2003-06 ELECTRICAL

Charging System - MDX

COMPONENT LOCATION INDEX

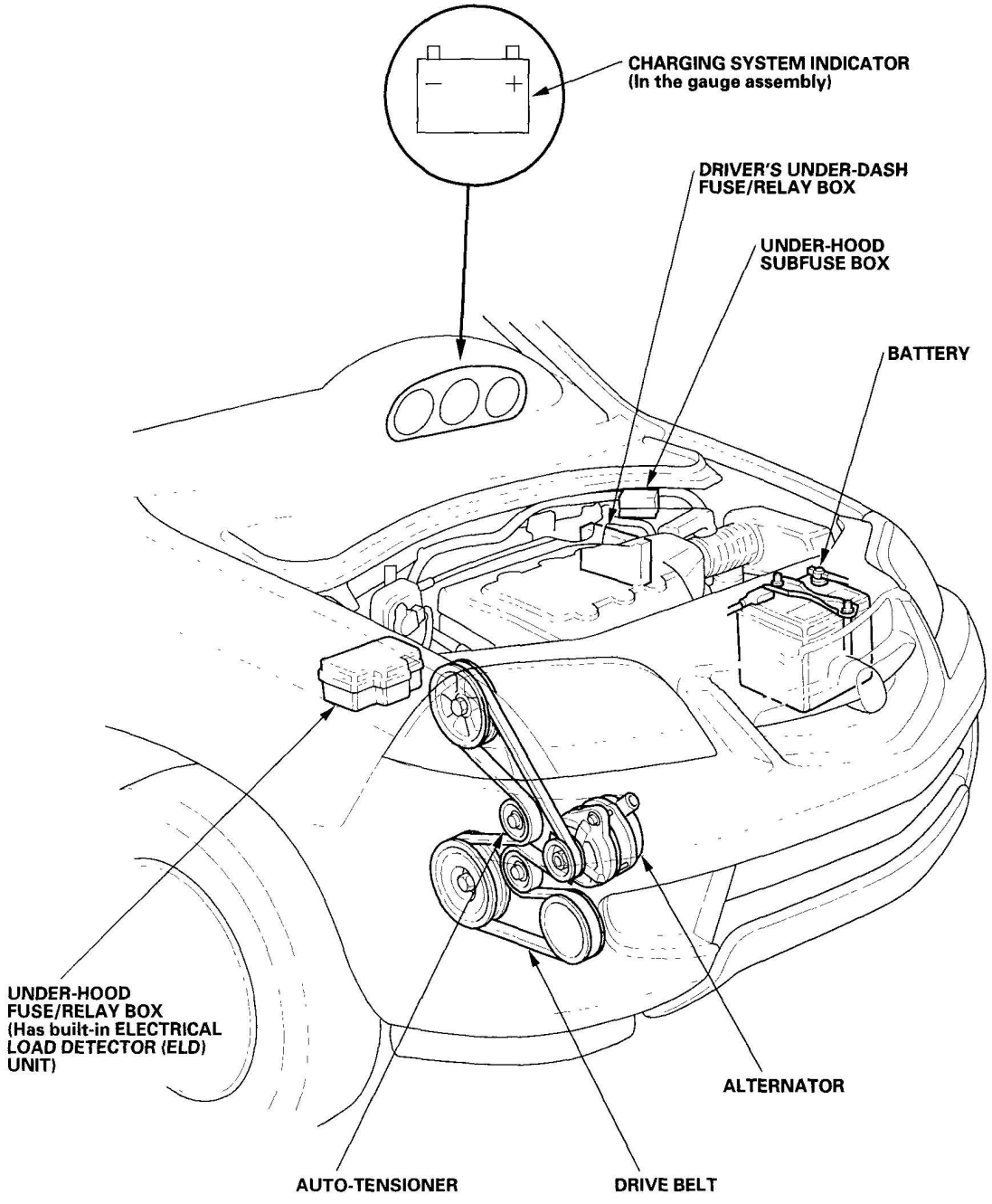

Fig. 1: Identifying Charging System Components Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

SYMPTOM TROUBLESHOOTING INDEX

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Symptom	Diagnostic procedure	Also check for
Charging system indicator does not come on with the ignition switch ON (II) Troubleshoot the charging system indicator circuit (see **CHARGING SYSTEM INDICATOR CIRCUIT TROUBLESHOOTING**). Charging system indicator stays on	1. Troubleshoot the charging system indicator circuit (see **CHARGING SYSTEM INDICATOR CIRCUIT TROUBLESHOOTING**). 2. Check for a broken drive belt (see **DRIVE BELT INSPECTION**). 3. Check the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER INSPECTION**).	
Battery discharged	1. Check for a poor connection and for open or shorted wire(s) in the charging system. 2. Check for parasitic electrical current draw. 3. Check for a broken drive belt (see **DRIVE BELT INSPECTION**). 4. Check the drive belt auto-tensioner (see **DRIVE BELT AUTO-TENSIONER INSPECTION**). 5. Troubleshoot the alternator and regulator circuit (see **ALTERNATOR AND REGULATOR CIRCUIT TROUBLESHOOTING**). 6. Check for a poor connection at the battery terminal. 7. Test the battery (see **BATTERY TEST**).	
Battery overcharged	1. Troubleshoot the alternator and regulator circuit (see **ALTERNATOR AND REGULATOR CIRCUIT TROUBLESHOOTING**). 2. Test the battery (see **BATTERY TEST**).	

CIRCUIT DIAGRAM

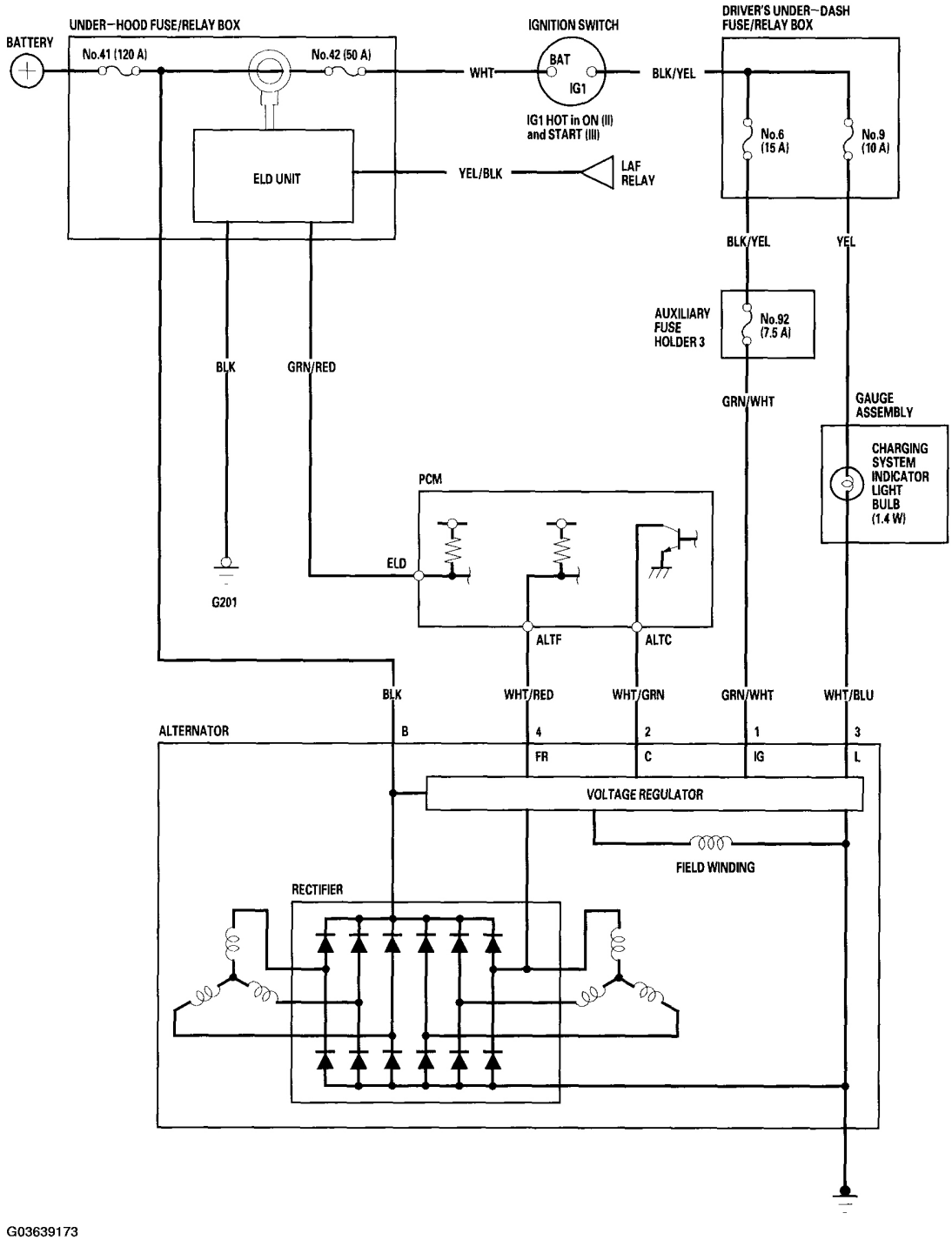

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Fig. 2: Identifying Charging System Circuit Diagram
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CHARGING SYSTEM INDICATOR CIRCUIT TROUBLESHOOTING

1. Turn the ignition switch ON (II).

   Does the charging system indicator come on?

   YES - Go to step 2.

   NO - Go to step 6 .
2. Start the engine.

   Does the charging system indicator go off?

   YES - Charging system indicator circuit is OK. Go to the alternator and regulator circuit troubleshooting (see **ALTERNATOR AND REGULATOR CIRCUIT TROUBLESHOOTING**).

   NO - Go to step 3.
3. Turn the ignition switch OFF.
4. Disconnect the alternator 4P connector.
5. Turn the ignition switch ON (II).

   Does the charging system indicator come on?

   YES - Turn the ignition switch OFF, and repair a short in the wire between the alternator and the gauge assembly.

   NO - Go to step 9 .
6. Turn the ignition switch OFF.
7. Disconnect the alternator 4P connector.
8. Connect alternator 4P connector terminal No. 3 to body ground with a jumper wire. Turn the ignition switch ON (II).

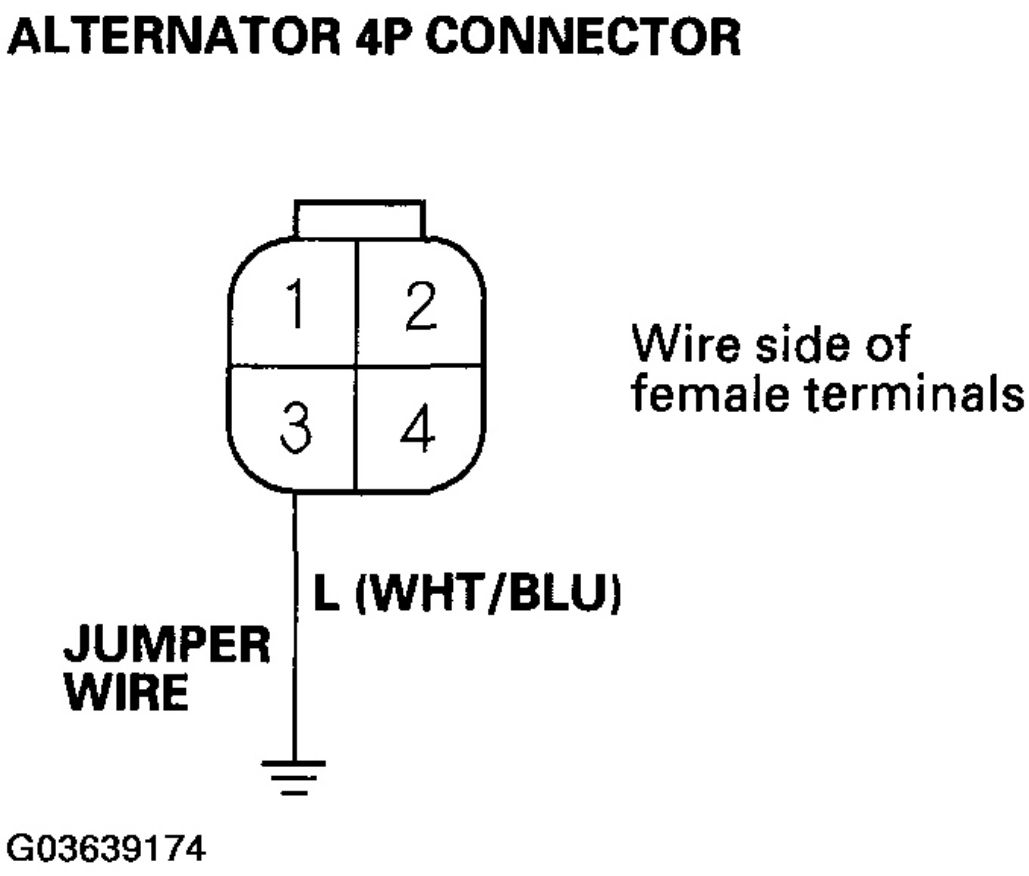

Fig. 3: Connecting Alternator 4P Connector Terminal No. 3 To Body Ground With Jumper Wire
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Does the charging system indicator come on?

YES - Go to step 9.

NO - Turn the ignition switch OFF. Check for a blown No. 9 (10 A) fuse in the driver's under-dash fuse/relay box and a blown charging system light bulb. If the fuse and bulb are OK, repair an open in the wire between the alternator and the gauge assembly and/or the gauge assembly and the driver's under-dash fuse/relay box.

