SECTION 9U

CRUISE CONTROL SYSTEM

CAUTION: Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

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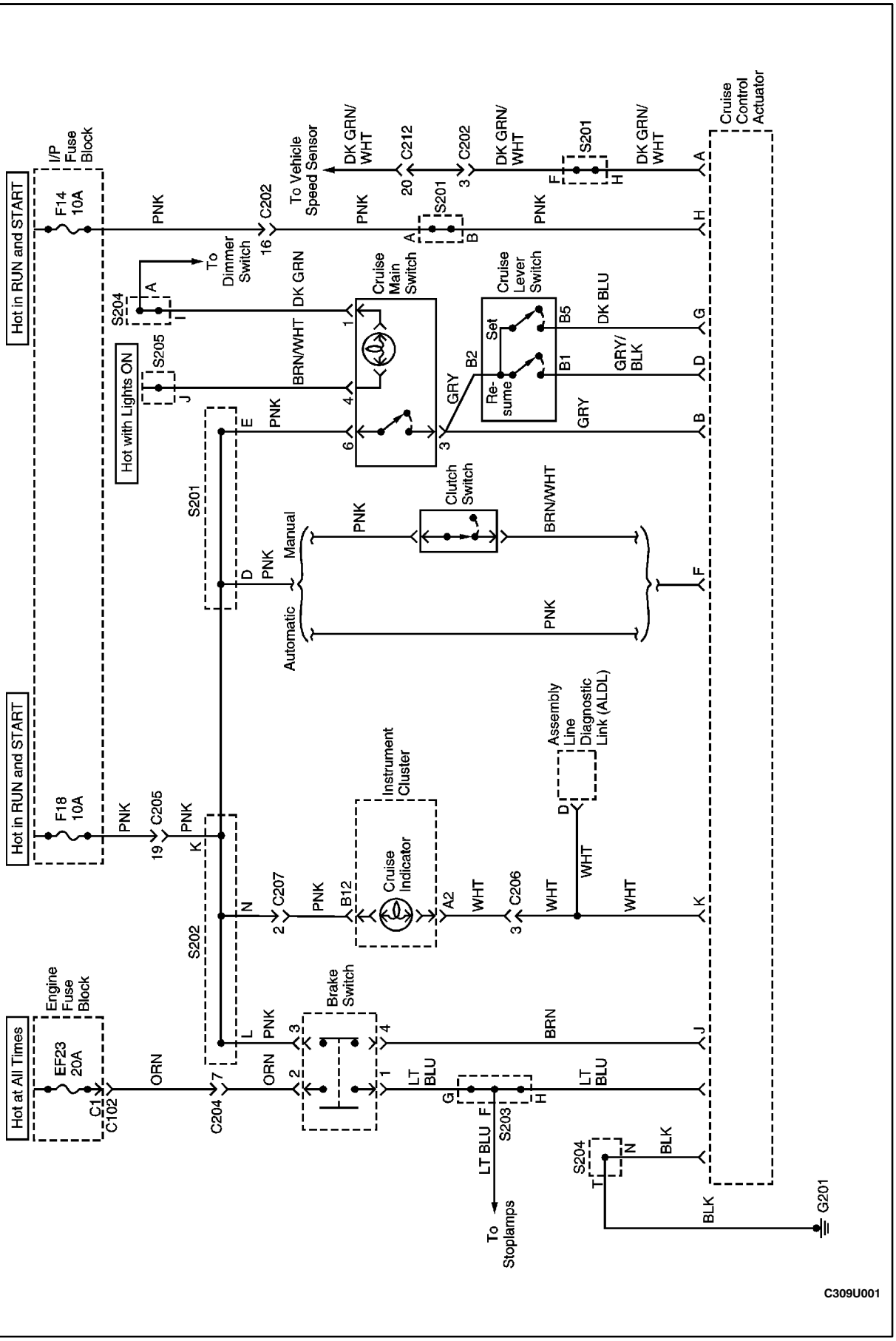
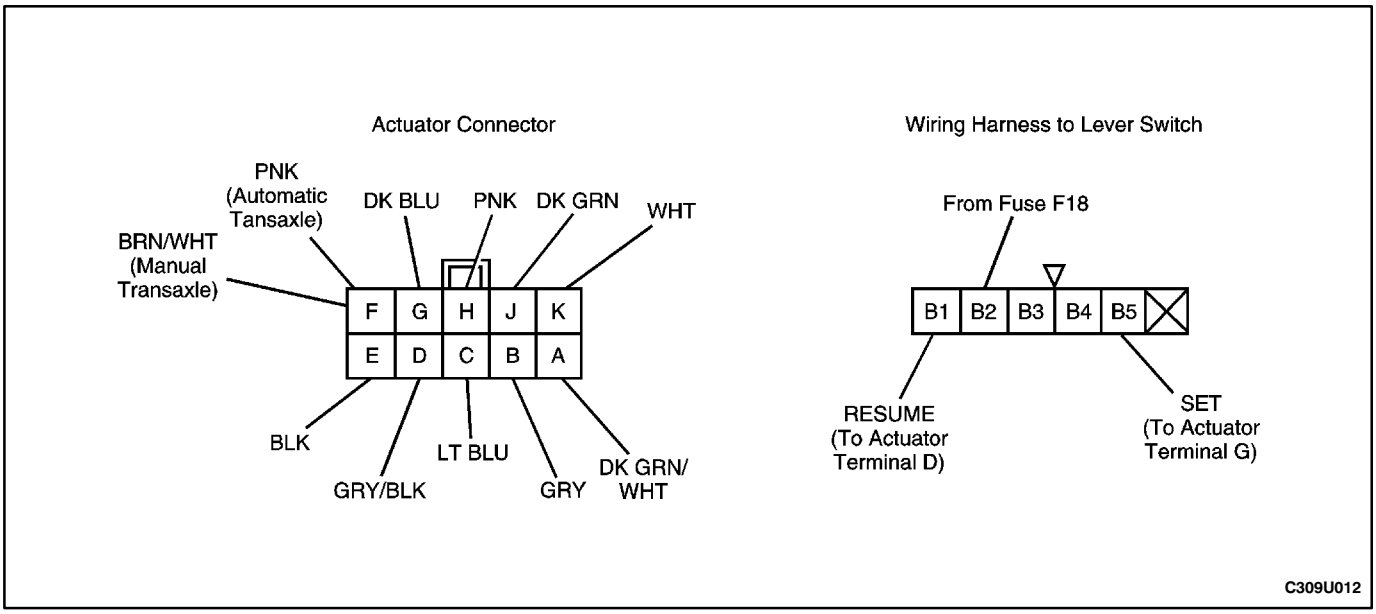
SCHEMATIC AND ROUTING DIAGRAM

CRUISE CONTROL SYSTEM



DIAGNOSIS



CRUISE CONTROL

Test Description

The number(s) below refer to step(s) on the diagnostic table.

