1999-2000 STEERING

Steering Columns - Tilt Wheel - Trucks & Vans

DESCRIPTION & OPERATION

Tilt steering columns incorporate a main shaft, attached by a "U" joint to an intermediate steering shaft. Shafts are held in place by upper and lower column tubes. Column tubes are pinned together so upper column can move up or down. Upper column is locked in place by pawl attached to lever. Steering columns are collapsible.

WARNING: To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS. Deactivate air bag system before performing any repairs. See DISABLING & ACTIVATING AIR BAG SYSTEM.

SERVICE PRECAUTIONS

Observe the following precautions when servicing SRS:

- Disable SRS before servicing any SRS or steering column component. Failure to do this could result in accidental air bag deployment and possible personal injury. See DISABLING & ACTIVATING AIR BAG SYSTEM.
- Remove air bag sensor assembly/center air bag sensor and front air bag sensors if repairing the vehicle requires impacting (shocking) the vehicle.
- Replace dropped, cracked, dented or otherwise damaged components.
- DO NOT expose front air bag sensors, air bag sensor assembly/center air bag sensor or steering wheel pad (air bag module) directly to heat or flame.
- Information labels are attached to air bag components. Follow all notices on labels.
- After work on SRS is completed, check air bag warning light to ensure system is functioning properly. See appropriate AIR BAG RESTRAINT SYSTEMS article in ACCESSORIES & EQUIPMENT.
- Always wear safety glasses when servicing or handling an air bag.
- When placing a live air bag on a bench or other surface, always face air bag and trim cover upward, away from surface. This will reduce motion of module if it is accidentally deployed.
- Carry a live air bag module with trim cover (air bag) pointed away from your body to minimize injury in case of accidental deployment.
- If SRS is not fully functional for any reason, vehicle should not be driven until system is repaired and becomes operational. DO NOT remove bulbs, modules, sensors or other components or in any way disable system from operating normally. If SRS is not functional, park vehicle until it is repaired and functions properly.

DISABLING & ACTIVATING AIR BAG SYSTEM

WARNING: Back-up power supply maintains SRS voltage for about 90 seconds after
battery is disconnected. After disabling SRS, wait at least 90 seconds before servicing SRS to prevent accidental air bag deployment and possible personal injury.

DISABLING SYSTEM

Turn ignition switch to LOCK position. Disconnect and shield negative battery cable. Wait at least 90 seconds before working on system. Remove steering wheel pad (air bag module). See STEERING WHEEL & AIR BAG under REMOVAL & INSTALLATION.

ACTIVATING SYSTEM

Install steering wheel pad. Reconnect negative battery cable. Perform system operation check. See appropriate AIR BAG RERAINT SYSTEMS article in ACCESSORIES & EQUIPMENT.

ADJUSTMENTS

SPIRAL CABLE

Spiral cable must be correctly adjusted to ensure proper air bag operation. Ensure front wheels are in straight-ahead position. Turn spiral cable counterclockwise by hand until it becomes difficult to turn. Turn spiral cable clockwise 2 1/2 turns for Land Cruiser, Tacoma, Tundra and 4Runner. Turn spiral cable clockwise 3 turns for 4Runner and Sienna. Ensure marks align and are visible through inspection hole. See Fig. 1.
REMOVAL & INSTALLATION

STEERING WHEEL & HORN PAD

NOTE: If air bag connector is disconnected with ignition switch at ON or ACC, DTCs will be recorded.

Removal & Installation

1. Disconnect negative battery cable. Ensure wheels are in straight-ahead position. Remove screw securing horn pad, and remove horn pad. Disconnect electrical connector(s). Remove lock nut and washer.

2. Mark steering shaft and steering wheel for installation reference. Install steering wheel puller and remove steering wheel from shaft. To install, reverse removal procedure. Tighten steering wheel nut to specification. See TORQUE SPECIFICATIONS.
STEERING WHEEL & AIR BAG

NOTE: See DISABLING & ACTIVATING AIR BAG SYSTEM.

Removal & Installation

1. Ensure wheels are in straight-ahead position. Disconnect negative battery cable. Remove screw covers, screws and lower instrument cluster trim panel(s). Loosen steering wheel pad Torx screws until groove along screw circumference catches on screw case. See Fig. 2. Pull steering wheel pad assembly from steering wheel, and disconnect electrical connector.

2. Remove steering wheel pad assembly (air bag) from steering wheel. Place steering wheel pad assembly (air bag) on flat surface with pad assembly facing upward.

WARNING: Pad assembly must face up on level surface. If assembly is stored face down, accidental air bag deployment could propel assembly and cause serious bodily injury.
3. Remove lock nut and washer. Mark steering shaft and steering wheel for installation reference. Install steering wheel puller, and remove steering wheel from shaft.