9. Measure the voltage between alternator 4P connector terminal No. 1 and body ground. Turn the ignition switch ON (II).

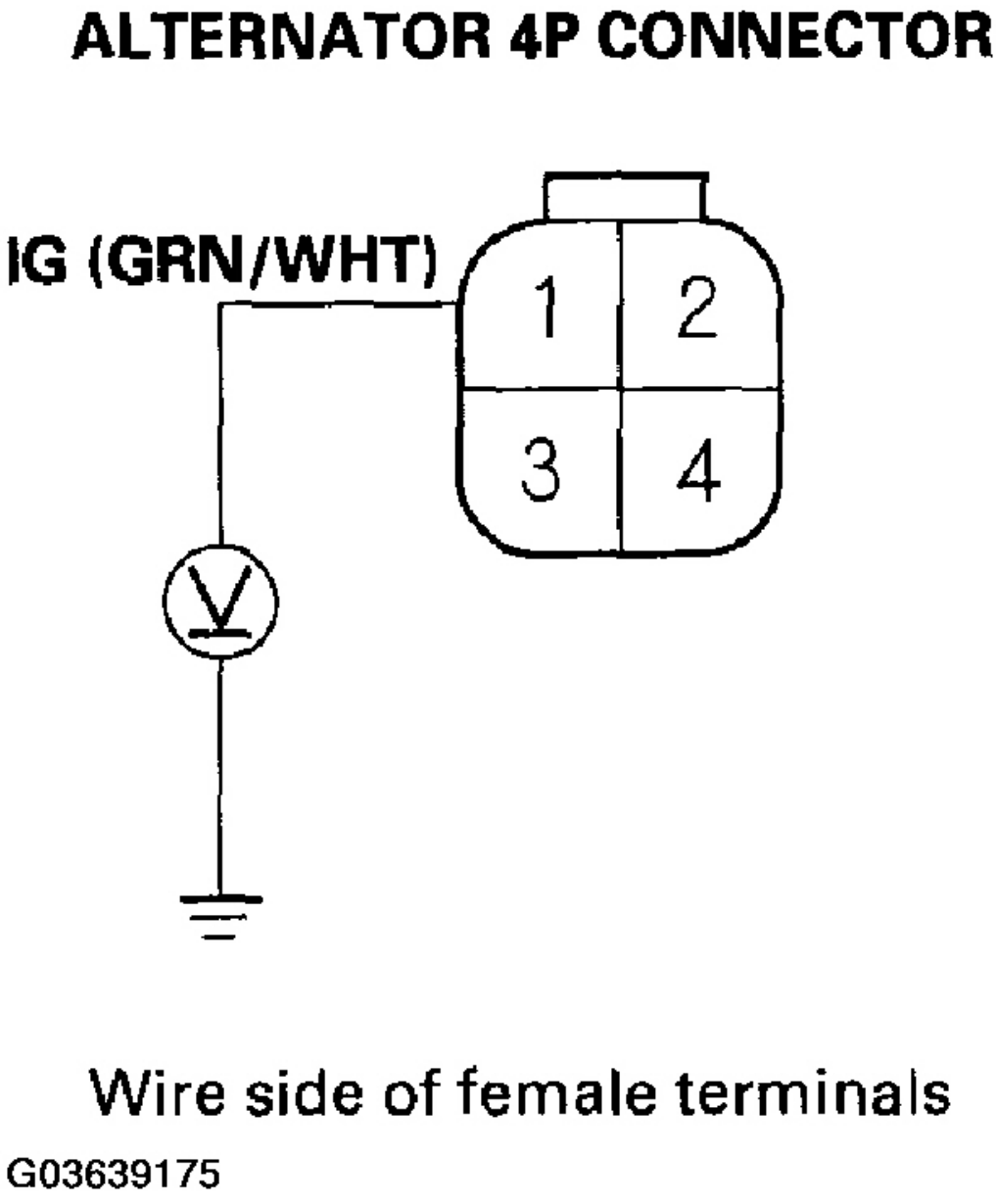

Fig. 4: Measuring Voltage Between Alternator 4P Connector Terminal No. 1 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there battery voltage?

YES - Go to alternator and regulator circuit troubleshooting (see **ALTERNATOR AND**

REGULATOR CIRCUIT TROUBLESHOOTING).

NO - Check for a blown No. 6(15 A) fuse in the driver's under-dash fuse/relay box and No. 92 (7.5 A) fuse in the auxiliary fuse holder 3. If the fuses are OK, repair an open in the wire between the alternator and auxiliary fuse holder 3, or auxiliary fuse holder 3 and driver's under-dash fuse/relay box.

ALTERNATOR AND REGULATOR CIRCUIT TROUBLESHOOTING

1. Make sure the battery connections are good and the battery is sufficiently charged.
2. Connect a VAT-40 (or equivalent tester), and turn the selector switch to position 1 (starting).

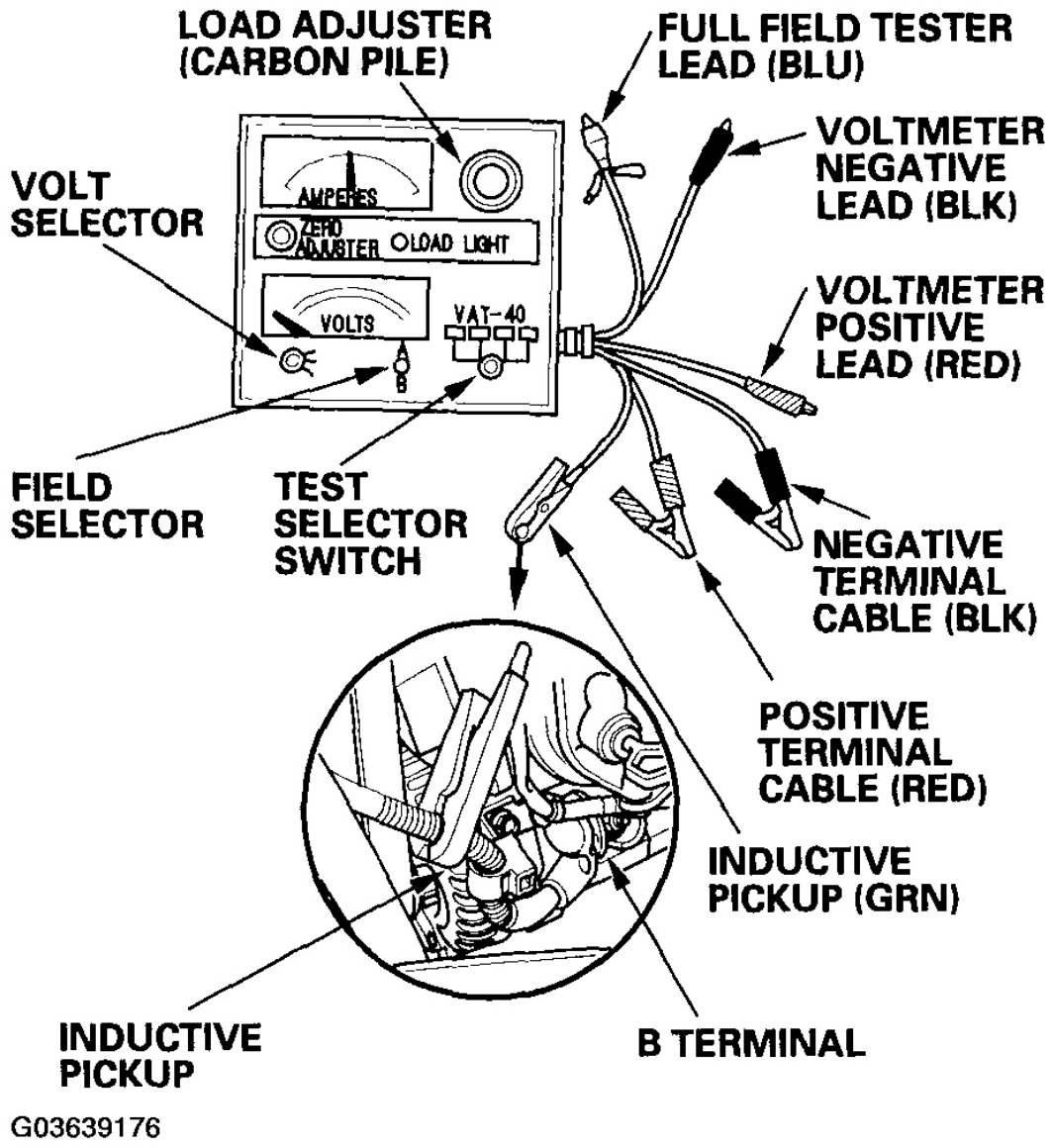

Fig. 5: Connecting VAT-40 And Turning Selector Switch To Position 1
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Start the engine. Hold the engine at 3,000 rpm, without load and with the shift lever in P or N until the radiator fan comes on, then let it idle.
4. Raise the engine speed to 2,000 rpm, and hold it there.

Is the voltage over 15.1 V?

YES - Replace the alternator (see **ALTERNATOR REMOVAL AND INSTALLATION**) or rear

housing assembly (see **ALTERNATOR OVERHAUL**).

NO - Go to step 5.

5. Release the accelerator pedal, and let the engine idle.
6. Make sure the all accessories are turned off. Turn the selector switch to position 2 (charging).
7. Remove the inductive pickup, and zero the ammeter.
8. Place the inductive pickup over the B terminal wire of the alternator so the arrow points away from the alternator.
9. Raise the engine speed to 2,000 rpm, and hold it there.

Is the voltage less than 13.5 V?

YES - Go to alternator control circuit troubleshooting (see **ALTERNATOR CONTROL CIRCUIT TROUBLESHOOTING**).

NO - Go to step 10.

10. Apply a load with the VAT-40 until the battery voltage drops within 12-13.5 V.

Is the amperage 87.5 A or more?

YES - The charging system is OK.

NO - Replace the alternator (see **ALTERNATOR REMOVAL AND INSTALLATION**) or repair the alternator (see **ALTERNATOR OVERHAUL**).

ALTERNATOR CONTROL CIRCUIT TROUBLESHOOTING

1. Connect the Honda Diagnostic System (HDS) to the data link connector (DLC), and check for DTCs (see **HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)**). If a DTC is present, diagnose and repair the cause before continuing with this test.
2. Disconnect the alternator 4P connector.
3. Start the engine, and turn on the headlights to high beam.
4. Measure the voltage between alternator 4P connector terminal No. 2 and the positive terminal of the battery.

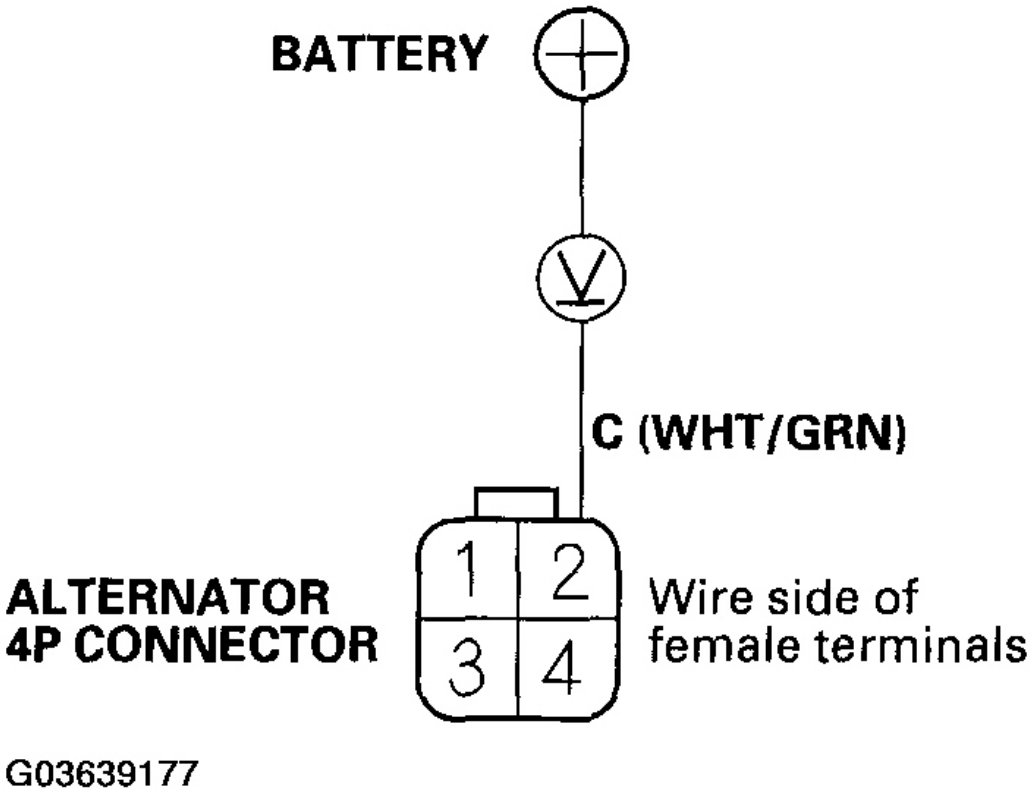

Fig. 6: Measuring Voltage Between Alternator 4P Connector Terminal No. 2 And Positive Terminal Of Battery
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there 1 V or less?

YES - Go to step 10 .
NO - Go to step 5.

5. Turn off the headlights.
6. With the ignition switch ON (II), connect the Honda Diagnostic System (HDS) to the data link connector (DLC) (see step 2 in **HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)**), and go into any of the live data screens.

NOTE: Steps 6 through 8 must be done to protect the powertrain control module (PCM) from damage.

7. Turn the ignition switch OFF.

8. Select "SCS" mode using the HDS.
9. Disconnect PCM connector A (73P).
10. Check for continuity between PCM connector A terminal No. 23 and body ground.

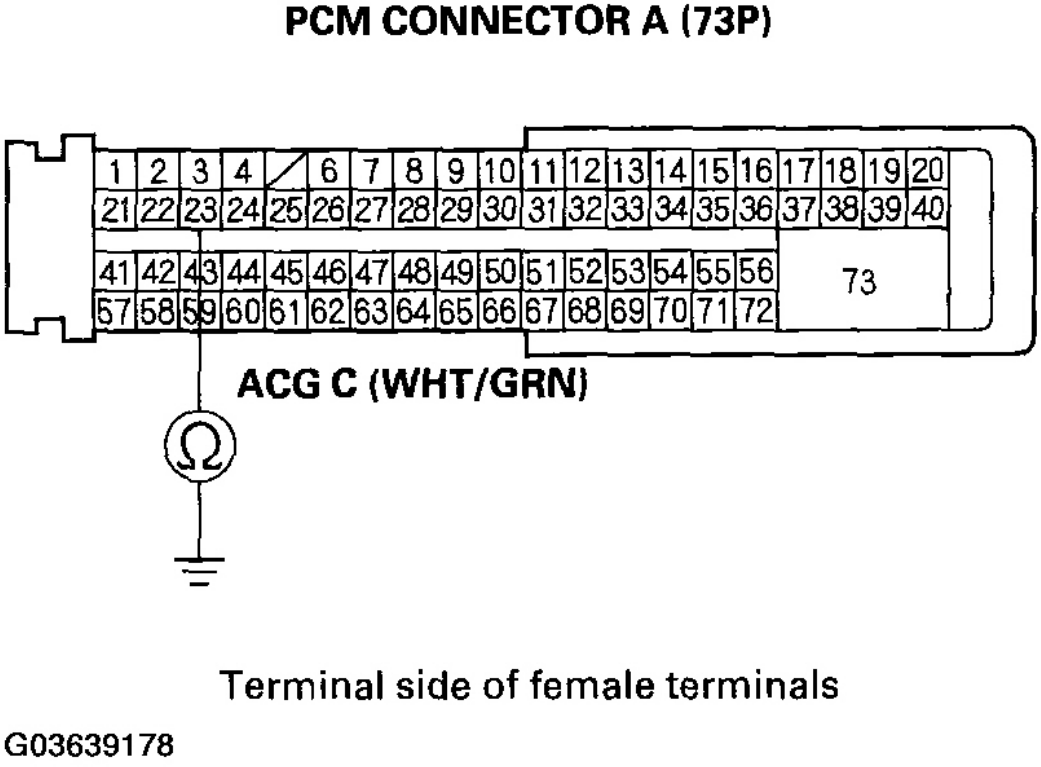

Fig. 7: Checking Continuity Between PCM Connector A Terminal No. 23 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES - Repair a short to ground in the wire between the alternator and the PCM.

NO - Update the PCM if it does not have the latest software (see **PCM UPDATING AND SUBSTITUTION FOR TESTING**), or substitute a known-good PCM (see **HOW TO SUBSTITUTE THE PCM**), then recheck. If the prescribed voltage is now available, and the PCM was updated, troubleshooting is complete. If the PCM was substituted, replace the original PCM (see **PCM REPLACEMENT**).