5. The electromagnetic clutch in the cruise control actuator is grounded through the brake lamps.

Cruise Control Does Not Operate

Step	Action	Value(s)	Yes	No
1	Visually inspect the cruise control system and verify the following conditions: ● The electrical connector is correctly attached to the cruise control actuator. ● The actuator and the bracket are not loose. ● The cable is not bent or kinked. ● The cable adjuster is correctly attached to its bracket. ● The cable and bushing are correctly attached to the accelerator assembly. ● The cable is properly adjusted. Have all of the above conditions been verified?	–	Go to *Step 3*	Go to *Step 2*
2	Make repairs to the components of the cruise control system that were observed to be faulty in Step 1. Is the repair complete?	–	System OK	–
3	1. Connect a scan tool to the Assembly Line Diagnostic Link (ALDL) and to a power source. 2. Check for engine control diagnostic trouble codes (DTCs). Is a vehicle speed sensor DTC present?	–	Go to *Step 5*	Go to *Step 4*

Cruise Control Does Not Operate (Cont'd)

Step	Action	Value(s)	Yes	No
4	Diagnose the vehicle speed sensor DTC before continuing with this diagnostic table. After the vehicle speed sensor system has been repaired, is the cruise control still inoperative?	–	Go to *Step 5*	System OK
5	Observe the brake lamps when the brakes are being applied. Do the brake lamps turn ON when the brakes are applied and turn OFF when the brakes are not applied?	–	Go to *Step 7*	Go to *Step 6*
6	Repair the brake lamp system. Does the cruise control operate after the brake lamp system has been repaired?	–	System OK	Go to *Step 7*
7	Check fuses F14 and F18. Is a fuse blown?	–	Go to *Step 8*	Go to *Step 9*
8	1. Check for a short circuit and repair if necessary. 2. Replace the blown fuse(s). Is the repair complete?	–	System OK	–
9	1. Turn the ignition ON. 2. Check the voltage at fuses F14 and F18. Is the specified voltage available at fuses F14 and F18?	11-14 V	Go to *Step 11*	Go to *Step 10*
10	Repair the power supply to the fuse(s). Is the repair complete?	–	System OK	–
11	1. Disconnect the electrical connector from the cruise control actuator. 2. Turn the ignition ON. 3. Check the voltage at terminal H of the connector. Is the voltage equal to the specified value?	11-14 V	Go to *Step 13*	Go to *Step 12*
12	Repair the open circuit between fuse F14 and the cruise control actuator. Is the repair complete?	–	System OK	–
13	With the electrical connector still removed from the cruise control actuator, use an ohmmeter to measure the resistance between connector terminal E and ground. Does the ohmmeter indicate the specified value?	≈ 0 Ω	Go to *Step 15*	Go to *Step 14*
14	Repair the open circuit between ground and terminal E of the actuator connector. Is the repair complete?	–	System OK	–
15	With the electrical connector still removed from the cruise control actuator, use an ohmmeter to measure the resistance between connector terminal C and ground. Does the ohmmeter indicate the specified value?	≈ 0 Ω	Go to *Step 17*	Go to *Step 16*
16	Repair the open circuit between the actuator connector terminal C and the instrument S204. Is the repair complete?	–	System OK	–
17	1. Turn the ignition ON. 2. With the electrical connector still removed from the cruise control actuator, use a voltmeter to check the voltage at terminal J of the connector. Is the voltage equal to the specified value?	11-14 V	Go to *Step 19*	Go to *Step 18*

Cruise Control Does Not Operate (Cont'd)

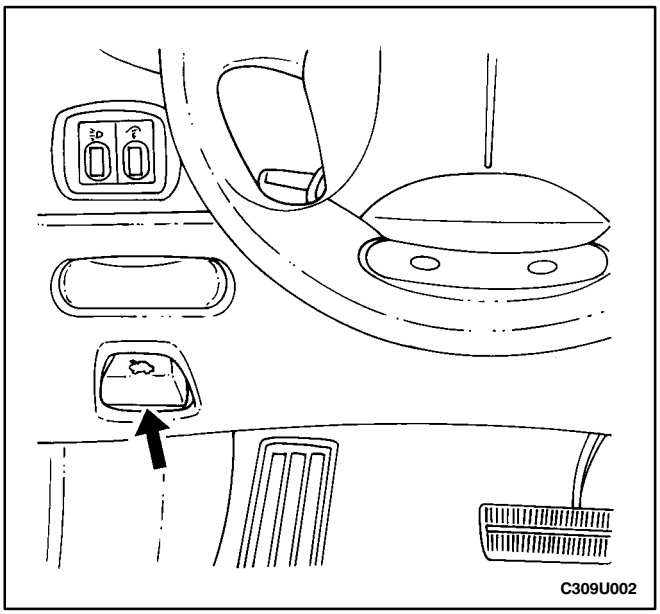
Step	Action	Value(s)	Yes	No
18	Repair the open circuit between fuse F18 and terminal J of the cruise control actuator. Is the repair complete?	–	System OK	–
19	1. Turn the ignition ON. 2. With the electrical connector still removed from the cruise control actuator, use a voltmeter to check the voltage at terminal F of the connector. Is the voltage equal to the specified value?	11-14 V	Go to *Step 21*	Go to *Step 20*
20	Repair the open circuit between fuse F18 and terminal F of the cruise control actuator. Is the repair complete?	–	System OK	–
21	1. Turn the ignition ON. 2. Make sure that the cruise main switch is OFF. 3. With the electrical connector still removed from the cruise control actuator, use a voltmeter to check the voltage at terminal B of the connector. Is the voltage equal to the specified value?	≈ 0 V	Go to *Step 23*	Go to *Step 22*
22	Repair the short to voltage between the cruise main switch and the cruise control actuator terminal B. Is the repair complete?	–	System OK	–
23	1. Turn the ignition ON. 2. Make sure that the cruise main switch is ON. 3. With the electrical connector still removed from the cruise control actuator, use a voltmeter to check the voltage at terminal B of the connector. Is the voltage equal to the specified value?	11-14 V	Go to *Step 28*	Go to *Step 24*
24	1. Remove the cruise control main switch for testing, but leave the electrical connector attached. 2. Turn the ignition ON. 3. Check the voltage at the PNK wire at the cruise main switch. Is the voltage equal to the specified value?	11-14 V	Go to *Step 26*	Go to *Step 25*
25	Repair the open circuit in the PNK wire between fuse F18 and the cruise control main switch. Is the repair complete?	–	System OK	–
26	1. With the cruise control main switch removed for testing, turn the ignition ON. 2. Turn the cruise control main switch ON. 3. Check the voltage at the GRY wire at the cruise main switch. Is the voltage equal to the specified value?	11-14 V	Go to *Step 28*	Go to *Step 27*
27	Replace the cruise control main switch. Is the repair complete?	–	System OK	–
28	1. Turn the ignition ON. 2. Turn the cruise control main switch ON. 3. With the electrical connector still removed from the cruise control actuator, check the voltage at terminals D and G of the connector. Is the voltage equal to the specified value?	≈ 0 V	Go to *Step 32*	Go to *Step 29*

Cruise Control Does Not Operate (Cont'd)

Step	Action	Value(s)	Yes	No
29	1. Disconnect the 6-pin connector at the cruise control lever switch. 2. Turn the ignition ON. 3. Turn the cruise control main switch ON. 4. With the electrical connector still removed from the cruise control actuator, check the voltage at terminals D and G of the cruise control actuator. Is the voltage equal to the specified value?	0 V	Go to *Step 30*	Go to *Step 31*
30	Replace the cruise control lever switch. Is the repair complete?	–	System OK	–
31	Repair the short to voltage between the cruise control lever switch and the cruise control actuator. Is the repair complete?	–	System OK	–
32	1. Turn the ignition ON. 2. Turn the cruise control main switch ON. 3. Select SET on the cruise control lever switch. 4. While holding the lever switch in the SET position, check the voltage at terminal G of the connector for the cruise control actuator. Does the voltmeter indicate the specified value?	11-14 V	Go to *Step 33*	Go to *Step 37*
33	1. Turn the ignition ON. 2. Turn the cruise control main switch ON. 3. Select RESUME on the cruise control lever switch. 4. While holding the lever switch in the RESUME position, check the voltage at terminal D of the connector for the cruise control actuator. Does the voltmeter indicate the specified value?	11-14 V	Go to *Step 34*	Go to *Step 37*
34	1. Turn the ignition OFF. 2. Disconnect the vehicle speed sensor (VSS). 3. Use an ohmmeter to check continuity between the DK GRN/WHT wire at the VSS and terminal A of the cruise control actuator connector. Does the ohmmeter indicate the specified value?	≈ 0 Ω	Go to *Step 36*	Go to *Step 35*
35	Repair the open circuit between the VSS and the cruise control actuator connector terminal A. Is the repair complete?	–	System OK	–
36	Replace the cruise control actuator. Is the repair complete?	–	System OK	–
37	1. Disconnect the 6-pin connector at the cruise control lever switch. 2. Turn the ignition ON. 3. Turn the cruise control main switch ON. 4. Refer to the illustration of "Wiring Harness to Lever Switch" and test the voltage at terminal B2 of the wiring harness connector. Is the voltage equal to the specified value?	11-14 V	Go to *Step 39*	Go to *Step 38*
38	Repair the open circuit between the cruise control main switch and the cruise control lever switch. Is the repair complete?	–	System OK	–

