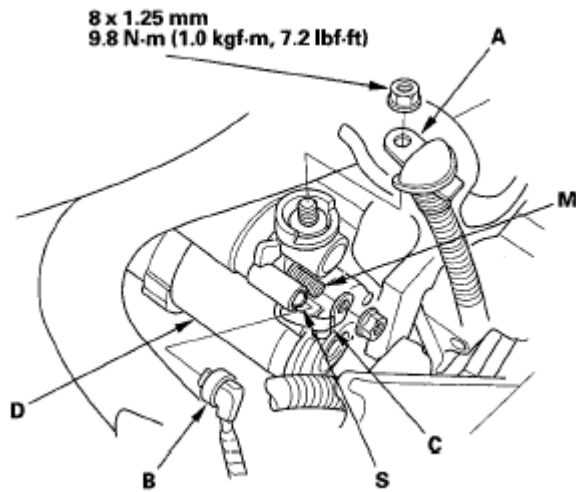


Fig. 5: Identifying Starter Motor Cables With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Check the hold-in coil for continuity between the S terminal and the armature housing (ground) (D). There should be continuity.
 - If there is continuity, go to step 6.
 - If there is no continuity, replace the solenoid.
6. Check the pull-in coil for continuity between the S terminal and the M terminal. There should be continuity.
 - If there is continuity, the solenoid is OK.
 - If there is no continuity, replace the solenoid.
7. Reconnect the starter cable, BLK/WHT wire, and motor cable.
8. Connect the negative cable to the battery.
9. Install the battery trim (see step 2 under **UPPER FENDER TRIM REPLACEMENT**).
10. Do the steering column position memorization procedure (see **STEERING COLUMN POSITION MEMORIZATION**).
11. Enter the anti-theft codes for the audio system and the navigation system.

STARTER PERFORMANCE TEST

1. Disconnect the wire from the M terminal.
2. 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.

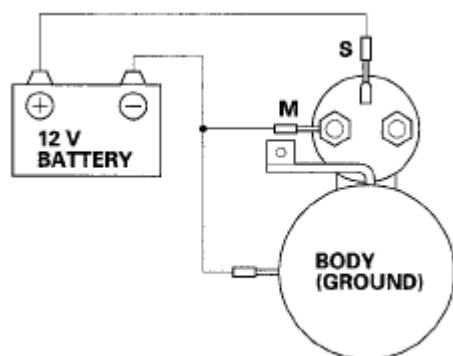


Fig. 6: Testing Starter Pinion - Moves Out
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Connect the battery as shown. Make sure you disconnect the starter motor wire from the solenoid. If the starter pinion moves out, it is working properly.
4. Disconnect the battery from the M terminal. If the pinion does not retract, the hold-in coil of the solenoid is working properly.

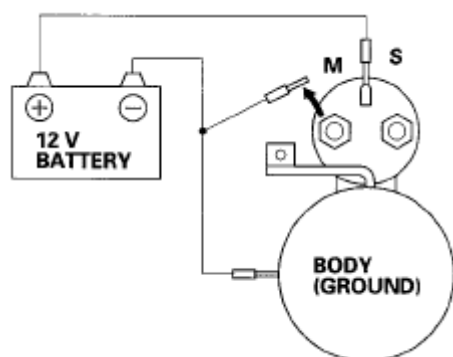


Fig. 7: Testing Starter Pinion Hold-In Coil
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Disconnect the battery from the starter body. If the pinion retracts immediately, it is working properly.

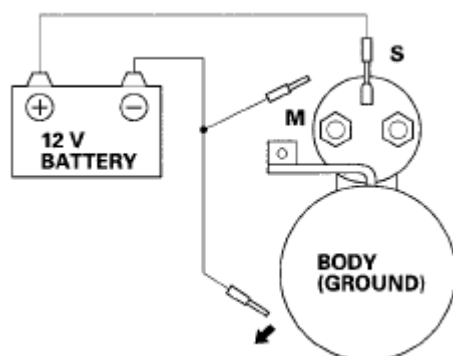


Fig. 8: Testing Starter Pinion - Pinion Retracts
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Firmly clamp the starter in a vise.

