

Steering

Steering

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EPS (Electrical Power Steering) Components

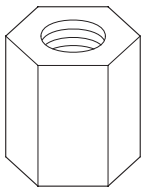
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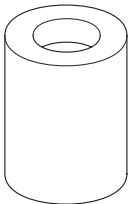
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Special Tools

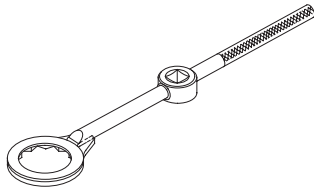
Ref. No.	Tool Number	Description	Qty
①	07AAF-SDAA100	Ball Joint Thread Protector, 12 mm	1
②	07JAF-SH20330	Bushing Base	1
③	07MAA-SL0020A	Locknut Wrench, 43 mm	1
④	07MAC-SL0A202	Ball Joint Remover, 28 mm	1



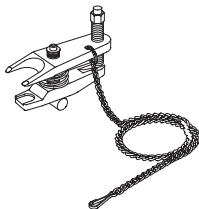
①



②



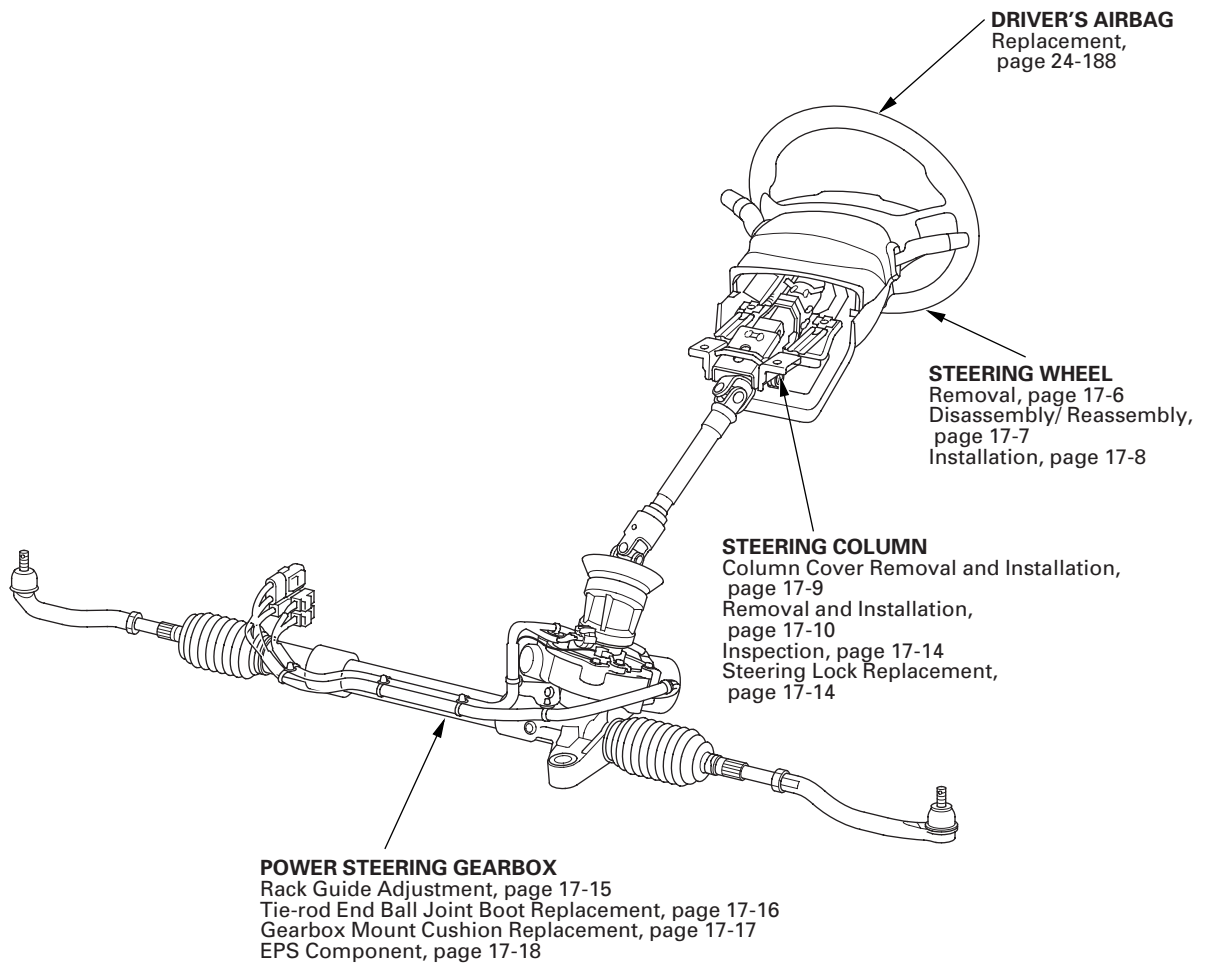
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④



Component Location Index

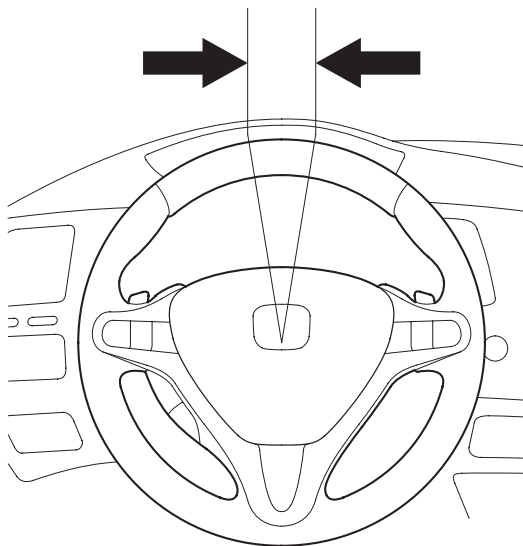


Steering

Steering Wheel Rotational Play Check

1. Turn the front wheels to the straight ahead position.
2. Measure how far you can turn the steering wheel left and right without moving the front wheels.
 - If the play is within the limit, the steering gearbox and steering linkage are OK.
 - If the play exceeds the limit, adjust the rack guide (see page 17-15). If the play is still excessive after rack guide adjustment, inspect the steering linkage and steering gearbox (see page 17-5).

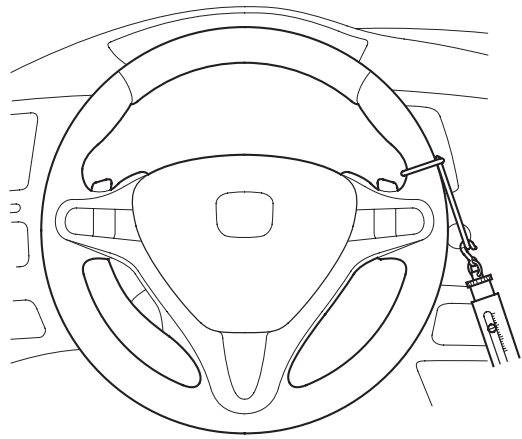
Rotational play: 0—10 mm (0—0.39 in.)



Power Assist Check

NOTE: This test should be done with original equipment tires and wheels at the correct tire pressure.

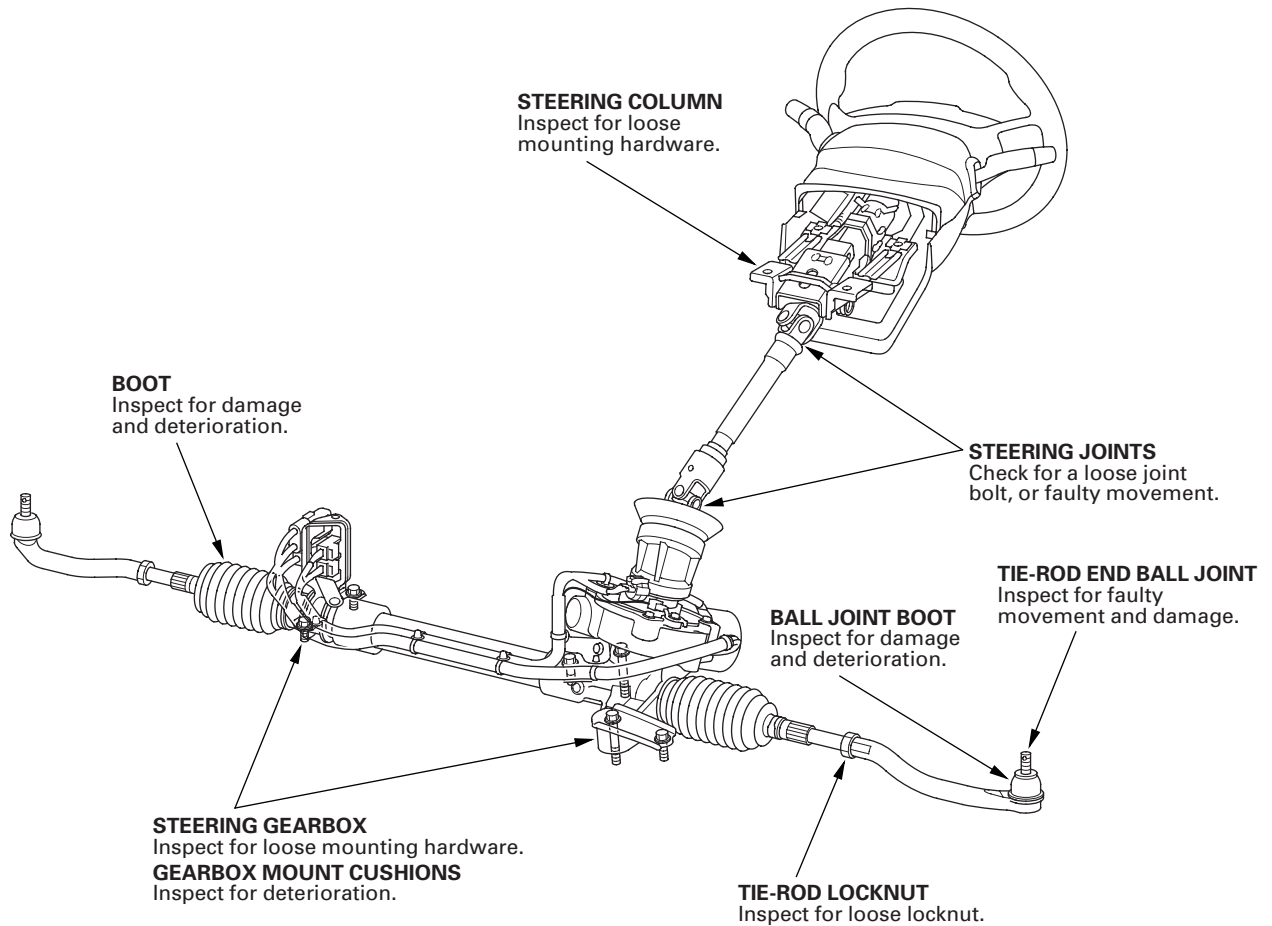
1. Start the engine, and let it idle.
2. Attach a commercially available spring scale to the steering wheel. With the engine idling and the vehicle on a clean, dry floor, pull the scale as shown, and read it as soon as the tires begin to turn.



3. If the scale reads no more than 34 N (3.5 kgf, 7.7 lbf), the power assist is OK. If it reads more, check these items:
 - Steering linkage (see page 17-5)
 - Rack guide adjustment (see page 17-15)
 - EPS system (see page 17-19)



Steering Linkage and Gearbox Inspection

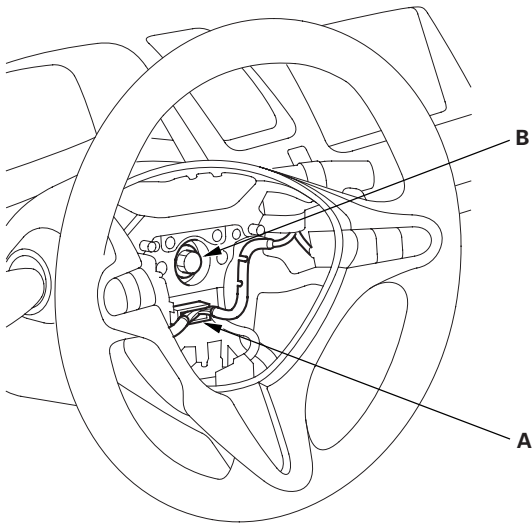


Steering

Steering Wheel Removal

SRS components are located in this area. Review the SRS component locations (see page 24-11) and the precautions and procedures (see page 24-13) before doing repairs or service.

1. Do the battery terminal disconnection procedure (see page 22-68).
2. Align the front wheels straight ahead, then remove the driver's airbag from the steering wheel (see page 24-188).
3. Disconnect the cable reel subharness connector (A).

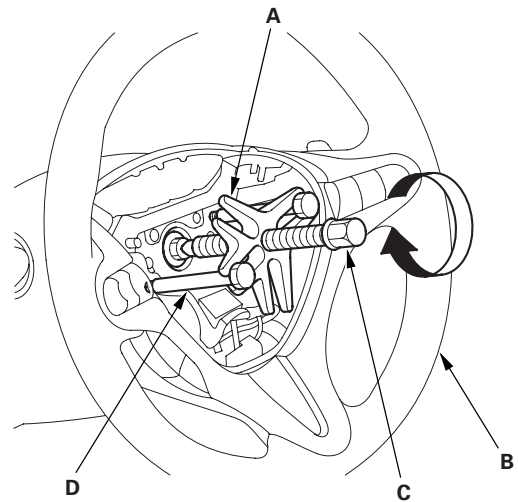


4. Loosen the steering wheel bolt (B).

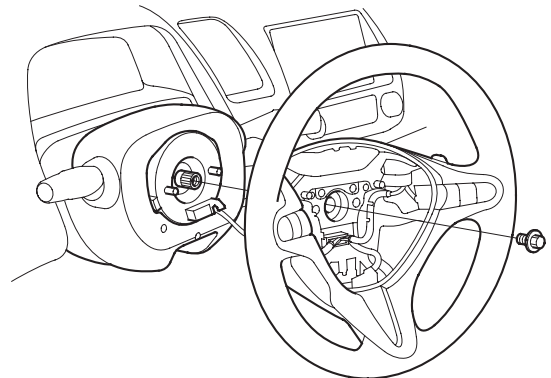
5. Install a commercially available steering wheel puller (A) on the steering wheel (B). Free the steering wheel from the steering column shaft by turning the pressure bolt (C) of the puller.

Note these items when removing the steering wheel:

- Do not tap on the steering wheel or the steering column shaft when removing the steering wheel.
- If you thread the puller bolts (D) into the wheel hub more than five threads, the bolts will hit the cable reel and damage it. To prevent this, install a pair of jam nuts five threads up on each puller bolt.

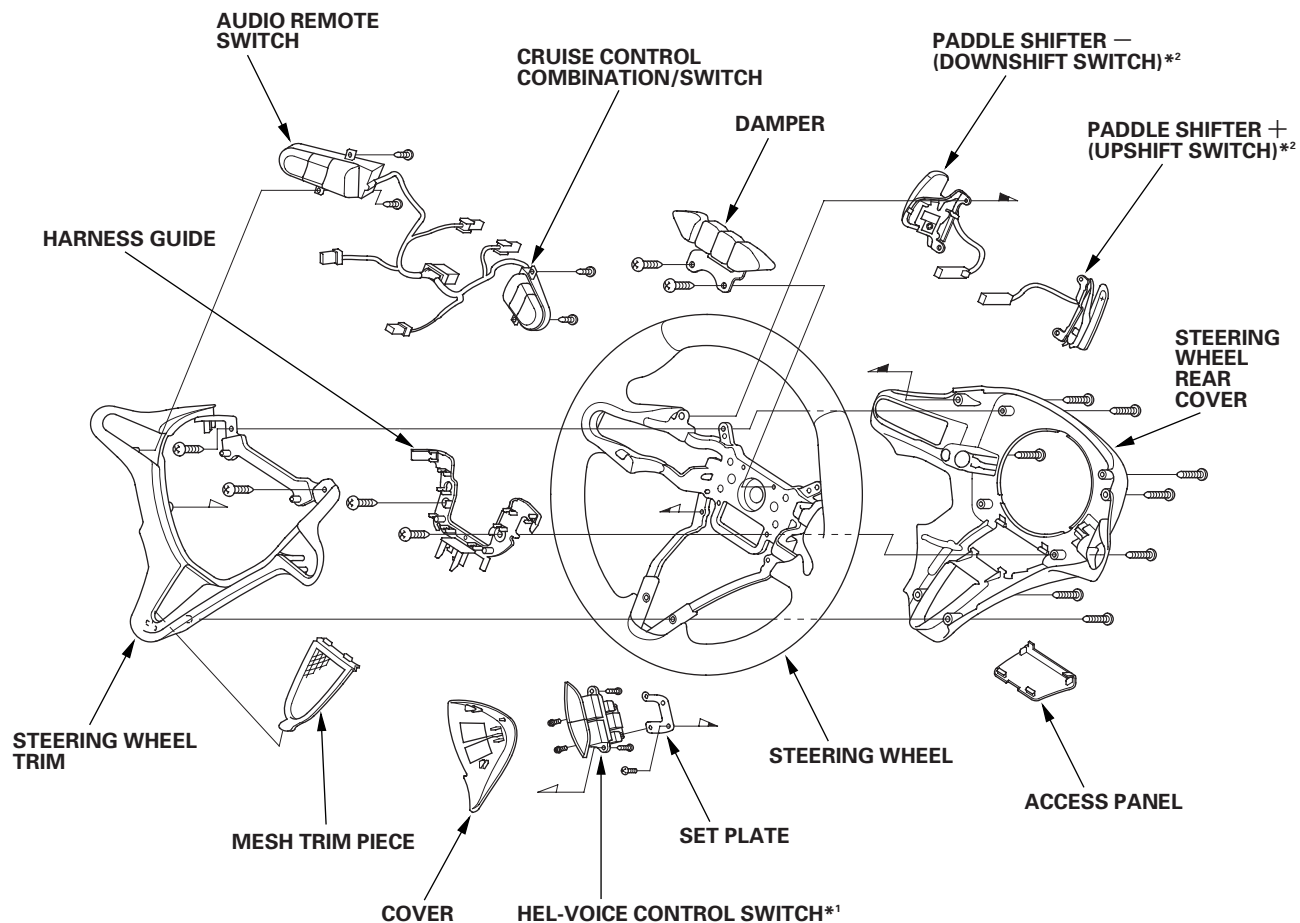


6. Remove the steering wheel puller, then remove the steering wheel bolt and steering wheel from the steering column.





Steering Wheel Disassembly/Reassembly



*1: With Navigation

*2: A/T

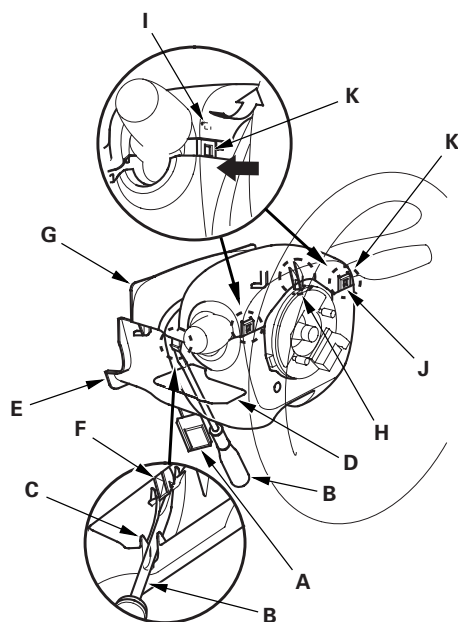


Column Cover Removal and Installation

NOTE:

- Take care not to scratch or damage the column covers.
- Do not pry the cover surface with any tools.

1. Release the lock lever (A), and adjust the steering column to full tilt down position and to the full telescopic out position.



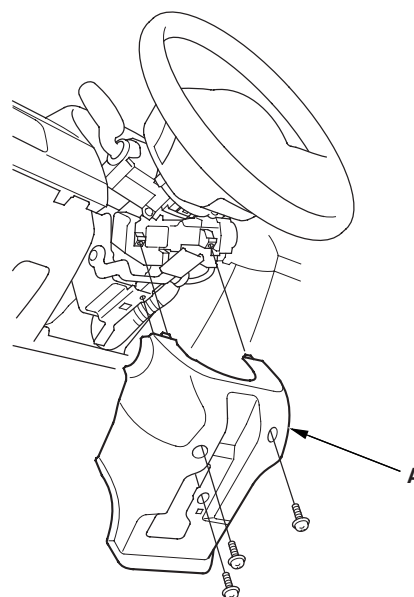
2. Insert a suitable sized screwdriver or equivalent tool (B) along the guide rib (C) into the lever hole (D) in the lower column cover (E).
3. Release the hook (F) located on the left side of the upper column cover (G). A right side hook (H) of the upper column cover can't be released from the inside.

4. Turn the steering wheel to the left, and release the left pawl (I) of the upper column cover while pushing the lower column cover from the front side.
5. Turn the steering wheel to the right, and release the right pawl (J) of the upper column cover in the same way as in step 4.
6. Remove the cover by lightly pulling it up by releasing the right side hook of the upper column cover.

NOTICE

Carefully release the pawls, note the hooks (K) may break when the upper column cover is pulled up too hard.

7. Remove the three screws, then remove the lower column cover (A).



8. Install the upper and lower column cover in the reverse order of removal, and push the hooks into place securely.

Steering

Steering Column Removal and Installation

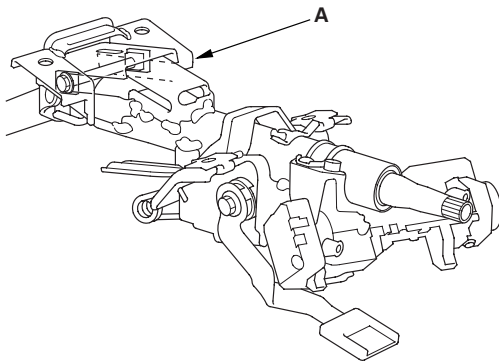
SRS components are located in this area. Review the SRS component locations (see page 24-11) and the precautions and procedures (see page 24-13) before doing repairs or service.

Removal

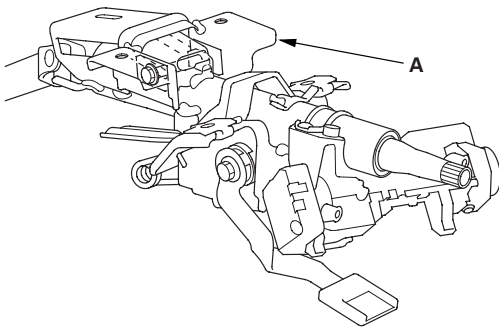
NOTICE

Be careful not to pull the bracket (A) on the front side of the steering column out of its normal position. If the bracket accidentally comes out, replace the steering column as an assembly.

Normal position

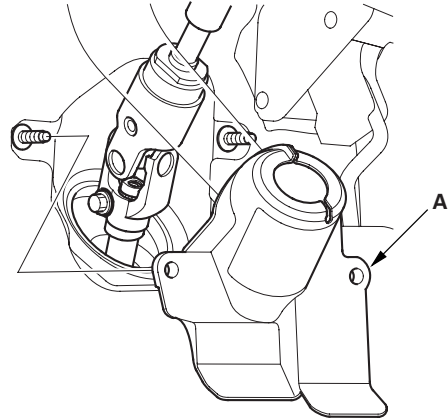


Out of position

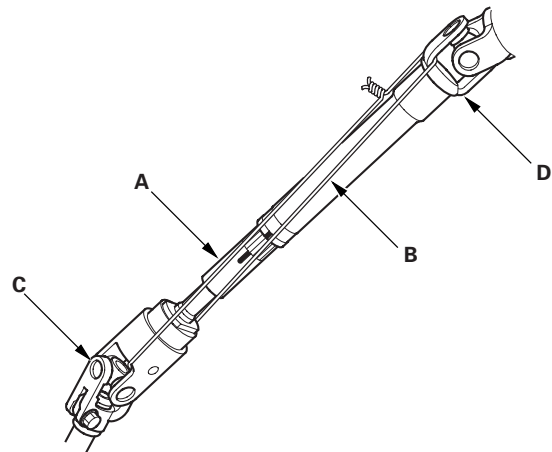


1. Do the battery terminal disconnection procedure (see page 22-68).
2. Remove the driver's airbag (see page 24-188), and the steering wheel (see page 17-6).
3. Remove the driver's dashboard undercover (see page 20-103).
4. Remove the column covers (see page 17-9).

5. Remove the steering joint cover (A).



6. Release the lock lever, and adjust the steering column to the full tilt up position, and to the full telescopic in position.
7. Tighten the lock lever.
8. Hold the lower slide shaft (A) on the column with a piece of wire (B) between the joint yoke (C) of the lower slide shaft and joint yoke (D) of the upper shaft to prevent the slider shaft from pulling out.

