

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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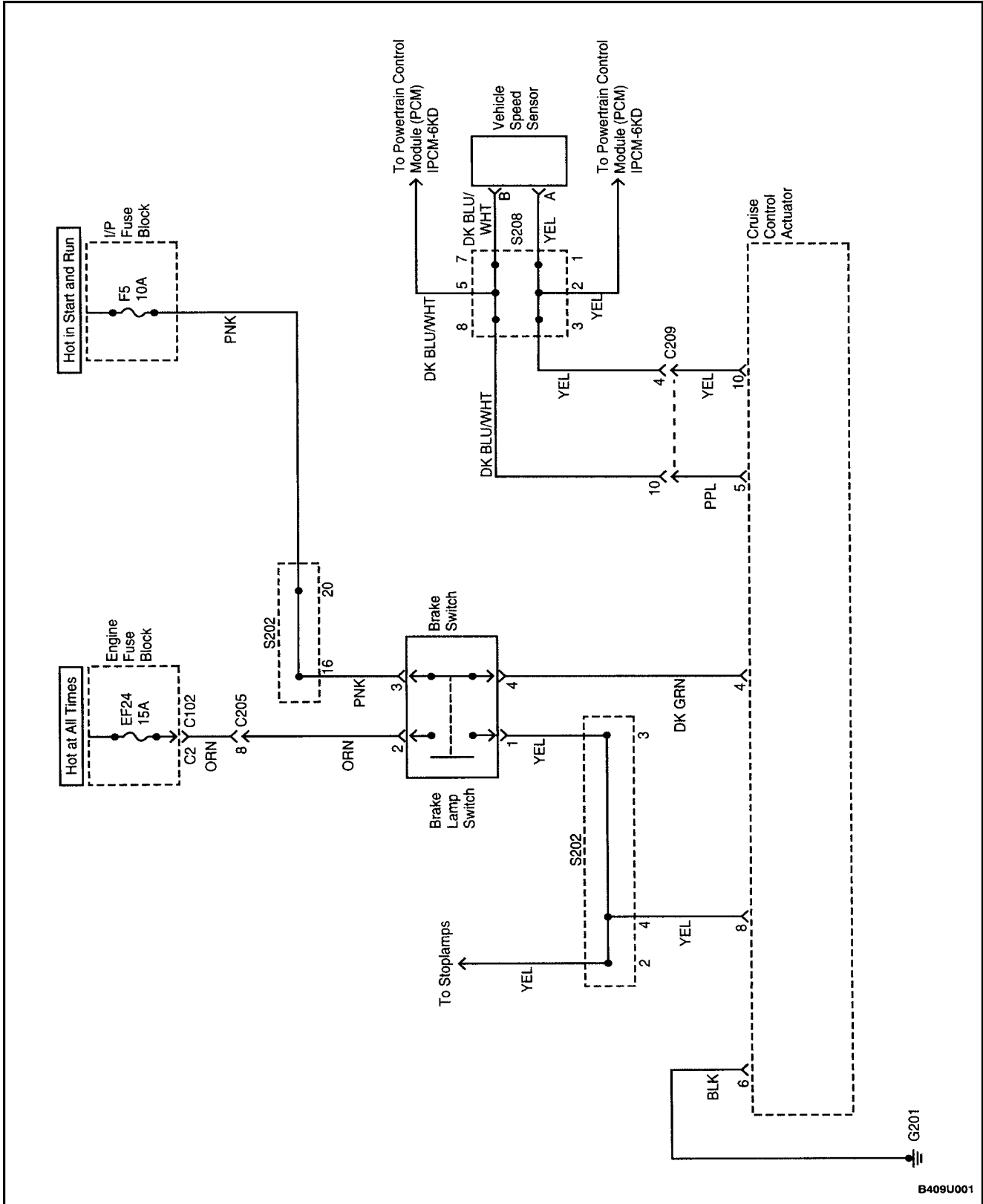
SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

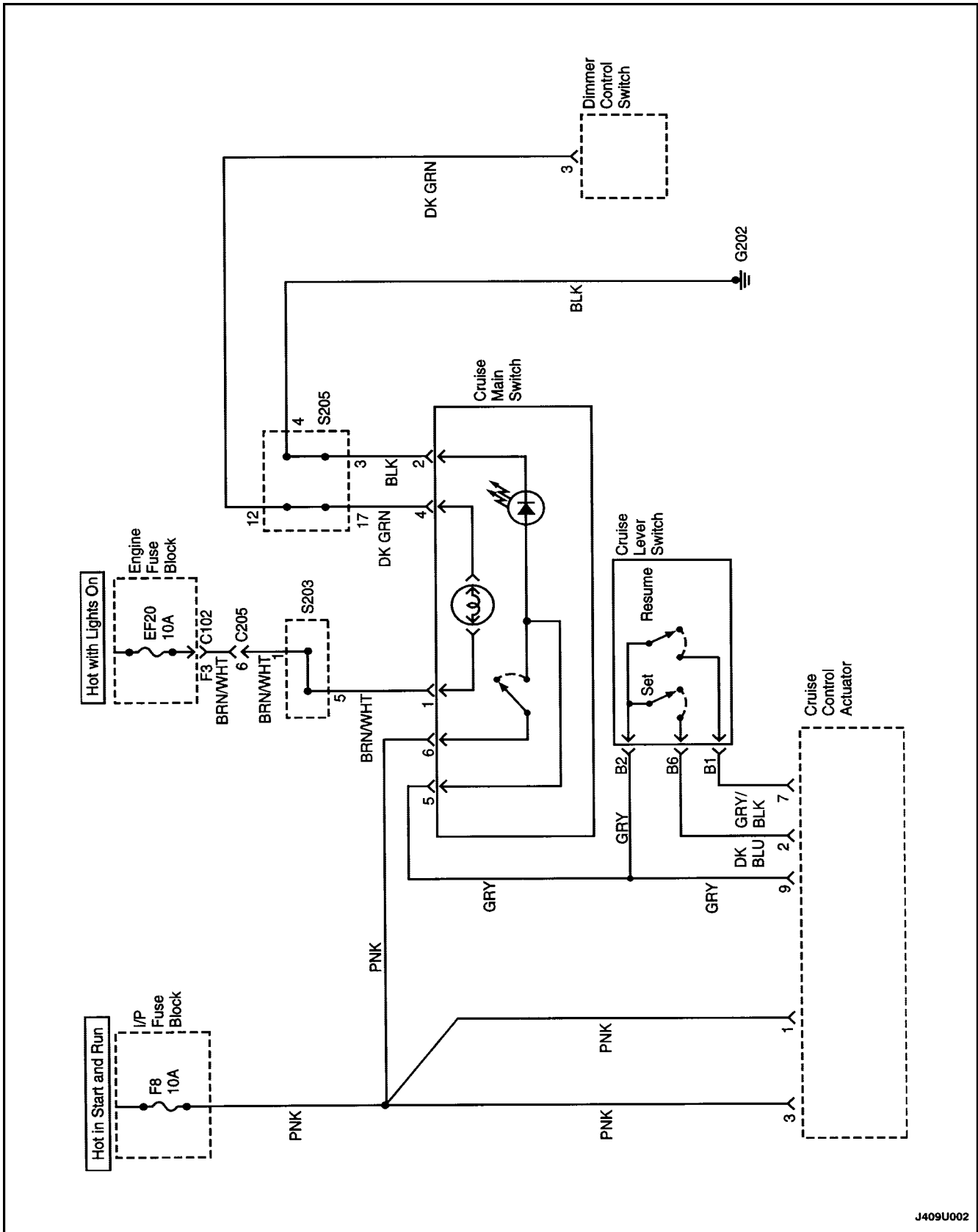
Application	N•m	Lb-Ft	Lb-In
Actuator Bolts	4	–	35
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SCHEMATIC AND ROUTING DIAGRAMS