7. Reconnect the wire to the M terminal.
8. Connect the starter to the battery as shown in the diagram, and check that the motor turns and keeps rotating.

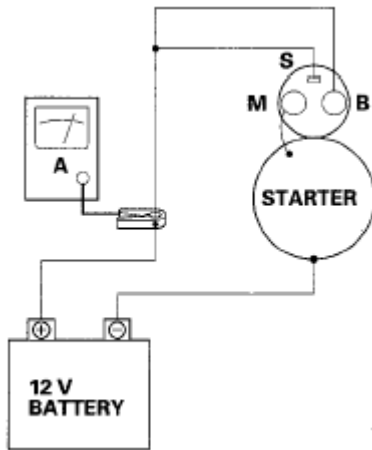


Fig. 9: Checking Starter Motor Turns And Current Draw
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. If the electric current meets the specification when the battery voltage is at 11 V, the starter is working properly.

Specification

Electric Current: 90 A or less

STARTER REMOVAL AND INSTALLATION

REMOVAL

1. Make sure you have the anti-theft codes for the audio system and navigation system. Make sure the ignition switch is OFF.
2. Remove the battery trim (see step 2 under **UPPER FENDER TRIM REPLACEMENT**).
3. Disconnect the negative cable from the battery.
4. Remove the engine cover.

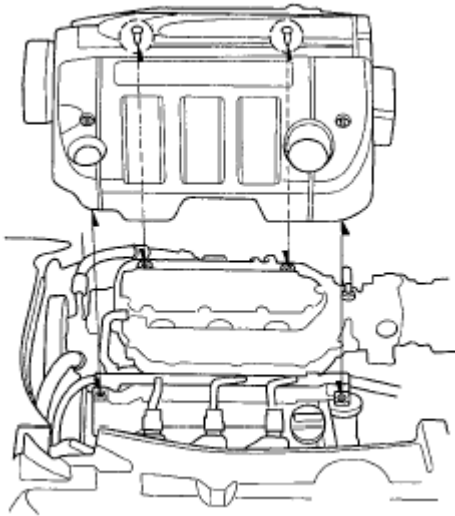


Fig. 10: Identifying Engine Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the vacuum hose (A) and transmission dipstick (B).

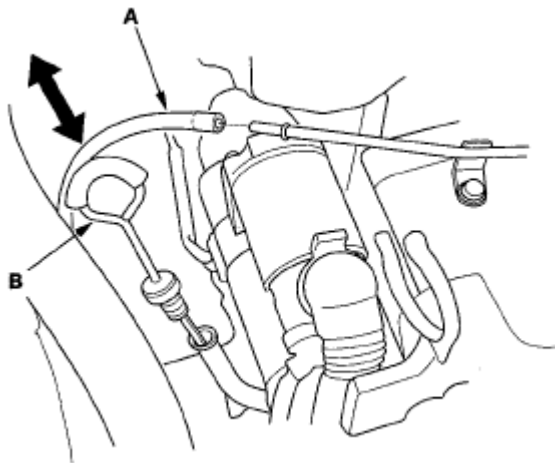


Fig. 11: Removing Vacuum Hose And Transmission Dipstick
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the harness clamp (A).

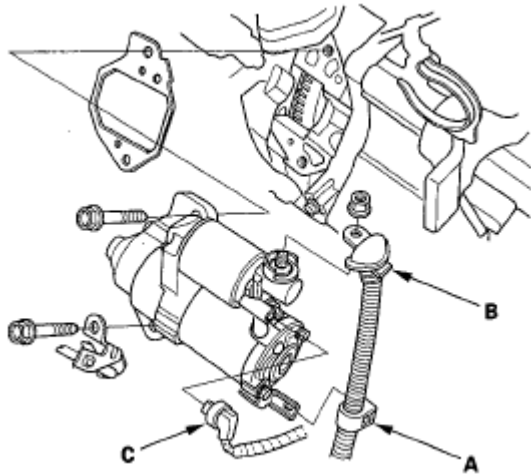


Fig. 12: Identifying Starter Mounting And Wiring
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Disconnect the starter cable (B) from the B terminal, then disconnect the BLK/WHT wire (C) from the S terminal.
8. Remove the two bolts holding the starter, then remove the starter.