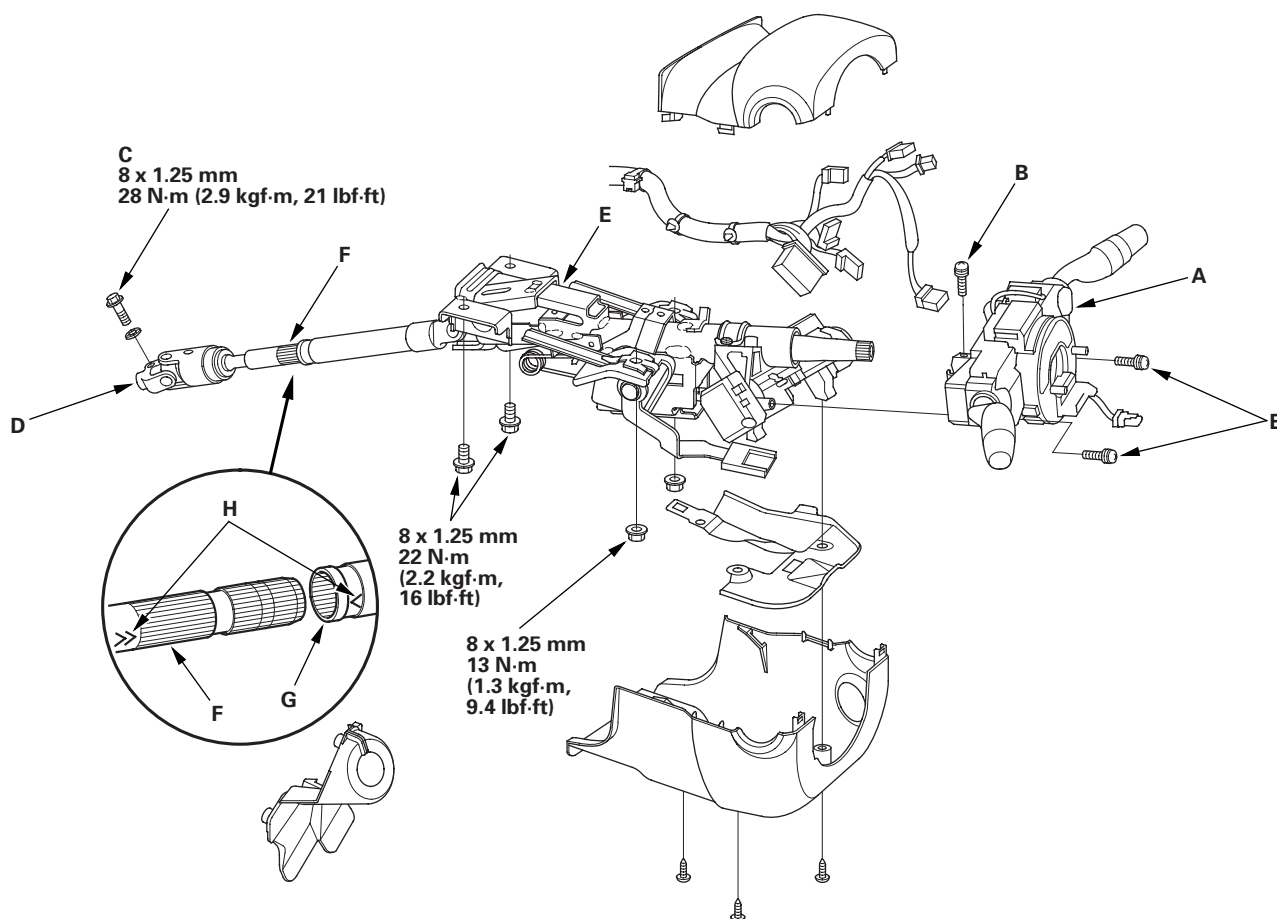


9. Release the lock lever, and adjust the steering column to the full telescopic out position, then tighten the lock lever.

NOTE: Do not release the lock lever when removing the steering column from the frame.



10. Disconnect the wire harness connectors from the combination switch assembly/cable reel (A).



11. Remove the combination switch assembly/cable reel from the steering column shaft by removing the screws (B).
12. Disconnect the connectors from the ignition switch, and release the wire harness clips from the steering column.
13. Remove the steering joint bolt (C), then disconnect the steering joint (D) from the pinion shaft.
14. Remove the steering column (E) by removing the attaching nuts and bolts. If the lower slide shaft (F) is removed, slip it into the upper shaft (G) by aligning the paint or stamped marks (H).
15. Remove the center guide (if equipped), and discard it. The center guide is for factory assembly only.

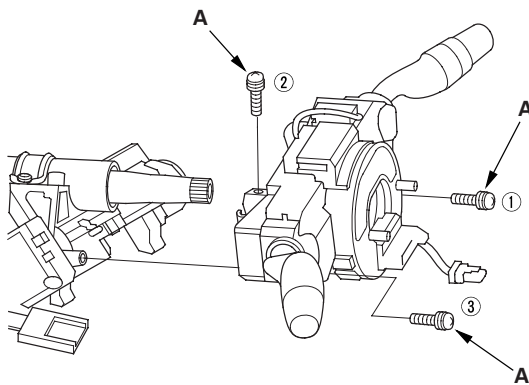
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Steering

Steering Column Removal and Installation (cont'd)

Installation

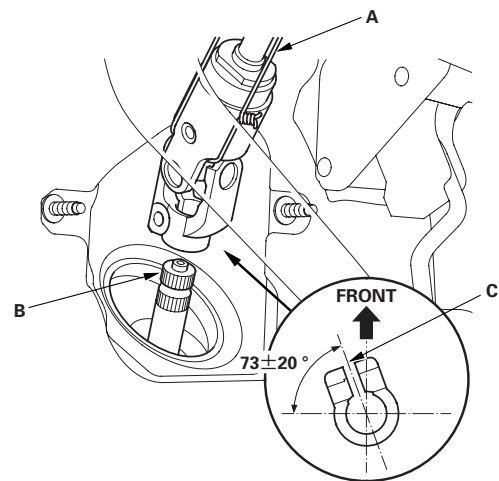
1. Install the steering column in the reverse order of removal, and note these items:
 - Make sure the wires are not caught or pinched by any parts.
 - Tighten the three screws (A) in the sequence shown.



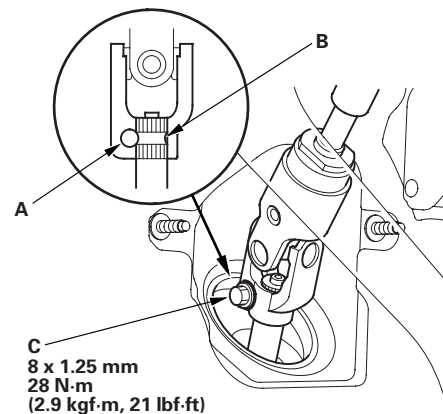
2. Center the steering rack within its stroke in the steering joint connection.
3. With the rack in the straight ahead driving position, cut the wire (A) and slip the lower end of the steering joint onto the pinion shaft (B).

NOTE:

- Pinion shaft with center guide; install the steering joint by aligning the center guide.
- Pinion shaft without center guide; position the steering column by aligning the gap (C) with the angle.

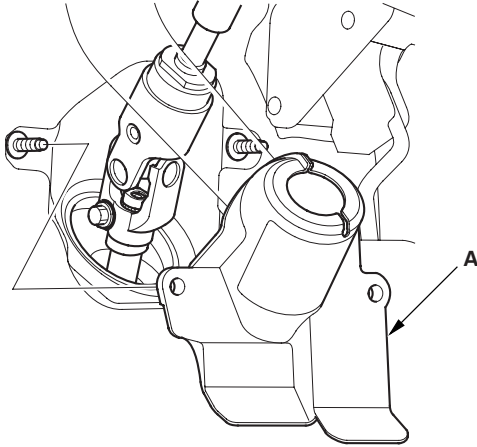


4. Align the bolt hole (A) on the steering joint with the groove (B) around the pinion shaft, then loosely install the steering joint bolt (C). Be sure that the joint bolt is securely in the groove in the pinion shaft. Pull on the steering joint to make sure that the steering joint is fully seated. Tighten the steering joint bolt to the specified torque.





5. Install the steering joint cover (A).



6. Install the steering wheel (see page 17-8), and the driver's airbag (see page 24-188).
7. Install the column covers (see page 17-9).
8. Install the driver's dashboard undercover (see page 20-103).

9. Do the battery terminal reconnection procedure (see page 22-68), and do these tasks:

- Turn the ignition switch to ON (II), and check that the SRS indicator comes on for about 6 seconds and then goes off.
- Make sure the horn and turn signal switches work properly.
- Make sure the steering wheel switches work properly.

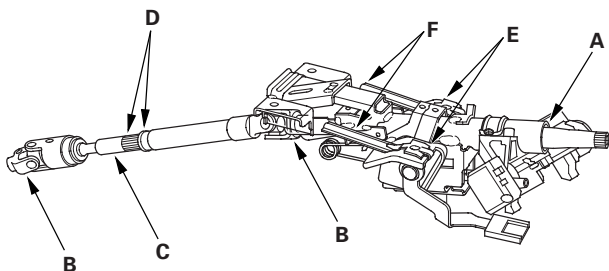
10. After installation, do these checks:

- Check the steering wheel spoke angle. If the steering spoke angles to the right and left are not equal (steering wheel and rack are not centered), correct the engagement of the joint/pinion shaft splines.
- Set the steering column to the center tilt position, and to the center telescopic position, then do the front toe inspection (see page 18-5).

Steering

Steering Column Inspection

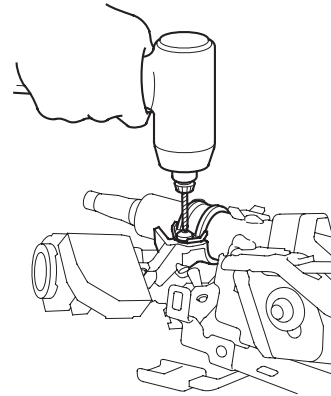
1. Remove the steering column (see page 17-10).
2. Do these checks:
 - Check the steering column ball bearing (A) and the steering joint (B) for play and proper movement. If any bearing is noisy or has excessive play, replace the steering column as an assembly.
 - Check the lower slide shaft (C) for smooth movement in and out. If the lower slide shaft is removed, slip it into the upper shaft by aligning the paint or stamped marks (D). If it sticks or binds, replace the steering column as an assembly.
 - Check the sliding capsules (E) for distortion or breakage. If there is distortion or breakage, replace the steering column as an assembly.
 - Check the tilt mechanism and telescopic mechanism for movement and damage.
 - Check the absorbing plates (F) for distortion or breakage. If there is distortion or breakage, replace the steering column as an assembly.



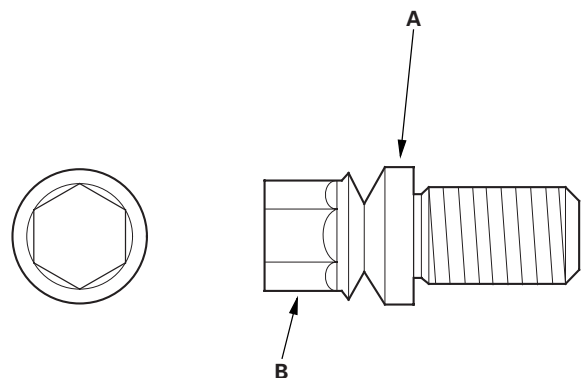
3. Install the steering column (see page 17-12).

Steering Lock Replacement

1. Remove the steering column (see page 17-10).
2. Center-punch both of the two shear bolts, and drill the heads of the bolts off with a 5 mm (0.20 in.) drill bit. Be careful not to damage the switch body when removing the shear bolts.



3. Remove the shear bolts from the switch body.
4. Install the switch body without the key inserted.
5. Loosely tighten the new shear bolts.
6. Insert the ignition key, and check for proper operation of the steering wheel lock and that the ignition key turns freely.
7. Tighten the shear bolts (A) until the hex heads (B) twist off.



8. Rewrite the immobilizer control unit-receiver (see page 22-329), and make sure the immobilizer system works properly.
9. Install the steering column (see page 17-12).

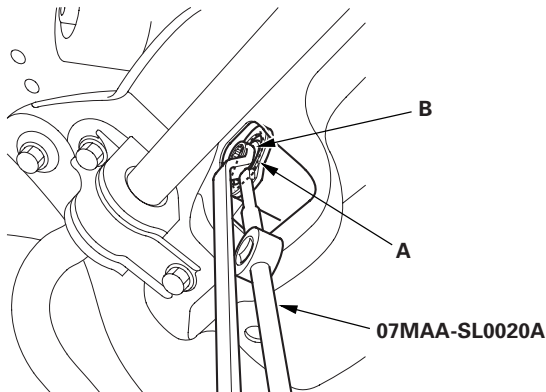


Rack Guide Adjustment

Special Tools Required

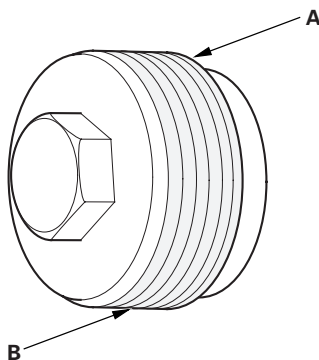
Locknut wrench, 43 mm 07MAA-SL0020A

1. Set the wheels in the straight ahead position.
2. Loosen the rack guide screw locknut (A) with the locknut wrench, then remove the rack guide screw (B).

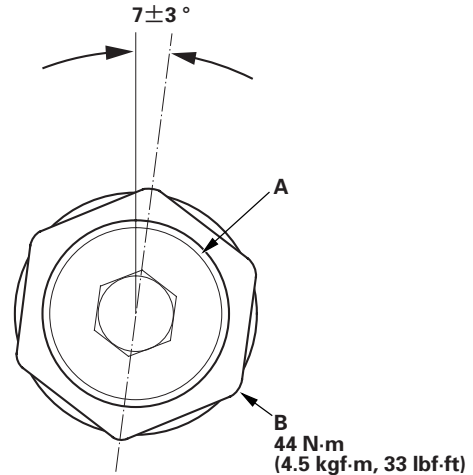


3. Remove the old sealant from the rack guide screw (A), and apply new sealant (Three Bond 1215 or Loctite 5699) to the middle of the threads (B). Loosely install the rack guide screw on the steering gearbox.

NOTE: If more than 5 minutes has passed after applying the sealant, remove the old sealant and residue, and reapply new sealant.



4. Tighten the rack guide screw (A) to 25 N·m (2.5 kgf·m, 18 lbf·ft), then loosen it.



5. Retighten the rack guide screw to 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft), then back it off to the specified angle.

Specified return angle: $7 \pm 3^\circ$

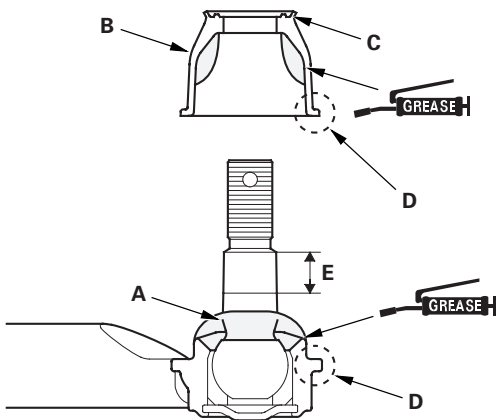
6. Hold the rack guide screw stationary with a wrench, and tighten the locknut (B) by hand until it's fully seated.
7. Install the locknut wrench on the locknut, and hold the rack guide screw stationary with a wrench. Tighten the locknut to the specified torque.
8. Check for unusual steering effort through the complete turning range.
9. Check the steering wheel rotational play (see page 17-4) and the power assist (see page 17-4).

Tie-rod End Ball Joint Boot Replacement

Special Tools Required

Bushing base 07JAF-SH20330

1. Disconnect the tie-rod end ball joint from the knuckle (see step 17 on page 17-67).
2. Remove the tie-rod end from the rack end.
3. Remove the tie-rod ball joint boot from the tie-rod end, and wipe the old grease off the ball pin.
4. Pack the lower area of the ball pin (A) with fresh multipurpose grease.

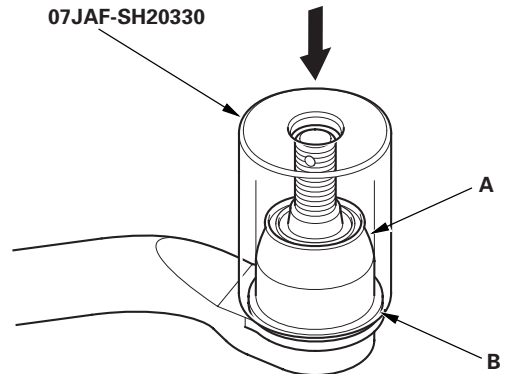


5. Pack the interior of the new tie-rod end ball joint boot (B) and lip (C) with fresh multipurpose grease.

Note these items when installing new grease:

- Keep grease off the boot mounting area (D) and the tapered section (E) of the ball pin.
- Do not allow dust, dirt, or other foreign materials to enter the boot.

6. Install the new tie-rod end ball joint boot (A) using the bushing base. The boot must not have a gap at the boot installation sections (B). After installing the boot, check the ball pin tapered section for grease contamination, and wipe it if necessary.

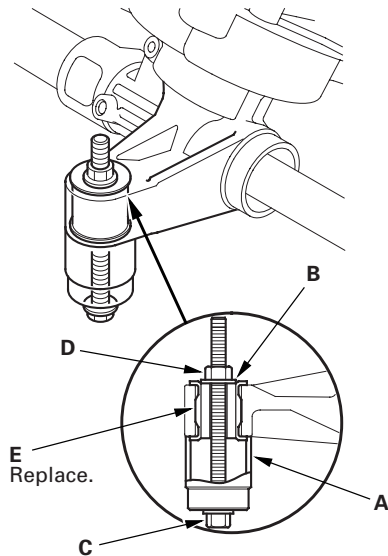


7. Install the tie-rod end to the rack end.
8. Connect the tie-rod end ball joint to the knuckle (see step 25 on page 17-76).
9. Check the wheel alignment, and adjust it if necessary (see page 18-5).



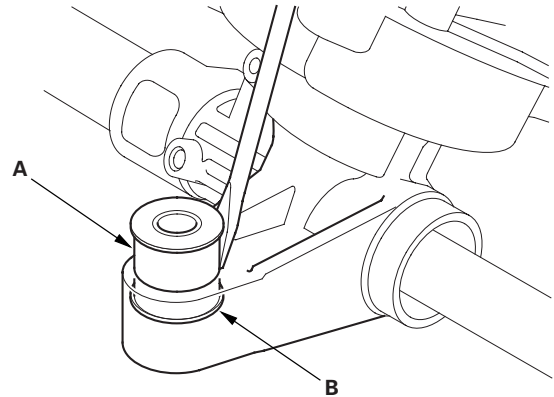
Gearbox Mount Cushion Replacement

1. Remove the steering gearbox (see page 17-65).
2. Position a 34 mm socket wrench (A) on the flange part of the gearbox housing with a washer (B), a 10 x 105 mm flange bolt (C), and a 10 mm nut (D) as shown.



3. Hold the 10 mm nut with a wrench, and tighten the 10 x 105 mm flange bolt with another wrench. Remove the gearbox mount cushion (E).

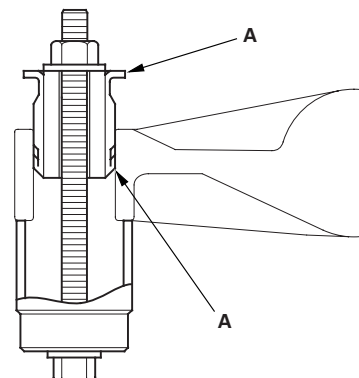
4. Apply a mild soap and water solution to the new gearbox mount cushion surface (A), then place the mount cushion on the gearbox mounting cushion hole.



5. Using a flat-tipped screwdriver, push the edge of the mount cushion (B) until it is about 1/3 of the way into the gearbox housing.

NOTE: Be careful not to damage the surface of the mount cushion when pushing it with the flat-tipped screwdriver.

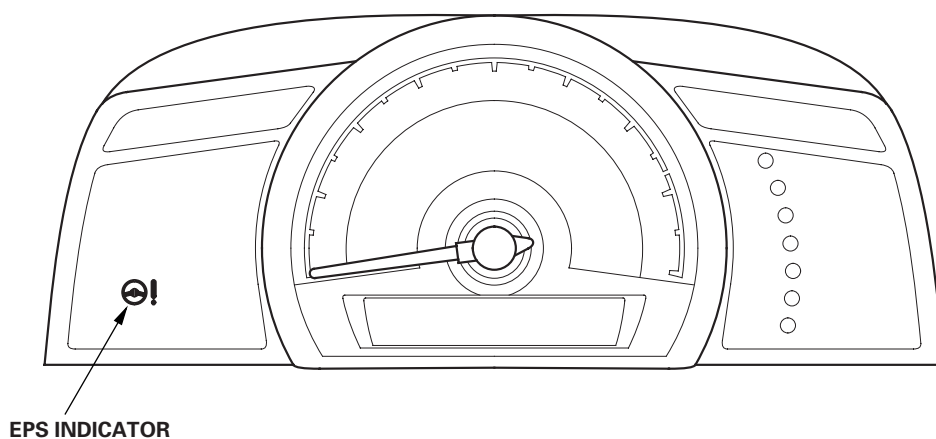
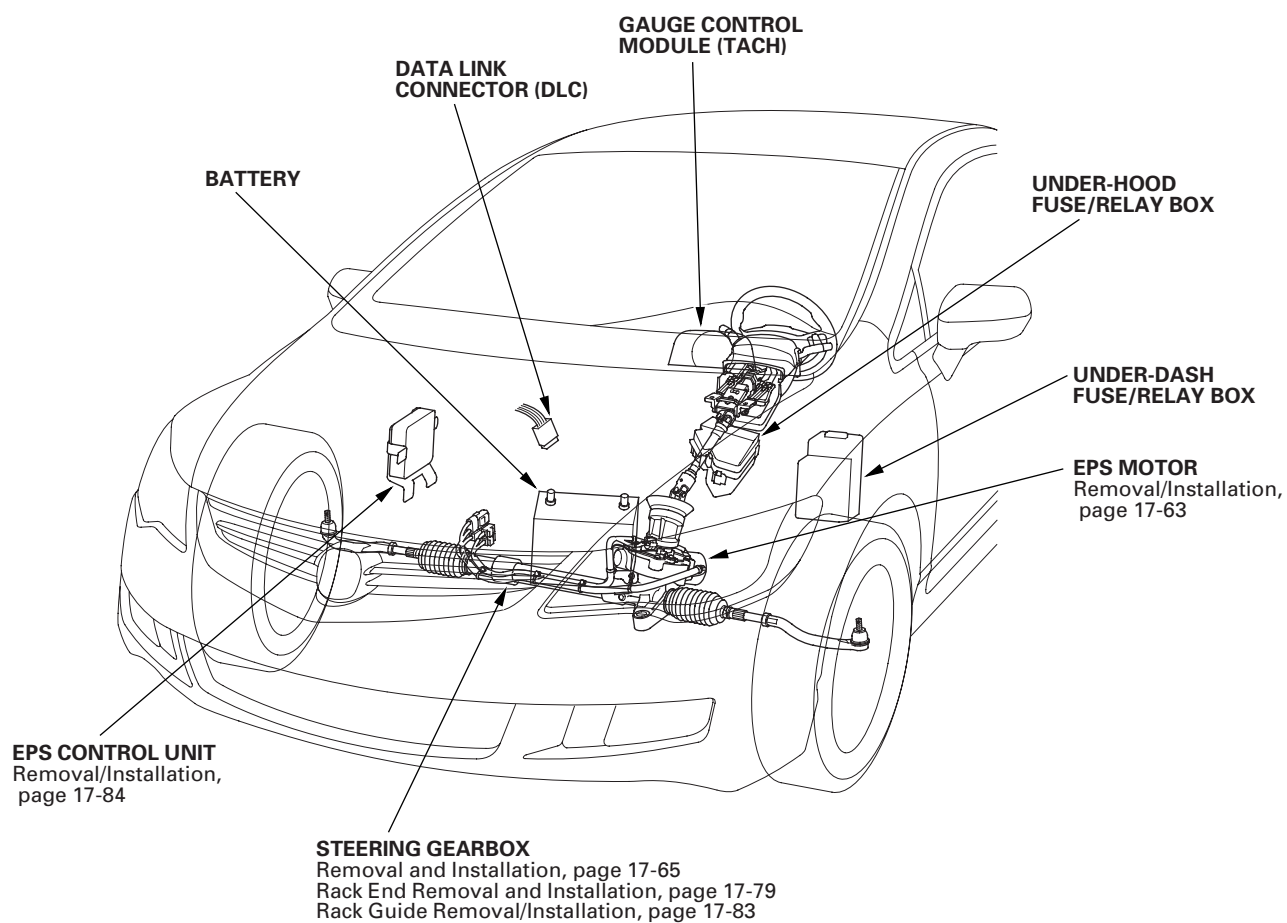
6. Position a 34 mm socket wrench on the flange part of the gearbox housing with a washer, flange bolt, and the nut as shown.
7. Install the gearbox mount cushion by tightening the nut until the mount cushion edges (A) contact the gearbox flange surface.



8. Install the steering gearbox (see page 17-72).
9. Check the wheel alignment, and adjust it if necessary (see page 18-5).

