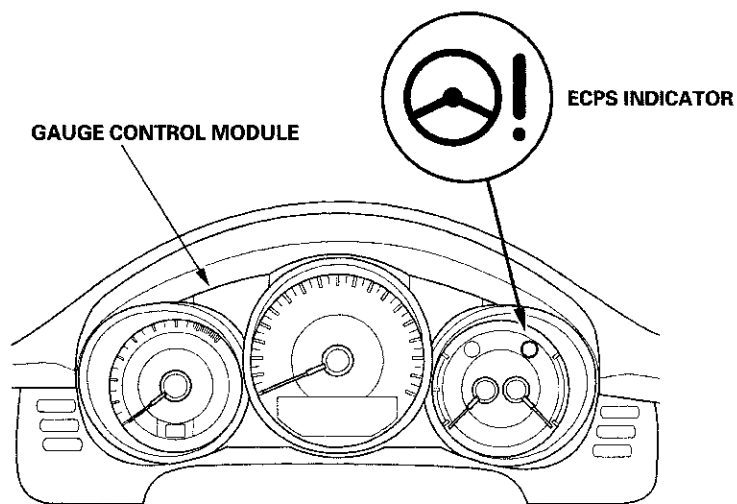
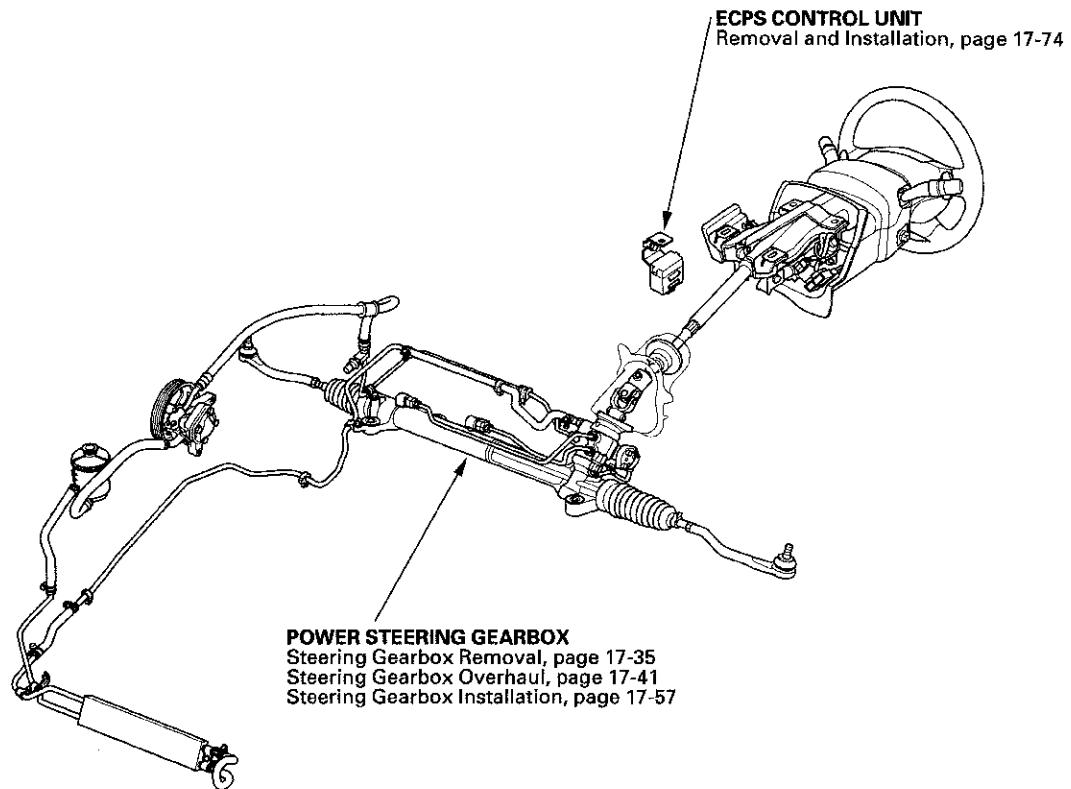