11. Turn off the headlights.
12. With the ignition switch ON (II), connect the HDS to the DLC (see step 2 in **HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)**), and go into any of the live screens.

NOTE: Steps 12 through 14 must be done to protect the PCM from damage.

13. Turn the ignition switch OFF.
14. Turn the HDS off and then back on. Select "SCS" mode using the HDS.
15. Disconnect PCM connector A (73P).
16. Check for continuity between PCM connector A terminal No. 23 and alternator 4P connector terminal No. 2.

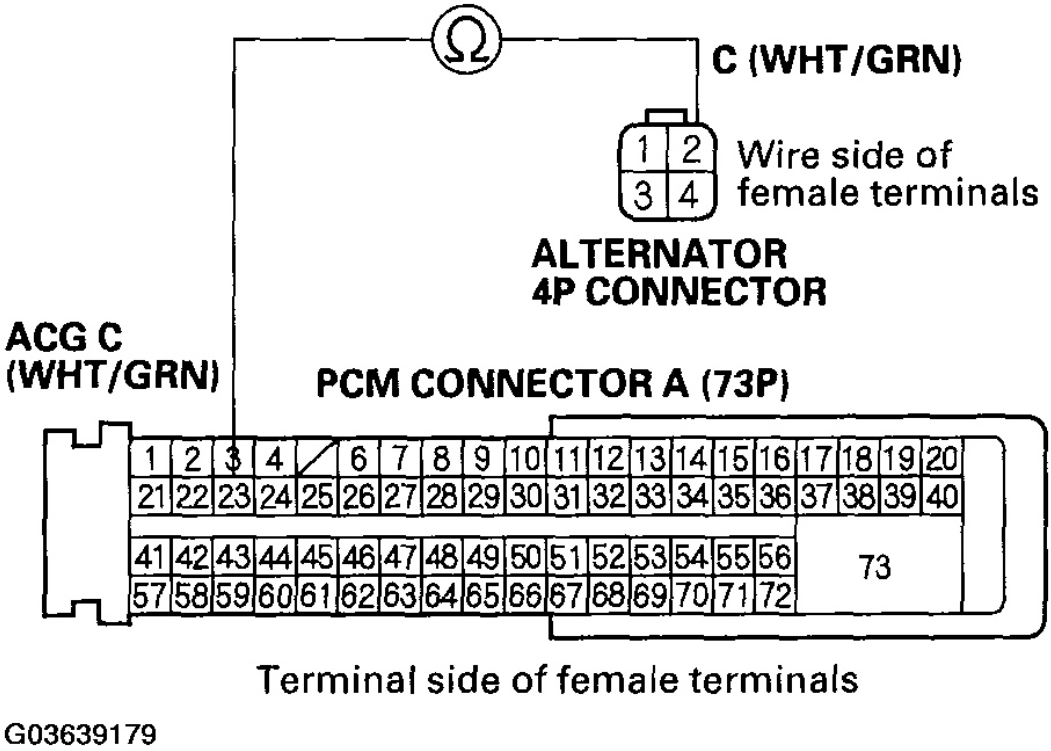

Fig. 8: Checking Continuity Between PCM Connector A Terminal No. 23 And Alternator 4P Connector Terminal No. 2
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES - Replace the alternator (see **ALTERNATOR REMOVAL AND INSTALLATION**) or repair the alternator (see **ALTERNATOR OVERHAUL**).

NO - Repair an open in the wire between the alternator and the PCM.

DRIVE BELT INSPECTION

1. Inspect the belt for cracks and damaged. If the belt is cracked or damaged, replace it.
2. Check that the auto-tensioner indicator (A) is within the standard range (B) as shown in **Fig. 9** . If it is out of the standard range, replace the drive belt (see **DRIVE BELT REPLACEMENT**).

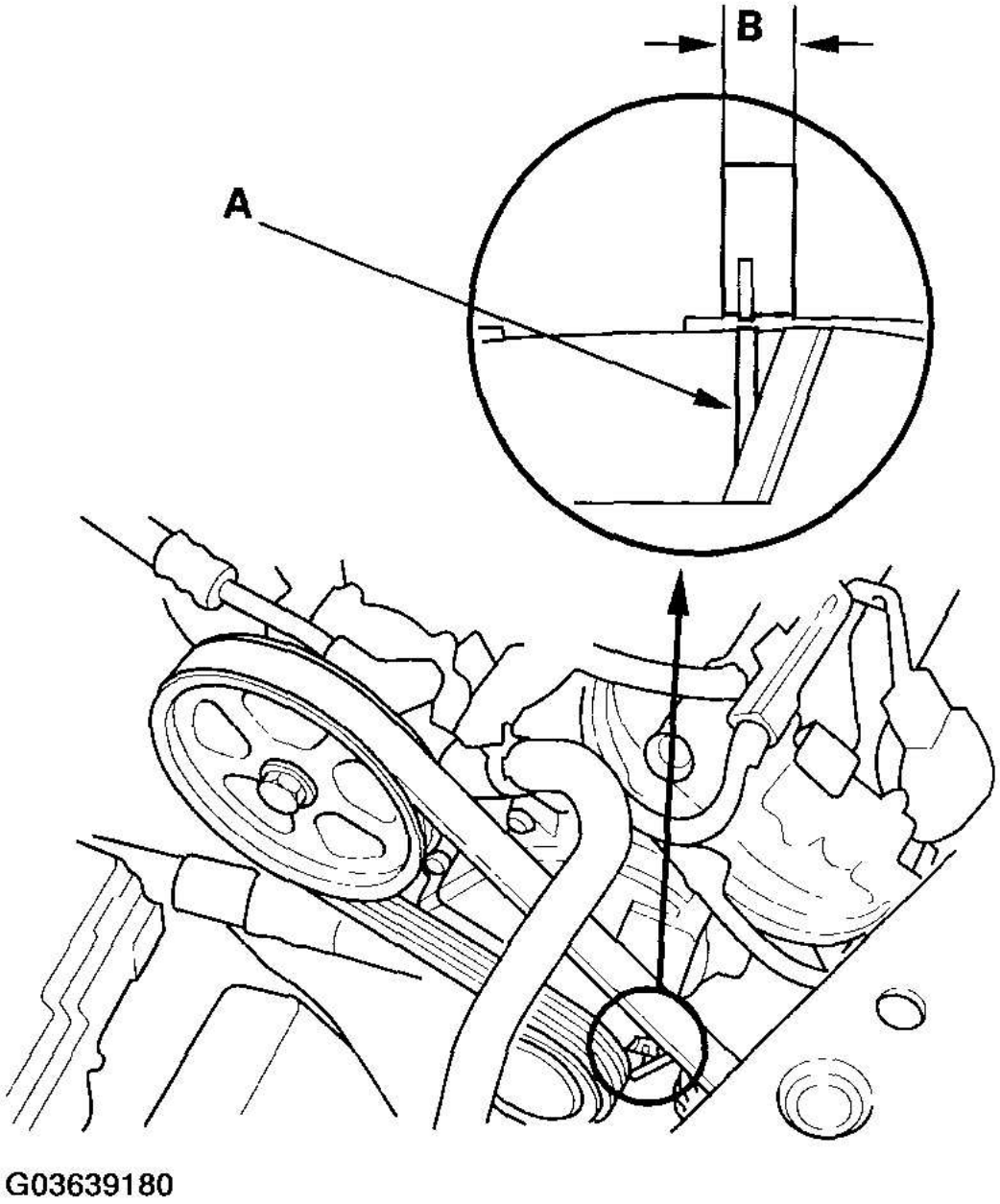

Fig. 9: Checking Auto-Tensioner Is Within Standard Range
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DRIVE BELT REPLACEMENT

Special Tools Required

Belt tension release tool Snap-on YA9317 or equivalent, commercially available

1. Move the auto-tensioner (A) with the belt tension release tool to relieve tension from the drive belt (B), then remove the drive belt.

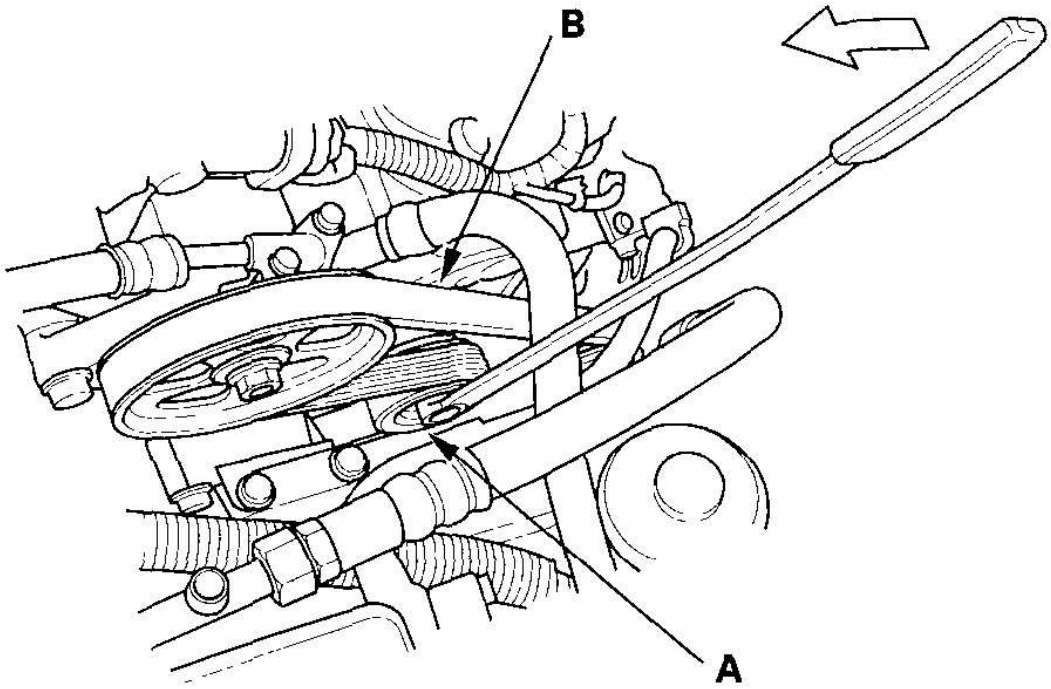

Fig. 10: Moving Auto-Tensioner With Belt Tension Release Tool To Relieve Tension From Drive Belt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Install the new belt in the reverse order of removal.

NOTE: For belt routing, see the Charging System Component Location Index (see COMPONENT LOCATION INDEX).

DRIVE BELT AUTO-TENSIONER INSPECTION

Special Tools Required

Belt tension release tool Snap-on YA9317 or equivalent, commercially available

1. Turn the ignition switch ON (II), then make sure to turn the A/C switch OFF.
2. With the engine OFF, check the position of the auto-tensioner indicator's pointer (A). Start the engine, then check the position again with the engine idling. If the position of the indicator moves or fluctuates very much, replace the auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).

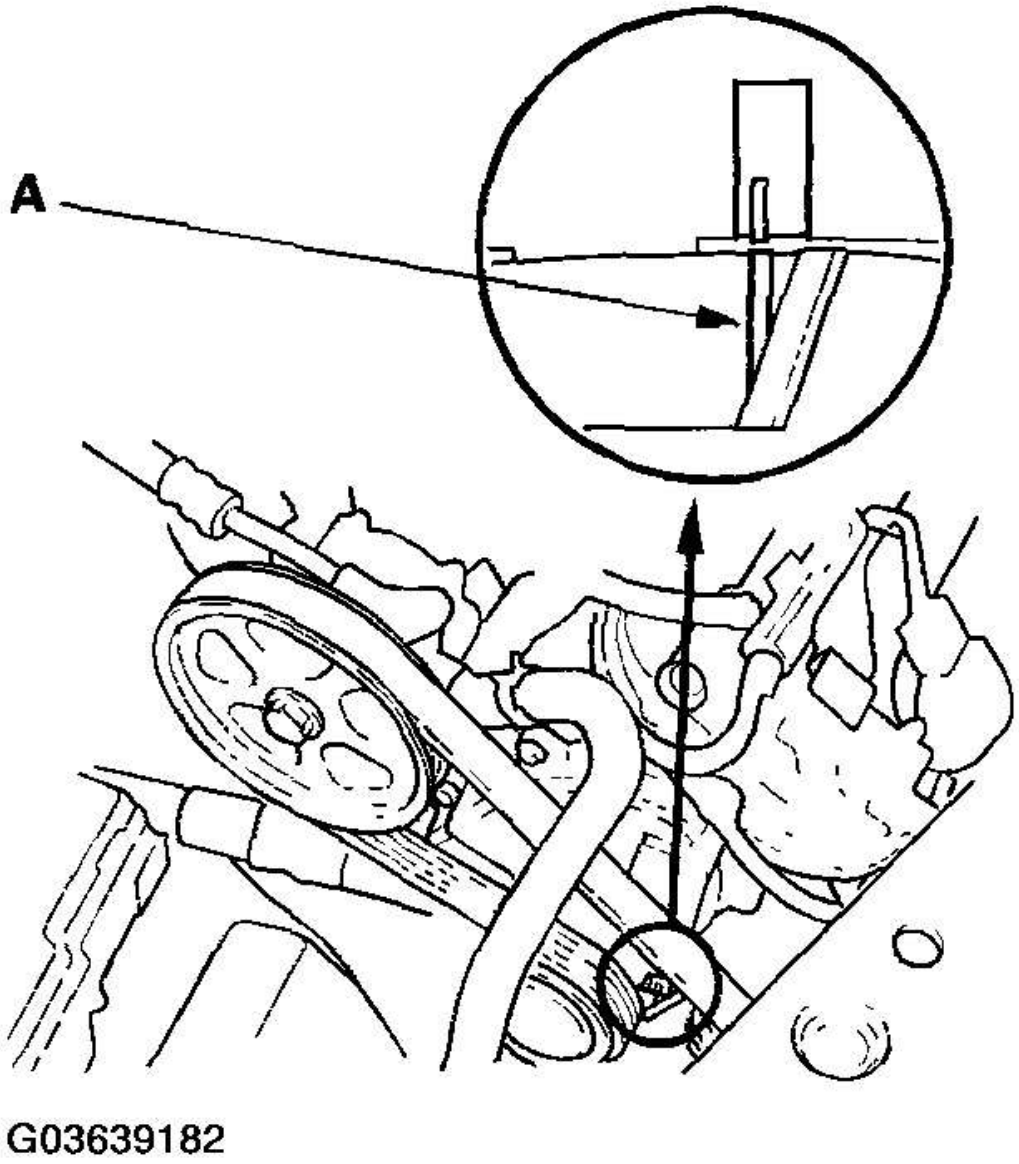

Fig. 11: Checking Position Of Auto-Tensioner Indicator's Pointer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Check for abnormal noise from the tensioner pulley. If you hear abnormal noise, replace the auto-tensioner pulley.
4. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
5. Move the auto-tensioner within its limit with the belt tension release tool in the direction shown. Check

that the tensioner moves smoothly and without any abnormal noise. If the tensioner does not move smoothly or you hear abnormal noise, replace the auto-tensioner.