Cruise Control Does Not Operate (Cont'd)

Step	Action	Value(s)	Yes	No
39	1. Use an ohmmeter to check for an open circuit between terminal B1 of the wiring harness at the lever switch and terminal D of the actuator connector. 2. Also use the ohmmeter to check for an open circuit between terminal B5 of the wiring harness at the lever switch and terminal G of the actuator connector. Does the ohmmeter indicate the specified value for both measurements?	≈ 0 Ω	Go to *Step 40*	Go to *Step 41*
40	Replace the lever switch. Is the repair complete?	–	System OK	–
41	Repair the open circuit between the lever switch connector and the actuator connector. Is the repair complete?	–	System OK	–



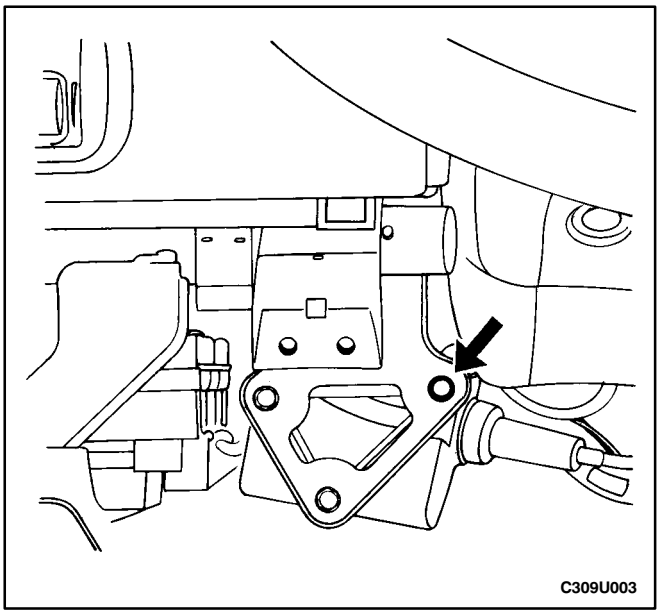
MAINTENANCE AND REPAIR

ON-VEHICLE SERVICE

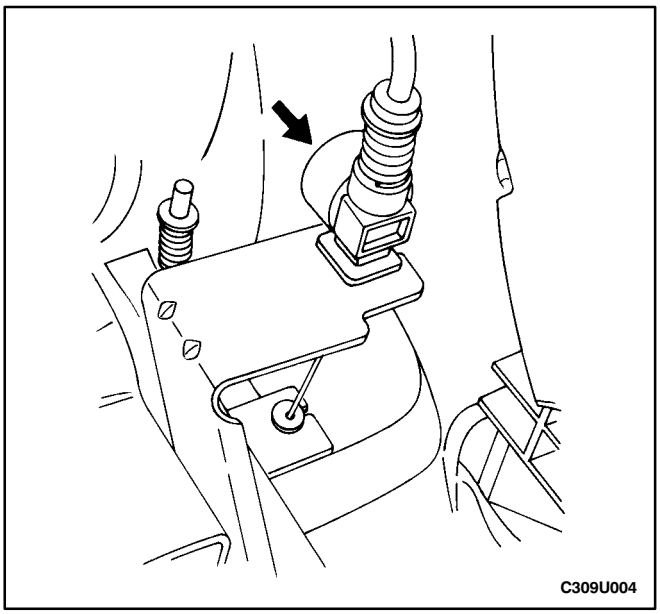
CRUISE CONTROL ACTUATOR

Removal Procedure

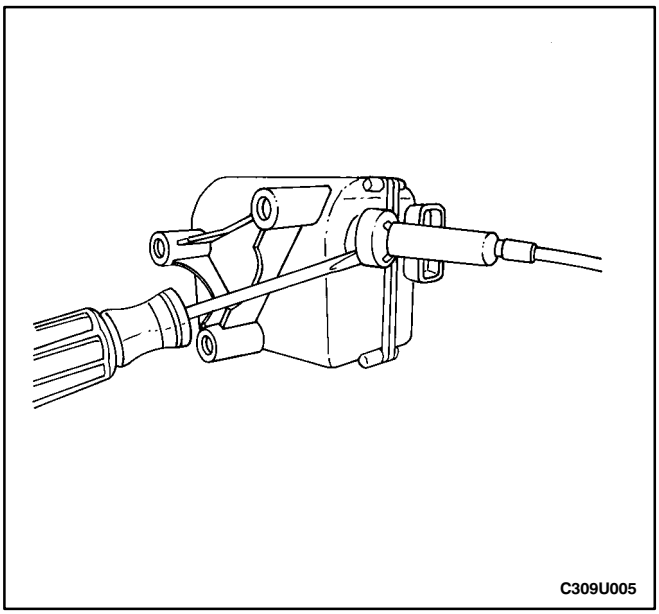
1. Remove the screw that attaches the hood release handle.



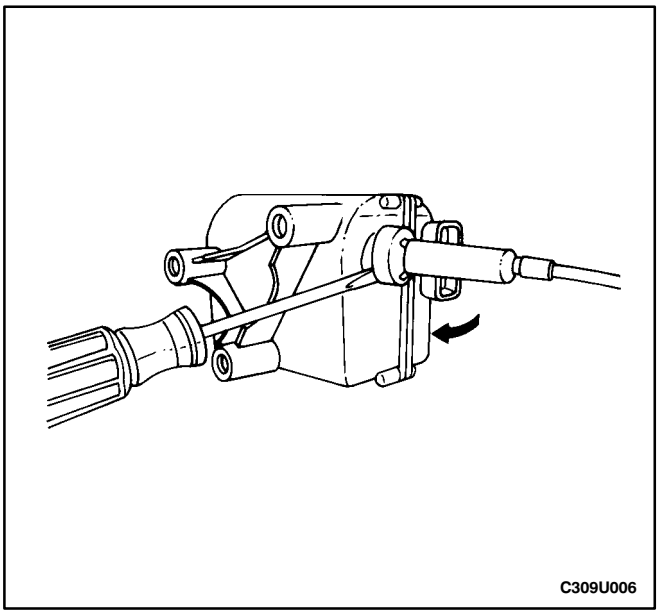
2. Carefully remove the knee bolster trim panel by pulling until the retaining clips are free from the slots in the instrument panel.
3. Disconnect the electrical connector from the cruise control actuator.
4. Remove the cruise control actuator mounting bolts.