Electronically Controlled Power Steering System



Component Location Index

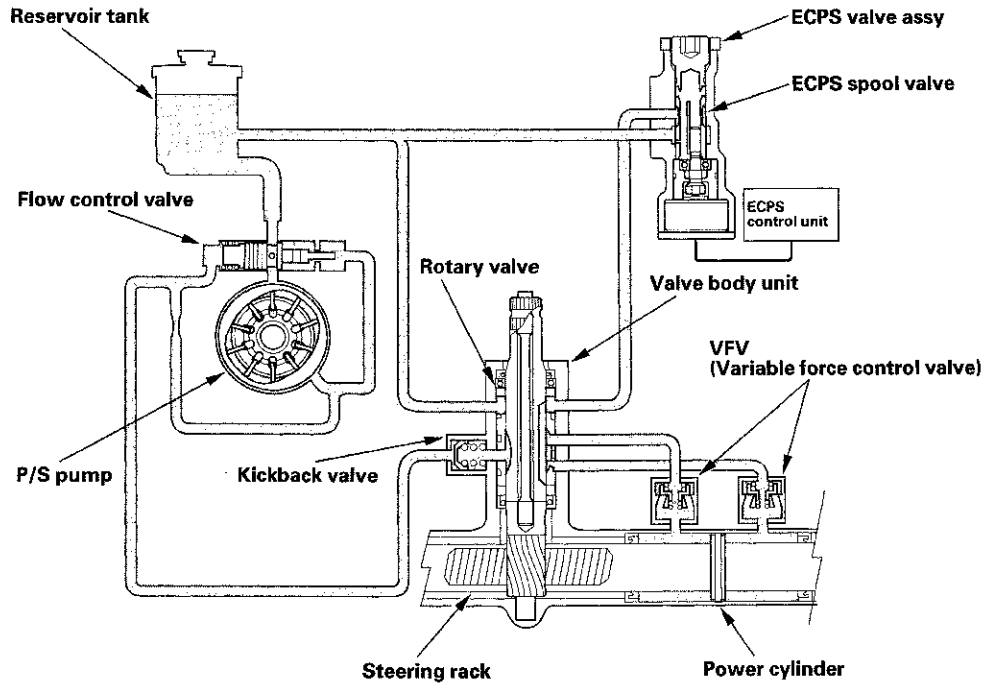


Electronically Controlled Power Steering System

System Description

System Outline

This vehicle is equipped with an Electronically Controlled Power Steering System (ECPS). Depending on the vehicle speed, the ECPS control unit controls the ECPS valve. The ECPS valve changes the P/S fluid pressure of the pressure side of the power cylinder. By controlling the P/S fluid pressure electrically, it made it possible to supply stable P/S fluid pressure to the power cylinder which ensures that the steering feel is not influenced by the fluctuation of the engine's speed, and corresponds to the driving situation.



Flow control valve

This valve stabilizes the P/S fluid pressure of the power steering pump output.

ECPS valve assembly

The spool valve built in the ECPS valve assembly is operated by the stepping motor which is controlled by the ECPS control unit. It changes the P/S fluid pressure to the power cylinder. When this valve closes, the pressure to the power cylinder increases.

Valve body unit

The rotary valve built in the valve body unit is driven by the rotation of the steering wheel. This changes the fluid passage between the power steering pump side, power cylinder side, reservoir side, and the ECPS valve side.

Kickback valve

When kickback occurs from the from steering rack, the kickback valve in the feed port decreases the kickback to the steering wheel.