4. Prior to installation, ensure spiral cable (located on combination switch) is properly aligned. See SPIRAL CABLE under ADJUSTMENTS. To complete installation, reverse removal procedure. Tighten steering wheel nut to specification. See TORQUE SPECIFICATIONS.

COMBINATION SWITCH

Removal & Installation

1. Disconnect negative battery cable. Remove steering wheel. See STEERING WHEEL & HORN PAD or STEERING WHEEL & AIR BAG. Remove instrument cluster lower finish panel. Remove upper and lower steering column covers.

2. Disconnect combination switch electrical connectors and air bag connector. Remove combination switch mounting screws, and remove combination switch. To install, reverse removal procedure. Tighten steering wheel nut to specification. See TORQUE SPECIFICATIONS.

IGNITION SWITCH & LOCK CYLINDER

Removal & Installation

1. Disconnect negative battery cable. Remove steering wheel, upper and lower steering column covers and combination switch (if necessary).

2. Place ignition key at ACC position. Using screwdriver, push down stop pin of cylinder, and pull out lock cylinder. Remove 2 screws and ignition switch.

3. To install, reverse removal procedure. Install combination switch, upper and lower steering column covers and steering wheel. Tighten steering wheel nut to specification. See TORQUE SPECIFICATIONS.

STEERING COLUMN

Removal & Installation (Land Cruiser)

1. Disconnect negative battery cable. Remove steering wheel. See STEERING WHEEL & HORN PAD or STEERING WHEEL & AIR BAG. Remove steering column upper and lower covers. See Fig. 4. Remove combination switch with spiral cable.

2. Remove scuff plate and cowl trim. Remove cluster finish panel. Remove lower No. 1 panel and left-side lower panel. Remove No. 2 heater-to-register duct from under steering column.

3. Mark intermediate shaft and control valve shaft for installation reference. Loosen bolt "A", and remove bolts "B" and "C". See Fig. 3. Disconnect No. 2 intermediate shaft assembly. Remove No. 2 intermediate shaft assembly. Remove hole cover.
4. Remove steering column assembly. Remove hose clamp. Remove No. 2 hole cover.

5. To install, install No. 2 hole cover. Install clamp. Install thrust stopper and sliding yoke to steering column assembly. Install and temporarily tighten bolt "A". Install steering column assembly with 4 nuts. Tighten to specification. See **TORQUE SPECIFICATIONS**. Tighten clamp and connect connectors.

6. Install hole cover. Align match marks on No. 2 intermediate shaft and control valve shaft. Install bolts "A", "B" and "C". Tighten bolts to specification. See **TORQUE SPECIFICATIONS** To install remaining components, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS**.
Fig. 4: Removing Steering Column (Land Cruiser Shown; Other Models Are Similar)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Removal & Installation (RAV4)

G98/12847
1. Disconnect negative battery cable. Remove steering wheel. See **STEERING WHEEL & AIR BAG**. Remove upper and lower column covers. See Fig. 4. Remove lower left-side instrument finish panel and panel insert from under steering column. Remove combination switch with spiral cable. Remove No. 2 heater-to-register duct.


3. Remove No. 2 intermediate shaft assembly. Remove column hole cover. To install, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS**.

**Removal & Installation (Sienna)**

1. Disconnect negative battery cable. Remove steering wheel. See **STEERING WHEEL & HORN PAD** or **STEERING WHEEL & AIR BAG**. Remove front door inside scuff plate. Remove lower left-side finish panel and left-side lower instrument panel. Remove upper and lower column covers. See Fig. 5.
Fig. 5: Exploded View Of Steering Column (Sienna)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Remove combination switch with spiral cable. Reference mark intermediate shaft and control valve shaft.

3. To install, reverse removal procedure. Tighten bolts and nuts to specification. See TORQUE SPECIFICATIONS.

Removal & Installation (Tacoma)

1. Disconnect negative battery cable. Remove steering wheel. See STEERING WHEEL & HORN PAD or STEERING WHEEL & AIR BAG. Remove upper and lower column covers. See Fig. 4. Remove left-side lower finish panel. Remove No. 2 heater-to-register duct from under steering column.

2. Remove combination switch with spiral cable. Disconnect junction block No. 1. Disconnect transmission control cable assembly from column shift lever assembly.

3. On 2WD models, mark intermediate No. 2 shaft and control shaft for installation reference. Disconnect intermediate No. 2 shaft, and then remove. Remove column hole cover. Remove steering column assembly. Remove sliding yoke.