EPS Components

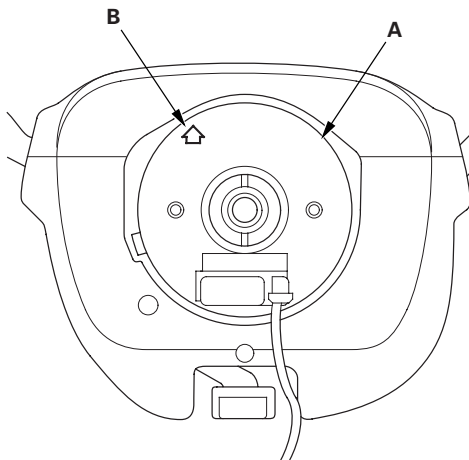
Component Location Index



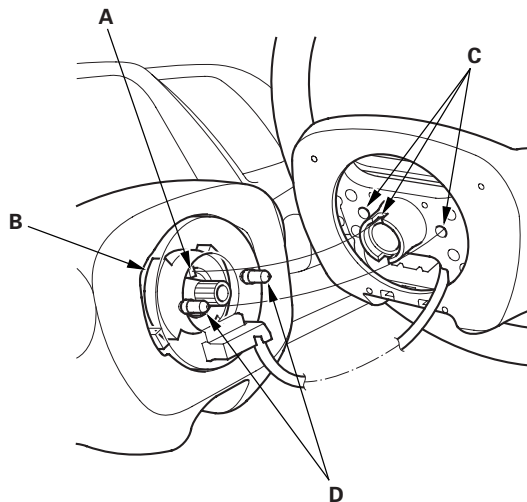
Steering

Steering Wheel Installation

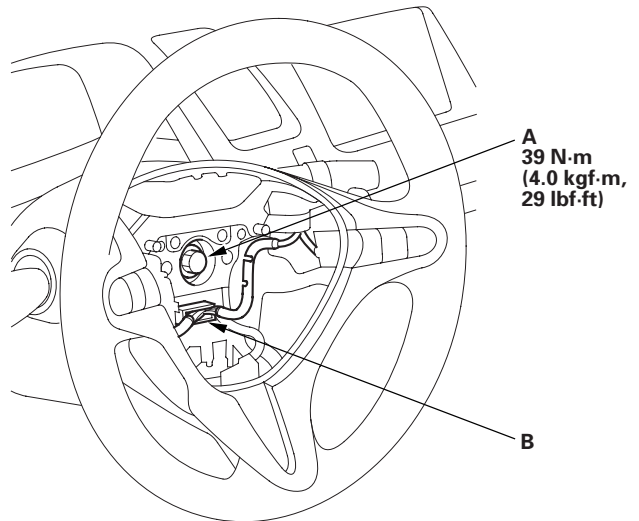
1. Before installing the steering wheel, make sure the front wheels are aligned straight ahead, then center the cable reel (A). Do this by first rotating the cable reel clockwise until it stops. Then rotate it counterclockwise about three full turns. The arrow mark (B) on the cable reel label should point straight up.



2. Position the two tabs (A) of the turn signal canceling sleeve (B) as shown. Install the steering wheel on to the steering column shaft, making sure the steering wheel hub (C) engages the pins (D) of the cable reel and tabs of the turn signal canceling sleeve. Do not tap on the steering wheel or steering column shaft when installing the steering wheel.



3. Install the steering wheel bolt (A), and tighten it to the specified torque. Connect the cable reel subharness connector (B). Make sure the wire harness is routed and fastened properly.



4. Install the driver's airbag, and confirm that the system is operating properly (see page 24-188).
5. Do the battery terminal reconnection procedure (see page 22-68), and do these tasks:
 - Turn the ignition switch to ON (II), and check that the SRS indicator comes on for about 6 seconds and then goes off.
 - Make sure the horn and turn signal switches work properly.
 - Make sure the steering wheel is centered.
6. After installation, check the steering wheel spoke angle. If the steering spoke angles to the right and left are not equal (steering wheel is not centered), correct the engagement of the wheel/column shaft serrations.



General Troubleshooting Information

EPS Indicator

Under normal conditions, the EPS indicator comes on when the ignition switch is turned to ON (II), then goes off after the engine is started. This indicates that the LED and its circuit are operating correctly.

If there is a failure in the system after the engine is started, the EPS indicator will stay on, and the power assist is turned off or restricted.

When the EPS indicator comes on, the control unit memorizes the DTC. In this case, the control unit will not activate the EPS system after the engine starts again, but it keeps the EPS indicator on.

When DTC 51-01, 51-02 or 51-06 is stored in the control unit, the EPS indicator will stay on until the DTC is erased. When a problem is detected and the EPS indicator comes on, there are cases when the indicator stays on until the ignition switch is turned to LOCK (0), and cases when the indicator goes off automatically when the system returns to normal. Even though the system is operating normally, the EPS indicator will come on under the following conditions:

- The vehicle speed decreases abruptly from 20 km/h (12 mph) or more (by applying brake), and it is less than 1 km/h (1 mph) and engine speed is 2,000 rpm or above for 5 seconds (continuously) after the abrupt deceleration.
- While turning the steering wheel with the vehicle speed of 1 km/h (1 mph) or less for 20 seconds, and the engine speed is 2,000 rpm or above for at least 10 seconds.
- When the engine speed is 500 rpm or less, and the vehicle is traveling at a speed of 10 km/h (6 mph) or more for about 3 seconds.

To determine the actual cause of the problem, question the client about the conditions during which the problem occurred, taking the above conditions into consideration.

Diagnostic Trouble Code (DTC)

- If the CPU cannot be activated, or it fails, the EPS indicator comes on, but the DTC is not memorized.
- The memory can hold any number of DTCs. However, when the same DTC is detected more than once, the most recent DTC is written over the prior DTC, therefore only one occurrence is memorized.
- The lowest DTC is indicated first. The DTCs are indicated in ascending order, not in the order that they occurred.
- The DTCs are memorized in the EEPROM (non-volatile memory) therefore the memorized DTCs cannot be erased by disconnecting the battery. Do the specified procedures to clear the DTCs.

Self-diagnosis

Self-diagnosis can be classified into three categories:

- Initial diagnosis: Done right after the engine starts and until the EPS indicator goes off.
- Regular diagnosis: Done right after the initial diagnosis until the ignition switch is turned to LOCK (0).
- Steering diagnosis: Done during regular diagnosis while turning the steering wheel.

The EPS control unit does these functions when a problem is detected by self-diagnosis:

1. Turns on the EPS indicator.
2. Memorizes the DTC.
3. Stops power assist and manual steering operation resumes.

NOTE: For DTCs 11-01, 11-02, 12-01, 21-01, 21-02, 22-01, and 35-04 the EPS indicator will go off automatically, and the system returns to normal.

(cont'd)

EPS Components

General Troubleshooting Information (cont'd)

Restriction on Power Assist Operation

Repeated extreme steering force, such as turning the steering wheel continuously back-and-forth with the vehicle stopped, causes an increase of power consumption in the EPS motor. The increase of electric current causes the EPS motor to heat up. Because this heat adversely affects the system, the control unit monitors the electric current of the EPS motor.

When the control unit detects heat build-up in the EPS motor, it reduces the electric current to the EPS motor gradually to protect the system, and it restricts the power assist operation. The EPS indicator does not come on during this function.

When steering torque is not applied to the steering wheel, or when the ignition is turned to LOCK (0) and the EPS motor cools, the control unit will restore the power assist gradually until it's fully restored (after about 8 minutes).

Torque Sensor Neutral Position

The EPS control unit stores the torque sensor neutral position in the EEPROM. The torque sensor neutral position must be memorized whenever the gearbox, the EPS motor, or the EPS control unit is replaced.

NOTE: The torque sensor neutral position is not effected when erasing the DTCs.

How to Troubleshoot DTCs

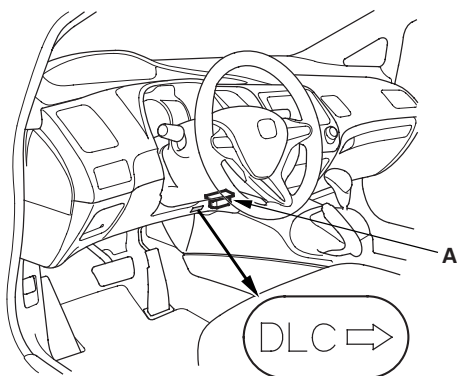
The troubleshooting procedures assume that the cause of the problem is still present and the EPS indicator is still on. Following the procedure when the EPS indicator does not come on can result in incorrect diagnosis.

1. Question the client about the conditions when the problem occurred, and try to reproduce the same conditions for troubleshooting. Find out when the EPS indicator came on, such as while turning, after turning, when the vehicle was at a certain speed, etc.
2. When the EPS indicator does not come on during the test-drive, but troubleshooting is done based on the DTC, check for loose connectors, poor terminal contact, etc., in the affected circuit before you start troubleshooting.
3. After troubleshooting, clear the DTC and test-drive the vehicle. Be sure the EPS indicator does not come on.



How to Retrieve DTCs

1. With the ignition switch in LOCK (0), connect the HDS (Honda diagnostic system) to the data link connector (DLC) (A) located under the driver's side of the dashboard.



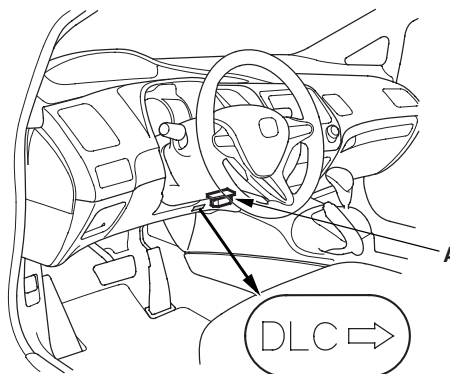
2. Turn the ignition switch to ON (II).
3. Make sure the HDS communicates with the vehicle and the EPS control unit. If it doesn't, troubleshoot the DLC circuit (see page 11-204).
4. Follow the prompts on the HDS to display the DTC(s) on the screen. After determining the DTC, refer to the DTC Troubleshooting.

NOTE: See the HDS Help menu for specific instructions.

5. Turn the ignition switch to LOCK (0).

How to Clear DTCs

1. With the ignition switch in LOCK (0), connect the HDS to the data link connector (DLC) (A) located under the driver's side of the dashboard.



2. Turn the ignition switch to ON (II).
3. Make sure the HDS communicates with the vehicle and the EPS control unit. If it doesn't, troubleshoot the DLC circuit (see page 11-204).
4. Clear the DTC(s) by following the screen prompts on the HDS.

NOTE: See the HDS Help menu for specific instructions.

5. Turn the ignition switch to LOCK (0).

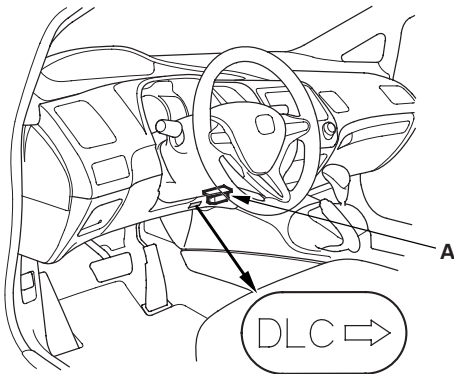
EPS Components

Memorizing the Torque Sensor Neutral Position

The torque sensor neutral position must be memorized whenever the steering gearbox, the torque sensor, the EPS motor, or the EPS control unit is replaced. Note that the torque sensor neutral position is not affected when erasing the DTC.

NOTE: The torque sensor is temperature sensitive. When memorizing the torque sensor neutral position, the ambient temperature must be above $20 \pm 10^{\circ}\text{C}$ ($68 \pm 18^{\circ}\text{F}$)

1. With the ignition switch in LOCK (0), connect the HDS to the data link connector (DLC) (A) located under the driver's side of the dashboard.



2. Turn the ignition switch to ON (II).
3. Make sure the HDS communicates with the vehicle and the EPS control unit. If it doesn't, troubleshoot the DLC circuit (see page 11-204).
4. From the EPS MENU, select MISCELLANEOUS TEST, then TORQUE SENSOR LEARN, and follow the screen prompts on the HDS.

NOTE: See the HDS Help menu for specific instructions.

5. Turn the ignition switch to LOCK (0).



DTC Troubleshooting Index

DTC	Detection Item	Note
11-01	Low/High IG1-terminal Voltage (Initial Diagnosis)	(see page 17-33)
11-02	Low/High IG1-terminal Voltage (Regular Diagnosis)	(see page 17-33)
12-01	Low/High VBU Voltage (Regular Diagnosis)	(see page 17-34)
21-01	Excessive Change of the Vehicle Speed Signal (Regular Diagnosis)	(see page 17-35)
21-02	Comparison between the Vehicle Speed and the Engine Speed Signal (Regular Diagnosis)	(see page 17-35)
22-01	Engine Speed Signal (Initial Diagnosis)	(see page 17-37)
31-01	No Writing the Torque Sensor Neutral Position (Initial Diagnosis)	(see page 17-22)
32-01	EPS Control Unit Internal Circuit (Current Sensor) (Initial Diagnosis)	(see page 17-39)
32-02	EPS Control Unit Internal Circuit (Current Sensor) (Regular Diagnosis)	(see page 17-39)
32-07	EPS Control Unit Internal Circuit (Current Sensor) (Steering Diagnosis)	(see page 17-39)
32-08	Current Sensor (Regular Diagnosis)	(see page 17-40)
32-09	Current Sensor (Initial Diagnosis)	(see page 17-40)
33-01	Lower FET Stuck ON (Initial Diagnosis)	(see page 17-41)
33-02	Upper FET Stuck ON (Initial Diagnosis)	(see page 17-43)
33-06	Lower FET Stuck ON (Regular Diagnosis)	(see page 17-41)
33-07	Upper FET Stuck ON (Regular Diagnosis)	(see page 17-43)
34-01	Power Relay Stuck ON (Ignition Switch is in LOCK (0))	(see page 17-44)
34-02	Fail-safe Relay Stuck ON (Initial Diagnosis)	(see page 17-45)
35-01	EPS Control Unit Internal Circuit (CPU) (Initial Diagnosis/Regular Diagnosis)	(see page 17-39)
35-02	EPS Control Unit Internal Circuit (EEPROM) (Initial Diagnosis)	(see page 17-39)
35-03	EPS Control Unit Internal Circuit (EPS CPU) (Initial Diagnosis)	(see page 17-46)
35-04	EPS Control Unit Internal Circuit (CPU Communication) (Regular Diagnosis)	(see page 17-39)
35-05	EPS Control Unit Internal Circuit (EPS Motor/EPS CPU) (Initial Diagnosis)	(see page 17-46)
35-06	EPS Control Unit Internal Circuit (ITN Communication) (Regular Diagnosis)	(see page 17-39)
35-07	EPS Control Unit Internal Circuit (INHL/INHR Ports) (Initial Diagnosis/Regular Diagnosis)	(see page 17-39)

NOTE:

- Initial diagnosis: Done right after the engine starts and until the EPS indicator goes off.
- Regular diagnosis: Done right after the initial diagnosis until the ignition switch is turned to LOCK (0).
- Steering diagnosis: Done during regular diagnosis while turning steering wheel.

(cont'd)

EPS Components

DTC Troubleshooting Index (cont'd)

DTC	Detection Item	Note
36-02	EPS Control Unit Internal Circuit (INH Output Circuit) (Initial Diagnosis)	(see page 17-39)
37-01	EPS Control Unit Internal Circuit (Step-up Circuit) (Initial Diagnosis)	(see page 17-39)
51-01	Low/High Voltage for the Torque Sensor (VT1 and VT2) (Regular Diagnosis)	(see page 17-46)
51-02	Torque Sensor (VT3 Differential-amplification Function) (Regular Diagnosis)	(see page 17-50)
51-03	Torque Sensor (VT1, VT2 Rapid-change) (Regular Diagnosis)	(see page 17-50)
51-06	Torque Sensor (VT1, VT2 Average) (Regular Diagnosis)	(see page 17-50)
51-07	Torque Sensor (VT1, VT2 Initial Check) (Initial Diagnosis)	(see page 17-50)
61-04	Open/Short in the EPS Motor Harness (Steering Diagnosis)	(see page 17-53)
71-01	EPS Motor Angle Sensor (SIN/COS Signals) (Steering Diagnosis)	(see page 17-55)
71-02	EPS Motor Angle Sensor (Neutral Position Learning of SIN/COS) (Initial Diagnosis)	(see page 17-55)
71-03	EPS Motor Angle Sensor (SIN/COS Signals) (Steering Diagnosis)	(see page 17-55)
71-04	EPS Motor Angle Sensor (Check Signals) (Regular Diagnosis)	(see page 17-58)
71-05	EPS Motor Angle Sensor (SIN/COS Signals Charging Amount) (Steering Diagnosis)	(see page 17-55)
71-06	EPS Motor Angle Sensor (Neutral Position of SIN/COS) (Initial Diagnosis)	(see page 17-55)

NOTE:

- Initial diagnosis: Done right after the engine starts and until the EPS indicator goes off.
- Regular diagnosis: Done right after the initial diagnosis until the ignition switch is turned to LOCK (0).
- Steering diagnosis: Done during regular diagnosis while turning steering wheel.



Symptom Troubleshooting Index

Symptom	Diagnostic procedure
HDS does not communicate with the EPS control unit or the vehicle	Troubleshoot the DLC circuit (see page 11-204)
EPS indicator does not come on	Symptom Troubleshooting (see page 17-60)
EPS indicator does not go off, and no DTCs are stored	Symptom Troubleshooting (see page 17-60)
EPS indicator is not on, no DTCs are stored, but there is no power assist or power assist is reduced	1. Check the EPS motor power wires between the EPS control unit and the EPS motor for a short to body ground. Repair as needed. 2. If the EPS motor power wires are OK, replace the EPS motor (short in the EPS motor) (see page 17-63). 3. Check the power and body ground connections at the EPS control unit.

EPS Components

System Description

EPS Control Unit Inputs and Outputs for Connector A (2P) (Connector disconnected)



Wire side of female terminals

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal sign	Description	Signal
1	BLK	PG (Power ground)	Ground for the actuator EPS motor	Continuity to ground
2	WHT	+B (Plus battery)	Power source for the actuator EPS motor	Battery voltage at all times

EPS Control Unit Inputs and Outputs for Connector B (2P) (Connector disconnected)



Wire side of female terminals

Terminal number	Wire color	Terminal sign	Description	Signal
1	GRN	H-W	Drives the actuator EPS motor	———

EPS Control Unit Inputs and Outputs for Connector C (2P) (Connector disconnected)



Wire side of female terminals

Terminal number	Wire color	Terminal sign	Description	Signal
1	RED	H-U	Drives the actuator EPS motor	———
2	BLU	H-V	Drives the actuator EPS motor	———



EPS Control Unit Inputs and Outputs for Connector D (28P) (Connector disconnected)



Wire side of female terminals

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal sign	Description	Signal
1	WHT	CAN-H (CAN-HI)	CAN communication circuit	—
3	BLU	NEP (Engine pulse)	Detects tachometer signal	With engine running: pulses
7	BRN	SCS (Service check signal)	Detects service check connector signal	With service check signal not grounded: battery voltage
8	LT GRN	VS2 (Voltage sensor 2)	Detects torque sensor signal	—
9	BRN	PVF (Voltage fade)	Drives the torque sensor	
10	GRN	VS1 (Voltage sensor 1)	Detects torque sensor signal	
12	PNK	S1 (Signal 1)	Detects motor angle sensor signal	
13	BLU	R1 (EPS Motor angle sensor 1)	Detects motor angle sensor signal	
14	BRN	S2 (Signal 2)	Detects motor angle sensor signal	
15	RED	CAN-L (CAN-LO)	CAN communication circuit	
16	YEL ^{*1} GRY ^{*2}	IG1 (Ignition 1)	Power source for activating the system	With ignition switch ON (II): battery voltage
17	LT BLU	K-LINE (Data link connector)	Communicates with HDS	With service check signal opened: about 5.0 V
26	BRN	S3 (Signal 3)	Detects motor angle sensor signal	—
27	PNK	R2 (EPS Motor angle sensor 2)	Detects motor angle sensor signal	
28	BLU	S4 (Signal 4)	Detects motor angle sensor signal	

* 1: '06 model

* 2: '07-09 models

(cont'd)

EPS Components

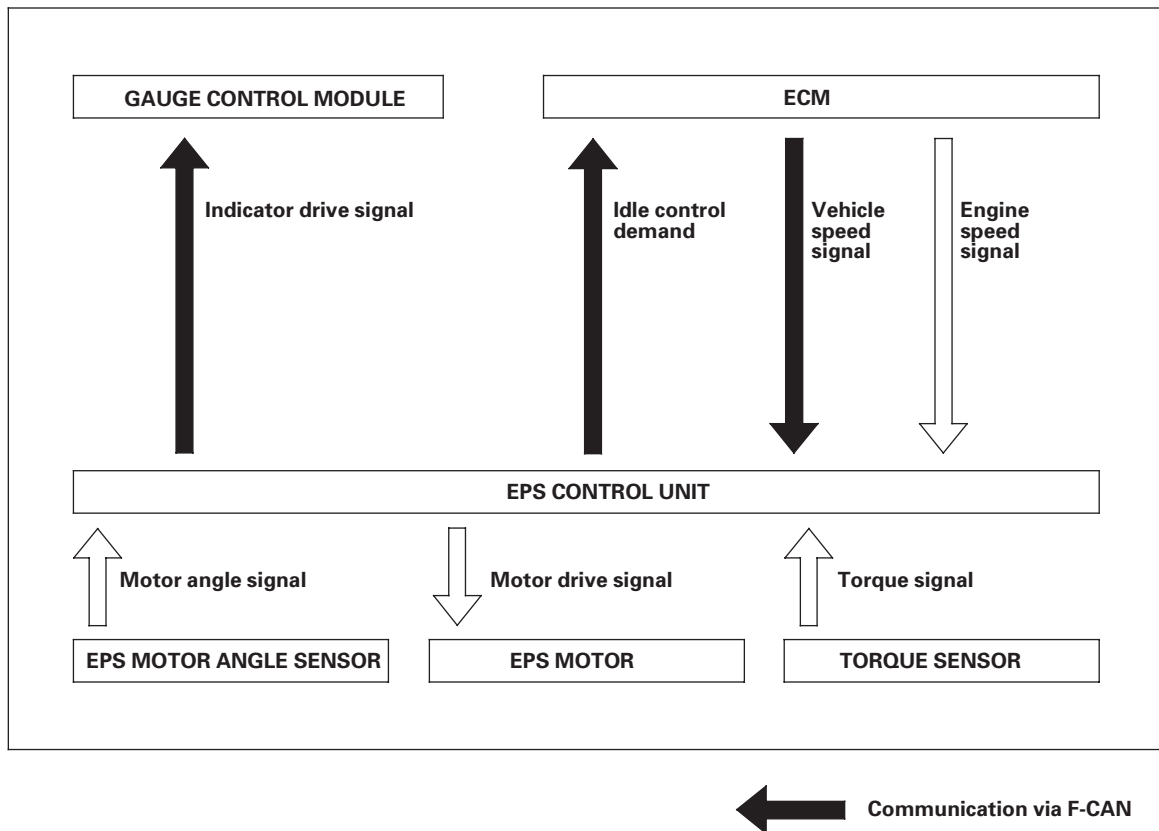
System Description (cont'd)

System Outline

The power steering system adopts the electric power steering assisting for the control force of the steering wheel in the driving force of the electric motor.

The EPS control unit is doing an appropriate steering force control according to the running situation of the vehicle (at time of low speed, lightness, by the control of emphasis and high-speed running time, control with the steady weight and the control which will be switched from low speed to high speed smoothly later) by the EPS motor.

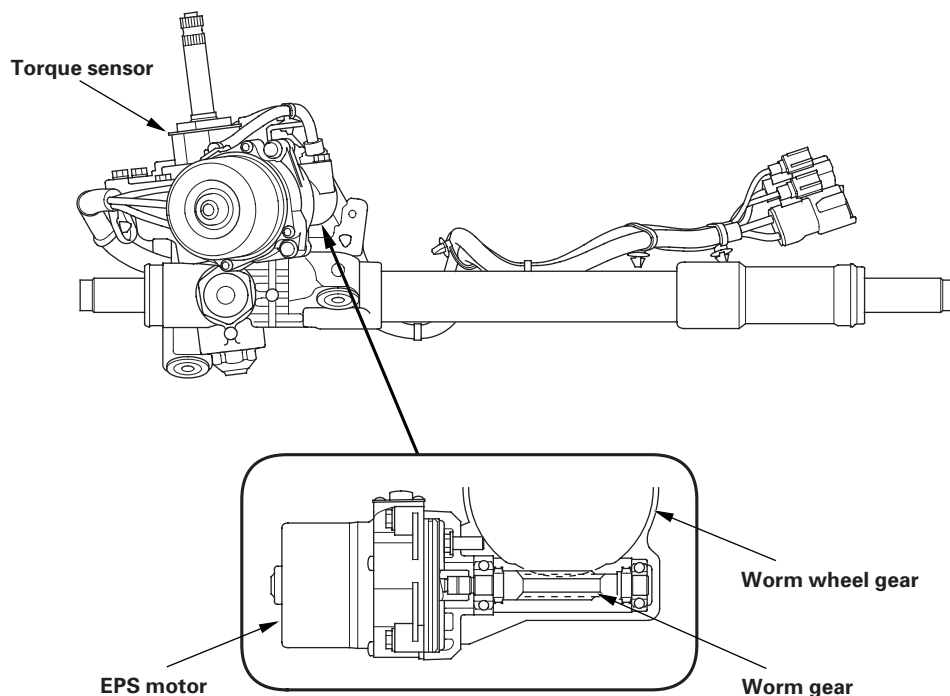
The EPS control unit is designed for use with an automotive power steering for the primary purpose of controlling the assist motor (brushless motor) for the power steering by using as inputs the steering torque signals received from the "steering torque sensor" installed in the steering gearbox as well as the speed signals received from the "vehicle speed sensor" installed in the vehicle. In addition to the above function, the EPS control unit also provides the failsafe function, self diagnosis function and motor output limiting function.





