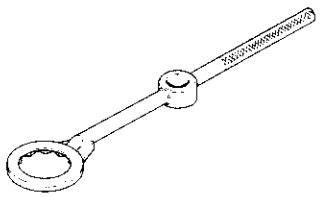
Steering

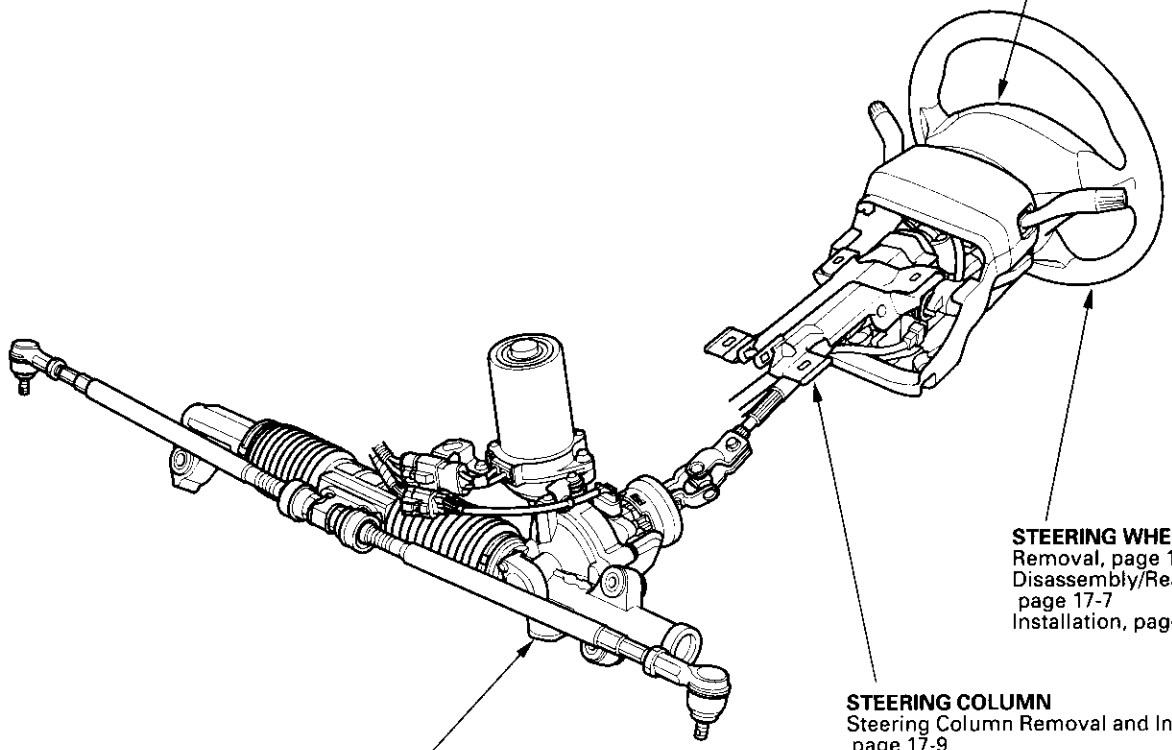
Special Tools

Ref.No.	Tool Number	Description	Qty
①	07MAA-SL00200	Locknut Wrench, 43 mm	1



①

Component Location Index



DRIVER'S AIRBAG ASSEMBLY
Removal/Installation, page 23-113

STEERING WHEEL
Removal, page 17-6
Disassembly/Reassembly, page 17-7
Installation, page 17-8

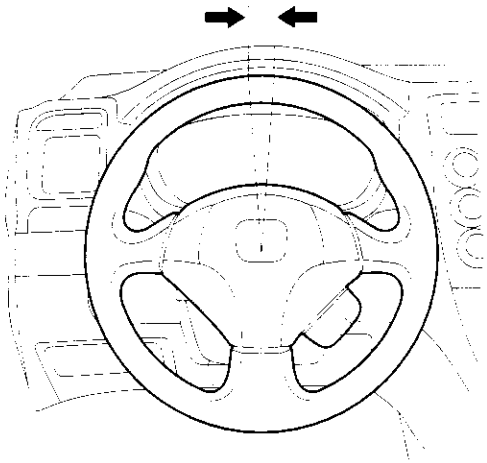
STEERING COLUMN
Steering Column Removal and Installation, page 17-9
Steering Column Inspection, page 17-11
Steering Lock Replacement, page 17-12

STEERING GEARBOX
Rack Guide Adjustment, page 17-13

Steering Wheel Rotational Play Check

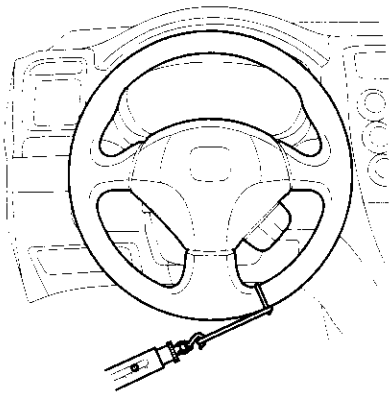
1. Turn the front wheels to the straight ahead position.
2. Measure how far you can turn the steering wheel left and right without moving the front wheels.
   - If the play is within the limit, the gearbox and linkage are OK.
   - If the play exceeds the limit, adjust the rack guide (see page 17-13). If the play is still excessive after rack guide adjustment, inspect the steering linkage and gearbox (see page 17-5).

ROTATIONAL PLAY: 0—10 mm (0—0.39 in.)



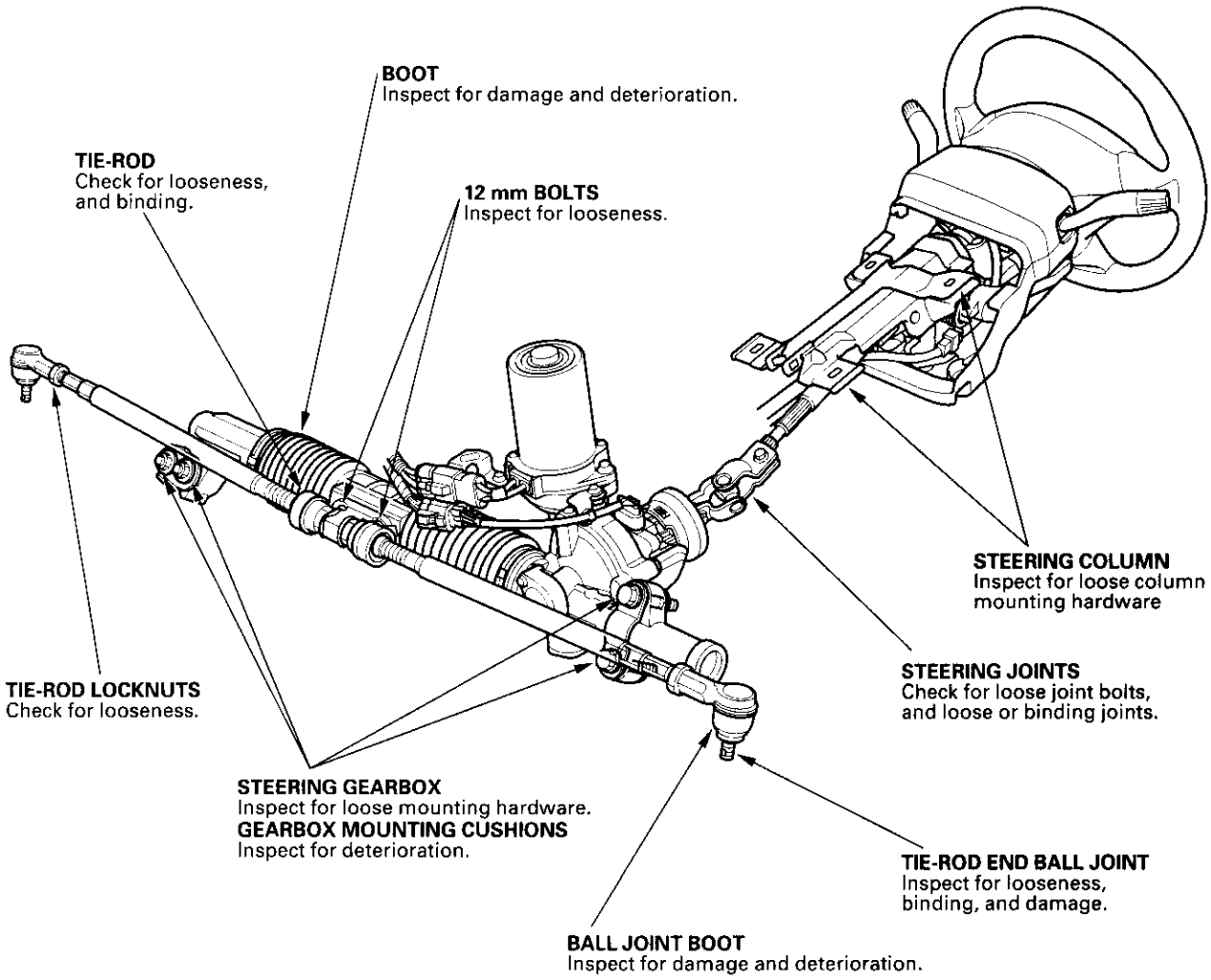
Power Assist Check

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 29 N (3.0 kgf, 6.6 lbf), the power assist is OK. If it reads more, check these items:
   - Front tire pressure
   - Steering linkage (see page 17-5)
   - Rack guide adjustment (see page 17-13)
   - EPS system (see page 17-18)

Steering Linkage and Gearbox Inspection

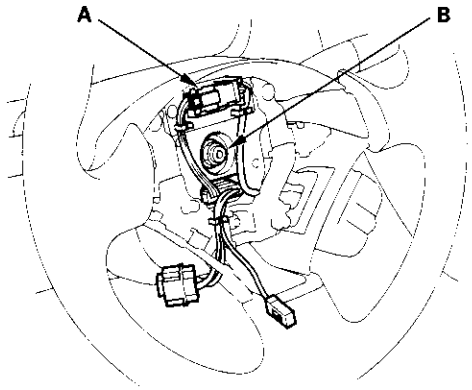


Steering Wheel Removal

SRS components are located in this area. Review the SRS component locations (see page 23-13), and precautions and procedures (see page 23-14) in the SRS section before performing repairs or service.

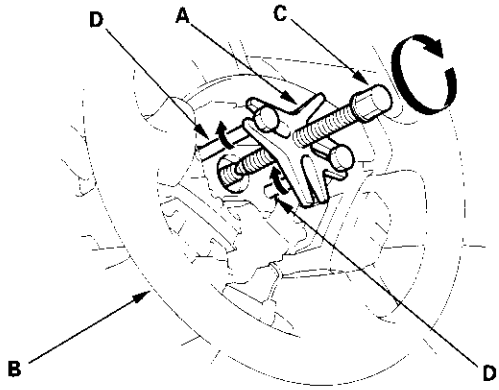
1. Align the front wheels straight ahead, then remove the driver's airbag from the steering wheel (see page 23-113).

2. Disconnect the cruise control set/resume switch connector (A), and loosen the steering wheel nut (B).

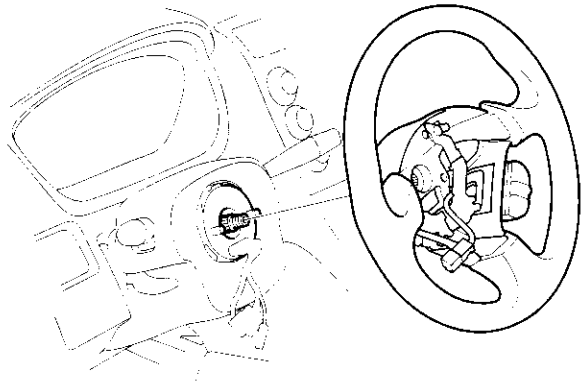


3. Install a commercially available steering wheel puller (A) on the steering wheel (B). Free the steering wheel from the steering column shaft by turning the pressure bolt (C) of the puller.

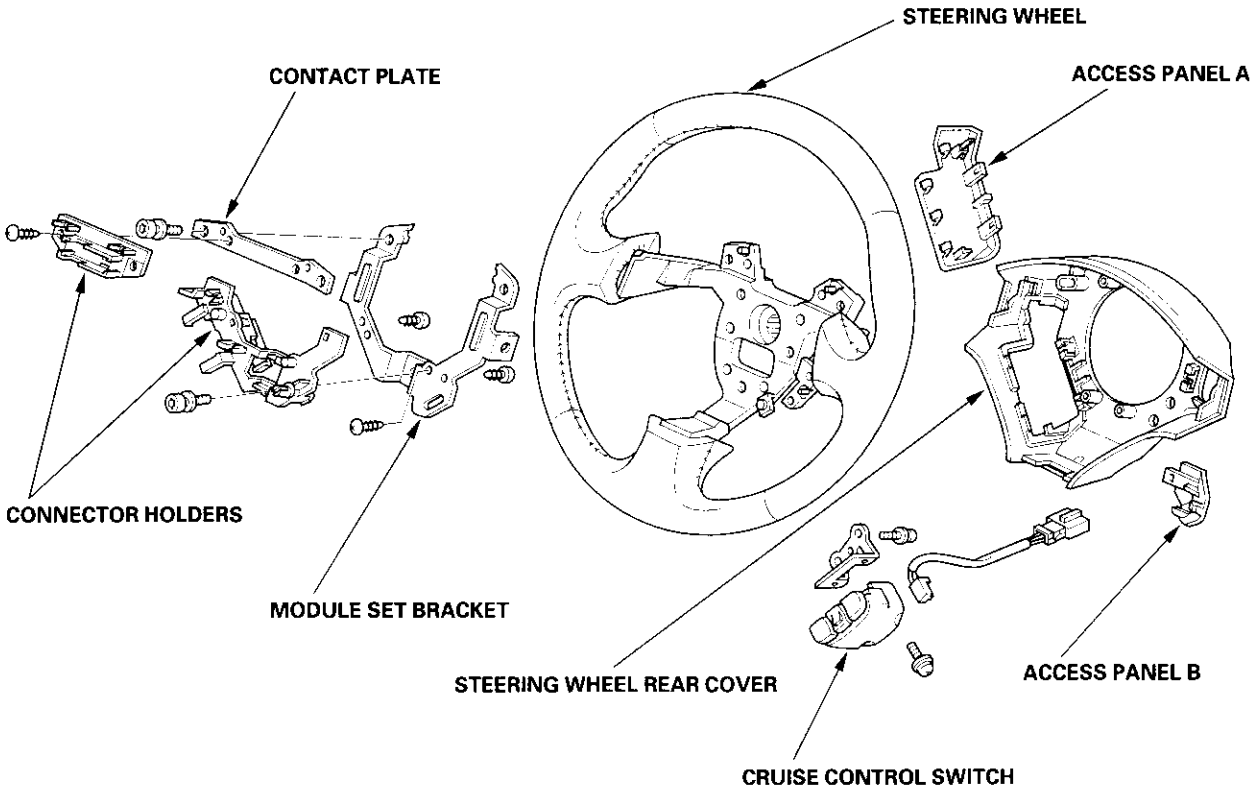
Note these items when removing the steering wheel:
- Do not tap on the steering wheel or the steering column shaft when removing the steering wheel.
- If you thread the puller bolts (D) into the wheel hub more than 5 threads, the bolts will hit the cable reel and damage it. To prevent this, install a pair of jam nuts 5 threads up on each puller bolt.



4. Remove the steering wheel puller, then remove the steering wheel nut and steering wheel from the steering column.

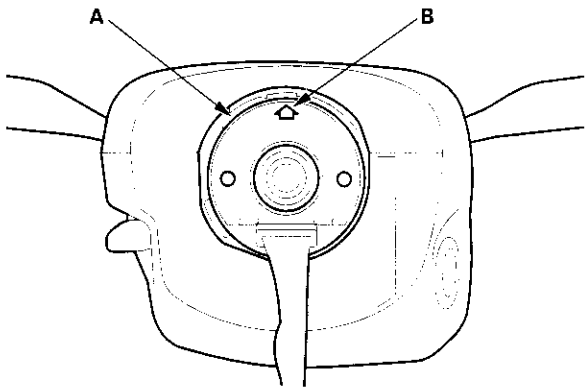


Steering Wheel Disassembly/Reassembly

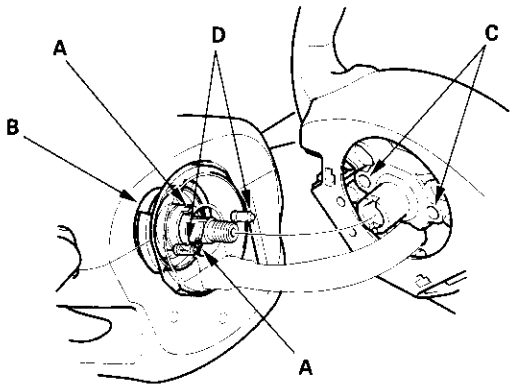


Steering Wheel Installation

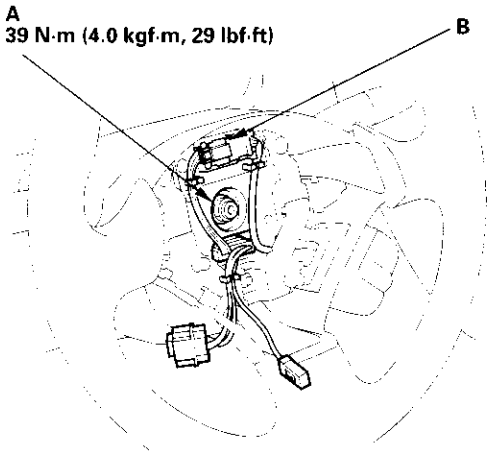
1. Before installing the steering wheel, make sure the front wheels are aligned straight ahead, then center the cable reel (A). Do this by first rotating the cable reel clockwise until it stops. Then rotate it counterclockwise about two and a half turns. The arrow mark (B) on the cable reel label should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



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



3. Install the steering wheel nut (A), and tighten it to the specified torgue.



4. Connect the cruise control set/resume switch connector (B). Make sure the wire harness is routed and fastened properly.