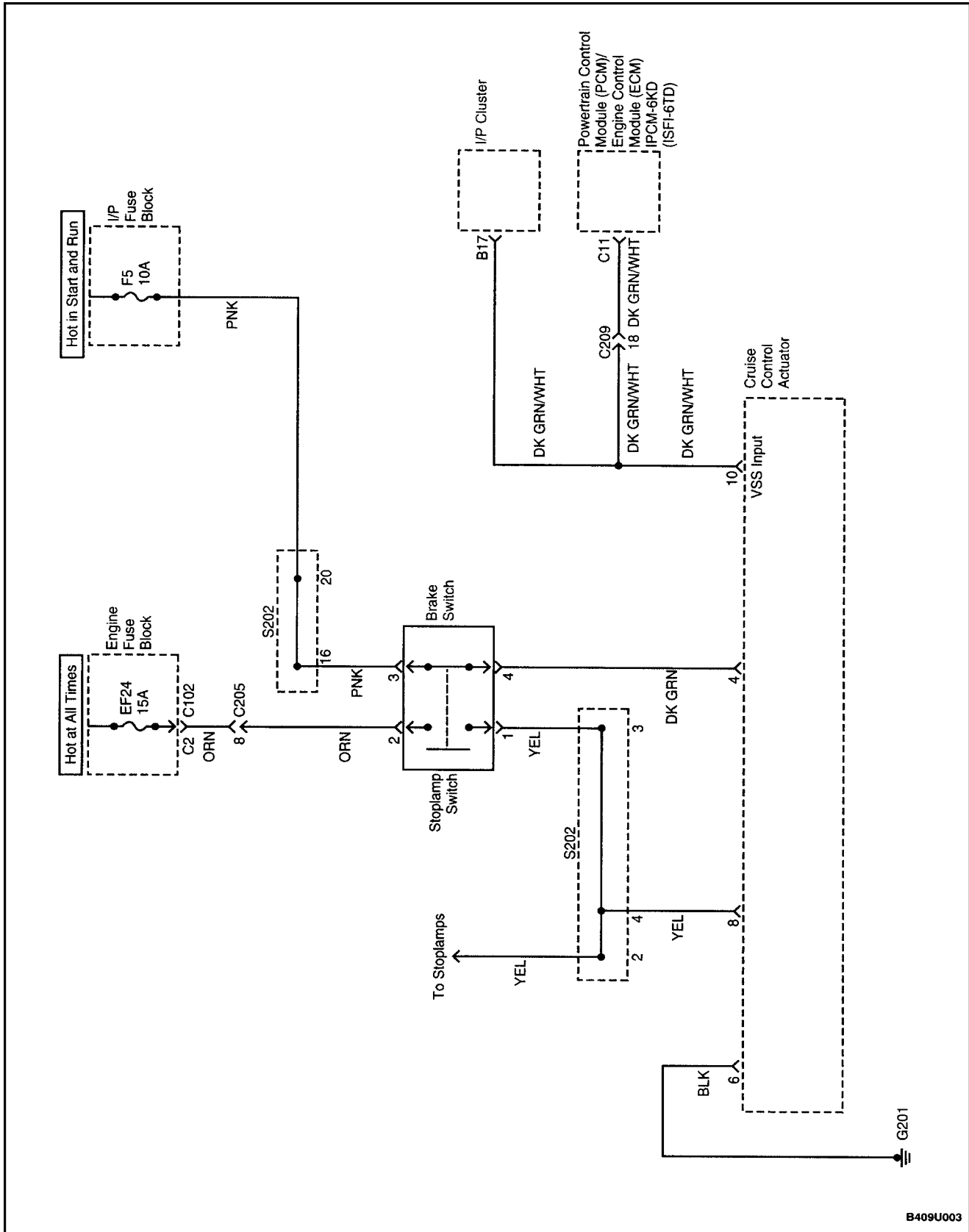
CRUISE CONTROL SYSTEM (AUTOMATIC TRANSAXLE) (1 OF 2)



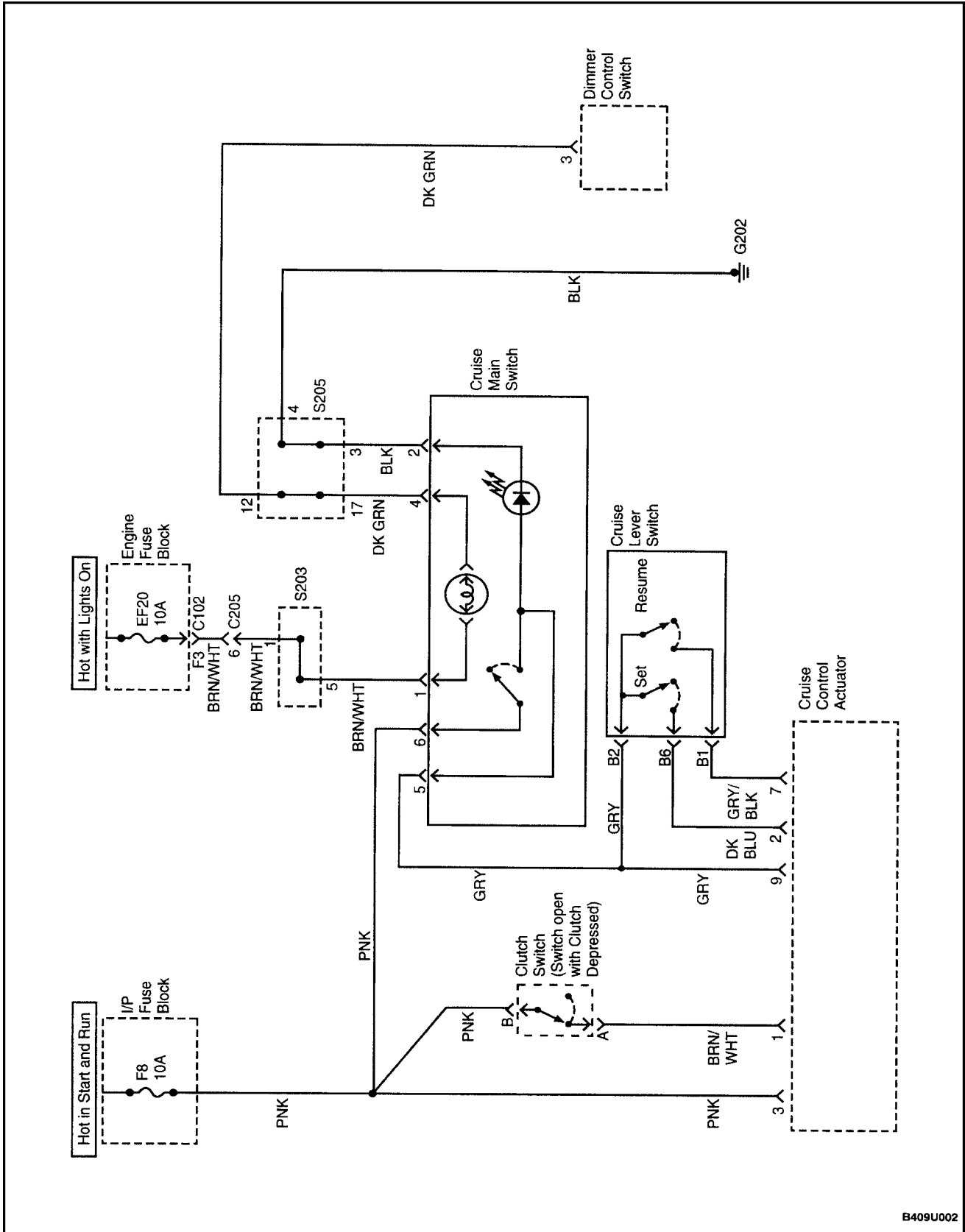
CRUISE CONTROL SYSTEM (AUTOMATIC TRANSAXLE) (2 OF 2)