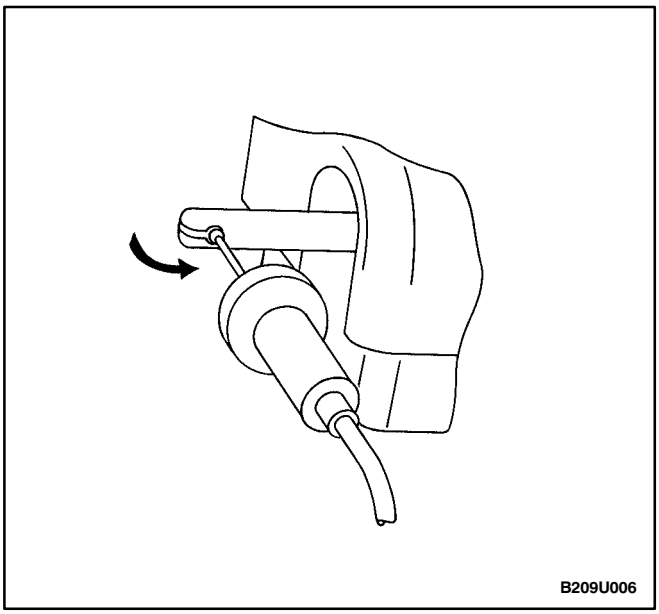
5. Press the release button on the cable adjuster and push the cable toward the adjuster until the spring is compressed.


C309U005

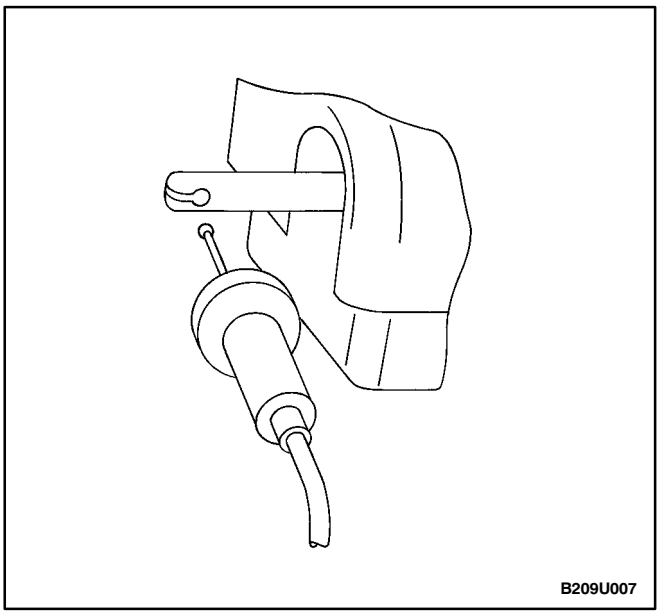
6. Tilt the cable housing and insert a flat-blade screwdriver into one of the slots in the actuator.


C309U006

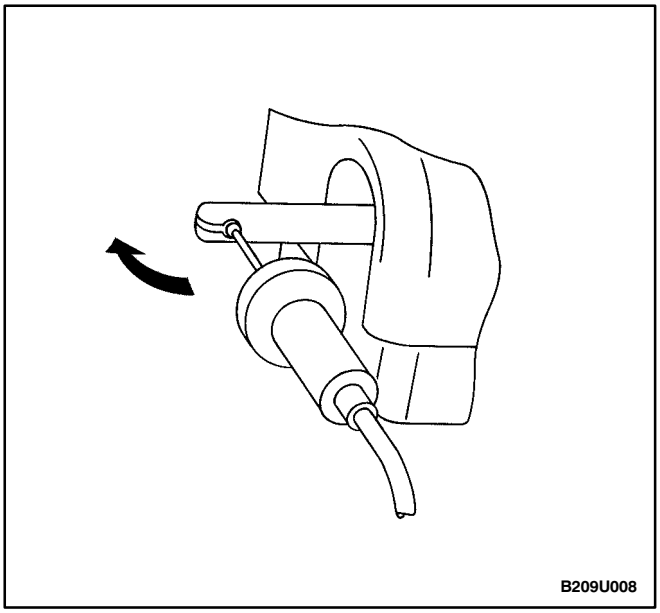
7. Tilt the cable housing toward the screwdriver. The cable housing retainers will release.


B209U006

8. Pull the guide sleeve and the cable out of the actuator and turn the cable 90 degrees to the axis of the guide sleeve.

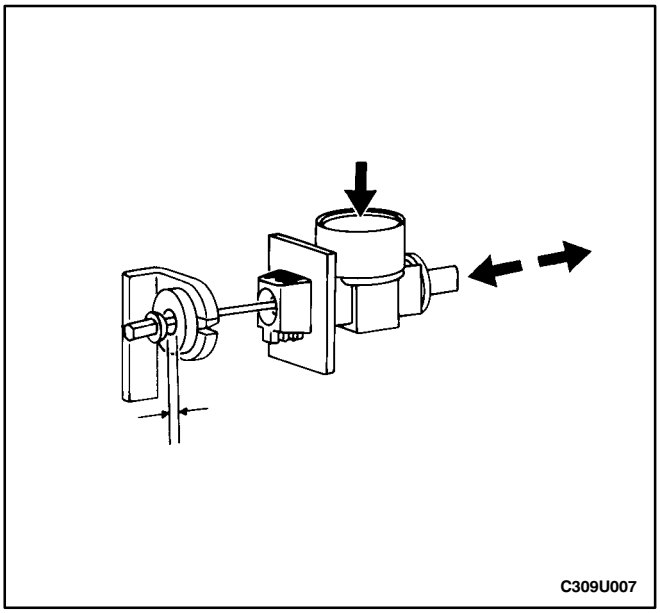

B209U007

9. Remove the actuator from the cable.


B209U008

Installation Procedure

1. Insert the cable ball into the actuator cable sleeve.

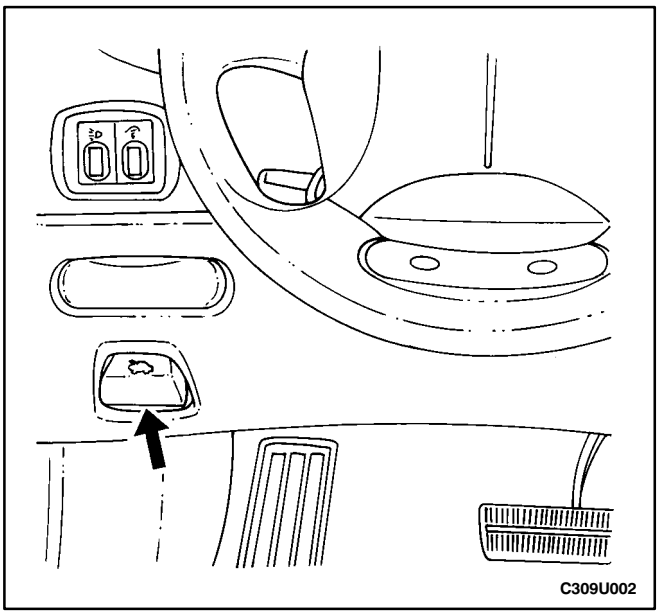

C309U007

2. Push the cable housing and sleeve into the actuator until the retainers lock the cable housing in place.
3. Install the cruise control actuator mounting bolts.

Tighten

Tighten the cruise control actuator mounting bolts to 6 N•m (53 lb-in).

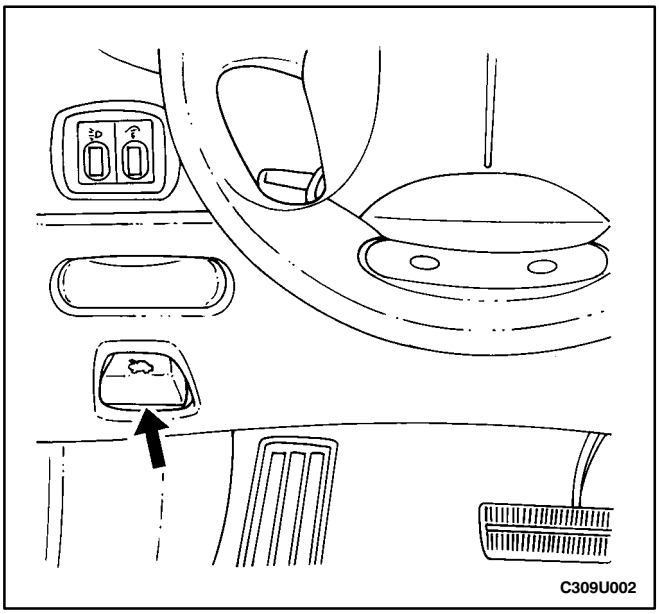
4. Press the cable adjuster button and adjust the cable so that the cable ball nipple is 0.5 mm (0.02 inch) from the bushing on the accelerator assembly.