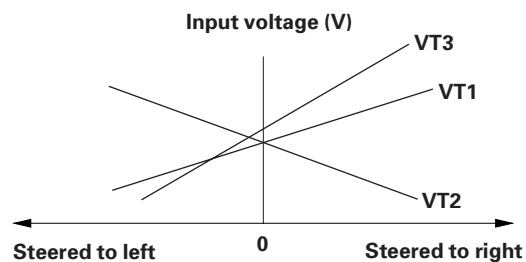
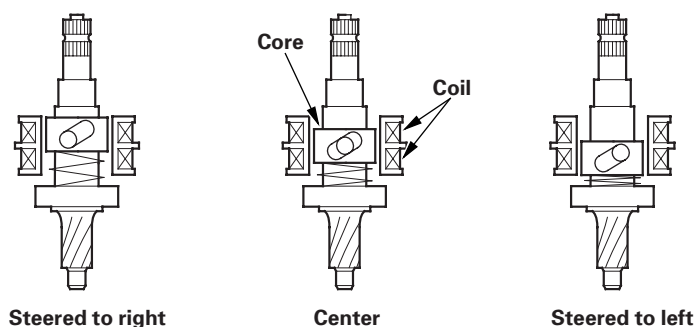
Steering Gearbox

The EPS motor engages with a pinion and one worm wheel gear, which is transmitted to a direct pinion, to move a rack.



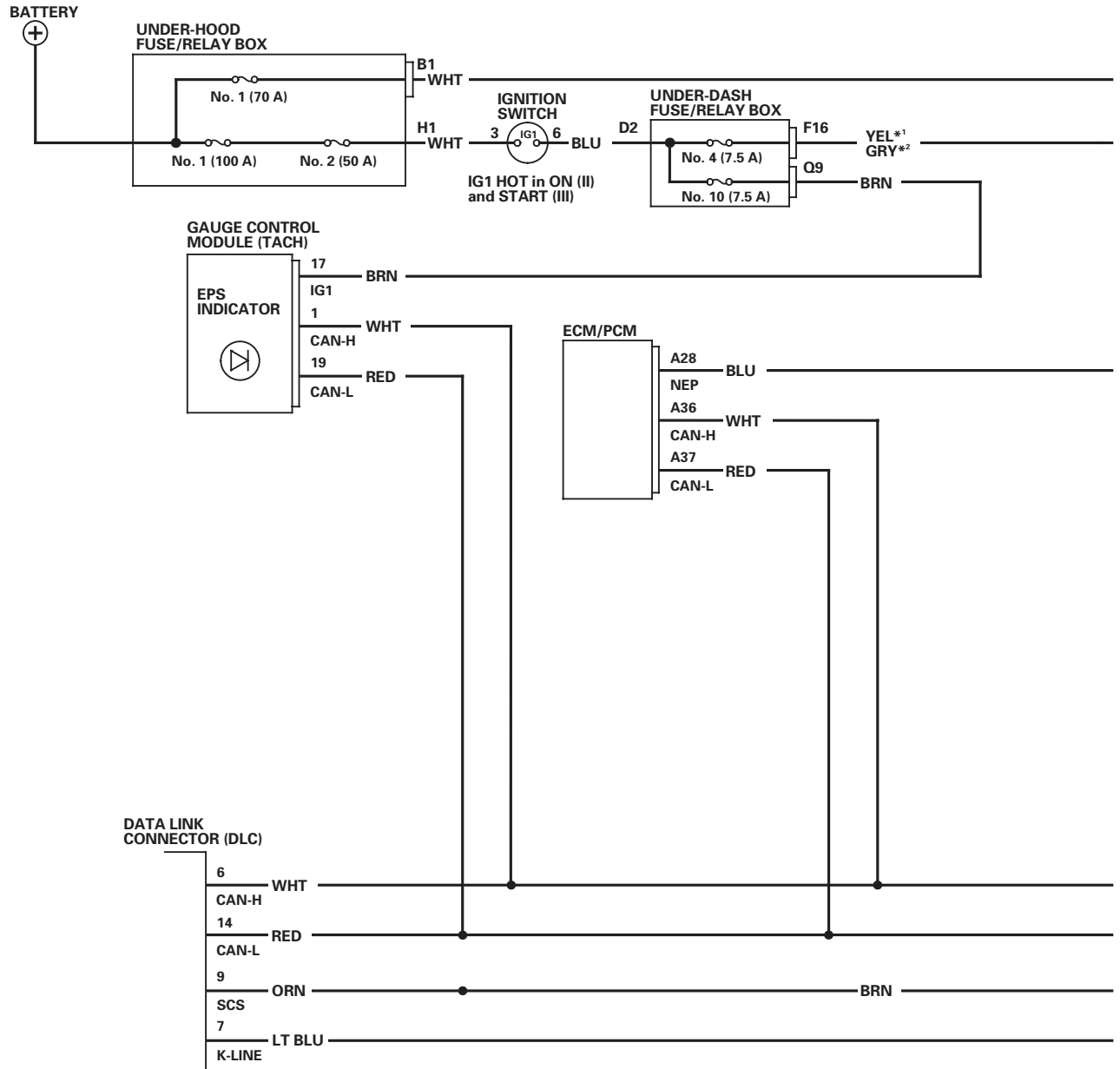
Torque Sensor

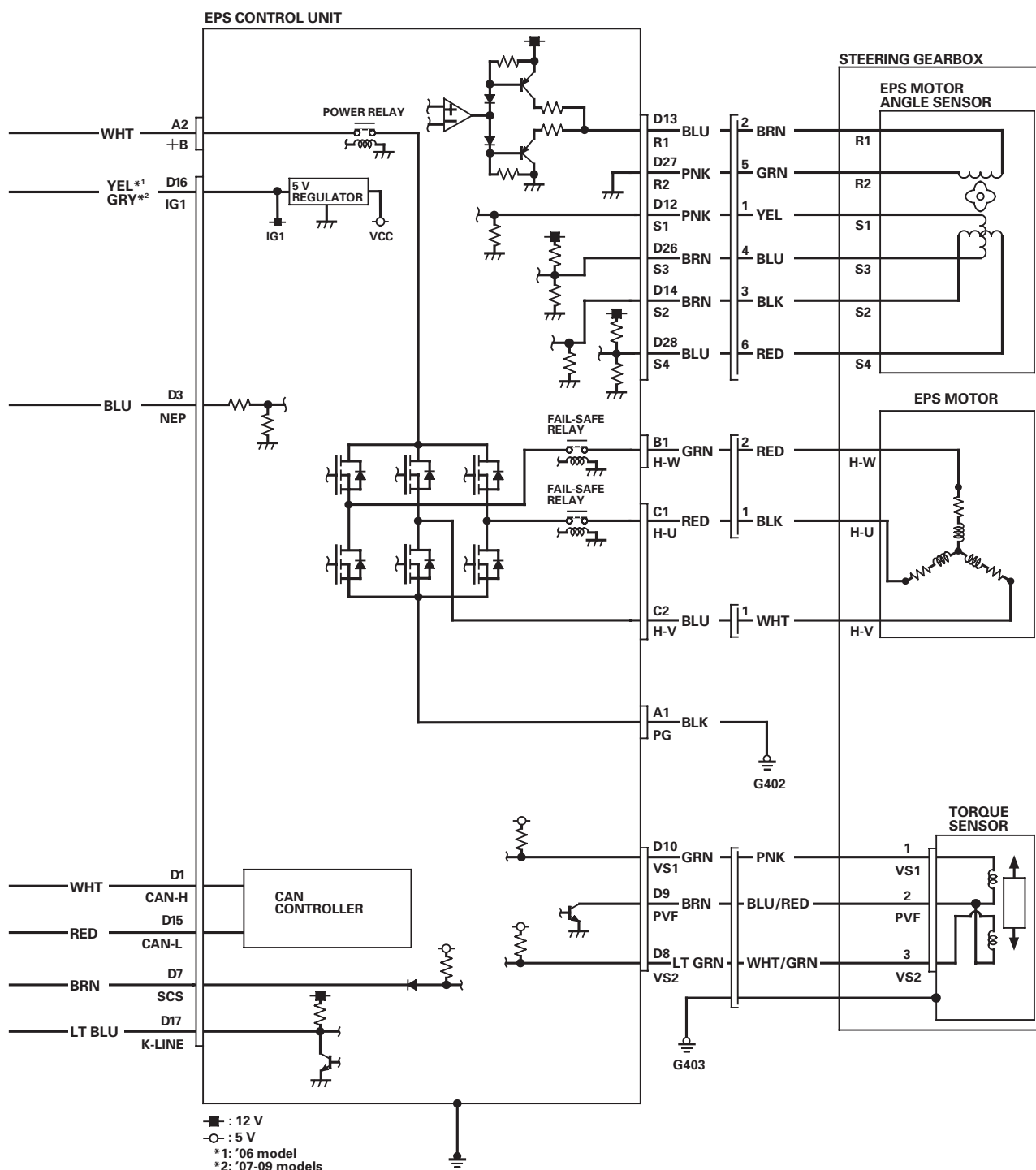
When the steering wheel is turned, twist occurs in the torsion bar between the steering side of the input shaft and the output shaft on the road reaction force side. Inductance is changed by the movement of the core. The amount this voltage changes (varies with the amount of movement, and direction of the core) is amplified with the interface circuitry of the sensor coil, and output to the EPS control unit as a steer signal.



EPS Components

Circuit Diagram





(cont'd)

EPS Components

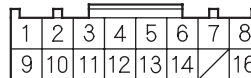
Circuit Diagram (cont'd)

**UNDER-HOOD FUSE/RELAY BOX
CONNECTOR B (1P)**

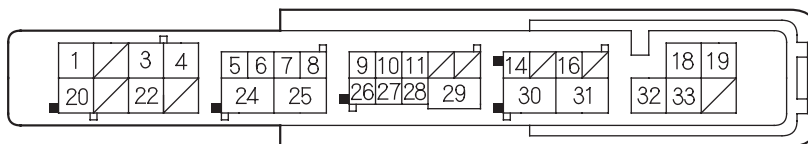


Wire side of female terminals

**UNDER-DASH FUSE/RELAY BOX
CONNECTOR Q (16P)**

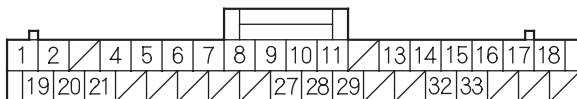


UNDER-DASH FUSE/RELAY BOX CONNECTOR F (34P)



Wire side of female terminals

GAUGE CONTROL MODULE (TACH) 36P CONNECTOR



Wire side of female terminals

**EPS CONTROL UNIT
CONNECTOR A (2P)**



**EPS CONTROL UNIT
CONNECTOR B (2P)**



**EPS CONTROL UNIT
CONNECTOR C (2P)**



**EPS CONTROL UNIT
CONNECTOR D (28P)**



Wire side of female terminals

**TORQUE SENSOR
3P CONNECTOR**



**EPS MOTOR 1P
CONNECTOR**

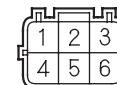


**EPS MOTOR 2P
CONNECTOR**

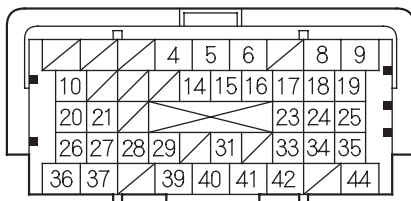


Terminal side of male terminals

**EPS MOTOR ANGLE
SENSOR 6P CONNECTOR**

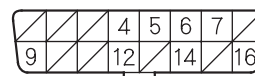


ECM/PCM CONNECTOR A (44P)



Terminal side of female terminals

DATA LINK CONNECTOR (DLC)





DTC Troubleshooting

DTC 11-01: Low/High IG1-terminal Voltage (Initial Diagnosis)

DTC 11-02: Low/High IG1-terminal Voltage (Regular Diagnosis)

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Start the engine.
5. Wait at least 60 seconds.

Does the EPS indicator come on?

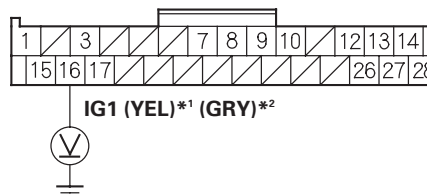
YES—Go to step 6.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

6. Turn the ignition switch to LOCK (0).
7. Disconnect EPS control unit connector D (28P).

8. Turn the ignition switch to ON (II).
9. Wait at least 60 seconds.
10. Measure the voltage between EPS control unit connector D (28P) terminal No. 16 and body ground.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

*1: '06 model

*2: '07-09 models

Is there battery voltage?

YES—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

NO—If there is no voltage, or the voltage is lower than specified, repair an open or high resistance in the wire between the No. 4 (7.5 A) fuse in the under-dash fuse/relay box and the EPS control unit. If the wire checks OK, check the battery (see page 22-67), and troubleshoot the alternator regulator circuit (see page 4-28). ■

EPS Components

DTC Troubleshooting (cont'd)

DTC 12-01: Low/High VBU Voltage (Regular Diagnosis)

1. Turn the ignition switch to ON (II).
2. Check the BATTERY in the EPS DATA LIST with the HDS.

Is the voltage at 9.2–17.4 V?

YES—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

NO—Go to step 3.

3. Turn the ignition switch to LOCK (0).
4. Check the No. 1 (70 A) fuse in the under-hood fuse/relay box.

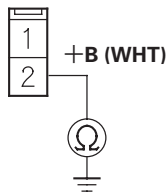
Is the fuse OK?

YES—Reinstall the checked fuse, then go to step 13.

NO—Go to step 5.

5. Disconnect the EPS control unit connector A (2P).
6. Check for continuity between EPS control unit connector A (2P) terminal No. 2 and body ground.

EPS CONTROL UNIT CONNECTOR A (2P)



Wire side of female terminals

Is there continuity?

YES—Repair short to body ground in the wire between the EPS control unit and the No. 1 (70 A) fuse in the under-hood fuse/relay box. ■

NO—Install a new No. 1 (70 A) fuse in the under-hood fuse/relay box, then go to step 7.

7. Reconnect the EPS control unit connector A (2P).
8. Turn the ignition switch to ON (II).
9. Clear the DTC with the HDS.
10. Turn the ignition switch to LOCK (0).
11. Start the engine.
12. Check for DTCs with the HDS.

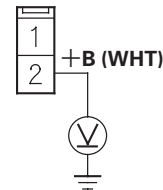
Is DTC 12-01 indicated?

YES—Replace the EPS control unit (see page 17-84). ■

NO—Troubleshooting is complete. If any other DTCs are indicated, go to the indicated DTC's troubleshooting. ■

13. Disconnect EPS control unit connector A (2P) and connector D (28P).
14. Measure the voltage between EPS control unit connector A (2P) terminal No. 2 and body ground.

EPS CONTROL UNIT CONNECTOR A (2P)



Wire side of female terminals

Is there battery voltage?

YES—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

NO—Repair open in the wire between the EPS control unit and the No. 1 (70 A) fuse in the under-hood fuse/relay box. ■



DTC 21-01: Excessive Change of the Vehicle Speed Signal (Regular Diagnosis)

DTC 21-02: Comparison between the Vehicle Speed and the Engine Speed Signal (Regular Diagnosis)

NOTE:

- If the MIL is on, troubleshoot the fuel and emissions systems first.
- Even though the system is operating normally, the EPS indicator will come on caused by the detecting condition of DTC 21-01 or DTC 21-02 when you raise the engine speed with the vehicle stopped.
- Clear the DTC related to the ABS/VSA.

1. Turn the ignition switch to LOCK (0).
2. Raise the vehicle, and support it with safety stands in the proper locations (see page 1-11), and allow all wheels to rotate freely.
3. Connect the HDS to the data link connector (DLC).
4. Turn off VSA by using the VSA OFF switch.
5. Start the engine, run the vehicle in the 4th (M/T), or D position (A/T).
6. Check the VEHICLE SPEED in the EPS DATA LIST with the HDS.

Is the vehicle speed indicated?

YES—The system is OK at this time. ■

NO—Go to step 7.

7. Check for DTCs in the fuel and emissions system (M/T) or A/T system (A/T) with the HDS.

Is DTC P0720, P0721, P0722 or P0723 indicated?

YES—Troubleshoot the indicated DTC(s). ■

NO—Go to step 8.

8. Start the engine, and check the tachometer.

Is the tachometer working correctly?

YES—Go to step 9.

NO—Troubleshoot the gauge control module (tach) (see page 22-241). ■

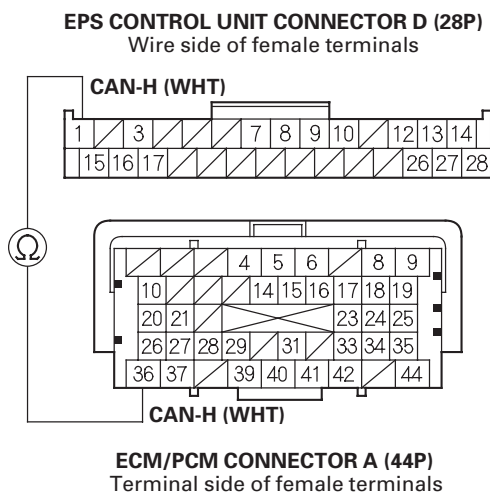
9. Turn the ignition switch to LOCK (0).
10. Short the SCS line with the HDS.
11. Disconnect ECM/PCM connector A (44P) and EPS control unit connector D (28P).

(cont'd)

EPS Components

DTC Troubleshooting (cont'd)

12. Check for continuity between EPS control unit connector D (28P) terminal No. 1 and ECM/PCM connector A (44P) terminal No. 36.

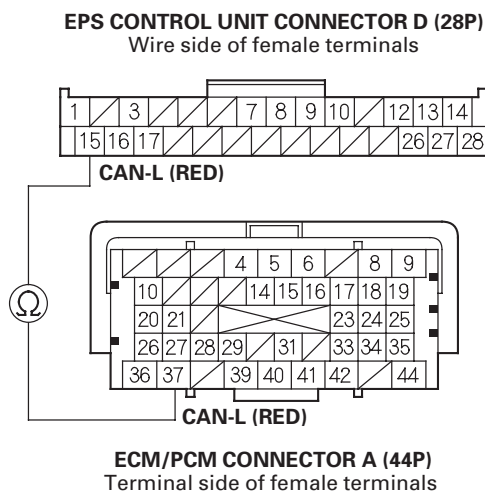


Is there continuity?

YES—Go to step 13.

NO—Repair open in the wire between the EPS control unit and the ECM/PCM. ■

13. Check for continuity between EPS control unit connector D (28P) terminal No. 15 and ECM/PCM connector A (44P) terminal No. 37.



Is there continuity?

YES—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

NO—Repair open in the wire between the EPS control unit and the ECM/PCM. ■



DTC 22-01: Engine Speed Signal (Initial Diagnosis)

NOTE: If the MIL indicator is on, troubleshoot the fuel and emissions systems first.

1. Turn the ignition switch to LOCK (0).
2. Connect the HDS to the data link connector (DLC).
3. Start the engine.
4. Check the ENGINE SPEED in the EPS DATA LIST with the HDS.

Is there 0 rpm at idle?

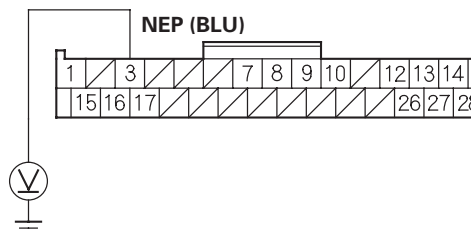
YES—Go to step 5.

NO—The system is OK at this time. ■

5. Turn the ignition switch to LOCK (0).
6. Disconnect EPS control unit connector D (28P).
7. Start the engine.

8. Measure the voltage between EPS control unit connector D (28P) terminal No. 3 and body ground.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

Is there any voltage?

YES—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

NO—Go to step 9.

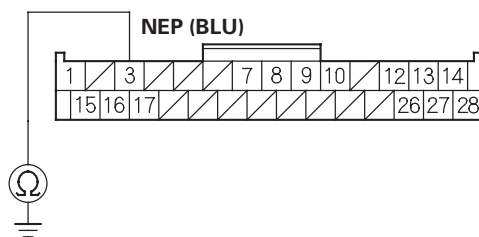
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EPS Components

DTC Troubleshooting (cont'd)

9. Turn the ignition switch to LOCK (0).
10. Short the SCS line with the HDS.
11. Disconnect ECM/PCM connector A (44P).
12. Check for continuity between EPS control unit connector D (28P) terminal No. 3 and body ground.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

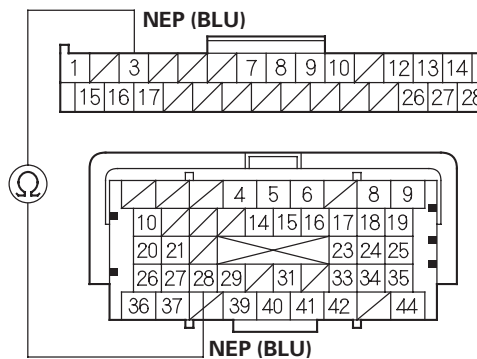
Is there continuity?

YES—Repair short to body ground in the wire between the EPS control unit and the ECM/PCM. ■

NO—Go to step 13.

13. Check for continuity between EPS control unit connector D (28P) terminal No. 3 and ECM/PCM connector A (44P) terminal No. 28.

EPS CONTROL UNIT CONNECTOR D (28P)
Wire side of female terminals



ECM/PCM CONNECTOR A (44P)
Terminal side of female terminals

Is there continuity?

YES—Update the ECM/PCM if it does not have the latest software (see page 11-227), or substitute a known-good ECM/PCM (see page 11-7), then go to step 1, and recheck. If the ECM/PCM was updated and DTCs are not indicated, troubleshooting is complete. If the ECM/PCM was substituted and DTCs are not indicated, replace the original ECM/PCM (see page 11-228). ■

NO—Repair open in the wire between the EPS control unit and the ECM/PCM. ■



DTC 32-01: EPS Control Unit Internal Circuit (Current Sensor) (Initial Diagnosis)

DTC 32-02: EPS Control Unit Internal Circuit (Current Sensor) (Regular Diagnosis)

DTC 35-01: EPS Control Unit Internal Circuit (CPU) (Initial Diagnosis/Regular Diagnosis)

DTC 35-02: EPS Control Unit Internal Circuit (EEPROM) (Initial Diagnosis)

DTC 35-04: EPS Control Unit Internal Circuit (CPU Communication) (Regular Diagnosis)

DTC 35-06: EPS Control Unit Internal Circuit (ITN Communication) (Regular Diagnosis)

DTC 35-07: EPS Control Unit Internal Circuit (INHL/INHR Ports) (Initial Diagnosis/Regular Diagnosis)

DTC 36-02: EPS Control Unit Internal Circuit (INH Output Circuit) (Initial Diagnosis)

DTC 37-01: EPS Control Unit Internal Circuit (Step-up Circuit) (Initial Diagnosis)

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Start the engine.

Does the EPS indicator come on?

YES—Go to step 5.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

5. Check for DTCs with the HDS.

Is DTC 32-01, 32-02, 35-01, 35-02, 35-04, 35-06, 35-07, 36-02, or 37-01 indicated?

YES—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

NO—Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time. ■

DTC 32-07: EPS Control Unit Internal Circuit (Current Sensor) (Steering Diagnosis)

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Start the engine.
5. Turn the steering wheel to the right or left, and wait 10 seconds or more.

Does the EPS indicator come on?

YES—Go to step 6.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

6. Check for DTCs with the HDS.

Is DTC 32-07 indicated?

YES—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

NO—Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time. ■

EPS Components

DTC Troubleshooting (cont'd)

DTC 32-08: Current Sensor (Regular Diagnosis)

DTC 32-09: Current Sensor (Initial Diagnosis)

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Start the engine.
5. Turn the steering wheel to the right or left, and wait 10 seconds or more.

Does the EPS indicator come on?

YES—Go to step 6.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

6. Check for DTCs with the HDS.

Is DTC 32-08 or 32-09 indicated?

YES—Go to step 7.

NO—Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time. ■

7. Turn the ignition switch to LOCK (0).

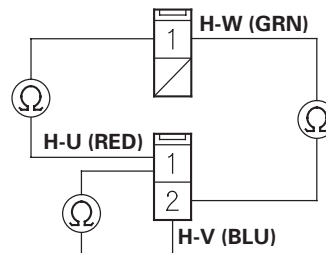
8. Disconnect EPS control unit connector B (2P) and connector C (2P).

9. Check for continuity between the following terminals of the EPS control unit connector B (2P) and connector C (2P).

EPS CONTROL UNIT CONNECTOR B		EPS CONTROL UNIT CONNECTOR C
---------------------------------	--	---------------------------------

No. 1	_____	No. 1
No. 1	_____	No. 2
		No. 1
		No. 2

EPS CONTROL UNIT CONNECTOR B (2P)
Wire side of female terminals



EPS CONTROL UNIT CONNECTOR C (2P)
Wire side of female terminals

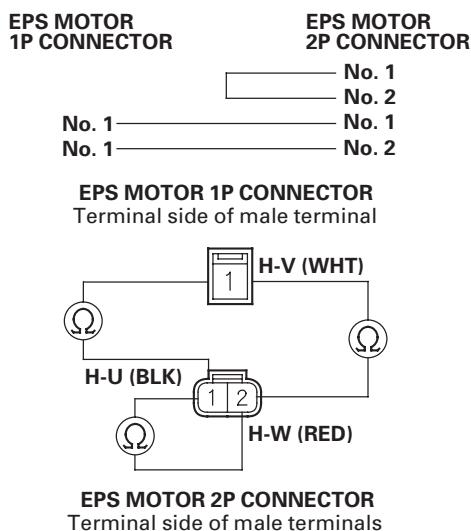
Is there continuity?

YES—Check for loose terminals in the EPS control unit connectors and EPS motor connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

NO—Go to step 10.