CRUISE CONTROL SYSTEM (MANUAL TRANSAXLE) (1 OF 2)



CRUISE CONTROL SYSTEM (MANUAL TRANSAXLE) (2 OF 2)



DIAGNOSIS

CRUISE CONTROL DIAGNOSIS

Test Description

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

5. This test is performed because 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. Are all of the above conditions verified?		Go to <i>Step 3</i>	Go to <i>Step 2</i>
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 data link connector (DLC). 2. Check for engine control diagnostic trouble codes (DTCs). Is a vehicle speed sensor (VSS) DTC or DTC722 or DTC723 present?		Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Diagnose and repair the cause of the DTCs. Is the cruise control still inoperative?		Go to <i>Step 5</i>	System OK
5	Observe the brake lamps when the brakes are applied. Do the brake lamps turn on when the brakes are applied and turn off when the brakes are not applied?		Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	Repair the brake lamp system. Does the cruise control operate after the brake lamp system has been repaired?		System OK	Go to <i>Step 7</i>
7	Check fuses F5 and F8. Is a fuse blown?		Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	1. Check for a short circuit and repair it, if necessary. 2. Replace any blown fuses. Is the repair complete?		System OK	
9	1. Turn the ignition ON. 2. Check the voltage at fuses F5 and F8. Is the specified voltage available at fuses F5 and F8?	11–14 v	Go to <i>Step 11</i>	Go to <i>Step 10</i>
10	Repair the power supply to the fuse(s). Is the repair complete?		System OK	

Step	Action	Value(s)	Yes	No
11	<ol style="list-style-type: none"> 1. Disconnect the electrical connector from the cruise control actuator. 2. Turn the ignition ON. 3. Check the voltage at terminal H of the actuator connector. <p>Is the voltage equal to the specified value?</p>	11–14 v	Go to <i>Step 13</i>	Go to <i>Step 12</i>
12	<p>Repair the open circuit between fuse F8 and the cruise control actuator connector terminal 3.</p> <p>Is the repair complete?</p>		System OK	
13	<p>With the electrical connector still removed from the cruise control actuator, use an ohmmeter to measure the resistance between connector terminal 6 and ground.</p> <p>Does the ohmmeter indicate the specified value?</p>	$\approx 0 \Omega$	Go to <i>Step 15</i>	Go to <i>Step 14</i>
14	<p>Repair the open circuit between ground and terminal 6 of the actuator connector.</p> <p>Is the repair complete?</p>		System OK	
15	<p>With the electrical connector still disconnected from the cruise control actuator, use an ohmmeter to measure the resistance between connector terminal 8 and ground.</p> <p>Does the ohmmeter indicate the specified value?</p>	$\approx 0 \Omega$	Go to <i>Step 17</i>	Go to <i>Step 16</i>
16	<p>Repair the open circuit between the actuator connector terminal 8 and the instrument splice pack S202.</p> <p>Is the repair complete?</p>		System OK	
17	<ol style="list-style-type: none"> 1. Turn the ignition ON. 2. With the electrical connector still disconnected from the cruise control actuator, use a voltmeter to check the voltage at terminal 4 of the connector. <p>Is the voltage equal to the specified value?</p>	11–14 v	Go to <i>Step 19</i>	Go to <i>Step 18</i>
18	<p>Repair the open circuit between fuse F5 and terminal 4 of the cruise control actuator connector.</p> <p>Is the repair complete?</p>		System OK	
19	<ol style="list-style-type: none"> 1. Turn the ignition ON. 2. With the electrical connector still disconnected from the cruise control actuator, use a voltmeter to check the voltage at terminal 1 of the connector. <p>Is the voltage equal to the specified value?</p>	11–14 v	Go to <i>Step 21</i>	Go to <i>Step 20</i>
20	<p>Repair the open circuit between fuse F8 and terminal 1 of the cruise control actuator.</p> <p>Is the repair complete?</p>		System OK	
21	<ol style="list-style-type: none"> 1. Turn the ignition ON. 2. Make sure that the cruise main switch is OFF. 3. With the electrical connector still disconnected from the cruise control actuator, use a voltmeter to check the voltage at terminal 9 of the actuator connector. <p>Is the voltage equal to the specified value?</p>	$\approx 0 \text{ v}$	Go to <i>Step 23</i>	Go to <i>Step 22</i>

9U – 8 CRUISE CONRTOL SYSTEM

Step	Action	Value(s)	Yes	No
22	Repair the short to voltage between the cruisemain switch and the cruise control actuatorconnector terminal 9. 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 disconnected 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 29</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 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 thePNK wire between fuse F8 and the cruise controlmain 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 <i>Step 27</i>	Go to <i>Step 25</i>
27	Replace the cruise control main switch. Is the repair complete?		System OK	
28	Repair the open circuit between the cruise control main switch connector terminal 5 and the cruise control actuatorconnector terminal 9. Is the repair complete?		System OK	
29	1. Turn the ignition ON. 2. Turn the cruise control main switch ON. 3. With the electrical connector still disconnected from the cruise control actuator, check the voltage at terminals 7 and 2 of the connector. Is the voltage equal to the specified value?	≈ 0 v	Go to <i>Step 33</i>	Go to <i>Step 30</i>
30	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 disconnected from the cruise control actuator, check the voltage at terminals 7 and 2 of the cruise control actuator. Is the voltage equal to the specified value?	0 v	Go to <i>Step 31</i>	Go to <i>Step 32</i>
31	Replace the cruise control lever switch. Is the repair complete?		System OK	
32	Repair the short to voltage between the cruise control lever switch and the cruise control actuator. Is the repair complete?		System OK	