5. Install the driver's airbag, and confirm that the system is operating properly (see page 23-113).

6. Check the horn, turn signal canceling and cruise control switches for proper operation.

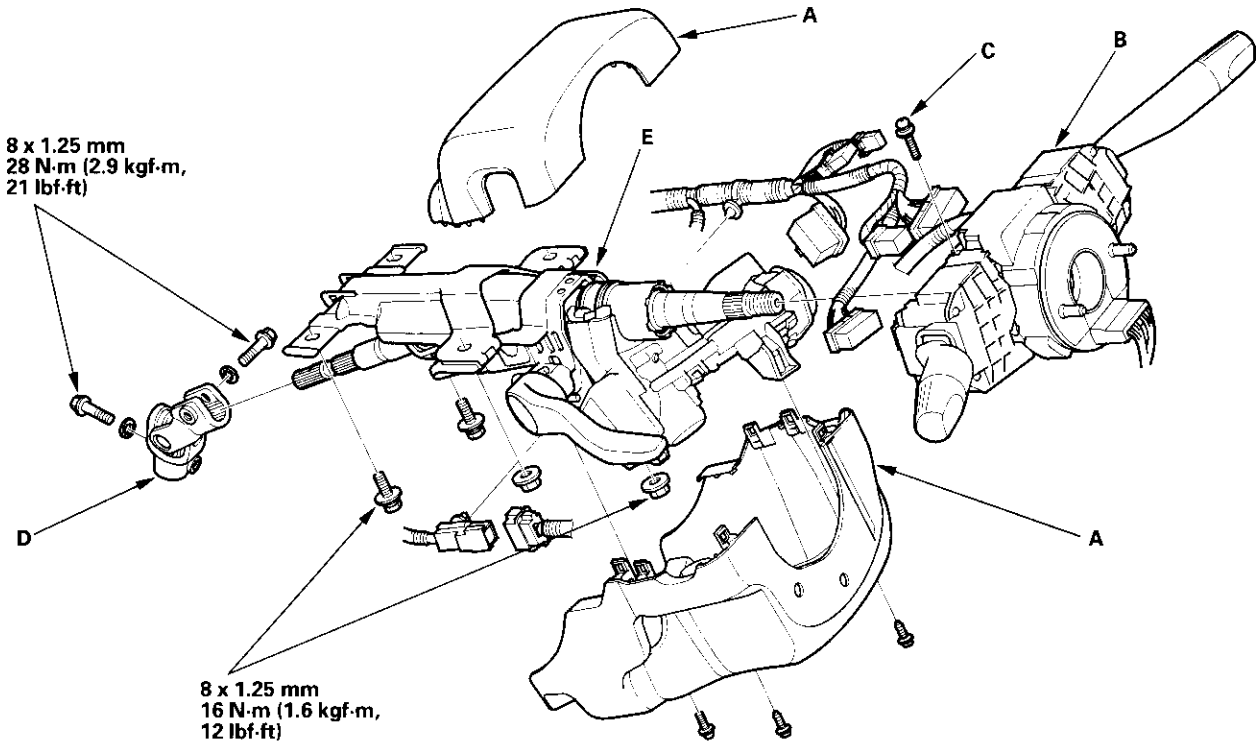
7. Reconnect the battery and do the following:
   - Do the engine control module (ECM) idle learn procedure (see page 11-139).
   - Power window control unit resetting procedure (see page 22-128).
   - Enter the anti-theft cord for the radio, then enter the custmer's radio station presets.
   - Set the clock.

Steering Column Removal and Installation

SRS components are located in this area. Review the SRS component locations (see page 23-13) and precautions and procedures (see page 23-14) in the SRS section before performing repairs or service.

Removal

1. Record the radio station presets, and disconnect the battery.
2. Remove the driver's airbag assembly (see page 23-113) and the steering wheel (see page 17-6).
3. Remove the driver's dashboard lower cover (see page 20-59) and under cover (see page 20-60).
4. Remove the column covers (A).



5. Disconnect the wire harness connectors from the combination switch assembly (B).
6. Remove the combination switch assembly from the steering column shaft by removing the screw (C) on the top of the combination switch.
7. Disconnect the connectors from the ignition switch, and release the wire harness clips from the steering column.
8. Disconnect the steering joint (D), and remove it from the column shaft.
9. Remove the steering column (E) by removing the attaching nuts and bolts.

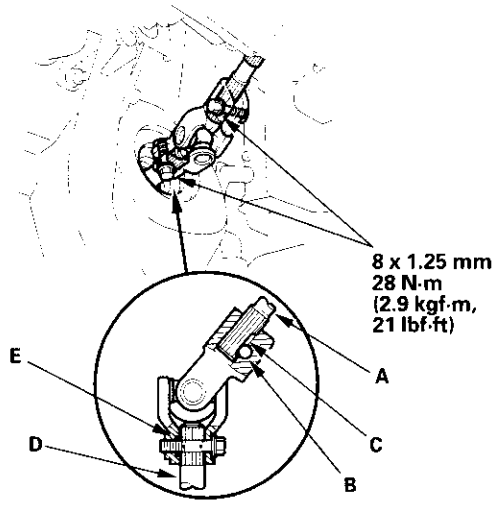
(cont'd)

Steering Column Removal and Installation (cont'd)

Installation

1. Install the steering column, and make sure the wires are not caught or pinched by any parts.

2. Insert the upper end of the steering joint onto the steering shaft (A) (line up the bolt hole (B) with the flat portion (C) on the shaft).



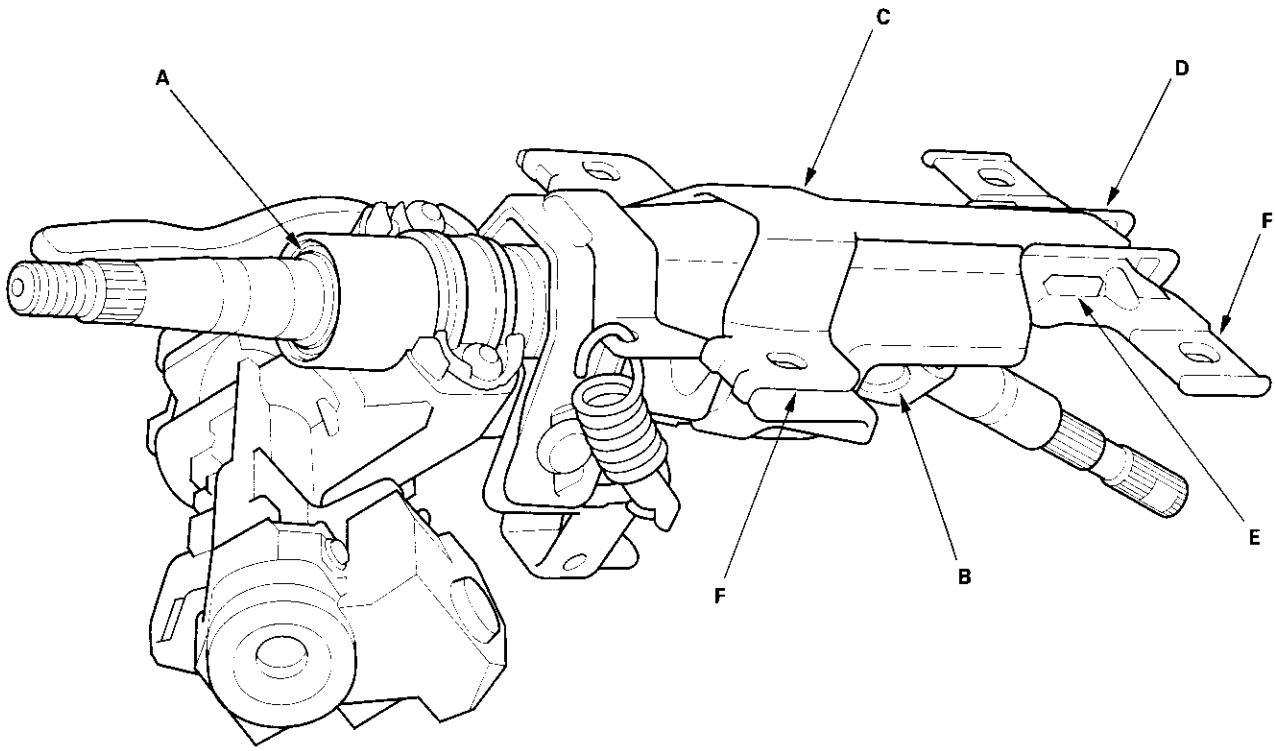
3. Slip the lower end of the steering joint onto the pinion shaft (D) (line up the bolt hole with the groove (E) around the shaft), and loosely install the lower joint bolt. Be sure that the lower joint bolt is securely in the groove in the pinion shaft.

4. Pull on the steering joint to make sure that the steering joint is fully seated. Then install the upper joint bolt, and tighten it to the specified torque. Tighten the lower joint bolt to the specified torque.

5. Finish the installation, and note these items:
   - Make sure the wire harness is routed and fastened properly.
   - Make sure the connectors are properly connected.
   - Reinstall the steering wheel (see page 17-8).
   - Reconnect the battery.
     - Do the power window control unit reset procedure (see page 22-128).
     - Enter the anti-theft code for the radio, then enter the custmer's radio station presets.
     - Set the clock.
   - Verify horn, turn signal switch, and cruise control switch operation.
   - Check wheel alignment, if necessary (see page 18-4).
   - Do the engine control module (ECM) idle learn procedure (see page 11-139).

Steering Column Inspection

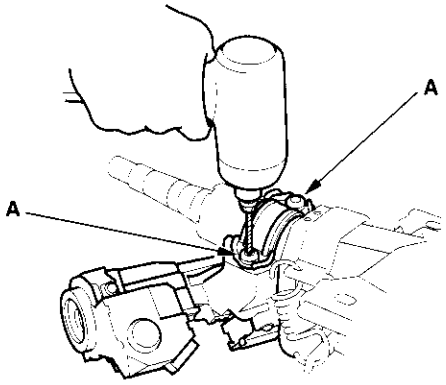
- Check the steering column ball bearing (A) and the steering joint bearings (B) for play and proper movement. If any bearing is noisy or has excessive play, replace the steering column as an assembly.
- Check the absorbing plates (C), absorbing plate guides (D), stop (E), and coating plates (F) for distortion and breakage. If there is distortion or breakage, replace the steering column as an assembly.



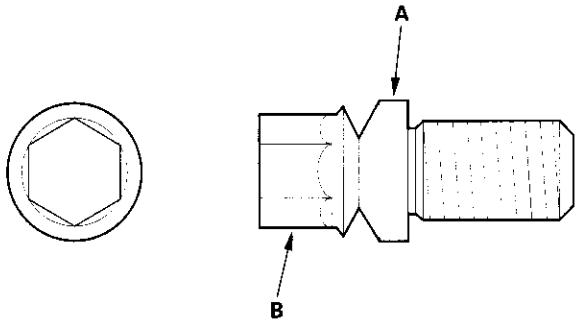
Steering Lock Replacement

NOTE: Do not try to re-key a replacement steering lock. If necessary, re-key the other locks.

1. Remove the steering column (see page 17-9).
2. Center punch each of the two shear bolts (A), and drill their heads off with a 5 mm (3/16 in.) drill bit. Be careful not to damage the switch body when removing the shear bolts.



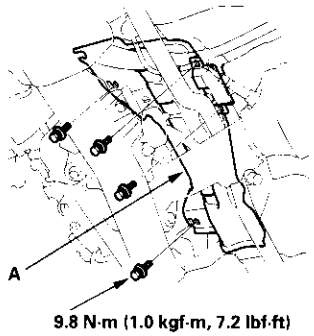
3. Remove the shear bolts from the switch body.
4. Install the switch body without the key inserted.
5. Loosely tighten the new shear bolts.
6. Insert the ignition key, and check for proper operation of the steering wheel lock and that the ignition key turns freely.
7. Tighten the shear bolts (A) until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



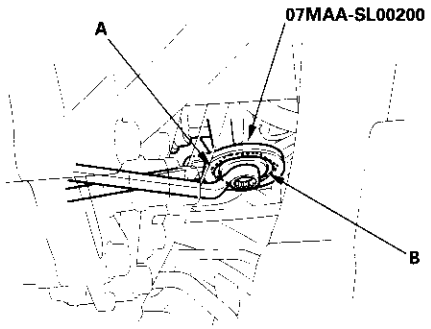
Rack Guide Adjustment

Special Tool Required
Locknut wrench, 43 mm 07MAA-SL00200

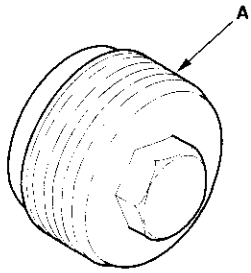
1. Set the wheels in the straight ahead position.
2. Remove the heat shield (A).



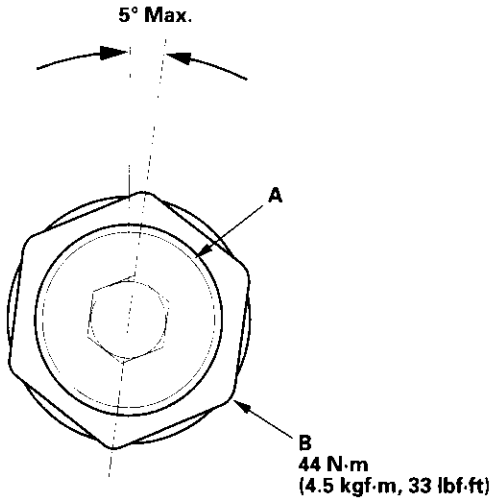
3. Remove the transmission mount bracket (see step 32 on page 13-8).
4. Loosen the rack guide screw locknut (A) with the special tool, then remove the rack guide screw (B).



5. Remove the old sealant from rack guide screw, and apply new sealant to the middle of the threads (A). Loosely install the rack guide screw on the steering gearbox.



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



7. Retighten the rack guide screw to 6 N·m (0.6 kgf·m, 4 lbf·ft), then back it off to the specified angle.

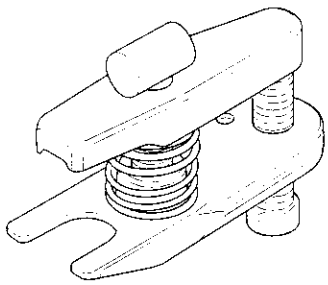
   Specified Return Angle: 5° Max.

8. Hold the rack guide screw stationary with a wrench, and tighten the locknut by hand until it's fully seated.
9. Install the special tool on the locknut (B), and hold the rack guide screw (A) stationary with a wrench. Tighten the locknut an additional 30° with the special tool.
10. Reinstall the transmission mount bracket and heat shield.
11. Check for unusual steering effort through the complete turning travel.
12. Check the steering wheel rotation play (see page 17-4) and the power assist (see page 17-4).

Electrical Power Steering (EPS)

Special Tools

Ref.No.	Tool Number	Description	Qty
①	07MAC-SL00200	Ball Joint Remover, 28 mm	1
②	07QAD-P0A0100	Attachment, 42 mm	1
③	07ZAA-S5A0100	Locknut Wrench	1



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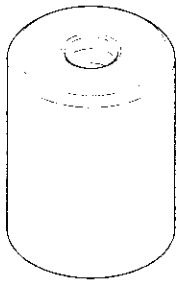

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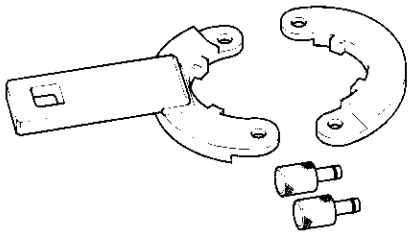

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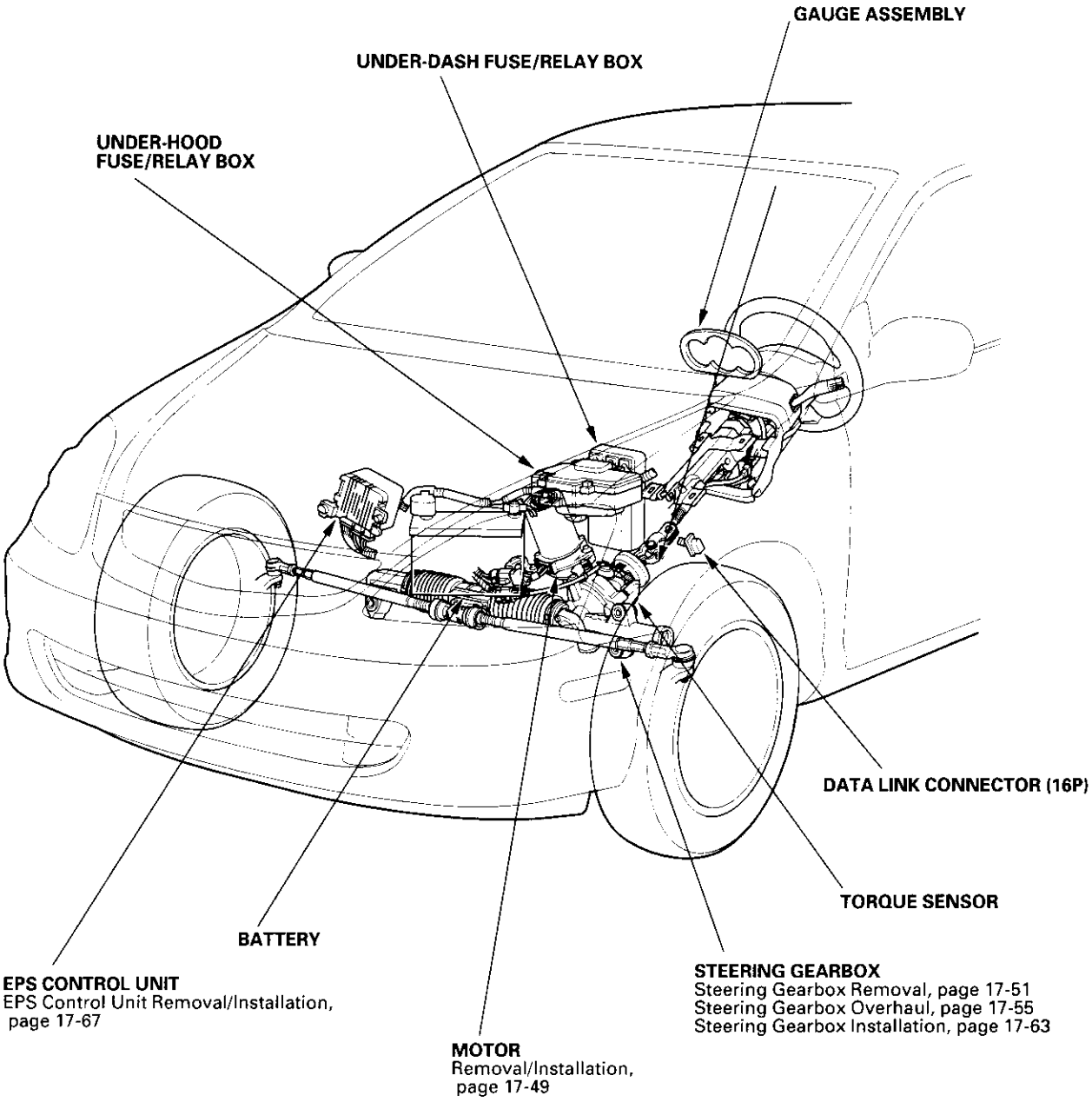
Component Location Index



General Troubleshooting Information

EPS Indicator

Under normal conditions, the EPS indicator comes on when the ignition switch is turned to the ON (II) position, then goes off after the engine is started. This indicates that the bulb and its circuit are operating correctly.
If there is any trouble in the system after the engine is started, the EPS indicator will stay on, and the power assist is turned off.

When EPS indicator light 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 12, 16, 17, 18 or 67 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 OFF, 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:

Condition 1:
- The vehicle was traveling at least 12.4 mph (20 km/h), then
- A rapid change in vehicle speed was detected, then
- The vehicle (or the vehicle speed sensor signal) stopped for at least 5 seconds
- The engine speed was still 1,640 rpm or higher for at least 5 seconds

Condition 2:
After the vehicle (or the vehicle speed sensor signal) has stopped for at least 10 seconds, yet the engine speed was still 1,640 rpm or higher for at least 20 seconds.

Condition 3:
When the engine speed is 280 rpm or less, and the vehicle is traveling at a speed of 6.2 mph (10 km/h) or more for 3 seconds.

To determine the actual cause of the problem, question the customer about the conditions during which the problem occured, 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 DTCs are indicated repeatedly until the ignition switch is turned OFF.
- If the DTC is not memorized, the EPS indicator blinks.
- The DTCs are memorized in the EEPROM (non-volatile memory) therefore the memorized DTCs cannot be erased by disconnecting the battery. Perform the specified procedures to clear DTCs.