10. Disconnect the EPS motor 1P connector and EPS motor 2P connector.
11. On the EPS motor side, check for continuity between the following terminals of the EPS motor 1P and EPS motor 2P connector.



Is there continuity?

YES—Repair open in the wire between the EPS control unit and EPS motor. ■

NO—Open in the EPS motor wire, or EPS motor internal circuit, replace the EPS motor (see page 17-63). ■

DTC 33-01: Lower FET Stuck ON (Initial Diagnosis)

DTC 33-06: Lower FET Stuck ON (Regular Diagnosis)

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Start the engine.

Does the EPS indicator come on?

YES—Go to step 5.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

5. Check for DTCs with the HDS.

Is DTC 33-01 or 33-06 indicated?

YES—Go to step 6.

NO—Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time. ■

6. Turn the ignition switch to LOCK (0).
7. Disconnect EPS control unit connector B (2P) and connector C (2P).

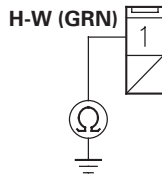
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EPS Components

DTC Troubleshooting (cont'd)

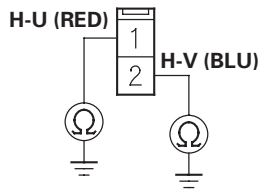
8. Check for continuity between body ground and EPS control unit connector B (2P) terminal No. 1, connector C (2P) terminal No. 1, and connector C (2P) terminal No. 2 individually.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

EPS CONTROL UNIT CONNECTOR C (2P)



Wire side of female terminals

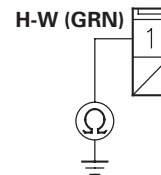
Is there continuity?

YES—Go to step 9.

NO—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

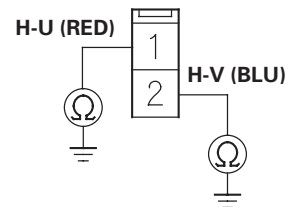
9. Disconnect the EPS motor 1P connector and EPS motor 2P connector.
10. Check for continuity between body ground and EPS control unit connector B (2P) terminal No. 1, connector C (2P) terminal No. 1, and connector C (2P) terminal No. 2 individually.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

EPS CONTROL UNIT CONNECTOR C (2P)



Wire side of female terminals

Is there continuity?

YES—Repair short to body ground in the wire between the EPS control unit and EPS motor. ■

NO—Short to body ground in the EPS motor wire; or a short in the EPS motor internal circuit, replace the EPS motor (see page 17-63). ■



DTC 33-02: Upper FET Stuck ON (Initial Diagnosis)

DTC 33-07: Upper FET Stuck ON (Regular Diagnosis)

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Start the engine.

Does the EPS indicator come on?

YES—Go to step 5.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

5. Check for DTCs with the HDS.

Is DTC 33-02 or 33-07 indicated?

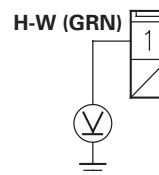
YES—Go to step 6.

NO—Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time. ■

6. Turn the ignition switch to LOCK (0).
7. Disconnect EPS control unit connector B (2P) and connector C (2P).
8. Turn the ignition switch to ON (II).

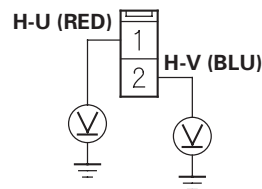
9. Measure the voltage between body ground and EPS control unit connector B (2P) terminal No. 1, connector C (2P) terminal No. 1, and connector C (2P) terminal No. 2 individually.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

EPS CONTROL UNIT CONNECTOR C (2P)



Wire side of female terminals

Is there battery voltage?

YES—Go to step 10.

NO—Check for loose terminals in the EPS control unit connectors and the EPS motor connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

10. Turn the ignition switch to LOCK (0).

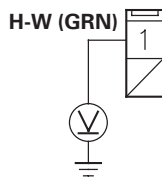
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EPS Components

DTC Troubleshooting (cont'd)

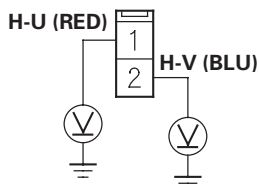
11. Disconnect the EPS motor 1P connector and EPS motor 2P connector.
12. Turn the ignition switch to ON (II).
13. Measure the voltage between body ground and EPS control unit connector B (2P) terminal No. 1, connector C (2P) terminal No. 1, and connector C (2P) terminal No. 2 individually.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

EPS CONTROL UNIT CONNECTOR C (2P)



Wire side of female terminals

Is there battery voltage?

YES—Repair short to power in the wire between the EPS control unit and the EPS motor. ■

NO—Short to power in the EPS motor wire; or a short in the EPS motor internal circuit, replace the EPS motor (see page 17-63). ■

DTC 34-01: Power Relay Stuck ON (Ignition Switch is in LOCK (0))

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Turn the ignition switch to ON (II).

Does the EPS indicator come on?

YES—Go to step 5.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

5. Check for DTCs with the HDS.

Is DTC 34-01 indicated?

YES—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

NO—Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time. ■



DTC 34-02: Fail-safe Relay Stuck ON (Initial Diagnosis)

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Turn the ignition switch to ON (II).

Does the EPS indicator come on?

YES—Go to step 5.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

5. Check for DTCs with the HDS.

Is DTC 34-02 indicated?

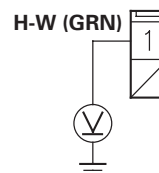
YES—Go to step 6.

NO—Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time. ■

6. Turn the ignition switch to LOCK (0).
7. Disconnect EPS control unit connector B (2P) and connector C (2P).
8. Turn the ignition switch to ON (II).

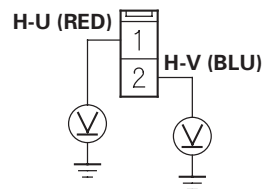
9. Measure the voltage between body ground and EPS control unit connector B (2P) terminal No. 1, connector C (2P) terminal No. 1, and connector C (2P) terminal No. 2 individually.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

EPS CONTROL UNIT CONNECTOR C (2P)



Wire side of female terminals

Is there battery voltage?

YES—Repair short to power in the wire between the EPS control unit and the EPS motor. ■

NO—Replace the EPS control unit (see page 17-84). ■

EPS Components

DTC Troubleshooting (cont'd)

DTC 35-03: EPS Control Unit Internal Circuit (EPS CPU) (Internal Diagnosis)

DTC 35-05: EPS Control Unit Internal Circuit (EPS Motor/EPS CPU) (Internal Diagnosis)

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Turn the ignition switch to ON (II).

Does the EPS indicator come on?

YES—Go to step 5.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

5. Start the engine.
6. Wait 10 seconds or more.
7. Check for DTCs with the HDS.

Is DTC 35-03 or 35-05 indicated?

YES—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

NO—Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time. ■

DTC 51-01: Low/High Voltage for the Torque Sensor (VT1 and VT2) (Regular Diagnosis)

1. Turn the ignition switch to LOCK (0).
2. Connect the HDS to the data link connector (DLC).
3. Turn the ignition switch to ON (II).
4. Check the ADVT1 in the DATA LIST with the HDS.

Is the voltage at 0.90—3.55 V?

YES—Go to step 5.

NO—Go to step 6.

5. Check the ADVT2 in the DATA LIST with the HDS.

Is the voltage at 1.02—3.73 V?

YES—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

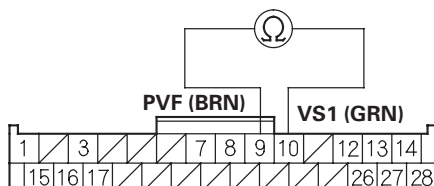
NO—Go to step 6.

6. Turn the ignition switch to LOCK (0).



7. Disconnect EPS control unit connector D (28P).
8. Measure the resistance between EPS control unit connector D (28P) terminals No. 9 and No. 10.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

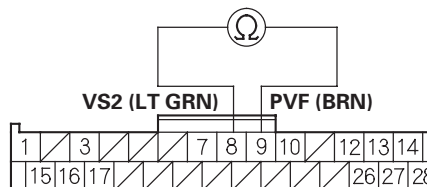
Is the resistance between 12— 15 Ω ?

YES—Go to step 9.

NO—Go to step 13.

9. Measure the resistance between EPS control unit connector D (28P) terminals No. 8 and No. 9.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

Is the resistance between 12— 15 Ω ?

YES—Go to step 10.

NO—Go to step 15.

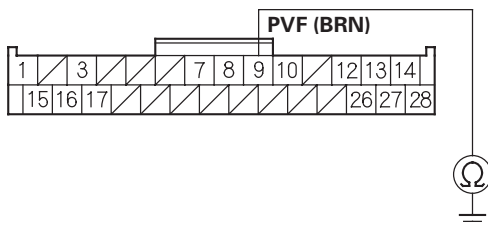
(cont'd)

EPS Components

DTC Troubleshooting (cont'd)

10. Check for continuity between EPS control unit connector D (28P) terminal No. 9 and body ground.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

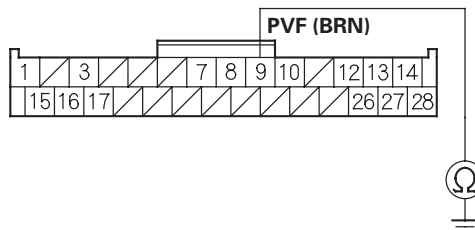
Is there continuity?

YES—Go to step 11.

NO—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

11. Disconnect the torque sensor 3P connector from the steering gearbox.
12. Check for continuity between EPS control unit connector D (28P) terminal No. 9 and body ground.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

Is there continuity?

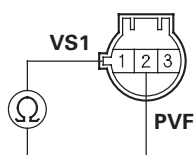
YES—Repair short to body ground in the wire between the torque sensor and the EPS control unit. ■

NO—Faulty torque sensor (short in the sensor internal circuit), replace the steering gearbox (see page 17-65). ■



13. Disconnect the torque sensor 3P connector from the steering gearbox.
14. On the sensor side, measure the resistance between torque sensor 3P connector terminals No. 1 and No. 2.

TORQUE SENSOR 3P CONNECTOR



Terminal side of male terminals

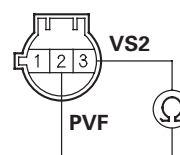
Is the resistance between 12— 15 Ω ?

YES—Repair open or short between the PNK and BLU/RED wires in the torque sensor circuit between the torque sensor and the EPS control unit. ■

NO—Faulty torque sensor (short or open in the internal circuit), replace the steering gearbox (see page 17-65). ■

15. Disconnect the torque sensor 3P connector from the steering gearbox.
16. On the sensor side, measure the resistance between torque sensor 3P connector terminals No. 2 and No. 3.

TORQUE SENSOR 3P CONNECTOR



Terminal side of male terminals

Is the resistance between 12— 15 Ω ?

YES—Repair open or short between the WHT/GRN and BLU/RED wires in the torque sensor circuit between the torque sensor and the EPS control unit. ■

NO—Faulty torque sensor (short or open in the internal circuit), replace the steering gearbox (see page 17-65). ■

EPS Components

DTC Troubleshooting (cont'd)

DTC 51-02: Torque Sensor (VT3 Differential-amplification Function) (Regular Diagnosis)

DTC 51-03: Torque Sensor (VT1, VT2 Rapid Change) (Regular Diagnosis)

DTC 51-06: Torque Sensor (VT1, VT2 Average) (Regular Diagnosis)

DTC 51-07: Torque Sensor (VT1, VT2 Initial Check) (Initial Diagnosis)

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Start the engine.

Does the EPS indicator come on?

YES—Go to step 5.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

5. Check for DTCs with the HDS.

Is DTC 51-02, 51-03, 51-06, or 51-07 indicated?

YES—Go to step 6.

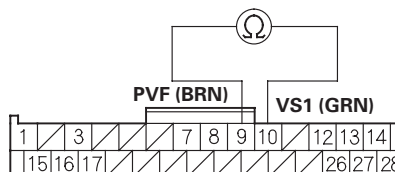
NO—Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time. ■

6. Turn the ignition switch to LOCK (0).

7. Disconnect EPS control unit connector D (28P).

8. Measure the resistance between EPS control unit connector D (28P) terminals No. 9 and No. 10.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

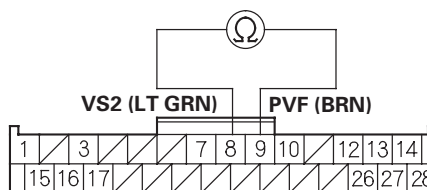
Is the resistance between 12— 15 Ω ?

YES—Go to step 9.

NO—Go to step 13.

9. Measure the resistance between EPS control unit connector D (28P) terminals No. 8 and No. 9.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

Is the resistance between 12— 15 Ω ?

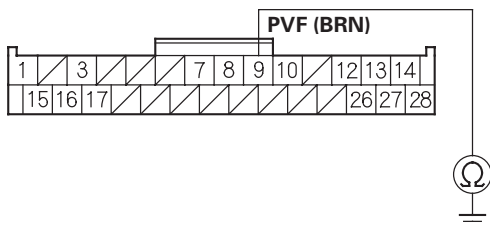
YES—Go to step 10.

NO—Go to step 15.



10. Check for continuity between EPS control unit connector D (28P) terminal No. 9 and body ground.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

Is there continuity?

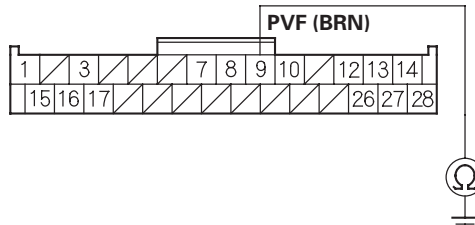
YES—Go to step 11.

NO—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

11. Disconnect the torque sensor 3P connector from the steering gearbox.

12. Check for continuity between EPS control unit connector D (28P) terminal No. 9 and body ground.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

Is there continuity?

YES—Repair short to body ground in the wire between the torque sensor and the EPS control unit. ■

NO—Faulty torque sensor (short in the sensor internal circuit), replace the steering gearbox (see page 17-65). ■

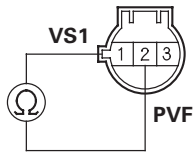
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EPS Components

DTC Troubleshooting (cont'd)

13. Disconnect the torque sensor 3P connector from the steering gearbox.
14. On the sensor side, measure the resistance between torque sensor 3P connector terminals No. 1 and No. 2.

TORQUE SENSOR 3P CONNECTOR



Terminal side of male terminals

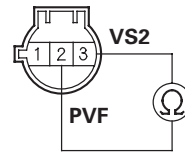
Is the resistance between 12— 15 Ω ?

YES—Repair open or short between the PNK and BLU/RED wires in the torque sensor circuit between the torque sensor and the EPS control unit. ■

NO—Faulty torque sensor (short or open in the internal circuit), replace the steering gearbox (see page 17-65). ■

15. Disconnect the torque sensor 3P connector from the steering gearbox.
16. On the sensor side, measure the resistance between torque sensor 3P connector terminals No. 2 and No. 3.

TORQUE SENSOR 3P CONNECTOR



Terminal side of male terminals

Is the resistance between 12— 15 Ω ?

YES—Repair open or short between the BLU/RED and WHT/GRN wires in the torque sensor circuit between the torque sensor and the EPS control unit. ■

NO—Faulty torque sensor (short or open in the internal circuit), replace the steering gearbox (see page 17-65). ■



DTC 61-04: Open/Short in EPS Motor Harness (Steering Diagnosis)

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Start the engine.
5. Turn the steering wheel to the right or left, and wait 10 seconds or more.

Does the EPS indicator come on?

YES—Go to step 6.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

6. Check for DTCs with the HDS.

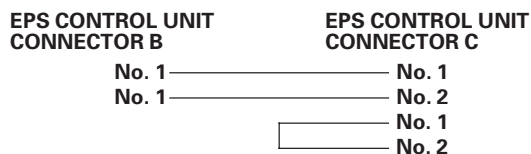
Is DTC 61-04 indicated?

YES—Go to step 7.

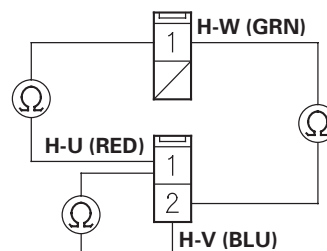
NO—Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time. ■

7. Turn the ignition switch to LOCK (0).
8. Disconnect the EPS control unit connector B (2P) and connector C (2P).

9. Check for continuity between the following terminals of the EPS control unit connector B (2P) and connector C (2P).



EPS CONTROL UNIT CONNECTOR B (2P)
Wire side of female terminals



EPS CONTROL UNIT CONNECTOR C (2P)
Wire side of female terminals

Is there continuity?

YES—Go to step 10.

NO—Go to step 13.

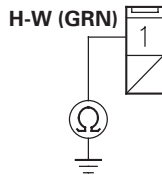
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EPS Components

DTC Troubleshooting (cont'd)

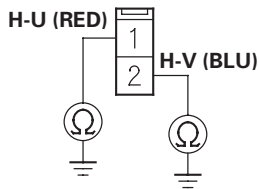
10. Check for continuity between body ground and EPS control unit connector B (2P) terminal No. 1, connector C (2P) terminal No. 1, and connector C (2P) terminal No. 2 individually.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

EPS CONTROL UNIT CONNECTOR C (2P)



Wire side of female terminals

Is there continuity?

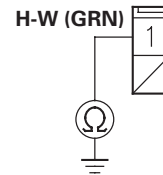
YES—Go to step 11.

NO—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

11. Disconnect the EPS motor 1P connector and the EPS motor 2P connector.

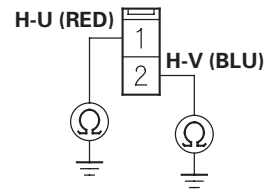
12. Check for continuity between body ground and EPS control unit connector B (2P) terminal No. 1, connector C (2P) terminal No. 1, and connector C (2P) terminal No. 2 individually.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

EPS CONTROL UNIT CONNECTOR C (2P)



Wire side of female terminals

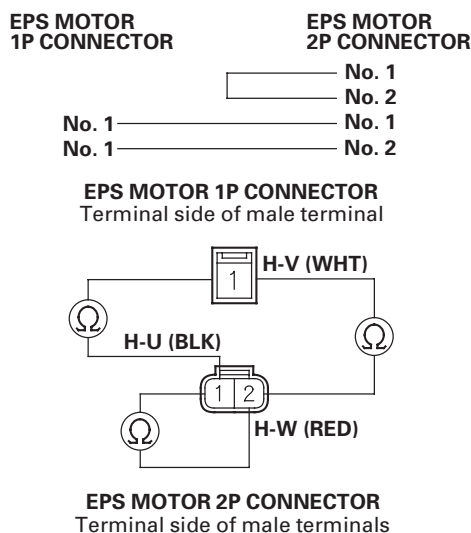
Is there continuity?

YES—Repair short to body ground in the wire between the EPS control unit and the EPS motor. ■

NO—Short to the body ground in the EPS motor wire, or the EPS motor internal circuit, replace the EPS motor (see page 17-65). ■



13. Disconnect the EPS motor 1P connector and the EPS motor 2P connector.
14. On the EPS motor side, check for continuity between the following terminals of the EPS motor 1P and the EPS motor 2P connector.



Is there continuity?

YES—Repair open in the wire between the EPS control unit and the EPS motor. ■

NO—Open in the EPS motor wire, or EPS motor internal circuit, replace the EPS motor (see page 17-63). ■

DTC 71-01: EPS Motor Angle Sensor (SIN/COS Signals) (Steering Diagnosis)

DTC 71-02: EPS Motor Angle Sensor (Neutral Position Learning of SIN/COS) (Initial Diagnosis)

DTC 71-03: EPS Motor Angle Sensor (SIN/COS Signals) (Steering Diagnosis)

DTC 71-05: EPS Motor Angle Sensor (SIN/COS Signals Charging Amount) (Steering Diagnosis)

DTC 71-06: EPS Motor Angle Sensor (Neutral Position of SIN/COS) (Initial Diagnosis)

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Start the engine.
5. Turn the steering wheel to the right or left, and wait 10 seconds or more.

Does the EPS indicator come on?

YES—Go to step 6.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

6. Check for DTCs with the HDS.

Is DTC 71-01, 71-02, 71-03, 71-05 or 71-06 indicated?

YES—Go to step 7.

NO—Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time. ■

7. Turn the ignition switch to LOCK (0).
8. Disconnect EPS control unit connector D (28P).

(cont'd)

EPS Components

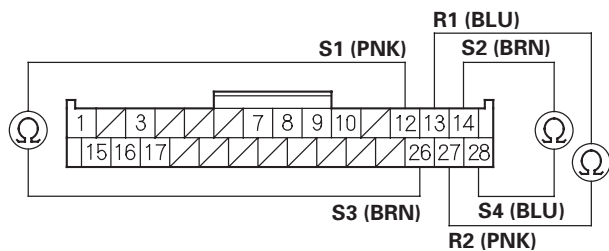
DTC Troubleshooting (cont'd)

9. Measure the resistance between the following terminals of EPS control unit connector D (28P).

EPS CONTROL UNIT CONNECTOR D (28P)

No. 13 (R1)	_____	No. 27 (R2)
No. 12 (S1)	_____	No. 26 (S3)
No. 14 (S2)	_____	No. 28 (S4)

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

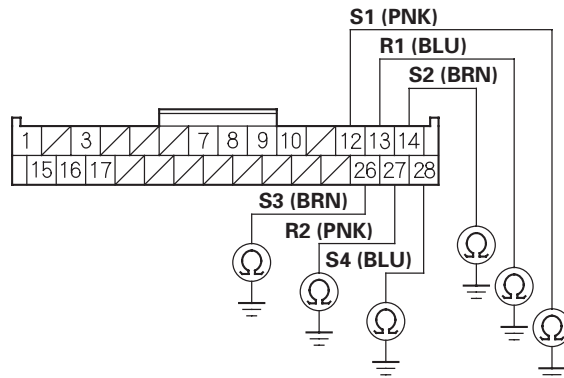
Is the resistance between R1-R2 13–25 Ω, S1-S3 26–49 Ω, and S2-S4 26–49 Ω?

YES—Go to step 10.

NO—Go to step 13.

10. Check for continuity between body ground and EPS control unit connector D (28P) terminal No. 12, terminal No. 13, terminal No. 14, terminal No. 26, terminal No. 27, and terminal No. 28 individually.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

Is there continuity?

YES—Go to step 11.

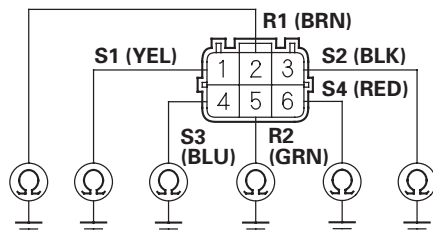
NO—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

11. Disconnect the EPS motor angle sensor 6P connector.



12. On the sensor side, check for continuity between body ground and EPS motor angle sensor 6P connector terminal No. 1, terminal No. 2, terminal No. 3, terminal No. 4, terminal No. 5, and terminal No. 6 individually.

EPS MOTOR ANGLE SENSOR 6P CONNECTOR



Terminal side of male terminals

Is there continuity?

YES—Faulty EPS motor angle sensor (internal failure), or short to body ground in the wire (sensor side), replace the EPS motor (see page 17-63). ■

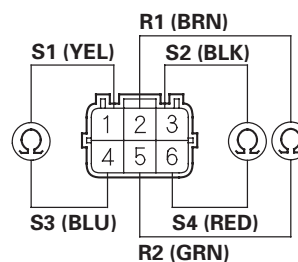
NO—Repair short to body ground in the wire between the EPS motor angle sensor 6P connector and the EPS control unit. ■

13. Disconnect the EPS motor angle sensor 6P connector.
14. On the sensor side, measure the resistance between the following terminals of the EPS motor angle sensor 6P connector.

EPS MOTOR ANGLE SENSOR 6P CONNECTOR

No. 2 (R1)	_____	No. 5 (R2)
No. 1 (S1)	_____	No. 4 (S3)
No. 3 (S2)	_____	No. 6 (S4)

EPS MOTOR ANGLE SENSOR 6P CONNECTOR



Terminal side of male terminals

Is the resistance between R1-R2 13–25 Ω , S1-S3 26–49 Ω , and S2-S4 26–49 Ω ?

YES—Open, or short to body ground in the wire between the EPS motor angle sensor 6P connector and the EPS control unit. ■

NO—Faulty EPS motor angle sensor (internal failure), or short to body ground in the wire (sensor side), replace the EPS motor (see page 17-63). ■

EPS Components

DTC Troubleshooting (cont'd)

DTC 71-04: EPS Motor Angle Sensor (Check Signals) (Regular Diagnosis)

1. Turn the ignition switch to ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0).
4. Start the engine.
5. Turn the steering wheel to the right or left, and wait 10 seconds or more.

Does the EPS indicator come on?

YES—Go to step 6.

NO—Check for loose terminals or poor connections. If the connections are good, the system is OK at this time. ■

6. Check for DTCs with the HDS.

Is DTC 71-04 indicated?

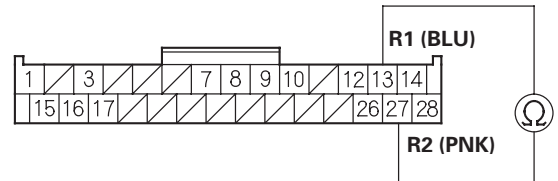
YES—Go to step 7.