C309U002

5. Connect the electrical connector to the cruise control actuator.
6. Align the knee bolster trim panel and press the retaining clips into the slots in the instrument panel.
7. Install the hood release handle screw.

Tighten

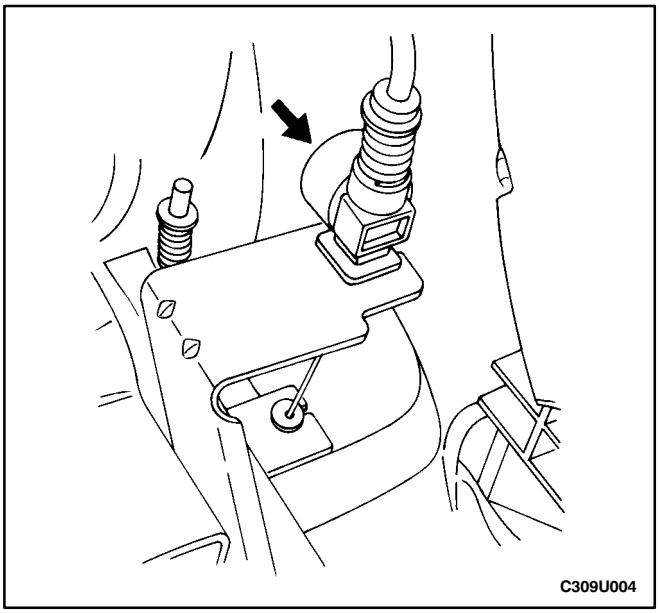
Tighten the hood release handle screw to 2.5 N•m (22 lb-in).


C309U002

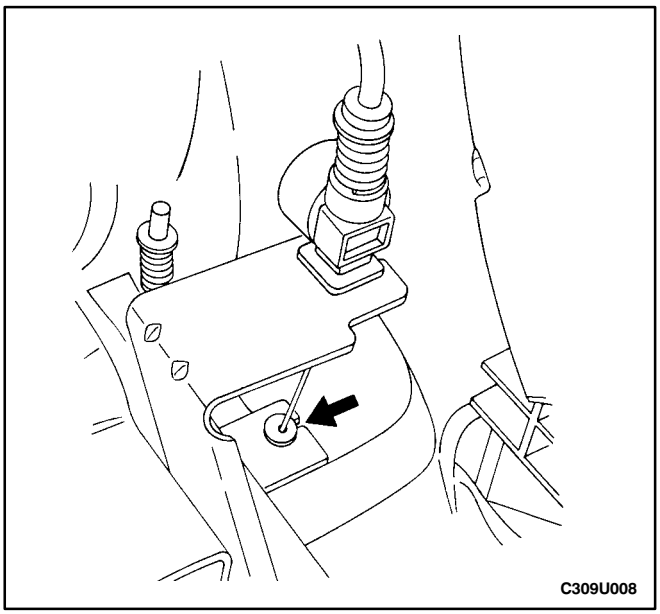
ACTUATOR CONTROL CABLE

Removal Procedure

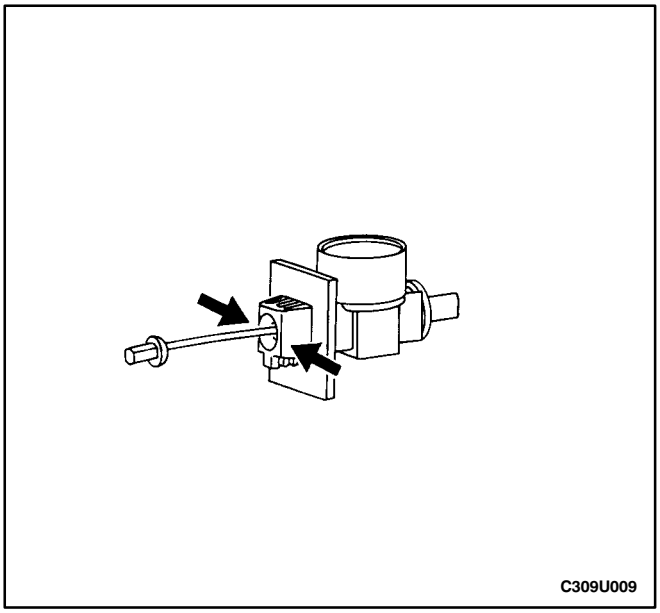
1. Remove the screw that attaches the hood release handle.


C309U004

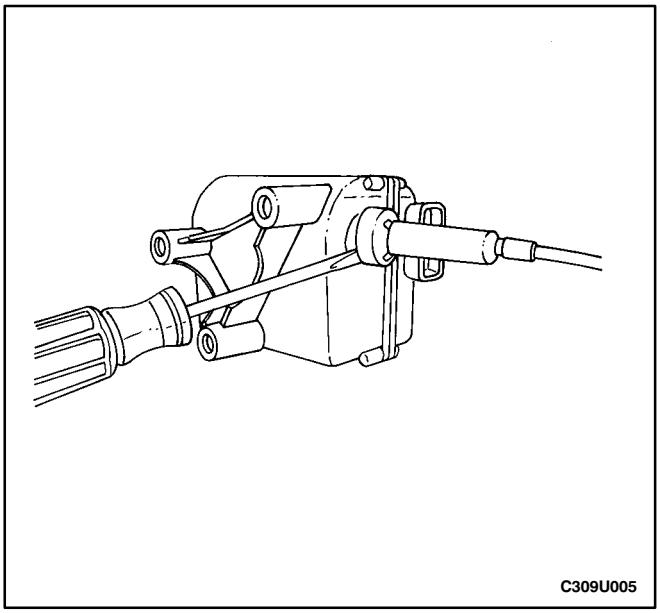
2. Carefully remove the knee bolster trim panel by pulling until the retaining clips are free from the slots in the instrument panel.
3. Press the release button on the cable adjuster and push the cable toward the adjuster until the spring is compressed.


C309U008

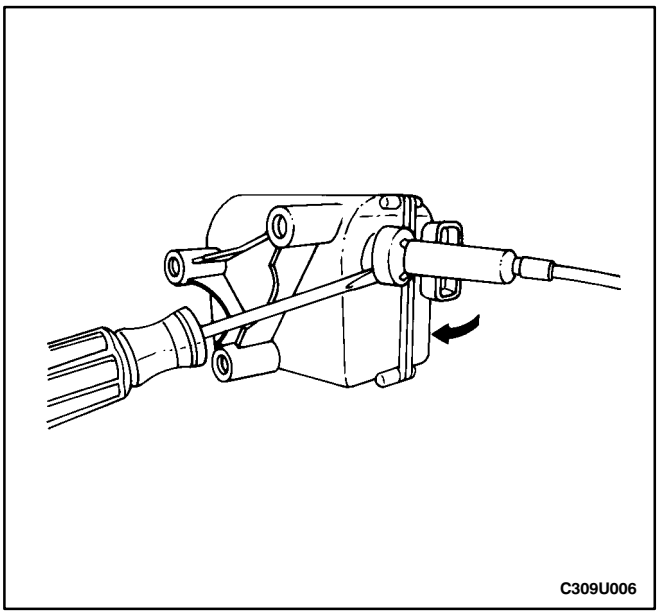
4. Remove the cable bushing from the accelerator assembly.