INSTALLATION

1. Install the starter (A) using a new gasket (B), then install the harness clamp (C), and connect the B terminal (D) and BLK/WHT wire (E). Make sure the crimped side of the B terminal faces away from the starter when you connect it.

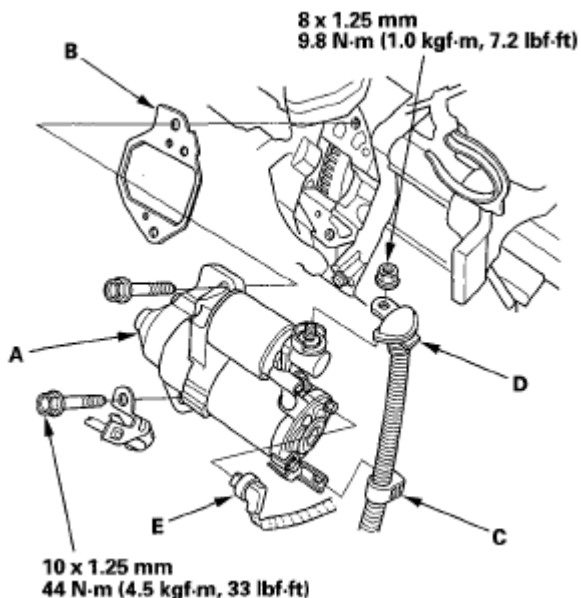


Fig. 13: Identifying Starter Mounting And Wiring With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the vacuum hose (A) and transmission dipstick (B).

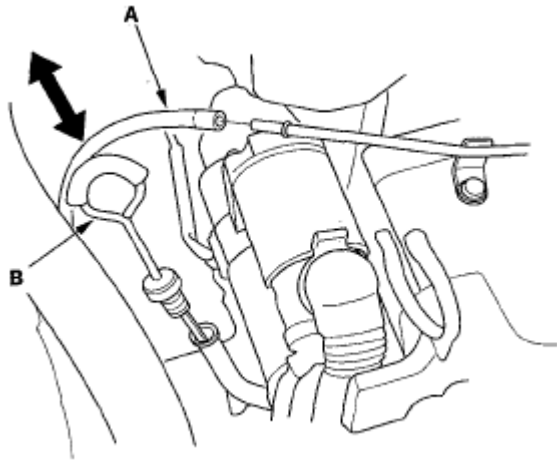


Fig. 14: Installing Vacuum Hose And Transmission Dipstick
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the engine cover.

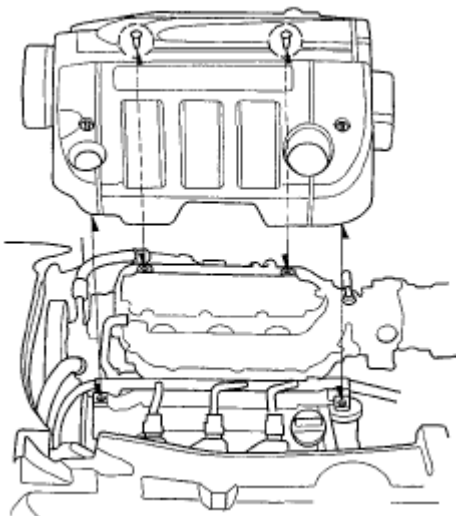


Fig. 15: Identifying Engine Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Connect the negative cable to the battery.
5. Install the battery trim (see step 2 under **UPPER FENDER TRIM REPLACEMENT**).
6. Start the engine to make sure the starter works properly.
7. Do the steering column position memorization procedure (see **STEERING COLUMN POSITION MEMORIZATION**).
8. Enter the anti-theft codes for the audio system and the navigation system.