NO—Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time. ■

7. Turn the ignition switch to LOCK (0).
8. Disconnect the EPS control unit connector D (28P).

9. Measure the resistance between the EPS control unit connector D (28P) terminal No. 13 and No. 27.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

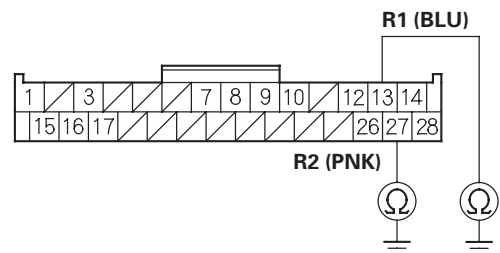
Is the resistance between 13—25 Ω ?

YES—Go to step 10.

NO—Go to step 13.

10. Check for continuity between body ground and the EPS control unit connector D (28P) terminal No. 13 and the terminal No. 27 individually.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

Is there continuity?

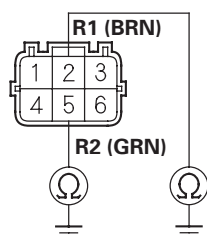
YES—Go to step 11.

NO—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■



11. Disconnect the EPS motor angle sensor 6P connector.
12. On the sensor side check for continuity between body ground and EPS motor angle sensor 6P connector terminal No. 2 and the terminal No. 5 individually.

EPS MOTOR ANGLE SENSOR 6P CONNECTOR



Terminal side of male terminals

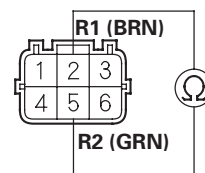
Is there continuity?

YES—Faulty EPS motor angle sensor (internal failure), or short to body ground in the wire (sensor side), replace the EPS motor (see page 17-63). ■

NO—Repair short to body ground in the wire between the EPS motor angle sensor 6P connector and the EPS control unit. ■

13. Disconnect the EPS motor angle sensor 6P connector.
14. On the sensor side measure the resistance between the EPS motor angle sensor 6P connector terminals No. 2 and No. 5.

EPS MOTOR ANGLE SENSOR 6P CONNECTOR



Terminal side of male terminals

Is the resistance between 13—25?

YES—Open, or short to body ground in the wire between the EPS motor angle sensor 6P connector and EPS control unit. ■

NO—Faulty EPS motor angle sensor (internal failure), or short to body ground in the wire (sensor side), replace the EPS motor (see page 17-63). ■

EPS Components

Symptom Troubleshooting

EPS indicator does not come on

1. Turn the ignition switch to ON (II), and watch the EPS indicator.

Does the EPS indicator come on?

YES—The system is OK at this time. ■

NO—Troubleshoot the gauge control module (tach) (see page 22-241). ■

EPS indicator does not go off, and no DTCs are stored

NOTE: Check for gauge DTCs with the HDS (see page 22-3). If gauge DTCs are stored, troubleshoot those DTCs first.

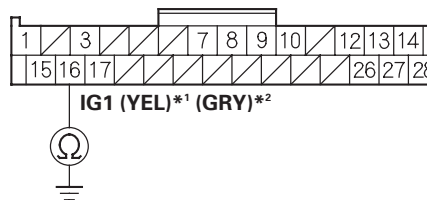
1. Turn the ignition switch to LOCK (0).
2. Check the No. 4 (7.5 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

YES—Reinstall the checked fuse, then go to step 5.

NO—Go to step 3.
3. Disconnect EPS control unit connector D (28P).
4. Check for continuity between EPS control unit connector D (28P) terminal No. 16 and body ground.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

*1: '06 model

*2: '07-09 models

Is there continuity?

YES—Repair short to body ground in the wire between the EPS control unit and the No. 4 (7.5 A) fuse in the under-dash fuse/relay box. ■

NO—Install a new No. 4 (7.5 A) fuse in the under-dash fuse/relay box, then go to step 5.



5. Reconnect EPS control unit connector D (28P).
6. Turn the ignition switch to ON (II), and watch the EPS indicator.

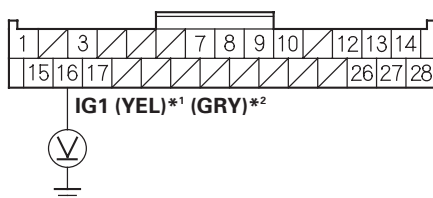
Does the EPS indicator come on, then go off?

YES—Troubleshooting is complete. ■

NO—Replace the EPS control unit (see page 17-84).
■

7. Disconnect EPS control unit connector D (28P).
8. Turn the ignition switch to ON (II).
9. Measure the voltage between EPS control unit connector D (28P) terminal No. 16 and body ground.

EPS CONTROL UNIT CONNECTOR D (28P)



Wire side of female terminals

*1: '06 model

*2: '07-09 models

Is there battery voltage?

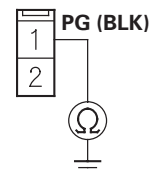
YES—Go to step 10.

NO—Repair open in the wire between the EPS control unit and under-dash fuse/relay box. ■

10. Turn the ignition switch to LOCK (0).
11. Disconnect EPS control unit connector A (2P).

12. Check for continuity between EPS control unit connector A (2P) terminal No. 1 and body ground.

EPS CONTROL UNIT CONNECTOR A (2P)



Wire side of female terminals

Is there continuity?

YES—Go to step 13.

NO—Repair open in the wire between the EPS control unit and body ground (G402). ■

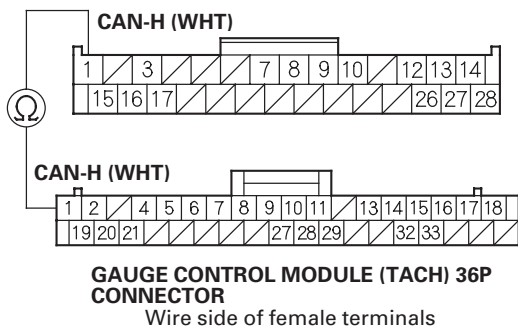
(cont'd)

EPS Components

Symptom Troubleshooting (cont'd)

13. Disconnect the gauge control module (tach) 36P connector.
14. Check for continuity between EPS control unit connector D (28P) terminal No. 1 and gauge control module (tach) 36P connector terminal No. 1.

EPS CONTROL UNIT CONNECTOR D (28P)
Wire side of female terminals



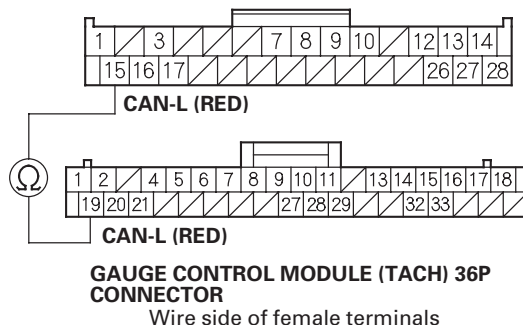
Is there continuity?

YES—Go to step 15.

NO—Repair open in the wire between the EPS control unit and the gauge control module (tach). ■

15. Check for continuity between EPS control unit connector D (28P) terminal No. 15 and gauge control module (tach) 36P connector terminal No. 19.

EPS CONTROL UNIT CONNECTOR D (28P)
Wire side of female terminals



Is there continuity?

YES—Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see page 17-84). ■

NO—Repair open in the wire between the EPS control unit and the gauge control module (tach). ■



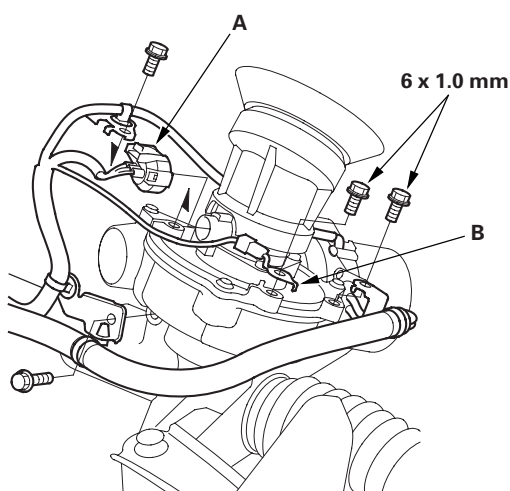
EPS Motor Removal and Installation

Removal

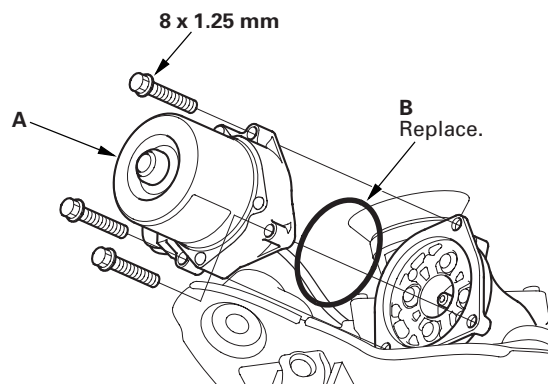
NOTE:

- Do not allow dust, dirt, or other foreign materials to enter the gearbox.
- Make sure not to get any silicone grease on the terminal part of the connectors and switches, especially if you have silicone grease on your hands or gloves.

1. Remove the steering gearbox (see page 17-65).
2. Disconnect the torque sensor 3P connector (A) from the steering gearbox, then remove the wire harness clamp bolts and the ground terminal (B).



3. Remove the EPS motor (A) from the steering gearbox, then remove the O-ring (B) and discard it.



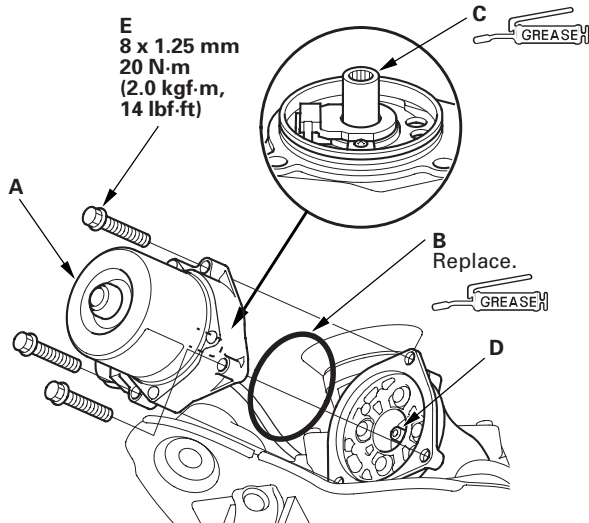
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EPS Components

EPS Motor Removal and Installation (cont'd)

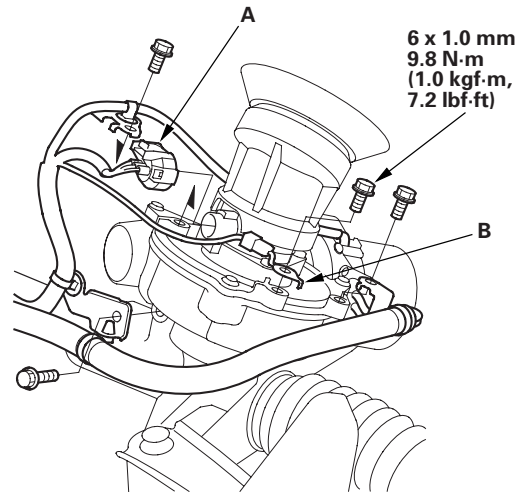
Installation

1. Clean the mating surface of the EPS motor (A) and the steering gearbox.



2. Apply a thin coat of silicone grease to the new O-ring (B), and carefully fit it on the EPS motor.
3. Apply steering grease into the EPS motor shaft (C).
4. Set the EPS motor on the gearbox by engaging the EPS motor shaft and the worm shaft (D).
5. Turn the EPS motor two or three times to the right and left about 45 degrees. Make sure the EPS motor is evenly seated on the steering gearbox, and that the O-ring is not pinched between the mating surfaces.
6. Loosely install the motor mount bolts(E), then turn the steering shaft two or three times to the right and left about 45 degrees.
7. Tighten the motor mount bolts to the specified torque.

8. Connect the torque sensor 3P connector (A) to the steering gearbox, then install the wire harness clamp bolts and the ground terminal (B).



9. Finish the installation, and note these items:

- Make sure the torque sensor 3P connector is properly connected.
- Make sure the EPS motor and the EPS wires are not caught or pinched by any parts.

10. Install the steering gearbox (see page 17-72).



Steering Gearbox Removal and Installation

Special Tools Required

- Ball joint remover, 28 mm 07MAC-SL0A202
 - Engine hanger adapter VSB02C000015 *
 - Front subframe adaptor VSB02C000016 *
 - 2006 Civic engine hanger VSB02C000025 *
 - Engine support hunger, A and Reds AAR-T1256 *
- * : These special tools are available through Honda Canada Inc. Technical Tools Department; FAX # 866-398-8665/e-mail: ch_technicaltools@ch.honda.com

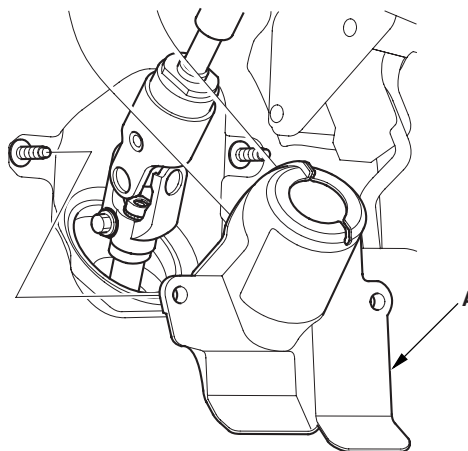
Note these items during removal:

- Use solvent and a brush, wash any oil and dirt off the end of the steering gearbox. Avoid any electrical parts. Blow dry with compressed air.
- Be sure to remove the steering wheel before disconnecting the steering joint, or damage to the cable reel may occur.

Removal

1. Do the battery terminal disconnection procedure (see page 22-68).
2. Raise the front of the vehicle, and support it with safety stands in the proper locations (see page 1-11).
3. Remove the front wheels.
4. Remove the driver's airbag (see page 24-188), and the steering wheel (see page 17-6).
5. Remove the driver's dashboard undercover (see page 20-103).

6. Remove the steering joint cover (A).

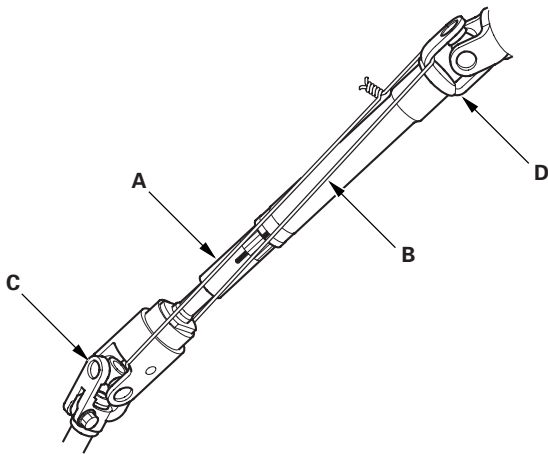


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EPS Components

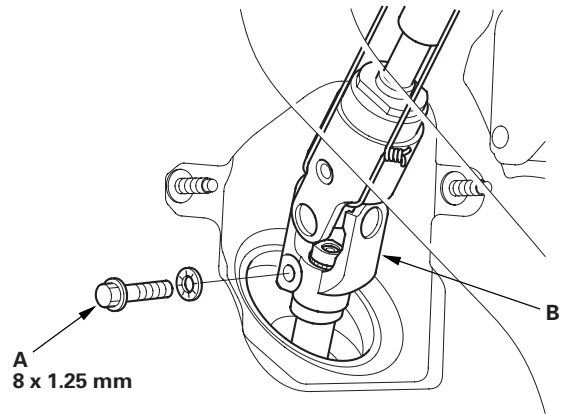
Steering Gearbox Removal and Installation (cont'd)

7. Release the lock lever, and adjust the steering column to the full tilt up position, and to the full telescopic in position.
8. Tighten the lock lever.
9. Hold the lower slide shaft (A) on the column with a piece of wire (B) between the joint yoke (C) of the lower slide shaft and joint yoke (D) of the upper shaft to prevent the slider shaft from pulling out.

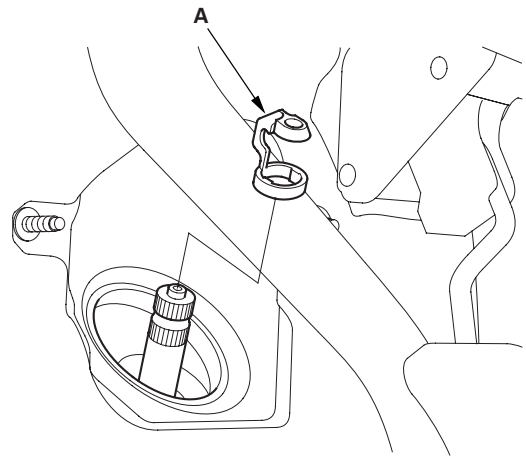


10. Release the lock lever, and adjust the steering column to the full telescopic out position, then tighten the lock lever.

11. Remove the steering joint bolt (A), and disconnect the steering joint by moving the steering joint (B) toward the column.



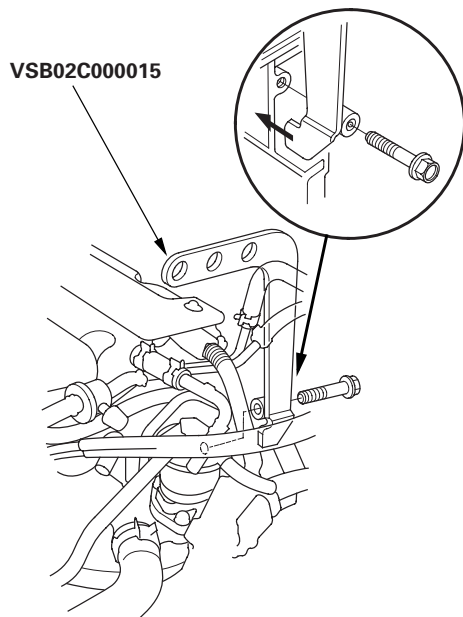
12. Remove the center guide (A) (if equipped), and discard it. The center guide is for factory assembly use only.



13. Remove the cowl cover and under cowl panel (see page 20-163).
14. Remove the air cleaner housing (see page 11-345).

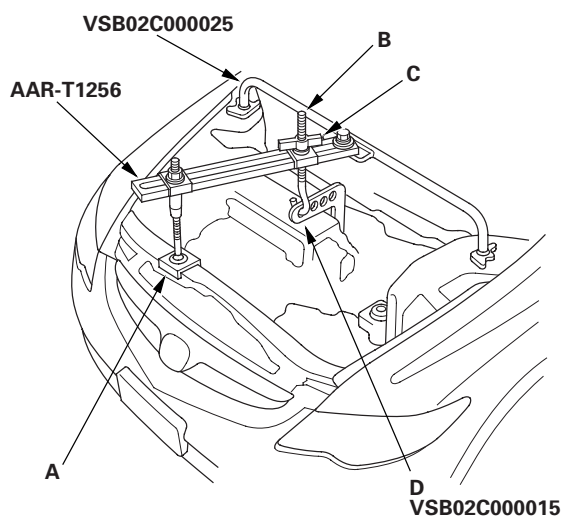


15. Attach the engine hanger adapter (VSB02C000015) to the threaded hole in the cylinder head.

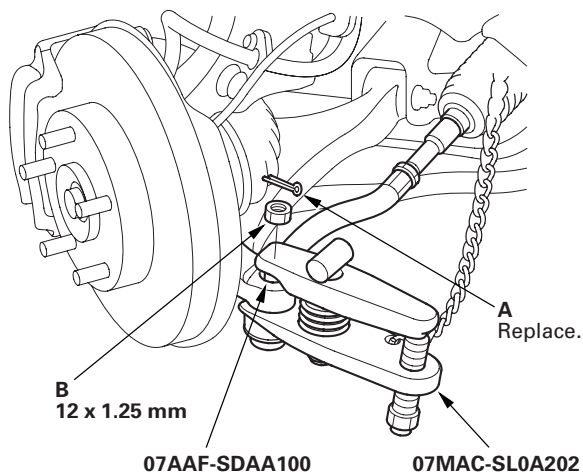


16. Install the front leg assembly (A), hook (B), and wing nut (C) from an A and Reds engine support hanger (AAR-T1256) onto the 2006 Civic engine hanger (VSB02C000025). Carefully position the engine hanger on the vehicle, and attach the hook to the forward hole in the engine hanger adapter (D). Tighten the wing nut by hand to lift and support the engine/transmission assembly.

NOTE: Use care when working around the windshield.



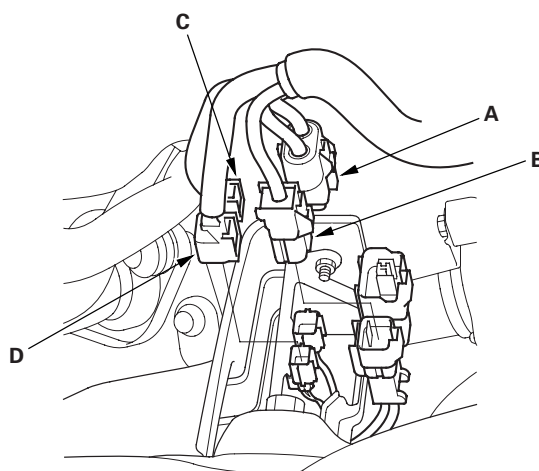
17. Remove the cotter pin (A) from the 12 mm nut (B), and loosen the nut.



18. Separate the tie-rod ball joint and the knuckle using the ball joint remover (see page 18-12).

19. Remove the front splash shield (see page 20-172).

20. Disconnect the EPS motor connector A (2P), the EPS motor connector B (1P), torque sensor 4P connector (C), the EPS motor angle sensor 6P connector (D), from passenger's side of the steering gearbox. Wrap the connectors with vinyl tape to avoid contamination from grease or water.

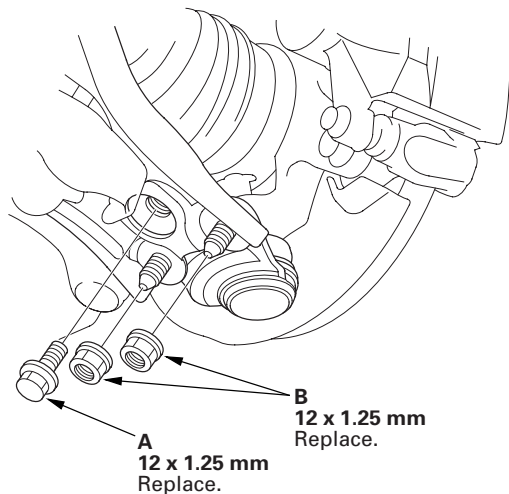


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EPS Components

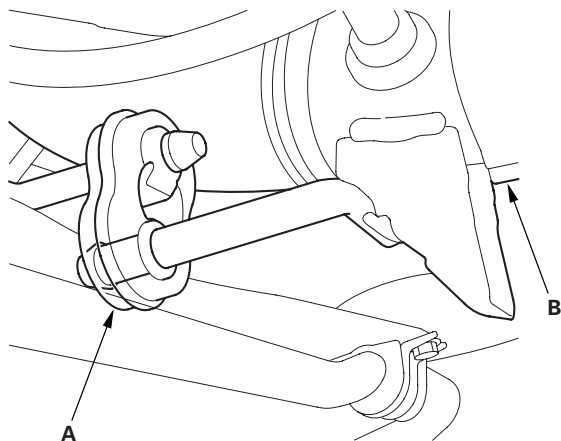
Steering Gearbox Removal and Installation (cont'd)

21. Remove the lower ball joint mounting bolt (A) and the self-locking nuts (B) from the lower arm.

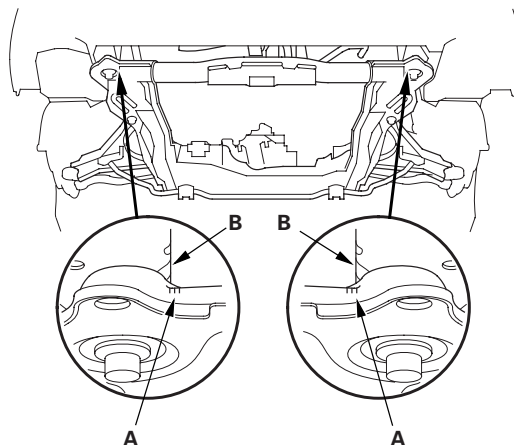


22. Disconnect the lower arm from the lower ball housing.

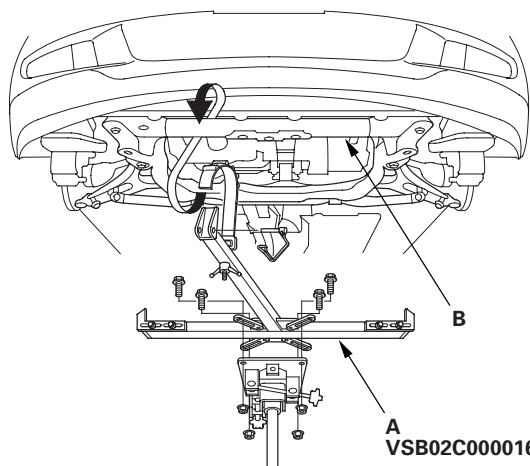
23. Remove the exhaust hanger (A) from the three way catalytic converter (TWC) (B).



