

2005 STEERING

Steering - RAV4

STEERING SYSTEM

PRECAUTION

- Care must be taken to replace parts properly because they could affect the performance of the steering system and result in a driving hazard.
- The RAV4 is equipped with SRS (Supplemental Restraint System) such as the driver airbag and passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read **PRECAUTION** in Supplemental Restraint System.

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in the order shown. If necessary, repair or replace these parts.

Symptom	Suspect Area
Hard steering	1. Tires (Improperly inflated) 2. Power steering fluid level (Low) 3. Drive belt (Loose) 4. Front wheel alignment (Incorrect) 5. Steering system joints (Worn) 6. Suspension arm ball joints (Worn) 7. Steering column (Binding) 8. Power steering vane pump 9. Power steering gear
Poor return	1. Tires (Improperly inflated) 2. Front wheel alignment (Incorrect) 3. Steering column (Binding) 4. Power steering gear
Excessive play	1. Steering system joints (Worn) 2. Suspension arm ball joints (Worn) 3. Intermediate shaft, Sliding yoke (Worn) 4. Front wheel bearing (Worn) 5. Power steering gear
Abnormal noise	1. Power steering fluid level (Low) 2. Steering system joints (Worn) 3. Power steering vane pump 4. Power steering gear

Fig. 1: Troubleshooting Symptoms Table

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

DRIVE BELT**INSPECTION**

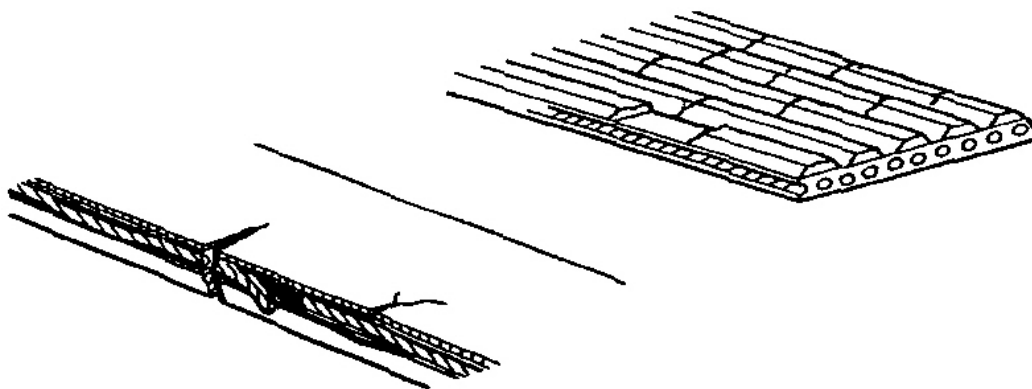
Visually check the drive belt for excessive wear, frayed cords, etc.

If any defect has been found, replace the drive belt.

HINT:

- Cracks on the rib side of a belt are considered acceptable.

If the missing chunks from the ribs are found on the drive belt, it should be replaced.



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Fig. 2: Inspecting Drive Belt Condition

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

- After installing a drive belt, check that it fits properly in the ribbed grooves.
- Check with your hand to confirm that the drive belt has not slipped out of the groove on the bottom of the pulley.

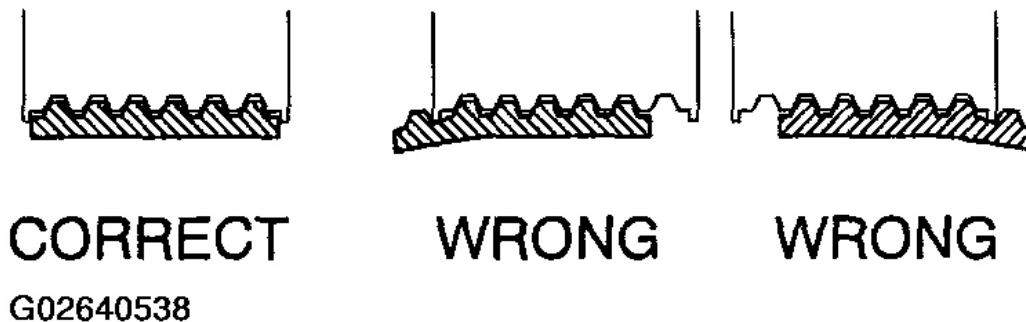


Fig. 3: Identifying Properly Drive Belt Installation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

POWER STEERING FLUID

BLEEDING

1. **CHECK FLUID LEVEL (See INSPECTION)**
2. **JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS**
3. **TURN STEERING WHEEL**

With the engine stopped, turn the steering wheel slowly from lock to lock several times.

4. **LOWER VEHICLE**
5. **START ENGINE**

Run the engine at idle for a few minutes.

6. **TURN STEERING WHEEL**
 - a. With the engine idling, turn the steering wheel to left or right full lock position and keep it there for 2 - 3 seconds, then turn the steering wheel to the opposite full lock position and keep it there for 2 - 3 seconds.
 - b. Repeat (a) several times.
7. **STOP ENGINE**
8. **CHECK FOR FOAMING OR EMULSIFICATION**

If the system has to be bled twice specifically because of foaming or emulsification, check for fluid leaks in the system.

9. **CHECK FLUID LEVEL (See INSPECTION)**

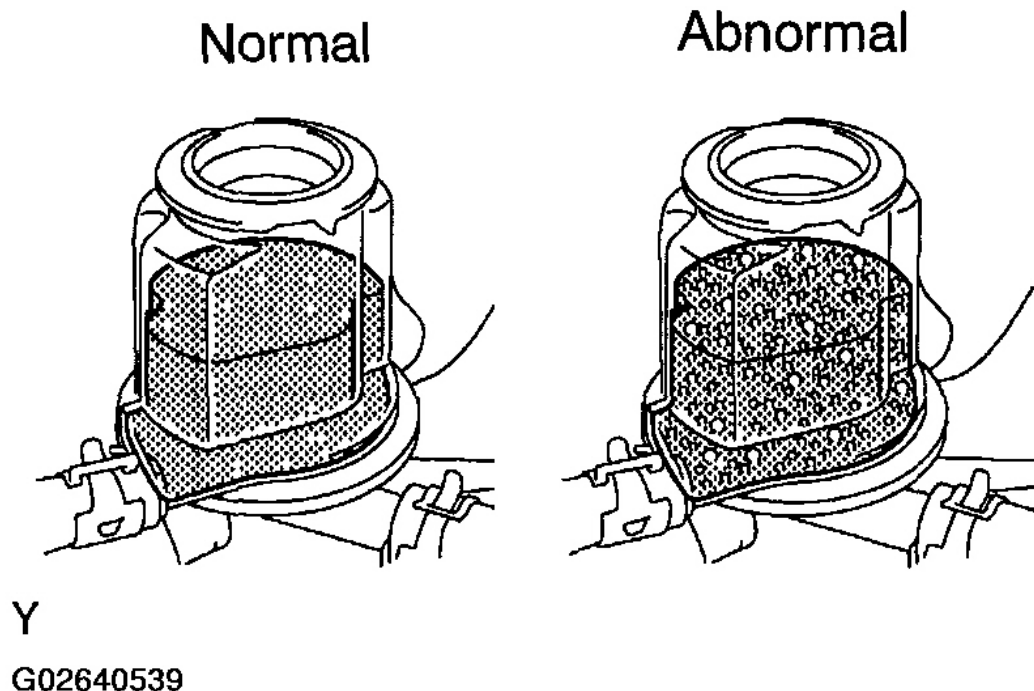


Fig. 4: Identifying Normal & Abnormal Foaming Or Emulsification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION

1. CHECK FLUID LEVEL

- a. Keep the vehicle level.
- b. With the engine stopped, check the fluid level in the oil reservoir.

If necessary, add fluid.

Fluid: ATF DEXRON(R) II or III

HINT:

If the fluid is hot, check that the fluid level is within the HOT LEVEL range on the reservoir. If the fluid is cold, check that it is within the COLD LEVEL range.

- c. Start the engine and run it at idle.
- d. Turn the steering wheel from lock to lock several times to boost fluid temperature.

Fluid temperature: 80°C (176°F)

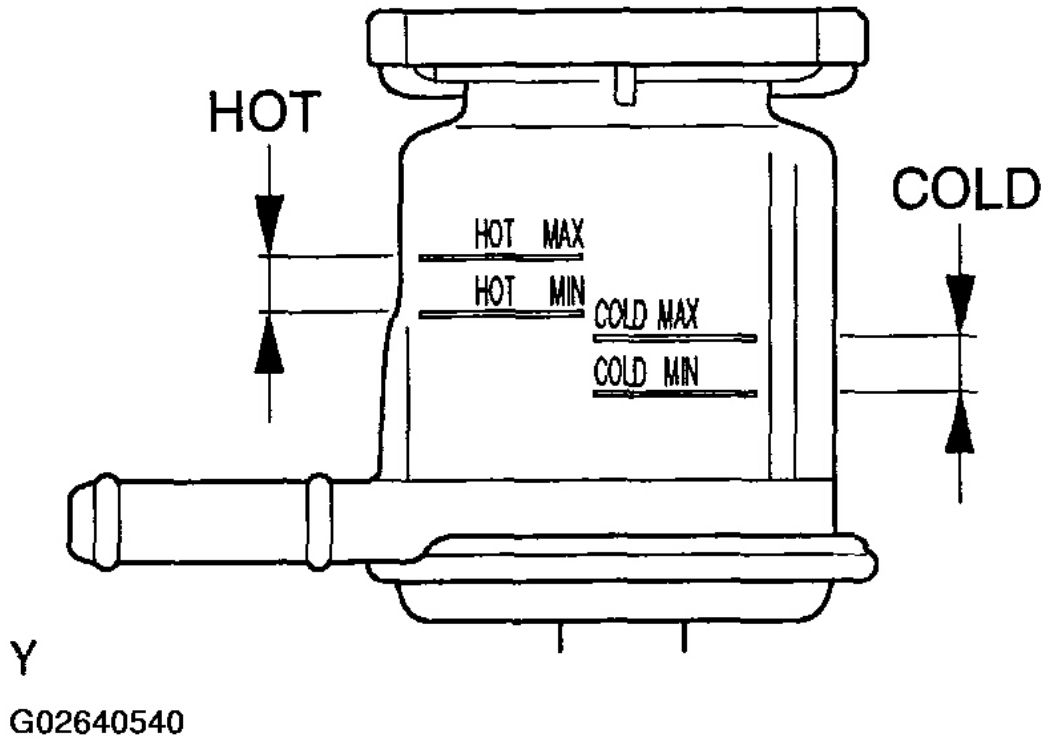


Fig. 5: Checking Fluid Level In Oil Reservoir

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

- e. Check for foaming or emulsification.

If there is foaming or emulsification, bleed power steering system (See **POWER STEERING FLUID**).

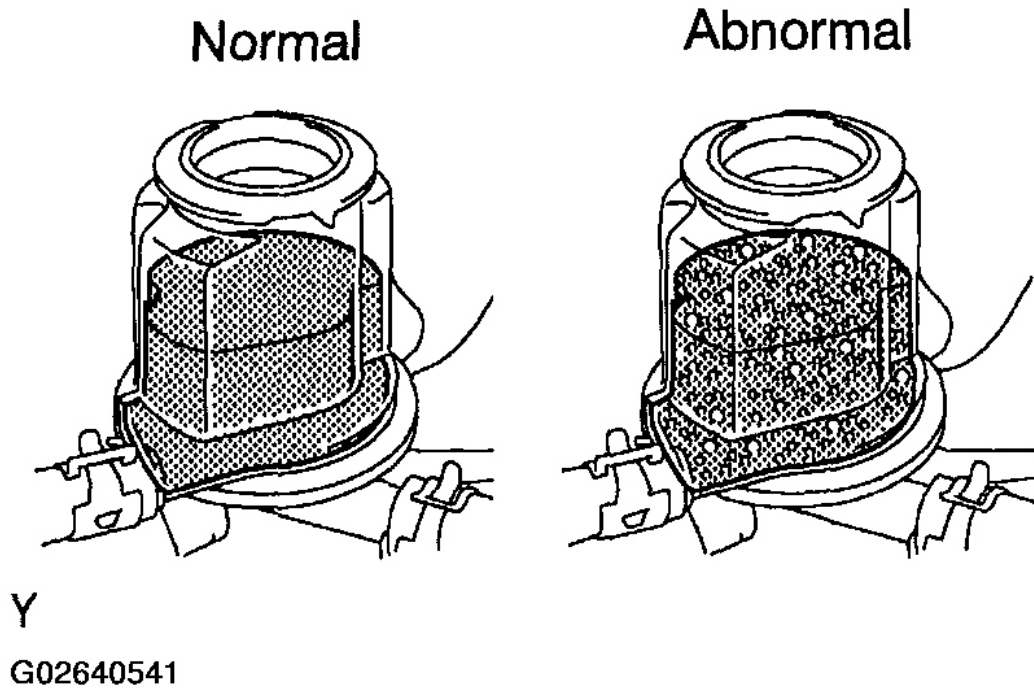


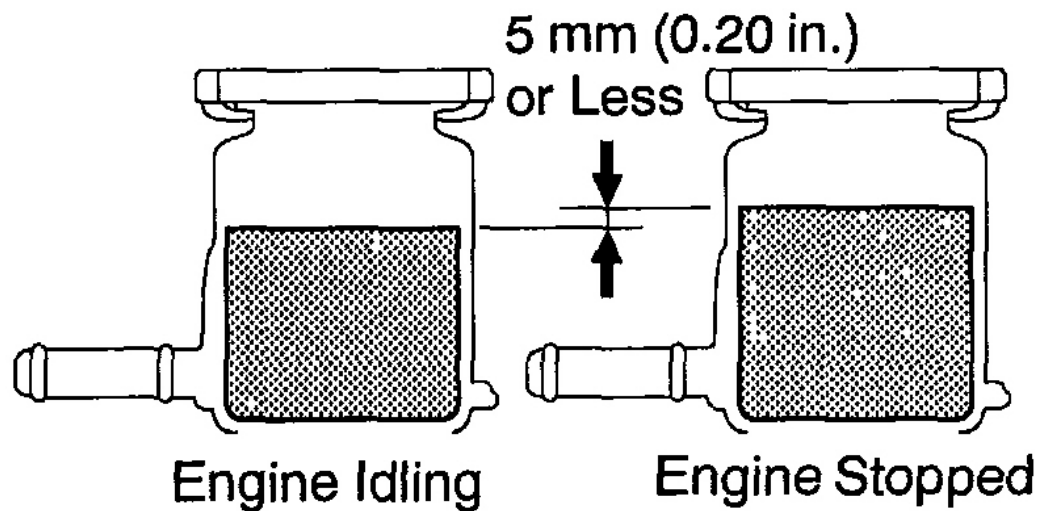
Fig. 6: Identifying Normal & Abnormal Foaming Or Emulsification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- f. With the engine idling, measure the fluid level in the oil reservoir.
- g. Stop the engine.
- h. Wait a few minutes and re-measure the fluid level in the oil reservoir.

Maximum fluid level rise: 5 mm (0.20 in.)

If a problem is found, bleed power steering system (See **POWER STEERING FLUID**).

- i. **Check the fluid level.**



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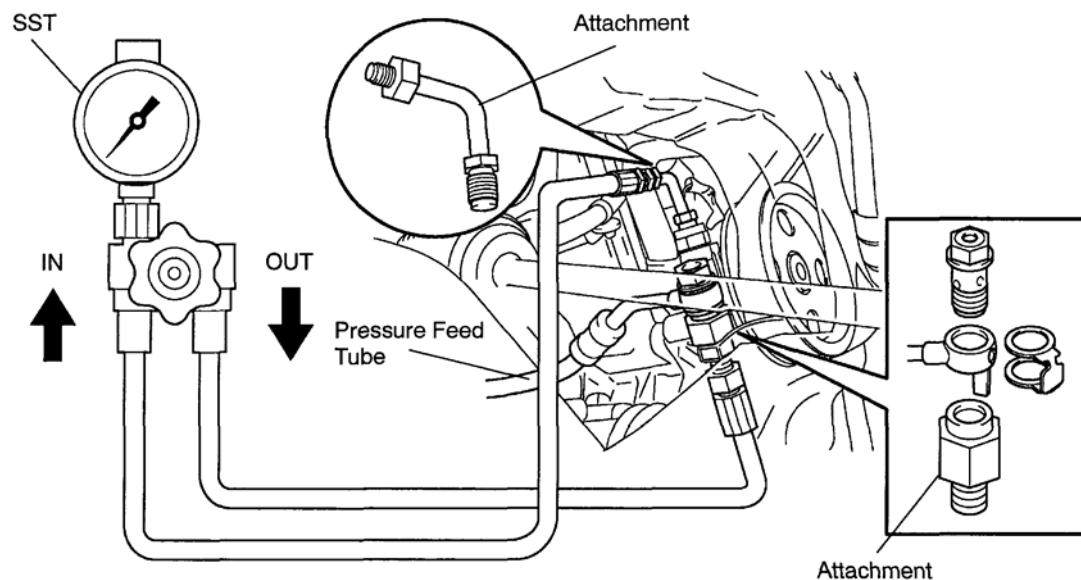
Fig. 7: Measuring Fluid Level In Oil Reservoir
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. CHECK STEERING FLUID PRESSURE

- Disconnect the pressure feed tube from the PS vane pump (See **REMOVAL**).
- Connect SST, as shown in the illustration below.

SST 09640-10010 (09641-01010, 09641-01030, 09641-01060)

NOTE: Check that the valve of the SST is in the open position.



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Fig. 8: Connecting SST To Pressure Feed Tube
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Bleed the power steering system (See **POWER STEERING FLUID**).
- d. Start the engine and run it at idle.
- e. Turn the steering wheel from lock to lock several times to boost fluid temperature.

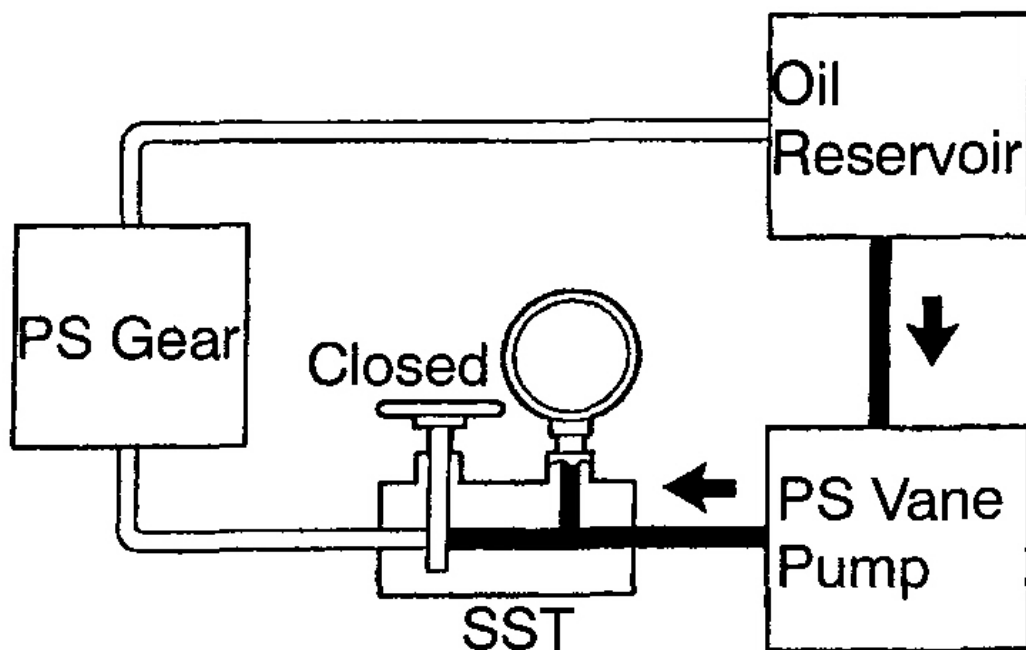
Fluid temperature: 80°C (176°F)

- f. With the engine idling, close the valve of the SST and observe the reading on the SST.

Minimum fluid pressure: 7,400 kPa (75 kgf/cm² , 1,067 psi)

NOTE:

- Do not keep the valve closed for more than 10 seconds.
- Do not let the fluid temperature become too high.



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Fig. 9: Measuring Fluid Pressure (Valve Closed Using SST)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- g. With the engine idling, open the valve fully.
- h. Measure the fluid pressure at engine speeds of 1,000 RPM and 3,000 RPM.

Difference fluid pressure: 490 kPa (5 kgf/cm² , 71 psi) or less

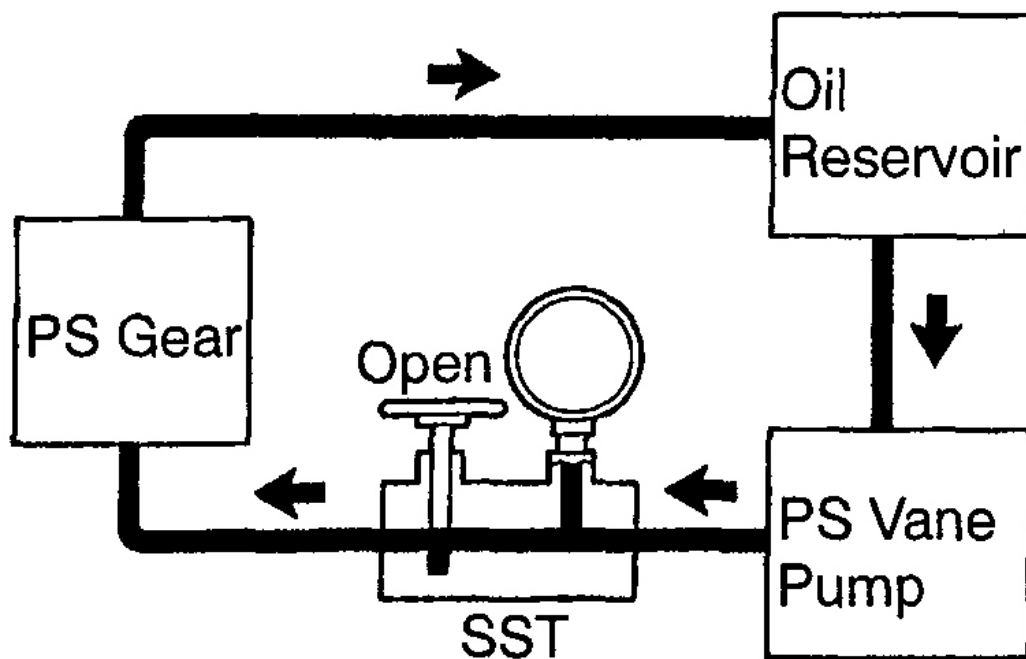
NOTE: Do not turn the steering wheel.

- i. With the engine idling and valve fully opened, turn the steering wheel to full lock.

Minimum fluid pressure: 7,400 kPa (75 kgf/cm² , 1,067 psi)

NOTE:

- Do not maintain lock position for more than 10 seconds.
- Do not let the fluid temperature become too high.