STARTER OVERHAUL

DISASSEMBLY/REASSEMBLY

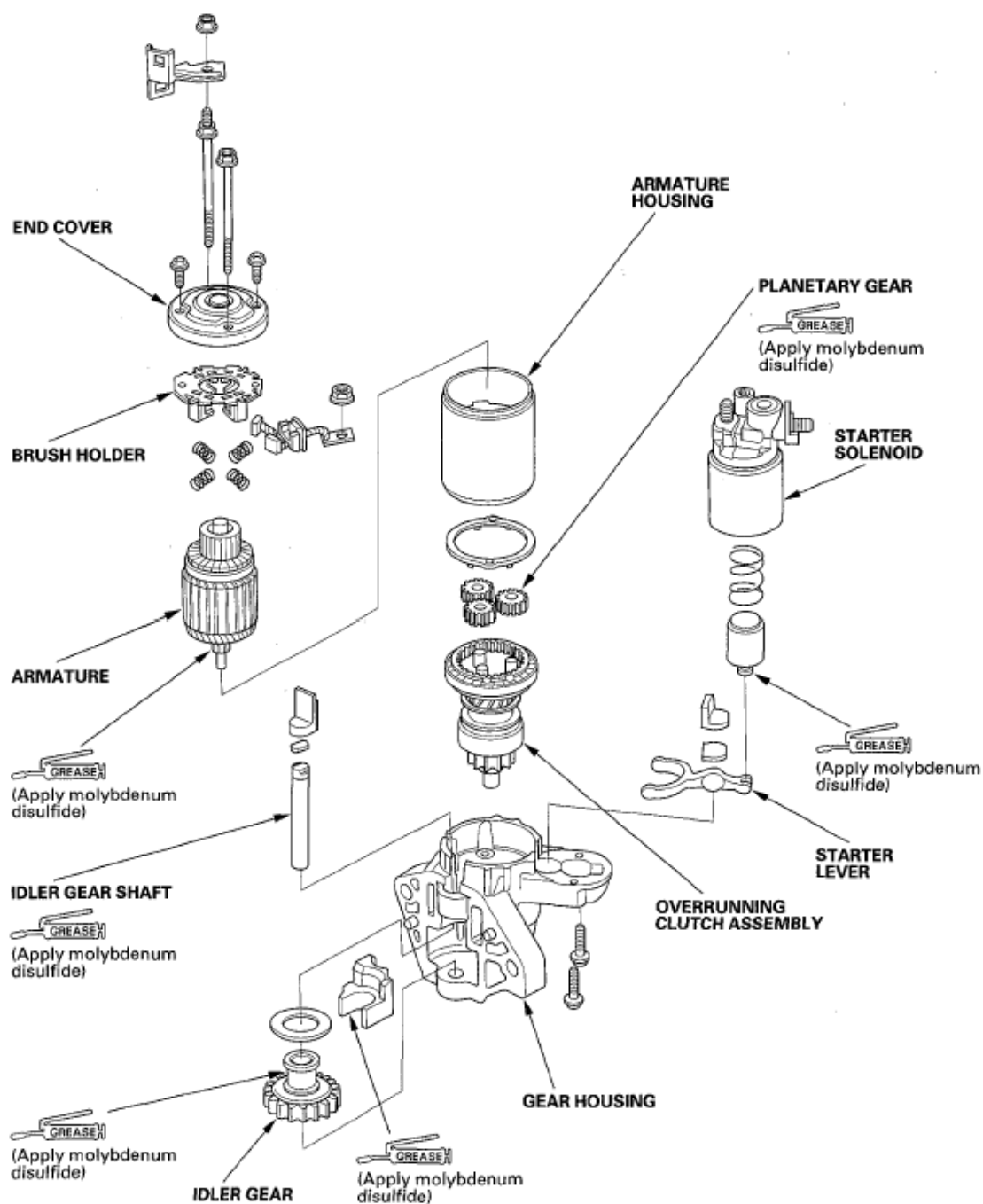


Fig. 16: Exploded View Of Starter Assembly
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

Brush Holder Removal

1. Remove the starter (see **STARTER REMOVAL AND INSTALLATION**).
2. Disconnect the wire from the M terminal, and remove the end cover.
3. Place a plastic pipe with an outside diameter of 29.4 mm (1.16 in.) on the armature.

