

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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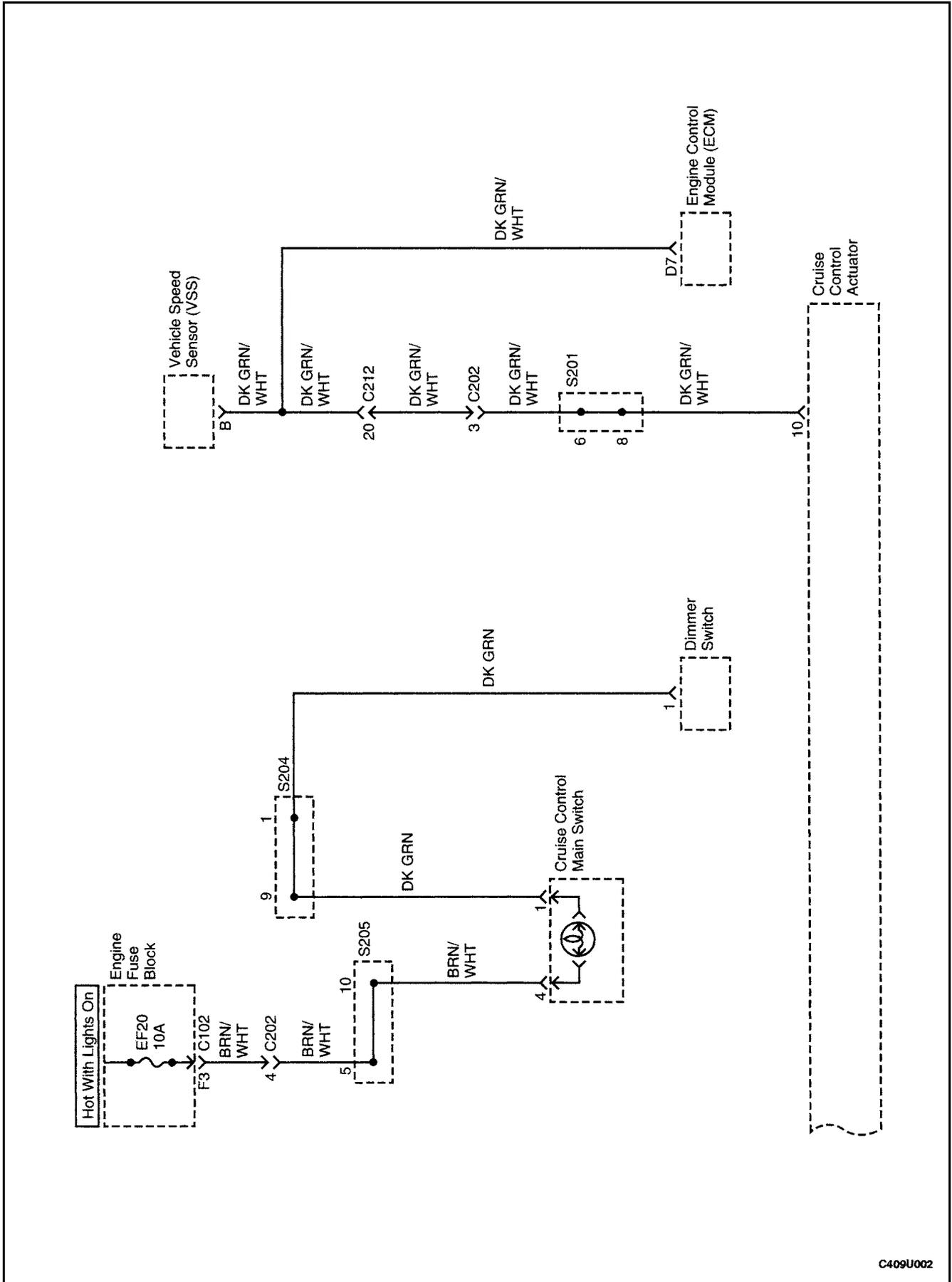
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SPECIFICATIONS

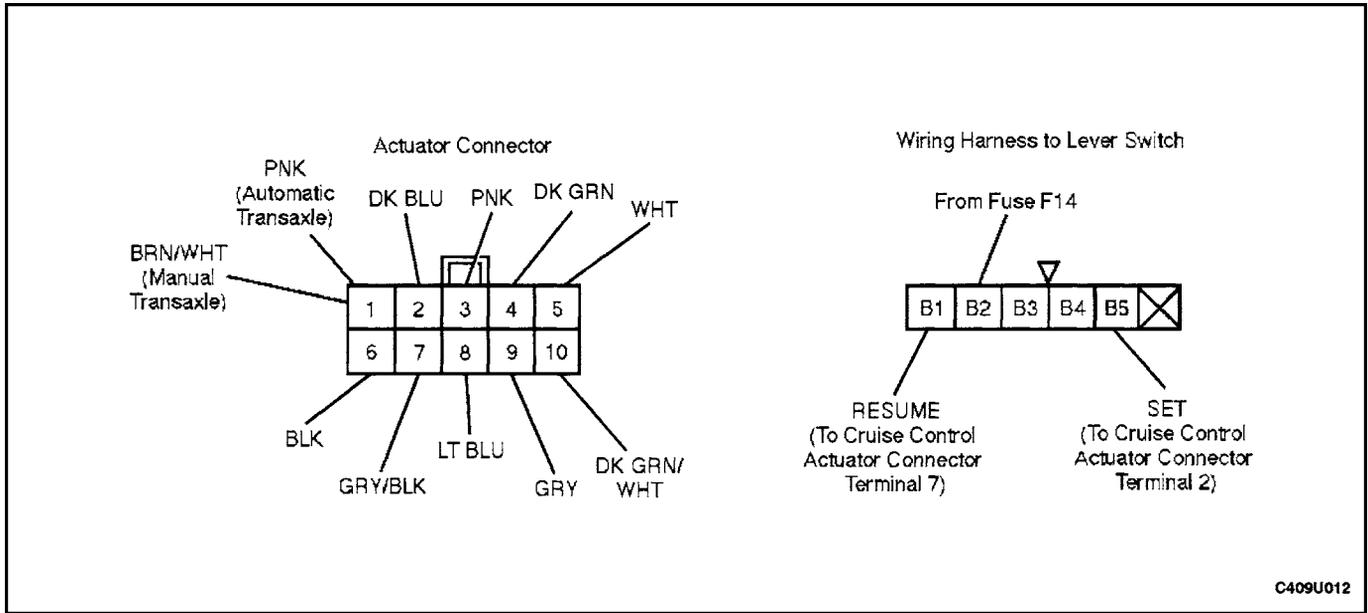
FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Cruise Control Actuator Mounting Bolts	6	–	53
Hood Release Handle Screw	3	–	27