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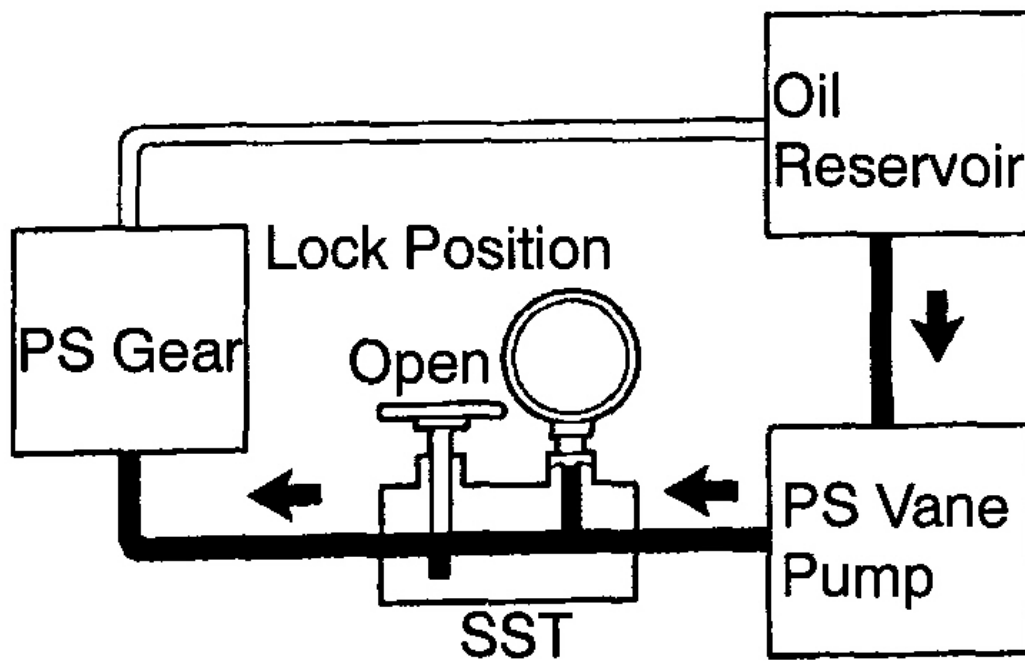
Fig. 10: Measuring Fluid Pressure (Valve Open Using SST)

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

- j. Disconnect the SST.

SST 09640-10010 (09641-01010, 09641-01030, 09641-01060)

- k. Connect the pressure feed tube to the PS vane pump (See **INSTALLATION**).
- l. Bleed the power steering system (See **POWER STEERING FLUID**).



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Fig. 11: Measuring Fluid Pressure (Valve Open Using SST)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

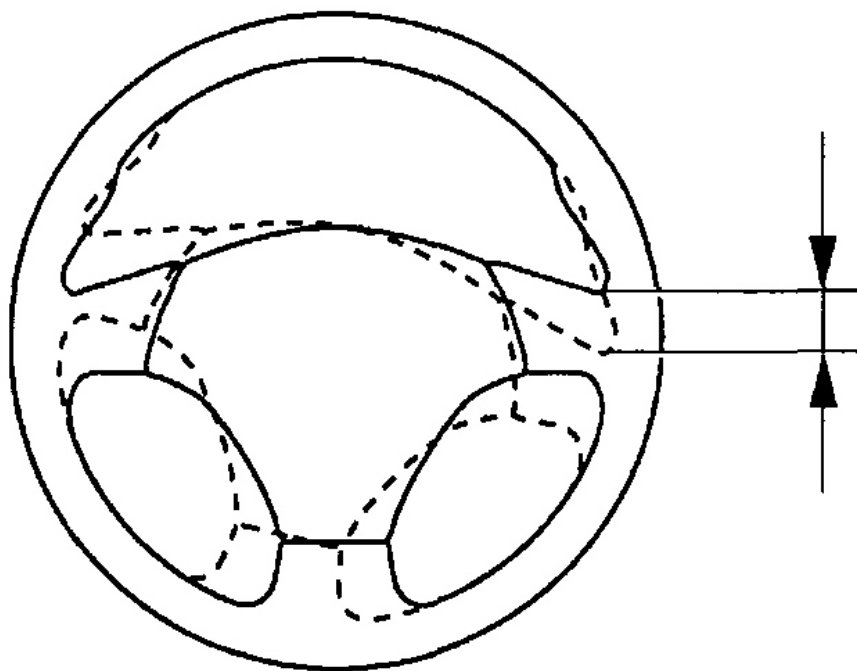
STEERING WHEEL

INSPECTION

1. CHECK STEERING WHEEL FREE PLAY

- Stop the vehicle and face the tires straight ahead.
- Rock the steering wheel gently up and down with a finger lightly, check the steering wheel free play.

Maximum free play: 30 mm (1.18 in.)



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Fig. 12: Identifying Steering Wheel Free Play

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

2. CHECK STEERING EFFORT

- Center the steering wheel.
- Remove the steering wheel pad (See **REMOVAL**).
- Start the engine and run it at idle.
- Measure the steering effort in both directions.

Steering effort (Reference): 5.9 N.m (60 kgf.cm, 52 in.lbf)

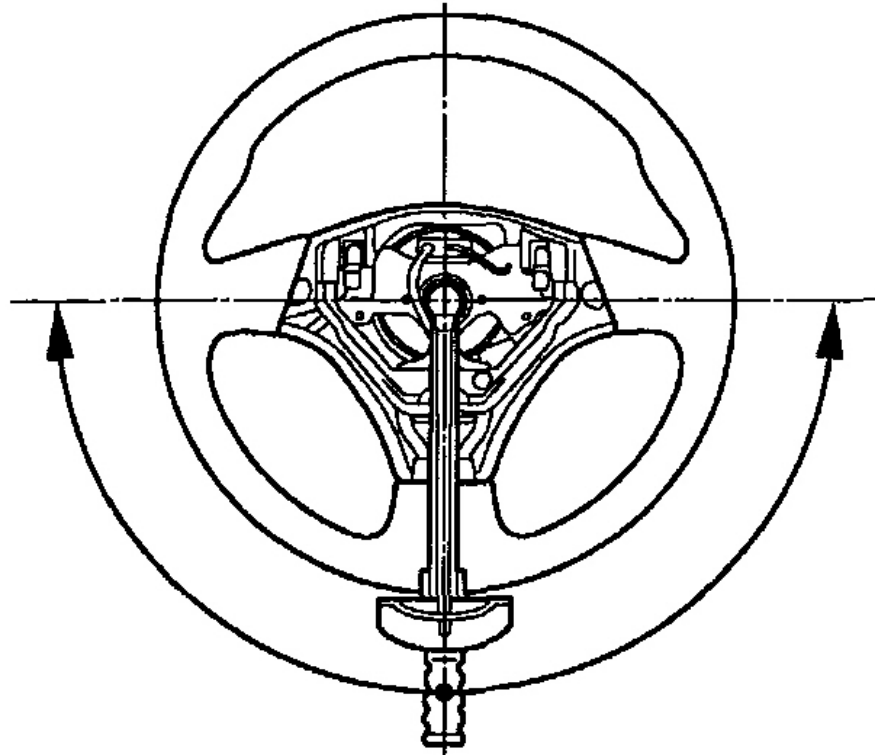
HINT:

Take the tire type, pressure and contact surface into consideration before making your diagnosis.

- Install the steering wheel set nut.

Torque: 50 N.m (500 kgf.cm, 35 ft.lbf)

- f. Install the steering wheel pad (See **INSTALLATION**).



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Fig. 13: Checking Steering Effort
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

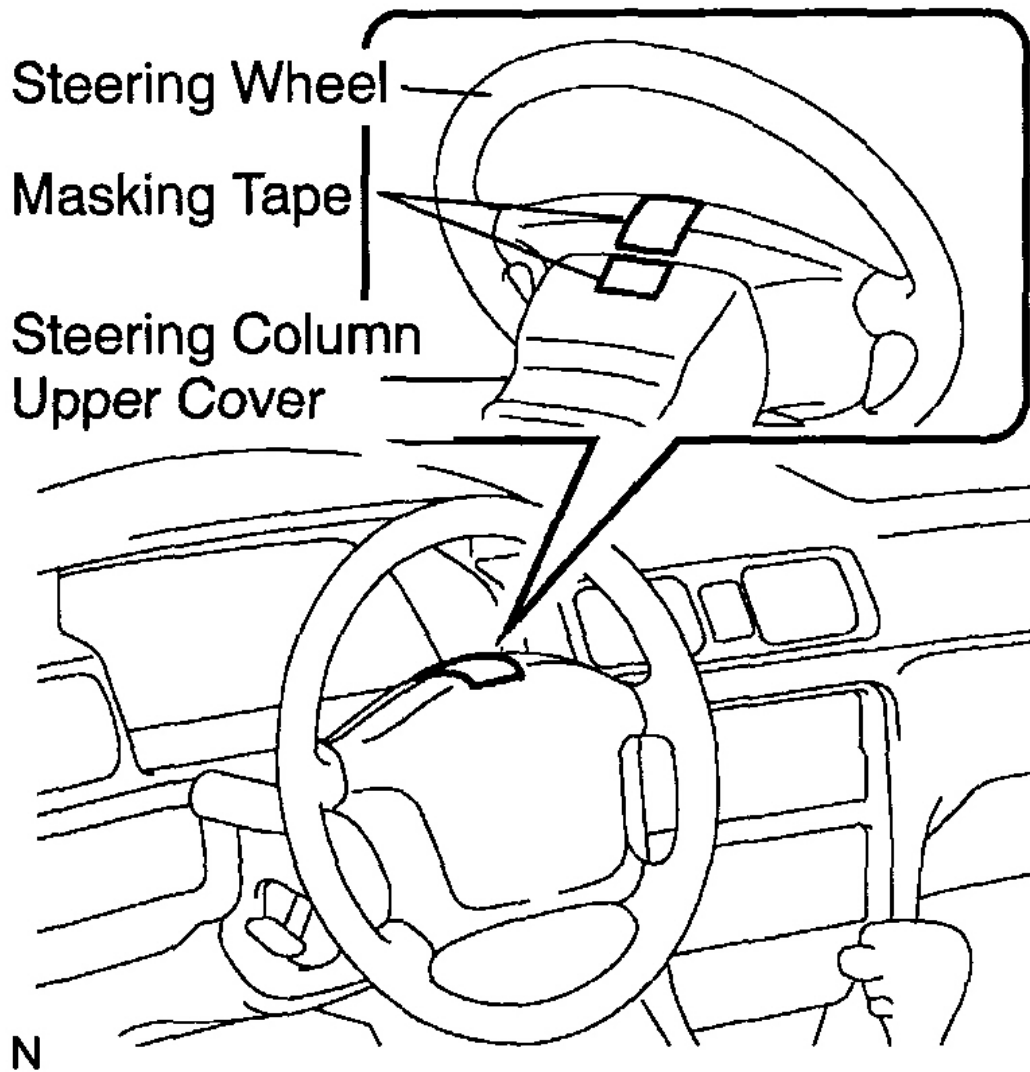
REPAIR PROCEDURES

HINT:

This is the repair procedure for steering off center.

1. INSPECT STEERING WHEEL OFF CENTER

- Apply masking tape on the top center of the steering wheel and steering column upper cover.



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Fig. 14: Applying Masking Tape On Top Center Of Steering Wheel & Steering Column Upper Cover

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

- b. Drive the vehicle in a straight line for 100 meters at a constant speed of 35 mph (56 km/h), and hold the steering wheel to maintain the course.
- c. Draw a line on the masking tape as shown.

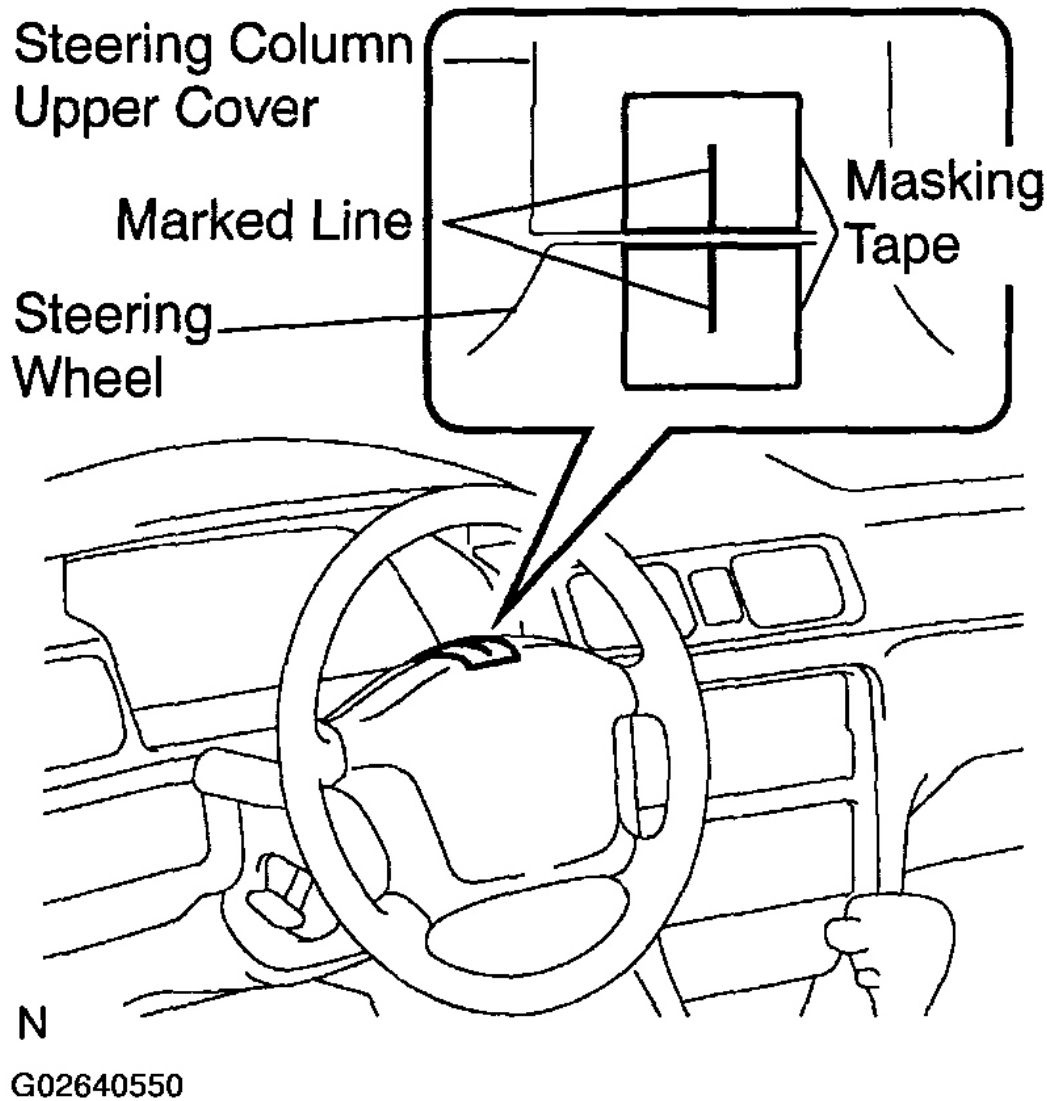


Fig. 15: Drawing Line On Masking Tape

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

- d. Turn the steering wheel to its straight position.

HINT:

Refer to the upper surface of the steering wheel, steering spoke and SRS airbag line for the straight position.

- e. Draw a new line on the masking tape of the steering wheel as shown.

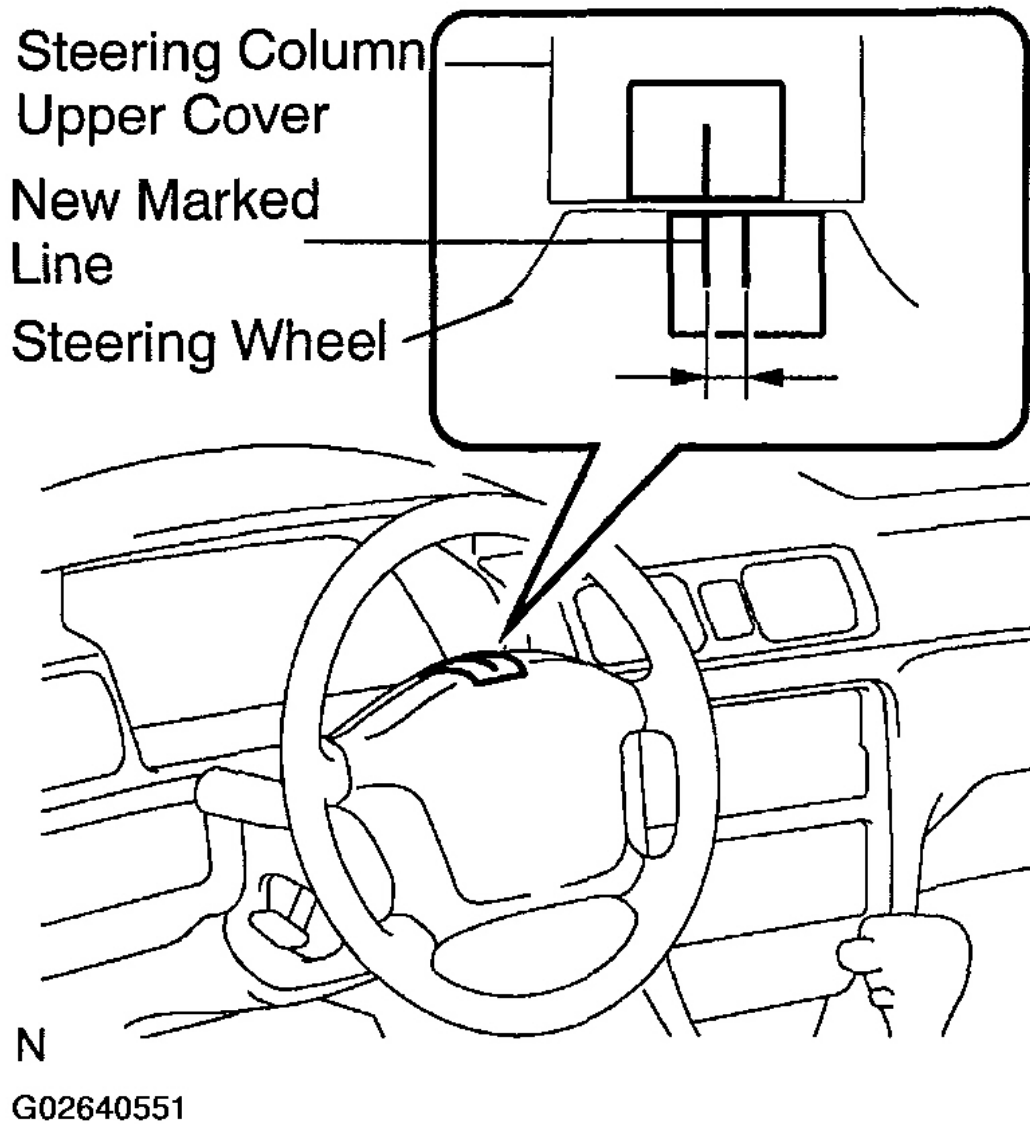


Fig. 16: Measuring Distance Between Lines On Masking Tape Of Steering Wheel
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- f. Measure the distance between the 2 lines on the masking tape of the steering wheel.
- g. Convert the measured distance to steering angle.

Measured distance 1 mm (0.04 in.) = Steering angle approximately 1 degree

HINT:

Make a note of the steering angle.

2. ADJUST STEERING ANGLE

- a. Lift up the vehicle.

NOTE: **The adjustment method for steering angle is different depending on the models. Check whether it is type A or B.**

- b. Draw a line on the RH and LH tie rod and rack ends where it can easily be seen.
- c. Using a paper gauge, measure the distance from RH and LH tie rod ends to the rack end screws.

HINT:

- Measure the RH side and LH side.
 - Make a note of the measured values.
- d. Remove the RH and LH boot clips from the rack boots.
 - e. Loosen the RH and LH lock nuts.
 - f. Turn the RH and LH rack end by the same amount (but in different directions) according to the steering angle.

1 turn 360 deg. of rack end (1.5 mm (0.059 in.) horizontal movement) = 12 deg. of steering angle

- g. Tighten the RH and LH lock nuts by the specified torque.

NOTE: **Make sure that the difference in length between RH and LH tie rod ends and rack end screws are within 1.5 mm (0.059 in.).**

- h. Install the RH and LH boot clips.