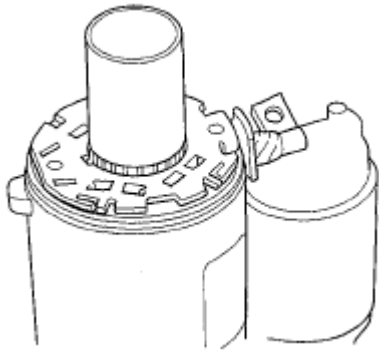


Fig. 17: Identifying Armature

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Move the brush holder (A) up to the pipe (B) while holding the pipe so the brushes do not pop out from the holder.

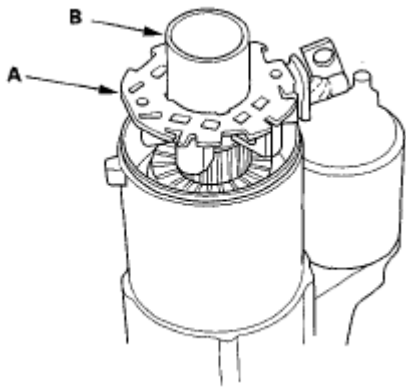


Fig. 18: Identifying Brush Holder And Pipe

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Armature Inspection and Test

5. Disassemble the starter as shown at the beginning of this procedure.
6. Inspect the armature for wear or damage from contact with the permanent magnet. If there is wear or damage, replace the armature.

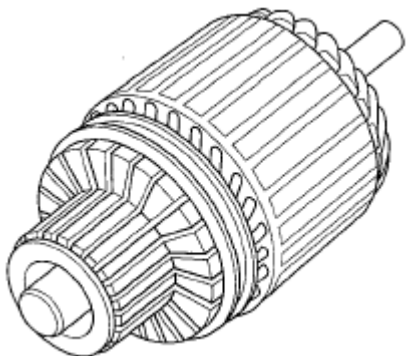


Fig. 19: Identifying Armature

Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. 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 8, or recondition with #500 or #600 sandpaper (B).

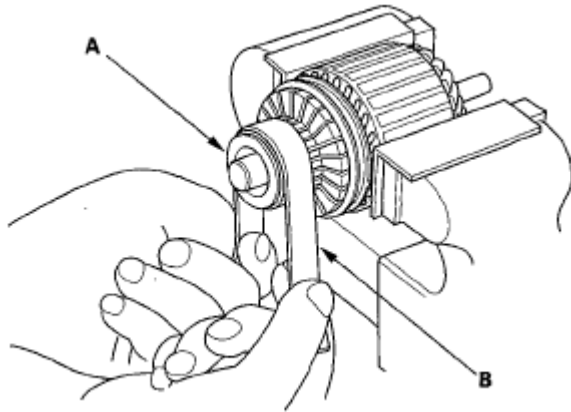


Fig. 20: Cleaning Commutator Surface With Sandpaper
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Check the commutator diameter. If the diameter is out of the service limit, replace the armature.

Commutator Diameter

Standard (New): 29.3-29.5 mm (1.154-1.161 in.)

Service Limit: 28.8 mm (1.134 in.)

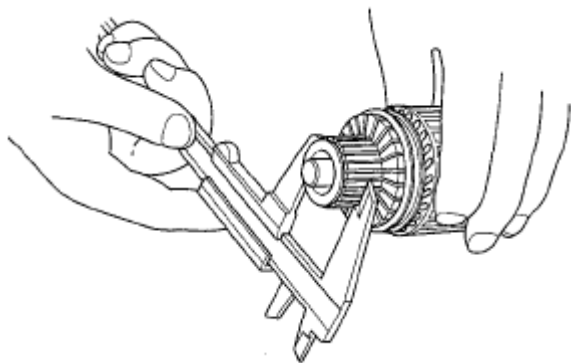


Fig. 21: Checking Commutator Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. 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): 0.05 mm (0.002 in.) max.

Service Limit: 0.1 mm (0.004 in.)

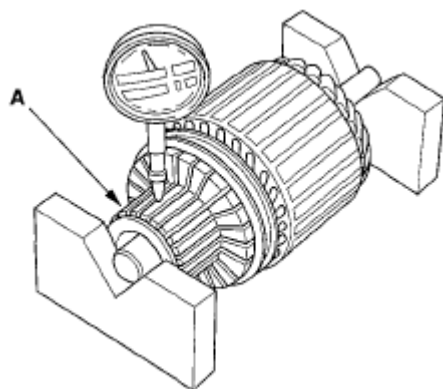


Fig. 22: Checking Commutator Runout
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. 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: 0.20 mm (0.008 in.)