Step	Action	Value(s)	Yes	No
33	<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 connector for the cruise control actuator. <p>Does the voltmeter indicate the specified value?</p>	11–14 v	Go to <i>Step 39</i>	Go to <i>Step 34</i>
34	<ol style="list-style-type: none"> 1. Disconnect the 6–pin connector from the lever switch. 2. Turn the ignition ON. 3. Turn the cruise control main switch ON. 4. Check the voltage at terminal 3 of the wiring harness side of the 6–pin lever switch connector. <p>Is the voltage equal to the specified value?</p>	11–14 v	Go to <i>Step 36</i>	Go to <i>Step 35</i>
35	<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	
36	<ol style="list-style-type: none"> 1. Disconnect the 6–pin connector from the lever switch. 2. Connect an ohmmeter between terminals 3 and 8 at the switch side of the 6–pin connector. 3. Observe the ohmmeter when moving the lever switch to the SET position. <p>Does the ohmmeter indicate the specified value?</p>	$\approx 0 \Omega$	Go to <i>Step 38</i>	Go to <i>Step 37</i>
37	<p>Replace the lever switch.</p> <p>Is the repair complete?</p>		System OK	
38	<p>Repair the open circuit between the leverswitch connector terminal B6 and the cruise control actuator connector terminal 2.</p> <p>Is the repair complete?</p>		System OK	
39	<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 connector for the cruise control actuator. <p>Does the voltmeter indicate the specified value?</p>	11–14 v	Go to <i>Step 42</i>	Go to <i>Step 40</i>
40	<p>Use the 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.</p> <p>Does the ohmmeter indicate the specified value?</p>	$\approx 0 \Omega$	Go to <i>Step 37</i>	Go to <i>Step 41</i>
41	<p>Repair the open circuit between terminal B1 of the leverswitch connector and terminal 7 of the cruise control actuator connector.</p> <p>Is the repair complete?</p>		System OK	

9U – 10 CRUISE CONTROL SYSTEM

Step	Action	Value(s)	Yes	No
42	<ol style="list-style-type: none"> 1. Turn the ignition OFF. 2. If the vehicle has a manual transaxle, disconnect the VSS electrical connector. 3. If the vehicle has an automatic transaxle, disconnect the electrical connector from the transaxle output shaft sensor. <ul style="list-style-type: none"> • If the vehicle has a manual transaxle, use an ohmmeter to check continuity between the DK GRN/WHT wire at the VSS and terminal 10 of the cruise control actuator connector. • If the vehicle has an automatic transaxle, check the continuity of the following wires: <ul style="list-style-type: none"> – The YEL wire between cruise control actuator connector terminal 10 and VSS connector terminal A. – The PPL wire between cruise control actuator connector terminal 5 and VSS connector terminal B. <p>Does the ohmmeter indicate the specified value when checking the wire(s) between the cruise control module and the VSS, for vehicles with a manual transaxle, or the output shaft sensor, for vehicles with an automatic transaxle?</p>	$\approx 0 \Omega$	Go to Step 44	Go to Step 43
43	Repair the open circuit between the cruise control actuator connector terminal 10 and the VSS, for vehicles with a manual transaxle, or the output shaft sensor for vehicles with an automatic transaxle. Is the repair complete?		System OK	
44	Replace the cruise control actuator. Is the repair complete?		System OK	

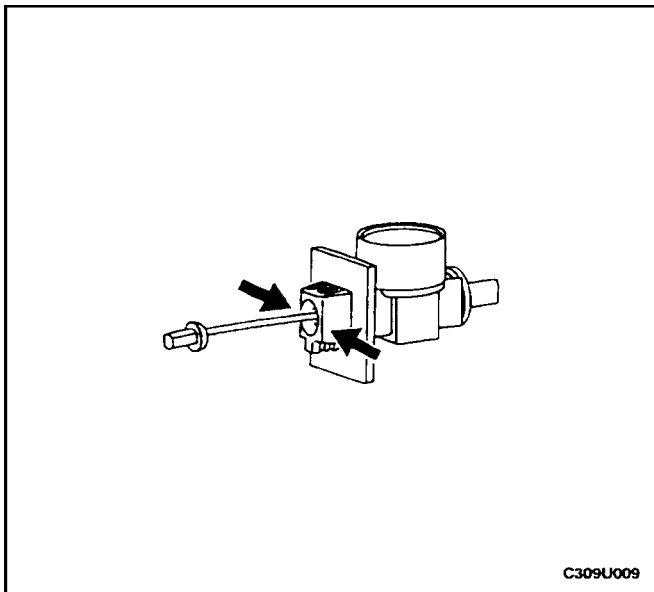
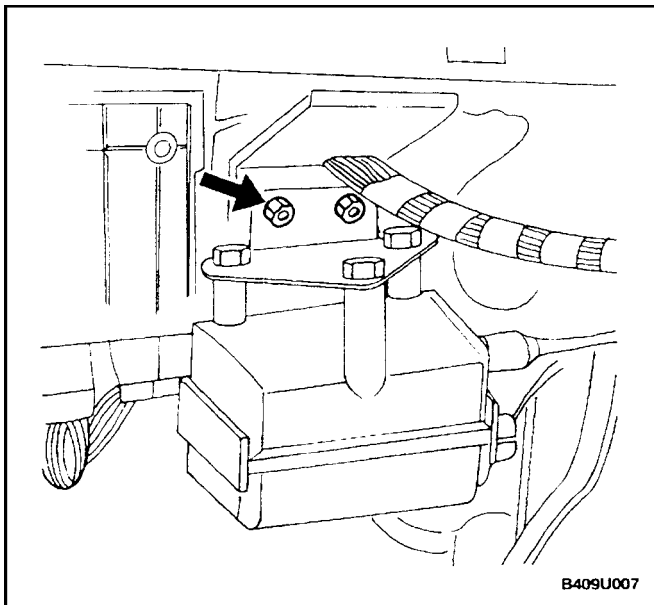
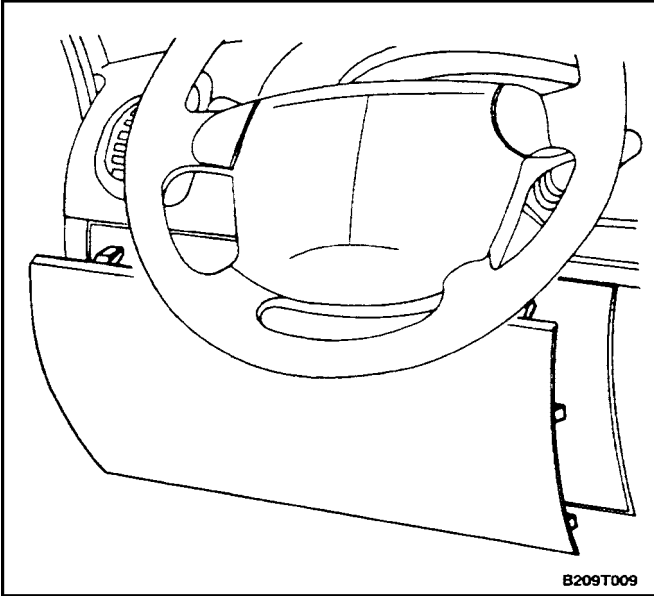
MAINTENANCE AND REPAIR