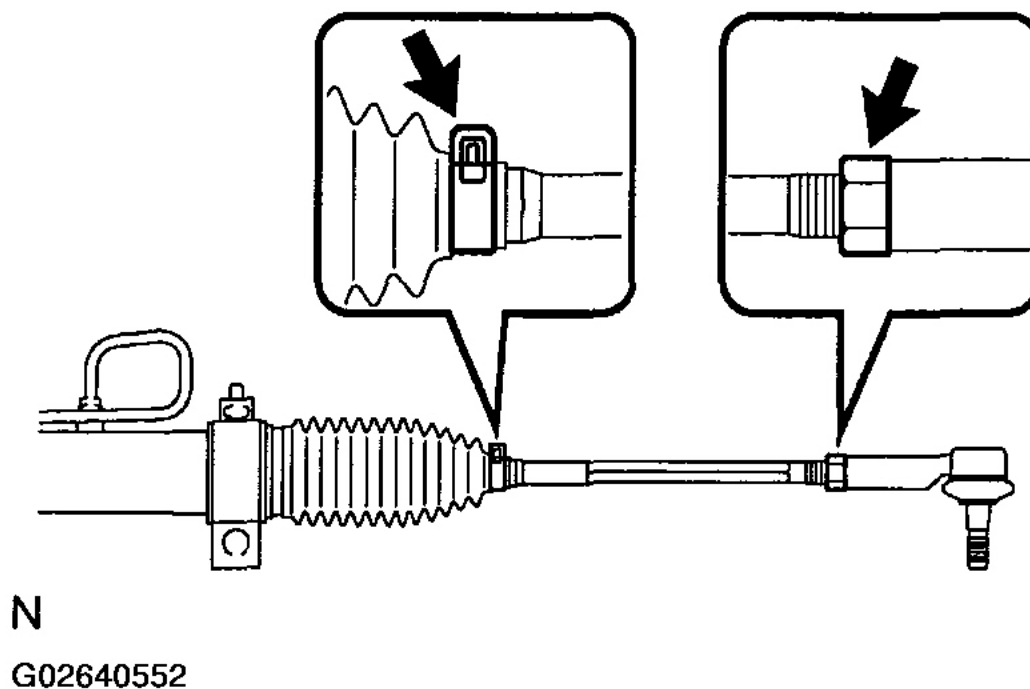


Fig. 17: Identifying Boot Clip & Tie Rod Nut
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TILT STEERING COLUMN

COMPONENTS

2005 Toyota RAV4

2005 STEERING Steering - RAV4

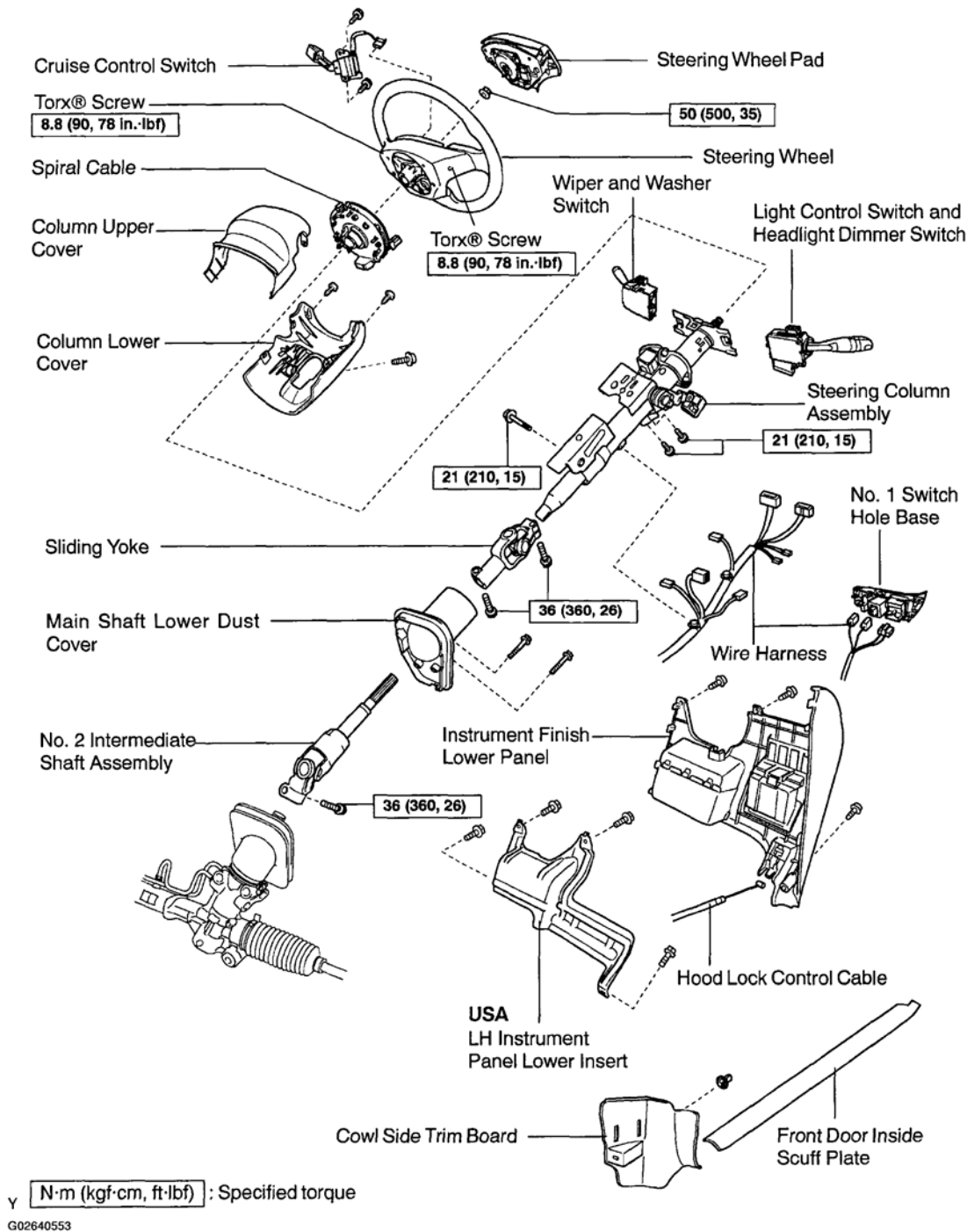
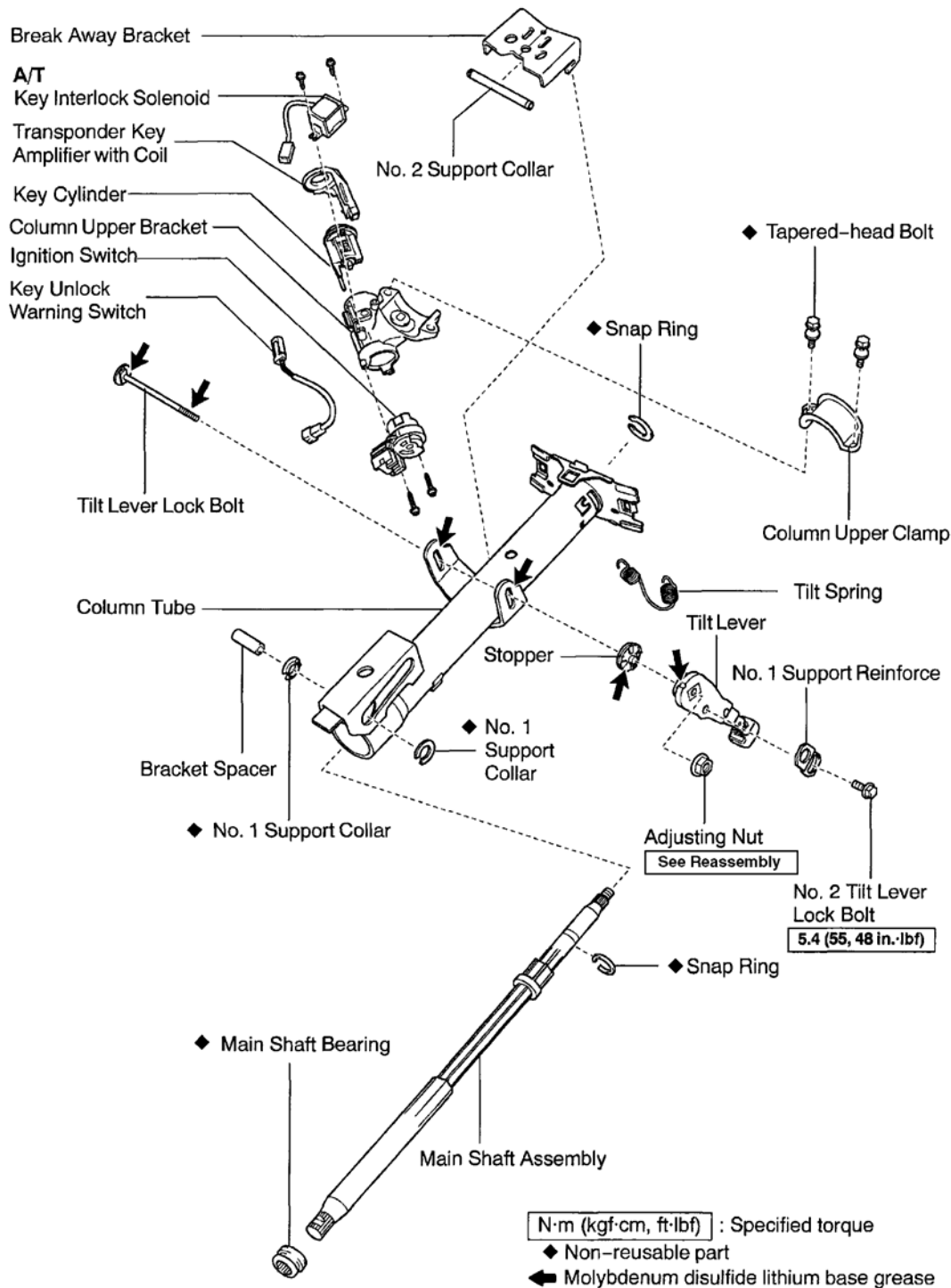


Fig. 18: Exploded View Of Tilt Steering Column & Torque Specifications (1 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2005 Toyota RAV4

2005 STEERING Steering - RAV4



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Fig. 19: Exploded View Of Tilt Steering Column & Torque Specifications (2 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

1. REMOVE STEERING WHEEL PAD

NOTE: If the airbag connector is disconnected with the ignition switch at ON, DTCs will be recorded.

- Place the front wheels facing straight ahead.
- Using a Torx(R) socket wrench (T30), loosen the 2 Torx(R) screws until the groove along the screw circumference catches on the screw case.

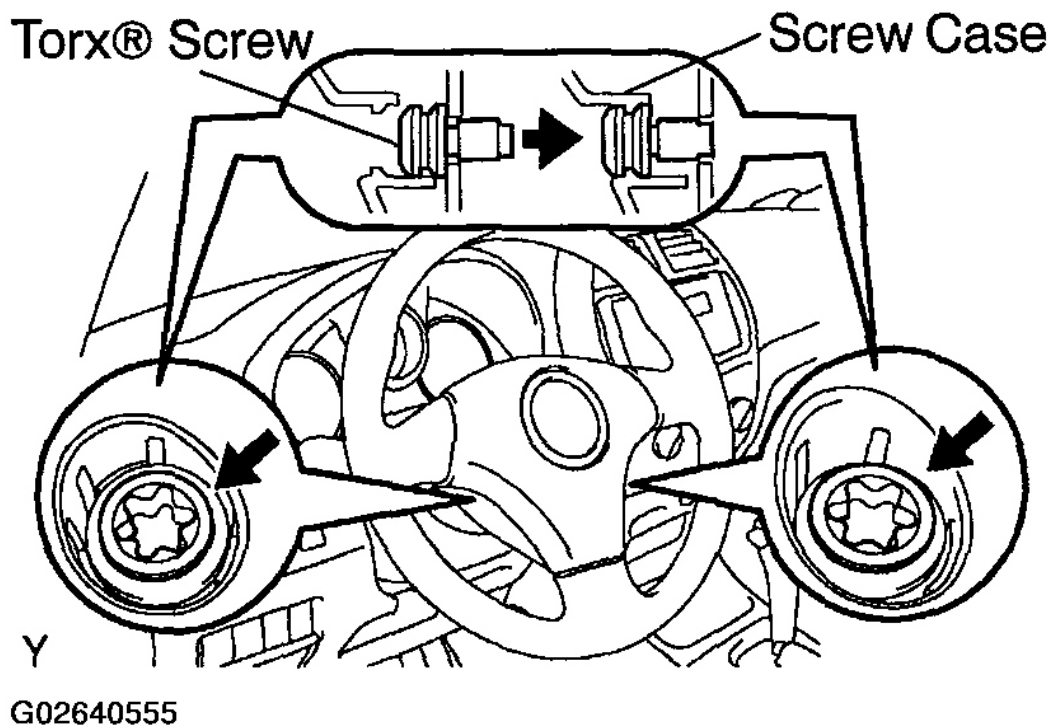


Fig. 20: Removing Steering Wheel Pad

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

- Pull out the wheel pad from the steering wheel and disconnect the airbag connector.

CAUTION:

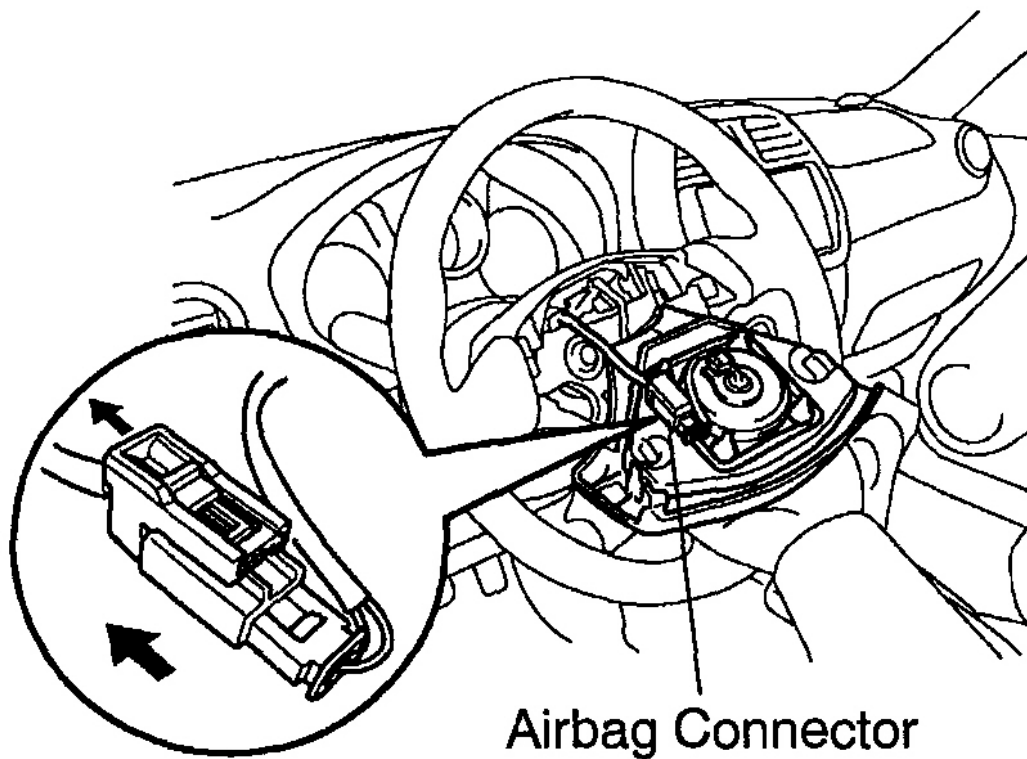
- When storing the wheel pad, keep the upper surface of the pad facing upward.
- Never disassemble the wheel pad.

NOTE:

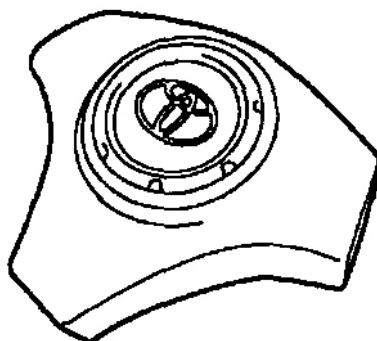
When removing the wheel pad, take care not to pull the airbag wire

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2005 STEERING Steering - RAV4

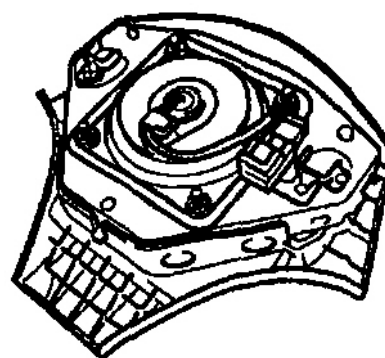
harness.



Correct



Wrong



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Fig. 21: Pulling Out Wheel Pad From Steering Wheel & Disconnecting Airbag Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. REMOVE STEERING WHEEL

- a. Disconnect the connector.
- b. Remove the steering wheel set nut.
- c. Place matchmarks on the steering wheel and main shaft assembly.
- d. Using SST, remove the steering wheel.

SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)

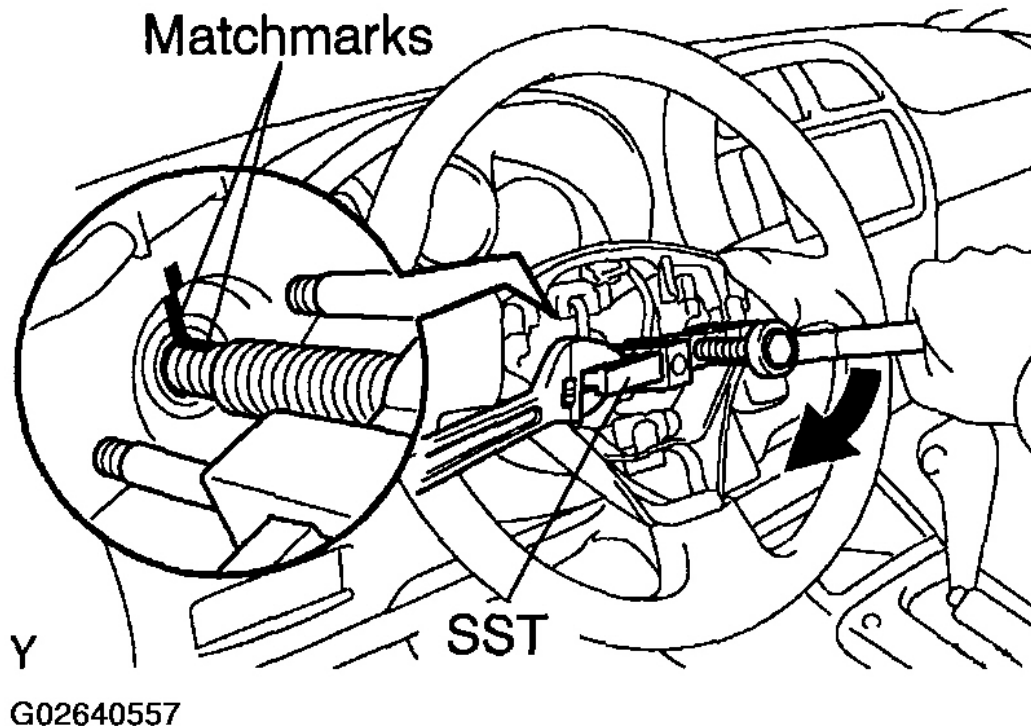


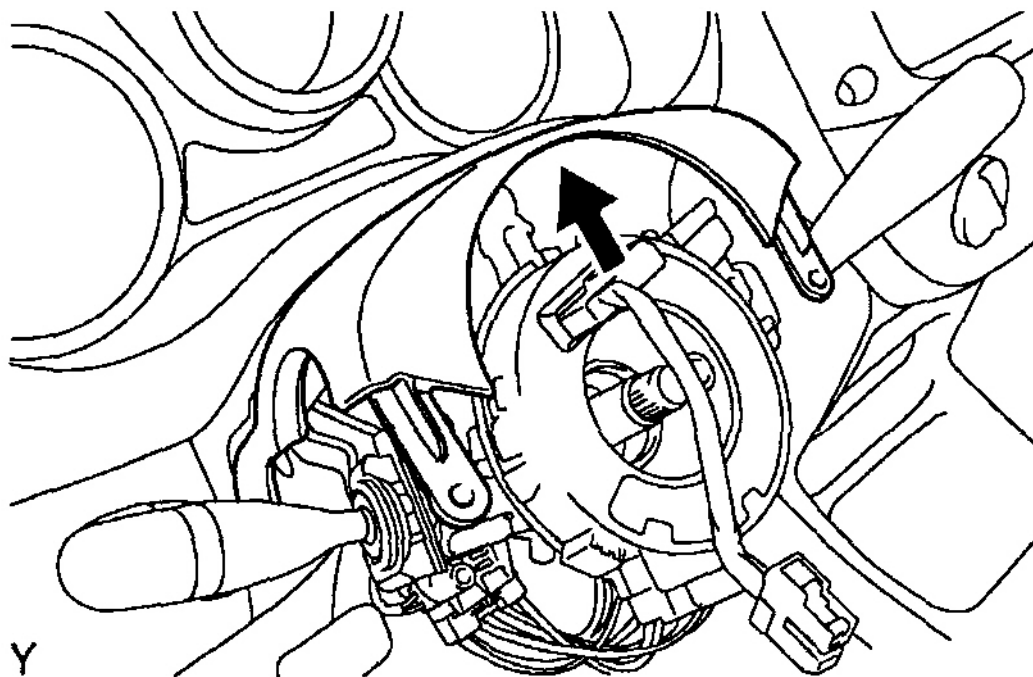
Fig. 22: Removing Steering Wheel Using SST
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. REMOVE COLUMN LOWER COVER

Remove the 3 screws and column lower cover.

4. DISCONNECT COLUMN UPPER COVER

Disconnect the column upper cover from the column tube.



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Fig. 23: Disconnecting Column Upper Cover

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

5. REMOVE SPIRAL CABLE, LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH AND WIPER AND WASHER SWITCH

- Disconnect the airbag connector from the spiral cable.
- Disconnect the 3 connectors from the spiral cable, light control switch and headlight dimmer switch and wiper and washer switch.
- Release the 3 claws and remove the spiral cable.

NOTE: Do not disassemble the spiral cable or apply oil to it.

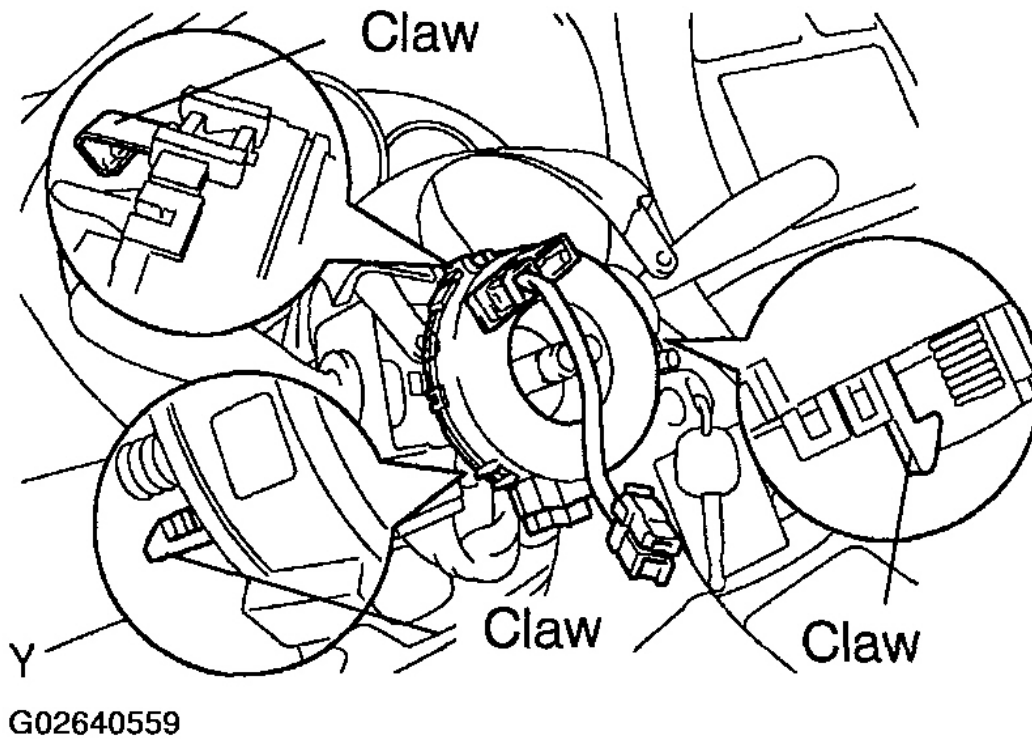


Fig. 24: Removing Spiral Cable

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

- d. Push the claw and pull out the light control switch and headlight dimmer switch.