Self-diagnosis

Self-diagnosis can be classified into two categories:
- Initial diagnosis: performed right after the engine starts and until the EPS indicator goes off.
- Regular diagnosis: performed right after the initial diagnosis until the ignition switch is turned OFF.

The EPS control unit performs the following 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 begins.

   NOTE:
   - When DTC 23 (a problem with the circuit for engine speed signal) is detected, the power assist will return to normal when the vehicle speed is 0.62 mph (1 km/h) or above.
   - For DTCs 22, 23, 64, or 66 the EPS indicator goes off automatically when the system returns to normal. For all other codes, the EPS indicator goes off when the system is OK after the ignition switch is turned from OFF to ON (II).

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 motor to heat up. Because this heat adversely affects the system, the control unit monitors the electric current of the motor.

When the control unit detects heat build-up in the motor, it reduces the electric current to the 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 off, and the motor cools, the control unit will restore the power assist gradually until it's fully restored (after approximately 15 minutes maximum).

How to Troubleshoot EPS DTCs

The troubleshooting flowchart procedures assume that the cause of the problem is still present and the EPS indicator is still on. Following the flowchart when the EPS indicator does not come on can result in incorrect diagnosis.
The connector illustrations show the female terminal connectors with a single outline and the male terminal connectors with a double outline.

1. Question the customer about the conditions when the problem occured, 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.

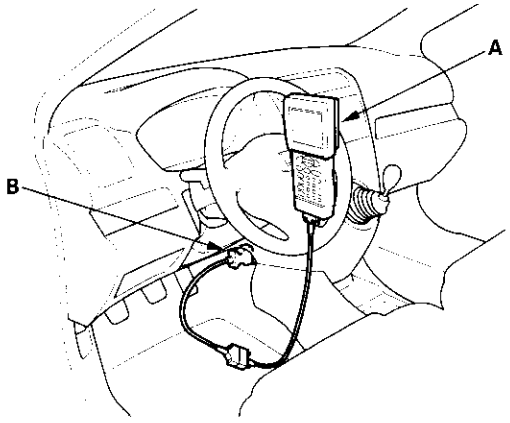
2. When the EPS indicator does not come on during the test drive, but troubleshooting is done based on the DTC, check for loose connectors, poor terminal contact, etc in the affected circuit, before you start troubleshooting.

3. After troubleshooting, clear the DTC and test-drive the vehicle. Be sure the EPS indicator does not come on.

How to Retrieve EPS DTCs

Honda PGM Tester Method:

1. With the ignition switch OFF, connect the Honda PGM Tester (A) to the 16P data link connector (DLC) (B) located under the dash on the driver's side of the vehicle.

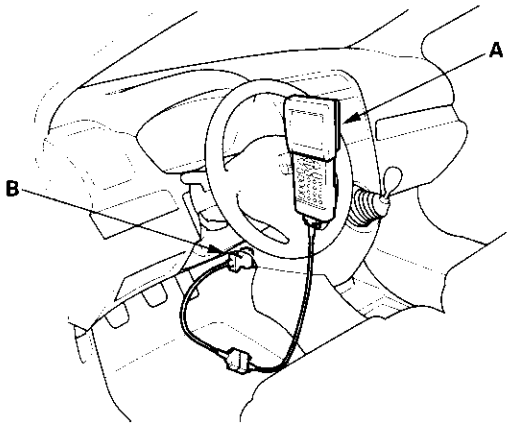


2. Turn the ignition ON (II), and follow the prompts on the PGM Tester to display the DTC(s) on the screen. After determining the DTC, refer to the DTC Troubleshooting Index.

   NOTE: See the Honda PGM Tester user's manual for specific instructions.

Service Check Signal Circuit Method:

1. With the ignition switch OFF, connect the Honda PGM Tester (A) to the 16P data link connector (DLC) (B) located under the dash on the driver's side of the vehicle.



2. Short the SCS circuit to body ground using the Honda PGM Tester.

3. Turn the ignition switch ON (II).

4. Record the DTC.

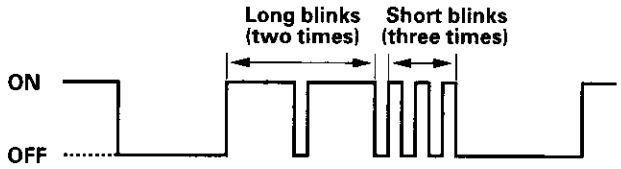
(cont'd)

General Troubleshooting Information (cont'd)

5. The blinking frequency indicates the DTC. DTCs are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the DTC. After determining the DTC, refer to the DTC Troubleshooting Index.

   The system will not indicate the DTC unless these conditions are met:
   - Set the front wheels in the straight ahead driving position.
   - The ignition switch is turned ON (II).
   - The engine is stopped.
   - The SCS circuit is shorted to body ground before the ignition switch is turned ON (II).

Example of DTC 23



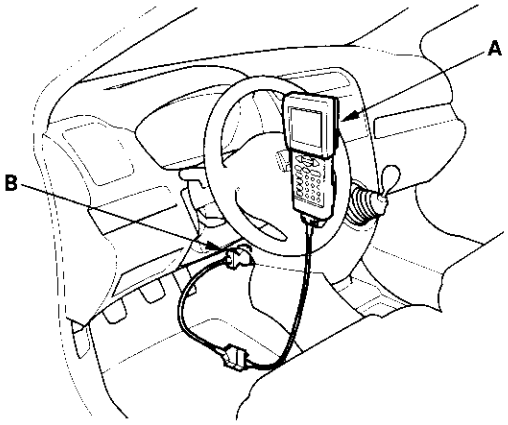
6. Turn the ignition switch OFF.

7. Disconnect the Honda PGM Tester from the DLC.

How to Clear EPS DTCs

Honda PGM Tester Method:

1. With the ignition switch OFF, connect the Honda PGM Tester (A) to the 16P data link connector (DLC) (B) located under the dash on the driver's side of the vehicle.



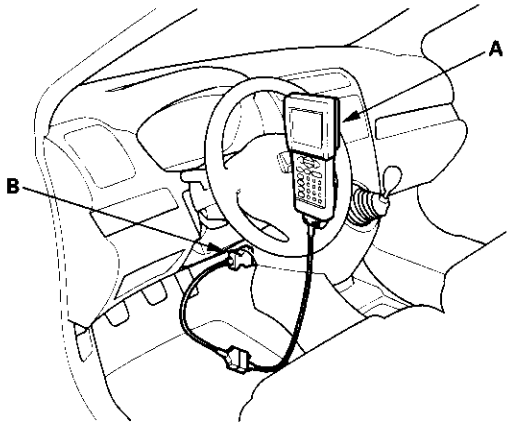
2. Turn the ignition switch ON (II), and clear the DTC(s) by following the screen prompts on the PGM Tester.

   NOTE: See the Honda PGM Tester user's manual for specific instructions.

Service Check Signal Circuit Method:

NOTE: Use this procedure when the PGM Tester software does not match the year/model vehicle you are working on.

1. With the ignition switch OFF, connect the Honda PGM Tester (A) to the 16P data link connector (DLC) (B) located under the dash on the driver's side of the vehicle.



2. With the vehicle on the ground, set the front wheels in the straight ahead driving position.

3. Short the SCS circuit to body ground using the Honda PGM Tester.

4. Turn the ignition switch ON (II). The EPS indicator comes on for about 6 seconds. Within 4 seconds of turning the switch ON, while the EPS indicator is on, turn the steering wheel 45 degrees to the left from the straight ahead driving position, and hold the steering wheel in that position until the EPS indicator goes off.

5. Within 4 seconds after the EPS indicator goes off, return the steering wheel to the straight ahead driving position and release the steering wheel. The EPS indicator comes on again 4 seconds after releasing the steering wheel.

6. Within 4 seconds after the EPS indicator comes on, turn the steering wheel 45 degrees to the left again and hold it in that position.
   The EPS indicator goes off after 4 seconds.

7. Within 4 seconds after the EPS indicator goes off, return the steering wheel to the straight ahead driving position again and release the steering wheel. The EPS indicator blinks twice 4 seconds after releasing the steering wheel, indicating that the DTC was erased.

   NOTE: If the EPS indicator does not blink twice, an error was made in the procedure and the DTC was not erased. Turn the ignition switch OFF, and repeat the operation from step 3.

8. Turn the ignition switch OFF after the EPS indicator blinks twice.

9. Disconnect the Honda PGM Tester from the DLC.

10. Perform the DTC code output operation, and be sure that the code has been erased.

DTC Troubleshooting Index

DTC	Detection Item	Note
DTC: 12	A problem with voltage for torque sensor T/SIG	(see page 17-28)
DTC: 16	A problem with average of voltage for torque sensor VT3 and VT6	(see page 17-29)
DTC: 17	A problem with the voltage for torque sensor 12 V power source Vcc 1	(see page 17-31)
DTC: 18	A problem with the voltage for torque sensor 5 V power source Vcc 2	(see page 17-31)
DTC: 22	A problem with the average for vehicle speed and engine speed	(see page 17-33)
	Excessive change of the vehicle speed sensor signal	(see page 17-33)
DTC: 23	A problem with the engine speed signal circuit	(see page 17-33)
DTC: 37	A problem with the circuit for input motor voltage in the EPS control unit	(see page 17-35)
DTC: 41	A problem with the motor voltage	(see page 17-36)
DTC: 42	A problem with the motor driven current (open circuit or short to ground)	(see page 17-38)
DTC: 43	A problem with the motor driven current (short to power)	(see page 17-41)
DTC: 45	A problem with the motor driven current (open circuit or short to ground)	(see page 17-38)
DTC: 47	A problem with the motor relay in the EPS control unit	(see page 17-42)
DTC: 50	A problem with the CPU in the EPS control unit	(see page 17-43)
DTC: 51	A problem with EEPROM in the EPS control unit	(see page 17-43)
DTC: 62	Fail-safe relay stuck ON	(see page 17-44)
DTC: 64	A problem with low battery voltage	(see page 17-44)
	Fail-safe relay contact failure	(see page 17-44)
DTC: 66	A problem with the motor driven voltage	(see page 17-45)
DTC: 67	A problem with the torque sensor I/F circuit	(see page 17-45)
DTC: 68	A problem with the interlock circuit (torque)	(see page 17-45)
DTC: 69	A problem with the interlock circuit (current)	(see page 17-46)

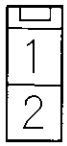
Symptom Troubleshooting Index

Symptom	Diagnostic procedure	Also check for
EPS indicator does not come on	EPS Indicator Circuit Troubleshooting (see page 17-47)	
EPS indicator does not go off and no DTC is stored	EPS Indicator Circuit Troubleshooting (see page 17-47)	
EPS indicator does not stay on, no DTC is stored, and there is no power assist	1. Check the motor wires between the EPS control unit and the motor for a short to ground. Repair as needed. 2. If the motor wires are OK, replace the steering gearbox (short in the motor).	

System Description

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

EPS CONTROL UNIT CONNECTOR A (2P)

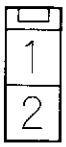


Wire side of female terminals

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement		
				Terminals	Conditions Ignition switch ON (II)	Voltage
1	WHT/BLU	+ BAT (Plus battery)	Power source for the actuator motor	1-Ground	Constant	Battery voltage
2	BLK	PG (Power ground)	Ground for the actuator motor	2-Ground		

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

EPS CONTROL UNIT CONNECTOR B (2P)

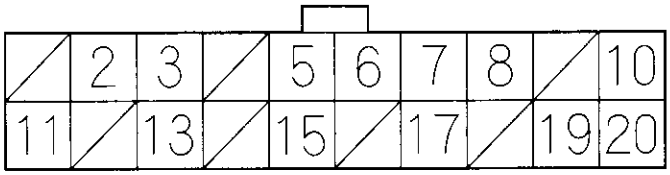


Wire side of female terminals

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement		
				Terminals	Conditions Ignition switch ON (II)	Voltage
1	RED	M1 (Motor 1)	Drives the actuator motor	1-Ground		
2	GRN	M2 (Motor 2)	Drives the actuator motor	2-Ground		

EPS Control Unit Inputs and Outputs at Connector C (20P)

EPS CONTROL UNIT CONNECTOR C (20P)

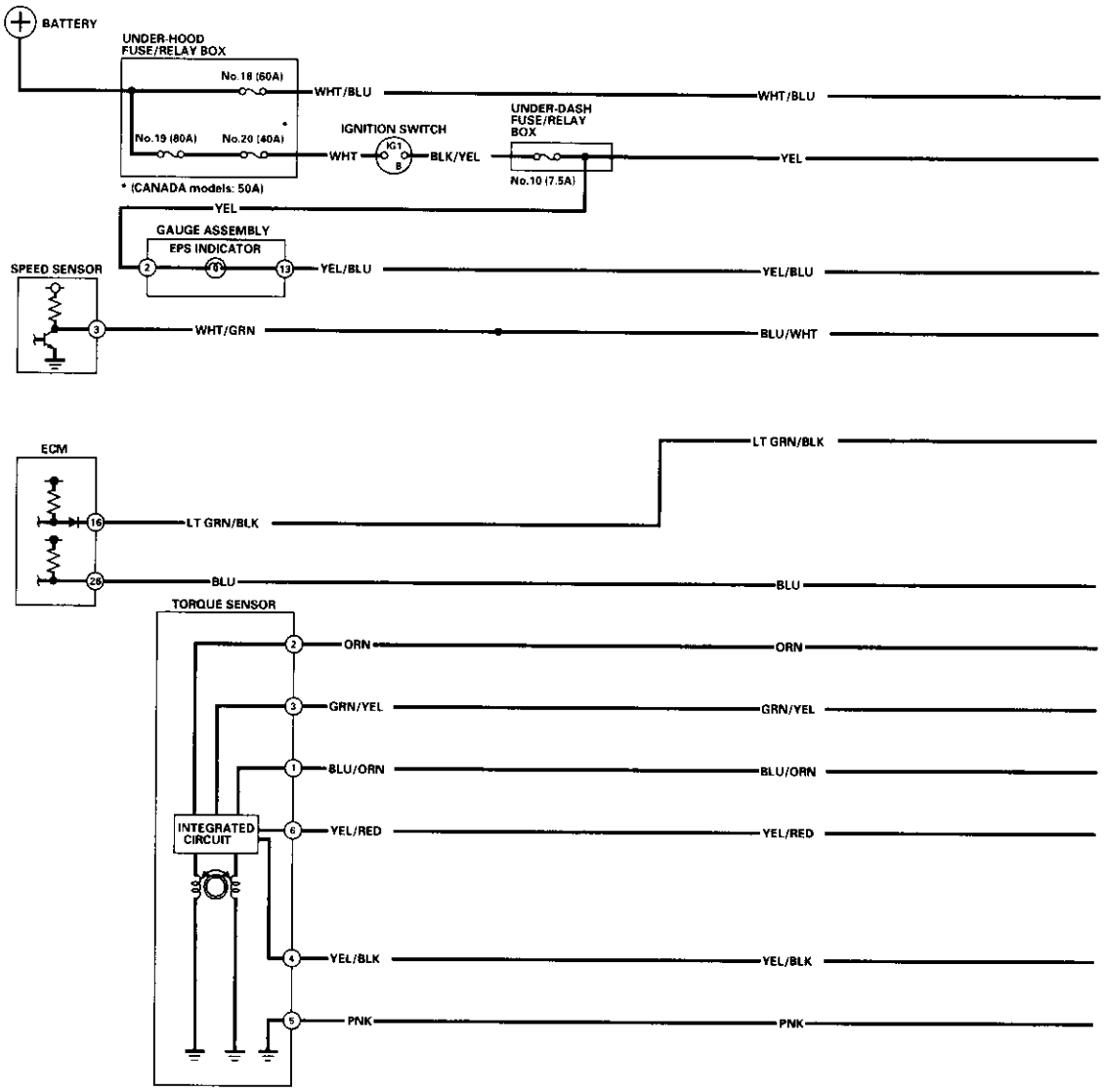


Wire side of female terminals

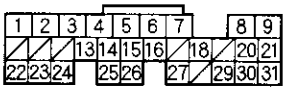
Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement		
				Terminals	Conditions (Ignition switch ON (II))	Voltage
2	PNK	T/S GND (Torque sensor ground)	Ground for the torque sensor			
3	ORN	VCC1 (Voltage common 1)	Power source for torque sensor (12 V)	3-Ground	Start the engine	Battery voltage
					Ignition switch OFF	0 V
5	YEL/RED	VT6 (Voltage torque 6)	Detects torque sensor signal	5-Ground	Start the engine and turn the steering wheel	About 5—0 V
6	YEL/BLU	WLP (Warning lamp)	Drives the EPS indicator light	6-Ground	EPS indicator ON	0 V
					EPS indicator OFF	Battery voltage
7	BLU/WHT	VSP (Vehicle speed pulse)	Detects the vehicle speed input signal for the speed sensor or the ECM (4 pulse/Rev).	7-Ground	Raise the vehicle off the ground and spin the front wheel	Alternating voltage about 0 V—5 V—0 V—5 V
8	BRN	SCS (Service check signal)	Detects service check connector signal	8-Ground	SCS not grounded	Battery voltage
10	YEL	IG1 (Ignition 1)	Power source for activating the system	10-Ground	Ignition switch ON (II)	Battery voltage
					Ignition switch OFF	0 V
11	GRN/YEL	VCC2 (Voltage common 2)	Drives the torque sensor (5 V)	11-Ground	Start the engine	About 5 V
					Ignition switch OFF	0 V
13	BLU/ORN	VT3 (Voltage torque 3)	Detects torque sensor signal	13-Ground	Start the engine and turn the steering wheel	About 5—0 V
15	YEL/BLK	T/SIG (Torque sensor F/S signal)	Detects torque sensor signal	15-Ground	Start the engine	Momentarily 5 V
17	LT GRN/BLK	PSW (Power steering switch)	Provides power steering switch signal	17-Ground	Start the engine and turn the steering wheel	0—12 V
19	BLU	NEP (Engine pulse)	Detects the engine pulse	19-Ground	Start the engine, and let it idle	About 0—12 V
20	GRY	DIAG-H (Diagnosis-H)	Communications with Honda PGM Tester	20-Ground	PGM Tester not connected	5 V

EPS Components

Circuit Diagram

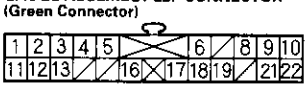


ECM 31P CONNECTOR (E)

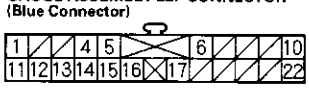


SPEED SENSOR 3P CONNECTOR

GAUGE ASSEMBLY 22P CONNECTOR (Green Connector)

