Multiplex Control System

System Description

The multiplex control system has four internal functions:

- Multiplexing (send multiple signals over shared wires)
- Wake up/sleep (runs at full power only on demand to reduce battery draw)
- Fail-safe (fixes or ignores faulty signals)
- Self-diagnosis (Mode 1 for system DTCs, Mode 2 for input lines)

The system controls the function of these circuits:

- Entry light control (ignition key light and ceiling light)
- Wiper/washer (intermittent wipe and park functions)
- Interlock system
- Power Door Lock
- Gauge assembly (temperature gauge and indicators)
- HVAC (Compressor and fan control)
- Key-in reminder
- Lights-on reminder
- Seat belt reminder
- Keyless entry ('04-05 EX model)

Multiplex Communication

To reduce the number of wire harnesses, digital signals are sent via shared multiplex communication lines rather than sending normal electrical signals through individual wires.

- The input signals from each switch are converted to digital signals at the central processing unit (CPU).
- The digital signals are sent from the transmitting unit to the receiving unit as serial data signals.
- The transmitted signal is converted to a switch signal at the receiving unit, and it operates the related component or performs a function.
- There are exclusive communication lines between the ECM/PCM, the gauge assembly, the keyless receiver unit ('04-05 EX model), and the under-dash fuse/relay box.

Wake-up and Sleep

The multiplex control system has "wake-up" and "sleep" functions to decrease parasitic draw on the battery when the ignition switch is OFF.

- In the sleep mode, the multiplex control unit stops functioning (communication and CPU control) when it is not necessary for the system to operate.
- As soon as any operation is requested (for example, a door is unlocked), the related control unit in the sleep mode immediately wakes up and begins to function.
- When the ignition switch is turned OFF, and the driver's or front passenger's door is opened, then closed, there is about a 40 second delay before the control unit goes from the wake-up mode to the sleep mode.
- If any door is open, the sleep mode will not function.
- If a key is in the ignition switch, the sleep mode will not function.
- When in sleep mode, the draw is reduced from 200 mA to less than 35 mA.

Fail-safe

To prevent improper operation, the multiplex control system has a fail-safe function. In the fail-safe mode, the output signal is fixed when any part of the system malfunctions (for example, a faulty control unit or communication line).

Each control unit has a hardware fail-safe function that fixes the output signal when there is any CPU malfunction, and a software fail-safe function that ignores the signal from the malfunctioning control unit and allows the system to operate normally.

Troubleshooting

Special Tools Required
MPCS Service Connector 07WAZ-001010A

1. Check the No. 9 (10 A) fuse in the under-hood fuse/relay box and the No. 10 (7.5 A) fuse in the under-dash fuse/relay box.

   Are the fuses OK?

   YES—Go to step 2.

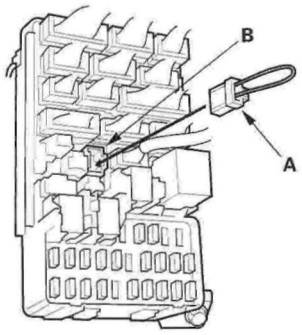
   NO—Find and repairthe cause of the blown fuse.**B**

2. Remove the driver's dashboard lower cover (see page 20-73).

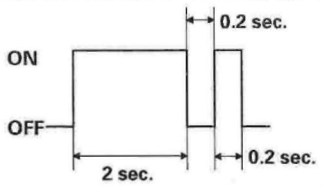
3. Switch the ceiling light to the middle position. Close all doors. Turn the ignition switch ON (II). If the driver's seat belt is unbuckled, the beeper will beep five times.

4. Check self-diagnosis function Mode 1 for a diagnostic trouble code (DTC) by connecting the special tool (A) to the multiplex control inspection connector (B). After about 5 seconds, the ignition key light and ceiling light should come on for 2 seconds, go out, then blink once for 0.2 second. This means that you are in Mode 1 of the self-diagnosis function.

   NOTE: To cancel Mode 1, disconnect the MPCS service connector from the multiplex control inspection connector for more than 10 seconds or turn the ignition switch OFF.



MODE 1: Ignition key light and ceiling light



   Did the blinking lights confirm that you are in Mode 1?

   YES—Count the blinks, then go to step 5.

   NO—See if the SCS circuit is working properly, then go to step 6.

5. Check for continuity between the connector J of under-dash fuse/relay box No. 4 terminal and body ground.

   Is there continuity?

   YES—Faulty under-dash fuse/relay box. Replace and check for DTCs.

   NO—Repair the open in the wire or poor ground (G301), and recheck for DTCs. •

6. If there is a DTC, it will blink, pause, then repeat the DTC as long as the ignition switch is ON (II).

   Is there a repeating DTC?

   YES—Count the blinks, then go to step 7.

   NO—Goto step 8.