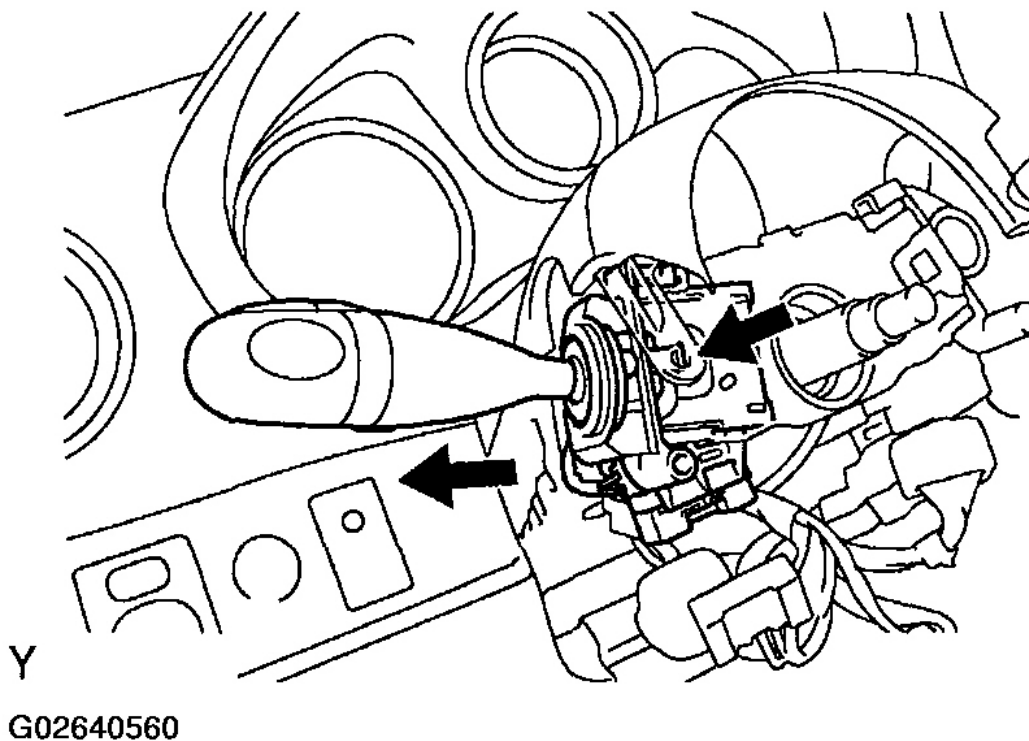


Fig. 25: Pulling Out Light Control Switch

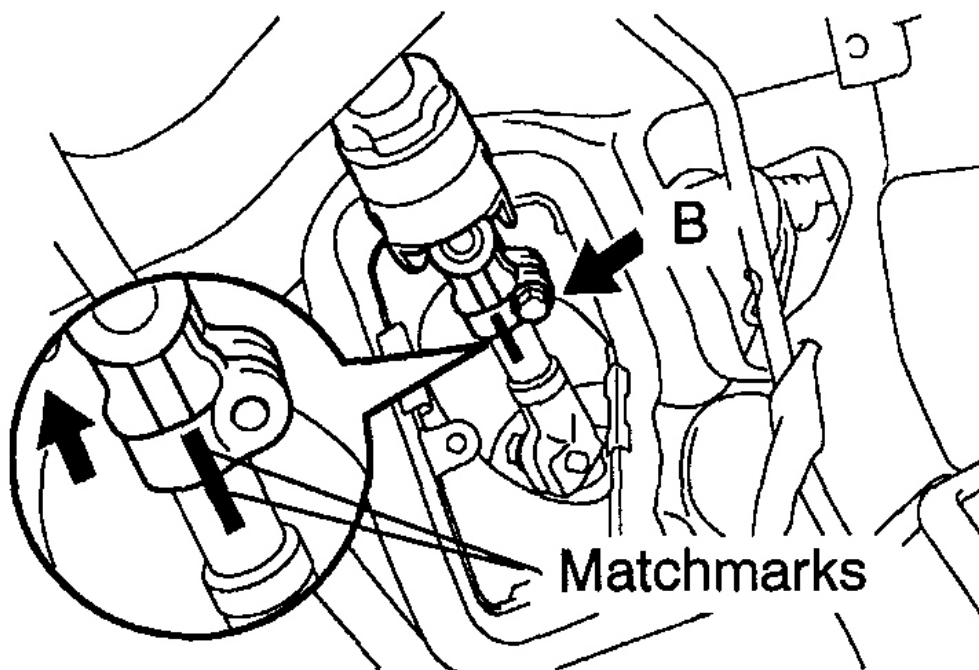
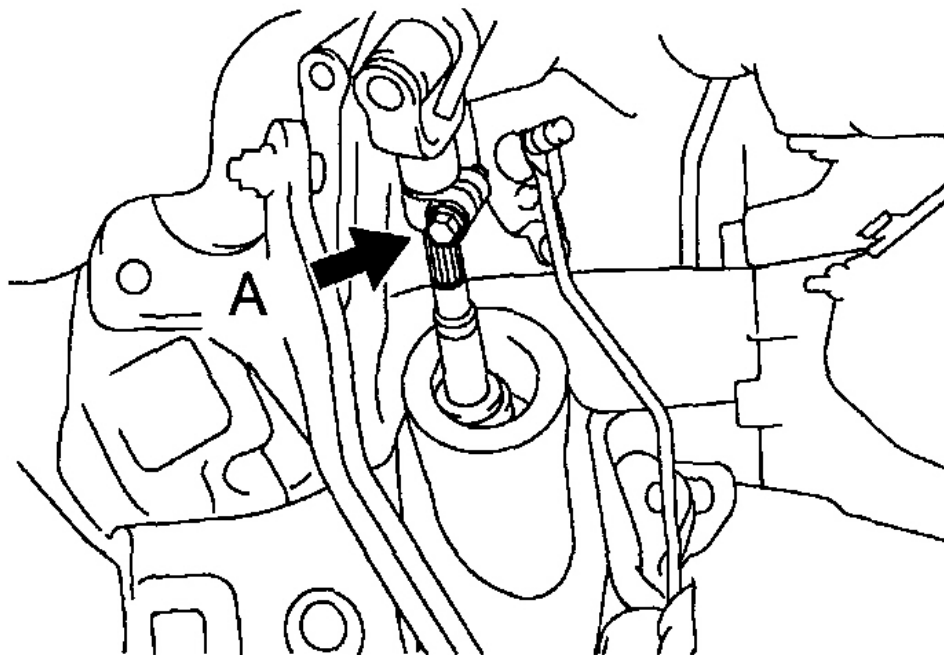
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- e. Employ the same manner described above to the wiper and washer switch.
6. **REMOVE COLUMN UPPER COVER**
7. **REMOVE FRONT DOOR INSIDE SCUFF PLATE**
8. **REMOVE COWL SIDE TRIM BOARD**
9. **REMOVE NO. 1 SWITCH HOLE BASE**
 - a. Pull out the No. 1 switch hole base.
 - b. Disconnect the connectors.
10. **REMOVE INSTRUMENT FINISH LOWER PANEL**
 - a. Remove the 3 screws and instrument finish lower panel.
 - b. Disconnect the connectors.
 - c. Disconnect the hood lock control cable.
11. **USA: REMOVE LH INSTRUMENT PANEL LOWER INSERT**

Remove the 4 bolts and LH instrument panel lower insert.

12. DISCONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY

- a. Remove the 2 bolts and disconnect the main shaft lower dust cover.
- b. Place matchmarks on the No. 2 intermediate shaft assembly and steering intermediate extension.
- c. Loosen the bolt A and remove the bolt B, then disconnect the No. 2 intermediate shaft assembly.
- d. Remove the main shaft lower dust cover.



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Fig. 26: Removing Bolt B Then Disconnecting Intermediate Shaft Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

13. REMOVE STEERING COLUMN ASSEMBLY

- a. Disconnect the connectors and wire harness clamps.
- b. Remove the 3 bolts and steering column assembly.

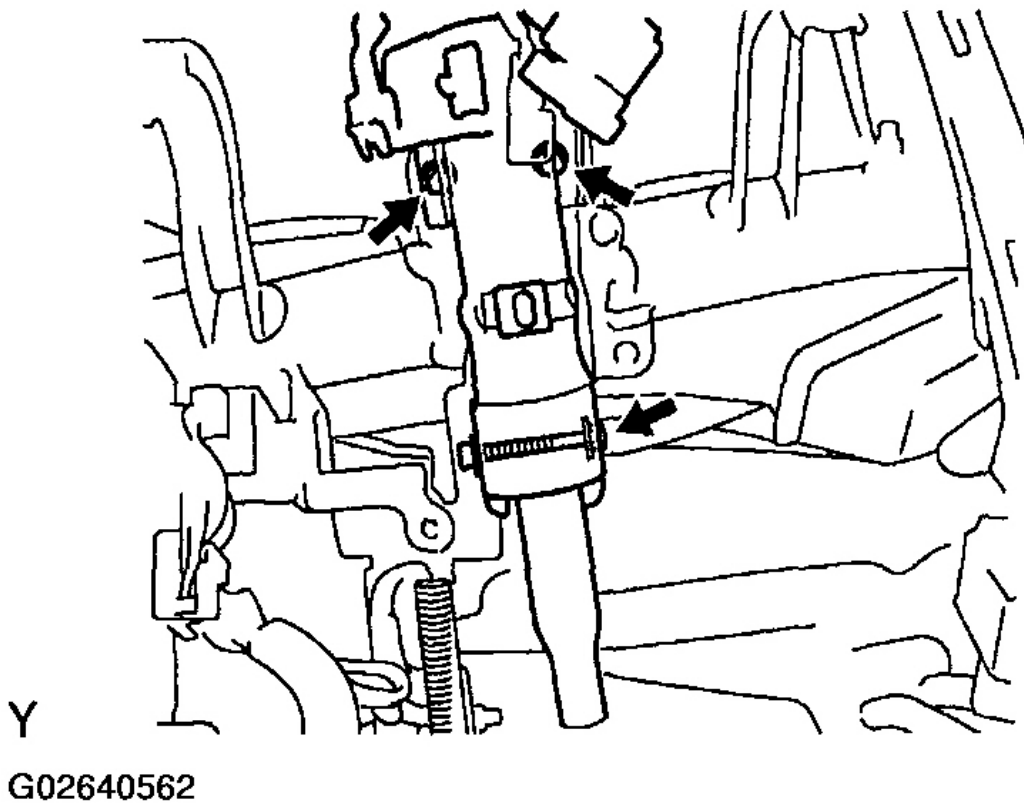


Fig. 27: Removing Steering Column Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

14. REMOVE SLIDING YOKE AND NO. 2 INTERMEDIATE SHAFT ASSEMBLY

- a. Place matchmarks on the sliding yoke and main shaft assembly.
- b. Place matchmarks on the sliding yoke and No. 2 intermediate shaft.
- c. Remove the bolt A and No. 2 intermediate shaft assembly.
- d. Remove the bolt B and sliding yoke.

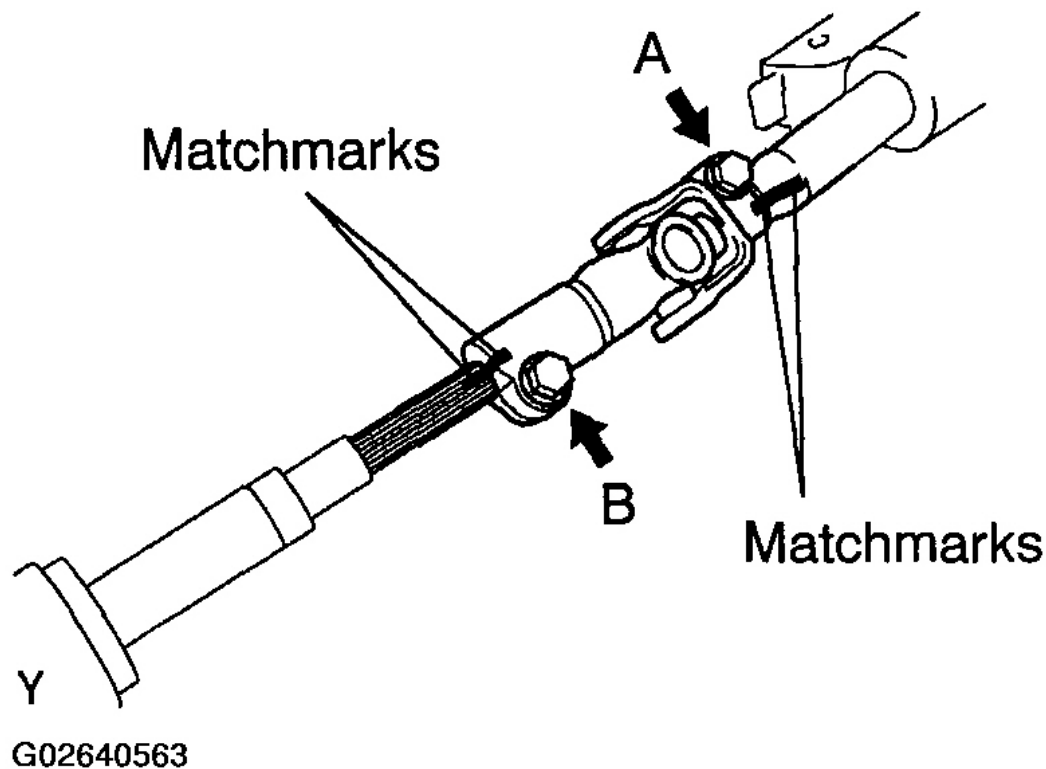


Fig. 28: Removing Sliding Yoke

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

15. REMOVE CRUISE CONTROL SWITCH FROM STEERING WHEEL

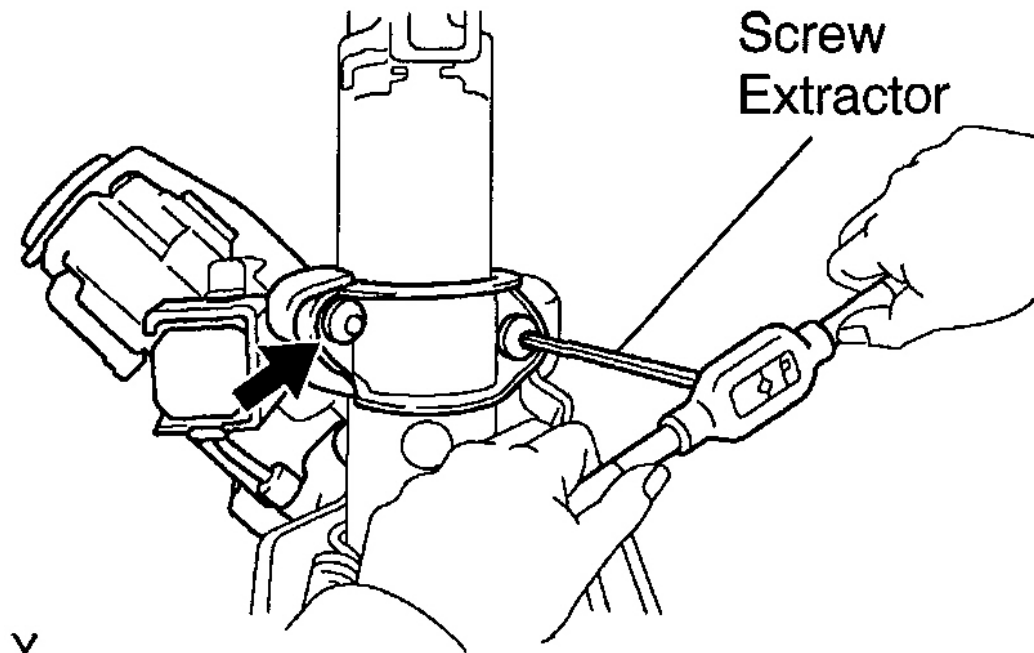
Remove the 2 screws and cruise control switch from the steering wheel.

DISASSEMBLY

NOTE: When using a vise, do not overtighten it.

1. REMOVE COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

- Using a centering punch, mark the center of the 2 tapered-head bolts.
- Using a 3-4 mm (0.12 - 0.16 in.) drill, drill into the 2 bolts.
- Using a screw extractor, remove the 2 bolts, column upper clamp and column upper bracket.



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Fig. 29: Removing Bolts Column Upper Clamp & Column Upper Bracket Using SST
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. REMOVE BRACKET SPACER AND NO. 1 SUPPORT COLLARS

- a. Using an extension bar and a hammer, tap out the bracket spacer.

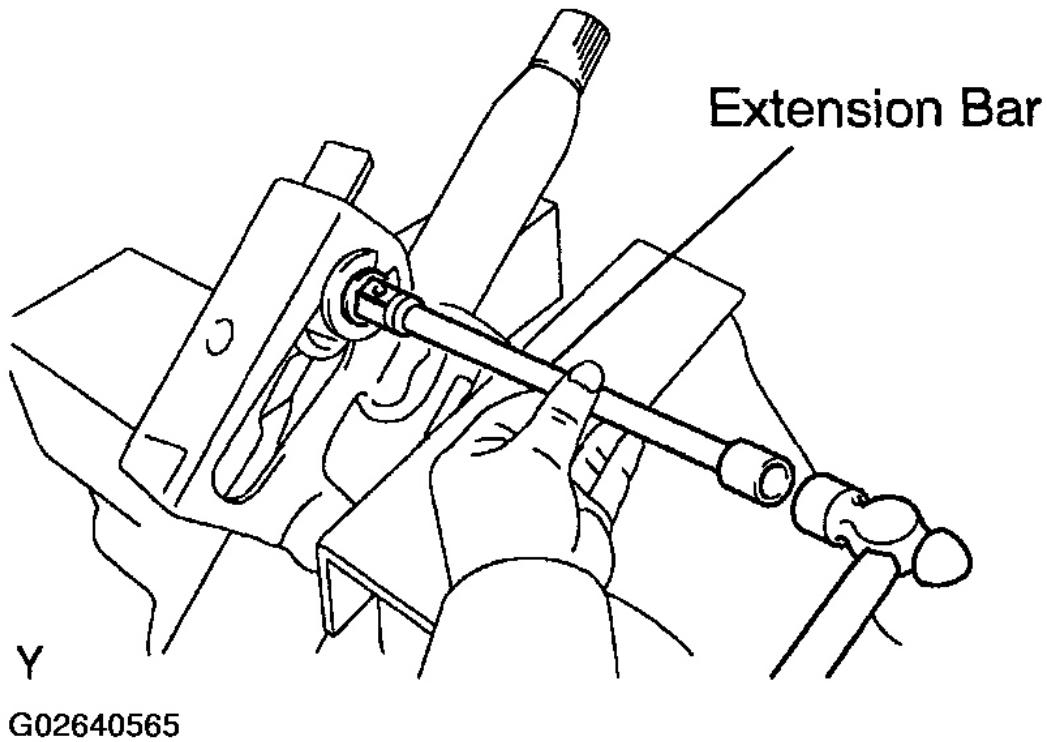


Fig. 30: Tapping Out Bracket Spacer Using Extension Bar & Hammer
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Using a screwdriver, remove the 2 No. 1 support collars.

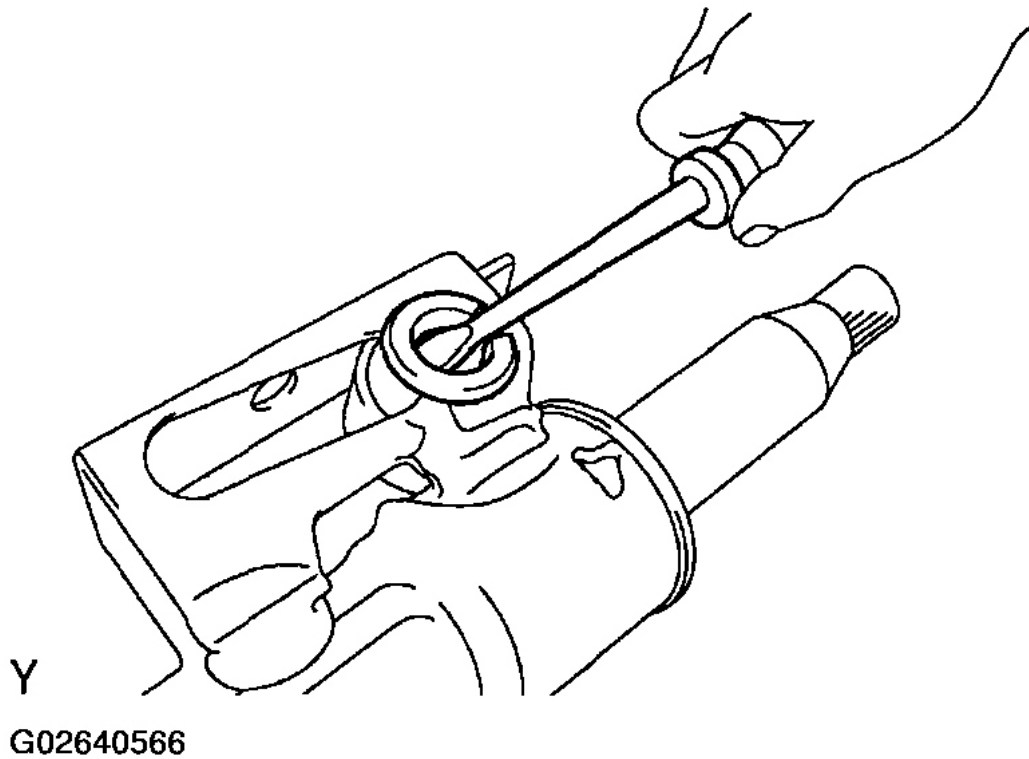


Fig. 31: Removing Support Collars Using Screwdriver
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. REMOVE TILT LEVER AND BREAK AWAY BRACKET

- a. Remove the tilt spring.
- b. Remove the No. 2 tilt lever lock bolt and No. 1 support reinforcement.

HINT:

This bolt is left-handed one.