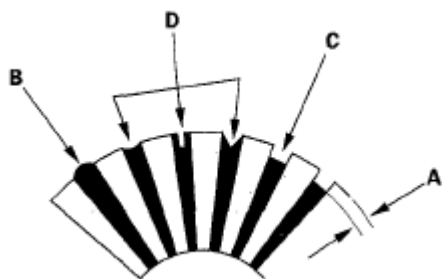


Fig. 23: Identifying Mica Depth
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

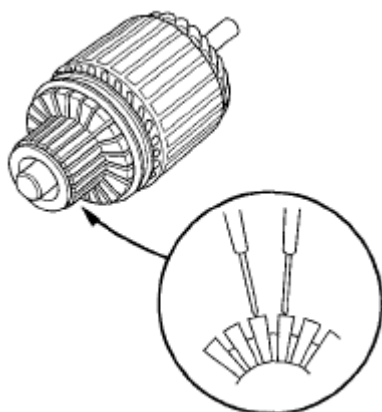


Fig. 24: Checking Continuity Between Segments Of Commutator
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

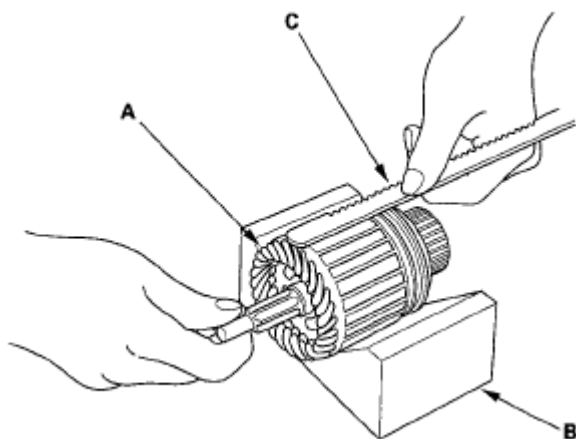


Fig. 25: Holding Hacksaw Blade On Armature Core
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. 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.

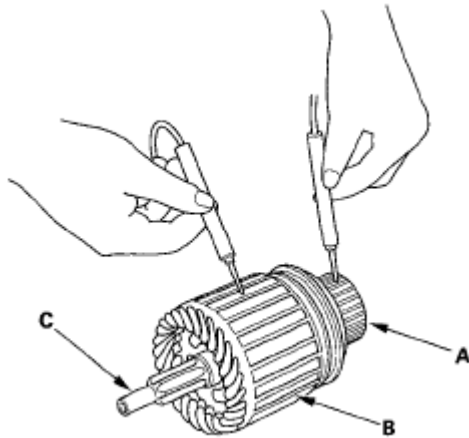


Fig. 26: Checking Continuity Between Commutator And Armature Coil Core
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Starter Brush Inspection

14. Measure the brush length (A). If it is shorter than the service limit, replace the brush holder assembly.

Brush Length

Standard (New): 7.7-8.0 mm (0.30-0.31 in.)

Service Limit: 0.9 mm (0.04 in.)

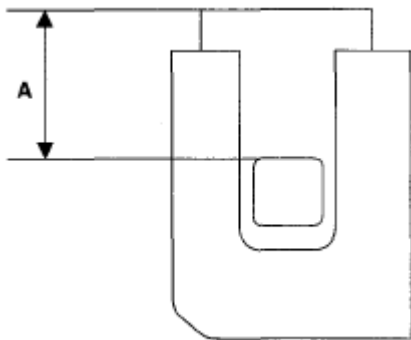


Fig. 27: Identifying Starter Brush Length
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Starter Brush Holder Test