C309U009

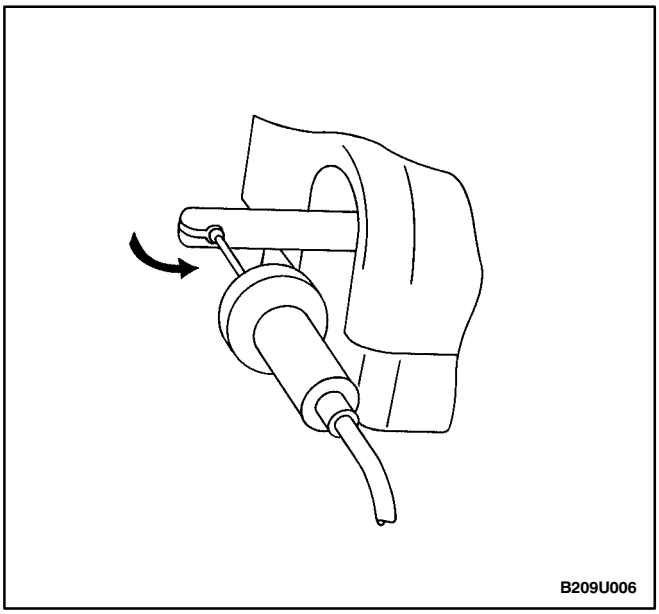
5. Depress the retaining tabs of the cable adjuster and remove the adjuster from the mounting bracket.


C309U005

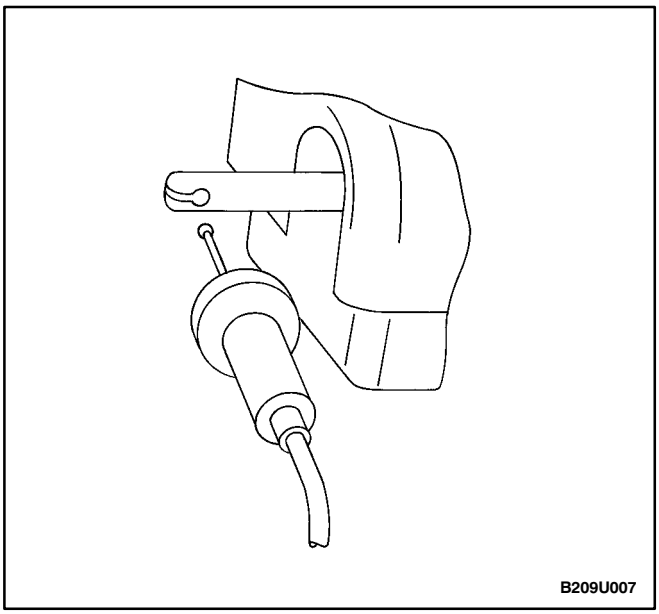
6. Tilt the cable housing and insert a flat-blade screwdriver into one of the slots in the actuator.


C309U006

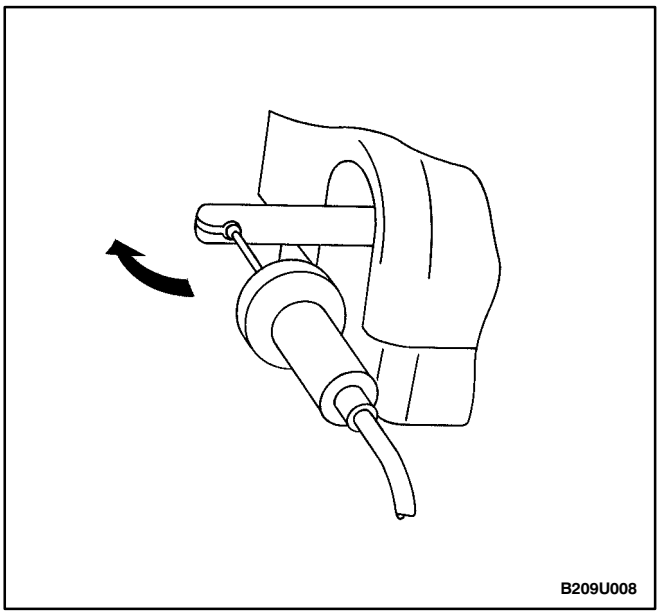
7. Tilt the cable housing toward the screwdriver. The cable housing retainers will release.


B209U006

8. Pull the guide sleeve and the cable out of the actuator and turn the cable 90 degrees to the axis of the guide sleeve.

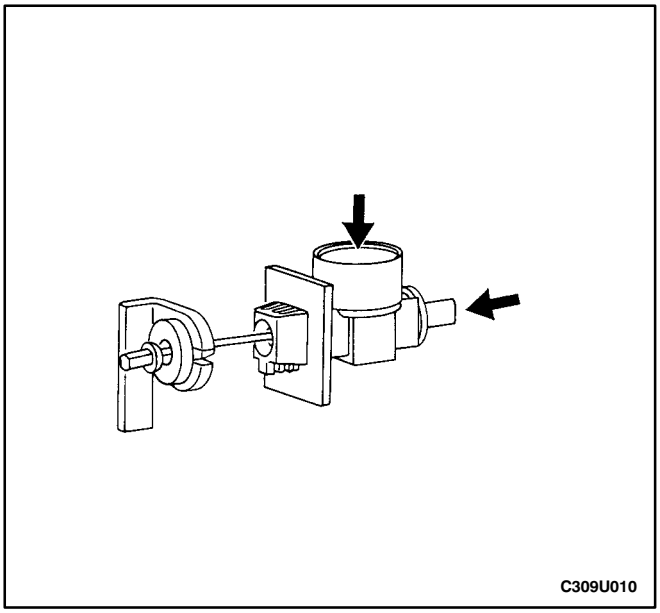

B209U007

9. Remove the actuator from the cable.

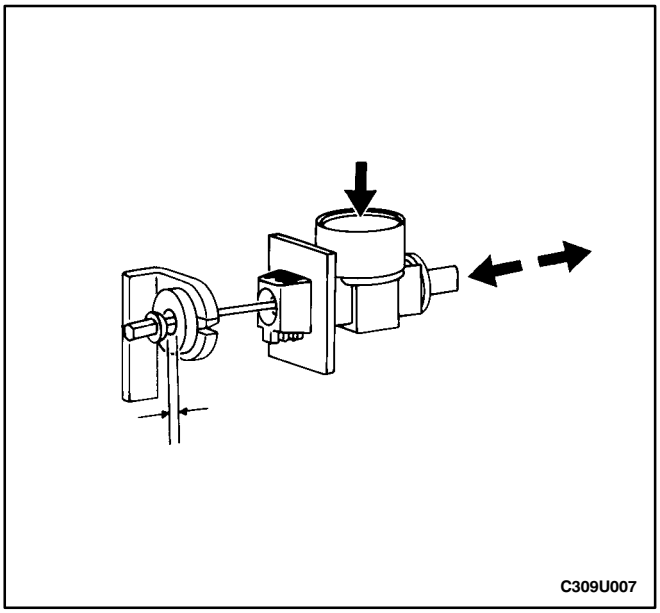

B209U008

Installation Procedure

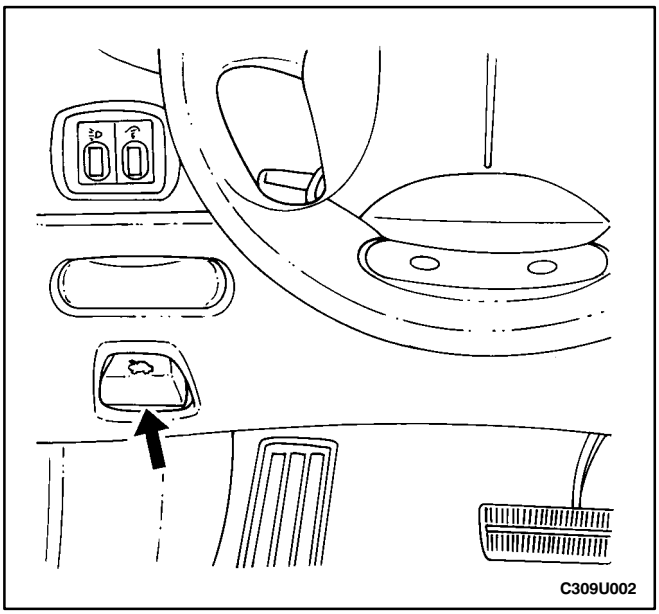
1. Insert the ball of the cable assembly into the slot in the actuator rod and then rotate the cable 90 degrees.