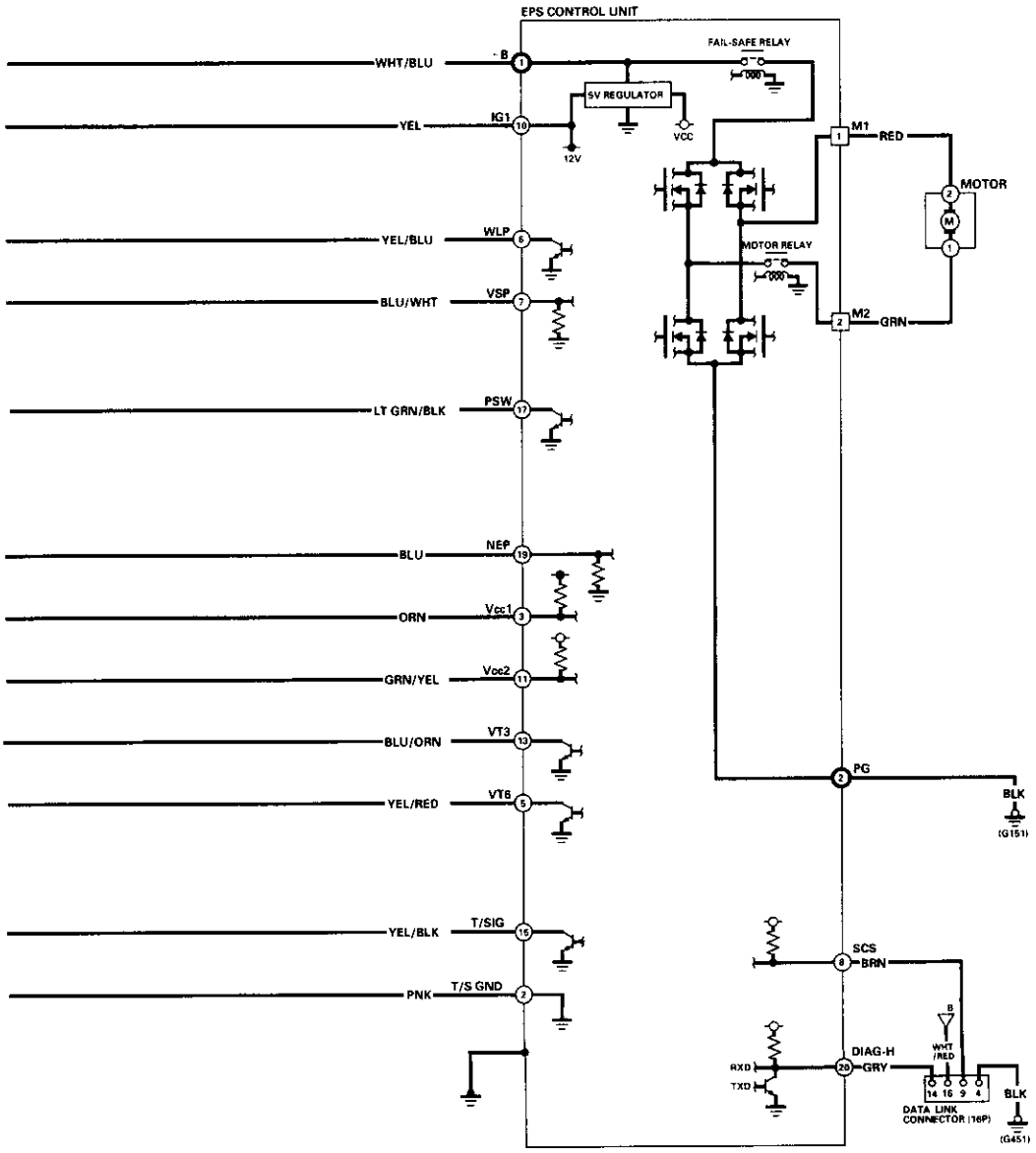


GAUGE ASSEMBLY 22P CONNECTOR (Blue Connector)



TORQUE SENSOR 6P CONNECTOR

Wire side of female terminals

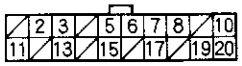


EPS CONTROL UNIT CONNECTOR A (2P) (: Connector)

EPS CONTROL UNIT CONNECTOR B (2P) (: Connector)

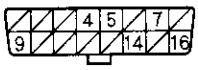
Wire side of female terminals

EPS CONTROL UNIT CONNECTOR C (20P) (: Connector)



MOTOR CONNECTOR (2P)

DATA LINK CONNECTOR (16P)



Terminal side of female terminals

DTC Troubleshooting

DTC 12: Torque Sensor T/SIG

1. Clear the DTC.
2. Start the engine.
3. Wait at least 10 seconds.

   Does the EPS indicator come on?

   YES—Go to step 4.

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

4. Stop the engine, and verify the DTC.

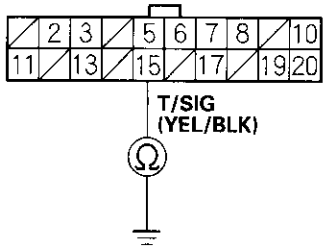
   Is DTC12 indicated?

   YES—Go to step 5.

   NO—Perform the appropriate troubleshooting for the code indicated. ■

5. Make sure the ignition switch is OFF, then disconnect EPS control unit connector C (20P) and the torque sensor 6P connector.
6. Check for continuity between EPS control unit connector C (20P) terminal No. 15 and body ground.

EPS CONTROL UNIT CONNECTOR C (20P)



Wire side of female terminals

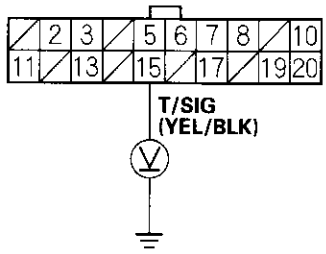
Is there continuity?

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

NO—Go to step 7.

7. Turn the ignition switch ON (II).
8. Measure the voltage between EPS control unit connector C (20P) terminal No. 15 and body ground.

EPS CONTROL UNIT CONNECTOR C (20P)



Wire side of female terminals

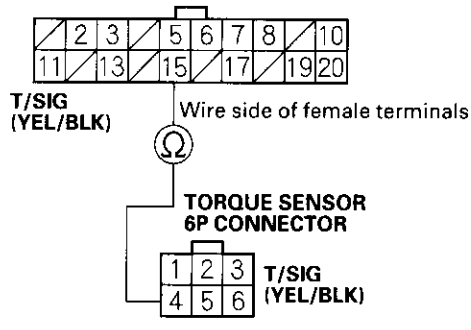
Is there battery voltage?

YES—Repair short to power in the + circuit wire between the torque sensor and EPS control unit. ■

NO—Go to step 9.

9. Turn the ignition switch OFF.
10. Check for continuity between EPS control unit connector C (20P) terminal No. 15 and the torque sensor 6P connector terminal No. 4.

EPS CONTROL UNIT CONNECTOR C (20P)



Wire side of female terminals

Is there continuity?

YES—Go to step 11.

NO—Repair open in the wire between the torque sensor and the EPS control unit. ■

11. Substitute a known-good EPS control unit, and connect the all disconnected connectors.

12. Start the engine.

    Does the EPS indicator come on?

    YES—Go to step 13.

    NO—Check for loose EPS control unit connectors. If necessary, replace the EPS control unit and retest.■

13. Stop the engine, and verify the DTC.

    Is DTC12 indicated?

    YES—Check for loose torque sensor connectors. If necessary, substitute a known-good steering gearbox and recheck.■

    NO—Perform the appropriate troubleshooting for the code indicated.■

DTC 16: Torque Sensor VT3 and VT6

1. Clear the DTC.
2. Start the engine.
3. Wait at least 10 seconds.

   Does the EPS indicator come on?

   YES—Go to step 4.

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

4. Stop the engine, and verify the DTC.

   Is DTC16 indicated?

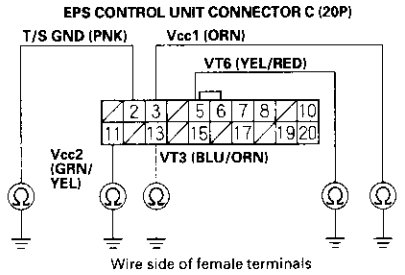
   YES—Go to step 5.

   NO—Perform the appropriate troubleshooting for the code indicated.■

5. Make sure the ignition switch is OFF, then disconnect EPS control unit connector C (20P) and the torque sensor 6P connector.

6. Check for continuity between the appropriate EPS control unit connector C (20P) terminal and body ground (see table).

Terminal name	EPS control unit connector C terminal No.
Vccl	3
Vcc2	11
VT3	13
VT6	5
T/S GND	2



Is there continuity?

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

NO—Go to step 7.

(cont'd)

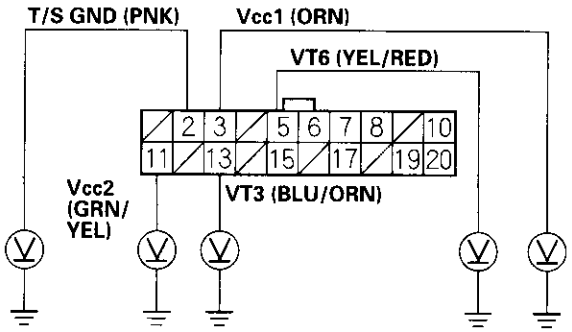
DTC Troubleshooting (cont'd)

7. Turn the ignition switch ON (II).

8. Measure the voltage between the appropriate EPS control unit connector C (20P) terminal and body ground (see table).

Terminal name	EPS control unit connector C terminal No.
Vcc1	3
Vcc2	11
VT3	13
VT6	5
T/S GND	2

EPS CONTROL UNIT CONNECTOR C (20P)



Wire side of female terminals

Is there battery voltage?

YES—Repair short to power in the + circuit wire between the EPS control unit and torque sensor. ■

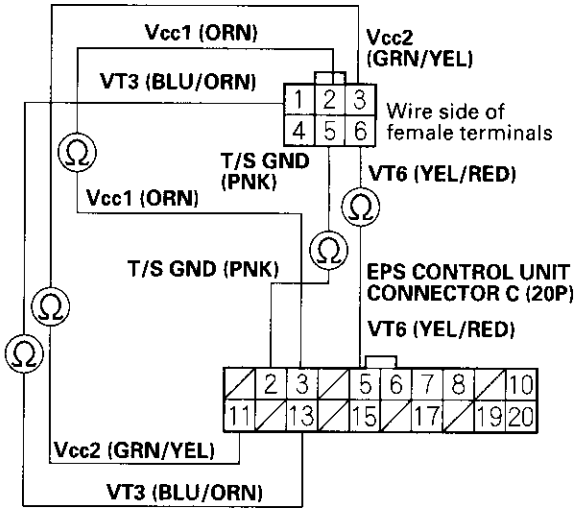
NO—Go to step 9.

9. Turn the ignition switch OFF.

10. Check for continuity between the appropriate EPS control unit connector C (20P) terminal and the torque sensor terminal (see table).

Terminal name	Torque Sensor terminal No.	EPS control unit connector C terminal No.
Vcc1	2	3
Vcc2	3	11
VT3	1	13
VT6	6	5
T/S GND	5	2

TORQUE SENSOR 6P CONNECTOR



Wire side of female terminals

Is there continuty?

YES—Go to step 11.

NO—Repair open in the appropriate torque sensor wire circuit between the EPS control unit and the torque sensor. ■

11. Substitute a known-good EPS control unit, and reconnect the disconnected connectors.

12. Start the engine.

    Does the EPS indicator come on?

    YES—Go to step 13.

    NO—Check for loose or poor connections at the EPS control unit and the torque sensor connectors. If the connections are good, replace the EPS control unit and recheck.■

13. Stop the engine, and verify the DTC.

    Is DTC16 indicated?

    YES—Replace the steering gearbox and recheck.■

    NO—Perform the appropriate troubleshooting for the code indicated.■

DTC 17: Torque Sensor Vcc1

DTC 18: Torque Sensor Vcc2

1. Clear the DTC.

2. Start the engine.

3. Wait at least 10 seconds.

    Does the EPS indicator come on?

    YES—Go to step 4.

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

4. Stop the engine, and verify the DTC.

    Is DTC17 or DTC18 indicated?

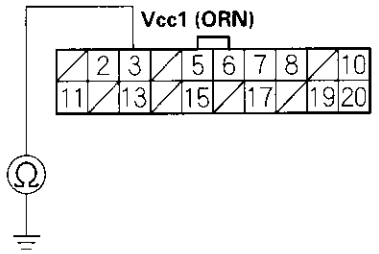
    YES—Go to step 5.

    NO—Do the troubleshooting for the DTC indicated.■

5. Make sure the ignition switch is OFF, then disconnect EPS control unit connector C (20P) and the torque sensor 6P connector.

6. Check for continuity between EPS control unit connector C (20P) terminal No. 3 and body ground.

EPS CONTROL UNIT CONNECTOR C (20P)



Wire side of female terminals

Is there continuity?

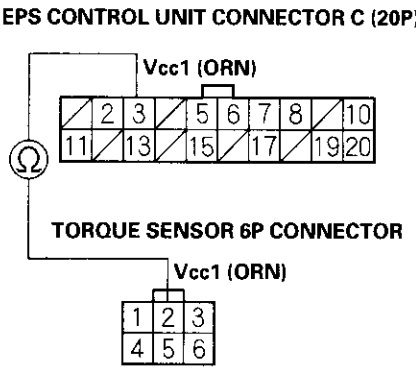
YES—Repair short to body ground in the wire between the torque sensor and EPS control unit.■

NO—Go to step 7.

(cont'd)

DTC Troubleshooting (cont'd)

7. Check for continuity between EPS control unit connector C (20P) terminal No. 3 and the torque sensor 6P connector terminal No. 2.

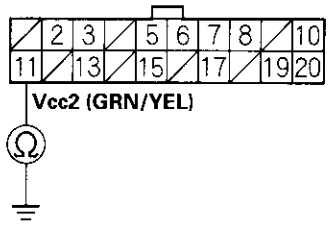


Is there continuity?

YES—Go to step 8.

NO—Repair open in the wire between the torque sensor and EPS control unit. ■

8. Check for continuity between EPS control unit connector C (20P) terminal No. 11 and body ground.

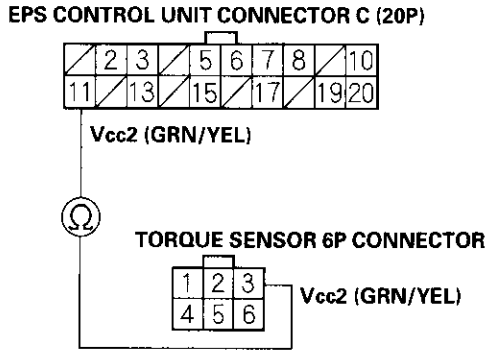


Is there continuity?

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

NO—Go to step 9.

9. Check for continuity between EPS control unit connector C (20P) terminal No. 11 and the torque sensor 6P connector terminal No. 3.



Is there continuity?

YES—Go to step 10.

NO—Repair open in the wire between the torque sensor and EPS control unit. ■

10. Substitute a known-good EPS control unit, and connect all the disconnected connectors.

11. Start the engine.

Does the EPS indicator come on?

YES—Go to step 12.

NO—Check for loose or poor connections at the EPS control unit and the torque sensor connectors. If the connections are good, replace the EPS control unit and recheck. ■

12. Stop the engine, and verify the DTC.

Is DTC17 or DTC18 indicated?

YES—Replace the steering gearbox and recheck. ■

NO—Perform the appropriate troubleshooting for the code indicated. ■

DTC 22: Vehicle Speed Sensor Signal

DTC 23: Engine Speed Signal

NOTE:
- If the MIL indicator is ON, troubleshoot the PGM-FI system first.
- Even though the system is operating normally, the EPS indicator will come on under the following conditions.

  – Condition 1:
    - The vehicle was traveling at least 12.4 mph (20 km/h), then
    - A rapid change in vehicle speed was detected, then
    - The vehicle (or the vehicle speed sensor signal) stopped for at least 5 seconds, and
    - The engine speed was still 1,640 rpm or higher for at least 5 seconds
  – Condition 2:
    After the vehicle (or the vehicle speed sensor signal) has stopped for at least 10 seconds, yet the engine speed was still 1,640 rpm or higher for at least 20 seconds.
  – Condition 3:
    When the vehicle speed is 10 km/h (6.2 mph) or above and the engine is running at 280 rpm or below for 3 seconds.

1. Start the engine and check the tachometer.

   Is the tachometer working correctly?

   YES—Go to step 2.

   NO—Go to step 9.

2. Test-drive the vehicle above 15 km/h (9.3 mph).

   Is the speedometer working correctly?

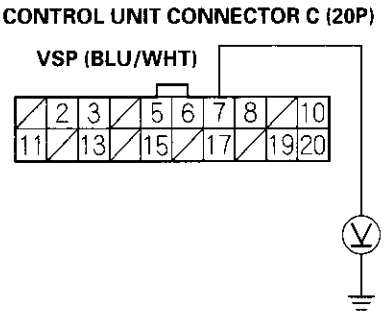
   YES—Go to step 3.

   NO—Perform the speedometer system troubleshooting (see page 22-65).■

3. Block the rear wheels and raise the vehicle, and make sure it is securely supported.

4. Turn the ignition switch ON (II).

5. Block the right front wheel, and slowly rotate the left front wheel, and measure the voltage between EPS control unit connector C (20P) terminal No.7 and body ground.



Wire side of female terminals

Does the voltage pulse 0 V and 5 V?

YES—Go to step 6.

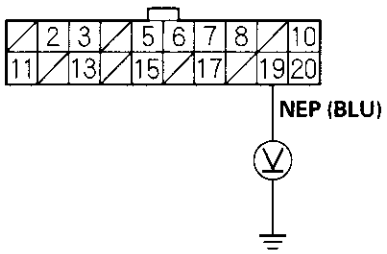
NO—Repair open in the wire between the EPS control unit and the VSS. If the wire is OK,check for a loose or poor connections at the EPS control unit. If necessary, substitute a known-good EPS control unit, and recheck.■

(cont'd)

DTC Troubleshooting (cont'd)

6. Turn the ignition switch OFF, and disconnect EPS control unit connector C (20P).
7. Start the engine, and let it idle.
8. Measure the voltage between EPS control unit connector C (20P) terminal No.19 and body ground.

EPS CONTROL UNIT CONNECTOR C (20P)



Wire side of female terminals

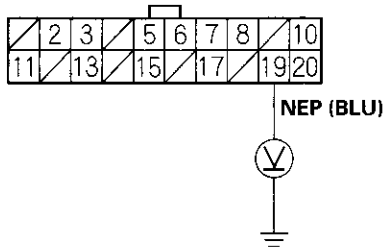
Is there about 6 V at idle? (With the meter set for frequency, is there 33 Hz per 1,000 engine rpm?)

YES—Check for loose EPS control unit connectors. If necessary, substitute a known-good EPS control unit and recheck. ■

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

9. Turn the ignition switch OFF, and disconnect EPS control unit connector C (20P).
10. Start the engine, and let it idle.
11. Measure the voltage between EPS control unit connector C (20P) terminal No. 19 and body ground.

EPS CONTROL UNIT CONNECTOR C (20P)



Wire side of female terminals

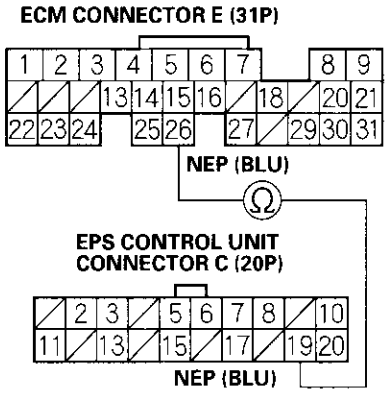
Is there about 6 V at idle? (With the meter set for frequency, is there 33 Hz per 1,000 engine rpm?)

YES—Check for loose EPS control unit connectors. If necessary, substitute a known-good EPS control unit and recheck. ■

NO—Go to step 12.

12. Turn the ignition switch OFF.
13. Disconnect the ECM connector E (31P) connector.

14. Check for continuity between EPS control unit connector C (20P) terminal No. 19 and ECM connector E (31P) terminal No. 26.