CRUISE CONTROL SYSTEM(2 OF 2)



DIAGNOSIS



C409U012

CRUISE CONTROL DIAGNOSIS

Test Description

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

- 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: <ul style="list-style-type: none"> 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 faulty in Step 1. Is the repair complete?		System OK	
3	1. Connect a scan tool to the data link connector (DLC). 2. Check for engine control diagnostic trouble codes (DTCs). Is a vehicle speed sensor (VSS) DTC 722, or DTC 723 present?		Go to Step 5	Go to Step 4
4	Diagnose the VSS DTC or automatic transaxle DTCs. After the VSS has been repaired, is the cruise control still inoperative?		Go to Step 5	Go to Step 4

Step	Action	Value(s)	Yes	No
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 either fuse blown?		Go to Step 8	Go to Step 9
8	1. Check for a short circuit and repair it, 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 voltage equal to the specified value?	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 3 of the cruise control actuator 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 cruise control actuator connector terminal 3. 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 cruise control actuator connector terminal 6 and ground. Is the resistance equal to the specified value?	$\approx 0 \Omega$	Go to Step 15	Go to Step 14
14	Repair the open circuit between ground and terminal 6 of the cruise control 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 8 and ground. Is the resistance equal to the specified value?	$\approx 0 \Omega$	Go to Step 17	Go to Step 16
16	Repair the open circuit between the cruise control actuator connector terminal 8 and the instrument splice pack 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 4 of the cruise control actuator connector. Is the voltage equal to the specified value?	11–14 v	Go to Step 19	Go to Step 18

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Step	Action	Value(s)	Yes	No
18	Repair the open circuit between fuse F18 and terminal 4 of the cruise control actuator connector. 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 1 of the connector. Is the voltage equal to the specified value?	11–14 v	Go to <i>Step 21</i>	Go to <i>Step 20</i>
20	Repair the open circuit between fuse F18 and terminal 1 of the cruise control actuator connector. Is the repair complete?		System OK	
21	1. Turn the ignition ON. 2. Turn the cruise control main switch OFF. 3. With the electrical connector still removed from cruise control actuator, use a voltmeter to check the voltage at terminal 9 of the connector. Is the voltage equal to the specified value?	$\approx 0 \Omega$	Go to <i>Step 23</i>	Go to <i>Step 22</i>
22	Repair the short to voltage between the cruise control main switch and the cruise control actuator connector terminal 9. Is the repair complete?		System OK	—
23	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, use a voltmeter to check the voltage at terminal 9 of the connector. Is the voltage equal to the specified value?	11–14 v	Go to <i>Step 28</i>	Go to <i>Step 24</i>
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 control main switch. Is the voltage equal to the specified value?	11–14 v	Go to <i>Step 26</i>	Go to <i>Step 25</i>
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 control main switch. Is the voltage equal to the specified value?	11–14 v	Go to <i>Step 28</i>	Go to <i>Step 27</i>
27	Replace the cruise control main switch. Is the repair complete?		System OK	—

Step	Action	Value(s)	Yes	No
28	<ol style="list-style-type: none"> 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 7 and 2 of the connector. <p>Is the voltage equal to the specified value?</p>	$\approx 0 \text{ v}$	Go to <i>Step 32</i>	Go to <i>Step 29</i>
29	<ol style="list-style-type: none"> 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 7 and 2 of the cruise control actuator connector. <p>Is the voltage equal to the specified value?</p>	0 v	Go to <i>Step 30</i>	Go to <i>Step 31</i>
30	<p>Replace the cruise control lever switch.</p> <p>Is the repair complete?</p>		System OK	
31	<p>Repair the short to voltage between the cruise control lever switch and the cruise control actuator connector.</p> <p>Is the repair complete?</p>		System OK	
32	<ol style="list-style-type: none"> 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 2 of the cruise control actuator connector. <p>Is the voltage equal to the specified value?</p>	11–14 v	Go to <i>Step 33</i>	Go to <i>Step 37</i>
33	<ol style="list-style-type: none"> 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 7 of the cruise control actuator connector. <p>Is the voltage equal to the specified value?</p>	11–14 v	Go to <i>Step 34</i>	Go to <i>Step 37</i>
34	<ol style="list-style-type: none"> 1. Turn the ignition OFF. 2. Disconnect the VSS. 3. Use an ohmmeter to check the continuity between the GRN/WHT wire at the VSS and terminal 10 of the cruise control actuator connector. <p>Is the continuity equal to the specified value?</p>	$\approx 0 \Omega$	Go to <i>Step 36</i>	Go to <i>Step 35</i>
35	<p>Repair the open circuit between the VSS and the cruise control actuator connector terminal 10.</p> <p>Is the repair complete?</p>		System OK	—
36	<p>Replace the cruise control actuator connector.</p> <p>Is the repair complete?</p>		System OK	

9U – 8 CRUISE CONTROL SYSTEM

Step	Action	Value(s)	Yes	No
37	<ol style="list-style-type: none"> 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. <p>Is the voltage equal to the specified value?</p>	11–14 v	Go to <i>Step 39</i>	Go to <i>Step 38</i>
38	<p>Repair the open circuit between the cruise control main switch and the cruise control lever switch.</p> <p>Is the repair complete?</p>		System OK	
39	<ol style="list-style-type: none"> 1. Use an ohmmeter to check for an open circuit between terminal B1 of the wiring harness at the lever switch and terminal 7 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 2 of the actuator connector. <p>Does the ohmmeter indicate the specified value for both measurements?</p>	$\approx 0 \Omega$	Go to <i>Step 40</i>	Go to <i>Step 41</i>
40	<p>Replace the lever switch.</p> <p>Is the repair complete?</p>		System OK	
41	<p>Repair the open circuit between the lever switch connector and the actuator connector.</p> <p>Is the repair complete?</p>		System OK	