C309U010

2. Push the guide sleeve onto the actuator rod and press the cable housing onto the actuator until it is locked in place by the retainers.
3. Clip the cable adjuster into the bracket of the pedal mount assembly.
4. Press the cable release button and slide the cable into the adjuster until the spring is fully compressed.


C309U007

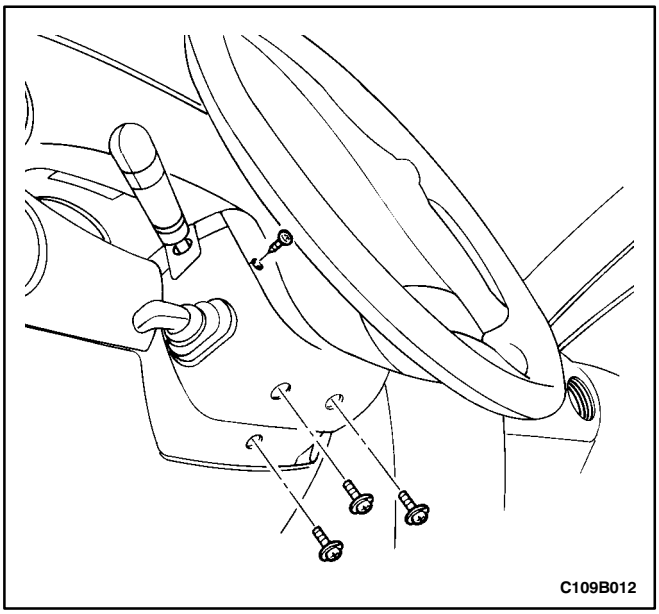
5. Install the cable bushing into the pedal assembly.
6. Press the cable release button and adjust the cable to achieve a gap of 0.5 mm (0.2 inch) between the bushing and the nipple of the ball.


C309U002

7. Align the knee bolster trim panel and press the retaining clips into the slots in the instrument panel.
8. Install the hood release handle screw.

Tighten

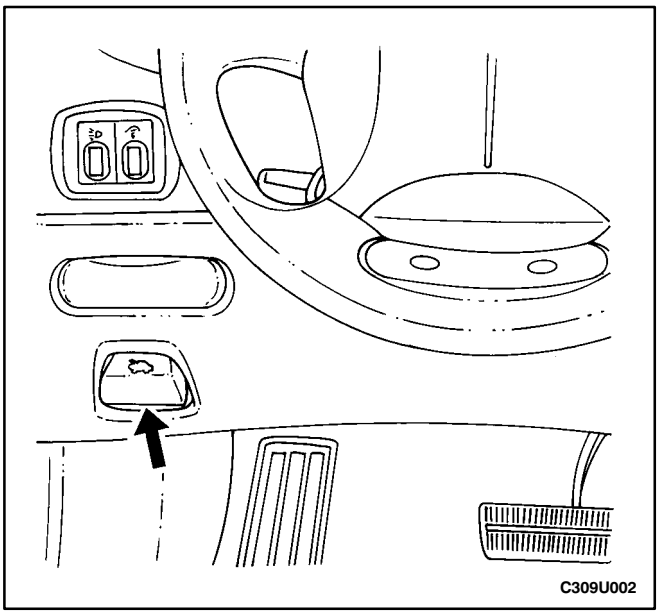
Tighten the hood release handle screw to 2.5 N•m (22 lb-in).


C109B012

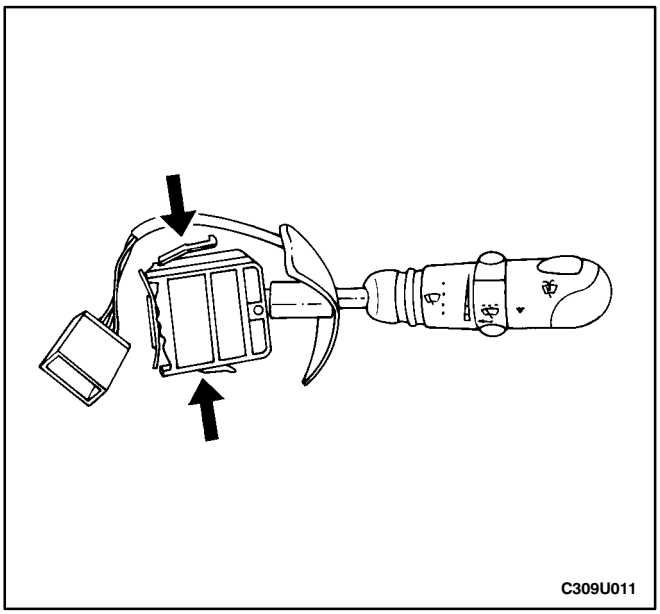
LEVER SWITCH

Removal Procedure

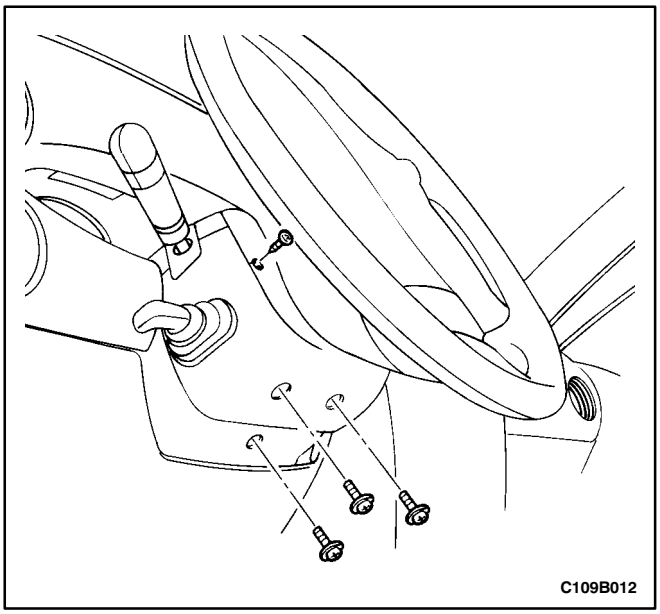
1. Remove the screws which retain the upper and lower steering column covers. It is not necessary to remove the steering wheel because access to the screws is possible by turning the steering wheel.


C309U002

2. Remove the screw that attaches the hood release handle.


C309U011

3. Carefully remove the knee bolster trim panel by pulling until the retaining clips are free from the slots in the instrument panel.
4. Remove the upper and the lower steering column covers.
5. Depress the retaining tabs of the cruise control lever switch.
6. Slide the cruise control switch away from the steering column.
7. Disconnect the electrical connectors from the cruise control lever switch.