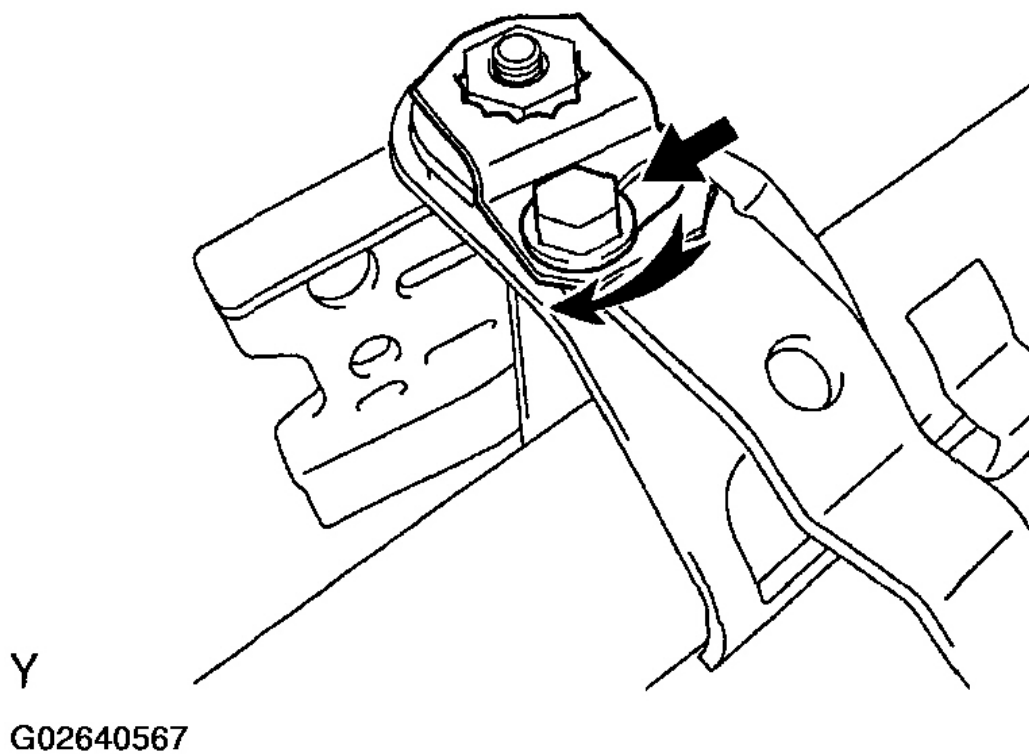
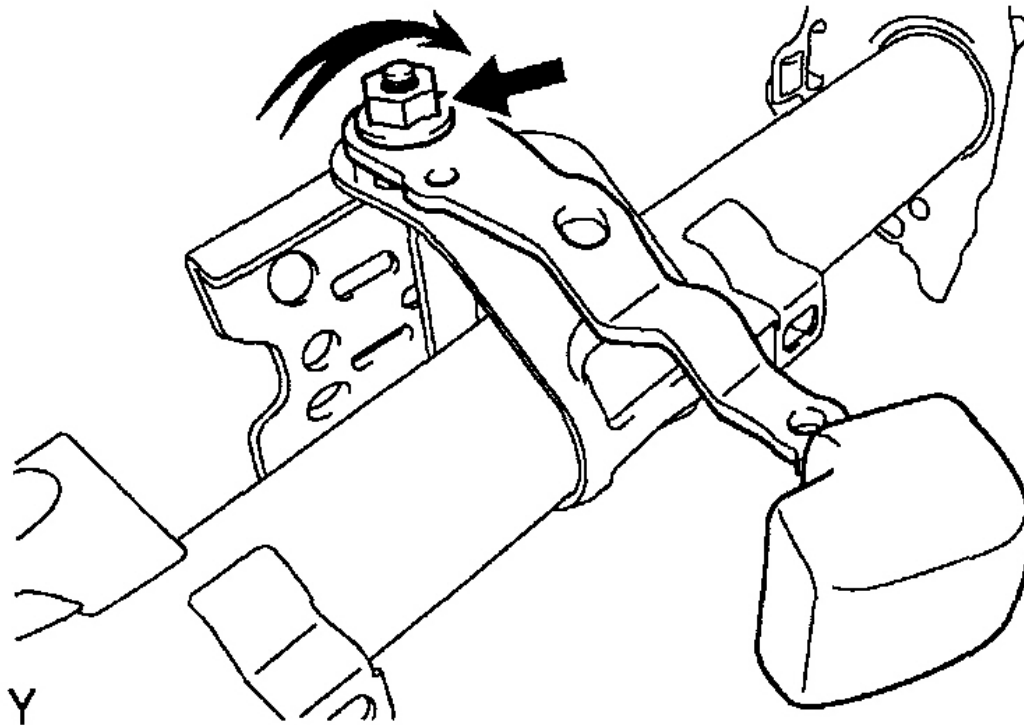


Fig. 32: Removing Tilt Lever Lock Bolt

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

- c. Remove the adjusting nut, tilt lever, stopper, tilt lever lock bolt and break away bracket.



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Fig. 33: Removing Adjusting Nut & Tilt Lever, Stopper
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

This nut is left-handed one.

- d. Remove the No. 2 support collar from the break away bracket.
4. **REMOVE MAIN SHAFT ASSEMBLY AND MAIN SHAFT BEARING**
 - a. Using a snap ring expander, remove the snap ring on the upper side.

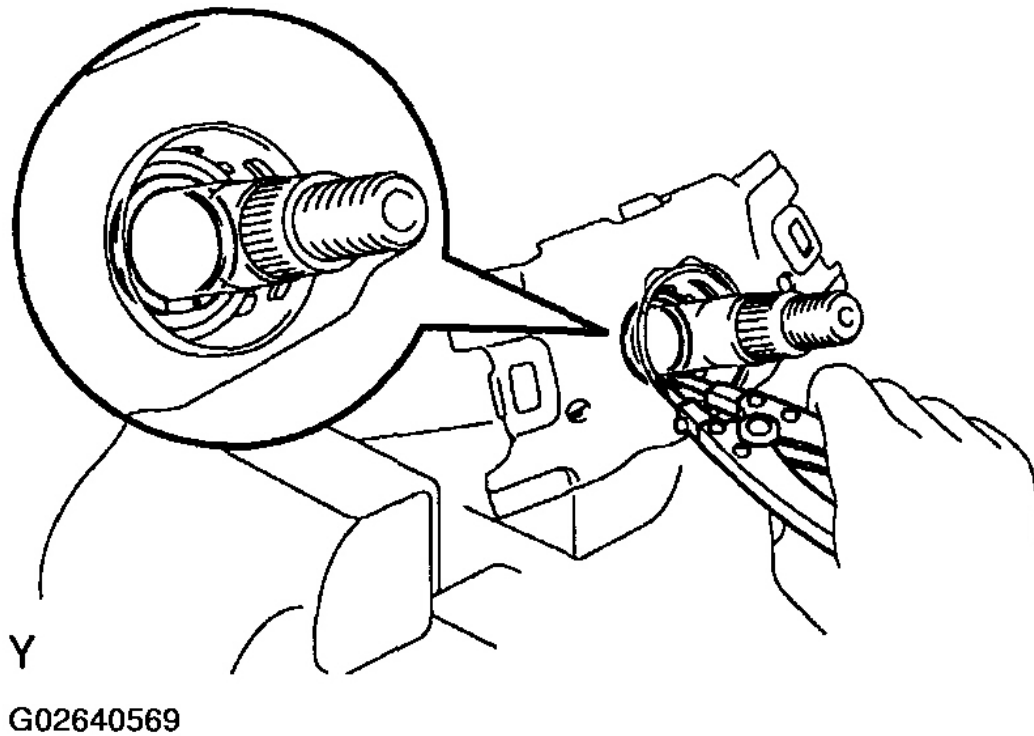


Fig. 34: Removing Snap Ring On Upper Side Using Snap Ring Expander
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Pull out the main shaft assembly and main shaft bearing.
- c. Using a snap ring expander, remove the snap ring on the lower side.

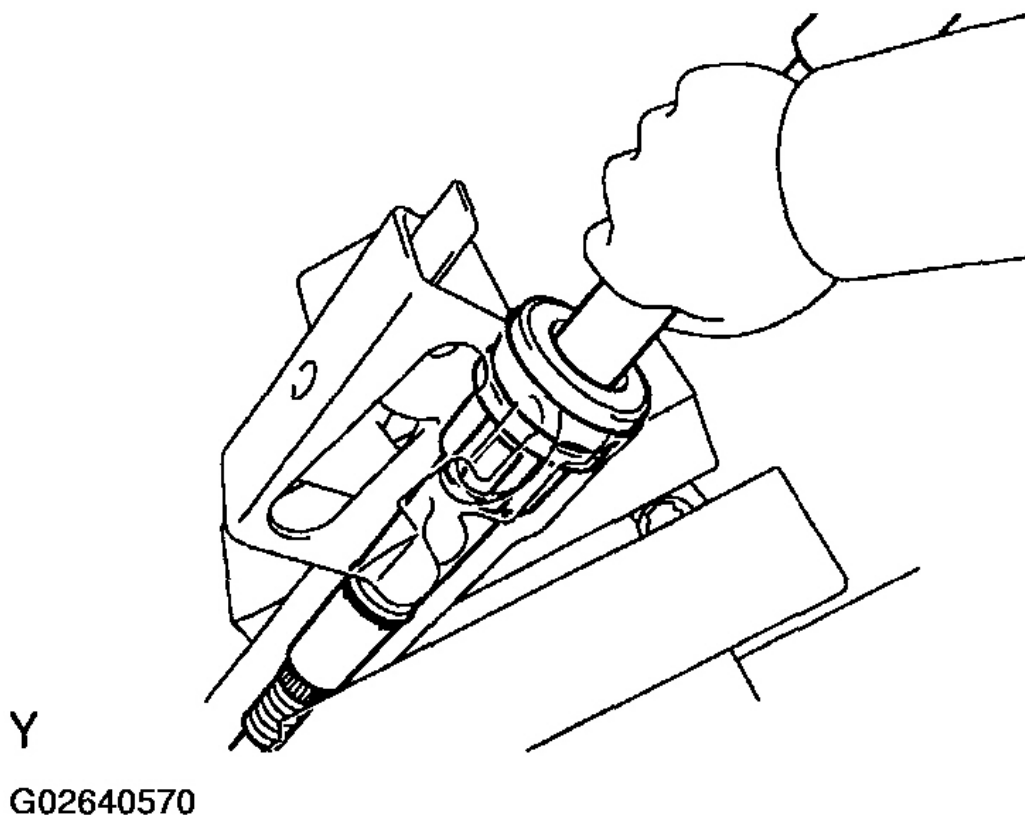


Fig. 35: Pulling Out Main Shaft Assembly
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION

1. **w/ A/T: INSPECT KEY INTERLOCK SOLENOID (See INSPECTION and SHIFT LOCK SYSTEM) .**
2. **w/ A/T: IF NECESSARY, REPLACE KEY INTERLOCK SOLENOID**
 - a. Remove the 2 screws and key interlock solenoid.
 - b. Install a new interlock solenoid with the 2 screws.
3. **INSPECT TRANSPONDER KEY AMPLIFIER WITH COIL (See HOW TO PROCEED WITH TROUBLESHOOTING) .**
4. **IF NECESSARY, REPLACE TRANSPONDER KEY AMPLIFIER WITH COIL**
 - a. Widen the claw hung on the upper bracket by approx. 1.0 mm (0.039 in.) using a screwdriver.
 - b. Pull the transponder key amplifier toward the rear of the vehicle with the claw open.

NOTE: Take care not to use excessive force to prevent the case from being damaged.

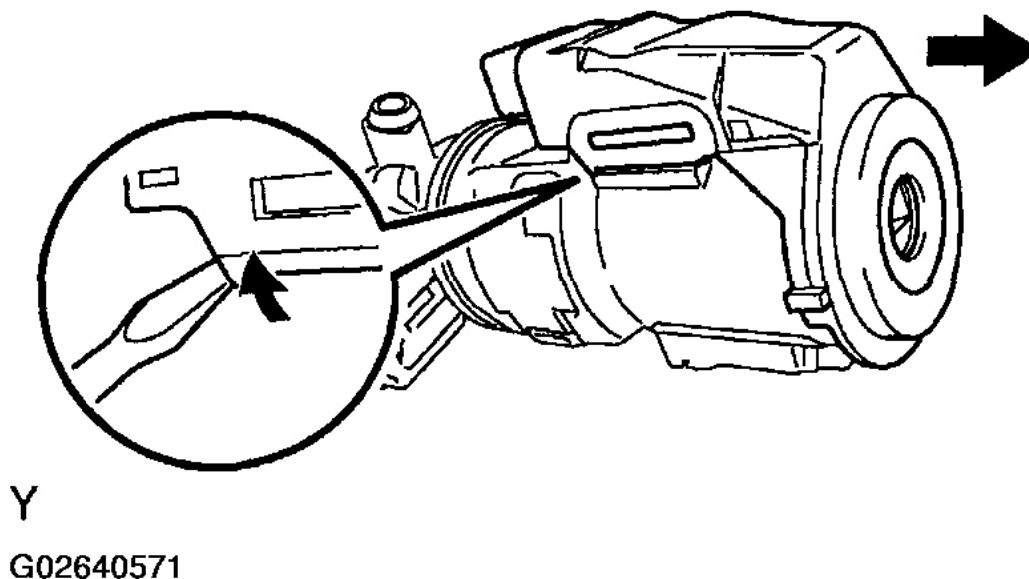
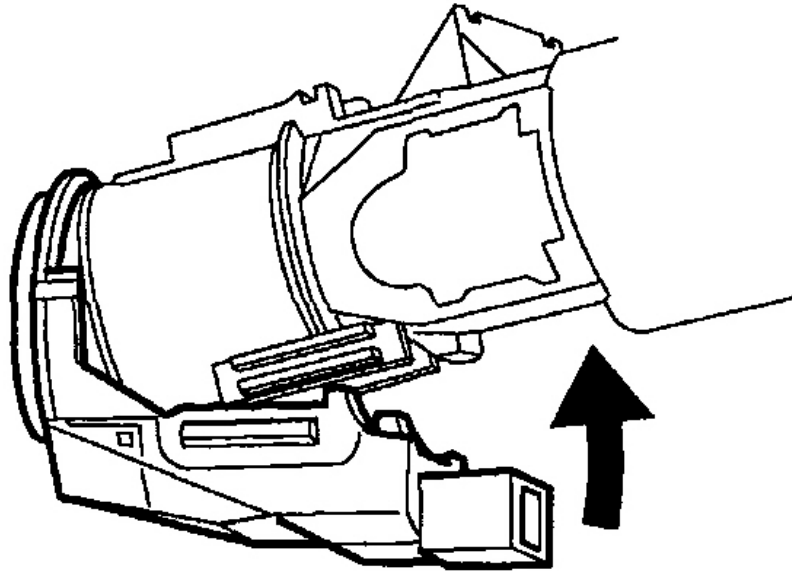


Fig. 36: Pulling Transponder Key Amplifier
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Align a new transponder key amplifier with the installation position of the upper bracket with the amplifier inclined.
- d. Push the transponder key amplifier up and connect it to the upper bracket.

NOTE: Take care not to push the amplifier up with excessive force to prevent it from being damaged.



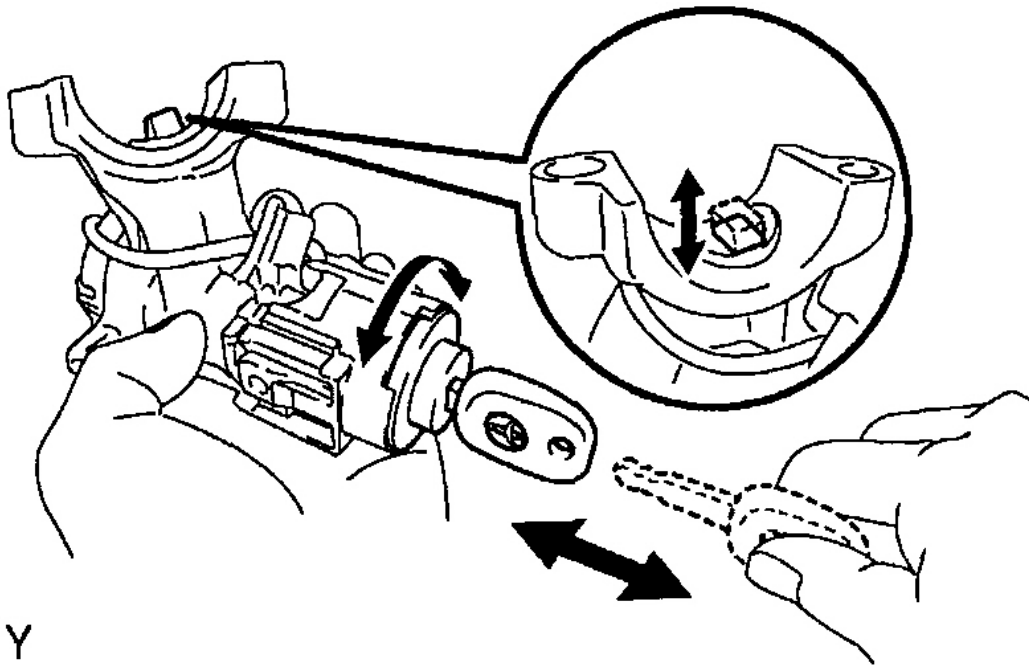
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Fig. 37: Aligning Transponder Key Amplifier
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

5. INSPECT STEERING LOCK OPERATION

Check that the steering lock mechanism operates properly.



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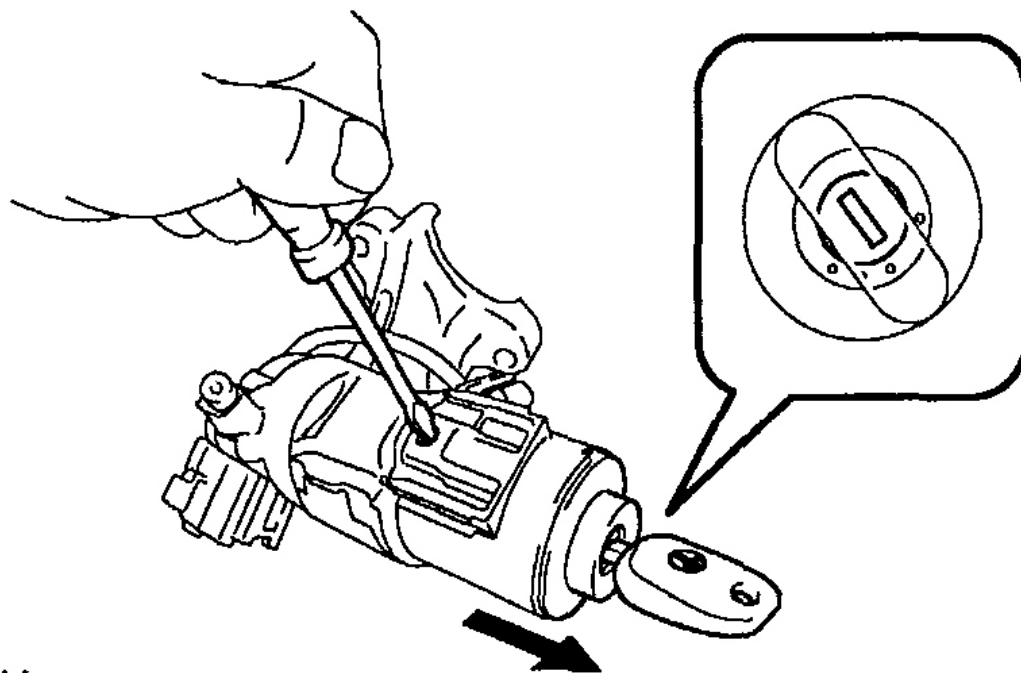
Fig. 38: Checking Steering Lock Mechanism Operates
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

6. IF NECESSARY, REPLACE KEY CYLINDER

- a. Place the ignition key at the ACC position.
- b. Push down the stop pin with a screwdriver, and pull out the cylinder.
- c. Install a new cylinder.

HINT:

Make sure the key is at the ACC position.



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Fig. 39: Removing Ignition Switch Cylinder

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

7. **INSPECT KEY UNLOCK WARNING SWITCH (See INSPECTION)**
8. **IF NECESSARY, REPLACE KEY UNLOCK WARNING SWITCH**
 - a. Slide the key unlock warning switch out of the column upper bracket.
 - b. Slide a new key unlock warning switch in the column upper bracket.
9. **INSPECT IGNITION SWITCH (See INSPECTION)**
10. **IF NECESSARY, REPLACE IGNITION SWITCH**
 - a. Remove the 2 screws and ignition switch from the column upper bracket.
 - b. Install a new ignition switch with the 2 screws.
11. **INSPECT BEARING**

Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the column tube.

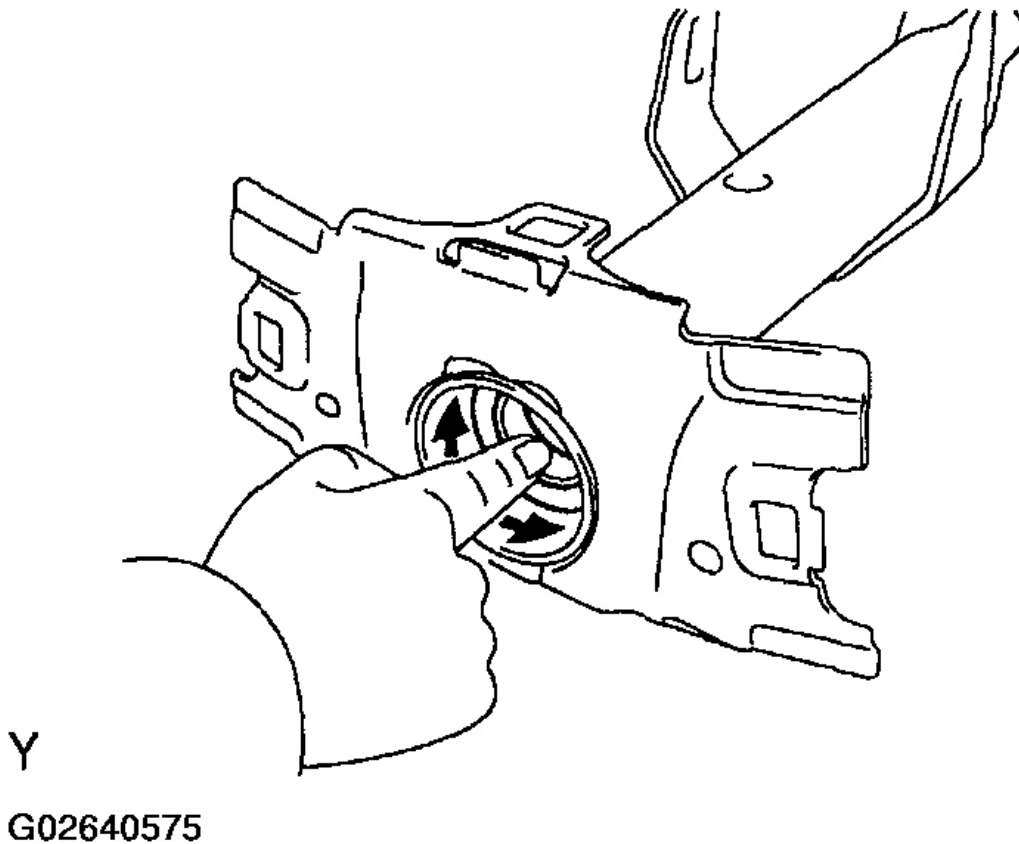


Fig. 40: Checking Bearing Rotation Condition
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REASSEMBLY

NOTE: When using a vise, do not overtighten it.

1. **COAT PARTS INDICATED BY ARROWS WITH MOLYBDENUM DISULFIDE LITHIUM BASE GREASE (See TILT STEERING COLUMN)**
2. **INSTALL MAIN SHAFT ASSEMBLY**
 - a. Using a snap ring expander, install a new snap ring on the lower side.
 - b. Install the main shaft assembly.
 - c. Using a snap ring expander, install a new snap ring on the upper side.