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

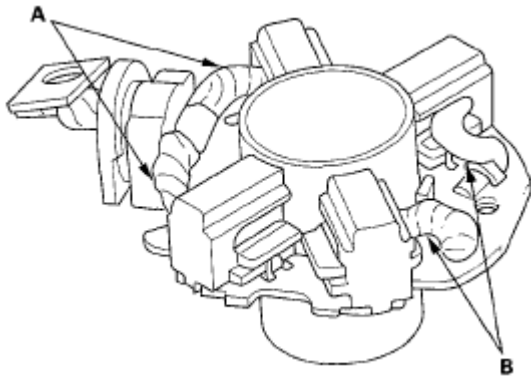


Fig. 28: Identifying Starter Brushes

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Planetary Gear Inspection

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

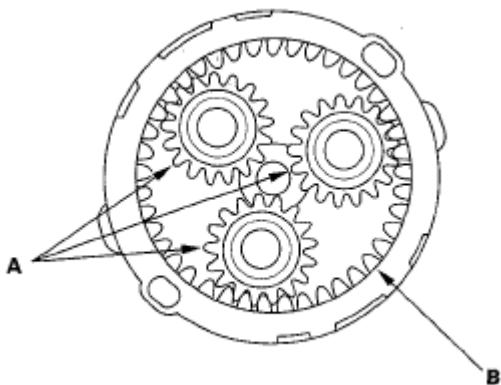


Fig. 29: Identifying Planetary Gears And Ring Gear

Courtesy of AMERICAN HONDA MOTOR CO., INC.

Overrunning Clutch Inspection

17. Slide the overrunning clutch along the shaft. Replace it if it does not slide smoothly.
18. Rotate the overrunning clutch (A) in both directions. It should lock and move upward in one direction and rotate smoothly in the other direction. If it does not lock in either direction, or if it locks both directions, then replace it.

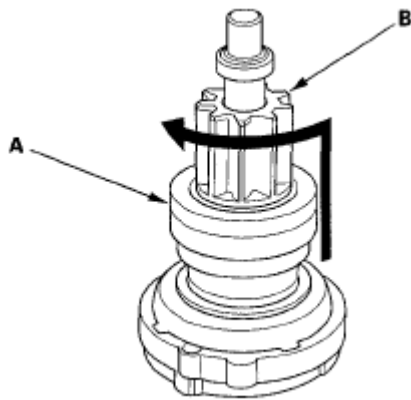


Fig. 30: Checking Overrunning Clutch

Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. If the starter drive gear (B) is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately. Check the condition of the idler gear and drive plate ring gear to see if the starter drive gear teeth are damaged.

Starter Reassembly

20. Install the armature into the housing.
21. Place the brush holder assembly on the armature, then move the brush holder (A) down to the armature.

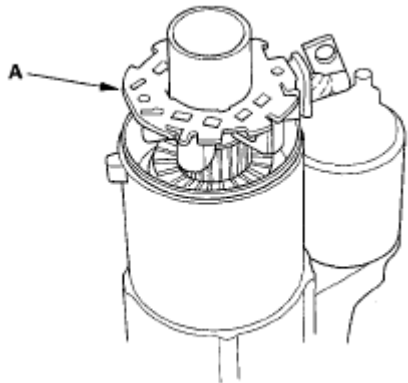


Fig. 31: Identifying Brush Holder

Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Install the end cover to retain the brush holder.

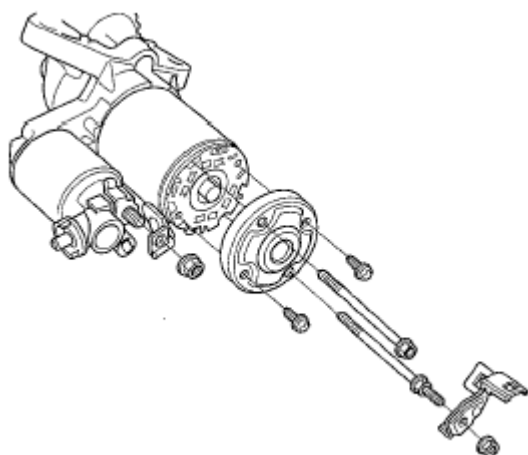


Fig. 32: Identifying End Cover

Courtesy of AMERICAN HONDA MOTOR CO., INC.