

1999 Toyota RAV4

1999-2000 DRIVE AXLES Center Differential Lock

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Center Differential Lock

DESCRIPTION & OPERATION

CENTER DIFFERENTIAL LOCK SYSTEM

The center differential lock system enables vehicle to have enough traction to move when one of the 4 wheels, both front wheels or both rear wheels are off the ground or on a slippery surface.

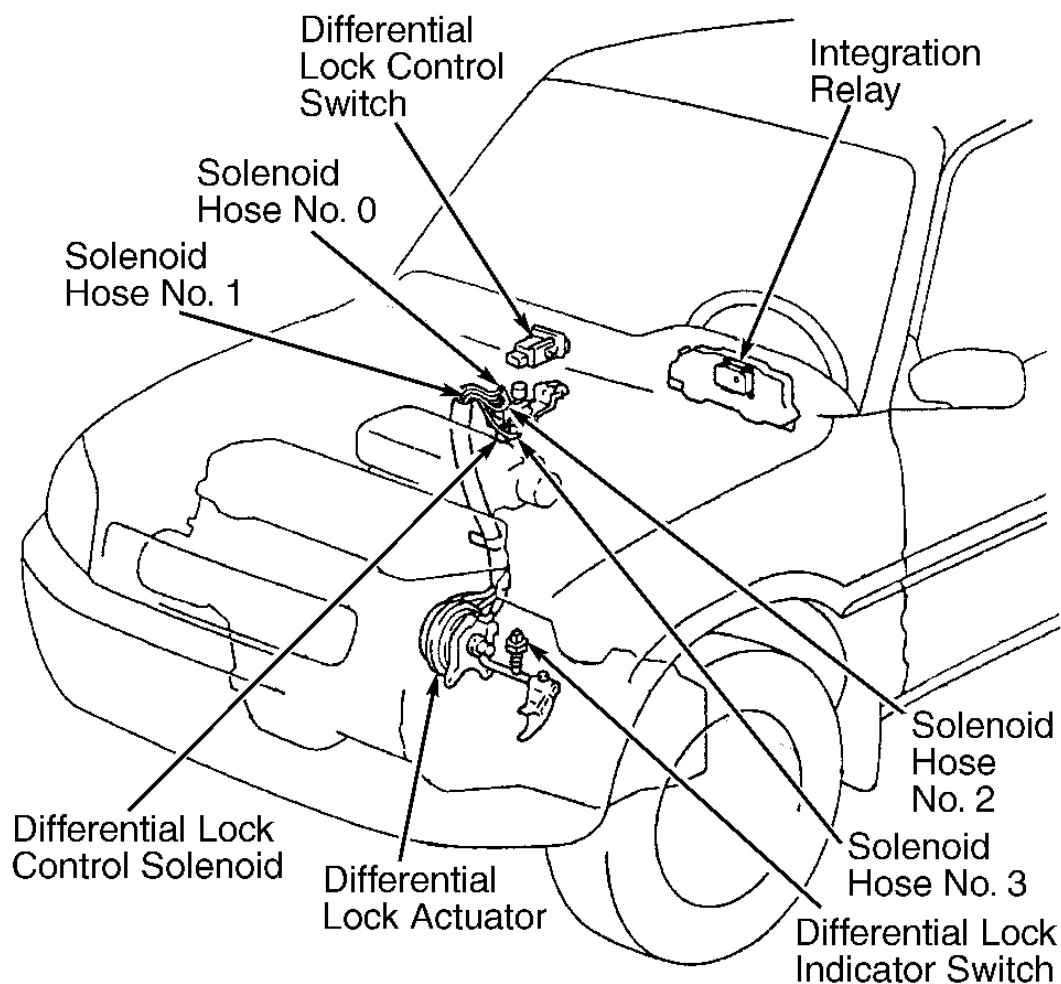
Center differential lock system consists of control switch, differential lock control solenoids, differential lock actuator, indicator switch, and integration relay. See **Fig. 1** .