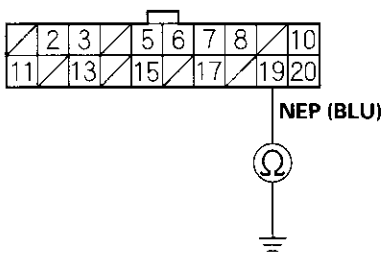
Is there continuity?

YES—Go to step 15.

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

15. Disconnect the gauge assembly 22P connector.

16. Check for continuity between EPS control unit connector C (20P) terminal No. 19 and body ground.



Wire side of female terminals

Is there continuity?

YES—Repair short to body ground in the wire between the EPS control unit, the test tachometer connector, the gauge assembly, and the ECM.■

NO—Check for loose ECM control unit connectors. If necessary, substitute a known-good ECM control unit and recheck.■

DTC 37: EPS Control Unit Internal Circuit (Input Circuit For Motor Voltage)

1. Clear the DTC.

2. Start the engine.

3. Turn the steering wheel from lock-to-lock several times, and wait 10 seconds or more.

   Does the EPS indicator come on?

   YES—Go to step 4.

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

4. Stop the engine, and verify the DTC.

   Is DTC 37 indicated?

   YES—Check for loose EPS control unit connectors. If necessary, substitute a known-good EPS control unit and recheck.■

   NO—Perform the appropriate troubleshooting for the code indicated.■

DTC Troubleshooting (cont'd)

DTC 41: Voltage For Motor

1. Clear the DTC.
2. Start the engine.
3. Turn the steering wheel from lock-to-lock several times, and wait 10 seconds or more.

   Does the EPS indicator come on?

   YES—Go to step 4.

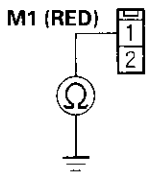
   NO—Check for loose wires or poor connections. If the connections are good, the system is OK at this time.■
4. Stop the engine, and verify the DTC.

   Is DTC 41 indicated?

   YES—Go to step 5.

   NO—Perform the appropriate troubleshooting for the code indicated.■
5. Make sure the ignition switch is OFF, then disconnect EPS control unit connector B (2P) and the motor 2P connector.
6. Check for continuity between EPS control unit connector B (2P) terminal No. 1 and body ground.

   EPS CONTROL UNIT CONNECTOR B (2P)



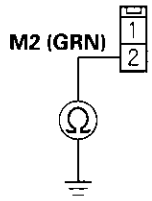
   Wire side of female terminals

   Is there continuity?

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

   NO—Go to step 7.
7. Check for continuity between EPS control unit connector B (2P) terminal No. 2 and body ground.

   EPS CONTROL UNIT CONNECTOR B (2P)



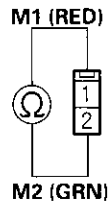
   Wire side of female terminals

   Is there continuity?

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

   NO—Go to step 8.
8. Check for continuity between EPS control unit connector B (2P) terminal No. 1 and No. 2.

   EPS CONTROL UNIT CONNECTOR B (2P)



   Wire side of female terminals

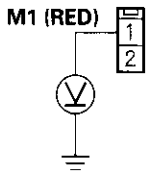
   Is there continuity?

   YES—Repair short between the RED and GRN wires in the motor circuit between the EPS control unit and the motor.■

   NO—Go to step 9.

9. Turn the ignition switch ON (II), and measure the voltage between EPS control unit connector B (2P) terminal No. 1 and body ground.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

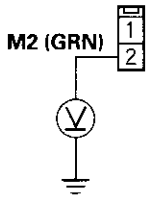
Is there battery voltage?

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

NO—Go to step 10.

10. Measure the voltage between EPS control unit connector B (2P) terminal No. 2 and body ground.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

Is there battery voltage?

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

NO—Go to step 11.

11. Turn the ignition switch is OFF.

12. Substitute a known-good EPS control unit, and connect all the disconnected connectors.

13. Start the engine, and turn the steering wheel from lock to lock several times.

Does the EPS indicator come on?

YES—Go to step 14.

NO—Check for loose or poor connections at the EPS control unit and the motor connections. If the connections are good, replace the EPS control unit and recheck.■

14. Stop the engine, and verify the DTC.

Is DTC 41 indicated?

YES—Replace the steering gearbox motor and recheck.■

NO—Perform the appropriate troubleshooting for the code indicated.■

DTC Troubleshooting (cont'd)

DTC 42, 45: Motor Driven Current

1. Clear the DTC.
2. Start the engine.
3. Turn the steering wheel from lock-to-lock several times, and wait 10 seconds or more.

   Does the EPS indicator come on?

   YES—Go to step 4.

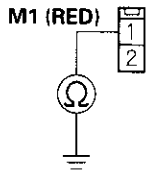
   NO—Check for loose wires or poor connections. If the connections are good, the system is OK at this time.■
4. Stop the engine, and verify the DTC.

   Is DTC 42 or 45 indicated?

   YES—Go to step 5.

   NO—Perform the appropriate troubleshooting for the code indicated.■
5. Make sure the ignition switch is OFF, then disconnect EPS control unit B connector (2P) and the motor 2P connector.
6. Check for continuity between EPS control unit connector B (2P) terminal No. 1 and body ground.

   EPS CONTROL UNIT CONNECTOR B (2P)



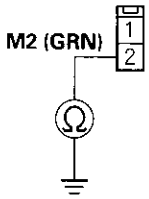
   Wire side of female terminals

   Is there continuity?

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

   NO—Go to step 7.
7. Check for continuity between EPS control unit connector B (2P) terminal No. 2 and body ground.

   EPS CONTROL UNIT CONNECTOR B (2P)



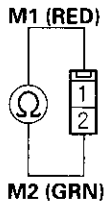
   Wire side of female terminals

   Is there continuity?

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

   NO—Go to step 8.
8. Check for continuity between EPS control unit connector B (2P) terminal No. 1 and No. 2.

   EPS CONTROL UNIT CONNECTOR B (2P)



   Wire side of female terminals

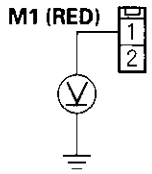
   Is there continuity?

   YES—Repair short between the RED and GRN wires in the motor circuit between the EPS control unit and the motor.■

   NO—Go to step 9.

9. Turn the ignition switch ON (II), and measure the voltage between EPS control unit connector B (2P) terminal No. 1 and body ground.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

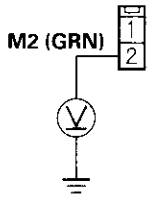
Is there battery voltage?

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

NO—Go to step 10.

10. Measure the voltage between EPS control unit connector B (2P) terminal No. 2 and body ground.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

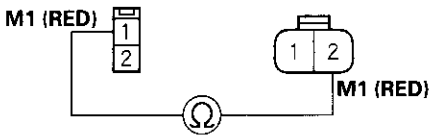
Is there battery voltage?

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

NO—Go to step 11.

11. Check for continuity between EPS control unit connector B (2P) terminal No. 1 and the motor 2P connector terminal No. 2.

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



Wire side of female terminals

Is there continuity?

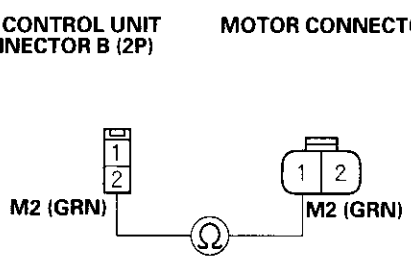
YES—Go to step 12.

NO—Repair open in the RED wire between the EPS control unit and the motor.■

(cont'd)

DTC Troubleshooting (cont'd)

12. Check for continuity between EPS control unit connector B (2P) terminal No. 2 and the motor 2P connector terminal No. 1.



Wire side of female terminals

Is there continuity?

YES—Go to step 13.

NO—Repair open in the GRN wire between the EPS control unit and the motor. ■

13. Check for loose wires or poor connections, if the connections are good, substitute a known-good EPS control unit, and connect all the disconnected connectors.

14. Start the engine, and turn the steering wheel from lock to lock several times.

Does the EPS indicator come on?

YES—Go to step 15.

NO—Check for loose EPS control unit connectors. If necessary, replace the EPS control unit and recheck. ■

15. Stop the engine, and verify the DTC.

Is DTC 42 or 45 indicated?

YES—Replace the steering gearbox motor and recheck. ■

NO—Perform the appropriate troubleshooting for the code indicated. ■

DTC 43: Motor Driven Current is Excessively High

1. Clear the DTC.
2. Start the engine.
3. Turn the steering wheel from lock-to-lock several times, and wait 10 seconds or more.

   Does the EPS indicator come on?

   YES—Go to step 4.

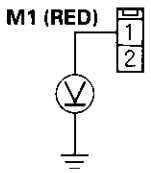
   NO—Check for loose wires or poor connections. If the connections are good, the system is OK at this time.■
4. Stop the engine, and verify the DTC.

   Is DTC 43 indicated?

   YES—Go to step 5.

   NO—Perform the appropriate troubleshooting for the code indicated.■
5. Make sure the ignition switch is OFF, then disconnect EPS control unit connector B (2P) and the motor 2P connector.
6. Turn the ignition switch ON (II).
7. Measure the voltage between EPS control unit connector B (2P) terminal No. 1 and body ground.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

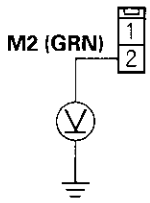
Is there battery voltage?

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

NO—Go to step 8.

8. Measure the voltage between EPS control unit connector B (2P) terminal No. 2 and body ground.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

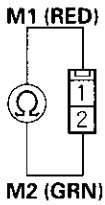
Is there battery voltage?

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

NO—Go to step 9.

9. Turn the ignition switch OFF.
10. Check for continuity between EPS control unit connector B (2P) terminals No. 1 and No. 2.

EPS CONTROL UNIT CONNECTOR B (2P)



Wire side of female terminals

Is there continuity?

YES—Repair short between the GRN and RED wires in the motor circuit between the EPS control unit and the motor.■

NO—Go to step 11.

(cont'd)

DTC Troubleshooting (cont'd)

11. Substitute a known-good EPS control unit, and connect all the disconnected connectors.

12. Start the engine, and turn the steering wheel from lock to lock several times.

    Does the EPS indicator come on?

    YES—Go to step 13.

    NO—Check for loose or poor connections at the EPS control unit and the motor connections. If the connections are good, replace the EPS control unit and recheck.■

13. Stop the engine, and verify the DTC.

    Is DTC 43 indicated?

    YES—Replace the steering gearbox motor and recheck.■

    NO—Perform the appropriate troubleshooting for the code indicated.■

DTC 47: EPS Control Unit Internal Circuit (Power Relay)

1. Clear the DTC.

2. Start the engine.

    Does the EPS indicator come on?

    YES—Go to step 3.

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

3. Stop the engine, and verify the DTC.

    Is DTC 47 indicated?

    YES—Check for loose EPS control unit connectors. If necessary, substitute a known-good EPS control unit and recheck.■

    NO—Perform the appropriate troubleshooting for the code indicated.■

DTC 50: EPS Control Unit Internal Circuit (CPU or Microcomputer)

1. Clear the DTC.
2. Start the engine.

   Does the EPS indicator come on?

   YES—Go to step 3.

   NO—Check for loose wires or poor connections. If the connections are good, the system is OK at this time.■
3. Stop the engine, and verify the DTC.

   Is DTC 50 indicated?

   YES—Check for loose or poor connections at the EPS control unit connections. If the connections are good, substitute a known-good EPS control unit. If the symptom/indication goes away, replace the original EPS control unit.■

   NO—Perform the appropriate troubleshooting for the code indicated.■

DTC 51: EPS Control Unit Internal Circuit (EEPROM)

1. Clear the DTC.
2. Start the engine.

   Does the EPS indicator come on?

   YES—Go to step 3.

   NO—Check for loose wires or poor connections. If the connections are good, the system is OK at this time.■
3. Stop the engine, and verify the DTC.

   Is DTC 51 indicated?

   YES—Check for loose or poor connections at the EPS control unit connections. If the connections are good, substitute a known-good EPS control unit. If the symptom/indication goes away, replace the original EPS control unit.■

   NO—Perform the appropriate troubleshooting for the code indicated.■

DTC Troubleshooting (cont'd)

DTC 62: EPS Control Unit Internal Circuit (Fail-safe Relay Stuck ON)

1. Clear the DTC.
2. Start the engine.

   Does the EPS indicator come on?

   YES—Go to step 3.

   NO—Check for loose wires or poor connections. If the connections are good, the system is OK at this time.■
3. Stop the engine, and verify the DTC.

   Is DTC 62 indicated?

   YES—Check for loose or poor connections at the EPS control unit. If the connections are good, substitute a known-good EPS control unit. If the symptom/indication goes away, replace the original EPS control unit and recheck.■

   NO—Perform the appropriate troubleshooting for the code indicated.■

DTC 64: Battery Voltage is Excessively Low (Fail-safe Relay Contact Failure and Motor Voltage Fall Off)

1. Clear the DTC.
2. Start the engine.

   Does the EPS indicator come on?

   YES—Go to step 3.

   NO—Check for loose wires or poor connections. If the connections are good, the system is OK at this time.■
3. Stop the engine, and verify the DTC.

   Is DTC 64 indicated?

   YES—Go to step 4.

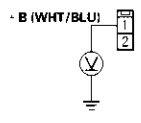
   NO—Perform the appropriate troubleshooting for the code indicated.
4. Check the No. 18 (60A) fuse in the under-hood fuse/relay box, and reinstall the fuse if it is OK.

   Is the fuse OK?

   YES—Go to step 5.

   NO—Replace the fuse and recheck.■
5. Disconnect EPS control unit connector A (2P).
6. Measure the voltage 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 battery voltage?

YES—Check for loose or poor connections at the EPS control unit connectors, and check for a poor ground at G151. If necessary, substitute a known-good EPS control unit and recheck.■

NO—Repair open in the WHT/BLU wire between the No. 18 (60A) fuse and EPS control unit.■

DTC 66, 68: EPS Control Unit Internal Circuit

1. Clear the DTC.
2. Start the engine.
3. Turn the steering wheel from lock-to-lock several times, and wait 10 seconds or more.

   Does the EPS indicator come on?

   YES—Go to step 4.

   NO—Check for loose wires or poor connections. If the connections are good, the system is OK at this time. ■
4. Stop the engine, and verify the DTC.

   Is DTC 66 or 68 indicated?

   YES—Check for loose or poor connections at the EPS control unit. If the connections are good, substitute a known-good EPS control unit. If the symptom/indication goes away, replace the original EPS control unit and recheck. ■

   NO—Perform the appropriate troubleshooting for the code indicated. ■

DTC 67: Torque Sensor I/F Circuit

1. Clear the DTC.
2. Start the engine.
3. Turn the steering wheel from lock-to-lock several times, and wait 10 seconds or more.

   Does the EPS indicator come on?

   YES—Go to step 4.

   NO—Check for loose wires or poor connections. If the connections are good, the system is OK at this time. ■
4. Stop the engine, and verify the DTC.

   Is DTC 67 indicated?

   YES—Check for loose or poor connections at the EPS control unit. If the connections are good, substitute a known-good EPS control unit. If the symptom/indication goes away, replace the original EPS control unit and recheck. ■

   NO—Perform the appropriate troubleshooting for the code indicated. ■

DTC Troubleshooting (cont'd)

DTC 69: EPS Control Unit Internal Circuit

1. Clear the DTC.
2. Start the engine.
3. Turn the steering wheel from lock-to-lock several times, and wait 10 seconds or more.

   Does the EPS indicator come on?

   YES—Go to step 4.

   NO—Check for loose wires or poor connections. If the connections are good, the system is OK at this time.■
4. Stop the engine, and verify the DTC.

   Is DTC 69 indicated?

   YES—Check for loose or poor connections at the EPS control unit. If the connections are good, substitute a known-good EPS control unit. If the symptom/indication goes away, replace the original EPS control unit and recheck.■

   NO—Perform the appropriate troubleshooting for the code indicated.■

EPS Indicator Circuit Troubleshooting

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

   Does the EPS indicator come on?

   YES—If the EPS indicator comes on and goes off, it's OK. If the EPS indicator stays on or blinks, go to step 12.

   NO—Go to step 2.

2. Turn the ignition switch OFF, then ON (II) again, and watch the brake system indicator.

   Does the brake system indicator come on?

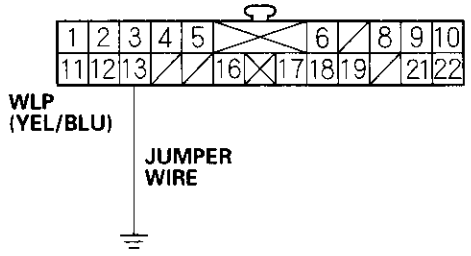
   YES—Go to step 3.

   NO—Repair open in the indicator power source circuit.■
   - Blown No. 10 (7.5A) fuse.
   - Open in the wire between the No. 10 (7.5A) fuse and gauge assembly.
   - Open circuit inside the under-dash fuse/relay box.
   - Faulty gauge assembly.

3. Turn the ignition switch OFF.

4. Connect a jumper wire between the gauge assembly 22P connector terminal No. 13 and body ground, then turn the ignition switch ON (II).

GAUGE ASSEMBLY 22P CONNECTOR (Blue connector)



Wire side of female terminals

Does the EPS indicator come on?

YES—Go to step 5.

NO—Inspect the EPS indicator bulb, if the bulb is OK, replace the bulb circuit board in the gauge assembly.■

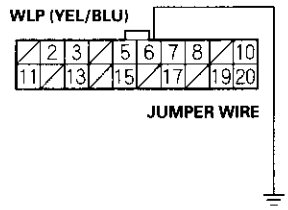
5. Turn the ignition switch OFF.

6. Disconnect EPS control unit connector C (20P).

7. Turn the ignition switch ON (II).

8. Connect EPS control unit connector C (20P) terminal No. 6 to body ground with a jumper wire.

EPS CONTROL UNIT CONNECTOR C (20P)



Wire side of female terminals

Does the EPS indicator come on?

YES—Go to step 9.

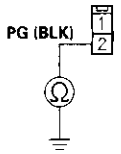
NO—Repair open in the wire between the gauge assembly and the EPS control unit.■

9. Turn the ignition switch OFF.

10. Disconnect EPS control unit connector A (2P).

11. Check for continuity between EPS control unit connector A terminal No. 2 and body ground.

EPS CONTROL UNIT CONNECTOR A (2P)



Wire side of female terminals

Is there continuity?

YES—Check for loose or poor connections at the EPS control unit. If the connections are good, substitute a known-good EPS control unit. If the symptom/indication goes away, replace the original EPS control unit and recheck.■

NO—Repair open in the wire or a bad ground at G151.■

(cont'd)

EPS Indicator Circuit Troubleshooting (cont'd)

12. Turn the ignition switch OFF.
13. Disconnect EPS control unit connector C (20P).
14. Turn the ignition switch ON (II).

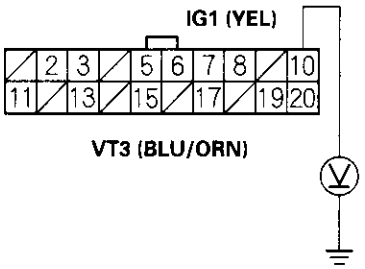
    Does the EPS indicator come on?

    YES—Repair short to ground in the YEL/BLU wire between the gauge assembly and the EPS control unit, or replace the bulb circuit board in the gauge assembly.■

    NO—Go to step 15.