(cont'd)

Troubleshooting (cont'd)

About 1 second after you go into self-diagnosis Mode 1, the ceiling light will indicate the DTC, and repeat it every 3 seconds. If there is more than one DTC, the system will indicate them in ascending order, beginning from the DTC with the lowest numerical value. Troubleshoot the DTCs as indicated:

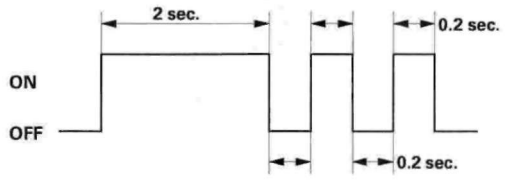
- DTC 1, 2, and 3 (ECM/PCM P0600) simultaneously: Check for a short to body ground in the YEL wire between multiplex control unit terminal E10 and ECM/PCM terminal E13, in the WHT/GRN wire between multiplex control unit terminal K10 and gauge assembly terminal B10. If both wires are OK, substitute a known-good multiplex control unit, gauge assembly, and ECM/PCM one at a time, in that order, and recheck for the DTCs after each substitution.
- DTC 2 and 5 simultaneously: Check for an open in the YEL wire between multiplex control unit terminal E10 and ECM/PCM terminal E13, If the wire is OK, substitute a known-good multiplex control unit, gauge assembly, and ECM/PCM one at a time, in that order, and recheck for the DTCs after each substitution.
- DTC 1 and 6 simultaneously: Check for an open in the WHT/GRN wire between multiplex control unit terminal K10 and gauge assembly terminal B10, and (on '04-05 EX model) in the BLU/ORN wire between the keyless receiver unit terminal No. 2 and the multiplex control unit terminal K2. If the wire is OK, substitute a known-good multiplex control unit, gauge assembly, and ECM/PCM one at a time, in that order, and recheck for the DTCs after each substitution.
- DTC 1 only (no other DTCs present): Substitute a known-good gauge assembly and a multiplex control unit one at a time, in that order, and recheck for the DTC after each substitution.
- DTC 2 only (no other DTCs present): Substitute a known-good multiplex control unit and a ECM/PCM one at a time, in that order, and recheck for the DTC after each substitution.
- DTC 3 only (no other DTCs present): Substitute a known-good multiplex control unit, and recheck for the DTC.
- DTC 5 only (no other DTCs present): Substitute a known-good gauge assembly, and recheck for the DTC.

DTC 6 only (no other DTCs present): Update the ECM/PCM if it does not have the latest software, or substitute a known-good ECM/PCM, then recheck (see page 11-6). If the symptom/ indication goes away with a known-good ECM/ PCM, replace the original ECM/PCM. •

DTC	Cause
1	The multiplex control unit cannot receive signals from the gauge assembly.
2	The multiplex control unit cannot receive signals from the ECM/PCM.
3	The multiplex control unit cannot receive signals from itself.
5	The gauge assembly cannot receive signals from multiplex control unit and the ECM/PCM.
6	The ECM/PCM cannot receive signals from multiplex control unit and the gauge assembly.

From Mode 1, disconnect the special tool from the multiplex control inspection connector for about 5 to 10 seconds, then reconnect it. The ceiling light should come on for 2 seconds, go out, then blink twice more at 0.2 second intervals. This means the system has gone from Mode 1 to Mode 2.

MODE 2:



NOTE: To cancel Mode 2, disconnect the SCS service connector from the multiplex control inspection connector for more than 10 seconds or turn the ignition switch OFF.

Look in the following table for the switches most closely related to the problem. While still in Mode 2, operate the switches. If the circuit is OK, the ceiling light should blink once. If the circuit is faulty, there will be no indication.
In the table below is a list of circuits that can be checked in Mode 2.

Windshield washer switch (ON)
Windshield wiper switch (INT)
Windshield wiper moter (Auto stop)
Driver's door switches (doors open, one at a time)
Driver's rear door switches
Passenger's door switches (doors open, one at a time)
Passenger's rear door switches
Hatch latch switch (hatch open)
Tailgate latch switches (tailgate open)
NOTE: For tailgate switches to work, hatch latch must be manually latched.
Parking brake switch (ON)
Driver's door lock switch (LOCK/UNLOCK)
Driver's door lock knob switch (LOCK)
Driver's seat belt switch (UNLATCH)
A/C switch (ON, with fan switch ON)
Combination light switch (parking lights ON)
ECM/PCM communication line (disconnect and reconnect)
Gauge assembly communication line (disconnect and reconnect)
Brake pedal position switch (pedal pressed)
Transmission range switch (P, R, D, 2,1)

NOTE: You can check the rear door switches individually if the others are latched.

Does the ceiling light blink?

YES—Go to Sleep and Wake-up Mode Test (see page 22-152).•

NO—Goto step 10.

10. Check two or three other circuits listed in the chart.

Does the ceiling light blink for each circuit?

YES—The additional circuits are OK. Repair the short or open in the circuit that failed the test in step 9. •

NO—Multiple failed circuits can mean that the control unit has failed without triggering a DTC. Test a few more circuits. If they also fail, test the multiplex control unit inputs (see page 22-153). If all the input test are OK, substitute a known-good multiplex control unit, gauge assembly, or ECM/PCM, one at a time, then recheck. If the system works properly, the part that was substituted is faulty; replace it. If there is still a malfunction, substitute a known-good control unit for the next most likely faulty control unit, then recheck. If the system works properly, that control unit is faulty; replace it. •