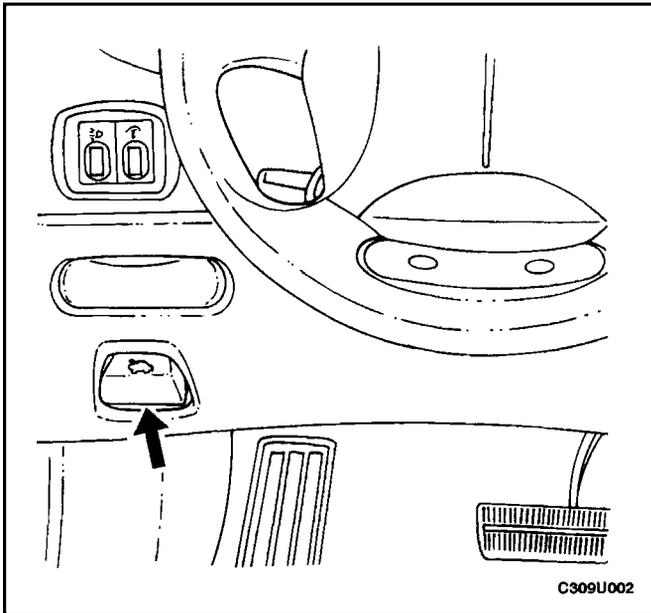
MAINTENANCE AND REPAIR

ON-VEHICLE SERVICE CRUISE CONTROL ACTUATOR

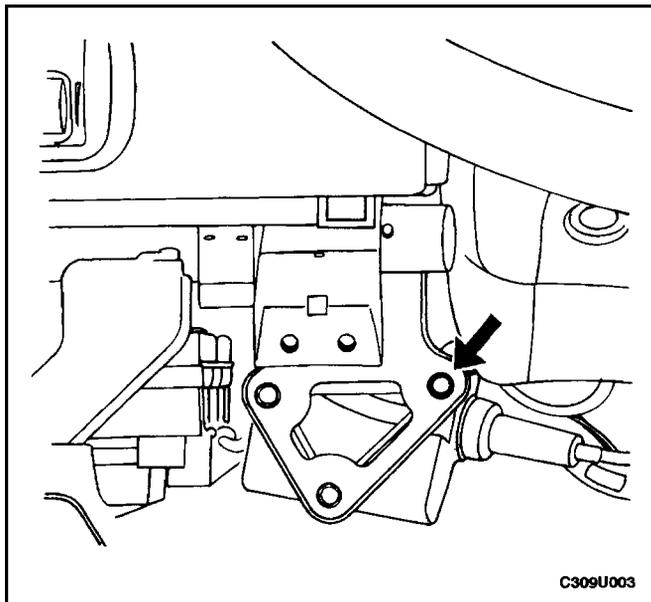
Removal Procedure

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. Remove the knee bolster. Refer to *Section 9G, Interior Trim*.
4. Disconnect the electrical connector from the cruise control actuator.
5. Remove the cruise control actuator mounting bolts.
6. Press the release button on the cable adjuster and push the cable toward the adjuster until the spring is compressed.

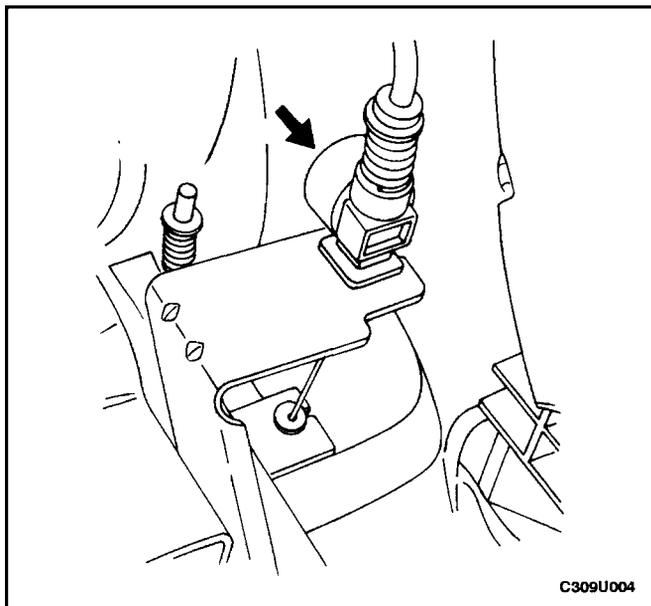
Notice : When the adjuster button is pressed, do not allow the adjuster spring to expand to a length of more than 2 cm (3/4 inch) or the adjuster rack will come out of the adjuster, and it will have to be reinserted. To keep the adjuster in one piece during adjustment, hold the cable when the adjuster button is pressed.