With control switch off, the center differential lock indicator light on instrument panel is off, along with vacuum switching valves No. 1 and 2. Vacuum switching valve No. 1 draws vacuum from vacuum tank to chamber "A" of the vacuum actuator. Vacuum switching valve No. 2 draws atmospheric air to chamber "B".

Under these conditions, the vacuum actuator diaphragm moves the rod, which moves the locking sleeve shift fork and shaft, which causes the locking sleeve to disengage from the case. See **Fig. 2** . During this time, the center differential warning buzzer will sound. When the locking sleeve is completely disengaged, the warning buzzer will turn off (free position).

1999 Toyota RAV4

1999-2000 DRIVE AXLES Center Differential Lock



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Fig. 1: Locating Center Differential Lock System Components

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

WARNING BUZZER

The warning buzzer sounds during the time the center differential lock fork moves from lock to free position (until the center differential lock sleeve is completely disengaged from the differential case).

1999 Toyota RAV4

1999-2000 DRIVE AXLES Center Differential Lock

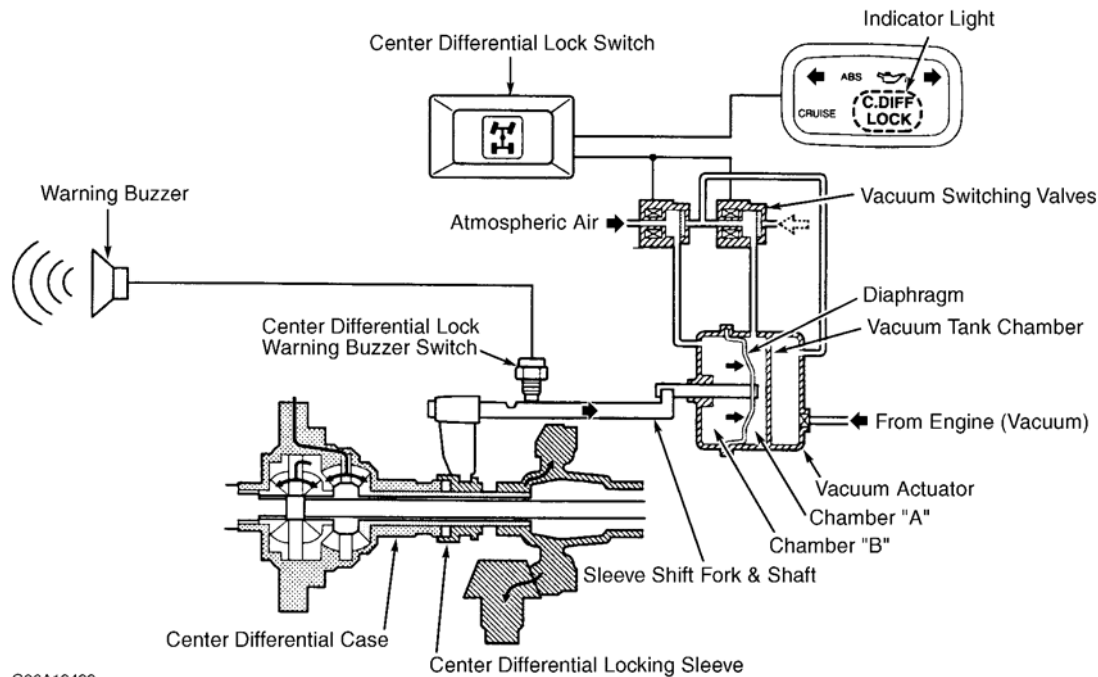


Fig. 2: Center Differential Lock System Schematic
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TROUBLE SHOOTING

CENTER DIFFERENTIAL LOCK SYSTEM

1. Raise vehicle off ground so all 4 wheels can rotate. Apply parking brake and start engine. Turn center differential lock system on.
2. Depress clutch pedal and shift into 2nd gear. With engine idling, gradually engage the clutch and ensure engine stalls.
3. With parking brake and engine on, turn center differential lock system off. Depress clutch pedal and shift into 2nd gear. With engine idling, gradually engage the clutch and ensure front wheels rotate.