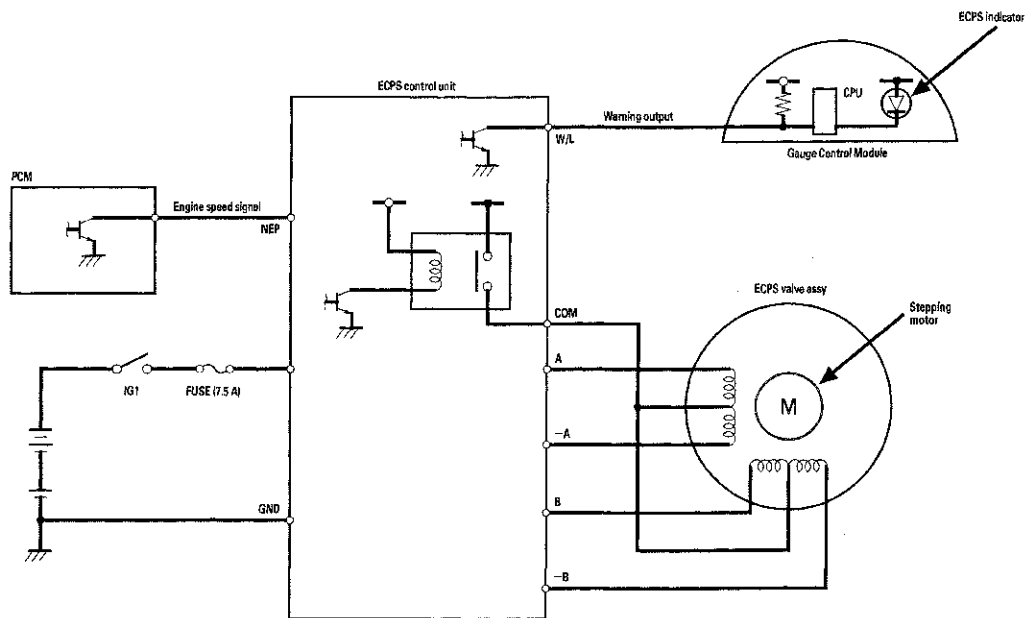
VFV (Variable force control valve)

The valve lessens rapid P/S oil pressure change.



ECPS control unit

The ECPS control unit controls the stepping motor built inside the ECPS valve assembly depending on the engine speed signal and the vehicle speed signal from the PCM. When a failure occurs, this unit stores a DTC and sends a signal to the gauge assembly to turn on the ECPS indicator.



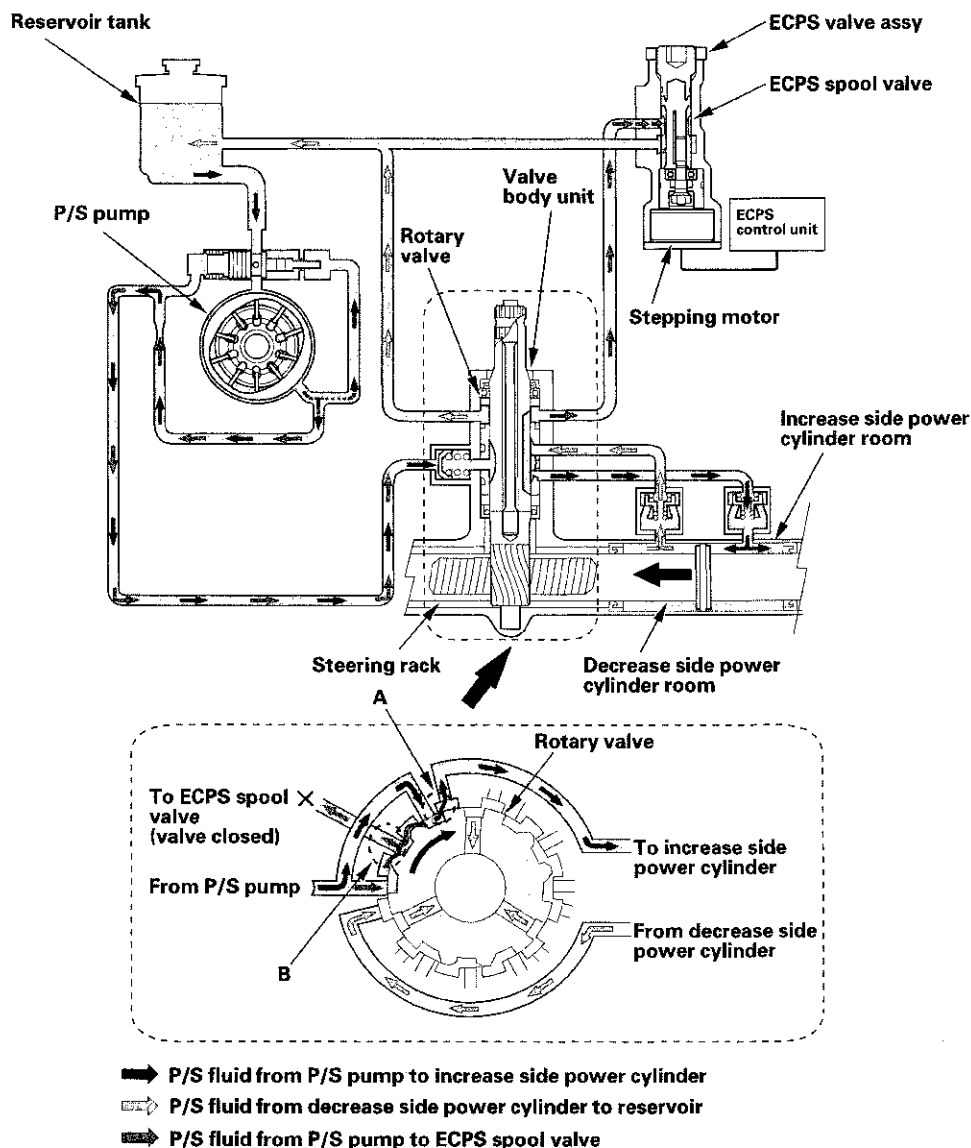
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Electronically Controlled Power Steering System