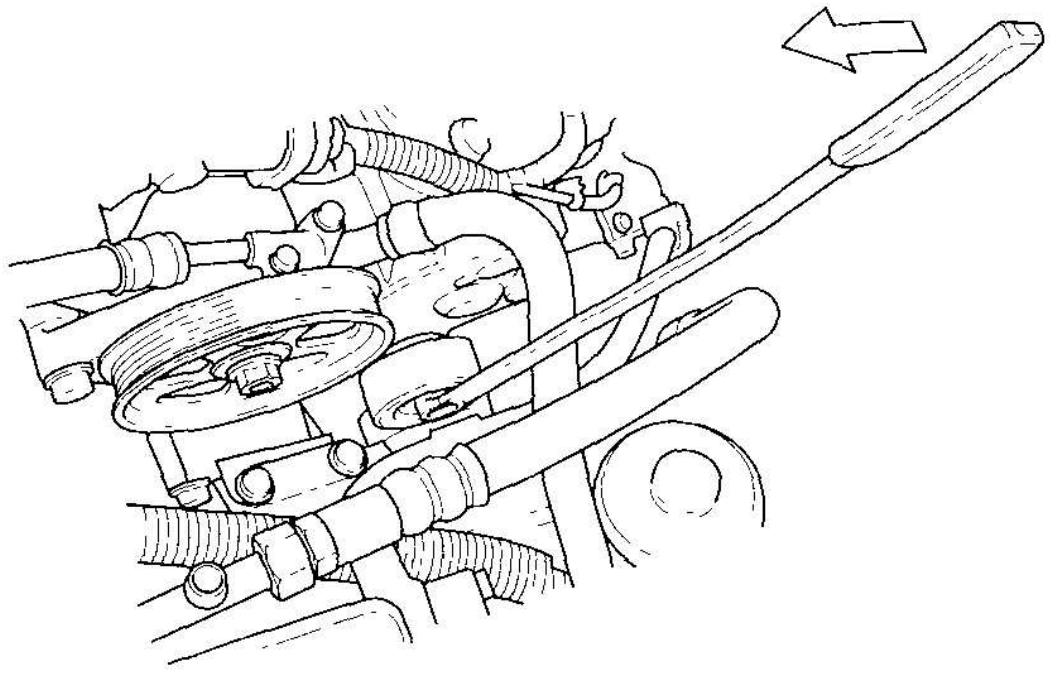

Fig. 12: Moving Auto-Tensioner With Belt Tension Release Tool
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
7. Clamp the auto-tensioner (A) by using a 10 mm bolt (B), 8 mm bolt (C), and a vise (D) as shown in **Fig. 13** . Do not clamp the auto-tensioner itself.

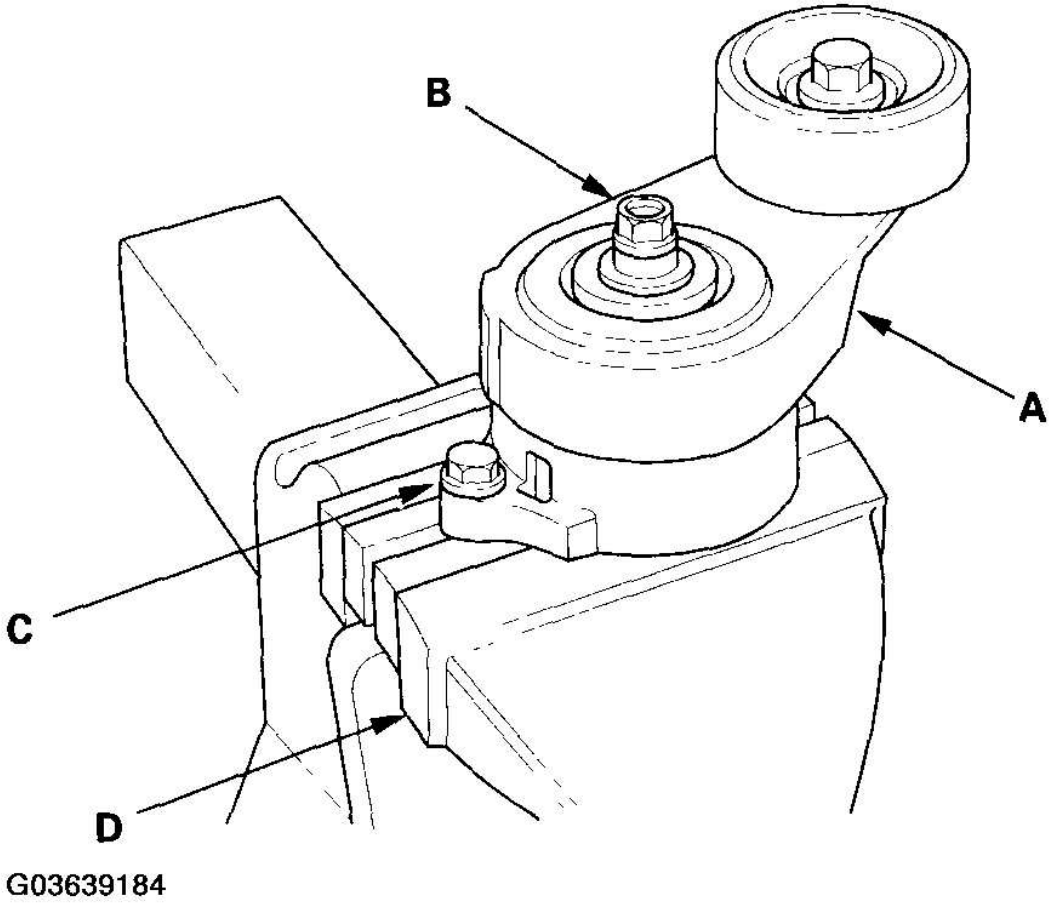

Fig. 13: Clamping Auto-Tensioner Using Bolts And Vise
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Attach a torque wrench (A) to the pulley bolt. Measure the torque when the tensioner is turned counterclockwise. If the torque is less than the specified value, replace the auto-tensioner.

Auto-tensioner Spring Torque: 50.5 N.m (5.15 kgf.m, 37.2 lbf.ft)

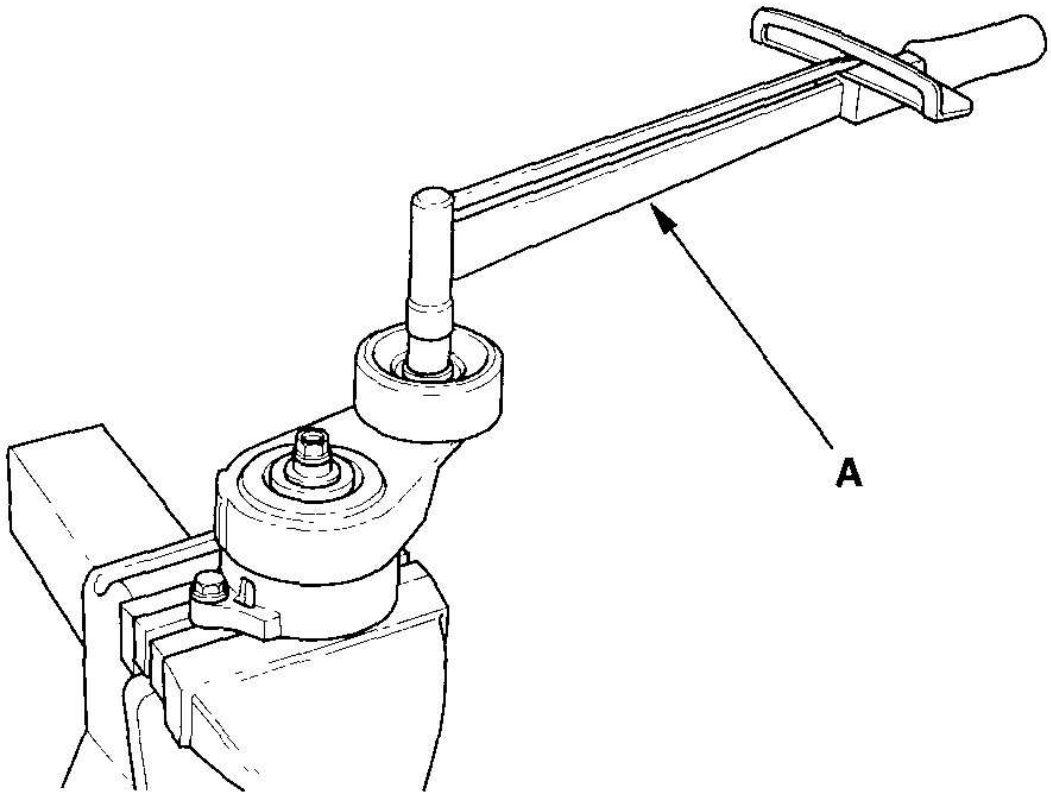

Fig. 14: Attaching Torque Wrench To Pulley Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DRIVE BELT AUTO-TENSIONER REPLACEMENT

1. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
2. Remove the splash shield (see step 25 in **ENGINE REMOVAL**).
3. Remove the auto-tensioner.

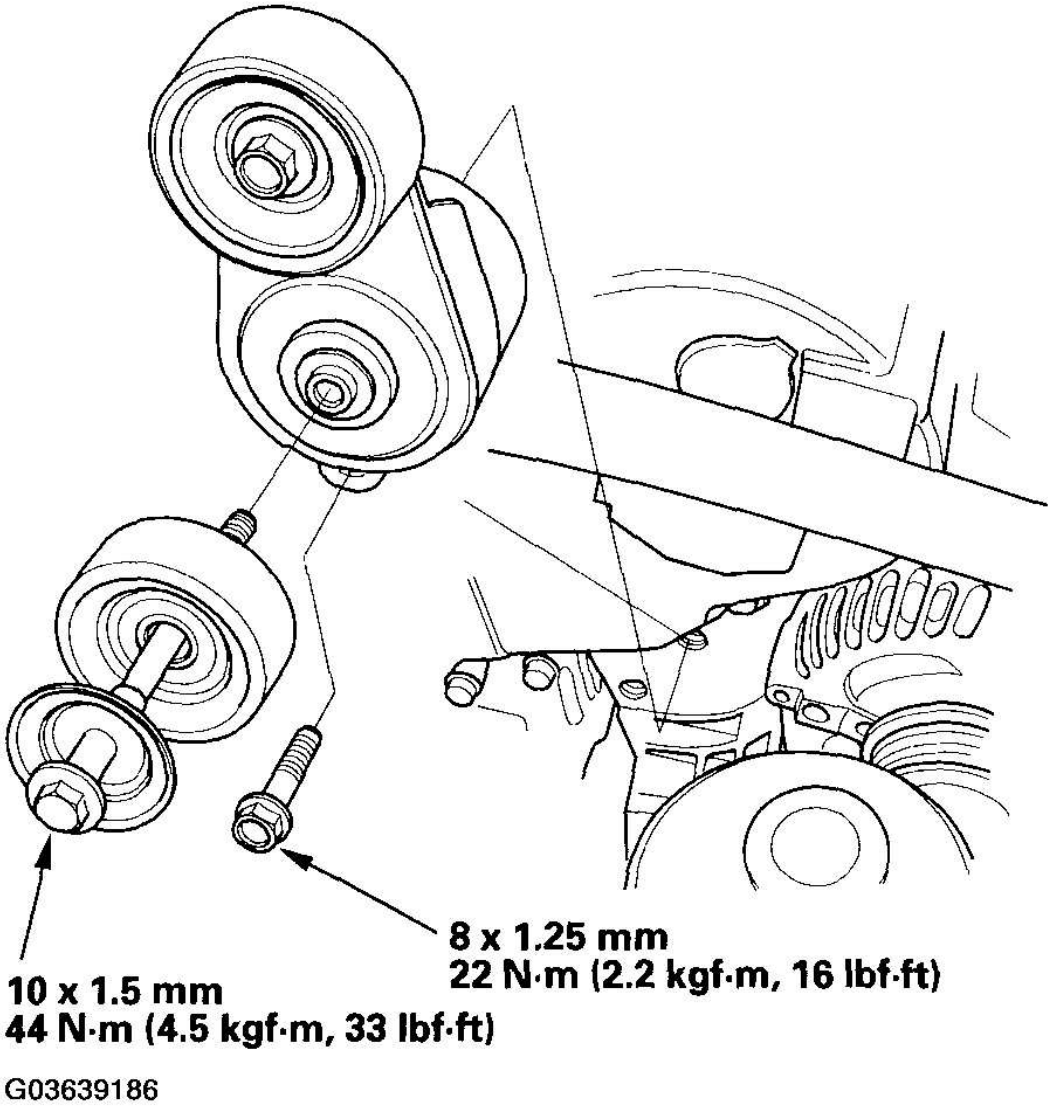

Fig. 15: Removing Auto-Tensioner
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the auto-tensioner in the reverse order of removal.

TENSIONER PULLEY REPLACEMENT

1. Remove the auto-tensioner (see **DRIVE BELT AUTO-TENSIONER REPLACEMENT**).
2. Remove the pulley bolt (A) (left-hand threads), and remove the tensioner pulley (B).

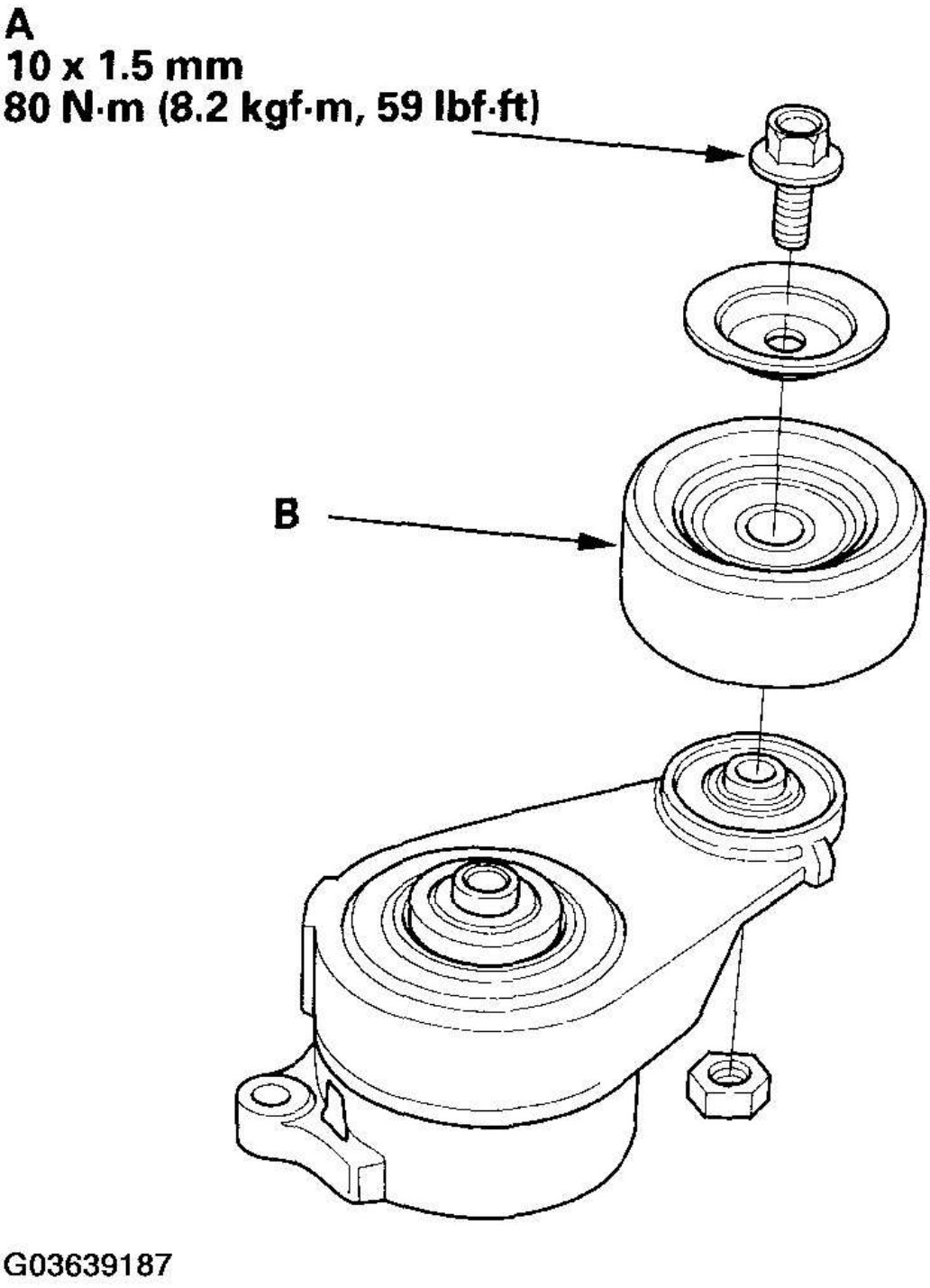

Fig. 16: Removing Pulley Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the tensioner pulley in the reverse order of removal.