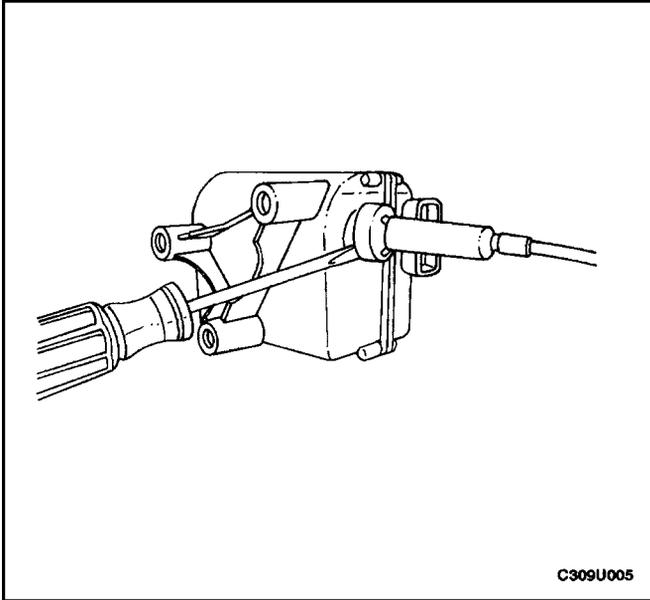
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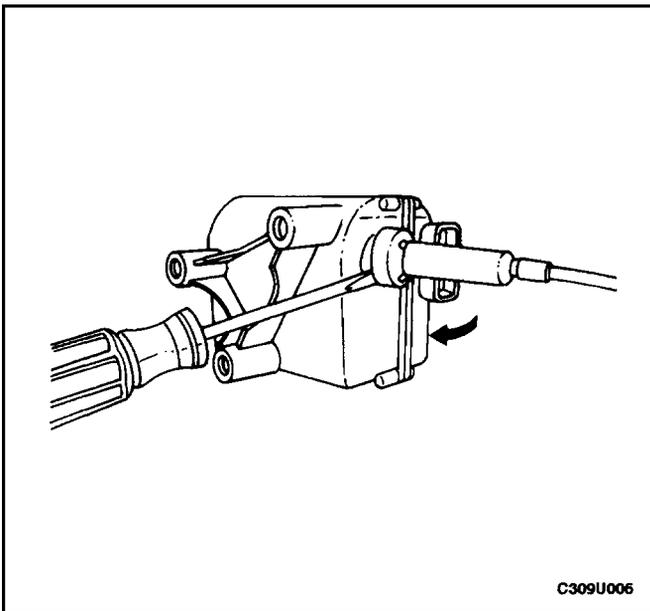
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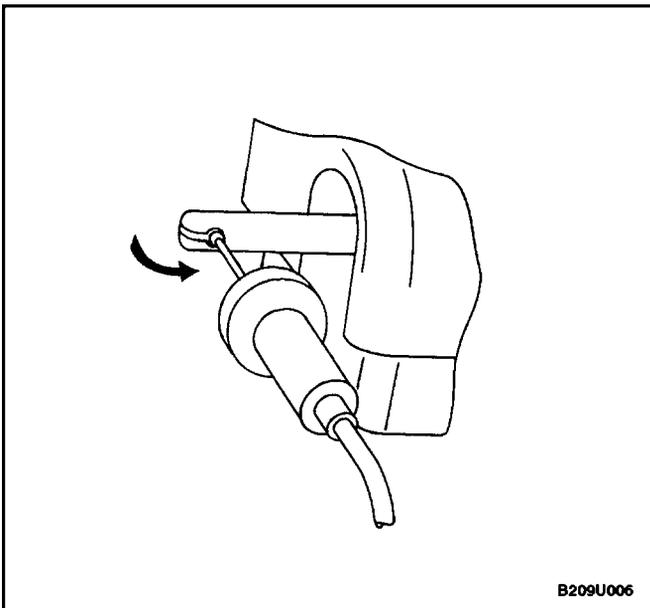
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7. Tilt the cable housing and insert a flat-blade screwdriver into one of the slots in the actuator.

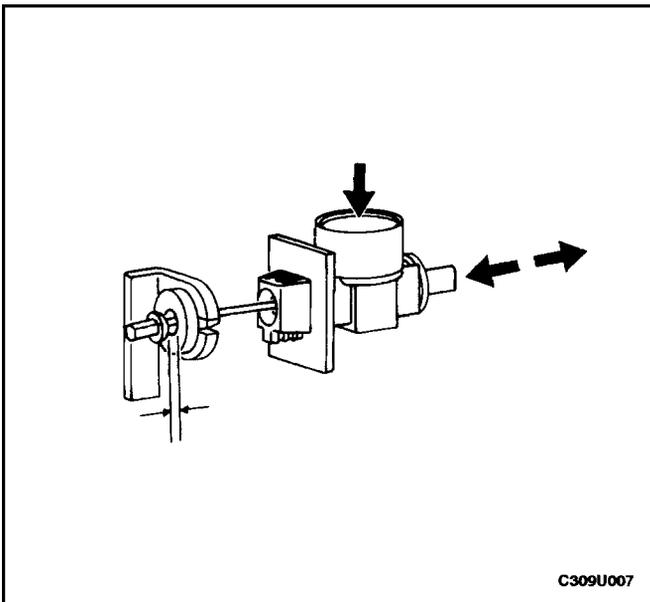
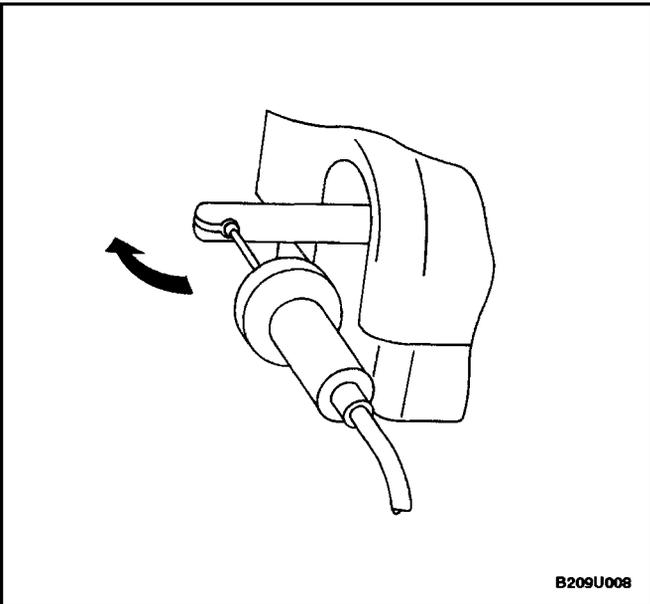
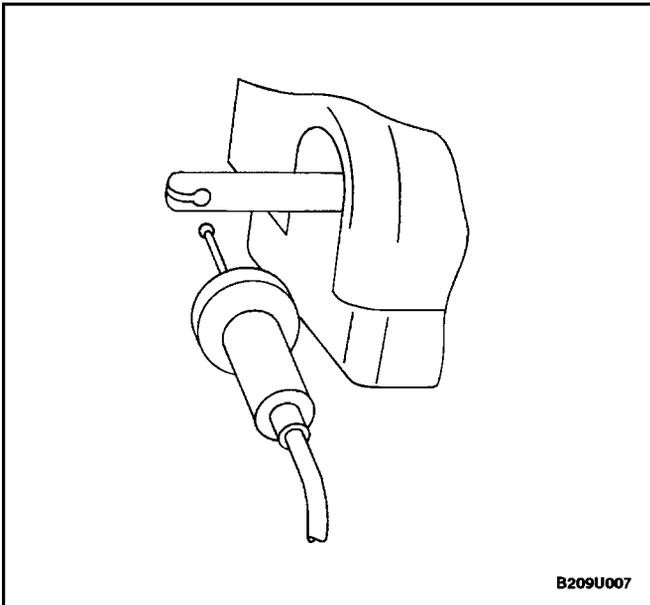