System Description (cont'd)

Operation when the vehicle is stopped (high assist)

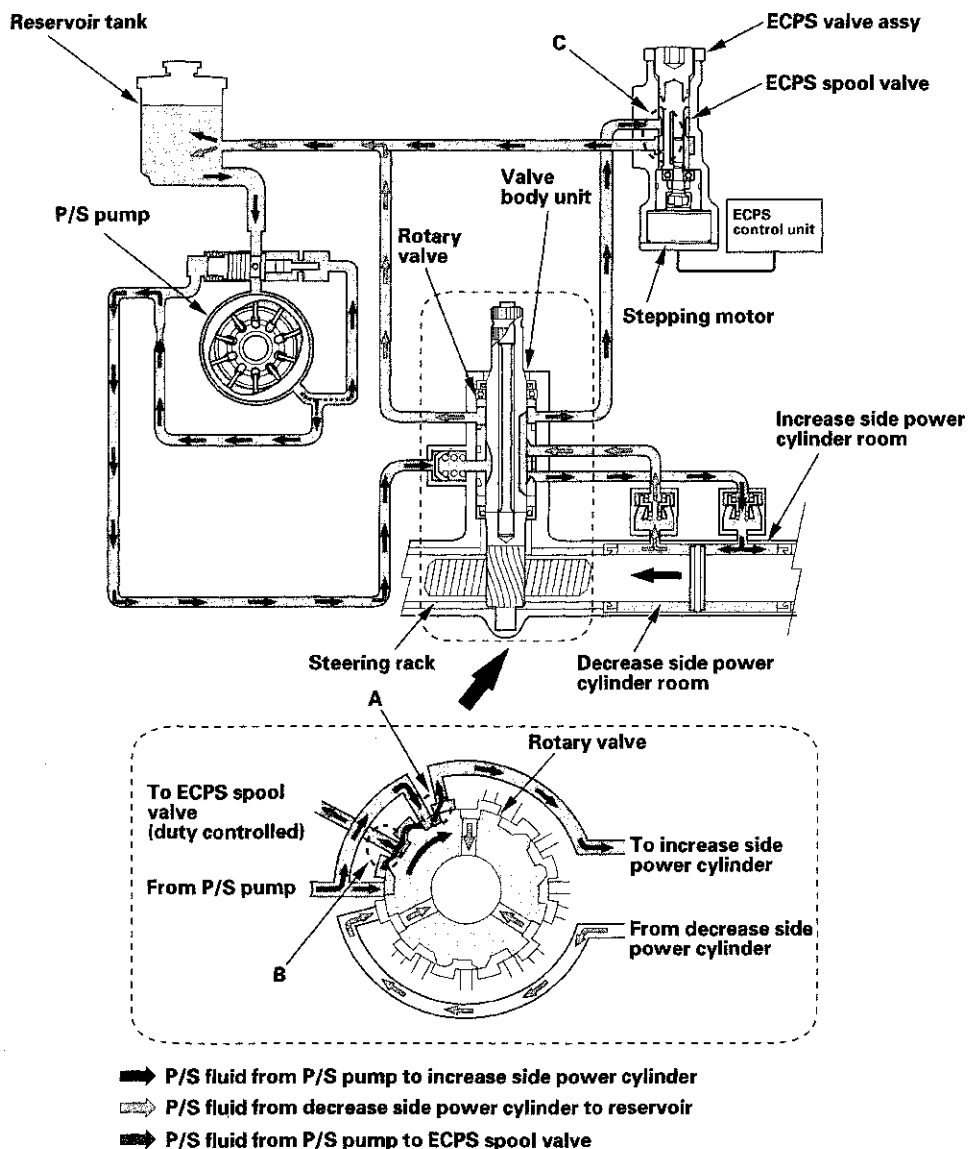
When the vehicle is stopped, the ECPS control unit closes the ECPS spool valve. When the steering wheel is turned, the passage between the increase side power cylinder room and the pump opens at the rotary valve. Because the spool valve is closed, all P/S fluid pressure is guided to the increase side power cylinder room passing the variable aperture of vehicle moving (A) at the rotary valve. At the same time, the passage between the decrease pressure side of the power cylinder room and the reservoir opens at the rotary valve, and the P/S fluid inside the decrease side of the power cylinder room returns to the reservoir. By this operation, the power steering system assists with strong force depending on the variable aperture of stationary steering (B) clearance.