24. Note the reference marks (A) on both sides of the subframe that line up with the body (B).



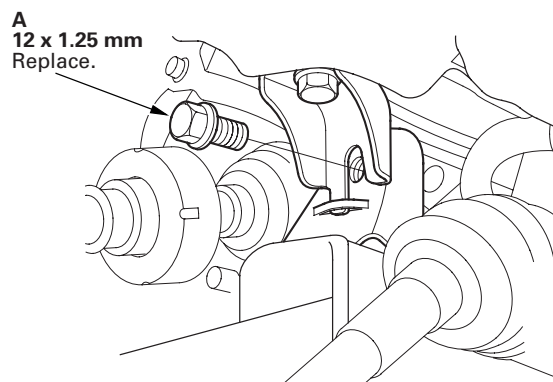
25. Attach the front subframe adaptor (VSB02C000016) (A) to the front subframe (B) and the transmission jack (model number LSL-W9371) or the powertrain lift (model number OTC-1585), then tighten the front subframe adaptor screw.



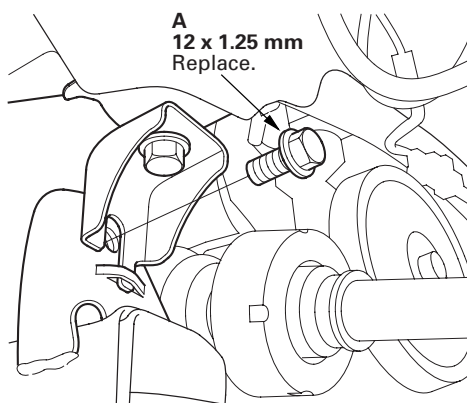
26. Make sure the front subframe is securely supported by the jack with the front subframe adaptor.



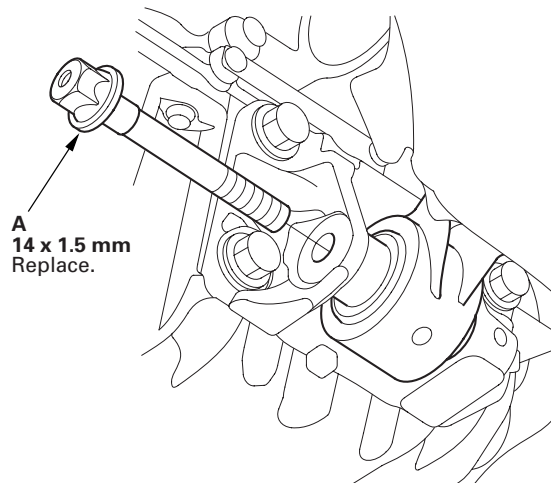
27. Remove the front subframe middle mount bolt (A) from the left side.



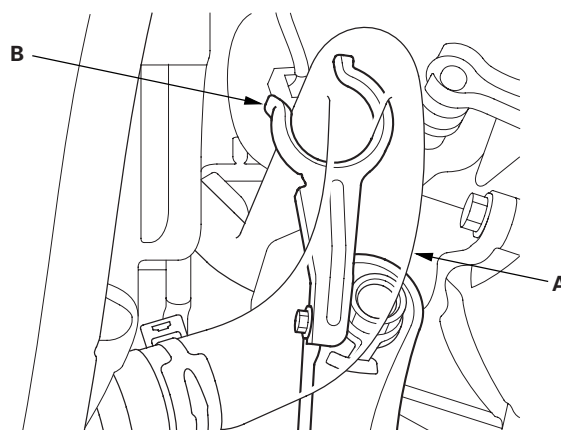
28. Remove the front subframe middle mount bolt (A) from the right side.



29. Remove the lower torque rod mounting bolt (A).



30. Remove the lower radiator hose (A) from the radiator hose stay (B).

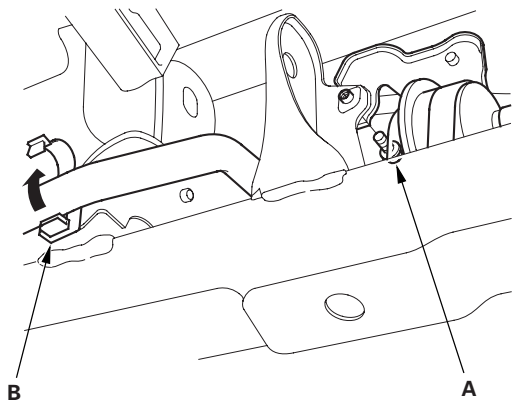


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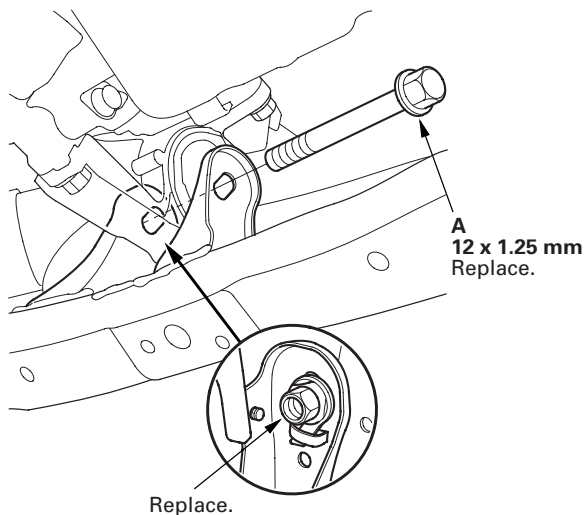
EPS Components

Steering Gearbox Removal and Installation (cont'd)

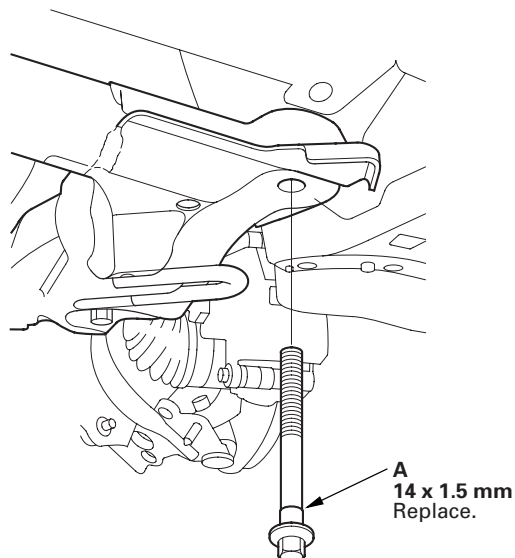
31. A/T: Remove the ATF filter mounting bolt (A), then open the ATF cooler hose clamp (B) on the front subframe.



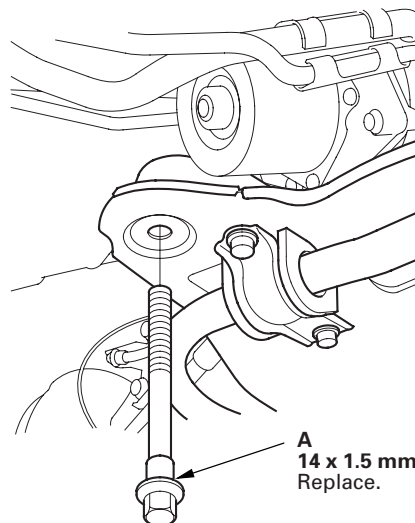
32. M/T: Remove the front engine mounting bolt (A).



33. Remove the front subframe front mounting bolts (A) from the right and left sides of the vehicle.



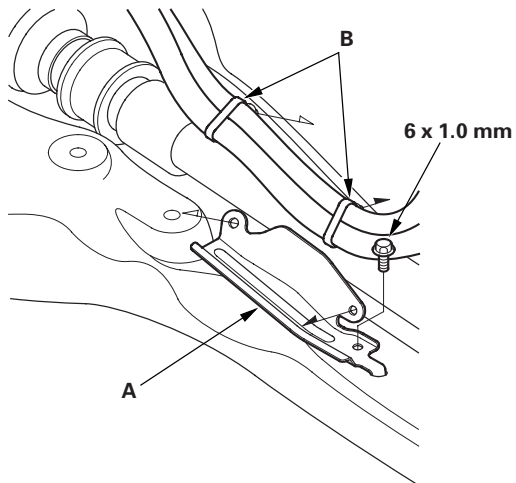
34. Remove the front subframe rear mounting bolts (A) from the right and left sides of the vehicle.



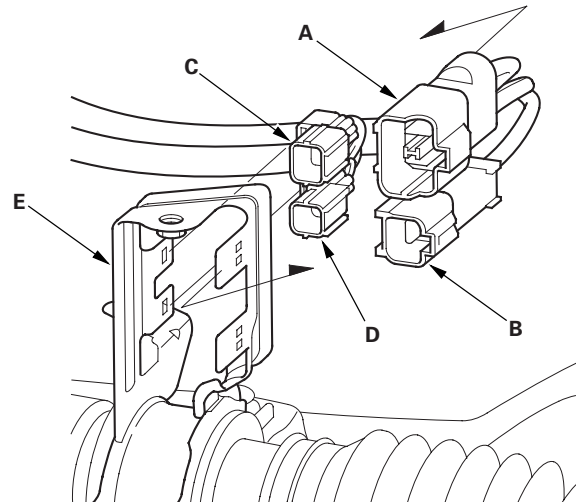
35. Lower the front subframe and steering gearbox as an assembly by lowering the jack slowly.



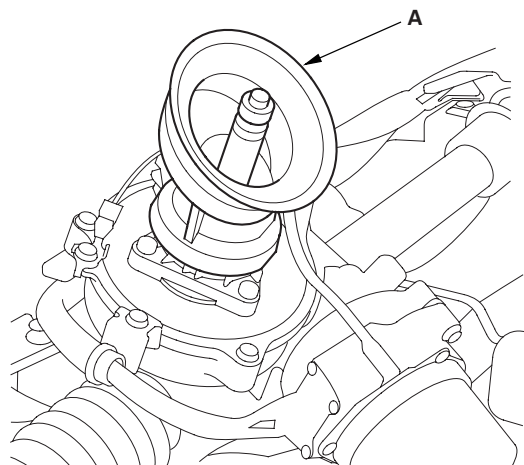
36. Remove the harness clamp bracket (A) from the front subframe, then remove the harness clips (B).



37. Remove the EPS motor connector A (2P), the EPS motor connector B (1P), torque sensor 4P connector (C), the EPS motor angle sensor 6P connector (D) from the passenger's side of the gearbox mounting bracket (E).



38. Remove the pinion shaft grommet (A) from the top of the torque sensor.

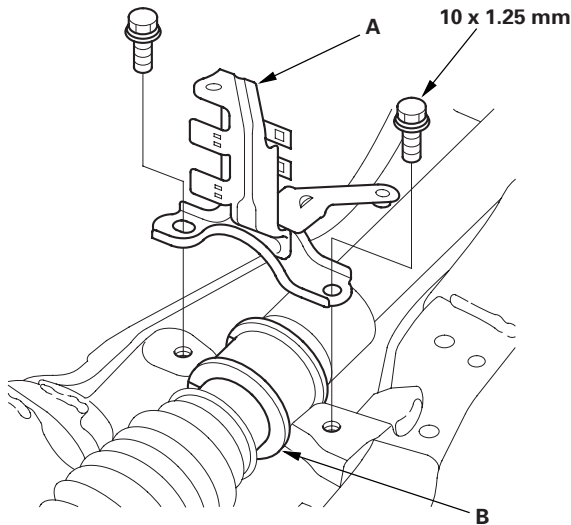


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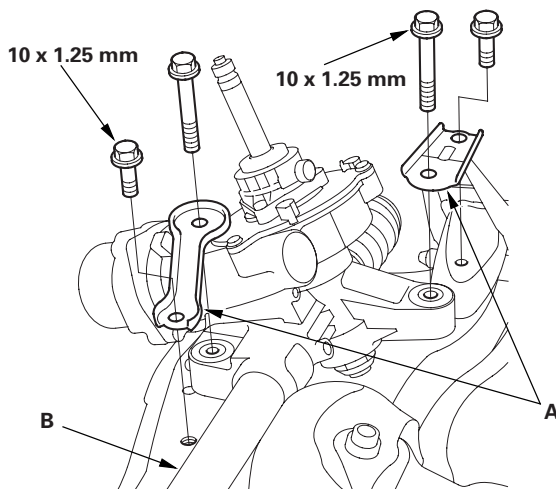
EPS Components

Steering Gearbox Removal and Installation (cont'd)

39. Remove the two 10 mm bolts from the right side of the steering gearbox, then remove the gearbox mounting bracket (A) and the mounting cushion (B).



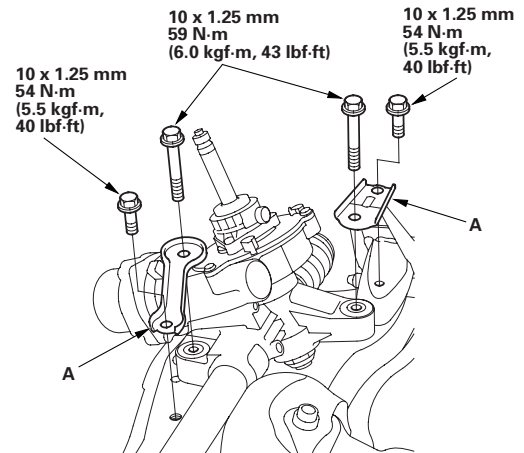
40. Remove the four 10 mm flange bolts from the left side of the steering gearbox, then remove the stiffener plates (A).



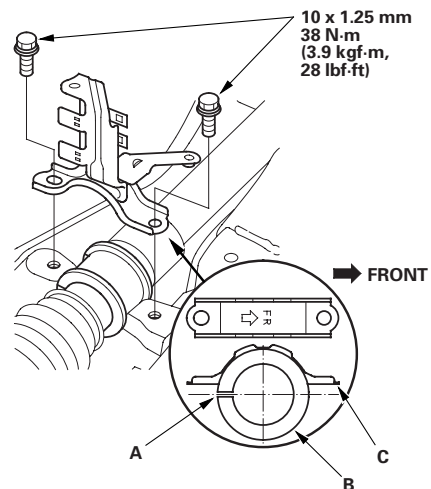
41. Remove the steering gearbox (B) from the front subframe.

Installation

1. Place the steering gearbox in position on the front subframe.
2. Loosely install the stiffener plates (A) and the gearbox mounting bolts on the left side of the steering gearbox.



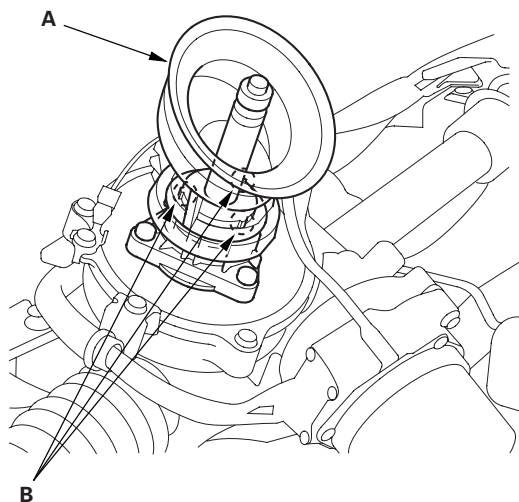
3. Position the cutout (A) on the mounting cushion (B) as shown, and install it on the right side of the steering gearbox securely.



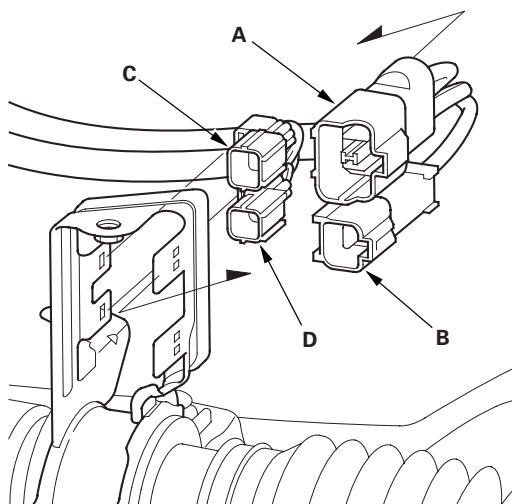
4. Install the gearbox mounting bracket (C) over the mounting cushion, and loosely install the two 10 mm bolts.
5. Tighten the 10 mm bolts on both sides of the steering gearbox to the specified torque alternately in two or more steps.



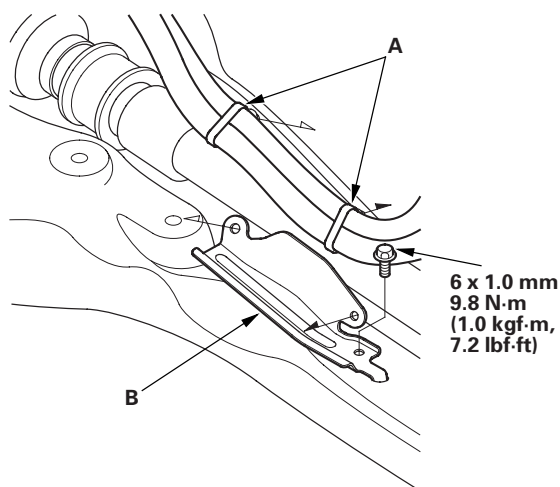
6. Install the pinion shaft grommet (A). Align the slot in the pinion shaft grommet with the lug portion (B) on the torque sensor. The grommet must not have a gap at the mating surface of the grommet and the torque sensor.



7. Install the EPS motor connector A (2P), the EPS motor connector B (1P), torque sensor 4P connector (C), the EPS motor angle sensor 6P connector (D) on the right side of the gearbox mounting bracket.



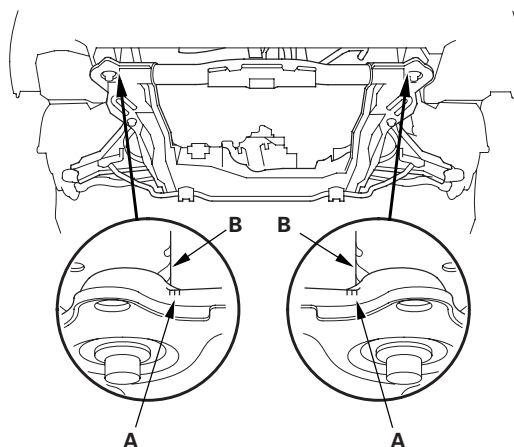
8. Install the harness clips (A) to the harness clamp bracket (B), then install the harness clamp bracket to the front subframe.



9. Carefully raise the front subframe with the front subframe adaptor and the transmission jack or the powertrain lift until the front subframe is in position, then loosely install the new front subframe mounting bolts.

NOTE: Be sure that the pinion shaft grommet is in place securely. Check whether the pinion shaft grommet is not turning up. Incorrect installation can cause leakage of water, mud, and noise.

10. Align the front subframe reference marks (A) to the body (B), as noted during removal.

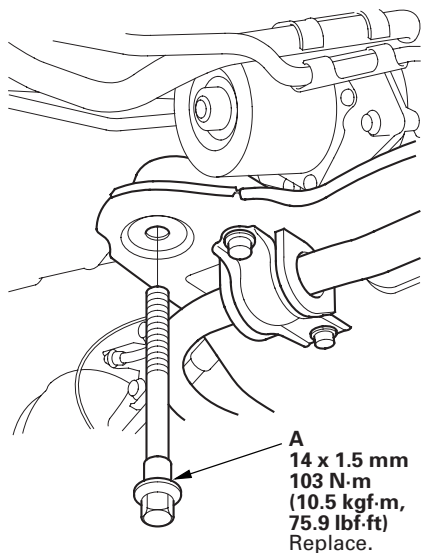


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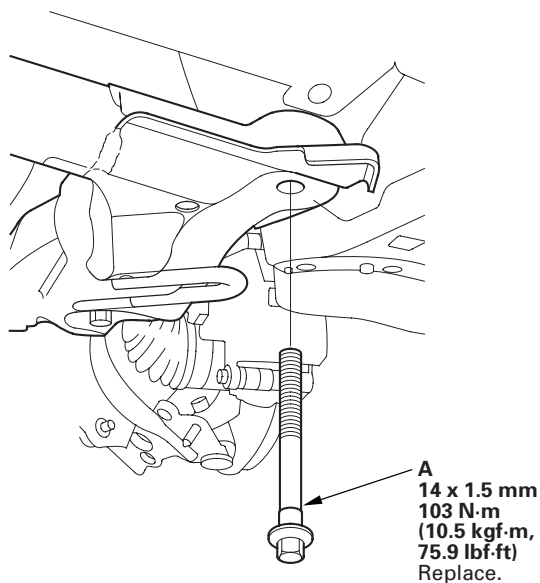
EPS Components

Steering Gearbox Removal and Installation (cont'd)

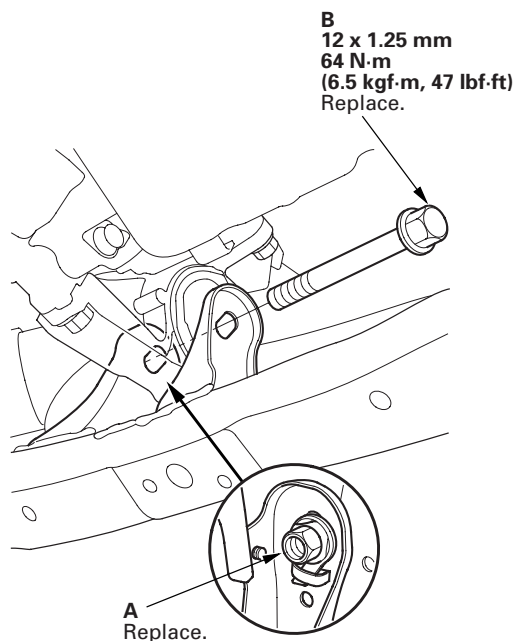
11. Install the new front subframe rear mounting bolts (A), and tighten them to the specified torque.



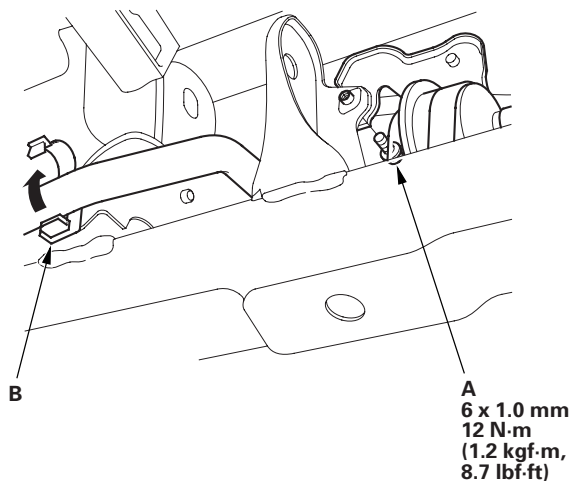
12. Install the new front subframe front mounting bolts (A), and tighten them to the specified torque.



13. M/T: Install the new nut (A) and the new front engine mounting bolt (B), and tighten the mounting bolt to the specified torque.

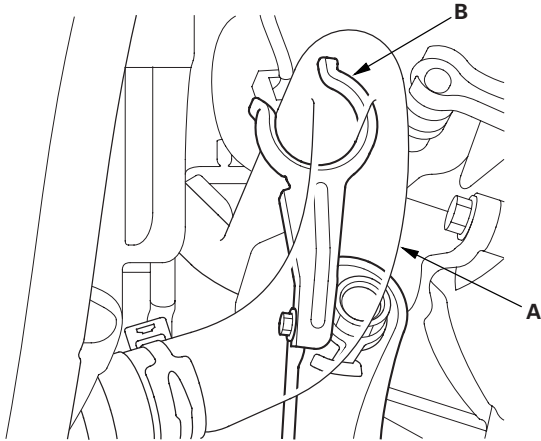


14. A/T: Install the ATF filter mounting bolt (A), then clamp the ATF cooler hose with the clamp (B).

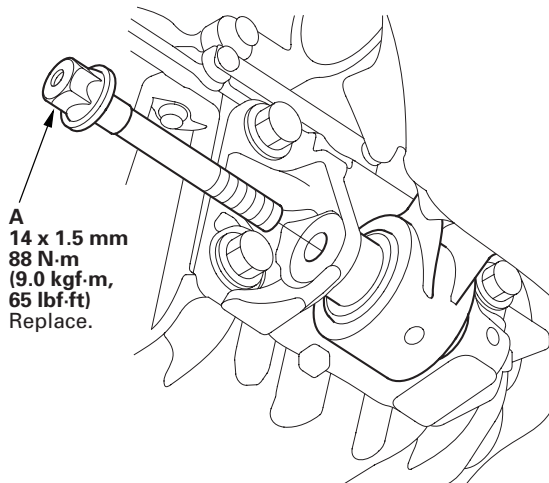




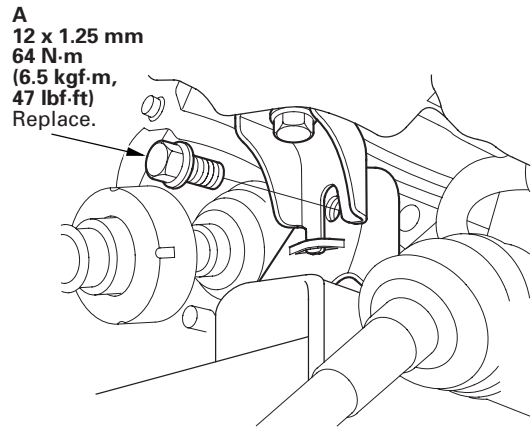
15. Install the lower radiator hose (A) to the radiator hose stay (B).



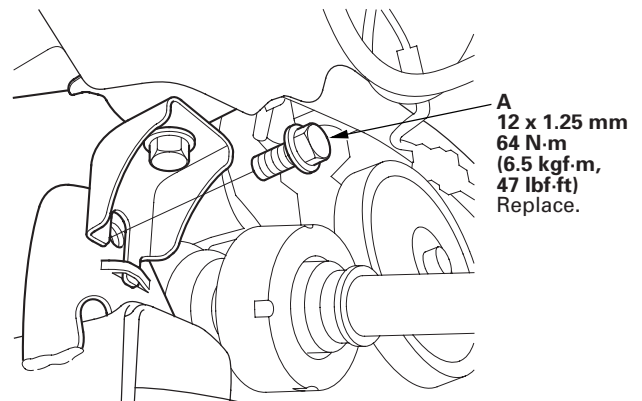
16. Install the new lower torque rod mounting bolt (A), and tighten to the specified torque.