CENTER DIFFERENTIAL LOCK INDICATOR LIGHT

Turn ignition on. Ensure indicator light is off with center differential lock system off, and on with system on.

WARNING BUZZER

NOTE: If the buzzer continues to sound, point the wheels straight ahead, accelerate or decelerate, or drive the vehicle in reverse to stop the buzzer.

1. Start engine and ensure warning buzzer does not sound when center differential lock switch is turned on.

1999 Toyota RAV4

1999-2000 DRIVE AXLES Center Differential Lock

Change position of vacuum hoses at vacuum switching valves.

2. Turn off center differential lock switch and ensure warning buzzer sounds. Change position of vacuum hoses at vacuum switching valves once again, and ensure buzzer stops. If buzzer operation is not as specified, check vacuum hoses.

TESTING

CENTER DIFFERENTIAL LOCK ACTUATOR

NOTE: If actuator operation is not as specified, replace actuator.

Vacuum Tank Chamber

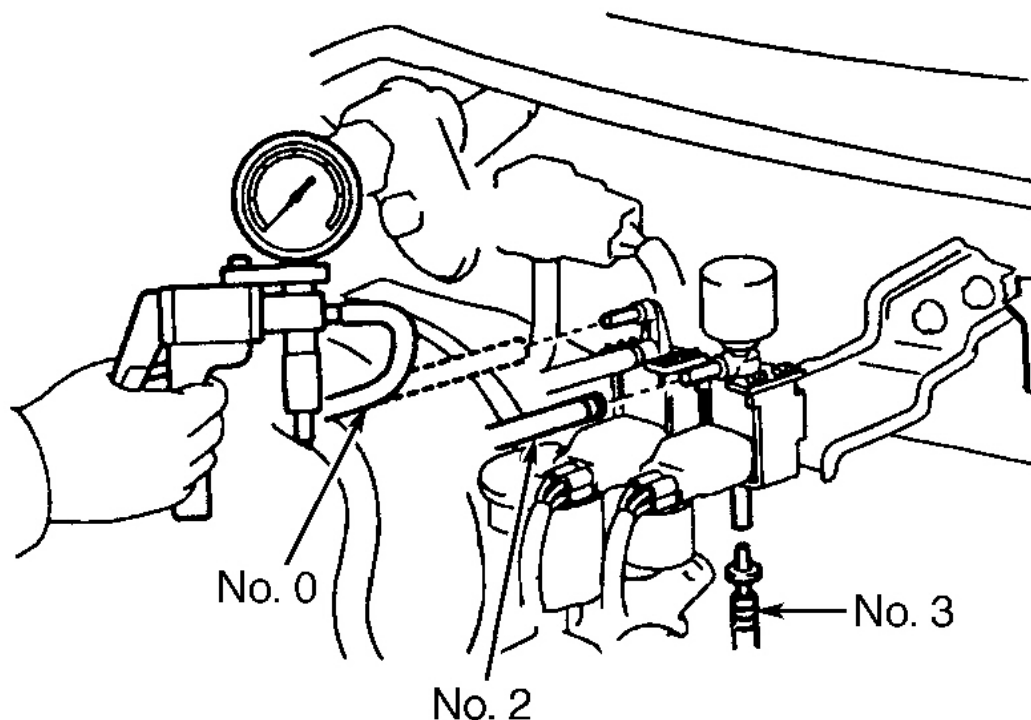
Disconnect vacuum hoses (except No. 1) and plug hose No. 3. See **Fig. 3**. Apply 20" Hg of vacuum to hose No. 0 and ensure indicator needle remains steady. Actuator may leak 1.7" Hg or less during 15 seconds.

Lock Chamber

Disconnect vacuum hoses No. 1 and 2. Apply 20" Hg of vacuum to hose No. 1 and ensure indicator needle remains steady. Actuator may leak 1.7" Hg or less during 15 seconds.

Free Chamber

Disconnect all vacuum hoses and plug hose No. 3. Using a "T" fitting, apply 20" Hg of vacuum to hoses No. 0 and 2. Ensure indicator needle remains steady. Actuator may leak 1.7" Hg or less during 15 seconds.