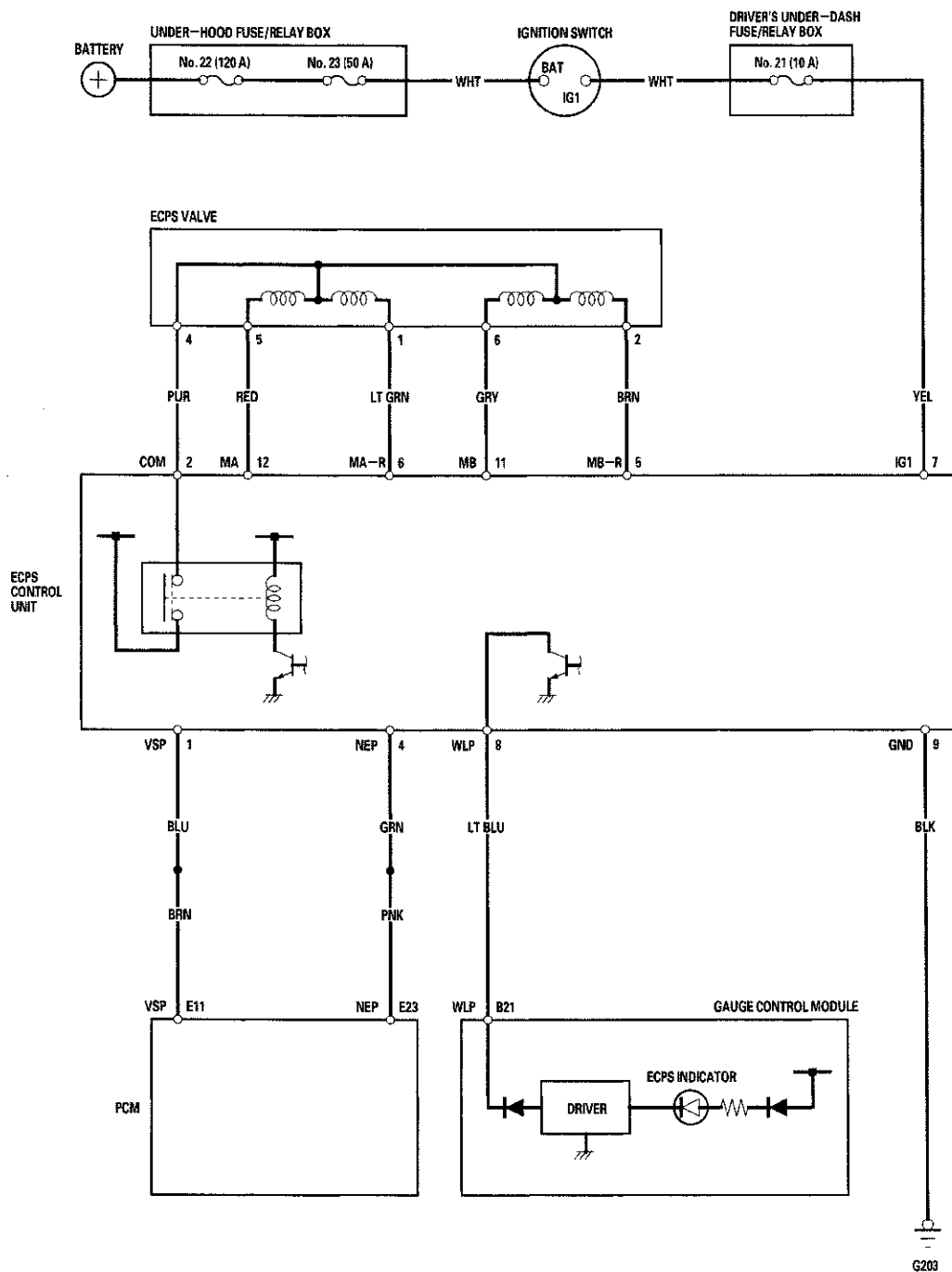
Operation when the vehicle is moving (duty assist)