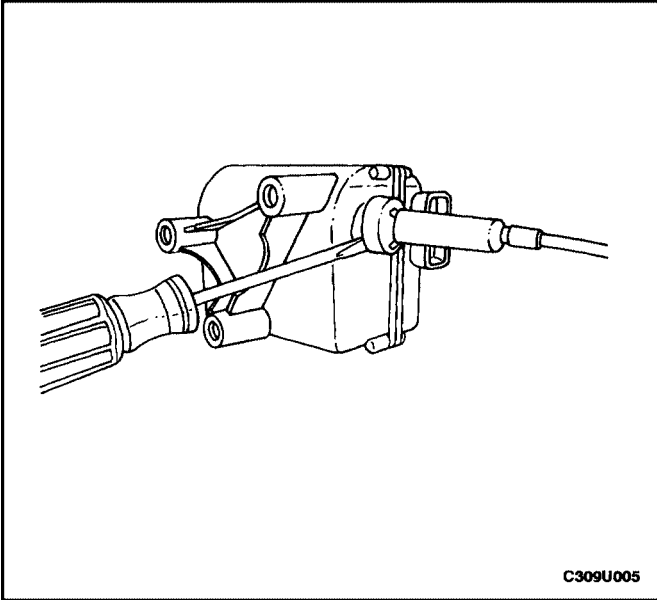
ON-VEHICLE SERVICE

CRUISE CONTROL ACTUATOR

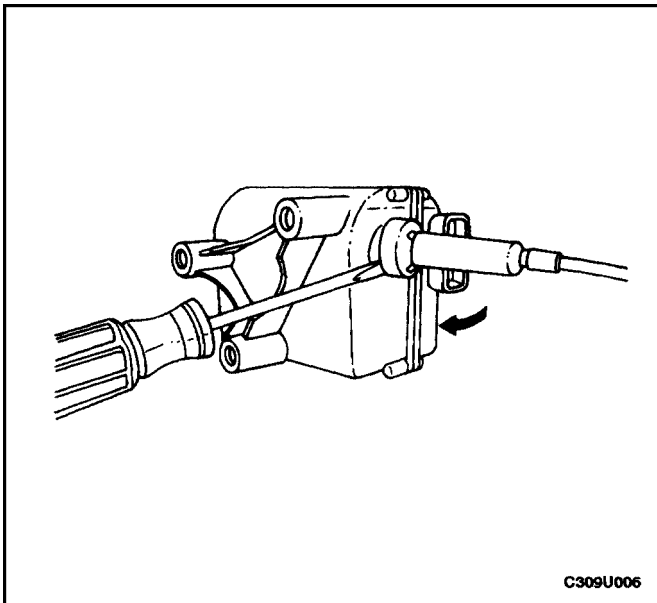
Removal Procedure

1. Carefully pull the knee bolster trim panel until it is loose from its retaining clips.
2. Remove the knee bolster. Refer to *Section 9G, Interior Trim*.
3. Remove the actuator bracket with the actuator still attached.
4. Press the tabs on the cable adjuster, and remove the cable and the adjuster from the adjuster bracket.

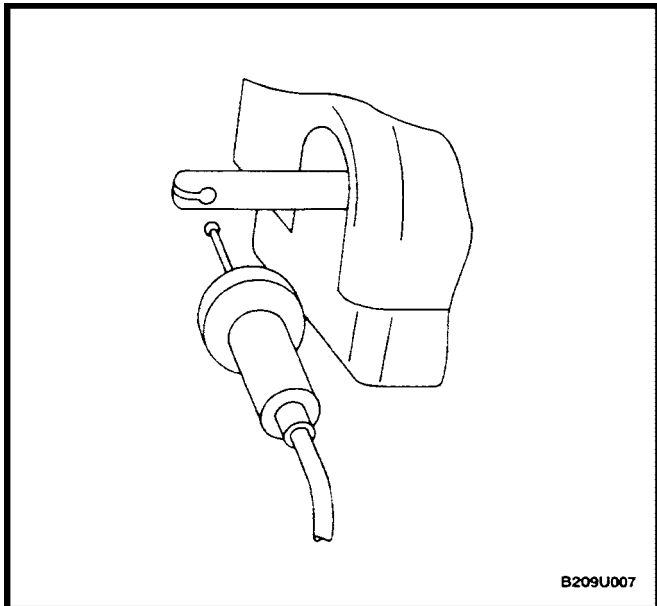




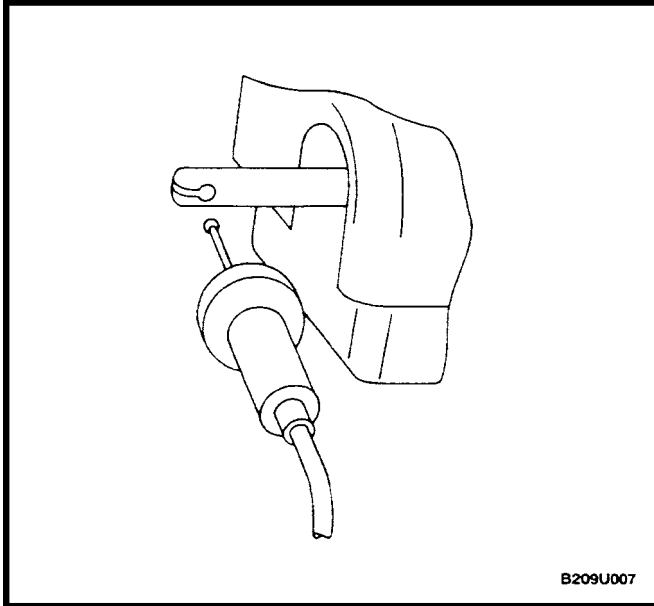
5. Tilt the cable housing to expose one of the slots in the actuator, and insert the tip of a flathead screwdriver into one of the slots.