ALTERNATOR REMOVAL AND INSTALLATION

REMOVAL

1. Make sure you have the anti-theft codes for the radio and the navigation system, then write down the customer's audio presets. Make sure the ignition switch is OFF.
2. Disconnect the negative cable from the battery first, then disconnect the positive cable.
3. Remove the intake manifold cover and ignition coil cover (see **IGNITION COIL REMOVAL/INSTALLATION**).
4. Remove the drive belt (see **DRIVE BELT REPLACEMENT**).
5. Remove the harness clamp (A), then remove the bracket (B).

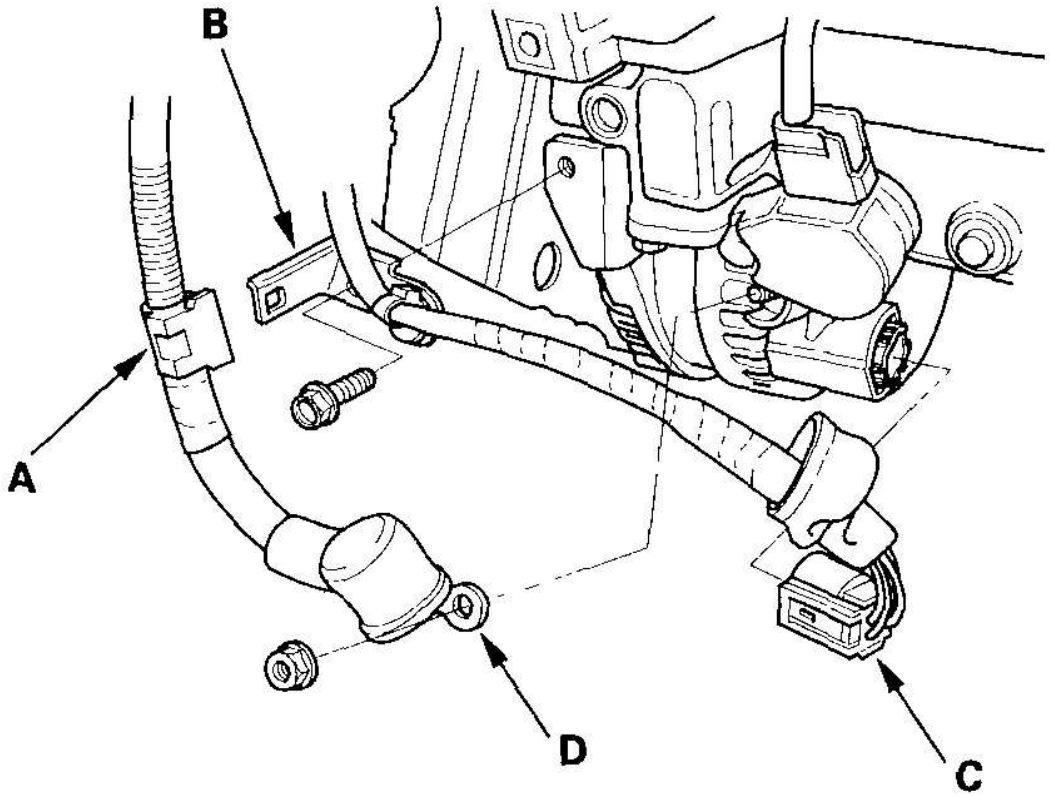

Fig. 17: Removing Harness Clamp And Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Disconnect the alternator connector (C) and the BLK wire (D) from the alternator.
7. Remove the mounting bolt (A) and alternator bracket mounting bolt (B), then remove the alternator.

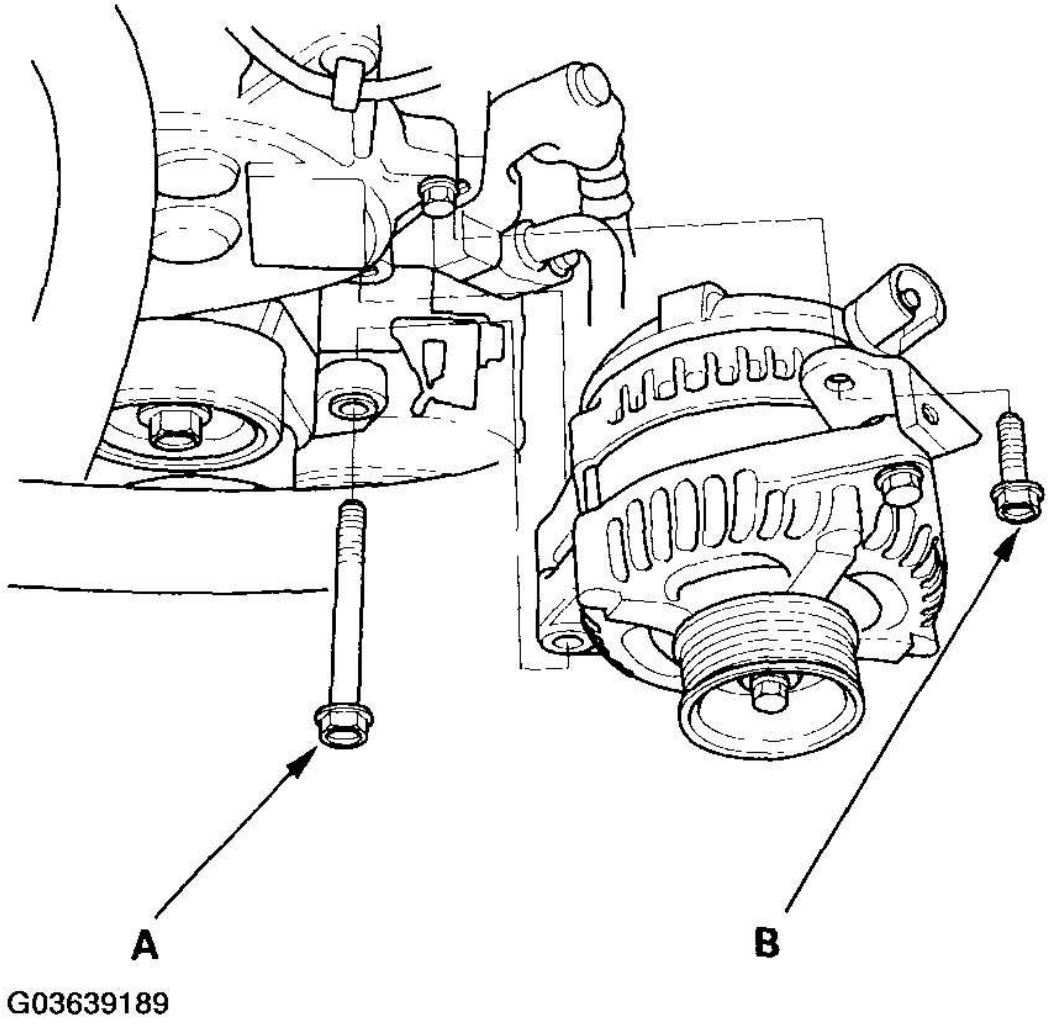

Fig. 18: Removing Mounting Bolt And Alternator Bracket Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

INSTALLATION

1. Install the alternator, and tighten the mounting bolt (A) and bracket mounting bolt (B).

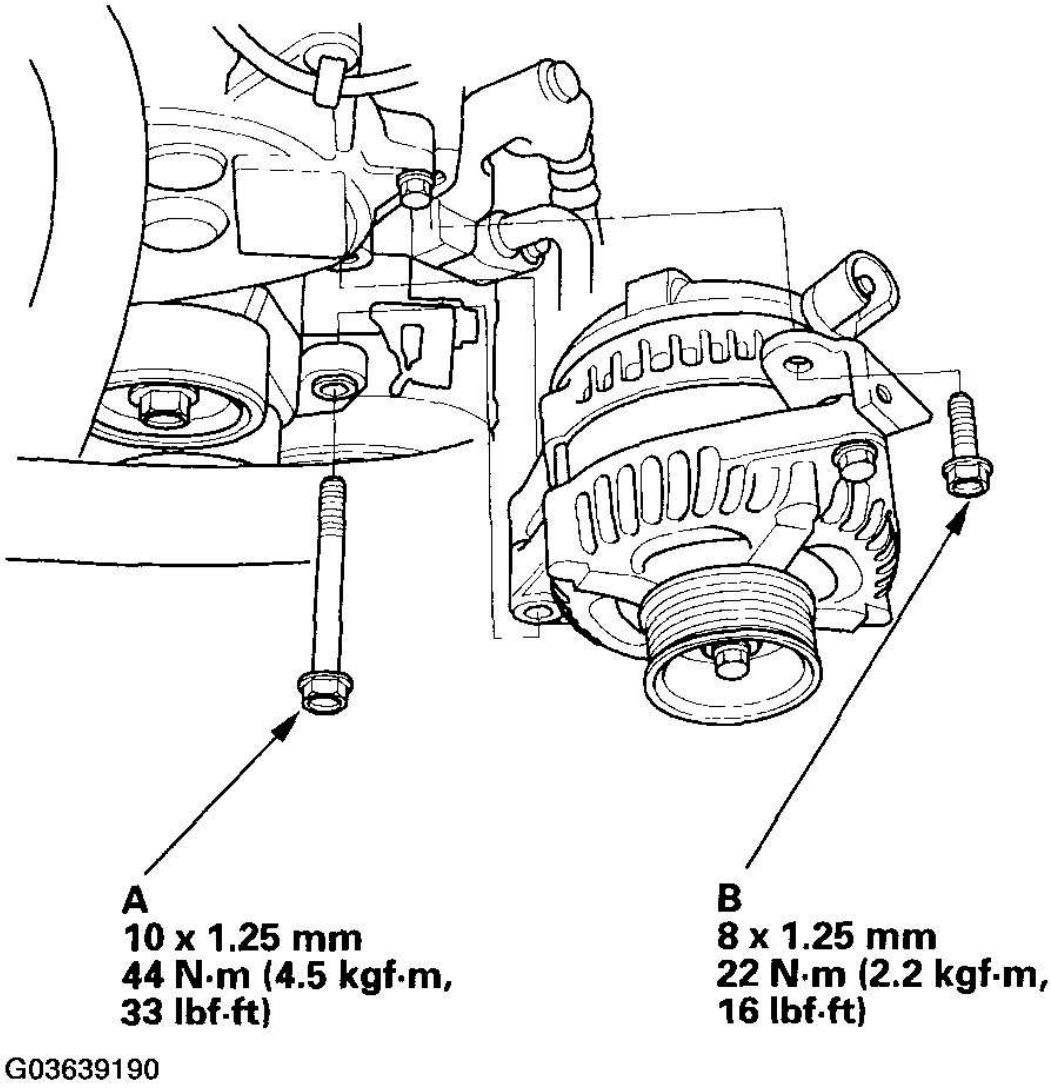

Fig. 19: Installing Alternator And Tightening Mounting Bolt & Bracket Mounting Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Connect the alternator connector (A), BLK wire (B) to the alternator.

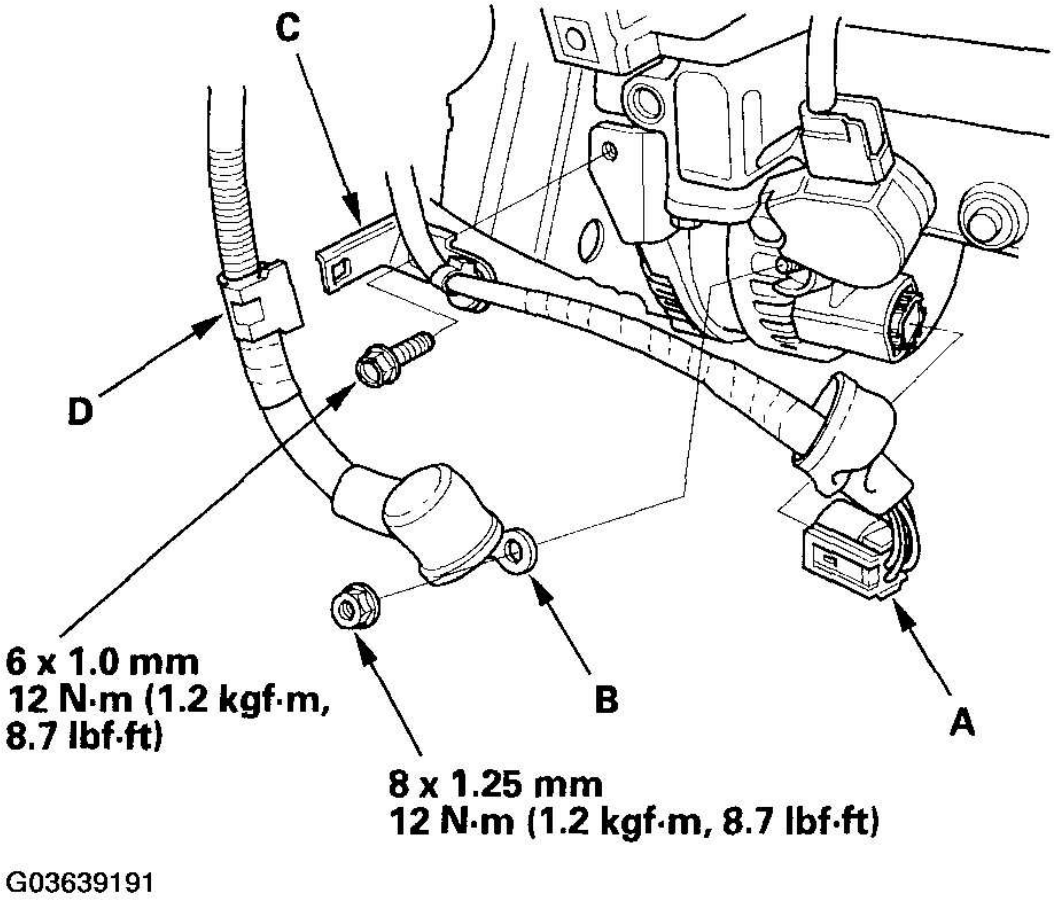

Fig. 20: Connecting Alternator Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the harness bracket (C), then install the harness clamp (D).
4. Install the drive belt (see **DRIVE BELT REPLACEMENT**).
5. Install the ignition coil cover and intake manifold cover (see step 1 in **IGNITION COIL REMOVAL/INSTALLATION**).
6. Connect the positive cable to the battery first, then connect the negative cable.
7. Enter the anti-theft codes for the radio and the navigation system.
8. Enter the customer's audio presets.
9. Do the power window control unit reset procedure (see **RESETTING THE POWER WINDOW CONTROL UNIT**).
10. Set the clock.