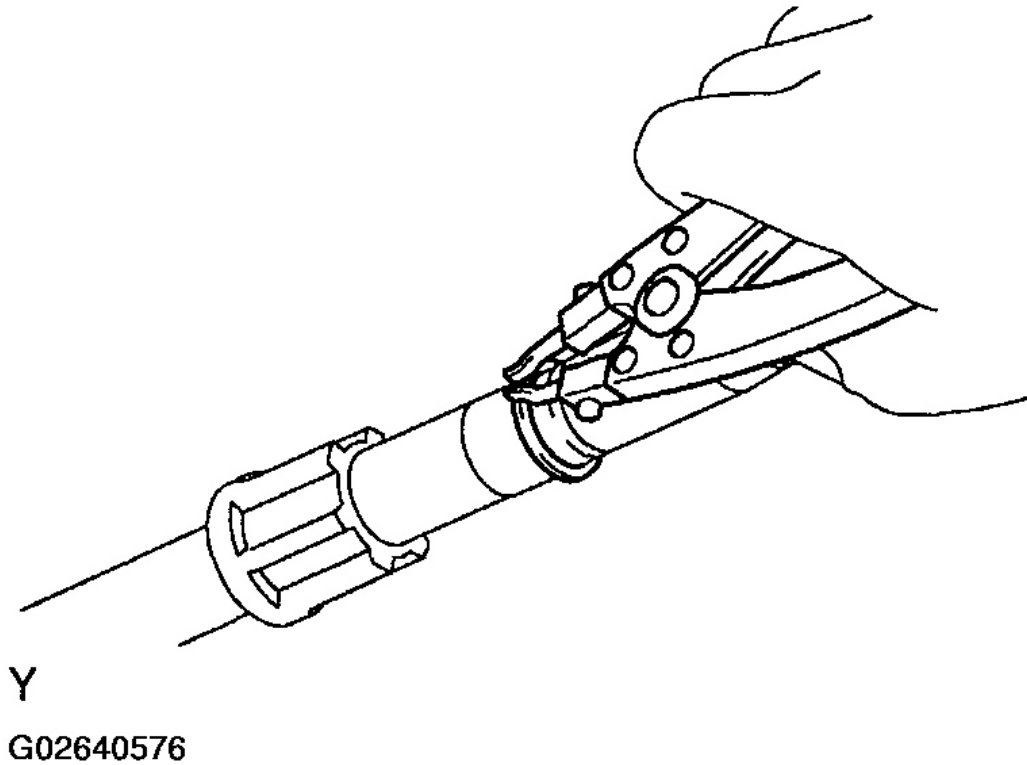


Fig. 41: Installing Snap Ring
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. INSTALL MAIN SHAFT BEARING

- a. Coat a new bearing with molybdenum disulfide lithium base grease.
- b. Using SST and a hammer, tap in the main shaft bearing.

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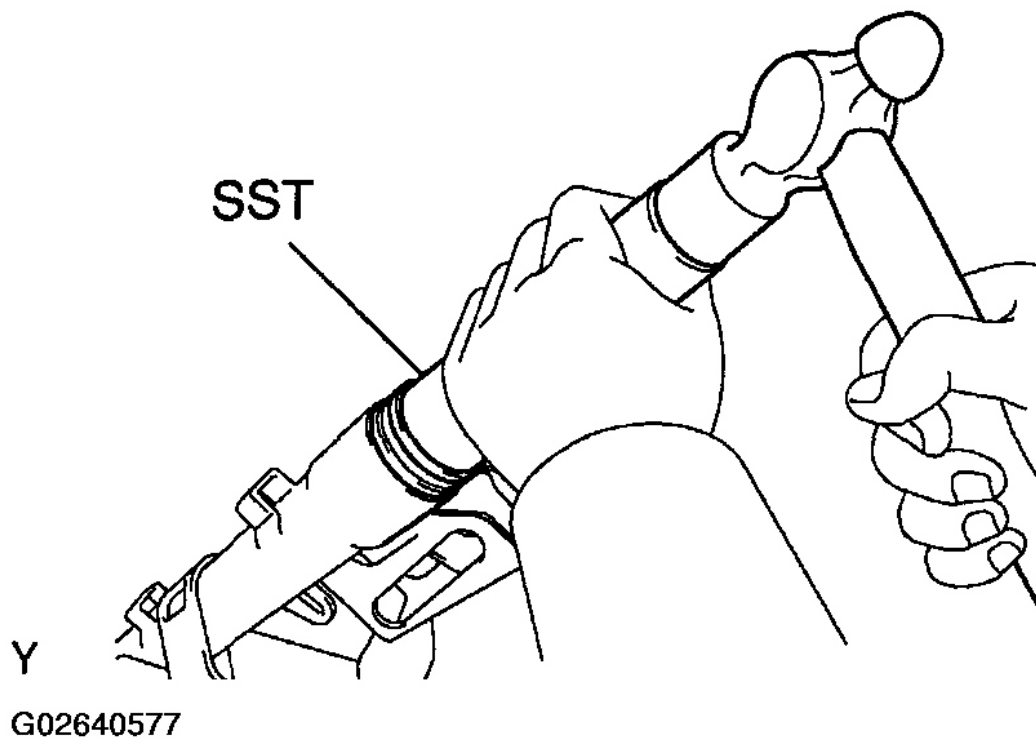


Fig. 42: Installing Main Shaft Bearing

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

4. INSTALL BREAK AWAY BRACKET AND TILT LEVER

- a. Install the No. 2 support collar to the break away bracket.
- b. Install the break away bracket, tilt lever lock bolt, stopper and tilt lever.

HINT:

Align the holes in the column tube with the projections of the tilt lever lock bolt and stopper.

- c. Install the adjusting nut by rotating it counterclockwise in the specified torque so that the locking load (load applied to when a knob is operated) of the tilt lever will be 43 - 91 N (4.4 - 9.3 kgf, 9.7 - 20.5 lbf).

Torque: 9 N.m - 14 N.m (90 kgf.cm - 145 kgf.cm, 80 in.lbf - 10 ft.lbf)

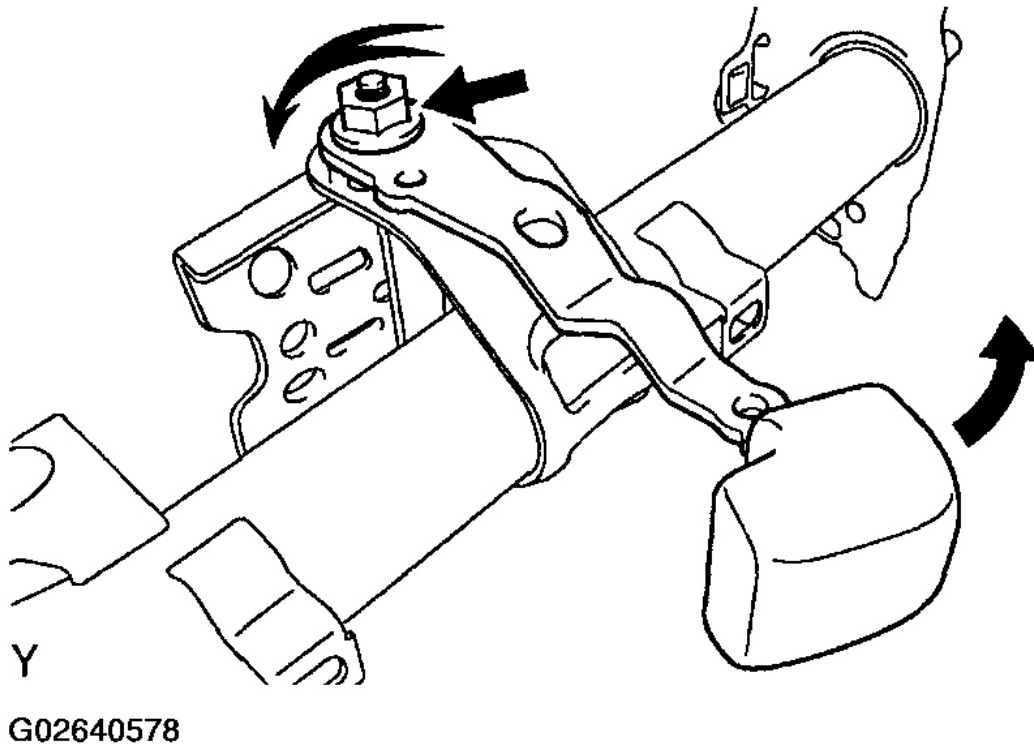


Fig. 43: Installing Adjusting Nut

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

- d. Install the No. 1 support reinforce with the No. 2 tilt lever lock bolt by turning it counterclockwise.

Torque: 5.4 N.m (55 kgf.cm, 48 in.lbf)

HINT:

Align the No. 1 support reinforce with the nut to eliminate looseness by turning the No. 1 support reinforce counterclockwise a little, then torque the No. 2 tilt lever lock bolt.

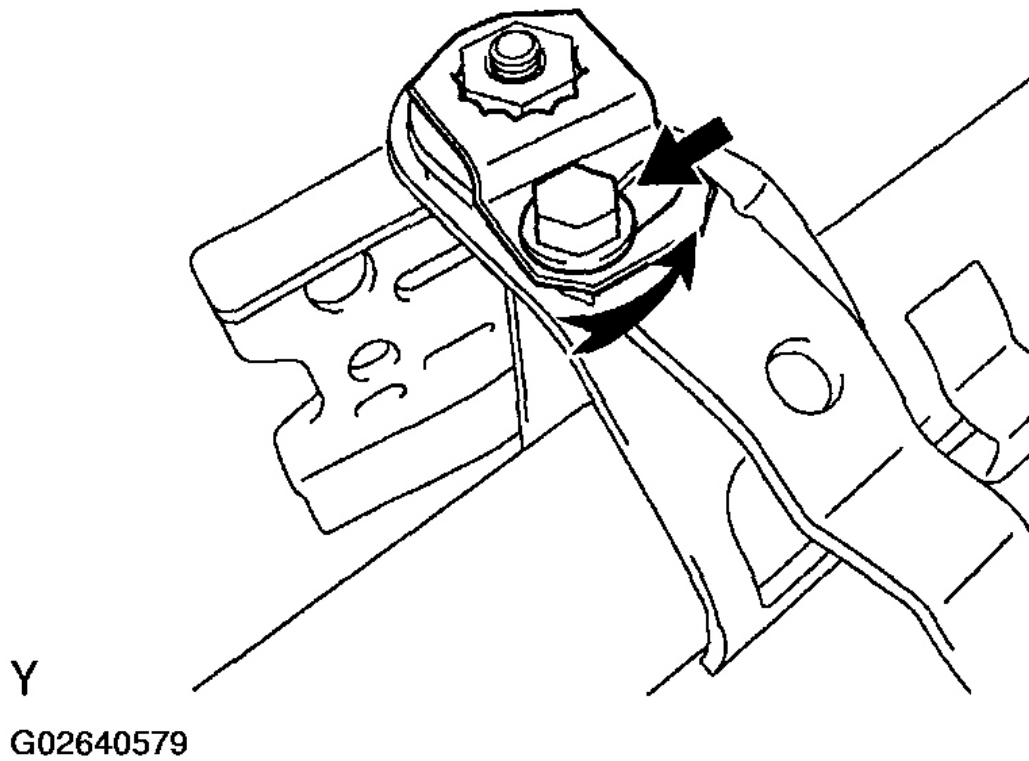


Fig. 44: Installing No. 1 Support Reinforce
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- e. Install the tilt springs.

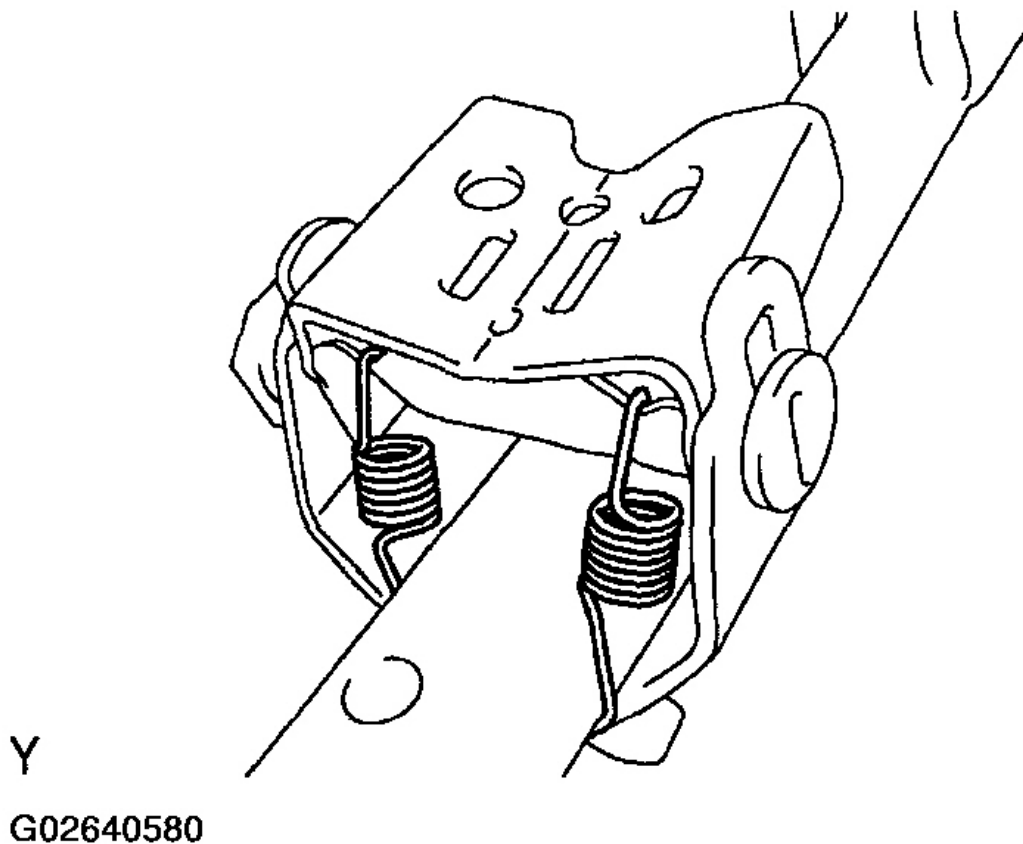


Fig. 45: Installing Tilt Springs

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

5. INSTALL NO. 1 SUPPORT COLLARS AND BRACKET SPACER

- a. Install 2 new No. 1 support collars.

NOTE: Install the white support collar to the RH side, black support collar to the LH side.

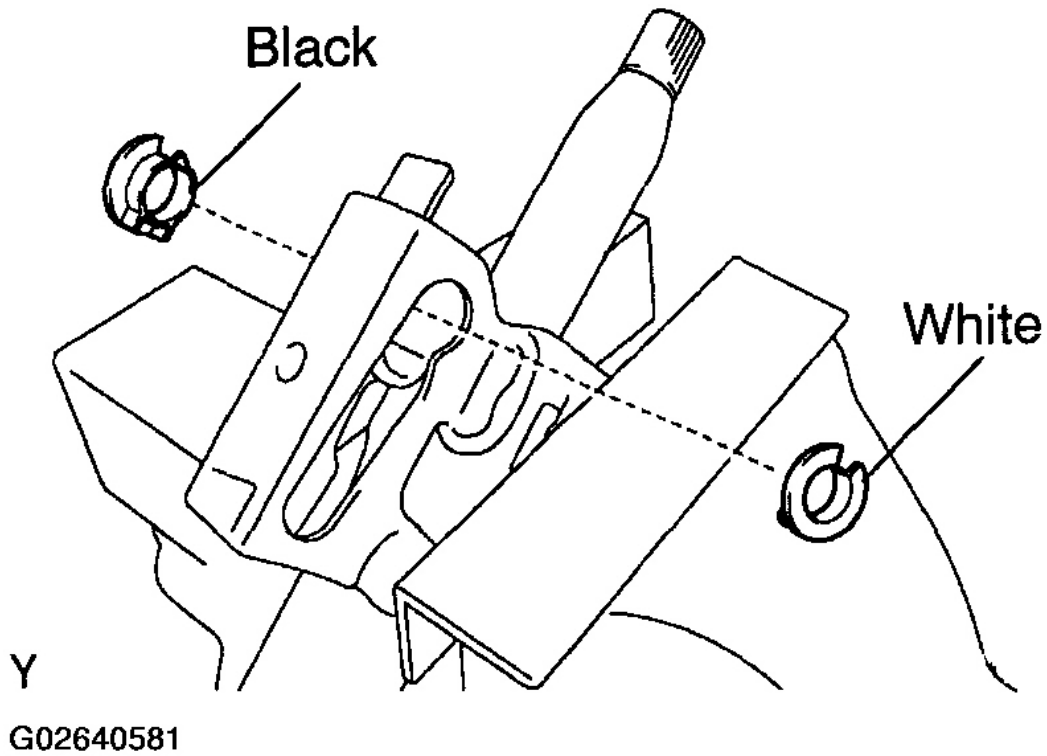


Fig. 46: Installing No. 1 Support Collars

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

- b. Using an extension bar and a hammer, drive in the bracket spacer.

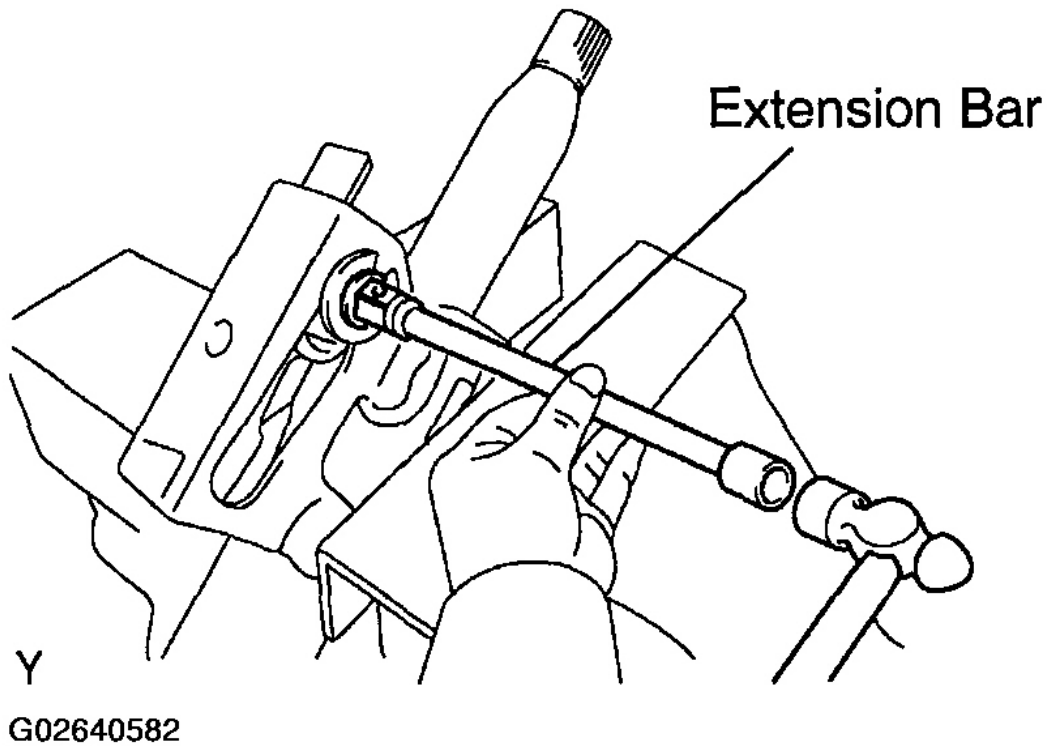
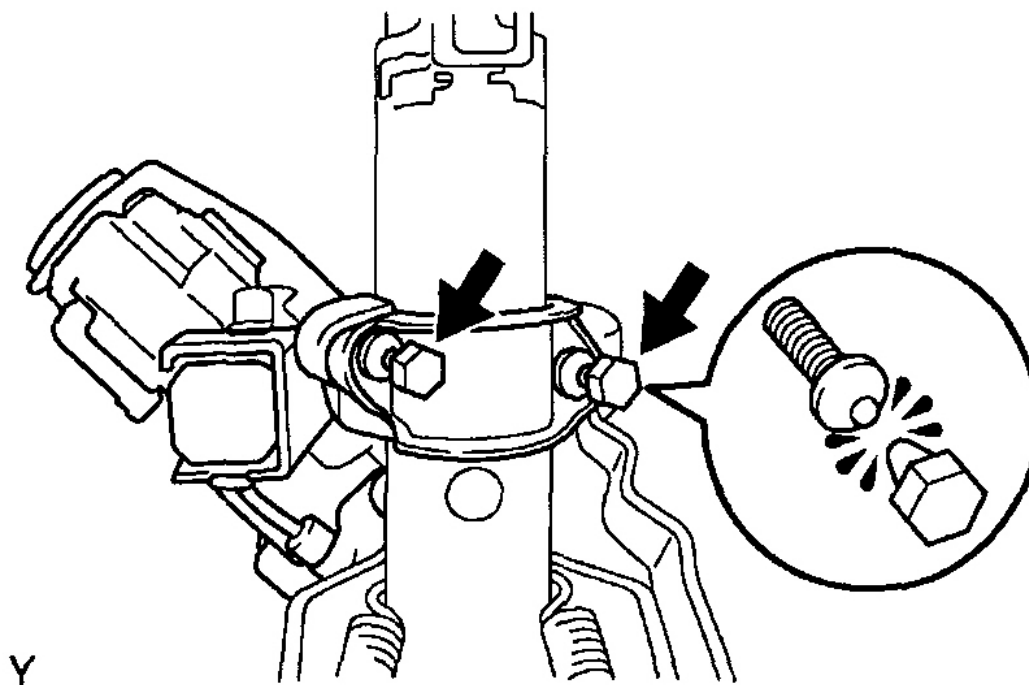


Fig. 47: Driving In Bracket Spacer

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

6. INSTALL COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

- a. Install the column upper bracket and column upper clamp with 2 new tapered-head bolts.
- b. Tighten the 2 tapered-head bolts until the bolt heads break off.



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Fig. 48: Tightening Tapered-Head Bolts
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSTALLATION

1. INSTALL CRUISE CONTROL SWITCH TO STEERING WHEEL

Install the cruise control switch to the steering wheel with the 2 screws.

2. INSTALL SLIDING YOKE AND NO. 2 INTERMEDIATE SHAFT

- Align the matchmarks on the sliding yoke and main shaft assembly.
- Install the sliding yoke with the bolt A.

Torque: 36 N.m (360 kgf.cm, 26 ft.lbf)

- Align the matchmarks on the No. 2 intermediate shaft and sliding yoke.
- Temporarily install the No. 2 intermediate shaft assembly with the bolt B.

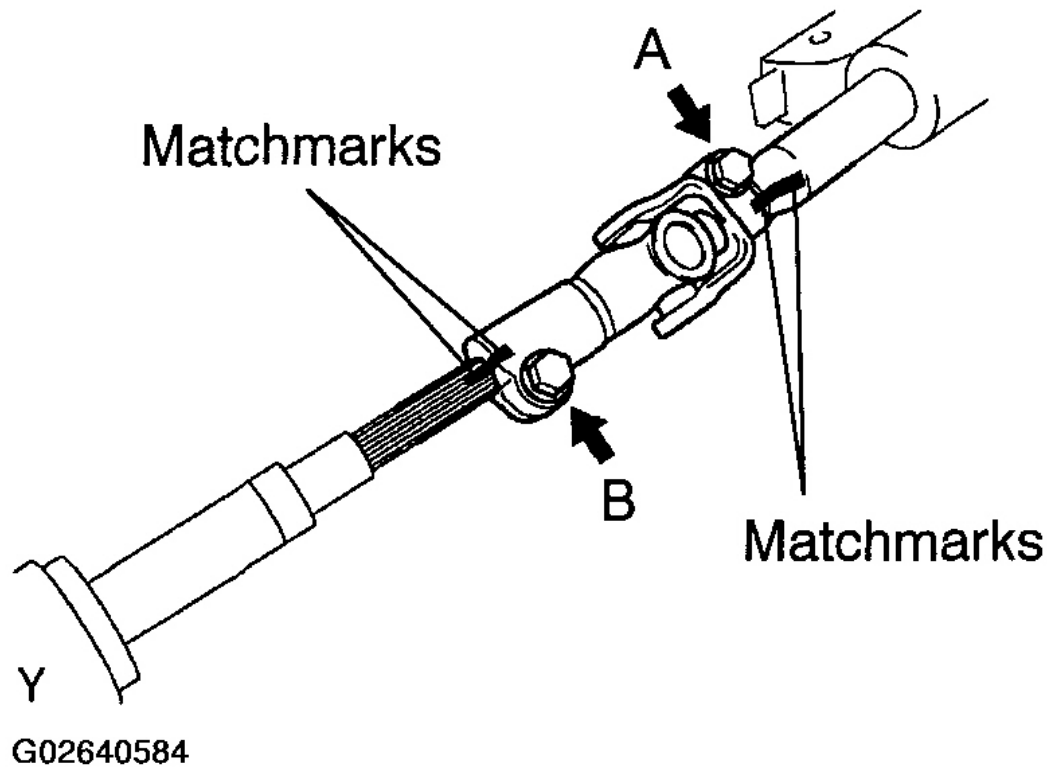


Fig. 49: Aligning Matchmarks On Sliding Yoke & Main Shaft Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. INSTALL STEERING COLUMN ASSEMBLY

- a. Install the steering column assembly with the 3 bolts.