4. On 4WD models, mark intermediate No. 2 shaft and control shaft for installation reference. Disconnect intermediate No. 2 shaft, and then remove. Remove column hole cover and column hole cover No. 2 set bolt. Remove steering column assembly. Mark "U" joint No. 2 and main shaft for installation reference. Remove "U" joint No. 2 and column hole cover No. 2.

5. To install, reverse removal procedure. Tighten bolts and nuts to specification. See TORQUE SPECIFICATIONS.

Removal (Tundra)

1. Disconnect and shield negative battery cable. Remove steering wheel. See STEERING WHEEL & AIR BAG.

2. Remove 3 screws and upper and lower steering column covers. Disconnect electrical connectors and air bag connector. Remove 3 screws and air bag spiral and combination switch with spiral cable.

3. Remove instrument lower finish panel. Remove 2 screws, and disconnect hood release lever from panel. Remove 4 bolts and instrument panel lower finish panel.

4. Remove No. 2 heater-to-register duct and brake pedal return spring.

5. Place match marks on No. 2 "U" joint and No. 2 intermediate shaft assembly. Remove bolt "A". Place match marks on No. 2 intermediate shaft assembly and control valve shaft. Remove bolt "B". Remove No. 2 intermediate shaft assembly. Remove 3 bolts and column hole cover No. 2.


7. Place match marks on steering column assembly and No. 2 "U" joint assembly. Remove bolt and column hole cover No. 2. Disconnect No. 2 "U" joint assembly.

Installation
1. Insert column hole cover No. 2. Align match marks on column assembly and No. 2 "U" joint assembly. Install bolt to connect No. 2 "U" joint assembly.

2. Install column assembly with No. 2 "U" joint assembly. Install 4 steering column set nuts. Connect connectors. On models equipped with A/T, connect transmission control cable assembly to shift lever assembly.

3. Align match marks on No. 2 "U" joint assembly and No. 2 intermediate shaft assembly. Align match marks on control valve shaft and No. 2 intermediate shaft assembly. Install "A" and "B" bolts.

4. Install brake pedal return spring and No. 2 heater to register duct. Install lower finish panel with 4 bolts. Connect hood lock release lever with 2 screws. Install spiral cable. See SPIRAL CABLE under ADJUSTMENTS. Install combination switch with 3 screws. Connect air bag and connectors.

5. Install lower and upper column covers with 3 screws. Ensure tires are in straight-ahead position. Turn cable counterclockwise until there is resistance. Rotate cable clockwise 2.5 turns to align mark.


7. Tighten all bolts to specifications. See TORQUE SPECIFICATIONS. Ensure spiral cable is properly installed and adjusted. See SPIRAL CABLE under ADJUSTMENTS.

Removal & Installation (4Runner)

1. Disconnect negative battery cable. Remove steering wheel. See STEERING WHEEL & AIR BAG. Remove upper and lower column covers. See Fig. 4. Remove left-side lower finish panel. Remove starter switch bezel. Remove No. 2 heater to register duct from under steering column.

2. Remove combination switch with spiral cable. Remove spiral cable. Remove brake pedal return spring. Mark intermediate shaft No. 2, "U" joints No. 2 and control valve for installation reference. Remove intermediate shaft No. 2 and bolts. Remove column hole cover and column hole cover No. 2 set bolt.

3. Remove steering column assembly with "U" joint No. 2. Disconnect "U" joint No. 2. To install, reverse removal procedure. Tighten bolts and nuts to specification. See TORQUE SPECIFICATIONS.

OVERHAUL

STEERING COLUMN

Disassembly (Land Cruiser)

1. Remove No. 2 lower cover. Mark shaft assembly and main shaft assembly for reassembly reference. Remove intermediate shaft assembly. See Fig. 6. Remove transponder key coil with key cylinder lamp assembly. Remove key cylinder lamp assembly.
2. On telescopic models, remove connector bracket and steering column protector No. 1. Remove turn...
signal bracket. Using hexagon wrench, remove support stopper bolt, spring and stopper No. 1. Remove 2 tilt steering bolts and power tilt motor. Remove 2 "E" rings. Remove 2 support stopper bolt bushings from power tilt motor.

3. On models without telescopic steering, using 1/8-5/32" (3-4 mm) drill, drill out tapered head column bracket bolts. Use screw extractor to remove bolts. Remove column upper bracket and column upper clamp.

4. On telescopic models, place plate washer and 6 mm X 50 mm bolt in tilt steering shaft, and use slide hammer to remove 2 steering shafts. See Fig. 7. Remove adjusting nut No. 1. Remove 2 support stopper bolt bushings from adjusting nut No. 1.