ALTERNATOR OVERHAUL

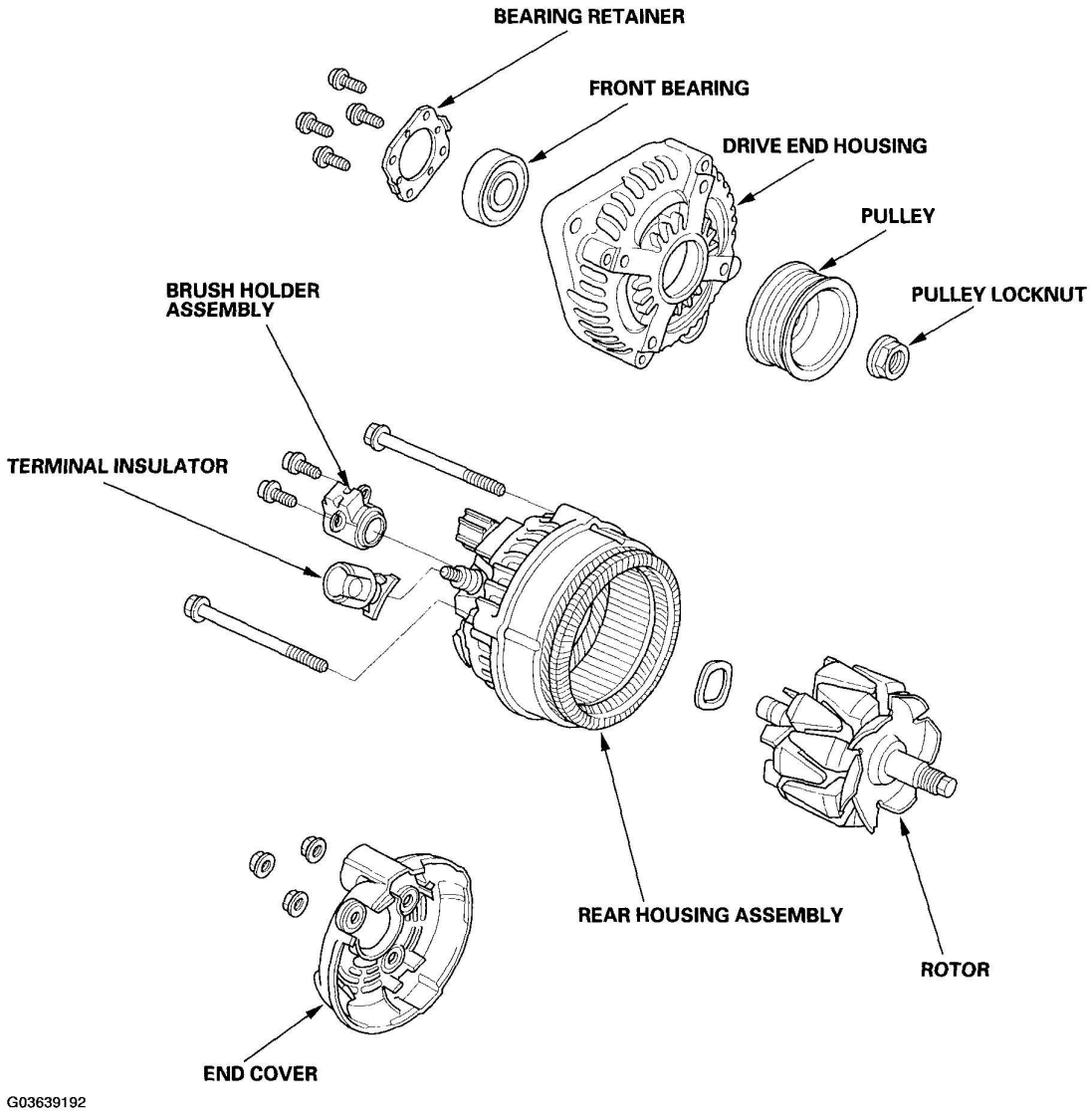

Fig. 21: Exploded View Of Alternator
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Special Tools Required

- Handle driver 07749-0010000
- Attachment, 42 x 47 mm 07746-0010300

NOTE: Refer to Fig. 21 as needed. .

Alternator Disassembly

1. Test the alternator and regulator before you remove them (see **CHARGING SYSTEM INDICATOR**

CIRCUIT TROUBLESHOOTING).

2. Remove the alternator (see **ALTERNATOR REMOVAL AND INSTALLATION**).
3. If the front bearing needs replacing, remove the pulley locknut with a 10 mm wrench (A) and a 22 mm wrench (B). If necessary, use an impact wrench.

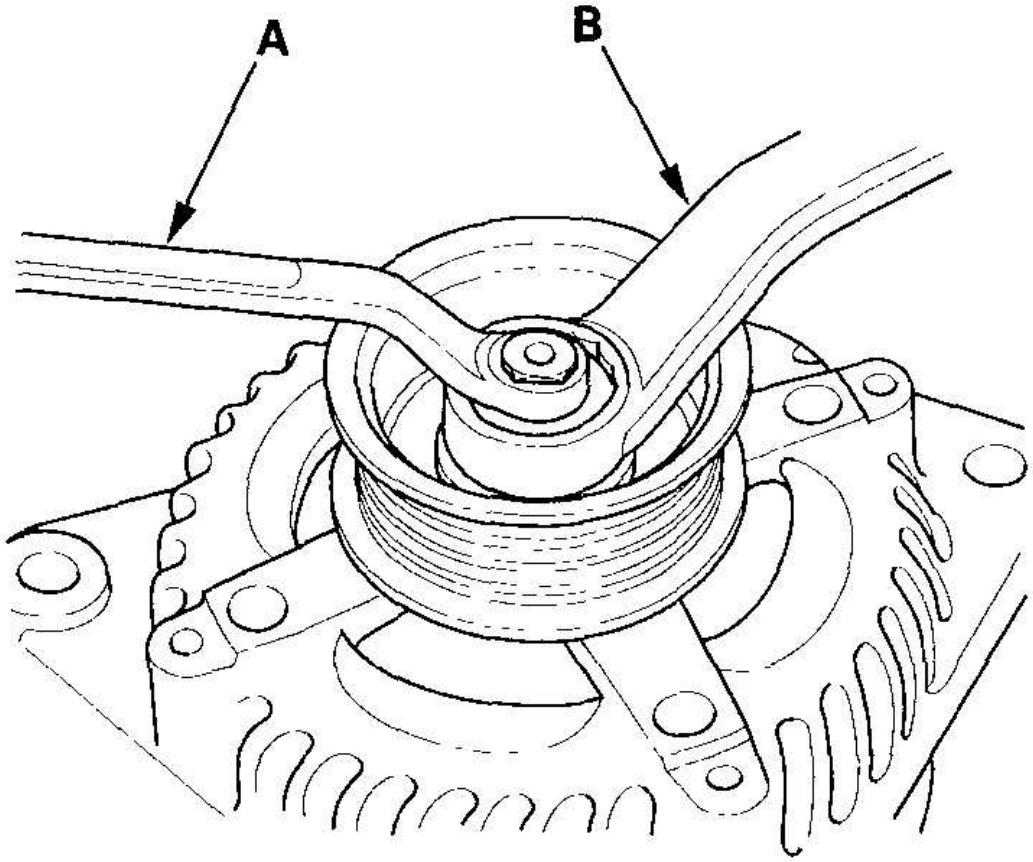

Fig. 22: Removing Pulley Locknut With Wrench
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the three flange nuts.

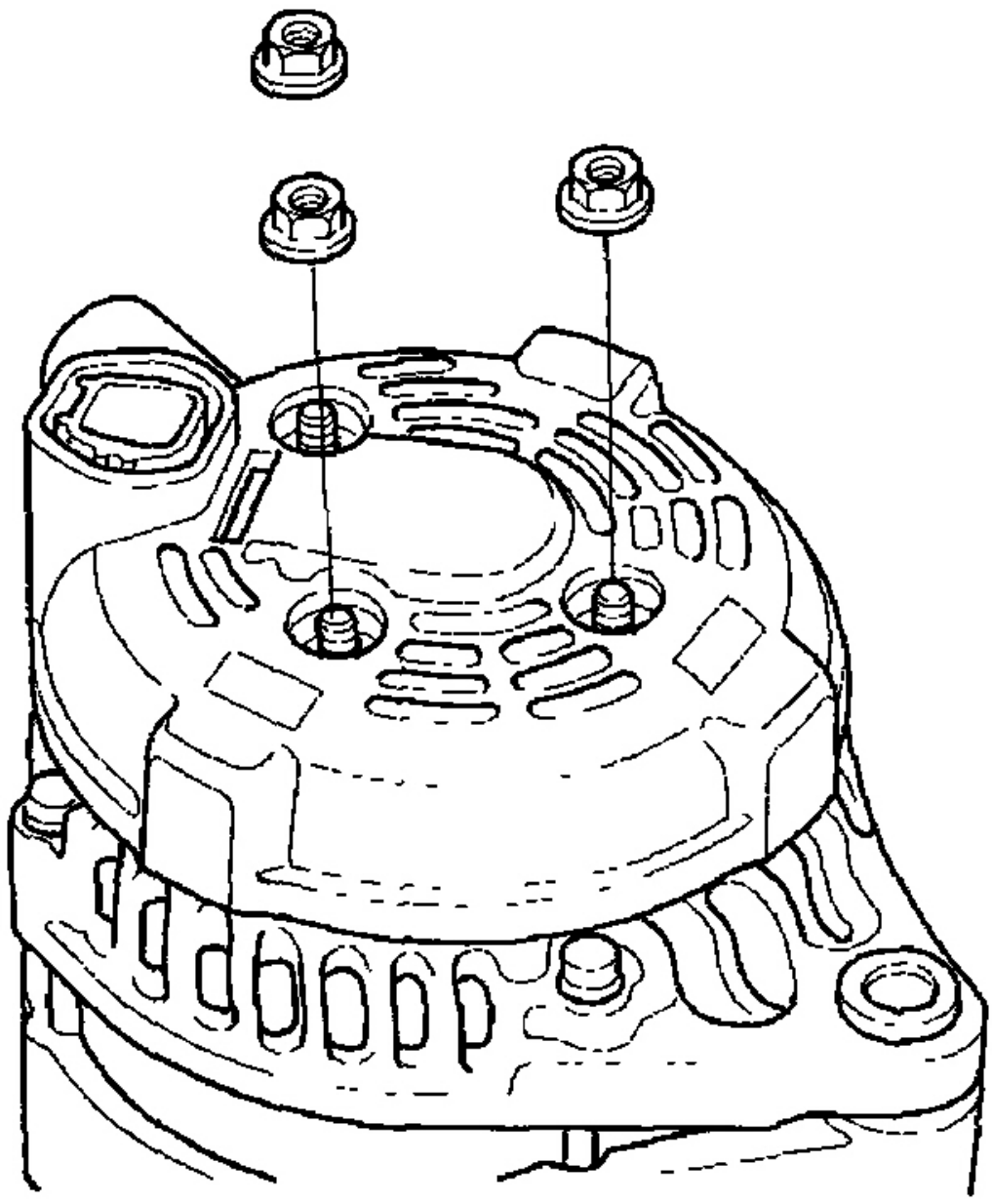

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Fig. 23: Removing Flange Nuts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Remove the end cover (A) and the insulator (B). A.

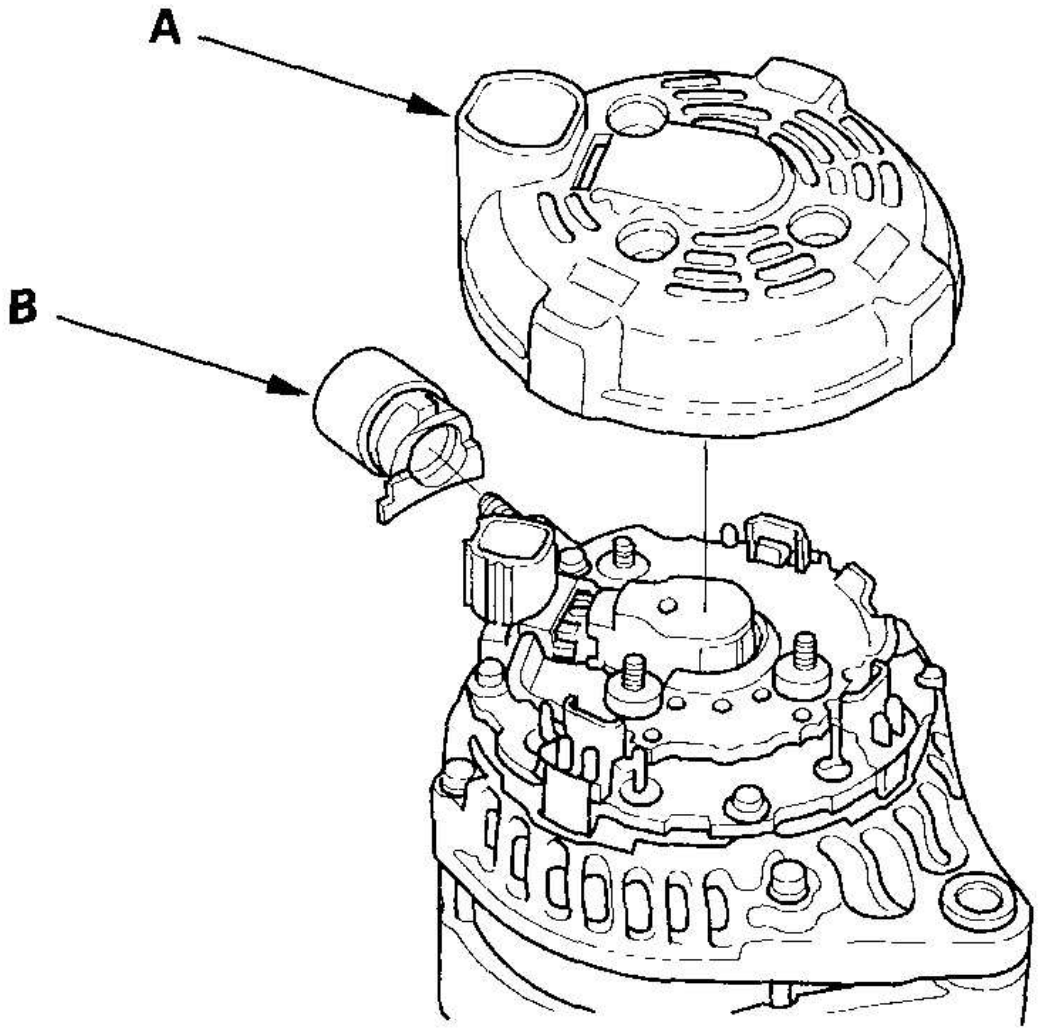

Fig. 24: Removing End Cover And Insulator
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the brush holder.