6. Tilt the cable housing toward the screwdriver to release the cable housing retainers.

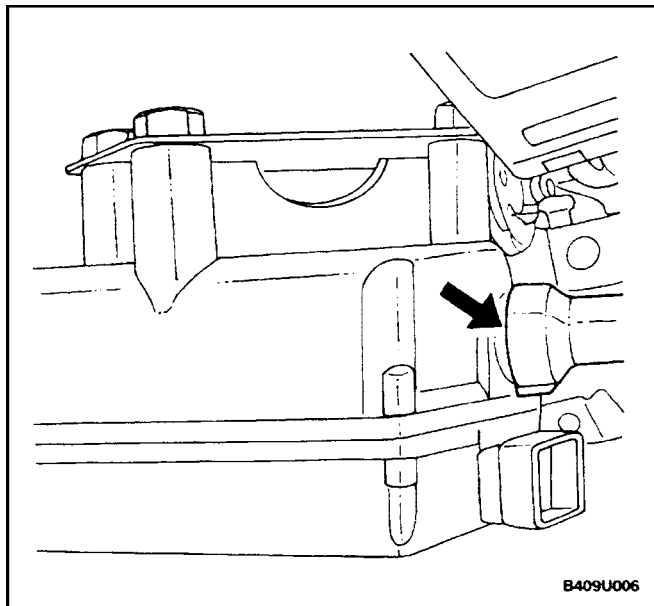


7. Remove the cable ball from the actuator rod.

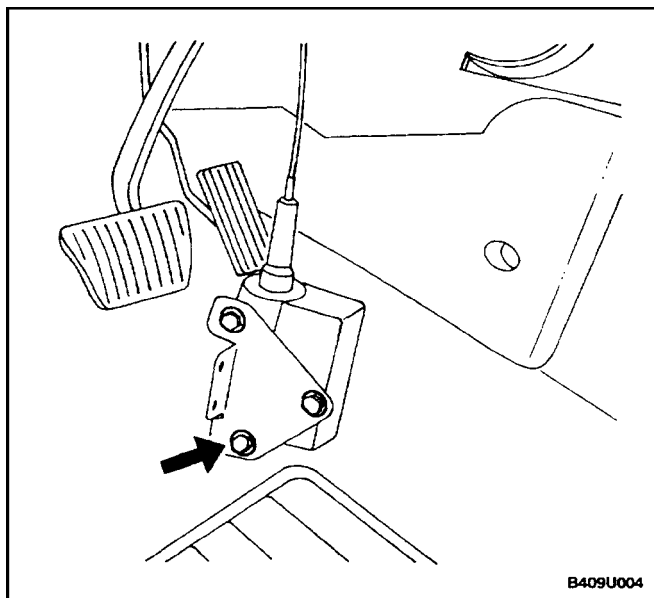


Installation Procedure

1. Insert the cable ball into the actuator rod.



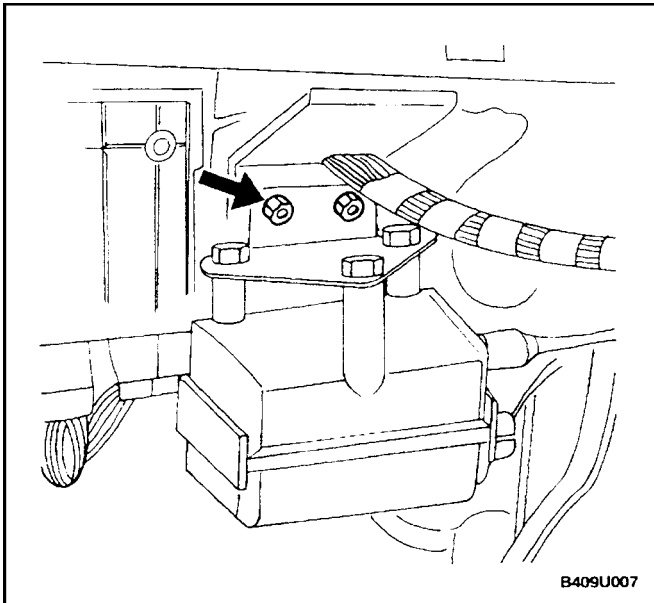
2. Align the cable housing and push the cable housing onto the actuator until it is locked in place by the retainers.



3. If a new actuator is being installed, attach it to the mounting bracket.

Tighten

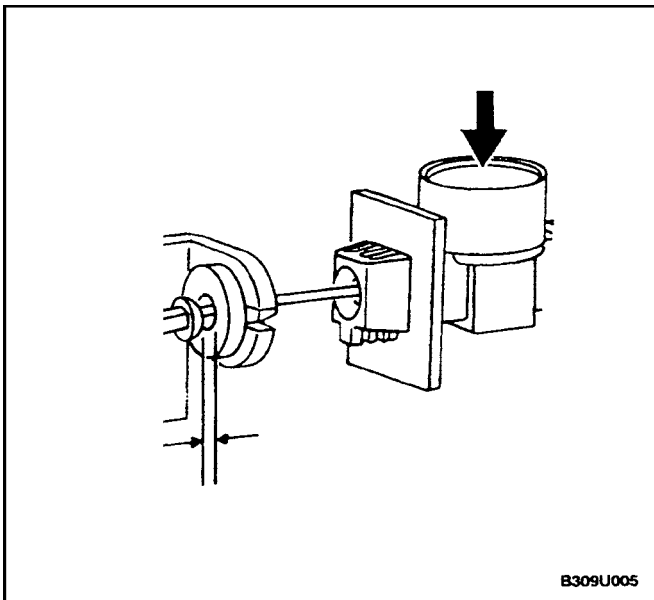
Tighten the actuator bolts to 4 N•m (35 lb-in).



4. Install the mounting bracket.

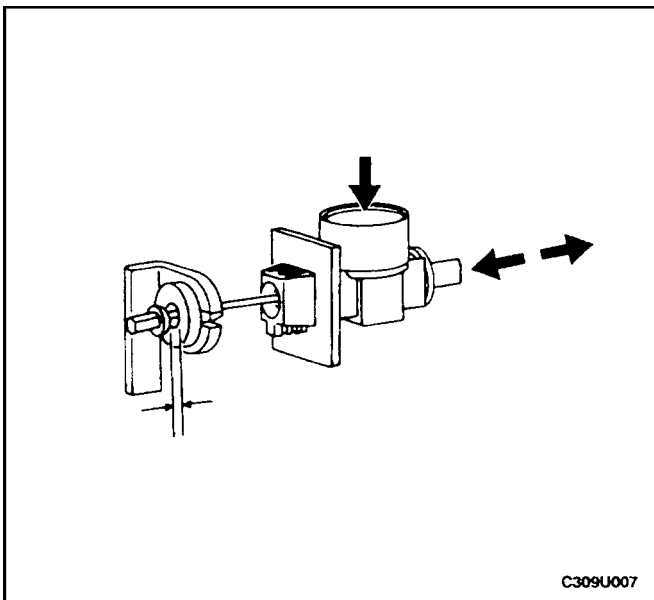
Tighten

Tighten the actuator bracket nuts to 18 N•m (13 lb–ft).



5. If the adjuster spring is not fully compressed, 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 will have to be re–inserted. To keep the adjuster in one piece during adjustment, hold the cable when the adjuster button is pressed.



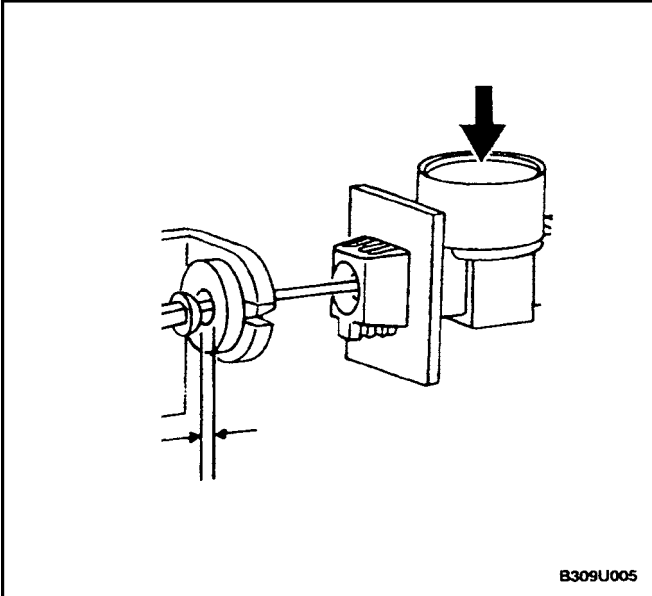
6. Insert the cable adjuster into the adjuster bracket.
7. Press the cable release button and adjust the cable to achieve a gap of 0.5 mm (0.02 inches) between the bushing and the nipple of the cable ball.
8. Install the knee bolster. Refer to *Section 9G, Interior Trim*.
9. Install the knee bolster trim panel.