5. On vehicles without telescopic steering, remove tube attachment from tube support. Remove column tube support.

wedges, column upper bracket and column upper clamp. Remove column tube support.

7. On all models, remove energy absorbing clip. Remove energy absorbing plates and guides. On vehicles without telescopic steering, and remove 4 tension springs.

8. On vehicles without telescopic steering, remove spring nut and tilt lever. Remove 2 bushings from column upper tube. Remove tilt lever link.


10. On models with telescopic steering, remove telescopic steering slider support. Remove telescopic steering bushing and slider. Remove steering column bracket spacer. Remove nut, 4 energy absorber cushions, 2 bearings and telescopic steering screw.


**Inspection**

Check that steering lock mechanism operates properly. Check bearing rotation condition of main shaft assembly and check for abnormal noise. Repair or replace components as necessary.

**Reassembly**

To reassemble, reverse disassembly procedure. Align bushing tab with hole of column tube. Apply molybdenum disulfide lithium base grease to tilt lever assembly, lock bolt, main shaft and steering column bolt pivot points. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS**.

**Disassembly (RAV4)**

1. Mark sliding yoke and main shaft. Remove sliding yoke. See **Fig. 8**. Using 1/8-5/32" (3-4 mm) drill, drill tapered head column bracket bolts. Using screw extractor, remove bracket bolts. Remove column upper bracket and column upper clamp. Remove tube attachment from column tube support. Remove column tube support.

2. Remove energy absorbing clip. Remove energy absorbing plate, energy absorbing guide and break-away capsule. Turn lock nut clockwise, and then remove it. Remove No. 1 tilt lever lock bolt, tilt lever assembly and tilt sub lever. Remove break-away bracket.

Fig. 8: Identifying Steering Column Components (RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Inspection

1. Energy Absorbing Plate
2. Breakaway Capsule
3. Key Cylinder
4. Energy Absorbing Guide
5. Energy Absorbing Clip
6. Column Upper Bracket
7. Breakaway Bracket
8. Key Unlock Warning Switch
9. No. 1 Tilt Lever Lock Bolt
10. Tilt Steering Support
11. Column Tube
12. Ignition Switch
13. Key Interlock Solenoid (A/T)
14. No. 1 Support Collar
15. Tapered Head Bolt
16. Tilt Lever Assembly
17. Tilt Sub Lever
18. Column Upper Clamp
19. Lower Bushing
20. Tilt Support No. 1 Reinforce
21. Pawl Set Bolt
22. Steering Column Protector
23. Torsion Spring
24. Main Shaft Assembly
25. Sliding Yoke

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Check that lock mechanism operates properly. Check bearing rotation condition and check for abnormal noise. Repair or replace components as necessary.

Reassembly

To reassemble, reverse disassembly procedure using NEW thrust collar. Align bushing tab with hole of column tube. Apply molybdenum disulfide lithium base grease to tilt lever assembly, main shaft, column bushing, thrust collar, bearing and steering column bolt pivot points. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS**.

Disassembly (Sienna)

1. Remove ignition key cylinder illumination. See **Fig. 9**. Using 1/8-5/32" (3-4 mm) drill, drill tapered head column bracket bolts. Using screw extractor, remove bracket bolts. Remove column upper bracket and column upper clamp. Remove shift lever.
Fig. 9: Identifying Steering Column Components (Sienna)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Remove shift lever housing. Remove park lock cable. Remove release lever spring. Remove turn signal
3. To remove steering column housing with main shaft, install plate washers (18 and 36-mm outer diameter) and screw (4-mm diameter, .7-mm pitch, 15-mm length). See Fig. 10.

![Fig. 10: Removing Steering Column Bolt (Sienna Shown; Tundra Is Similar)](Image)

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


**Inspection**

Check that lock mechanism operates properly. Check bearing rotation condition and check for abnormal noise. Repair or replace components as necessary.

**Reassembly**

To reassemble, reverse disassembly procedure using NEW thrust collar. Align bushing tab with hole of column tube. Apply molybdenum disulfide lithium base grease to tilt lever assembly, main shaft, column bushing, thrust collar, bearing and steering column bolt pivot points. Tighten bolts and nuts to specification. See **TORQUE**
SPECIFICATIONS

Disassembly (Tacoma & 4Runner)

1. On 4 Runner, remove screw and transponder key coil with key cylinder lamp assembly. On all models, use screw extractor to remove steering column upper bracket bolts. Remove column upper bracket and column upper clamp. See Fig. 11 and Fig. 12.