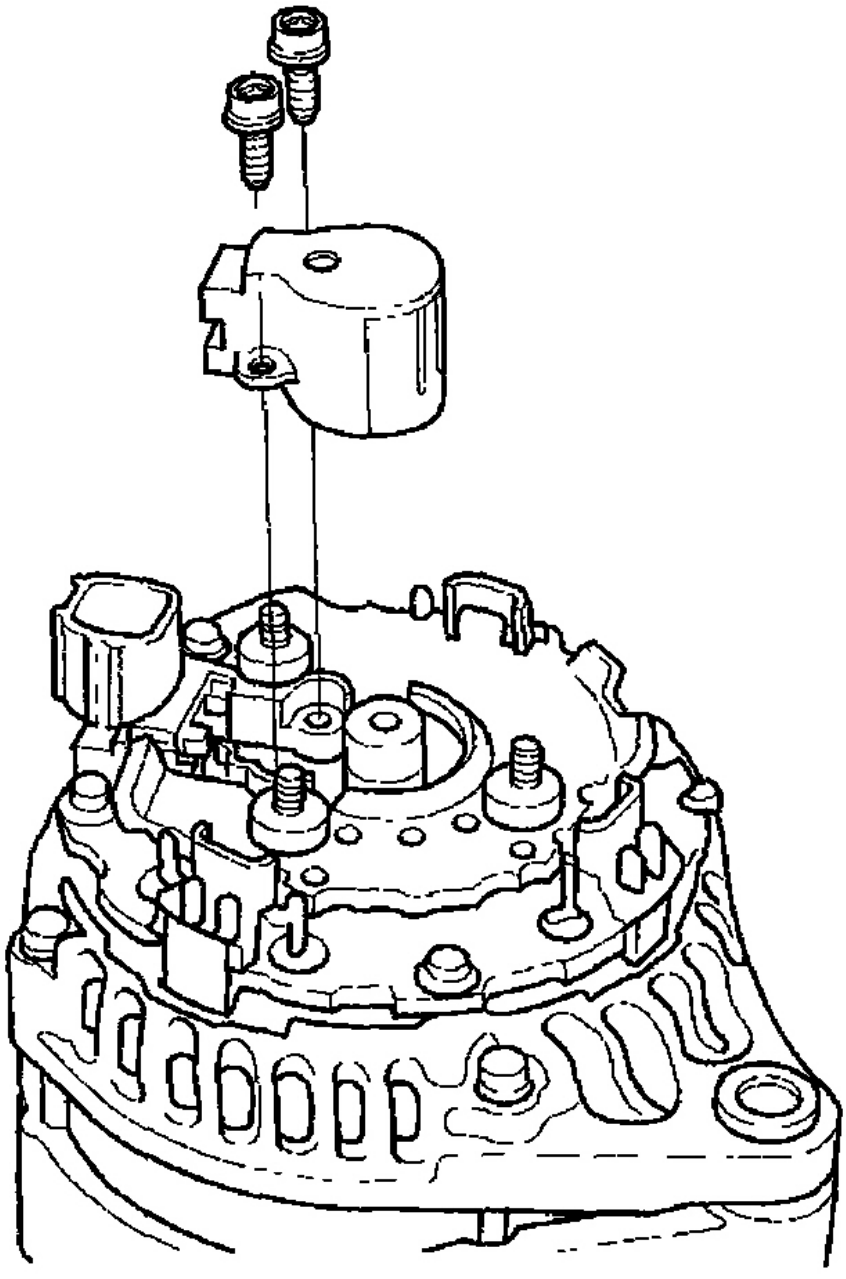

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Fig. 25: Removing Brush Holder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the four bolts, then remove the rear housing assembly (A) and washer (B).

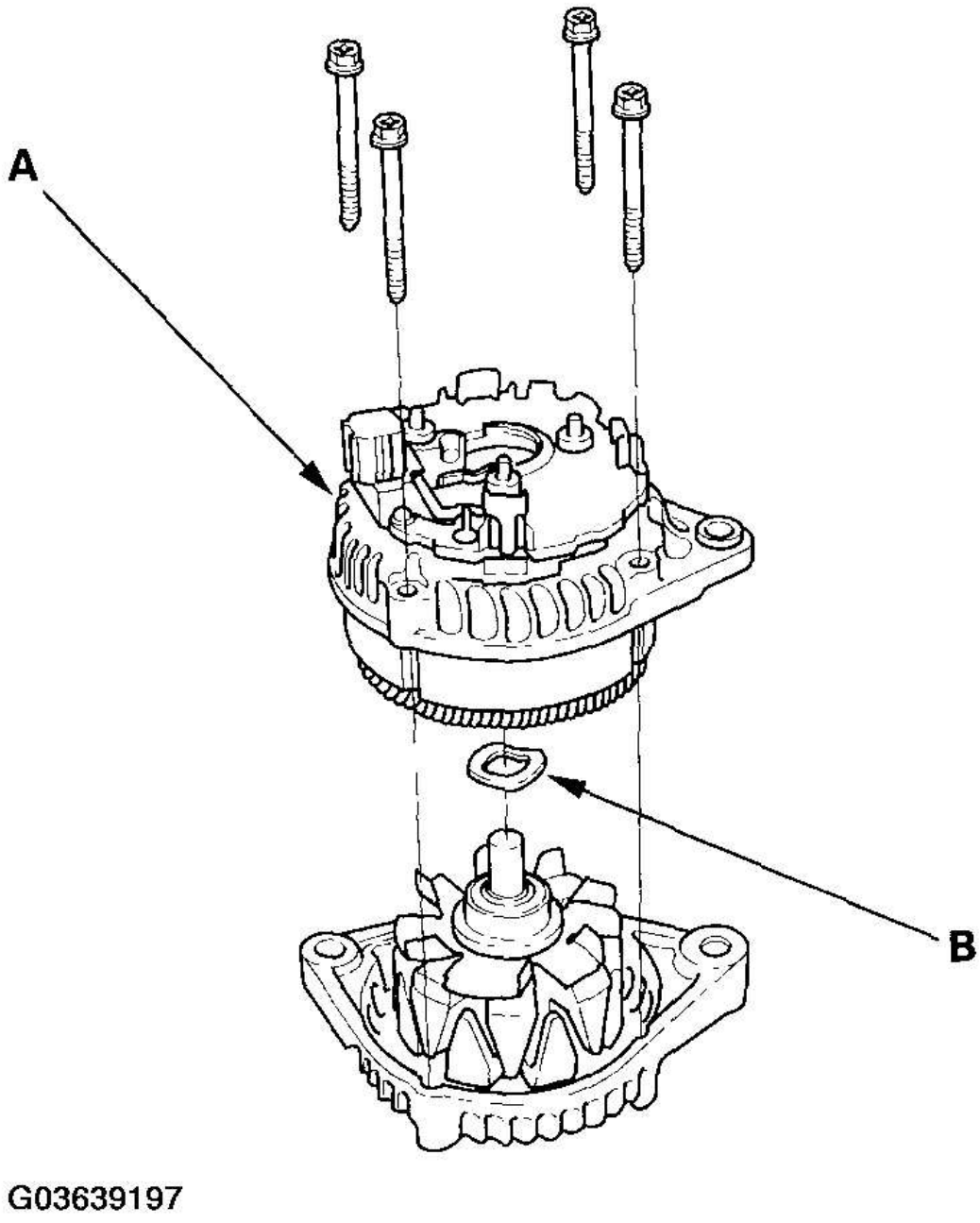

Fig. 26: Removing Rear Housing Assembly And Washer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. If you are not replacing the front bearing, go to step 13 . Remove the rotor from the drive end housing.

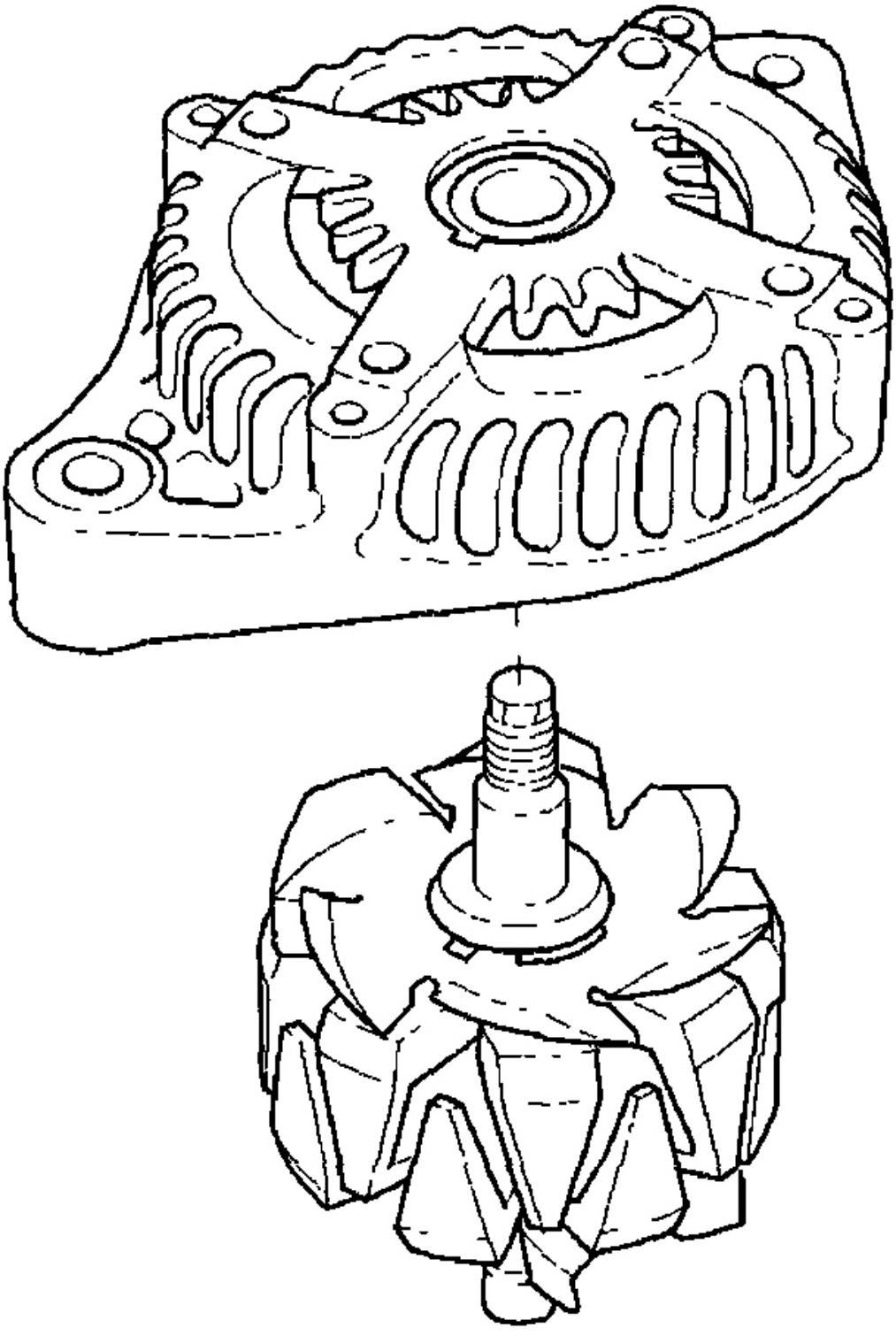

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Fig. 27: Removing Rotor From Drive End Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Inspect the rotor shaft for scoring, and inspect the bearing journal surface in the drive end housing for seizure marks.
    - If the rotor is damaged, replace the rotor assembly.
    - If the rotor is OK, go to step 10.
10. Remove the front bearing retainer plate.

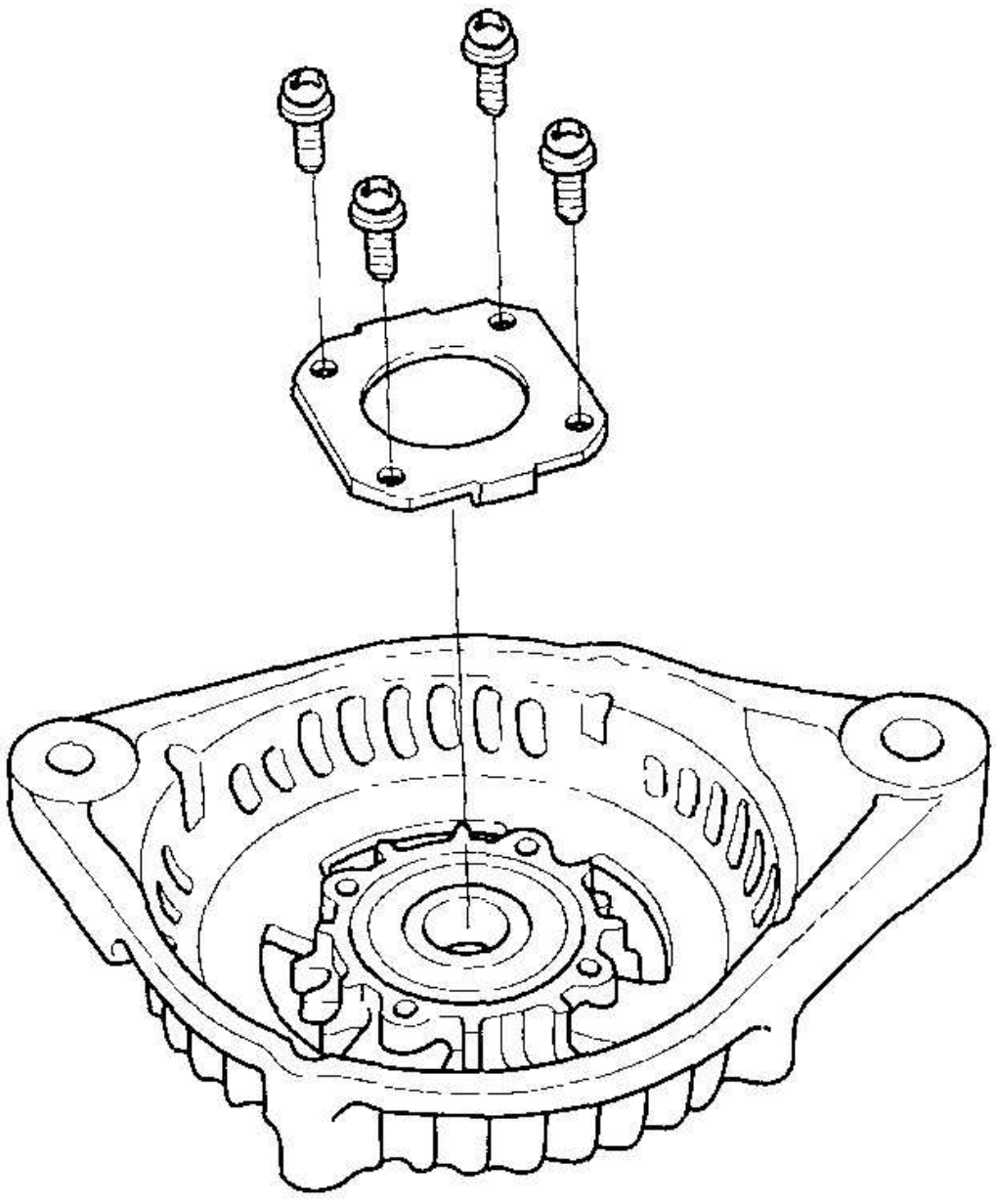

Fig. 28: Removing Front Bearing Retainer Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Drive out the front bearing with a brass drift and hammer.