8. Tilt the cable housing toward the screwdriver. The cable housing retainers will release.



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

10. Remove the actuator from the cable.



Installation Procedure

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

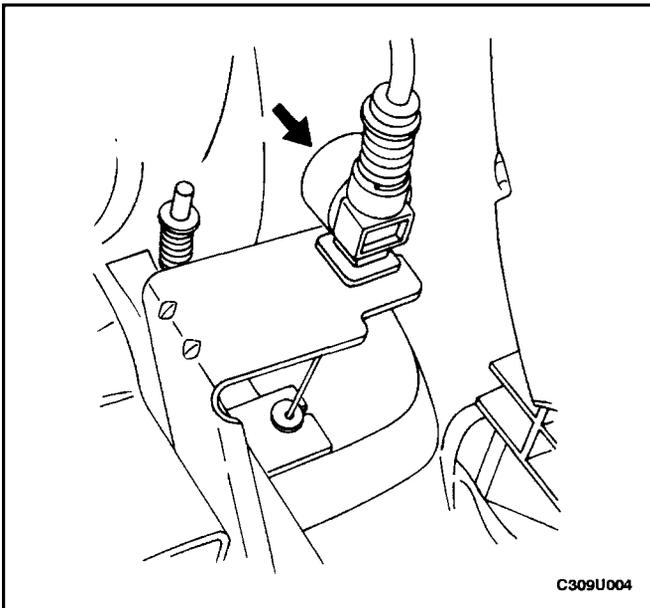
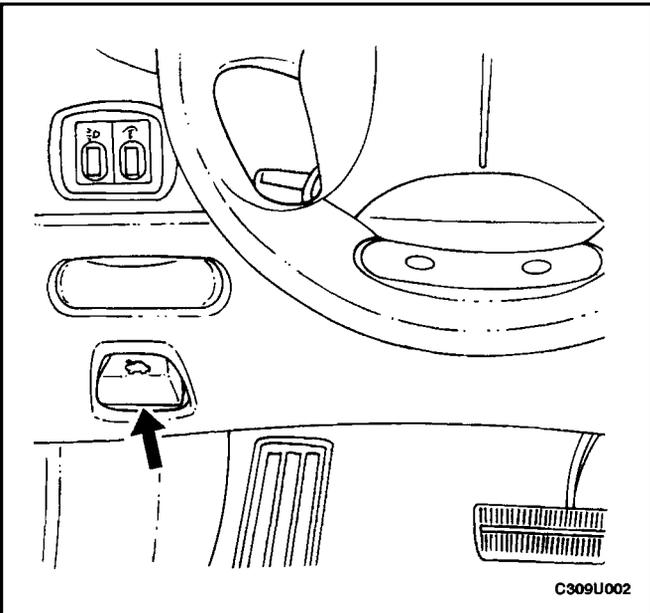
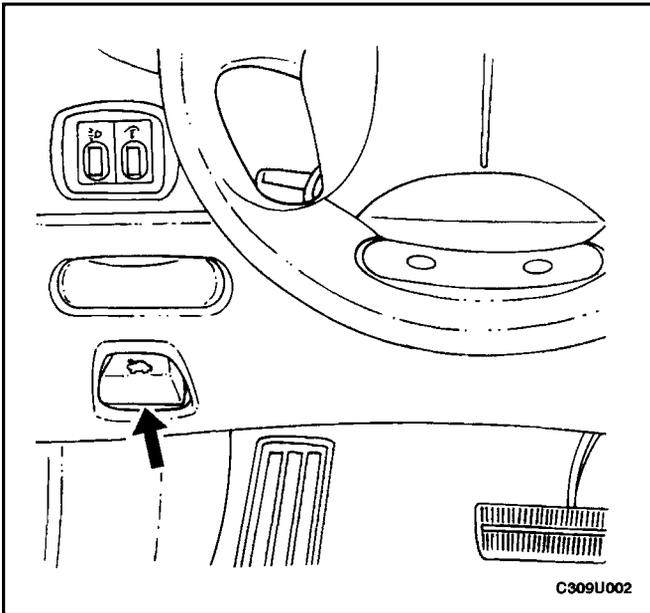
2. Push the cable housing and the sleeve into the actuator until the retainers lock the cable housing in place.
3. Install the cruise control actuator mounting bolts.

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.

Notice : When the adjuster button is pressed, do not allow the adjuster spring to expand to a length of more than 2 cm (3/4 inch) or the adjuster rack will come out of the adjuster, and it will have to be reinserted. To keep the adjuster in one piece during adjustment, hold the cable when the adjuster button is pressed.



5. Connect the electrical connector to the cruise control actuator.
6. Install the knee bolster. Refer to *Section 9G, Interior Trim*.
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 3 N•m (27 lb-in).