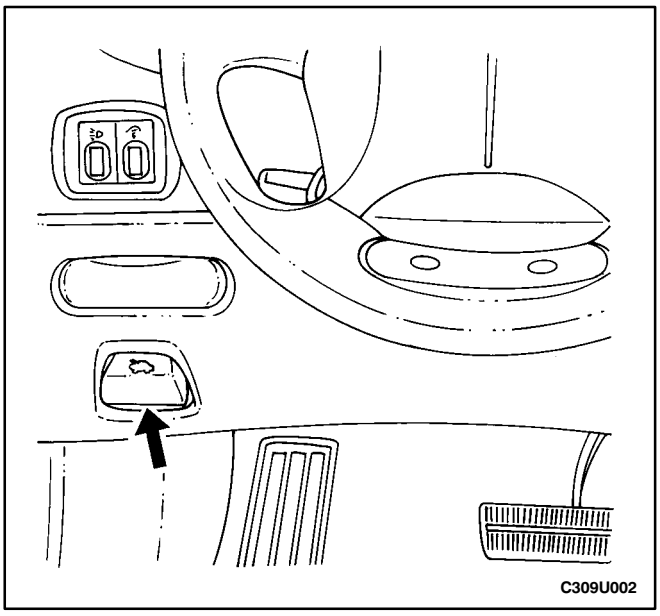

C109B012

Installation Procedure

1. Align the cruise control switch and slide it toward the steering column until the retaining tabs lock.
2. Connect the electrical connectors to the cruise control lever switch.
3. Install the upper and the lower steering column covers with the screws.

Tighten

Tighten the steering column cover retaining screws to 3 N•m (27 lb-in).


C309U002

4. Align the knee bolster trim panel and press the retaining clips into the slots in the instrument panel.
5. Install the hood release handle screw.

Tighten

Tighten the hood release handle screw to 2.5 N•m (22 lb-in).

GENERAL DESCRIPTION AND SYSTEM OPERATION

CRUISE CONTROL SYSTEM OPERATION

The purpose of the cruise control system is to automatically maintain a vehicle speed set by the driver. When the cruise control is activated, speed is maintained or increased by means of an electronically controlled cable attached to the accelerator assembly. If the vehicle must be slowed to maintain the speed that was set by the driver, the cruise control system allows the throttle return spring to close the throttle.

If driving conditions require sudden acceleration after the cruise control has been set, speed can be increased in the normal manner by manually pressing the accelerator. The cruise control is disengaged if the brakes (or clutch, with manual transmission) are applied.

The minimum speed for setting the cruise control is 38.6 km/h (24 mph). When cruise control is operating, the CRUISE indicator lamp is turned on in the instrument cluster.

The cruise control system is capable of monitoring internal software and hardware faults as well as external faults in the connectors and wire harness. If a fault is detected, cruise control is stopped immediately, and the program logic and hardware logic independently prevent the cruise control from opening the throttle.

The cruise control will function in temperatures ranging from –40°C (–40°F) to 85°C (185°F). Maximum temperature could cause the regulation properties to be out of tolerance, but the safety shutdown is still operational under maximum temperature conditions. If high temperature interferes with cruise control operation, the actuator electromagnetic clutch will open, and the throttle return spring will close the throttle unless the accelerator pedal is pressed.

CRUISE CONTROL ACTUATOR

The cruise control actuator is a single component system. The electronic controls are combined in one housing with the mechanical components. The actuator is mounted in the passenger compartment.

The mechanical components of the cruise control actuator are listed below:

- Permanent field DC motor.
- Single stage belt transfer gearing.
- Spindle drive.
- Electromagnetic clutch.
- Clutch plate with cable attachment.
- End switches.
- Plastic housing with noise reduction cover.
- Damping unit for clutch plate slap.

The mechanical parts are not serviceable. The entire actuator must be replaced if it is mechanically defective.

The electronics of the cruise control system include the following items:

- A microprocessor which controls speed regulation and monitors input signals.
- A clutch activation circuit which energizes the clutch magnet in order to couple the DC motor to the control cable.
- A driver circuit which activates the DC motor in a clockwise or counterclockwise direction.
- A control unit for lamp activation.

The electronic parts are not serviceable. The entire actuator must be replaced if there is an electronic defect in one of the systems.

LEVER SWITCH

After the main switch is turned ON and the neutral position of the lever switch is detected by the cruise control actuator, the following operations can be performed by using the cruise control lever switch:

Set

If the cruise control is ON and the minimum speed is 38.6 km/h (24 mph), but not more than 155 km/h (96 mph), the target speed can be set by selecting the SET button for 10 to 300 milliseconds. If SET is selected for more than 300 milliseconds, the cruise will be activated in the (COAST) function. If the accelerator is pressed by the driver after the cruise control has been set, the previous target speed will be maintained when the accelerator is released. If the accelerator is pressed by the driver until the actual speed is more than 35 km/h (22 mph) over the target speed, or until the vehicle exceeds 160 km/h (99 mph), the cruise control will disengage.

Coast

If a target speed has been set and (COAST) is selected for at least 300 milliseconds, the throttle is allowed to return to idle, and the vehicle will coast. When the (COAST) switch is released, the current speed will be maintained as the new target speed. If the vehicle speed drops below 32.2 km/h (20 mph) while coasting, the cruise control will be disengaged. If the switch is released between 32.2 km/h (20 mph) and 38.6 km/h (24 mph), the minimum target speed of 38.6 km/h (24 mph) will be used.

Resume

If the cruise control is ON, and the system was disengaged by using the brake or clutch, exceeding the maximum speed, failing to maintain the minimum speed, or exceeding the target speed by more than 35 km/h (22 mph), the last memorized speed can be reset by selecting RESUME if the time since disengagement is not greater than 5 seconds. The RESUME function is selected by switching to RESUME for 10 to 300 milliseconds. If the actual speed is below the target speed when RESUME is selected, the vehicle will be accelerated at 3.4 km/h per second (2.1 mph/second) until the vehicle is within 10 km/h (6 mph) of the target speed, and then acceleration will be reduced in order to

achieve a smooth transition from acceleration to cruising. If the actual speed is above the target speed when RESUME is selected, the throttle will be allowed to return to idle until the target speed is achieved. RESUME can be canceled by selecting SET, and then the current speed will be maintained as the new target speed.

Accelerate

If cruise control is ON, and the (ACCEL) switch is selected for more than 300 milliseconds, the vehicle will accelerate. The acceleration is maintained at the rate of 3.4 km/h per second (2.1 mph/second) as long as vehicle performance is sufficient; otherwise, full throttle is applied. When the switch is released, the current speed will be stored and used as the new target speed. The (ACCEL) switch cannot be used for acceleration above 155 km/h (96 mph). If 155 km/h (96 mph) is attained, acceleration will stop and 155 km/h will be set as the new target speed.

Tap-Up

If the cruise control has been set, and RESUME is selected again for more than 10 milliseconds but less than 300 milliseconds, the target speed will be increased by 2 km/h (1.2 mph) for each time that the RESUME button was selected (or tapped). If the driver has used the accelerator to increase speed over 8 km/h over the current target speed, a tap-up signal will be interpreted as a normal SET signal. The cruise control will not accept a tap-up target speed above 155 km/h (96 mph). If the actual speed has fallen 16.1 km/h (10 mph) below the target speed, tap-up signals are not accepted.

Tap-Down

If the cruise control is already set and SET is selected for between 10 and 300 milliseconds, the target speed will be decreased by 2 km/h for each time that SET was selected (or tapped). Tap-down signals will not be accepted for a target speed below 38.6 km/h (24 mph). If the vehicle speed has increased to 8 km/h (5 mph) over the target speed, the cruise control system will interpret a tap-down signal as a SET.

If the cruise control is turned OFF with the main switch, all cruise control functions are stopped, the actuator cable is driven toward idle, and then the electromagnetic clutch for the cable actuator is opened. The cable actuator clutch is not opened immediately to accomplish a smooth transition in vehicle speed. If the cruise control is off for more than 5 seconds, the memorized target speed is erased.