2. On 4 Runner, remove 3 tension springs. On Tacoma remove 4 tension springs. On all models, using screwdriver, remove spring nut. Remove lever and 2 bushings from column upper tube. Remove tilt lever link. On all models except Tacoma (NASTECH), remove column upper tube with main shaft. See Fig. 12.

1. Key Unlock Warning Switch
2. Column Upper Tube
3. Tilt Steering Bolt
4. Key Cylinder
5. Tilt Steering Pawl
6. Spring Nut
7. Tilt Lever Retainer
8. Bushing
9. Tilt Lever
10. Tilt Steering Bolt
11. Column Upper Bracket
12. Tilt Lever Link
13. Tension Spring
14. Tilt Steering No. 2 Shaft
15. Ignition Switch
16. Key Interlock Solenoid
17. Compression Spring
18. Bearing Thrust Collar
19. Bearing
20. Column Tube
21. Main Shaft Assembly
22. Column Upper Clamp
23. Tapered Head Bolt

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Fig. 11: Identifying Steering Column Components (4Runner Shown; Toyota Made)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Fig. 12: Exploded View Of Steering Column & Components (Tacoma shown; NASTECH Made)
Inspection

Check that lock mechanism operates properly. Check bearing rotation condition and check for abnormal noise. Check bearing rotation condition of main shaft assembly and check for abnormal noise. Repair or replace components as necessary.

Reassembly

To reassemble, reverse disassembly procedure. Align bushing tab with hole of column tube. Apply molybdenum disulfide lithium base grease to tilt lever assembly, lock bolt, main shaft and steering column bolt pivot points. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS**.

Disassembly (Tundra)


2. On all models, remove release lever spring and turn signal bracket. To remove steering column housing with main shaft on models equipped with tilt steering, install plate washers (18 and 36-mm outer diameter) and screw (4-mm diameter, .7-mm pitch, 15-mm length). See **Fig. 10**. Remove column housing with shaft assembly from column tube assembly. Remove tilt spring and spring guide.

3. On models equipped with A/T, remove 4 Torx bolts, 2 tilt No. 1 stoppers and steering column housing support. On all models, remove bolt and washer and remove column tube support with lower column tube attachment. Remove lower column tube attachment from column tube support.


Inspection

Ensure lock mechanism, key cylinder, ignition switch and key unlock warning switch operate properly. Check column bearing for rotating smoothness. Replace column housing if bearing or housing shows any damage. Check steering shaft for bends, damaged splines or damaged "U" joints. Repair or replace components as necessary.

Reassembly

1. Install inner race, upper bearing inner race seat, compression spring and spring retainer. Install NEW retaining ring to main shaft assembly. Install retaining ring remover/replacer to main shaft assembly. Using retaining ring remover/replacer, push down retaining ring until ring fits into shaft groove. Install main shaft assembly.

2. Ensure main shaft assembly does not rotate. Install main shaft stopper. Install NEW lower column tube attachment, bolt and washer to column tube support.
3. On models equipped with A/T, install 2 NEW tilt No. 1 stopper with steering column housing support. Install 4 NEW Torx bolts.

4. On all models, install steering column with main shaft assembly into column tube assembly. Install tilt spring and spring guide. Place steering column assembly in vise. Temporarily install 2 NEW pivot pins. Using a punch and hammer, tap in pivot pins. Using a pin punch, stake 3 places evenly around hole.

5. Install turn signal bracket with 2 NEW Torx screws. Install release lever spring. On models equipped with A/T, install park lock cable assembly, shift lever housing with 3 NEW Torx screws, upper No. 2 steering cover and shift lever with NEW Torx screw.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS (LAND CRUISER)

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TORQUE SPECIFICATIONS (RAV4)

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<td>1999-2000 STEERING Steering Columns - Tilt Wheel - Trucks &amp; Vans</td>
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**TORQUE SPECIFICATIONS (SIENNA)**

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Microsoft

Sunday, November 22, 2009 10:34:03 AM
<table>
<thead>
<tr>
<th>Hardware</th>
<th>INCH Lbs. (N.m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;U&quot; Joint Bolt (Pinch Bolt)</td>
<td>26 (35)</td>
</tr>
<tr>
<td>Column Tube Support Bolts</td>
<td>74 (8.4)</td>
</tr>
<tr>
<td>Shift Lever Housing Torx Screws</td>
<td>106 (12)</td>
</tr>
<tr>
<td>Steering Column Hole Cover No. 2 Bolts</td>
<td>71 (8)</td>
</tr>
<tr>
<td>Steering Wheel Pad Torx Screw</td>
<td>79 (9)</td>
</tr>
<tr>
<td>Turn Signal Bracket Torx Screws</td>
<td>65 (7.5)</td>
</tr>
</tbody>
</table>