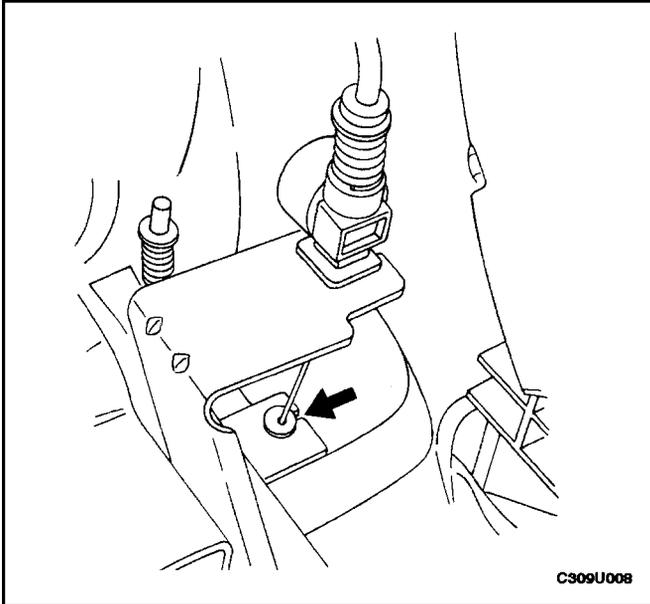
ACTUATOR CONTROL CABLE

Removal Procedure

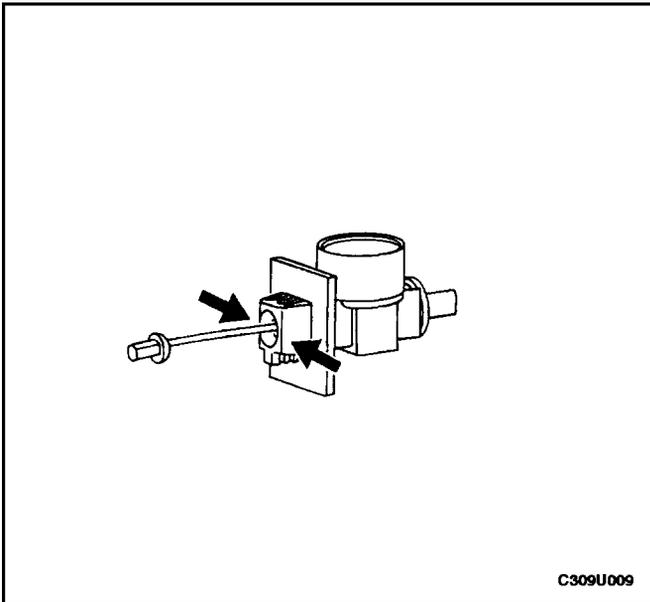
1. Remove the screw that attaches the hood release handle.

2. Carefully remove the knee bolster trim panel by pulling until the retaining clips are free from the slots in the instrument panel.
3. Remove the knee bolster. Refer to *Section 9G, Interior Trim*.
4. Press the release button on the cable adjuster and push the cable toward the adjuster until the spring is compressed.

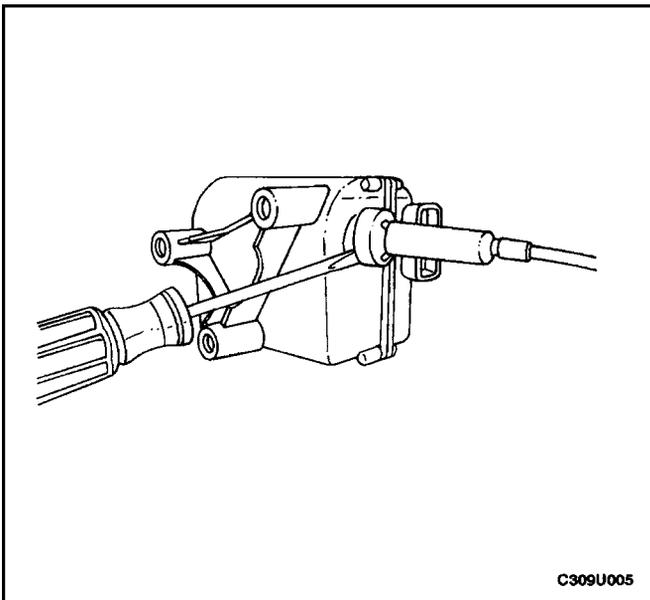
Notice : When the adjuster button is pressed, do not allow the adjuster spring to expand to a length of more than 2 cm (3/4 inch) or the adjuster rack will come out of the adjuster, and it will have to be reinserted. To keep the adjuster in one piece during adjustment, hold the cable when the adjuster button is pressed.



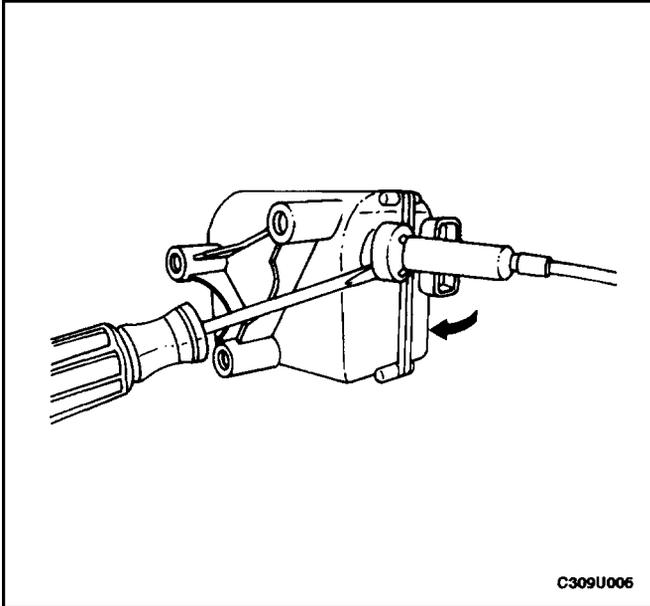
5. Remove the cable bushing from the accelerator assembly.