15. Measure the voltage between EPS control unit connector C (20P) terminal No. 10 and body ground.

EPS CONTROL UNIT CONNECTOR C (20P)



Wire side of female terminals

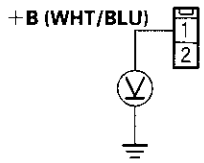
Is there battery voltage?

YES—Go to step 16.

NO—Repair open in the wire between EPS control unit connector C (20P) and the No. 10 (7.5A) fuse.■

16. Measure the voltage between EPS control unit connector A (2P) terminal No. 1 and body ground.

EPS CONTROL UNIT CONNECTOR A (2P)



Wire side of female terminals

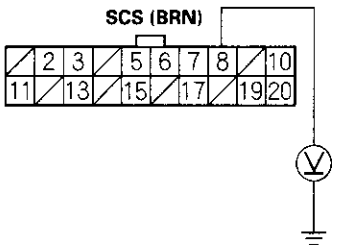
Is there battery voltage?

YES—Go to step 17.

NO—Check for a blown No. 18 (60A) fuse in the under-hood fuse/relay box or open/short in the WHT/BLU wire between the under-hood fuse/relay box and the EPS control unit.■

17. Turn the ignition switch OFF.
18. Reconnect EPS control unit connector A (2P).
19. Turn the ignition switch ON (II).
20. Measure the voltage between EPS control unit connector C (20P) terminal No. 8 and body ground.

EPS CONTROL UNIT CONNECTOR C (20P)



Wire side of female terminals

Is there about 10 V?

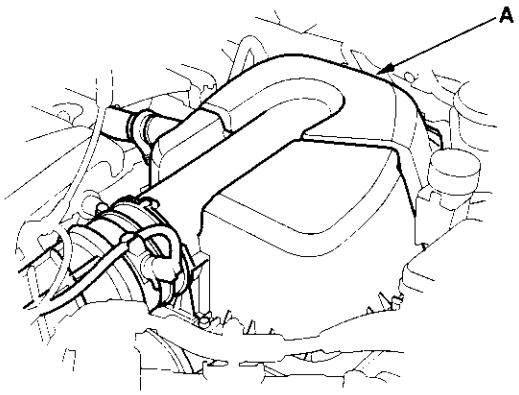
YES—Check for loose or poor connections at the EPS control unit. If the connections are good, substitute a known-good EPS control unit. If the symptom/indication goes away, replace the original EPS control unit and recheck.■

NO—Repair short to ground in the BRN wire between the data link connector and the EPS control unit.■

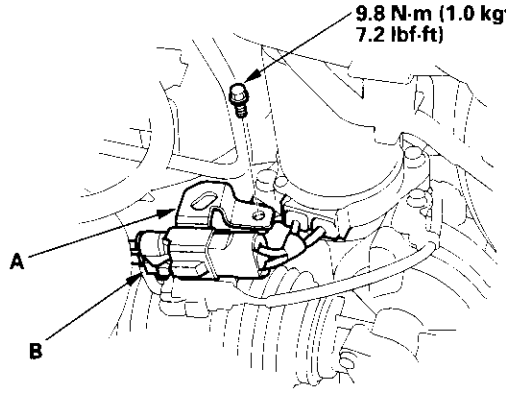
Motor Removal/Installation

Removal

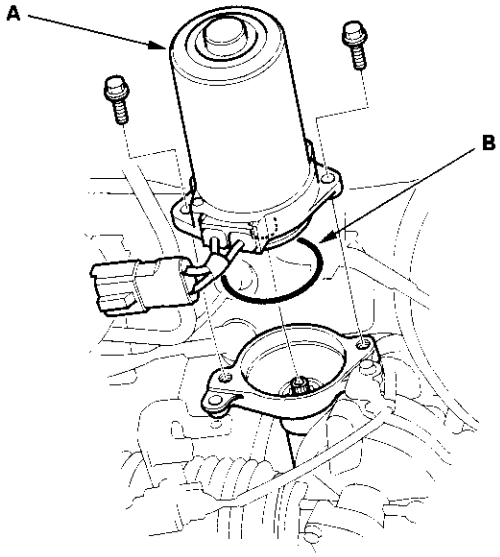
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the preset buttons.
2. Disconnect the negative cable from the battery, and wait 3 minutes before beginning work.
3. Remove the air cleaner assembly (A).



4. Remove the connector bracket (A) on the gearbox housing, and disconnect the motor 2P connector (B).



5. Remove the motor (A) from the gearbox housing.



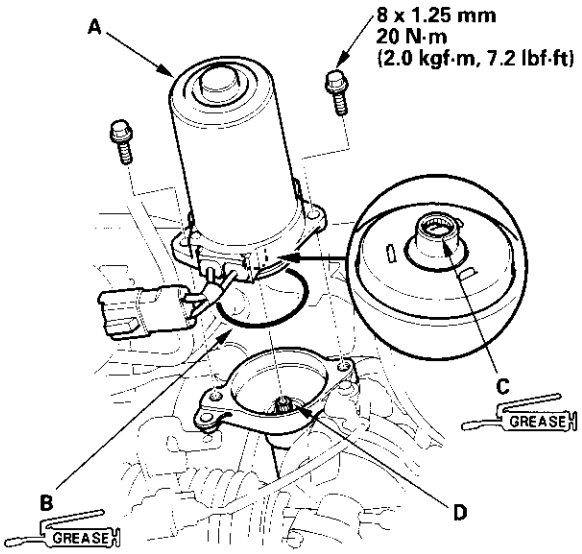
6. Remove the O-ring (B) and discard it.

(cont'd)

Motor Removal/Installation (cont'd)

Installation

7. Clean the mating surface of the motor (A) and gearbox.



8. Apply a thin coat of silicone grease (P/N 08733-B070E) to the new O-ring (B), and carefully fit it on the motor.

9. Apply grease (Nippon Grease WR-S or equivalent steering gear grease) into the motor shaft (C).

10. Install the motor on the gearbox by engaging the motor shaft and worm shaft (D). Note the motor installation position (direction of motor wires).

11. Before tightening the bolts, turn the motor two or three times right and left about 45 degrees. Make sure the motor is evenly seated on the steering gearbox and that the O-ring is not pinched between the mating surfaces.

12. Install the removed parts in the reverse order of removal, and note these items:

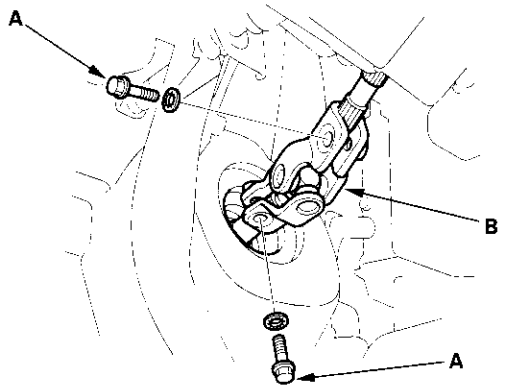
    - Make sure the motor 2P connector is properly connected.
    - Make sure the motor and EPS wires are not caught or pinched by any parts.
    - Reconnect the negative cable to the battery.
    - Do the engine control module (ECM) idle learn procedure (see page 11-139).
    - Enter the anti-theft code for the radio station presets. Reset the clock.
    - Do the power window control unit reset procedure (see page 22-128).

13. 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.

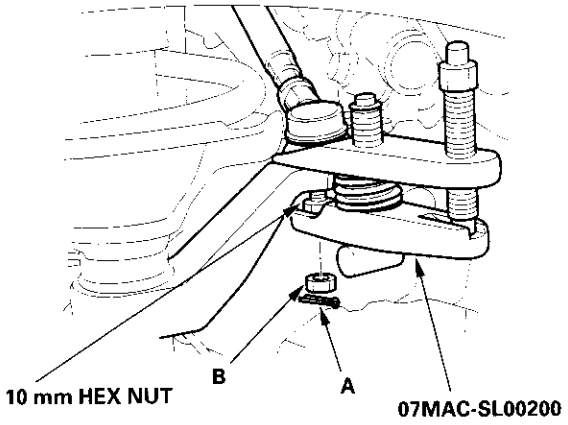
Steering Gearbox Removal

Special Tool Required
Ball joint remover, 28 mm 07MAC-SL00200

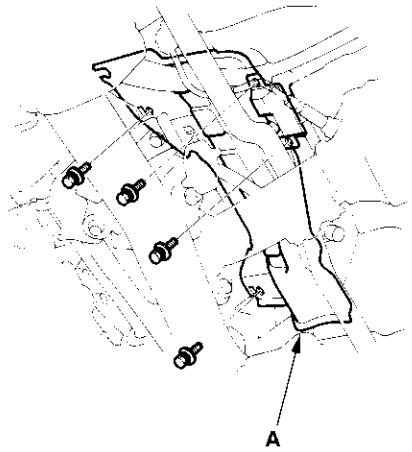
1. Raise the front of vehicle, and make sure it is securely supported.
2. Remove the front wheels.
3. Remove the driver's airbag (see page 23-113).
4. Remove the steering wheel (see page 17-6).
5. Remove the motor on the steering gearbox (see page 17-49).
6. Remove the driver's dashboard lower cover (see page 20-59) and under cover (see page 20-60).
7. Remove the steering joint bolts (A), and disconnect the steering joint by moving the steering joint (B) toward the column.



8. Remove the cotter pin (A) from the tie-rod ball joint nut (B), and loosen the nut.



9. Separate the tie-rod ball joint and damper steering arm using the special tool (see page 18-10). Repeat on the other side of the vehicle.
10. Grasp the right side tie-rod, and pull the rack all the way to the passenger's side.
11. Remove the heat shield (A) mounting bolts from the body stiffener, and let the heat shield lay against the exhaust.



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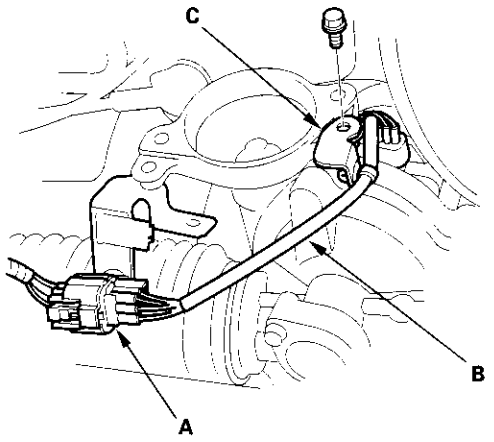
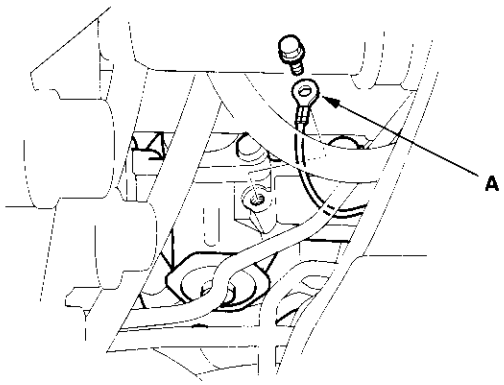
Steering Gearbox Removal (cont'd)

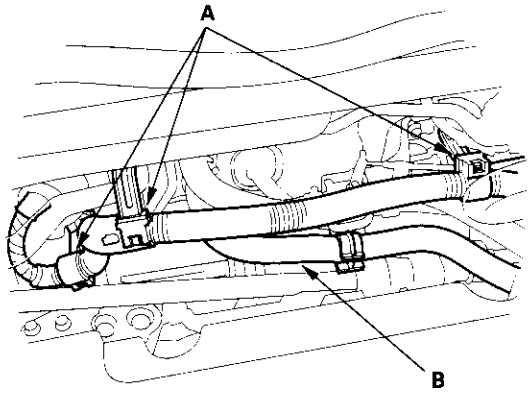
12. Disconnect the EPS wire harness 6P connector (A), and remove the EPS wire harness (B) and mounting bracket (C).



13. Remove the ground cable terminal (A) from the steering gearbox housing.

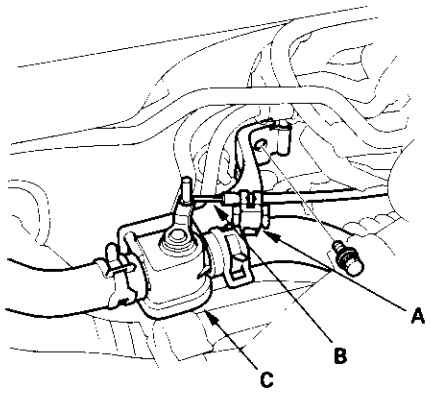


14. Remove the engine wire harness clamps (A) from the three mounting brackets.

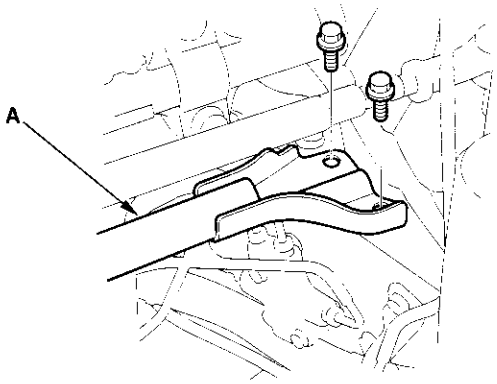


15. Remove the heater hose (B) from the bracket.

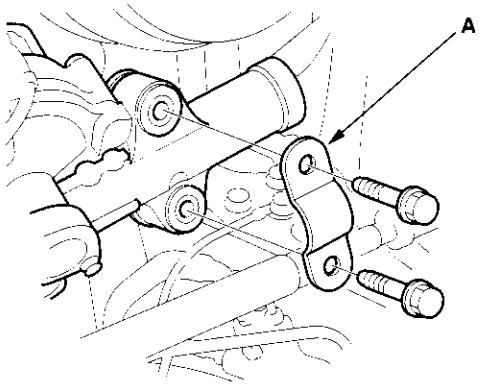
16. Open the heater valve cable clamp (A), and disconnect the heater valve cable (B). Remove the heater valve (C) from the bulkhead, and move it aside.



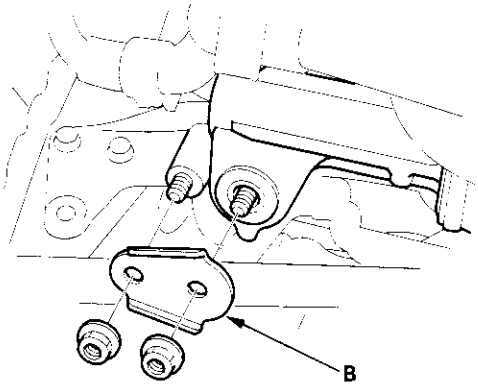
17. Remove the body stiffener (A).



18. Remove the steering stiffener A from the left side of the steering gearbox.

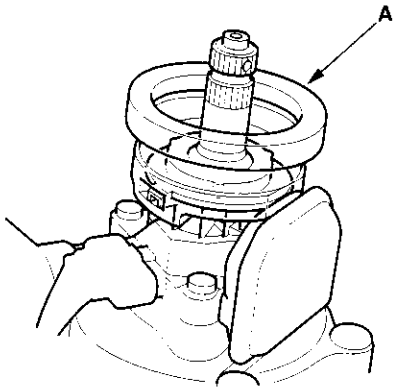


19. Remove the steering stiffener B from the right side of the steering gearbox.



20. Lower the steering gearbox, and rotate it so the pinion shaft points upward.

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

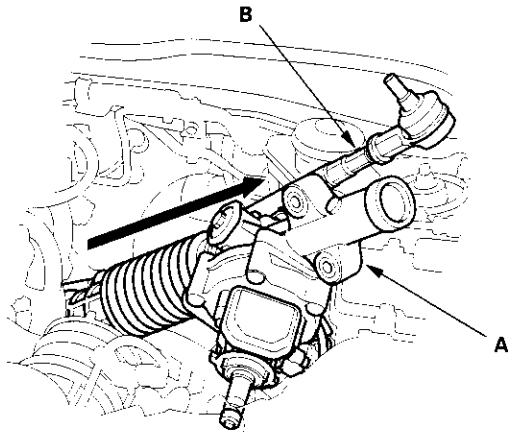


(cont'd)

Steering Gearbox Removal (cont'd)

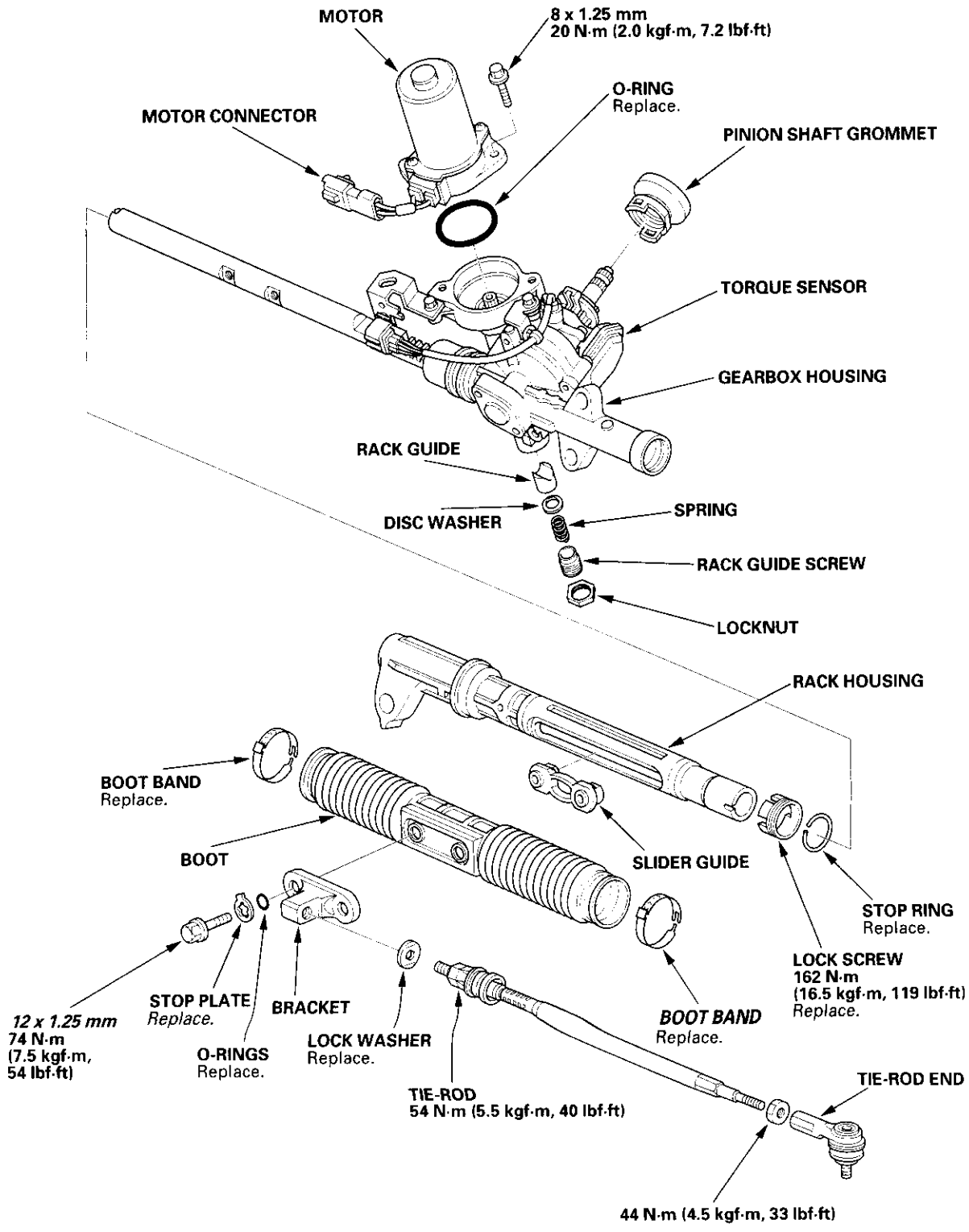
22. Move the steering gearbox and tie-rod ends as an assembly to the wheelwell opening on the passenger's side.