Torque: 21 N.m (210 kgf.cm, 15 ft.lbf)

- b. Connect the connectors and wire harness clamps.

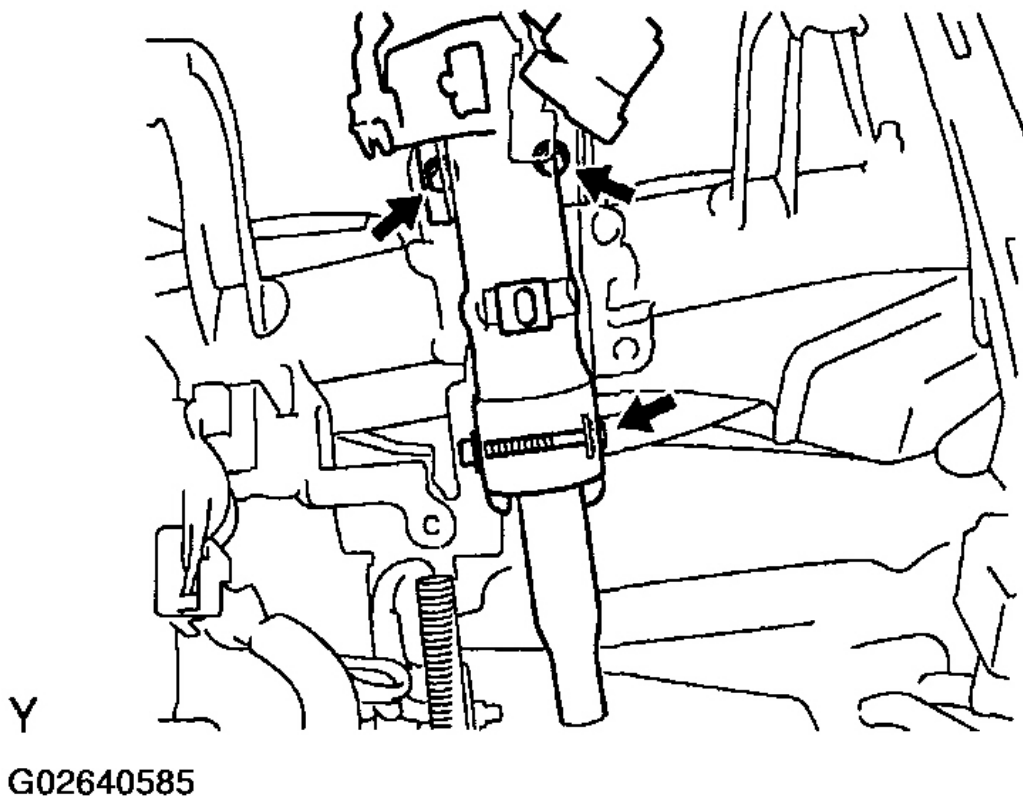


Fig. 50: Installing Steering Column Assembly

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

4. CONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY

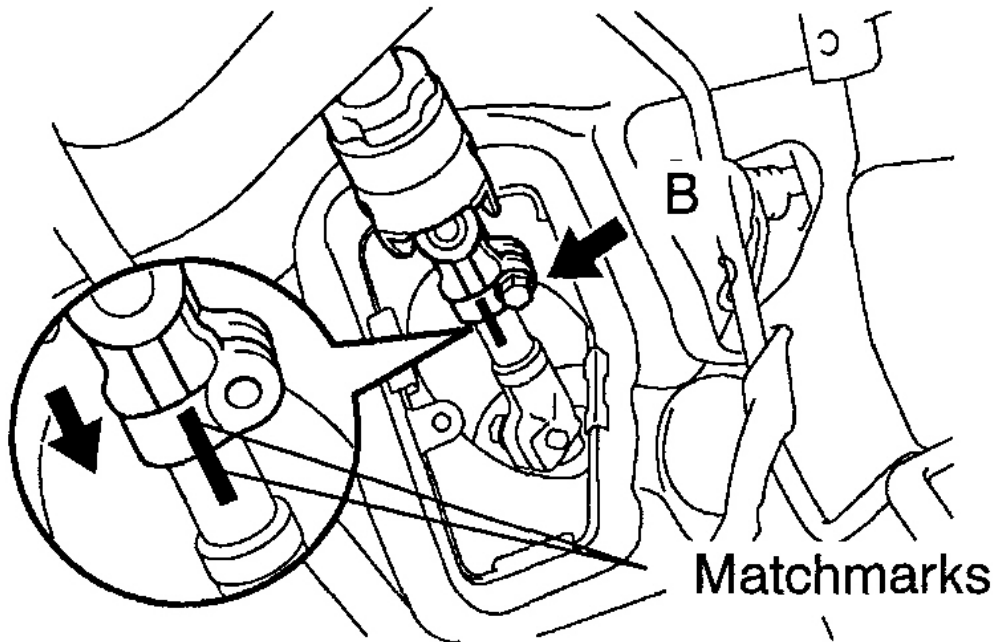
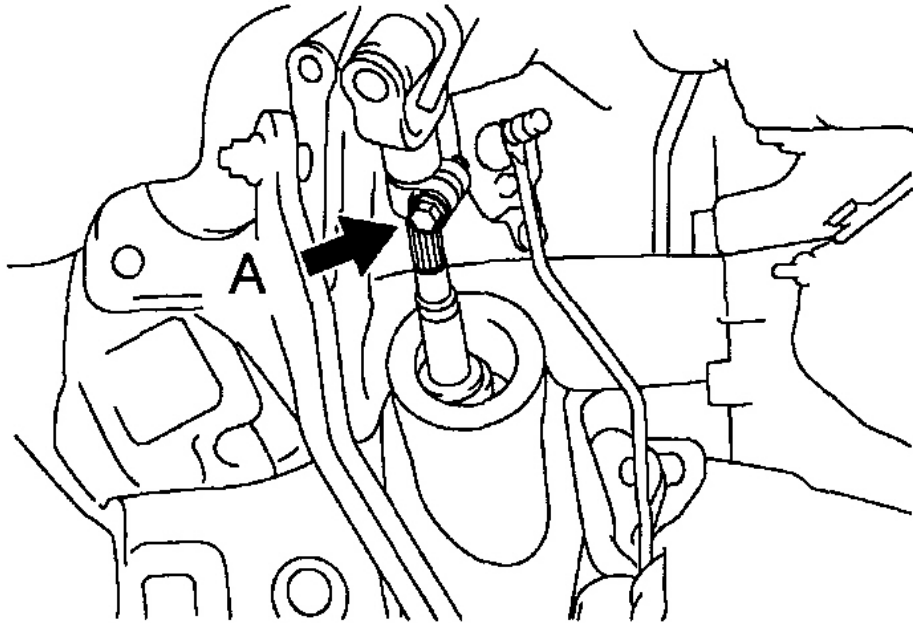
- a. Put the main shaft lower dust cover to the No. 2 intermediate shaft.
- b. Align the matchmarks on the No. 2 intermediate shaft assembly and steering intermediate extension.
- c. Install bolt B.

Torque: 36 N.m (360 kgf.cm, 26 ft.lbf)

- d. Torque bolt A.

Torque: 36 N.m (360 kgf.cm, 26 ft.lbf)

- e. Install the main shaft lower dust cover with the 2 bolts.



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Fig. 51: Aligning Matchmarks On No. 2 Intermediate Shaft Assembly & Steering Intermediate Extension

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

5. USA: INSTALL LH INSTRUMENT PANEL LOWER INSERT

Install the LH instrument panel lower insert with the 4 bolts.

6. INSTALL INSTRUMENT FINISH LOWER PANEL

- a. Connect the hood lock control cable.
- b. Connect the connectors.
- c. Install the instrument finish lower panel with the 3 screws.

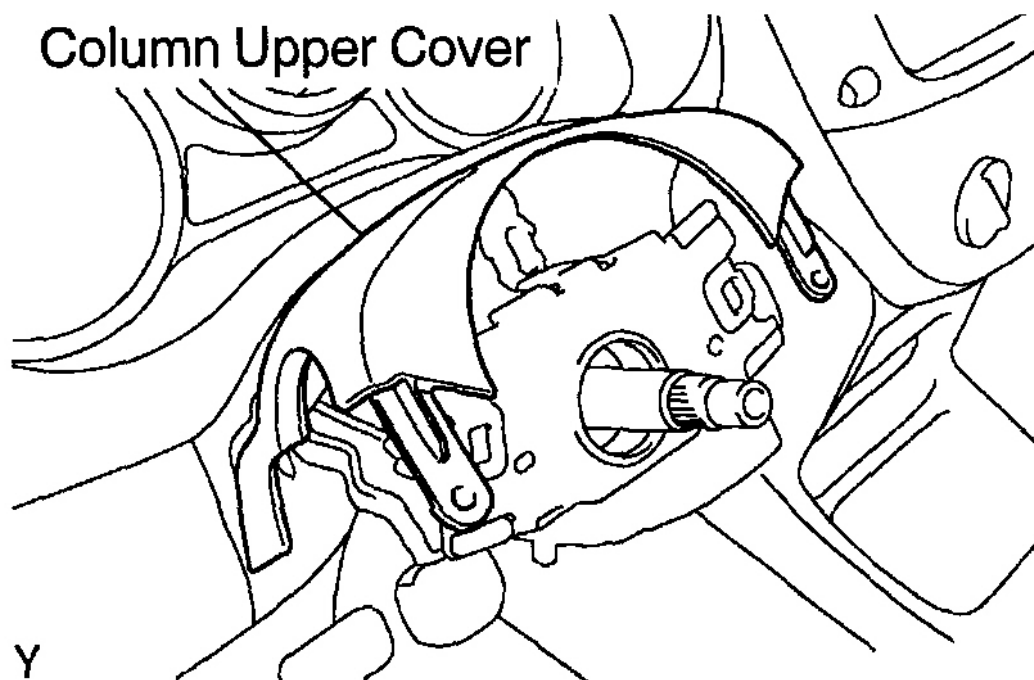
7. INSTALL NO. 1 SWITCH HOLE BASE

Connect the connectors and install the No. 1 switch hole base.

8. INSTALL COWL SIDE TRIM BOARD

9. INSTALL FRONT DOOR INSIDE SCUFF PLATE

10. PLACE COLUMN UPPER COVER TO STEERING COLUMN ASSEMBLY



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Fig. 52: Placing Column Upper Cover To Steering Column Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

11. **INSTALL LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH, WIPER AND WASHER SWITCH AND SPIRAL CABLE**
 - a. Push into the light control switch and headlight dimmer switch until the claw is latched.
 - b. Employ the same manner described above to the wiper and washer switch.
 - c. Install the spiral cable.
 - d. Connect the 3 connectors to the spiral cable, light control switch and headlight dimmer switch and wiper and washer switch.
 - e. Connect the airbag connector to the spiral cable.

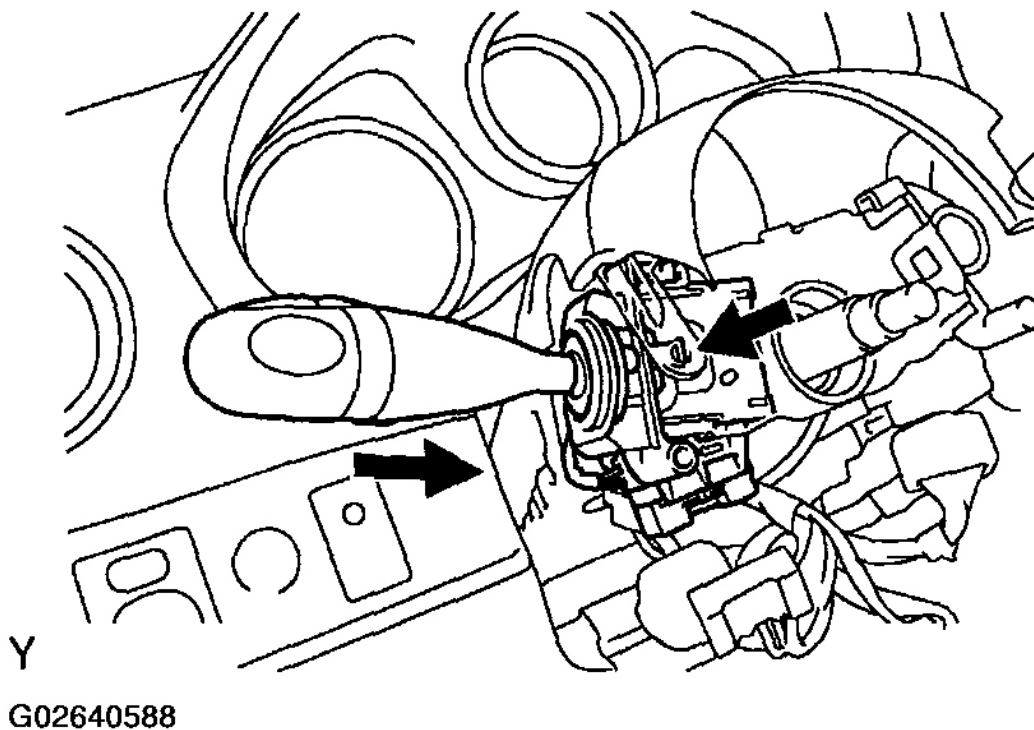


Fig. 53: Installing Light Control Switch
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

12. **INSTALL COLUMN UPPER AND LOWER COVERS**

Install the column upper and lower covers with the 3 screws.

13. **CENTER SPIRAL CABLE**

- a. Check that the front wheels are facing straight ahead.
- b. Turn the cable counterclockwise by hand until it becomes harder to turn.
- c. Then rotate the cable clockwise about 2.5 turns to align the marks.

HINT:

The cable will rotate about 2.5 turns to either left or right of the center.

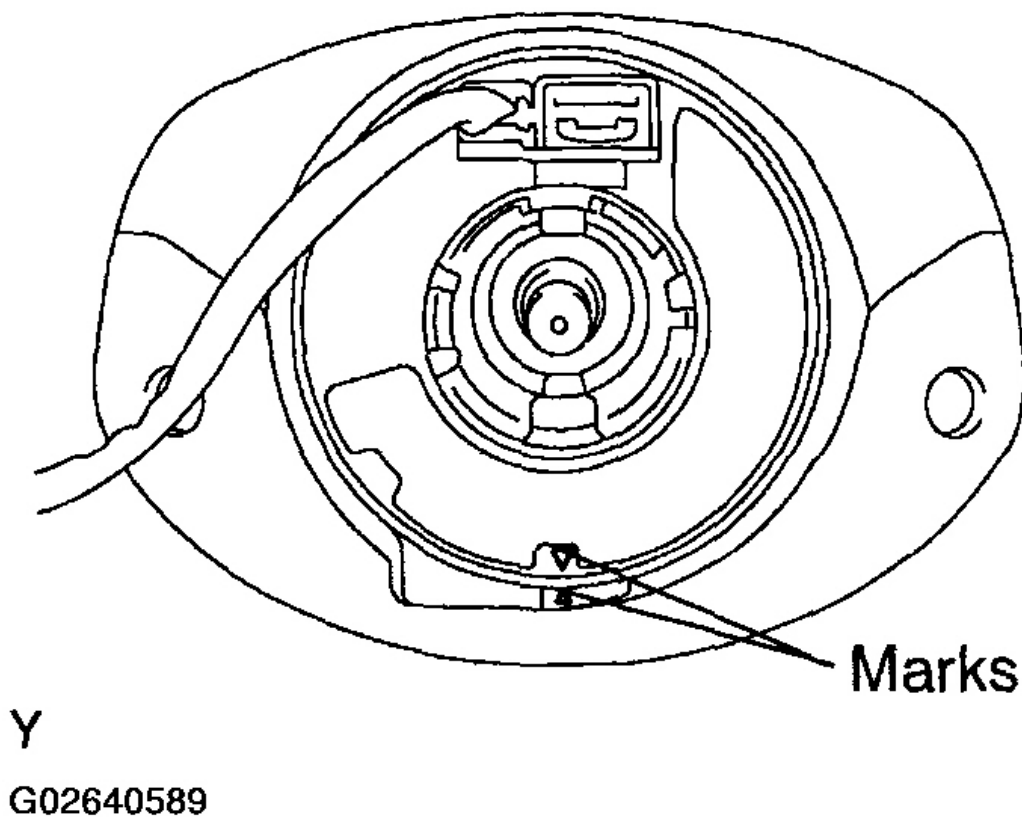


Fig. 54: Aligning Match Marks On Spiral Cable
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

14. INSTALL STEERING WHEEL

- a. Align the matchmarks on the steering wheel and main shaft assembly.
- b. Install the steering wheel set nut.

Torque: 50 N.m (500 kgf.cm, 35 ft.lbf)

- c. Connect the connector.

15. INSTALL STEERING WHEEL PAD**NOTE:**

- **Never use airbag parts from another vehicle. When replacing parts, replace with new ones.**
- **Make sure the wheel pad is installed with the specified torque.**
- **If the wheel pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.**
- **When installing the wheel pad, take care that the wirings do not interfere with other parts and that they are not pinched between other parts.**

- a. Connect the airbag connector.
- b. Install the steering wheel pad after confirming that the circumference groove of the Torx(R) screws is caught on the screw case.
- c. Using a Torx(R) socket wrench (T30), torque the 2 screws.

Torque: 8.8 N.m (90 kgf.cm, 78 in.lbf)

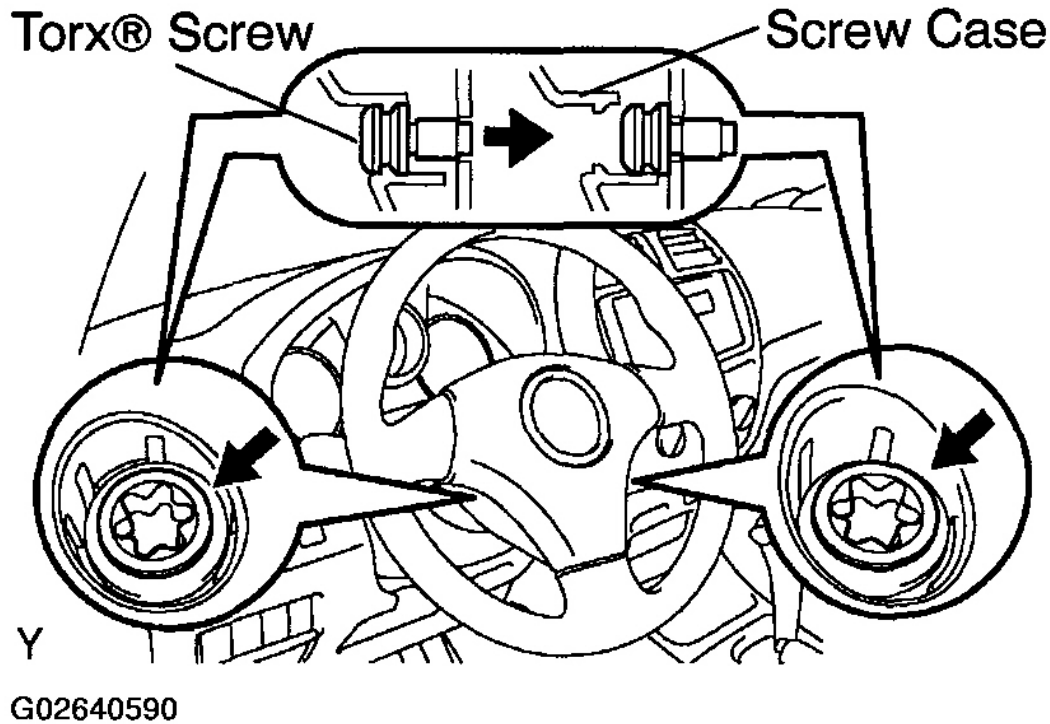


Fig. 55: Installing Torx Screws

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

16. CHECK STEERING WHEEL CENTER POINT

POWER STEERING VANE PUMP

POWER STEERING VANE PUMP COMPONENTS

2005 Toyota RAV4

2005 STEERING Steering - RAV4

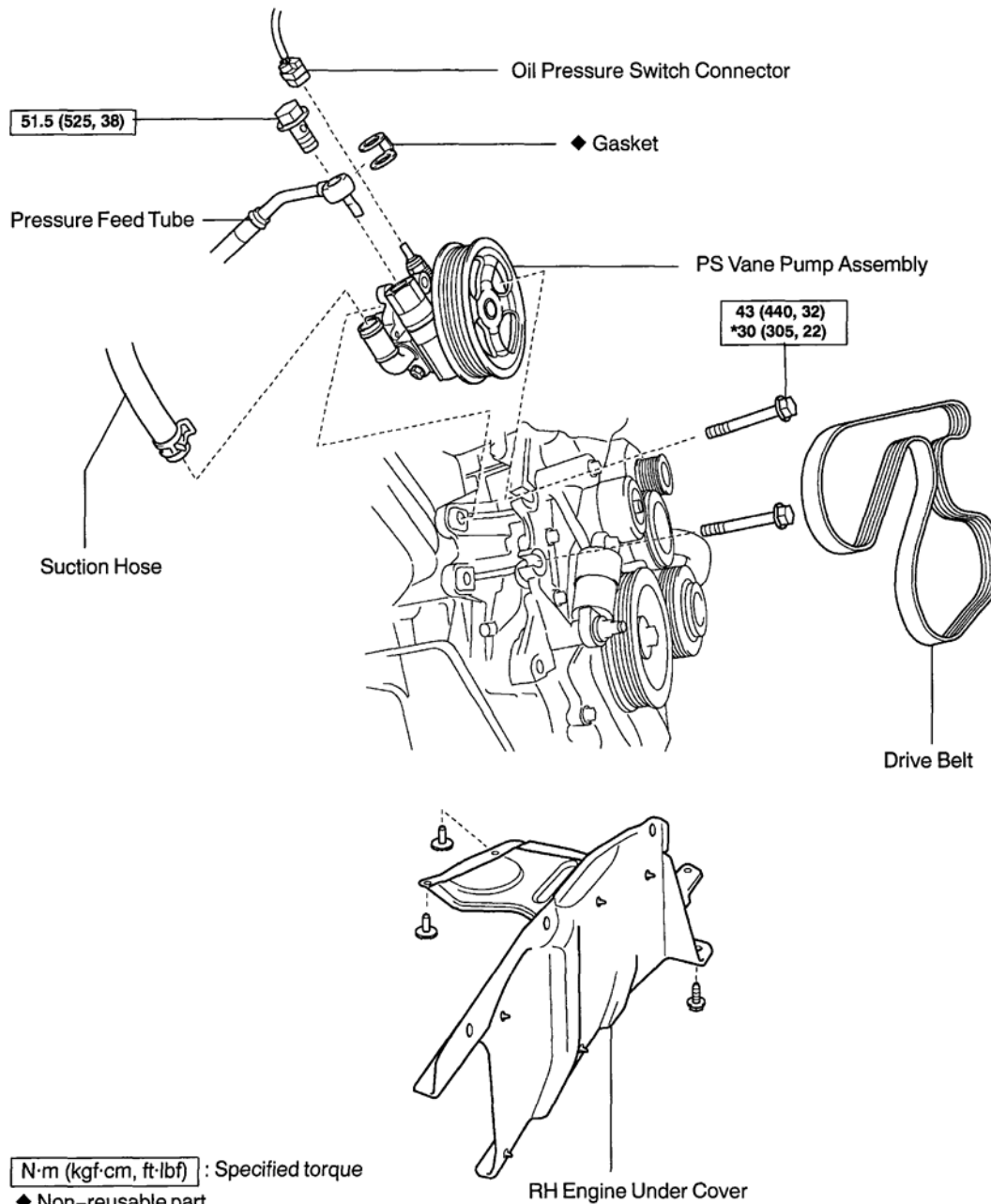


Fig. 56: Identifying Power Steering Vane Pump Components & Torque Specifications (1 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2005 Toyota RAV4