ACTUATOR CONTROL CABLE

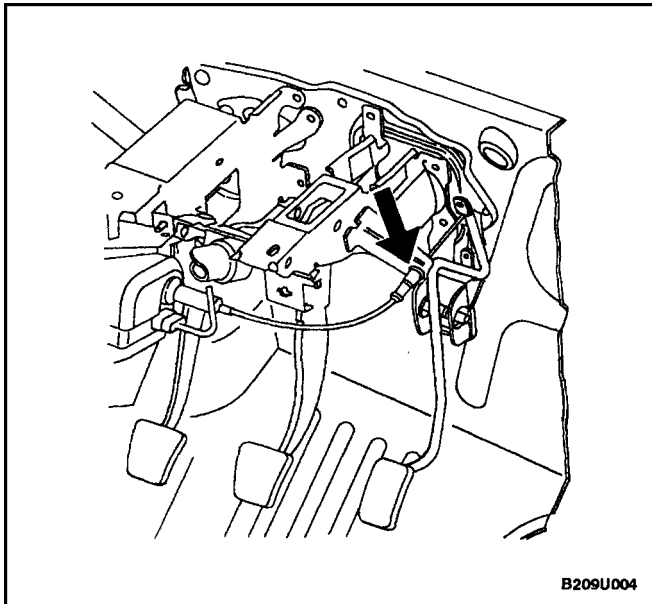
Removal Procedure

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

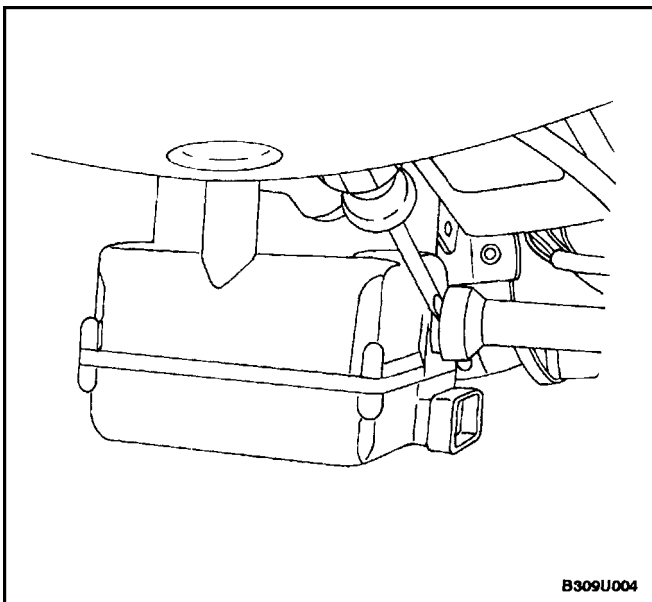
Notice : When the adjuster button is pressed, do not allow the adjuster spring to expand to a length of more than 2 cm (3/4 inch) or the adjuster rack will come out of the adjuster, and will have to be re-inserted. To keep the adjuster in one piece during adjustment, hold the cable when the adjuster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

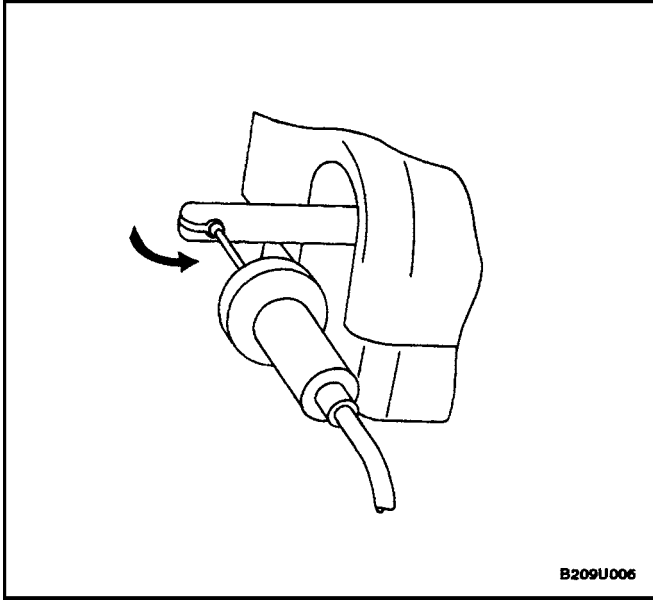


2. Press the retaining tabs of the cable adjuster, and remove the adjuster from the mounting bracket.

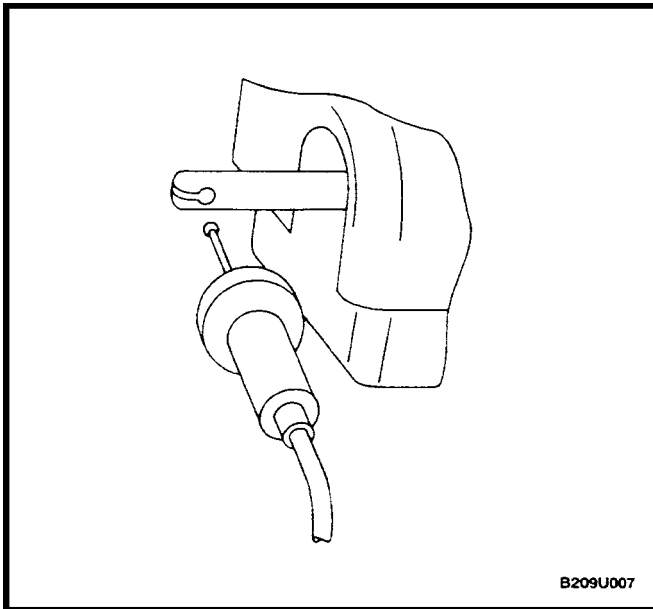


3. Tilt the cable housing and insert a flathead screwdriver into one of the slots in the actuator.
4. Tilt the cable housing toward the screwdriver, so that the cable housing retainers will release.

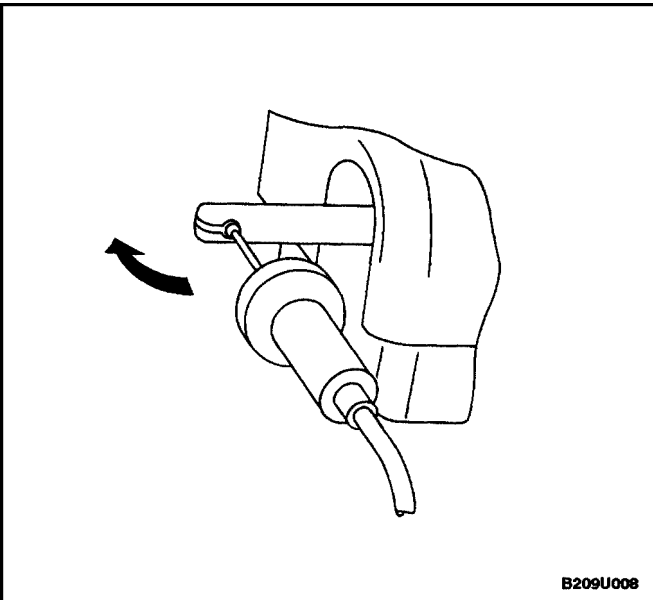




5. Slide the sleeve and the cable out of the actuator and rotate the cable so it can be removed from the slot in the actuator rod.