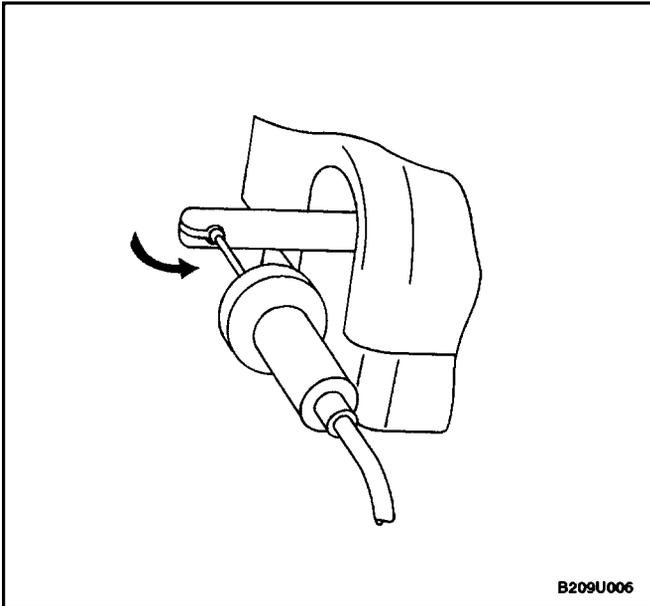
6. Press the retaining tabs of the cable adjuster and remove the adjuster from the mounting bracket.



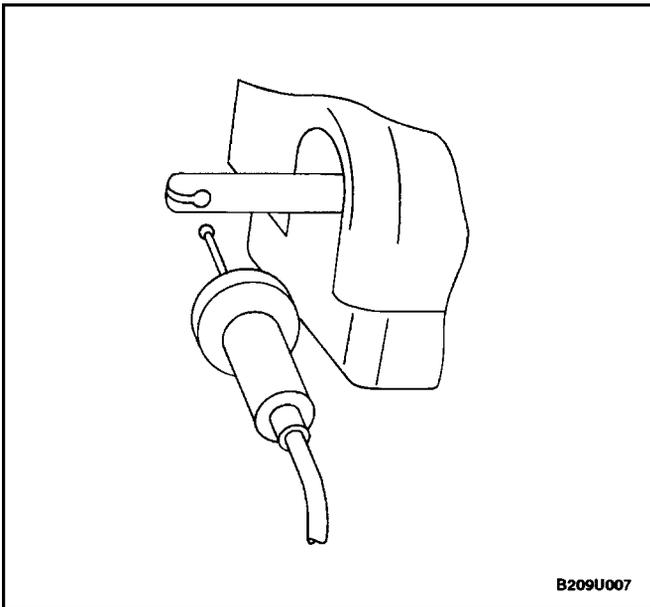
7. Tilt the cable housing and insert a flat-blade screwdriver into one of the slots in the actuator.



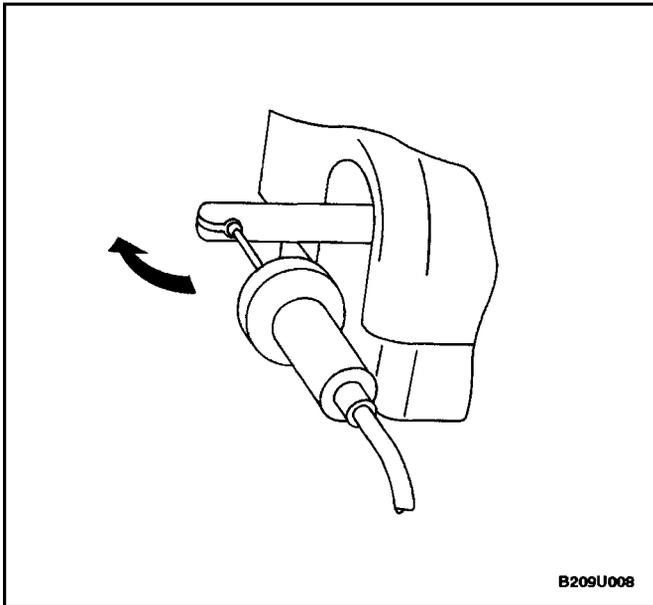
8. Tilt the cable housing toward the screwdriver. The cable housing retainers will release.