The ECPS control unit duty controls the ECPS spool valve depending on the vehicle speed. When the steering wheel is rotated, the P/S fluid amount to the increase side of the power cylinder room changes depending on the clearance of the variable aperture of stationary steering (A), variable aperture of high speed steering (B), and the variable aperture of the ECPS spool valve (C). The assist force is controlled with the synthetic valve of these three aperture clearance. Because the synthetic clearance is larger than the vehicle in stopped condition, the power steering assist force is controlled lower.



Electronically Controlled Power Steering System

Circuit Diagram





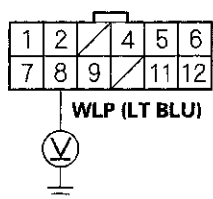
Symptom Troubleshooting

ECPS indicator does not go off after the engine is started

NOTE: High engine speed (1,700 rpm or above) when the vehicle is not moving may cause the ECPS indicator to come on.

1. Disconnect the ECPS control unit 12P connector.
2. Turn the ignition switch to ON (II).
3. Measure the voltage between ECPS control unit 12P connector terminal No. 8 and body ground.

ECPS CONTROL UNIT 12P CONNECTOR



Wire side of female terminals

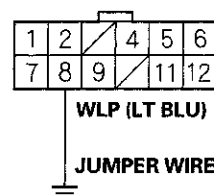
Is there about 5 V?

YES—Go to step 4.

NO—Repair an open in the wire between the ECPS control unit and the gauge control module. ■

4. Connect ECPS control unit 12P connector terminal No. 8 and body ground with a jumper wire.

ECPS CONTROL UNIT 12P CONNECTOR



Wire side of female terminals

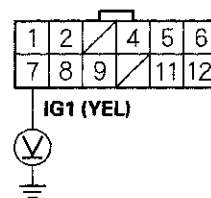
Does the ECPS indicator go off?

YES—Go to step 5.

NO—Do the troubleshooting for the gauge control module (see page 22-396). ■

5. Disconnect the jumper wire.
6. Measure the voltage between body ECPS control unit 12P connector terminal No. 7 and body ground.

ECPS CONTROL UNIT 12P CONNECTOR



Wire side of female terminals

Is there battery voltage?

YES—Go to step 7.