17. Install the new front subframe middle mount bolt (A) on the left side, and tighten it to the specified torque.



18. Install the new front subframe middle mount bolt (A) on the right side, and tighten to the specified torque.



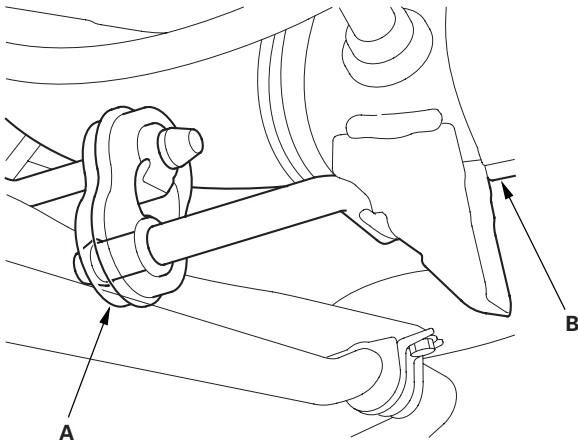
19. Lower the transmission jack supporting the front subframe.

(cont'd)

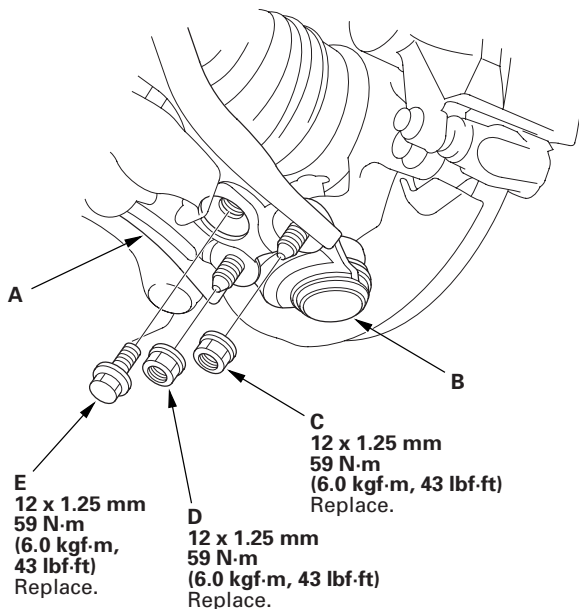
EPS Components

Steering Gearbox Removal and Installation (cont'd)

20. Install the exhaust hanger (A) to the three way catalytic converter (TWC) (B).

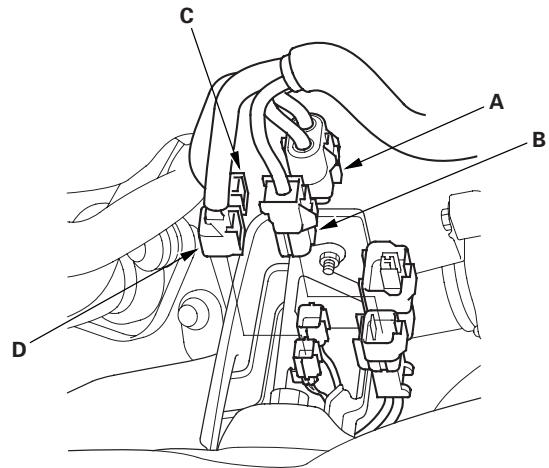


21. Connect the lower arm (A) to the lower ball joint (B).



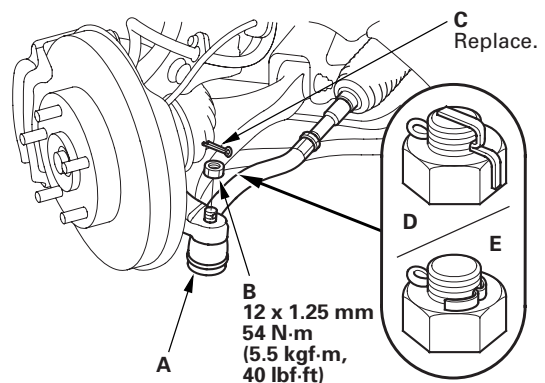
22. Install a new flange bolt and the new self-locking nuts. After lightly tightening all three fasteners, tighten them to the specified torque in the following order; the self-locking nut on the front (C), the self-locking nut on the rear (D), then the flange bolt (E).

23. Remove the vinyl tape, then connect the EPS motor connector A (2P), the EPS motor connector B (1P), torque sensor 4P connector (C), the EPS motor angle sensor 6P connector (D) to the steering gearbox. Make sure to push these connectors until you hear a click so that the connectors are secured.



24. Install the front splash shield (see page 20-172).

25. Wipe off any grease contamination from the ball joint tapered section and the threads. Reconnect the tie-rod ends (A) to the steering knuckles. Install the 12 mm nut (B) and tighten it.



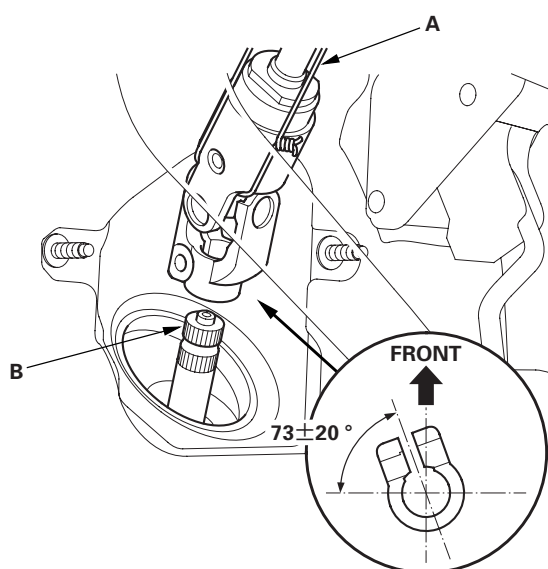
26. Install the new cotter pin (C), and bend it as shown (D) or (E).

27. Install the front wheel, then set the wheels in the straight ahead position.

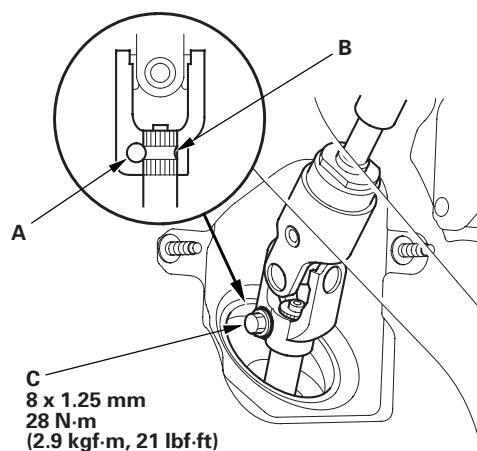
NOTE: Before installing the wheel, clean the mating surfaces between the brake disc and inside of the wheel.



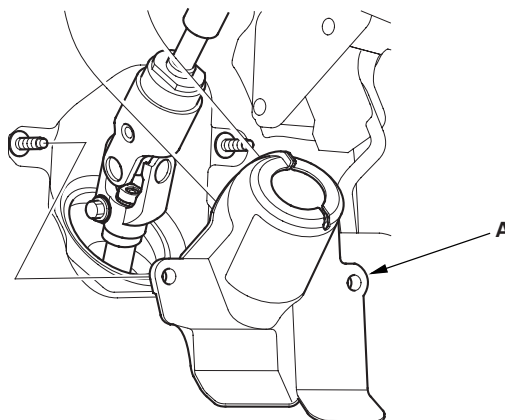
28. Lower the vehicle.
29. Center the steering rack within its stroke in the steering joint connection.
30. With the rack in the straight ahead driving position, cut the wire (A) and slip the lower end of the steering joint onto the pinion shaft (B) in the range shown.



31. Align the bolt hole (A) on the steering joint with the groove (B) around the pinion shaft, and loosely install the joint bolt (C). Be sure that the joint bolt is securely in the groove of the pinion shaft. Pull on the steering joint to make sure that the steering joint is fully seated. Tighten the steering joint bolt to the specified torque.



32. Install the steering joint cover (A).



33. Install the driver's dashboard under cover (see page 20-103).

(cont'd)

Steering Gearbox Removal and Installation (cont'd)

34. Install the steering wheel (see page 17-8).
35. With the tires raised off the ground (vehicle on a lift), check for the following symptoms by turning the steering wheel fully to the right and left several times.

Symptom	Probable cause
Rubbing sound coming from the lower steering column area.	Steering column joint is contacting the cover.
Grating sound from the lower steering column area, or a rough feeling during steering.	Poor engagement of the pinion shaft serrations.
Noise from around the steering wheel during steering.	Poor engagement of the SRS cable reel with the steering wheel, or a damaged cable reel.

36. Install the air cleaner housing (see page 11-345).
37. Install the under cowl panel and cowl cover (see page 20-163).

38. Do the battery terminal reconnection procedure (see page 22-68), and do these tasks:
- Turn the ignition switch to ON (II) and check that the SRS indicator comes on for about 6 seconds and then goes off.
 - Make sure the horn and turn signal switches work properly.
 - Make sure the steering wheel switches work properly.

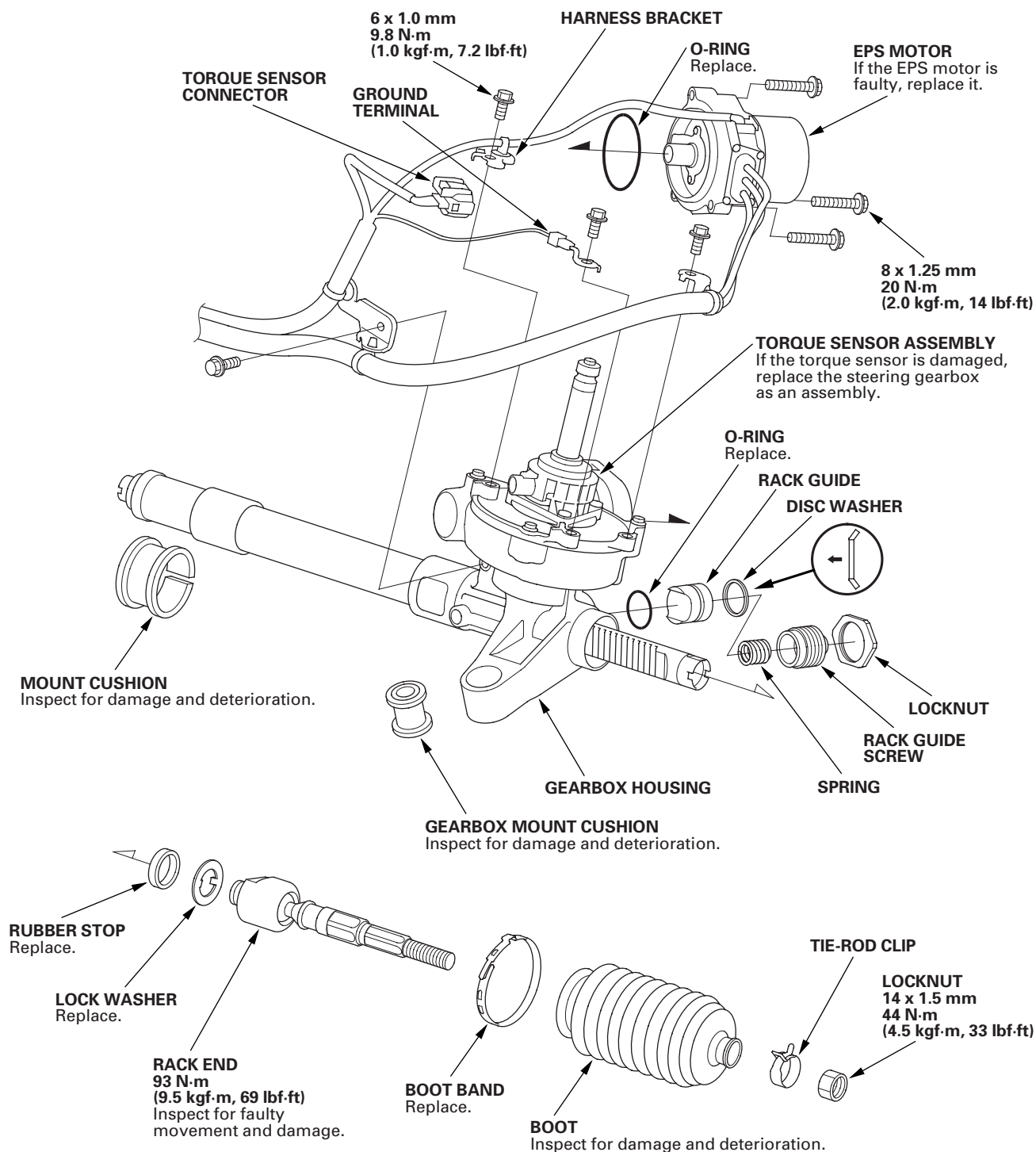
39. After installation, do the following checks:

- Check the steering wheel spoke angle. If steering spoke angles to the right and left are not equal (steering wheel and rack are not centered), correct the engagement of the joint/pinion shaft splines.
- Set the steering column to the center tilt position, and to the center telescopic position, then check the wheel alignment and adjust (see page 18-5).
- Make sure the steering wheel spokes are centered.
- Start the engine, and let it idle. Turn the steering wheel from lock-to-lock several times. Check that the EPS indicator does not come on.
- Do the memorizing for the torque sensor neutral position (see page 17-22).



Rack End Removal and Installation

Exploded view



(cont'd)

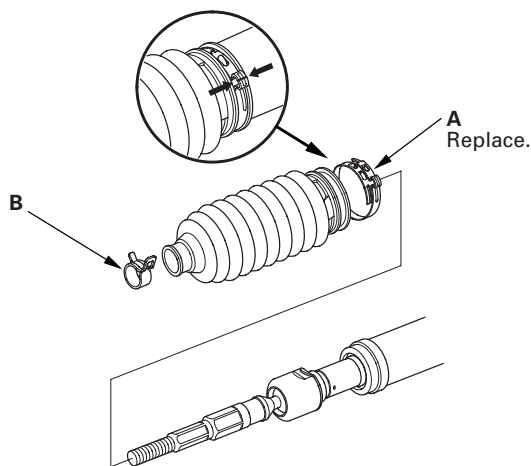
EPS Components

Rack End Removal and Installation (cont'd)

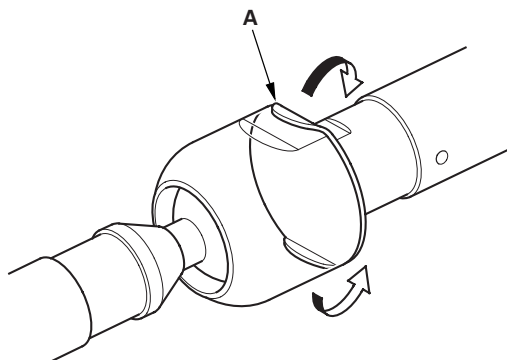
Removal

NOTE: Do not allow dust, dirt, or other foreign materials to enter the steering gearbox.

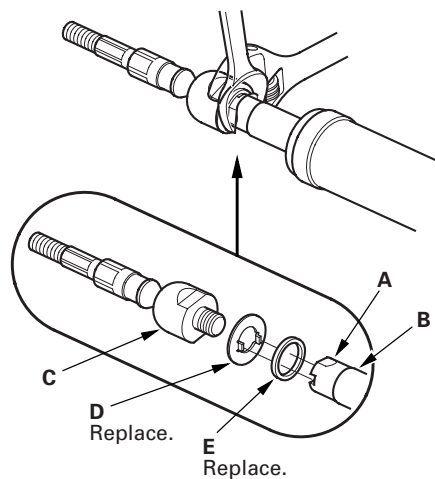
1. Remove the boot bands (A), and discard them. Remove the tie-rod clips (B), and pull the boots away from the ends of the gearbox.



2. Unbend the lock washer (A).



3. Hold the surface sections (A) of the steering rack (B) with one wrench, and unscrew both rack ends (C) with another wrench. Be careful not to damage the rack shaft surface with the wrench.

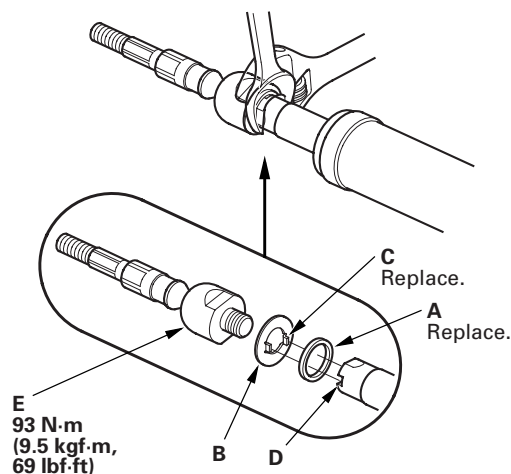


4. Remove the lock washer (D) and rubber stop (E).

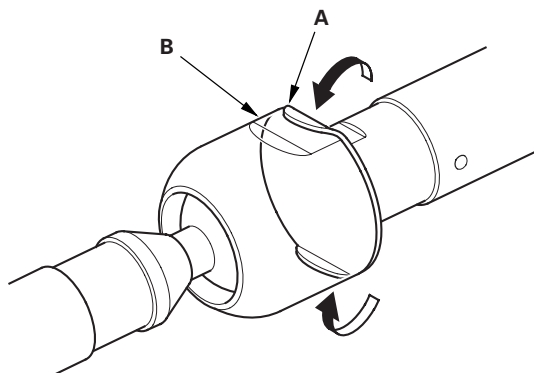


Installation

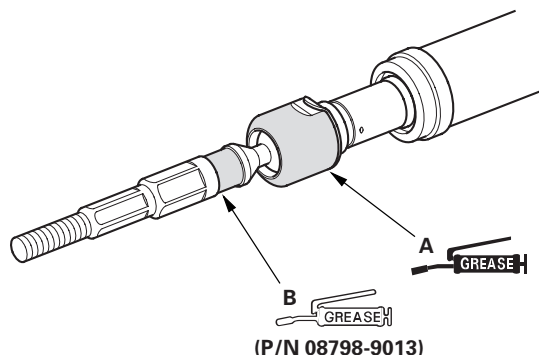
1. Install a new rubber stop (A) and a new lock washer (B). Align the lock washer tabs (C) with the slots (D) on the rack end (E) while holding the lock washer in place. Repeat this step for the other side of the rack shaft.



2. Hold the flat surface sections of the steering rack with one wrench, and tighten both rack ends with another wrench. Be careful not to damage the rack surface with the wrench.
3. Bend the lock washer (A) back against the flat spots (B) on the rack end ball joint housing.



4. Apply multipurpose grease to the circumference of the rack end joint housing (A) and lock washer.



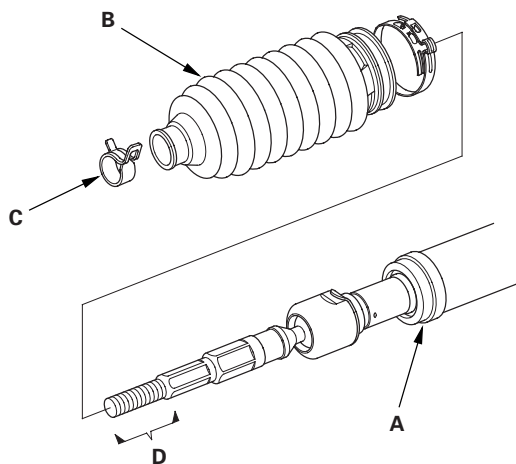
5. Apply a light coat of silicone grease (P/N 08798-9013) to the boot fitting grooves (B) on the rack ends.

NOTE: Make sure not to get any silicone grease on the terminal part of the connectors and switches, especially if you have silicone grease on your hands or gloves.

(cont'd)

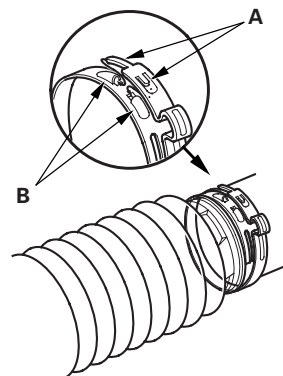
Rack End Removal and Installation (cont'd)

6. Center the steering rack within its stroke.
7. Clean off any grease or contamination from the boot installation grooves (A) around the gearbox housing. Install the boots (B) on the rack ends with the tie-rod clips (C), and fit the boot end in the installation grooves in the housing properly.

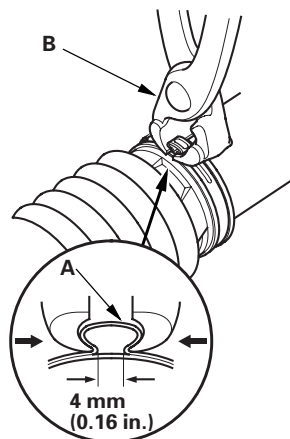


8. After installing the boots, wipe the grease off the thread section (D) of the rack end.

9. Install the new boot bands by aligning the tabs (A) with the holes (B) of the band.



10. Close the ear portion (A) of the band with commercially available pincers Oetiker 1098 or equivalent (B).



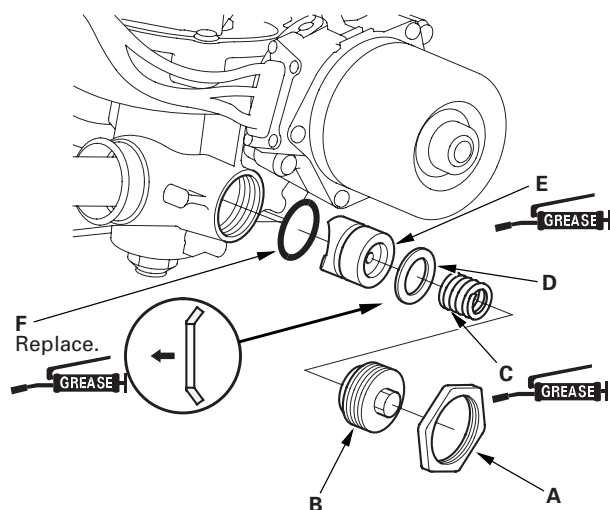
11. Slide the rack shaft right and left to be certain that the boots are not deformed or twisted.



Rack Guide Removal/Installation

NOTE: During removal/installation, do not allow dust, dirt, or other foreign materials to enter the steering gearbox.

1. Remove the steering gearbox (see page 17-65).
2. Loosen the locknut (A), then remove the rack guide screw (B), the spring (C), the disc washer (D), and the rack guide (E).



3. Remove the O-ring (F) from the rack guide. Wipe the grease off the sliding surface of the rack guide.

4. Apply multipurpose grease to the new O-ring, then install it to the rack guide.
5. Apply multipurpose grease to the sliding surface and the circumference of the rack guide, and install it onto the gearbox housing. Wipe the grease off the threaded section of the housing.
6. Apply multipurpose grease to both ends of the spring, and install it onto the gearbox housing.
7. Install the disc washer with its convex side facing the rack guide.
8. Remove the old sealant from the rack guide screw and apply new sealant (Three Bond 1215 or Loctite 5699) to the middle of the threads. Loosely install the rack guide screw on the steering gearbox.

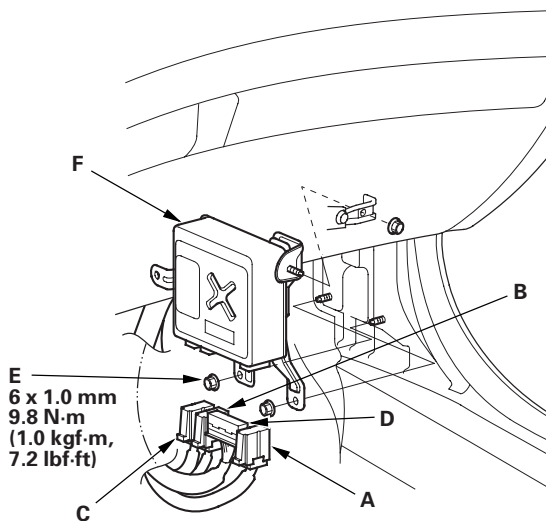
NOTE: If more than 5 minutes has passed after applying the sealant, remove the old sealant and residue, and apply new sealant.

9. Loosely install the locknut.
10. Adjust the rack guide screw (see page 17-15). After adjusting, check that the rack moves smoothly by sliding the rack right and left.

EPS Components

EPS Control Unit Removal/Installation

1. Do the battery terminal disconnection procedure (see page 22-68).
2. Remove the passenger's dashboard lower cover (see page 20-102).
3. Remove the passenger's side kick panel (see page 20-66).
4. Disconnect EPS control unit connectors A (2P), connector B (2P), connector C (2P), and connector D (28P).



5. Remove the nuts (E) from the EPS control unit (F).
6. Remove the EPS control unit.

7. Install the EPS control unit in the reverse order of removal.
8. Do the battery terminal reconnection procedure (see page 22-68), and do these tasks:
 - Make sure the horn and turn signal switches work properly.
 - Make sure the steering wheel switches work properly.
 - If the EPS control unit is replaced, the EPS control unit must memorize the torque sensor neutral position (see page 17-22).
9. After installation, start the engine, and let it idle. Turn the steering wheel from lock-to-lock several times. Check that the EPS indicator does not come on.