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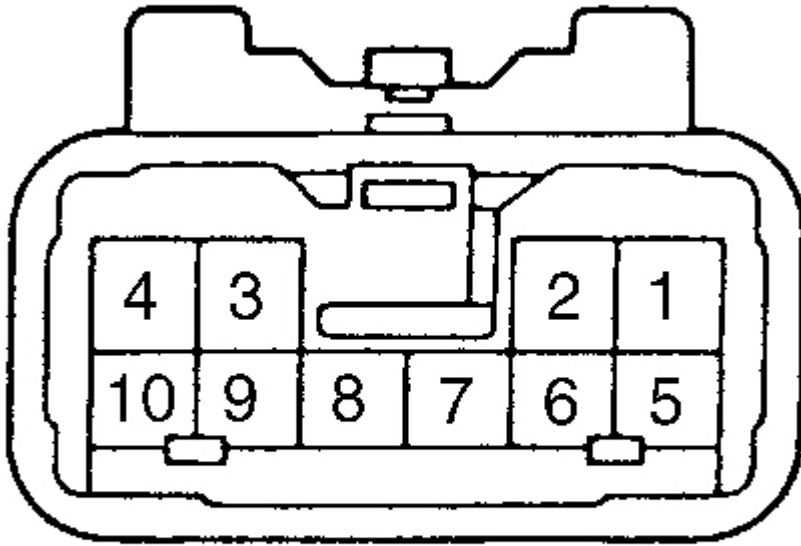
Fig. 3: Testing Center Differential Lock Actuator
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

CENTER DIFFERENTIAL LOCK CONTROL SWITCH

With switch off, ensure continuity exists between terminals No. 7 and 10. See **Fig. 4** . With switch on, ensure continuity exists between terminals No. 7 and 8. Continuity must exist between switch terminals No. 2 and 3 at all times (switch illumination circuit). Check bulb or replace switch if continuity is not as specified.

1999 Toyota RAV4

1999-2000 DRIVE AXLES Center Differential Lock



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Fig. 4: Testing Center Differential Lock Control Switch
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CENTER DIFFERENTIAL LOCK INDICATOR LIGHT SWITCH

With switch off (released), ensure no continuity exists between switch terminals No. 1 and No. 2. With switch on (pushed in), ensure continuity exists between switch terminals No. 1 and No. 2. Replace indicator light switch if continuity is not as specified.

CENTER DIFFERENTIAL LOCK SOLENOID

Disconnect connector from solenoids No. 1 and No. 2. Check for continuity to each port. Apply battery voltage to vacuum switching valve terminals and check air flow across passage ports. Disconnect battery voltage and ensure air flow across passage ports changes. Replace center differential lock solenoid if necessary.

INTEGRATION RELAY

1. Connect positive battery voltage to terminals No. 12 and No. 20. Connect negative battery voltage to terminal No. 11. See **WIRING DIAGRAMS**.
2. Ensure bulb lights up and buzzer sounds for 4-8 seconds. Repeat step 1. Connect positive battery voltage to terminal No. 20. Ensure buzzer stops sounding.