NO—Repair an open in the wire between the ECPS control unit 12P connector and No. 21 fuse in the driver's under-dash fuse/relay box. ■

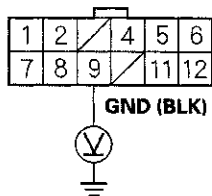
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Electronically Controlled Power Steering System

Symptom Troubleshooting (cont'd)

7. Measure the voltage between ECPS control unit 12P connector terminal No. 9 and body ground.

ECPS CONTROL UNIT 12P CONNECTOR



Wire side of female terminals

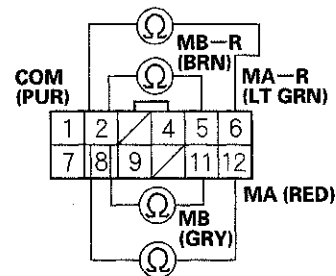
Is there less than 0.1 V?

YES—Go to step 8.

NO—Repair an open in the wire between the ECPS control unit 12P connector and body ground (G203). ■

8. Measure the resistance between ECPS control unit 12P connector terminals No. 2 and No. 5, No. 6, No. 11, and No. 12 individually.

ECPS CONTROL UNIT 12P CONNECTOR



Wire side of female terminals

Is the resistance between 19.8 to 24.2 Ω at 68 °F (20 °C)?

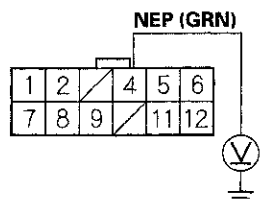
YES—Go to step 9.

NO—Check for and repair an open/ or a short in the wires between the ECPS control unit 12P connector and the stepping valve motor. If the wires are OK, the ECPS valve is faulty; replace the ECPS valve. ■



9. Start the engine.
10. Measure the voltage between ECPS control unit 12P connector terminal No. 4 and body ground.

ECPS CONTROL UNIT 12P CONNECTOR



Wire side of female terminals

Is there about 5.0 V?

YES—Check for loose connector terminals in the ECPS control unit 12P connector and repair if necessary. If the terminals are OK, replace the ECPS control unit (see page 17-74). ■

NO—Repair an open in the GRN wire between the ECPS control unit and PCM connector E (31P). ■

ECPS indicator comes on while driving the vehicle (but the ECPS indicator goes off after the engine is restarted)

Repair an open in the BLU wire between the ECPS control unit 12P connector and PCM connector E (31P), or repair the poor connection in the ECPS circuit. ■

Electronically Controlled Power Steering System

Symptom Troubleshooting (cont'd)

ECPS indicator comes on, but there is no power assist

- Hard steering
- Uneven or rough steering

1. Turn the ignition switch to ON (II).

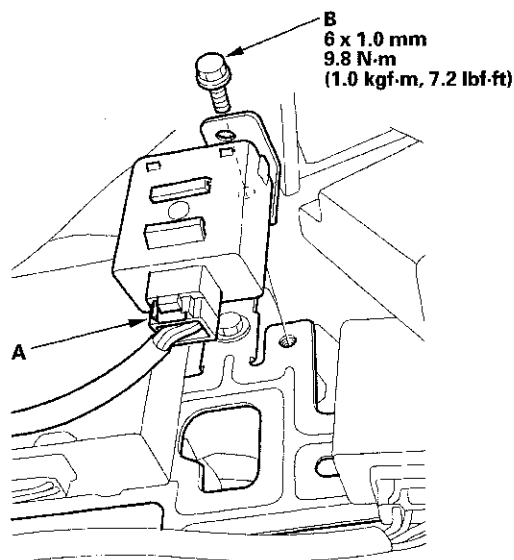
Is there a clicking noise from the ECPS valve for 2 to 3 seconds?

YES—The ECPS system is OK at this time. Go to Symptom Troubleshooting (see page 17-7). ■

NO—Faulty ECPS control unit or the ECPS valve, replace the ECPS control unit (see page 17-74) or the valve housing and stepping valve motor (see page 17-41). ■

ECPS Control Unit Removal/Installation

1. Remove the driver's dashboard undercover (see page 20-100), and the driver's dashboard lower cover (see page 20-100).
2. Disconnect the connector (A) from the ECPS control unit, and remove the bolt (B).



3. Install the ECPS control unit in the reverse order of removal.