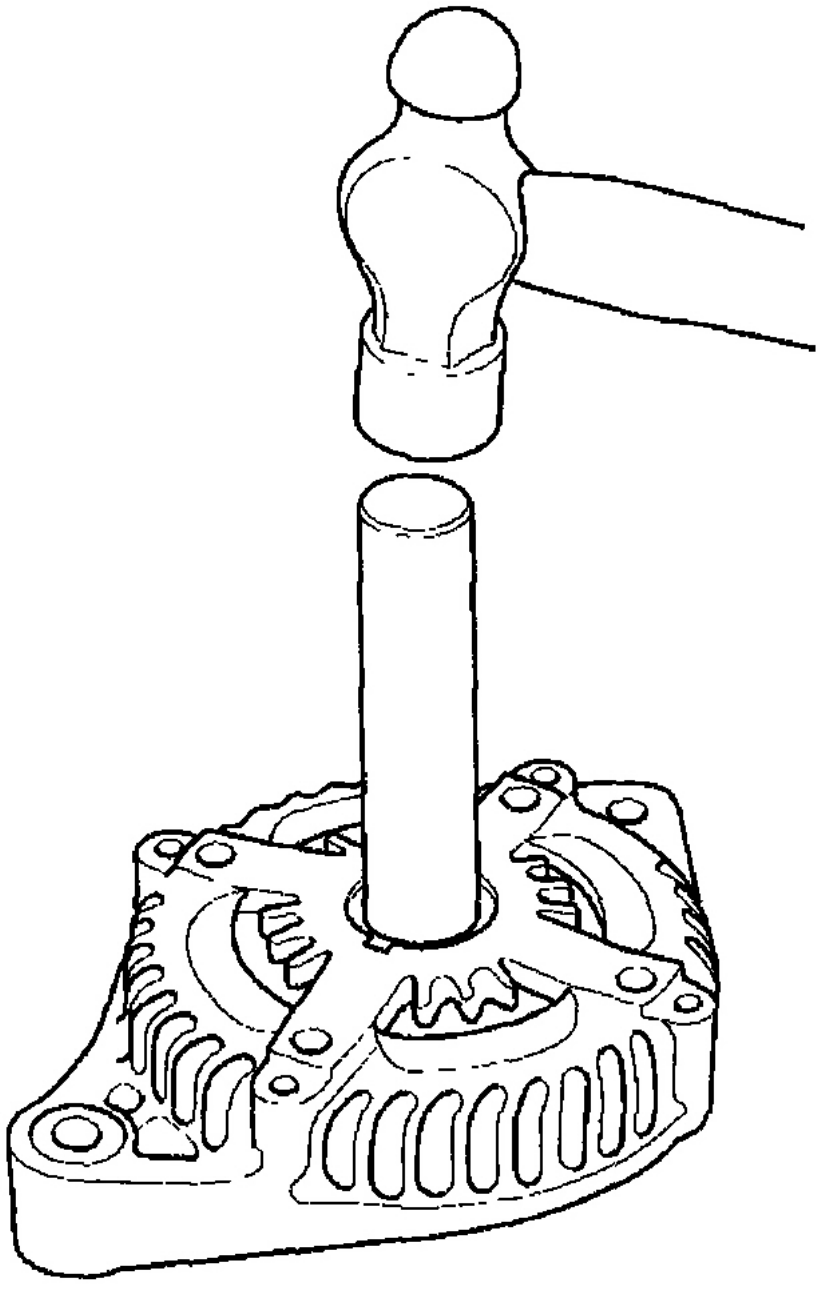

Fig. 29: Driving Out Front Bearing With Brass Drift And Hammer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. With a hammer and special tools, install a new front bearing in the drive end housing.

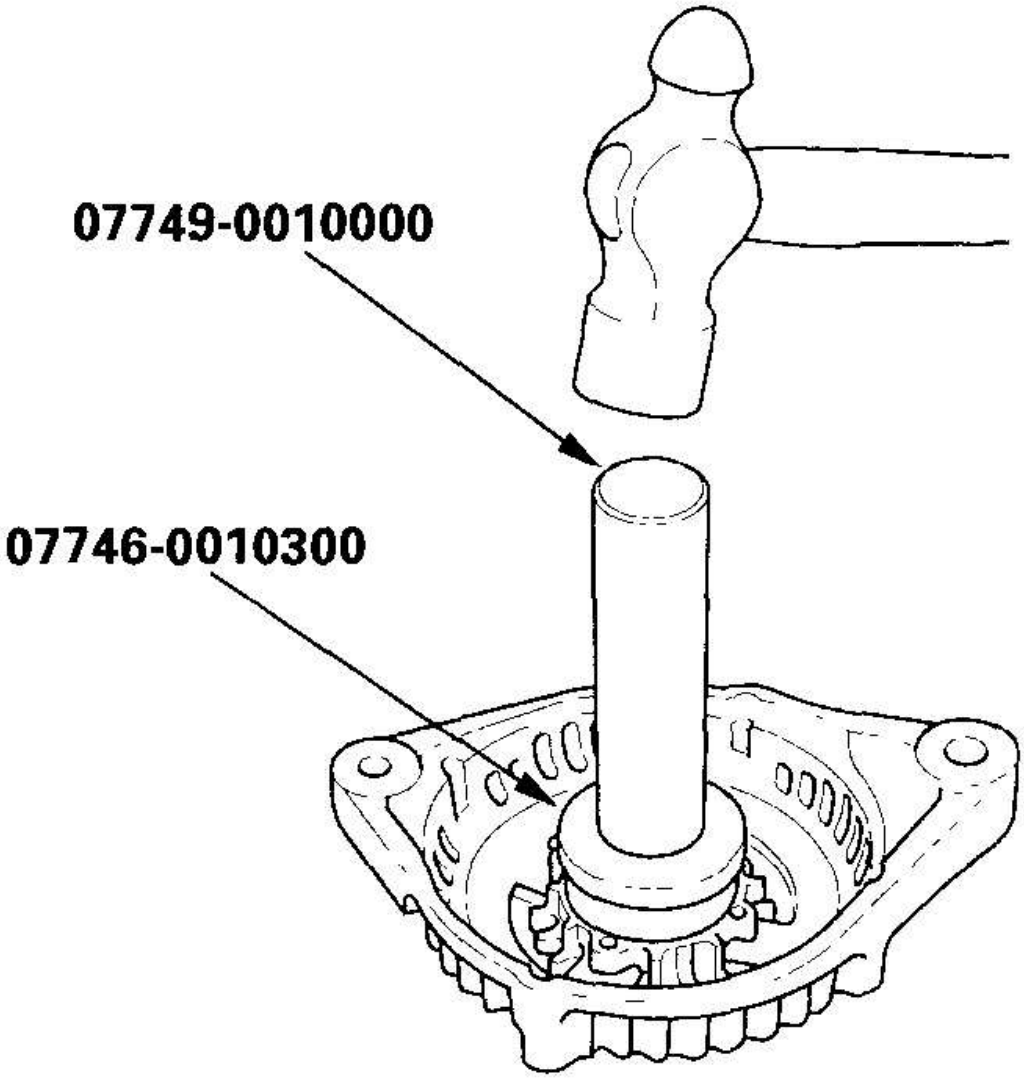

Fig. 30: Installing New Front Bearing In Drive End Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Measure the length of both brushes (A) with vernier calipers (B).
    - If either brush is shorter than the service limit, replace the brush holder assembly.
    - If the brush length is OK, go to step 14.

Alternator Brush Length

Standard (New): 10.5 mm (0.41 in.)
Service Limit: 1.5 mm (0.06 in.)

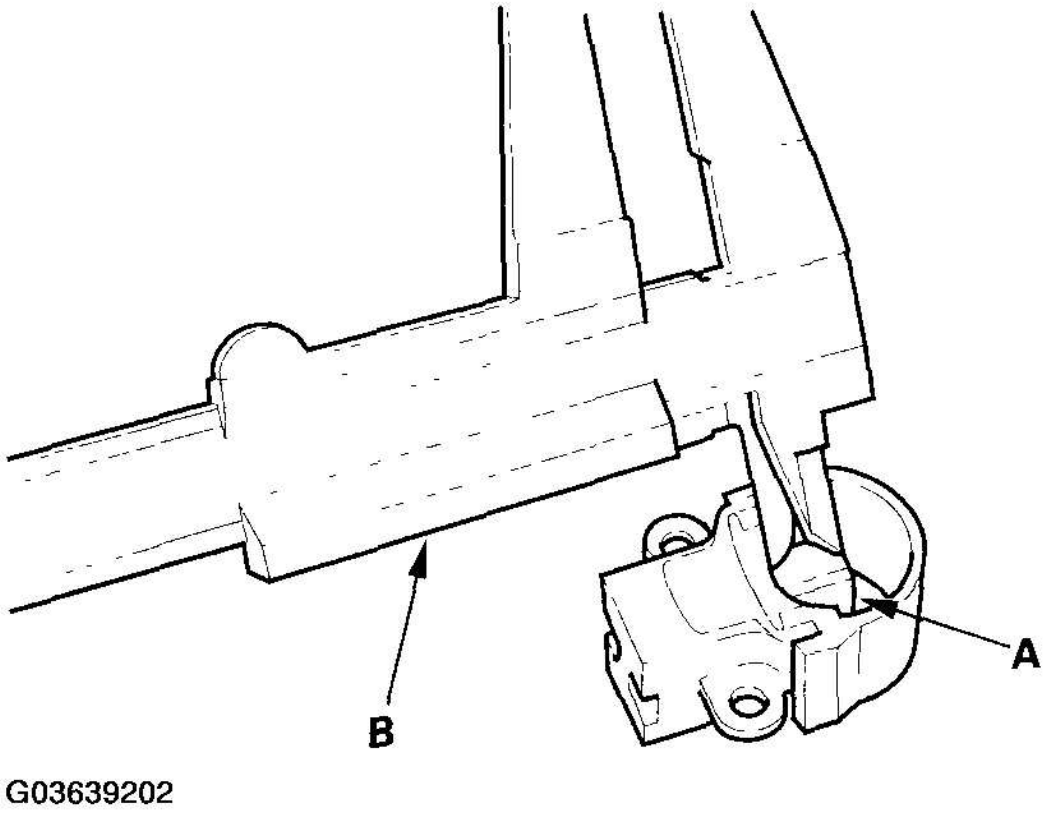

Fig. 31: Measuring Length Of Brushes With Vernier Calipers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Rotor Slip Ring Test

14. Check for continuity between the slip rings (A).
    - If there is continuity, go to step 15.
    - If there is no continuity, replace the rotor assembly.

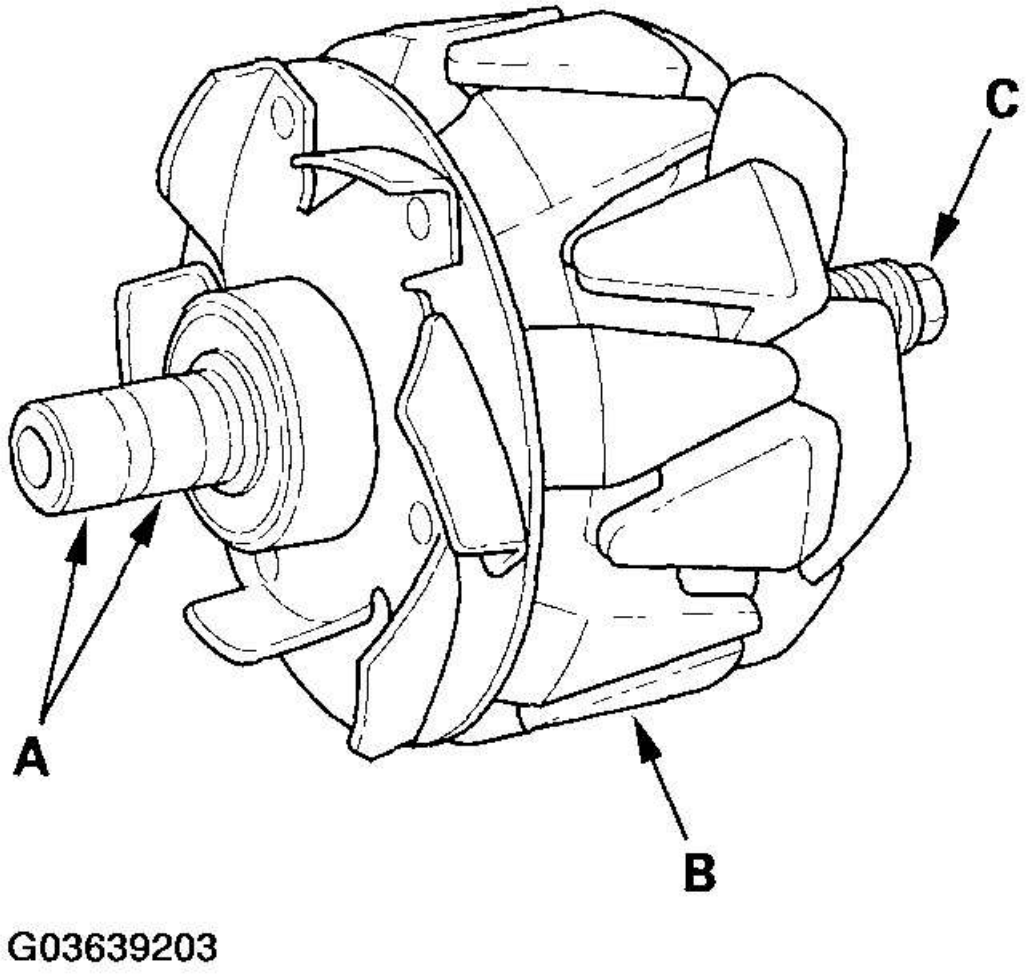

Fig. 32: Checking Continuity Between Slip Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Check for continuity between each slip ring and the rotor (B) and the rotor shaft (C).
    - If there is no continuity, replace the rear housing assembly, and go to step 16.
    - If there is continuity, replace the rotor assembly.
16. Assemble the alternator in the reverse order of disassembly, and note these items:
    - Be careful not to get any grease or oil on the slip rings.
    - If you removed the pulley, tighten its locknut to 110 N.m (11.2 kgf.m, 81.0 lbf.ft) when you reinstall it.