1999 Toyota RAV4

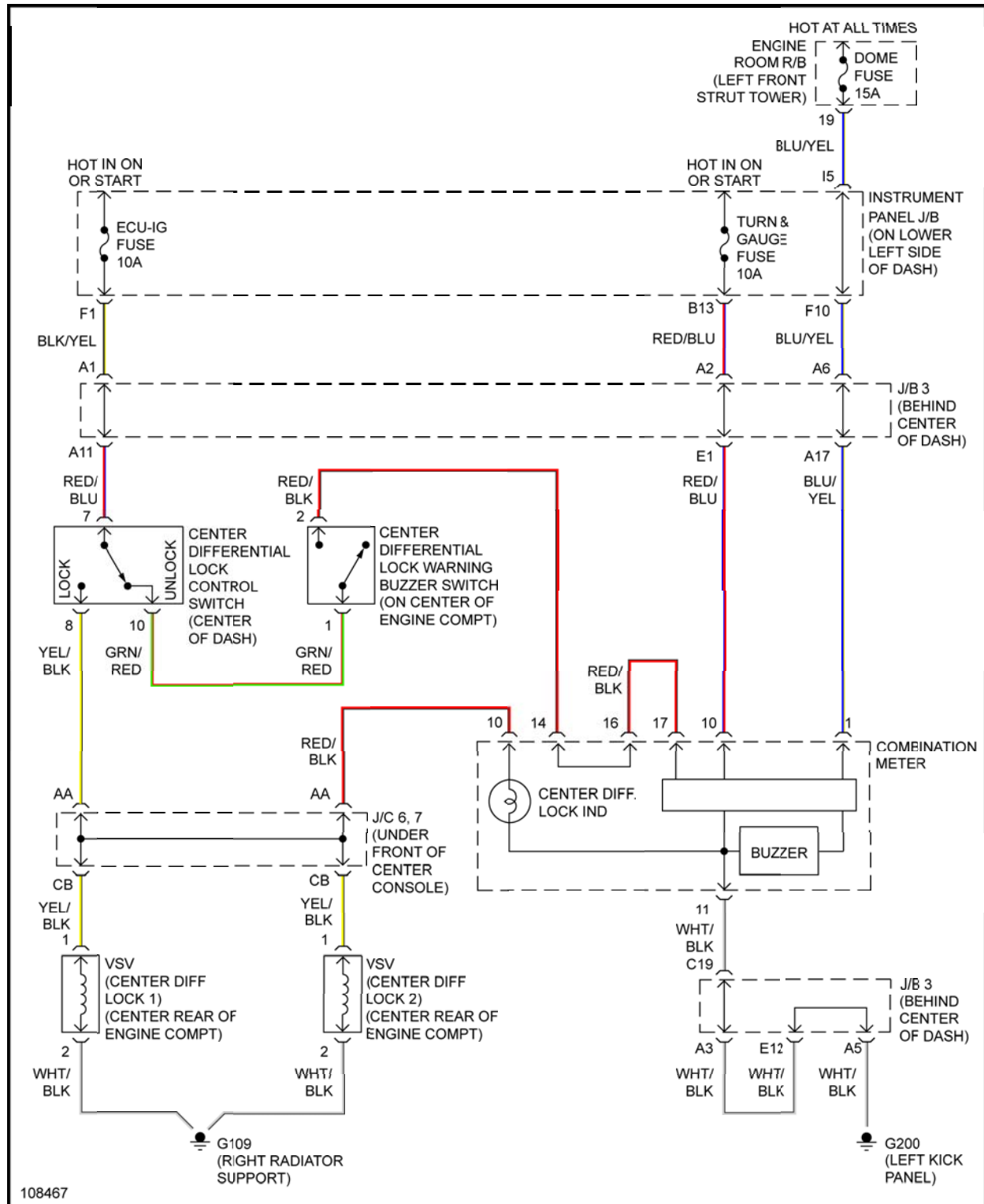
1999-2000 DRIVE AXLES Center Differential Lock

3. Inspect integration relay circuit. Remove relay from combination meter. Check connectors for damage or corrosion. Connect voltmeter between relay terminal No. 12 and ground. Turn ignition switch and differential lock control switch ON. Battery voltage should be present. Turn ignition switch ON and differential lock control switch OFF. Voltage should not be present.
4. Connect voltmeter between relay terminal No. 20 and ground. Turn ignition switch ON and differential lock control switch OFF. Battery voltage should be present. Turn ignition off. Voltage should not be present. If any circuit fails test, replace relay.

WIRING DIAGRAMS

1999 Toyota RAV4

1999-2000 DRIVE AXLES Center Differential Lock



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| 1999 Toyota RAV4 |
| 1999-2000 DRIVE AXLES Center Differential Lock |

Fig. 5: Center Differential Lock System Wiring Diagram (1999-2000 RAV4)