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

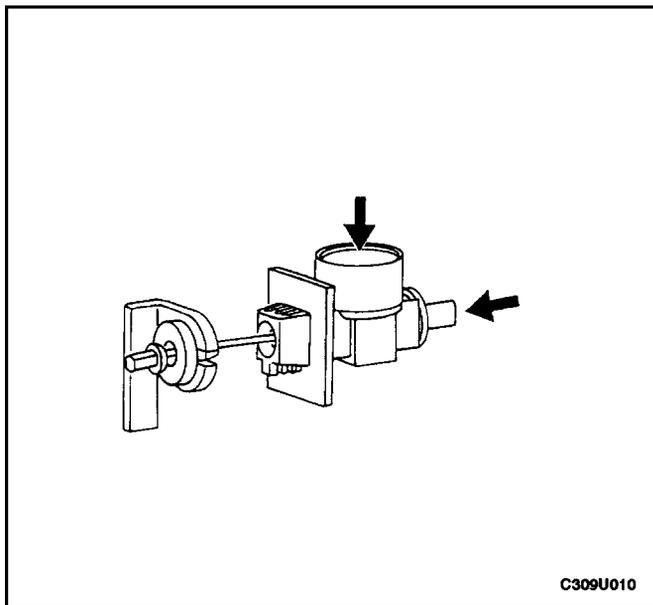


10. Remove the actuator from the cable.



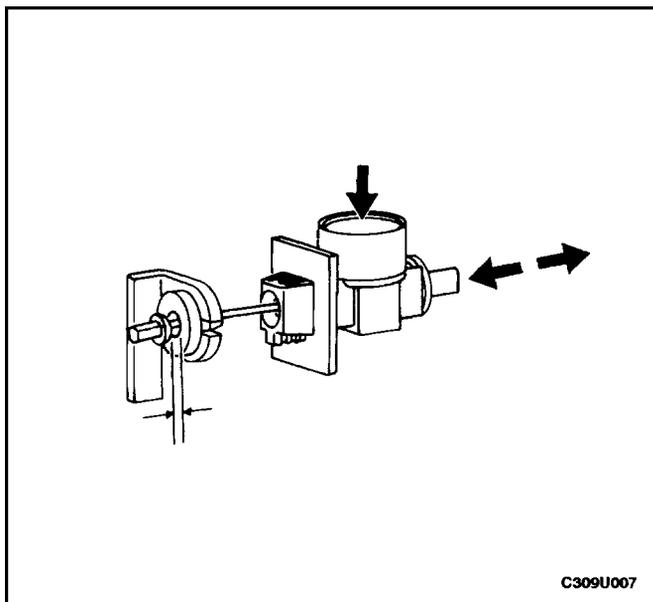
Installation Procedure

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

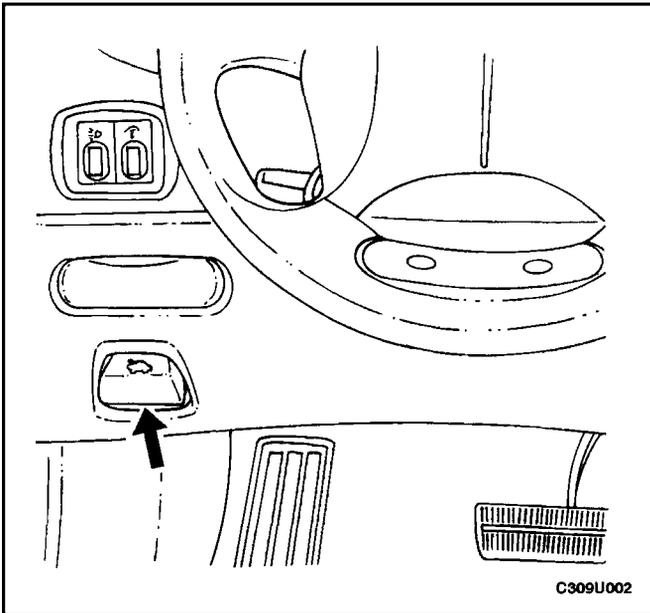


2. Push the guide sleeve onto the actuator rod and press the cable housing onto the actuator until it is locked in place by the retainers.
3. Clip the cable adjuster into the bracket of the pedal mount assembly.
4. Press the cable release button and slide the cable into the adjuster until the spring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

Notice : When the adjuster button is pressed, do not allow the adjuster spring to expand to a length of more than 2 cm (3/4 inch) or the adjuster rack will come out of the adjuster, and it will have to be reinserted. To keep the adjuster in one piece during adjustment, hold the cable when the adjuster button is pressed.



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.



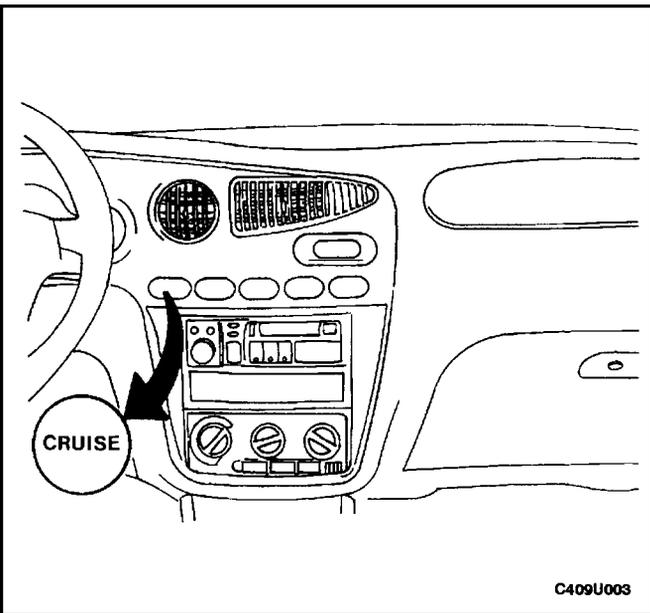
7. Install the knee bolster. Refer to *Section 9G, Interior Trim*.
8. Align the knee bolster trim panel and press the retaining clips into the slots in the instrument panel.
9. Install the hood release handle screw.

Tighten

Tighten the hood release handle screw to 3 N•m (27 lb-in).

LEVER SWITCH

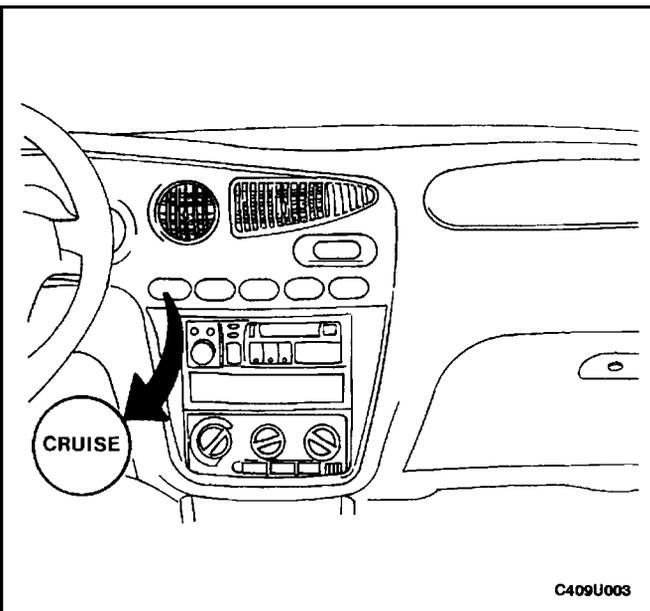
Refer to *Section 6E, Steering Wheel and Column*.



MAIN SWITCH

Removal Procedure

1. Remove the instrument cluster trim panel. Refer to *Section 9E, Instrumentation/Driver Information*.
2. Disconnect the electrical connector from the cruise control main switch.
3. Press the retaining tabs to release the cruise control main switch, and push it out of the trim panel.



Installation Procedure

1. Push the cruise control main switch into the instrument cluster trim panel until it is locked in place by its retainers.
2. Connect the electrical connector to the cruise control main switch.
3. Reinstall the instrument cluster trim panel. Refer to *Section 9E, Instrumentation/Driver Information*.

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 transaxle) 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 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 will still be 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 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.

MAIN SWITCH

The cruise control main switch is located in the center of the instrument panel. Cruise control can only be set with the lever switch when the main switch is on. The main switch includes an indicator which turns on when the main switch is pressed. If the switch is pressed again, the indicator and the switch will turn off. The main switch is also connected to the instrument illumination system, and will illuminate when the headlamps or the parking lamps are on.

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 control 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 will 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 accelerate 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 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 increase 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 decrease 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 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.