23. Carefully raise the driver's side (pinion side) of the steering gearbox (A) and tie-rod (B) until clears the master cylinder and under-hood fuse relay box, then remove the steering gearbox. Be careful not to damage the hoses, lines and wire harnesses.



Steering Gearbox Overhaul

Exploded View



(cont'd)

Steering Gearbox Overhaul (cont'd)

Special Tools Required
- Locknut wrench 07ZAA-S5A0100
- Pincers, Oetiker 1098 or equivalent, commercially available.

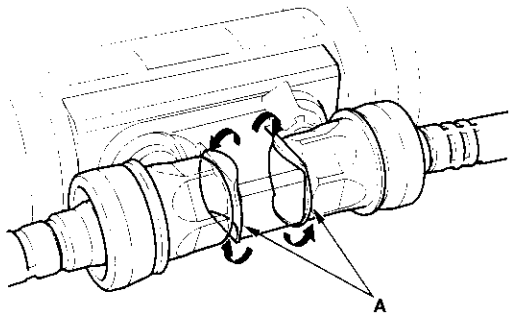
NOTE:
- Refer to the Exploded View as needed during this procedure.
- Do not allow dust, dirt, or other foreign materials to enter into the steering gearbox.

Removal

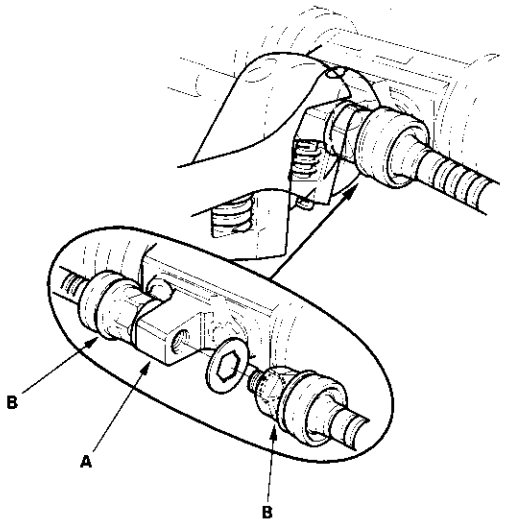
1. Remove the steering gearbox (see page 17-51).

Disassembly

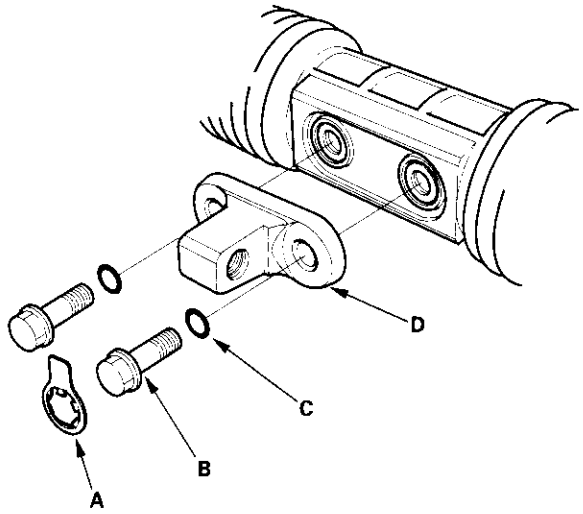
2. Unbend the lock washer (A).



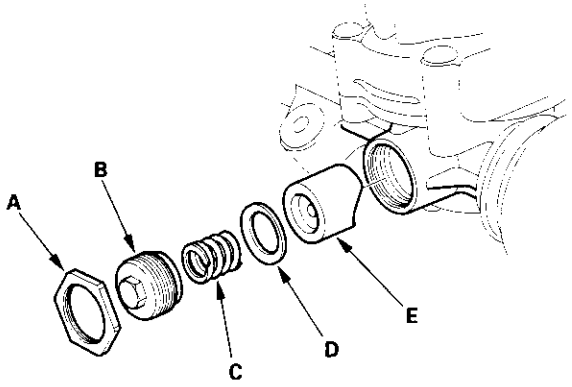
3. Hold the bracket (A) with one wrench, and unscrew both tie-rod ends (B) with another wrench. Remove the lock washers.



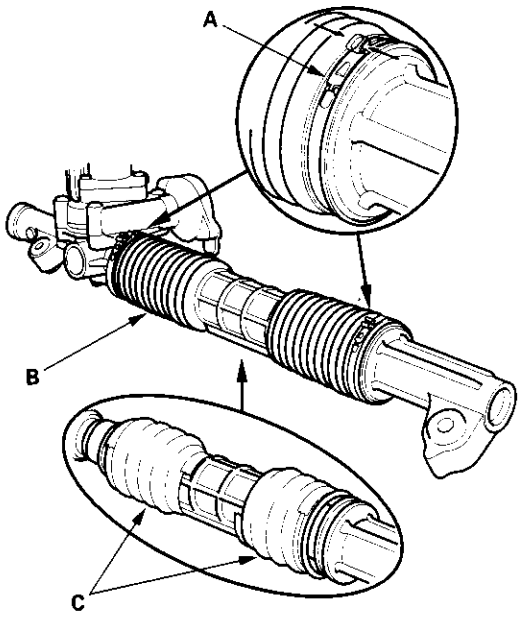
4. Remove the stop plate (A), the 12 mm flange bolts (B), the O-rings (C), and the bracket (D) from the steering gearbox.



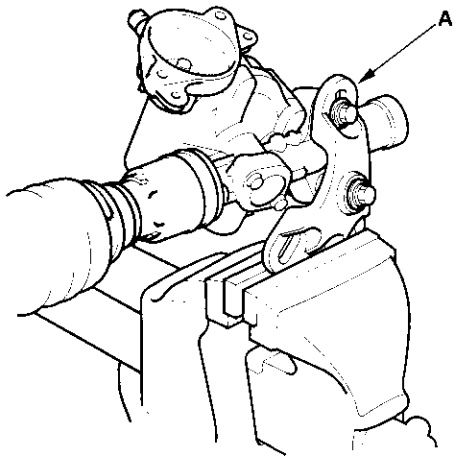
5. Loosen the locknut (A), then remove the rack guide screw (B), spring (C), disc washer (D), and rack guide (E) from the steering gearbox.



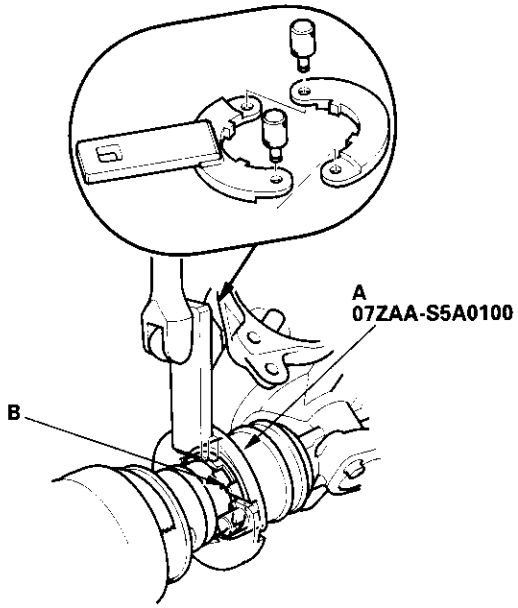
6. Remove the two boot bands (A) from boot (B). Compress the boot by hand, and apply vinyl tape (C) so the boot ends stay collapsed and pulled back.



7. Attach the yoke (A) of a universal puller to the steering gearbox mounts with bolts. Securely clamp the yoke in a vise as shown. Do not clamp the steering gearbox housing in the vise.

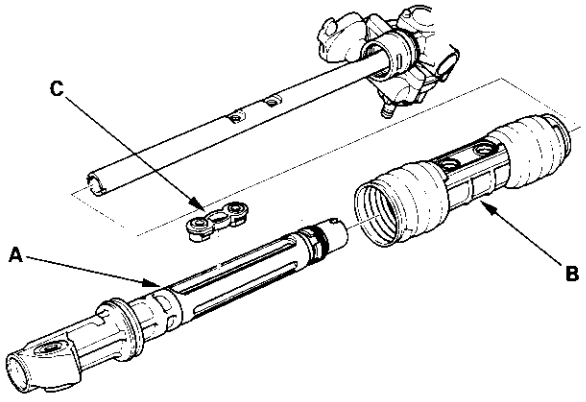


8. Install the special tool (A) on the lock screw (B) securely, then loosen and remove the lock screw from the steering gearbox housing.



9. Remove the special tool.

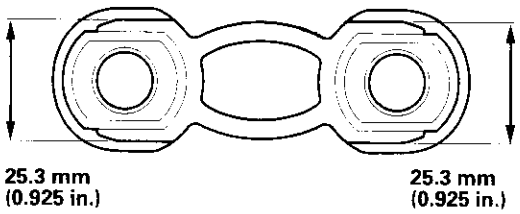
10. Pull on the rack housing (A) to remove it from the steering gearbox housing. Remove the boot (B) and slider guide (C) from the cylinder.



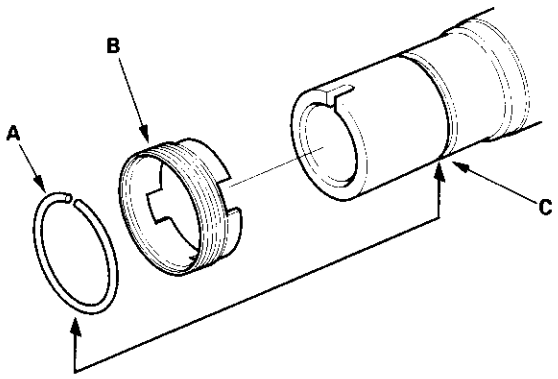
(cont'd)

Steering Gearbox Overhaul (cont'd)

11. Check the slider guide for damage and cracks. Using vernier calipers to measure the thickness of the slider guide. If the thickness is less than service limit, replace the slider guide.



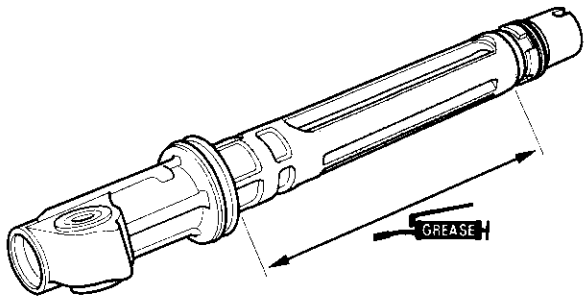
12. Remove and discard the stop ring (A) on the cylinder by expanding it with snap ring pliers. Remove and discard the lock screw (B).



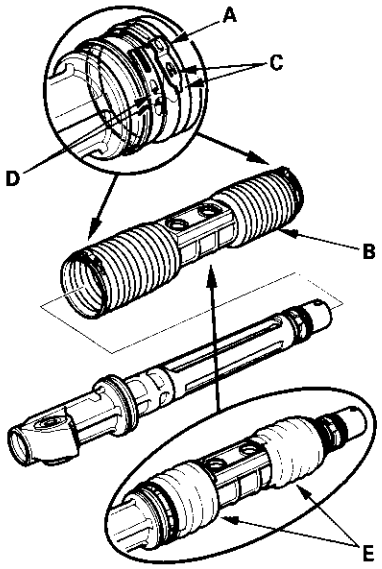
13. Install the new lock screw on the rack housing.

14. Install the new stop ring in the groove (C) on the cylinder by expanding it with a snap ring pliers. Be careful not to scratch or damage the housing surface with the stop ring edges.

15. Apply multipurpose grease to the indicated part (shaded part) of the outer surface of the rack housing. Do not apply to the dents and grooves.

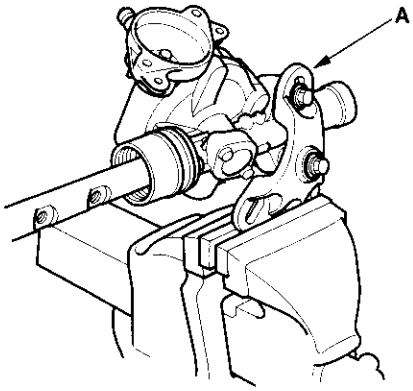


16. Set the new boot bands (A) on the band installation grooves of the boot (B) by aligning the tabs (C) with the holes (D) of the band. Do not close the ear of the boot band in this step.

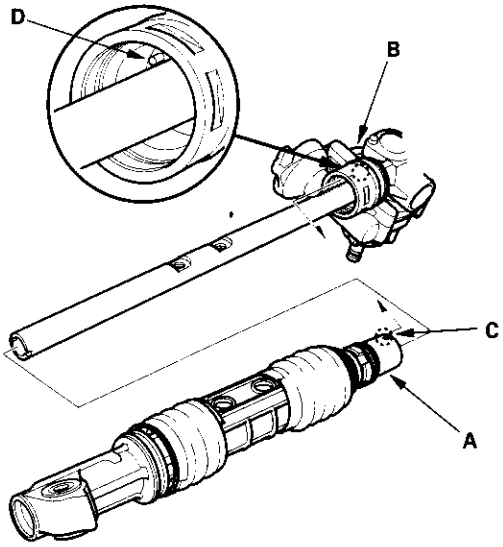


17. Compress the boot by hand, and apply vinyl tape (E) to the bellows so the boot ends stay collapsed and pulled back.
Pass the boot over the rack housing so the smaller diameter end of the boot faces the steering gearbox housing.

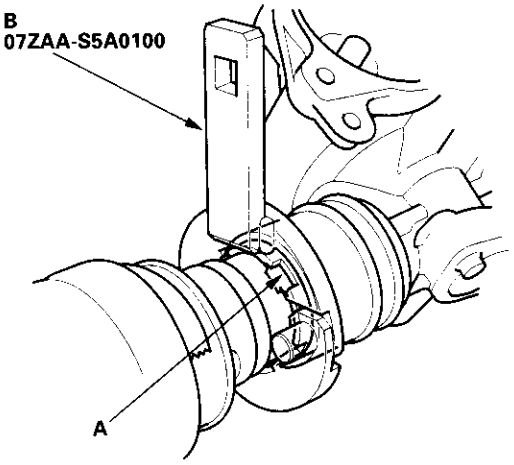
18. Attach the yoke (A) of a universal puller to the gearbox housing mounts with bolts, then securely clamp the yoke in a vise as shown. Do not clamp the steering gearbox housing in a vise.



19. Push the rack housing (A) into the steering gearbox housing (B) so the notch (C) is aligned with the pin (D) on the bottom of the gearbox housing inside.



20. Tighten the lock screw (A) by hand first, then install the special tool (B) on the lock screw. Lightly tighten the lock screw. Do not tighten the lock screw to the specified torque yet.

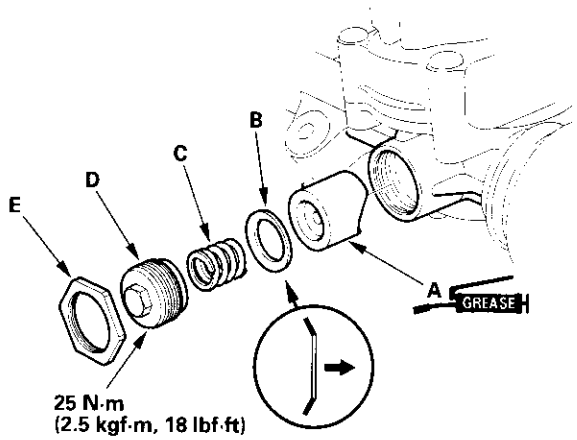


21. Remove the special tool.

(cont'd)

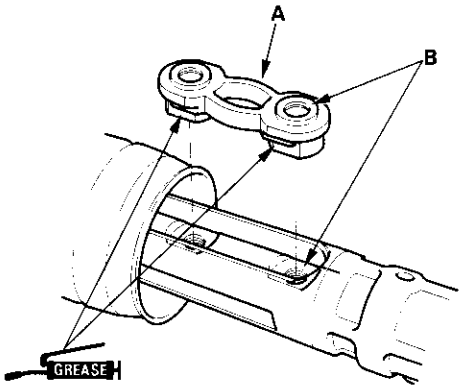
Steering Gearbox Overhaul (cont'd)

22. Apply multipurpose grease to the sliding surface and circumference of the rack guide (A), and install it onto the gearbox housing. Wipe the grease off the threaded section of the housing.

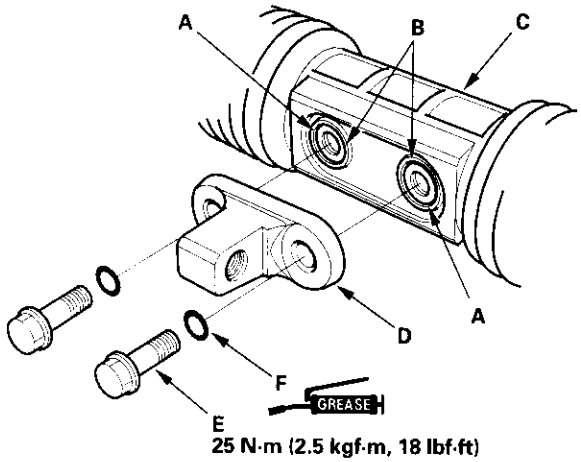


23. Install the disc washer (B) with its convex side facing the rack guide. Install the spring (C). Apply sealant to the middle of the threads on the rack guide screw (D), then install and tighten it to 25 N·m (2.5 kgf·m, 18 lbf·ft). Loosely install the locknut (E).

24. Apply multipurpose grease to the sliding surface of the slider guide (A). Keep grease off of the rack-to-slider guide mating surfaces and the boot-to-slider guide mating surfaces.
Slide the steering rack all the way to left, and place the slider guide on the steering rack by aligning the bolt holes (B).



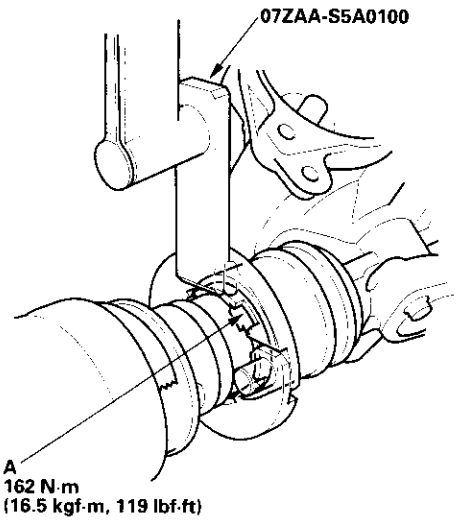
25. Center the steering rack within its stroke, and align the slider guide (A) with the holes (B) in the boot (C). Fit the slider guide to the boot by pressing around the edges of the holes securely.



26. Before installing the bracket (D), clean the mating surface of the 12 mm flange bolts (E) and the bracket. Coat the new O-rings (F) with multipurpose grease, and install them on the 12 mm flange bolts.