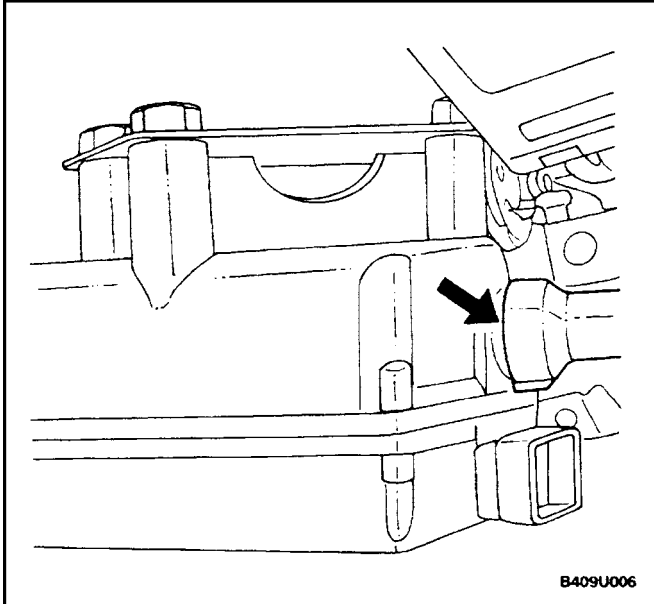


6. Remove the cable ball from the actuator rod.

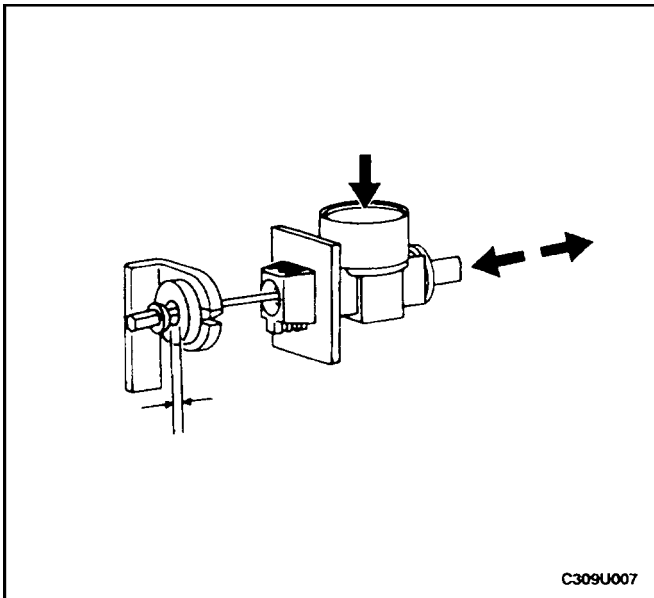


Installation Procedure

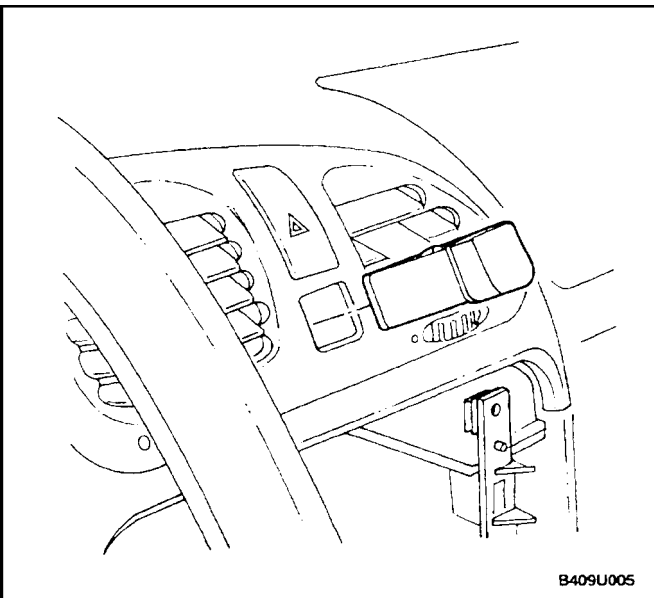
1. Insert the ball nipple of the cable assembly into the slot in the actuator rod, and then rotate the cable 90 degrees.



2. Align the cable housing and push the cable housing onto the actuator until it is locked in place by the retainers.



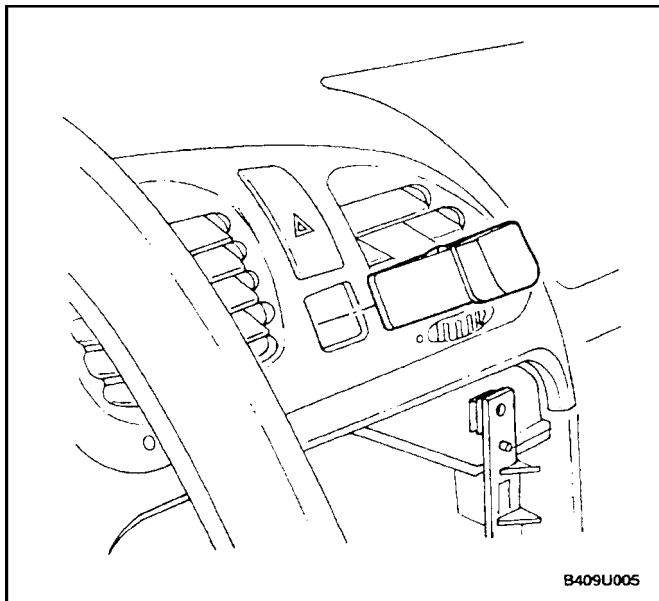
3. Insert the cable adjuster into the bracket of the pedal mount assembly.
4. If the adjuster spring is not fully compressed, press the cable release button and slide the cable into the adjuster until the spring is fully compressed.
5. Install the cable bushing into the pedal assembly.
6. Press the cable release button and adjust the cable to achieve a gap of 0.5 mm (0.02 inches) between the bushing and the nipple of the ball.



MAIN SWITCH

Removal Procedure

1. Remove the radio, taking care not to scratch the instrument panel or trim with the corners of the radio case. Refer to *Section 9F, Audio Systems*.
2. Reach through the radio opening in the instrument panel and wiggle the cruise control main switch to loosen it.
3. Push the cruise control main switch out of the instrument panel.
4. Disconnect the electrical connector from the cruise control main switch.



Installation

1. Connect the electrical connector to the cruise control main switch.
2. Push the cruise control main switch into the instrument panel until it is locked in place by its retainers.
3. Reinstall the radio, taking care not to scratch the instrument panel or trim when installing the radio case. Refer to *Section 9F, Audio Systems*.

GENERAL DESCRIPTION AND SYSTEM OPERATION

CRUISE CONTROL SYSTEM OPERATION

The cruise control system automatically maintains a vehicle speed set by the driver. When the cruise control system 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 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 the clutch, with a 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 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 the wire harness. If a fault is detected, cruise control is stopped immediately, and the program logic and hardware logic both 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 the 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 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 parts of the cruise control actuator are not serviceable. The entire actuator must be replaced if there is an electronic or mechanical defect in one of the systems.

MAIN SWITCH

The cruise control main switch is on 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 has an indicator which turns ON when the main switch is pressed. If the switch is pressed again, the indicator and the switch turn OFF.

The main switch also is connected to the instrument illumination system, so the dimmer switch controls switch illumination when the headlamps or 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 function 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 is disengaged by using the brake or the 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. In that case, the current speed will be maintained as the new target speed.

Accelerate – If cruise control is ON, and the ACCEL function 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 function 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 (96 mph) 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) each time the RESUME function is selected (or tapped). If the driver has used the accelerator to increase speed more than 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 (1.2 mph) each time SET is 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 in order 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.