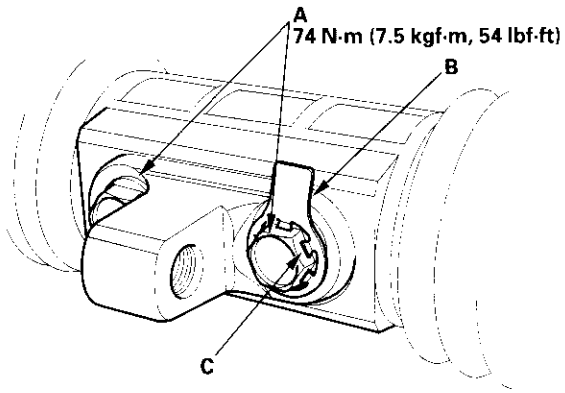
27. Loosely install the bracket on the steering rack by tightening the 12 mm flange bolts to 25 N·m (2.5 kgf·m, 18 lbf·ft).

28. Hold the gearbox housing using a yoke, then install the special tool on the lock screw (A). Retighten the lock screw to the specified torque values.



29. Remove the special tool.

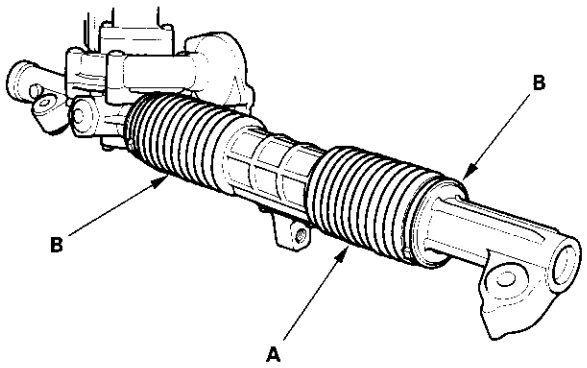
30. Retighten the 12 mm flange bolts (A) to the specified torque value.



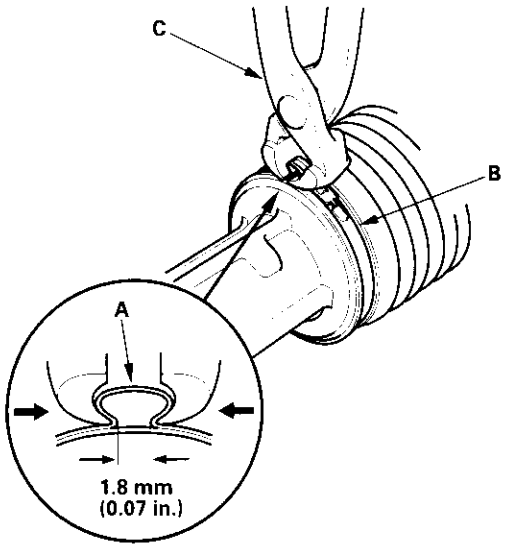
31. After tightening the 12 mm flange bolts, install a new stop plate (B) over one of the bolt heads. Be sure the tabs (C) of the stop plate are aligned with the flat surfaces of the bolt head.

32. Clean off any grease or contamination from the boot installation grooves on the housing.

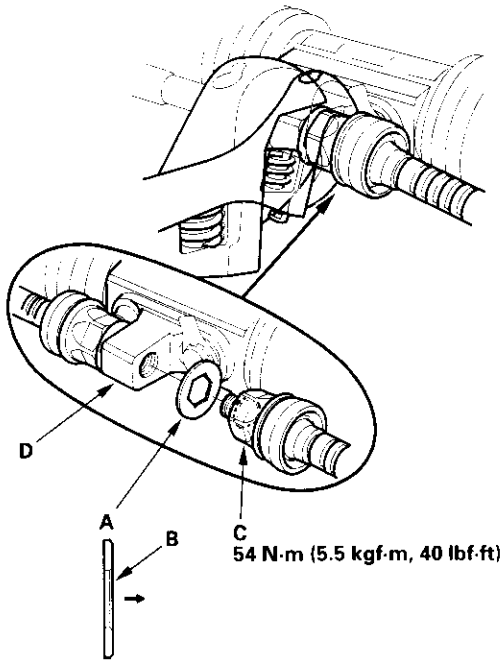
33. Expand the boot (A) by removing the vinyl tape, and fit the boot ends (B) in the installation grooves on the cylinder housing.



34. Close the ear portion (A) of the bands (B) with commercially available pincers, Oetiker 1098 or equivalent (C).



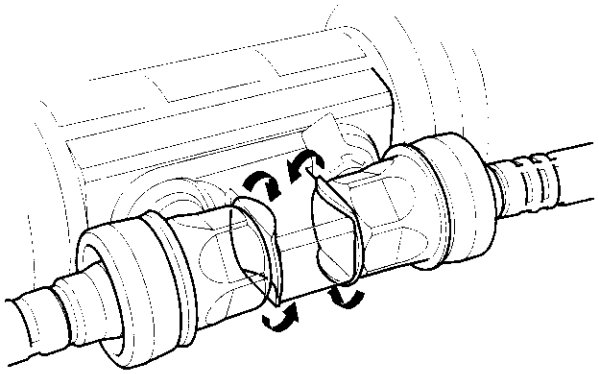
35. Install the new lock washer (A) with its radiused side facing (B) the tie-rod (C), and screw the tie-rod on the bracket (D). Repeat this step for the other side of the tie-rod. Hold the bracket with one wrench, and tighten the tie-rods to the specified torque with another wrench.



(cont'd)

Steering Gearbox Overhaul (cont'd)

36. Bend the lock washer against the flat spots on the bracket with a large pair of pliers.



37. Adjust the rack guide screw (see page 17-13).

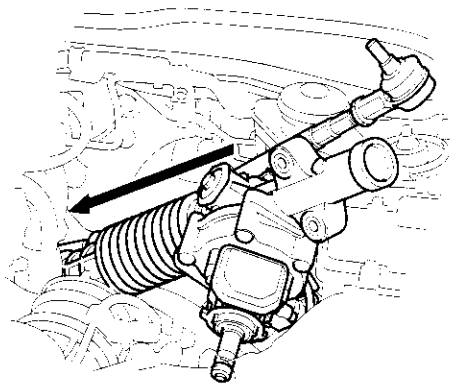
Steering Gearbox Installation

1. Before installing the steering gearbox, slide the rack all the way to the passenger's side (right direction).

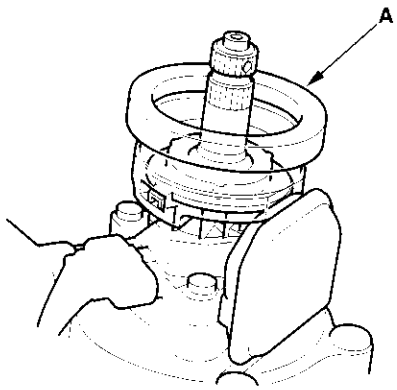
2. Pass the right side of the steering gearbox together with the tie-rods through the wheelwell opening on the passenger's side. Continue moving the steering gearbox toward the passenger's side until the driver's side tie-rod end and gearbox clears the master cylinder and under-hood fuse relay box. Lower the steering gearbox, and move it toward the driver's side until the steering gearbox is in position.

NOTICE

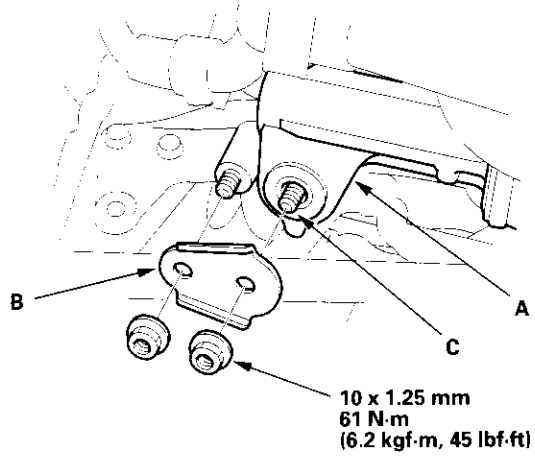
Be careful not to damage the hoses, lines and wire harnesses.



3. Install the pinion shaft grommet (A).

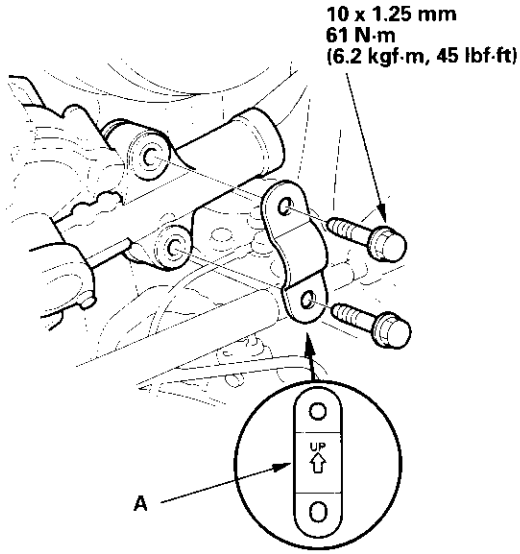


4. Insert the pinion shaft up through the bulkhead, then slip the right side of the steering gearbox housing (A) over the mounting stud (C) on the gearbox mounting bracket.



5. Install the steering stiffener B, and lightly tighten the steering gearbox mounting nuts.

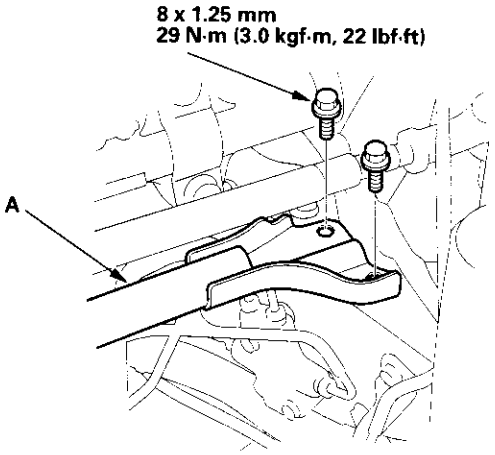
6. Install the steering stiffener A with the gearbox mounting bolts. Then tighten all the steering gearbox mounting hardware to the specified torque.



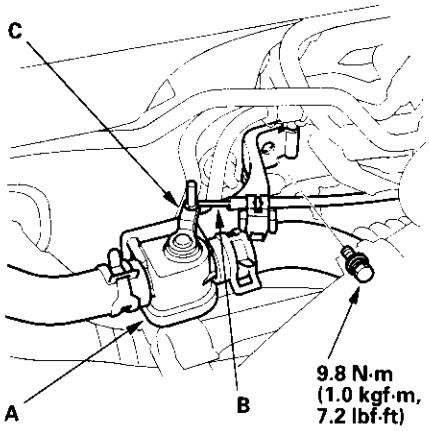
(cont'd)

Steering Gearbox Installation (cont'd)

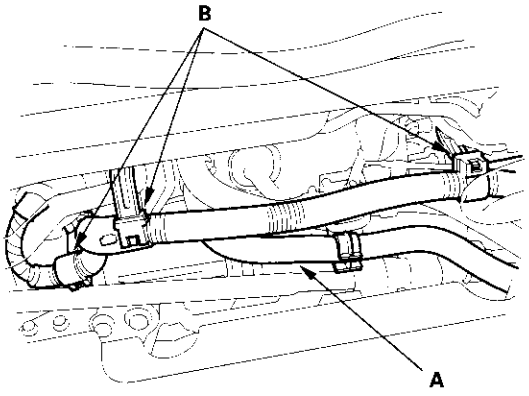
7. Install the body stiffener (A), and torque the mounting bolts to the specified torque.



8. Install the heater valve (A) on the bulkhead, and connect the heater valve cable end (B) to the heater valve arm (C). Readjust the heater valve cable (see page 21-46).

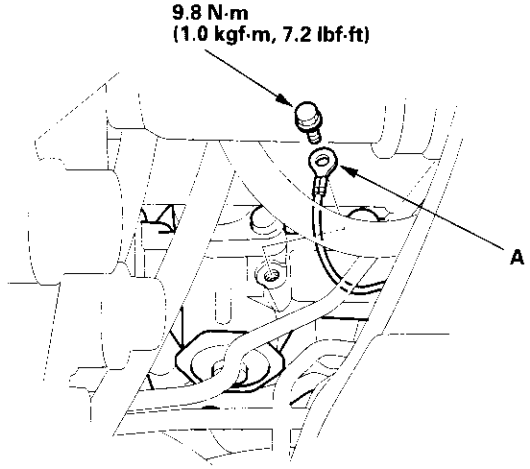


9. Reinstall the heater hose (A) on the hose bracket.

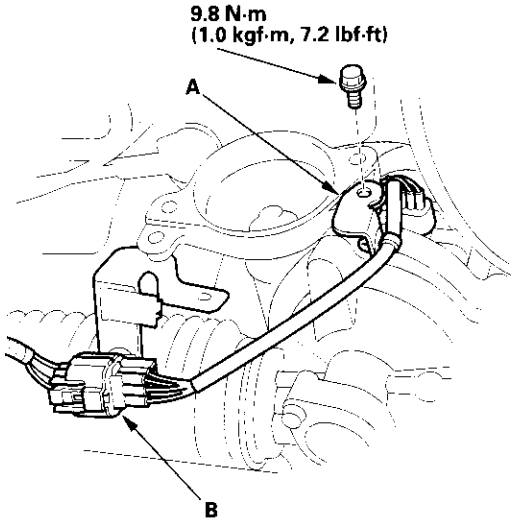


10. Install the engine wire harness clamps (B) to the three harness brackets.

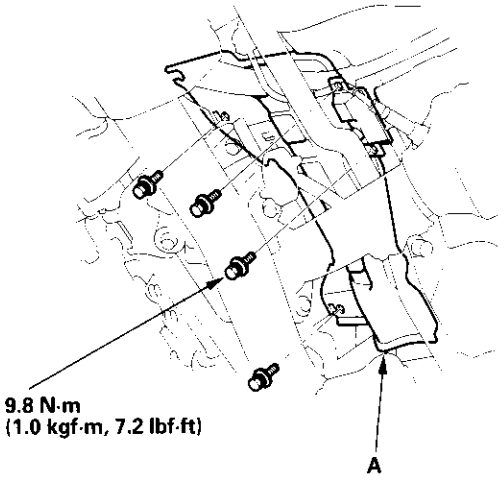
11. Under the steering gearbox, install the ground cable terminal (A) on the steering gearbox housing.



12. Install the EPS wire harness bracket (A) on the gearbox housing, and connect the 6P connector (B) properly.

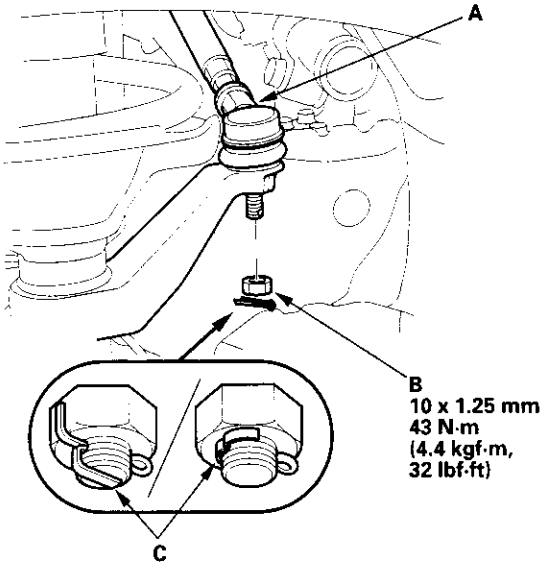


13. Install the heat shield (A).



14. Center the steering rack within its stroke.

15. Wipe off any grease contamination from the ball joint tapered section and threads. Then reconnect the tie-rod ends (A) to the damper steering arms. Install the ball joint nut (B) and tighten them.



16. Install the new cotter pins (C), and bend them as shown.

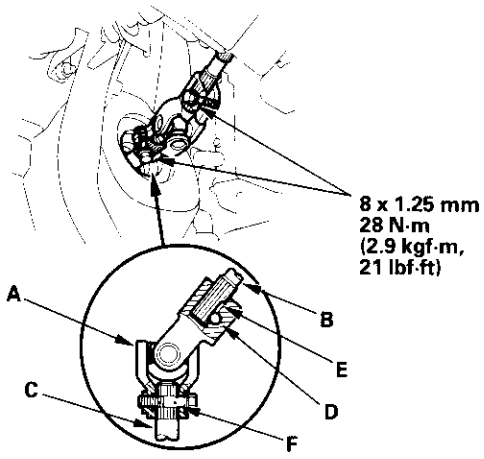
(cont'd)

Steering Gearbox Installation (cont'd)

17. Install the motor on the steering gearbox (see page 17-49).

18. Install the steering joint (A), and reconnect the steering shaft (B) and pinion shaft (C). Make sure the steering joint is connected as follows:

    - Insert the upper end of the steering joint onto the steering shaft (line up the bolt hole (D) with the flat portion (E) on the shaft).
    - Slip the lower end of the steering joint onto the pinion shaft (line up the bolt hole with the groove (F) around the shaft), and loosely install the lower joint bolt. Be sure that the lower 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. Then install the upper joint bolt, and tighten it to the specified torque. Tighten the lower joint bolt to the specified torque.



19. Install the driver's dashboard lower cover (see page 20-59) and under cover (see page 20-60).

20. If the steering wheel was turned, center the cable reel by first rotating it clockwise until it stops. Then rotate it counterclockwise (about two and half turns) until the arrow mark on the label points straight up. Reinstall the steering wheel (see page 17-8).

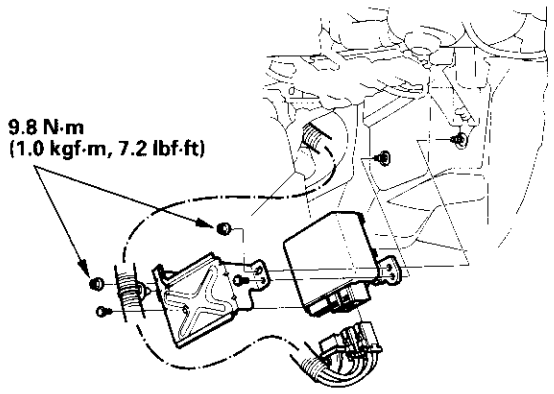
21. Install the front wheels.

22. After installation, perform the following checks.

    - Perform the front toe inspection.
    - 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 serrations, then adjust the front toe by turning the tie-rods, if necessary.

EPS Control Unit Removal/ Installation

1. Remove the passenger's under panel.
2. Turn up the floor carpet, remove the EPS control unit.

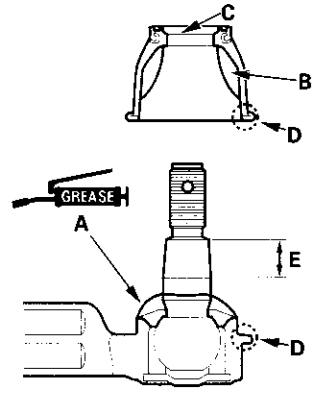


3. Disconnect the EPS control unit connectors.
4. Install the EPS control unit in the reverse order of removal.
5. After installation, start the engine, and let it idle. Turn the steering wheel from lock-to-lock several times. Check that the EPS indicator does not come on.

Tie-rod Ball Joint Boot Replacement

Special Tool Required
Attachment, 42 mm 07QAD-P0A0100

1. Remove the boot from the tie-rod end, and wipe the old grease off the ball pin.
2. Pack the lower area of the ball pin (A) with fresh multipurpose grease.



3. Pack the interior of the new boot (B) and lip (C) with fresh multipurpose grease.

   Note these items when installing new grease:

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

4. Install the new boot (A) using the special tool. 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.