2005 STEERING Steering - RAV4

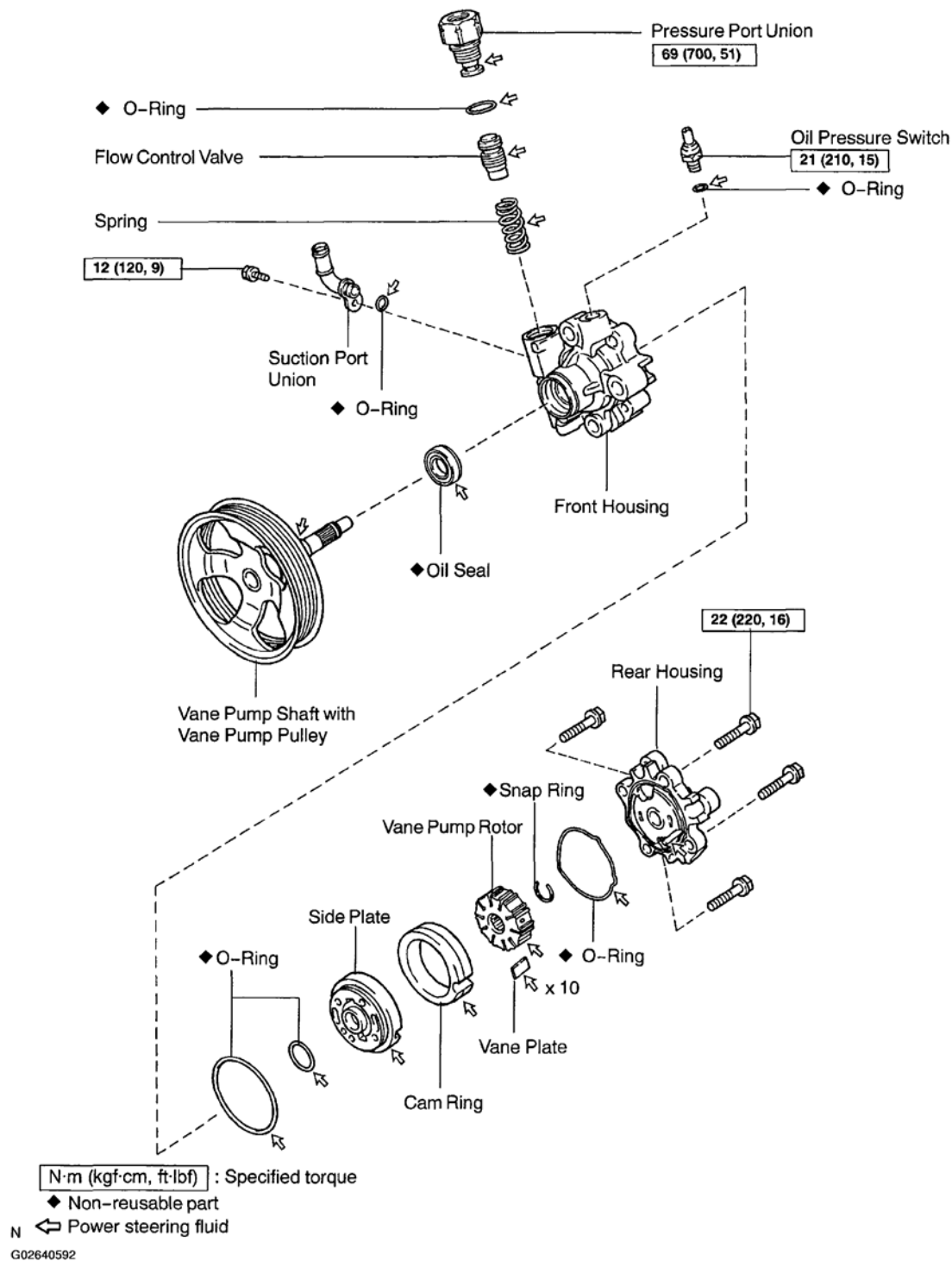


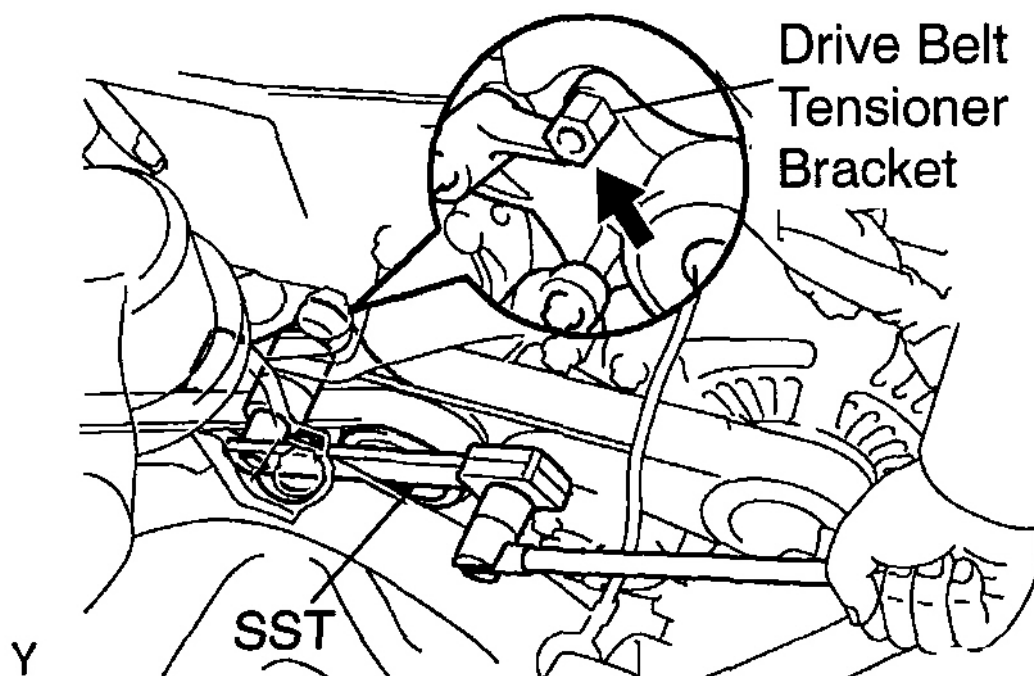
Fig. 57: Identifying Power Steering Vane Pump Components & Torque Specifications (2 Of 2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

1. **REMOVE RH ENGINE UNDER COVER**
2. **REMOVE DRIVE BELT**

Hook SST on the hexagonal portion of the drive belt tensioner bracket, compress the drive belt tension by turning the drive belt tensioner bracket clockwise, and remove the drive belt.

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Fig. 58: Removing Drive Belt

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

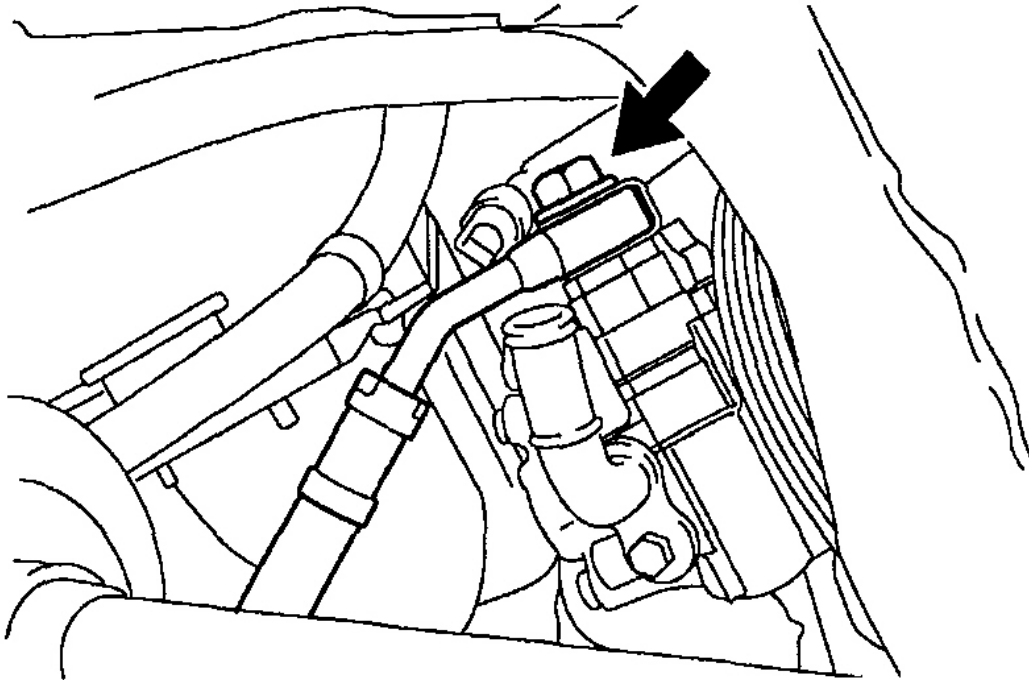
3. **DISCONNECT SUCTION HOSE**

Loosen the clip and disconnect the suction hose.

NOTE: Take care not to spill fluid on the drive belt.

4. **DISCONNECT PRESSURE FEED TUBE**

Remove the union bolt and gasket, and disconnect the pressure feed tube.



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Fig. 59: Disconnecting Pressure Feed Tube
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

5. DISCONNECT OIL PRESSURE SWITCH CONNECTOR

6. REMOVE PS VANE PUMP ASSEMBLY

- a. Using SST, loosen the bolt A sufficiently so that pump assembly can be removed.

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HINT:

Bolt A cannot be removed.

- b. Remove the bolt B and PS vane pump assembly.

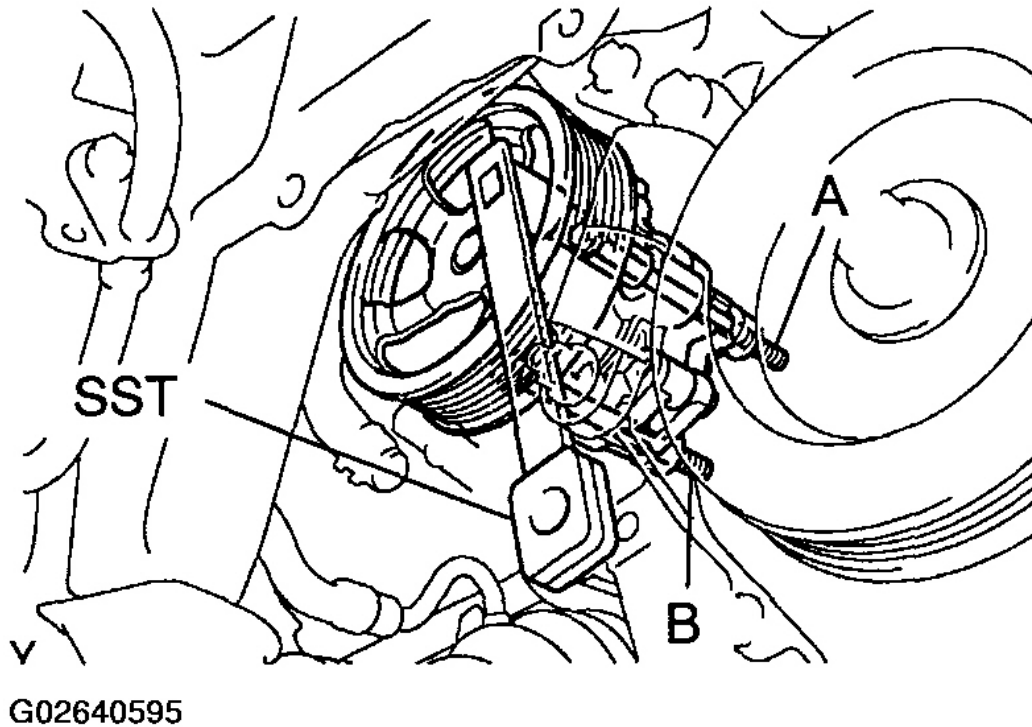


Fig. 60: Removing PS Vane Pump Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

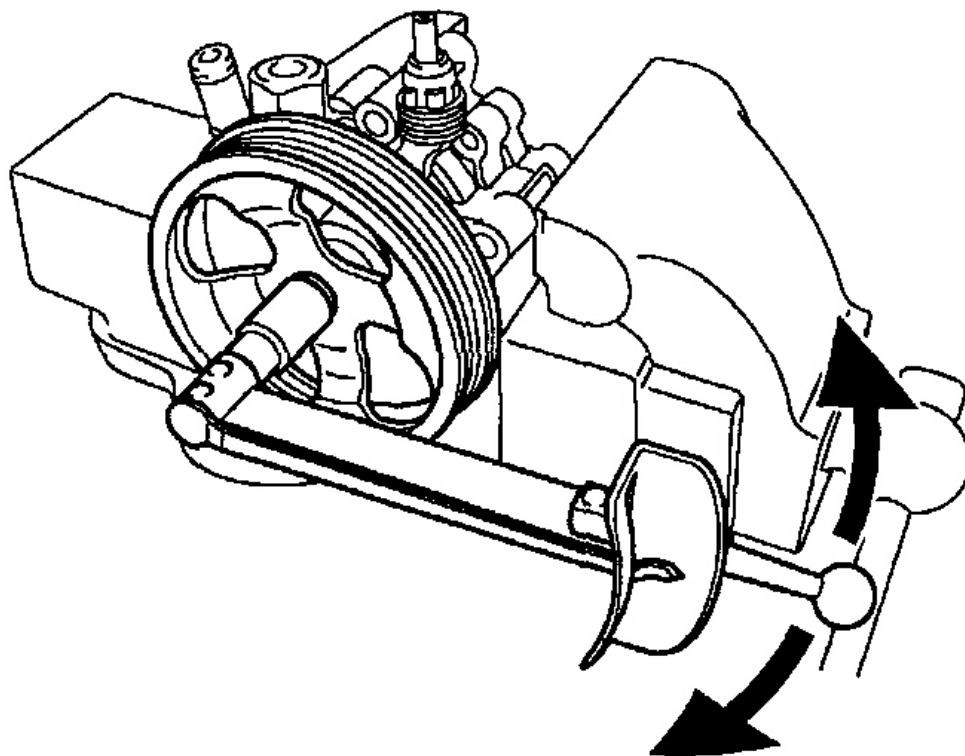
DISASSEMBLY

NOTE: When using a vise, do not overtighten it.

1. MEASURE PS VANE PUMP ROTATING TORQUE

- Check that the pump rotates smoothly without abnormal noise.
- Using a torque wrench, check the pump rotating torque.

Rotating torque: 0.27 N.m (2.8 kgf.cm, 2.4 in.lbf) or less



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Fig. 61: Checking Pump Rotating Torque

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

2. REMOVE SUCTION PORT UNION

- a. Remove the bolt and suction port union.
- b. Remove the O-ring from the suction port union.

3. REMOVE PRESSURE PORT UNION, FLOW CONTROL VALVE AND SPRING

- a. Remove the pressure port union, flow control valve and spring.
- b. Remove the O-ring from the pressure port union.

4. REMOVE OIL PRESSURE SWITCH

NOTE: Be careful not to drop the oil pressure switch.

If the oil pressure switch is dropped or strongly damaged, replace it with a new one.

5. REMOVE REAR HOUSING

2005 Toyota RAV4

2005 STEERING Steering - RAV4

- a. Remove the 4 bolts and rear housing.
- b. Remove the O-ring from the rear housing.
6. **REMOVE CAM RING, 10 VANE PLATES, VANE PUMP ROTOR AND SIDE PLATE**
 - a. Remove the cam ring and 10 vane plates.

NOTE: **Take care not to drop the vane plate.**

- b. Using a screwdriver, remove the snap ring, vane pump rotor and side plate.
- c. Remove the 2 O-rings from the side plate.
7. **REMOVE VANE PUMP SHAFT WITH VANE PUMP PULLEY**

INSPECTION

1. **MEASURE OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING**

Using a micrometer and a caliper gauge, measure the oil clearance.

Standard clearance: 0.021 - 0.043 mm (0.0008 - 0.0017 in.)

Maximum clearance: 0.07 mm (0.0028 in.)

If it is more than the maximum, replace the front housing and vane pump shaft.

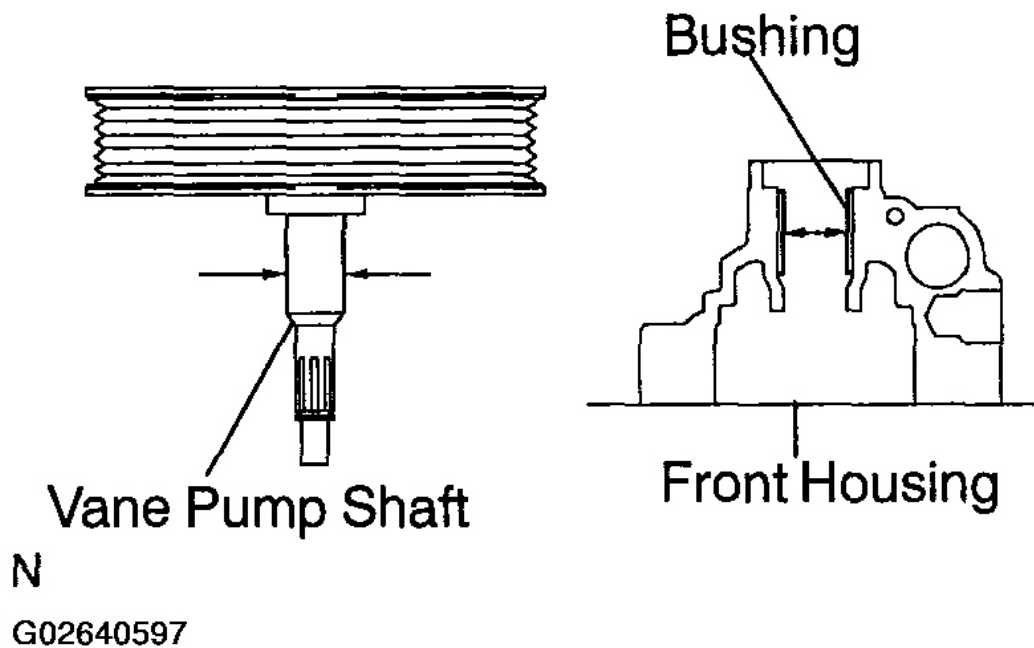


Fig. 62: Measuring Oil Clearance Between Vane Pump Shaft & Bushing
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

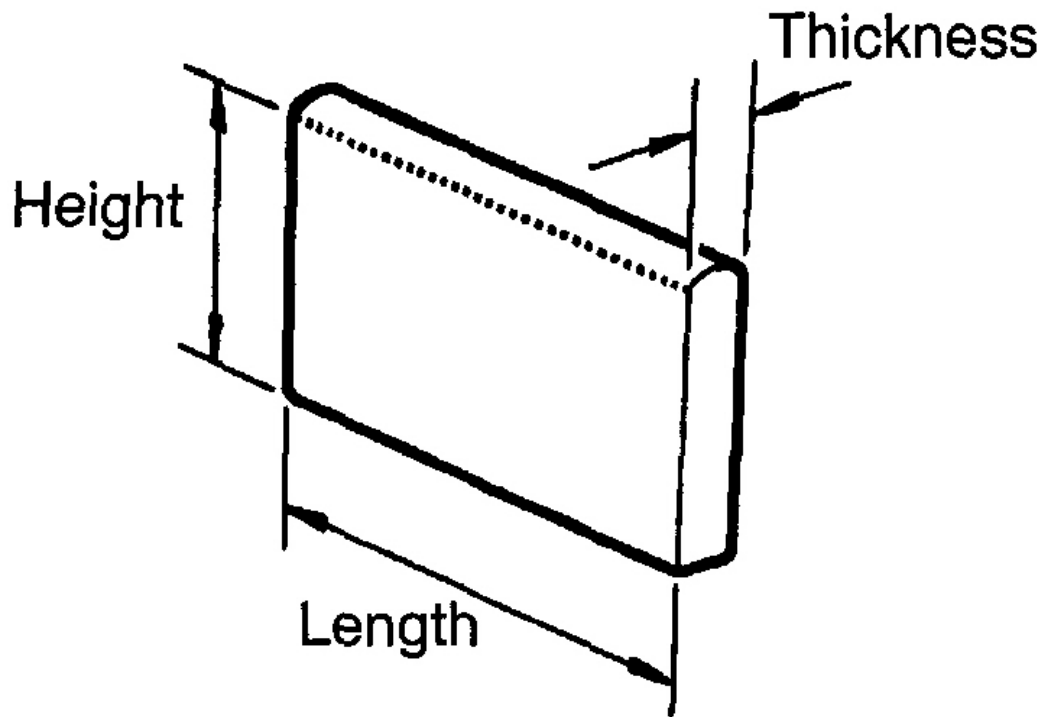
2. INSPECT VANE PUMP ROTOR AND VANE PLATES

- a. Using a micrometer, measure the height, thickness and length of the 10 vane plates.

Minimum height: 7.6 mm (0.299 in.)

Minimum thickness: 1.405 mm (0.0553 in.)

Minimum length: 11.993 mm (0.4722 in.)



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Fig. 63: Measuring Height, Thickness & Length Of 10 Vane Plates

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

- b. Using a feeler gauge, measure the clearance between the vane pump rotor groove and vane plate.

Maximum clearance: 0.025 mm (0.0010 in.)

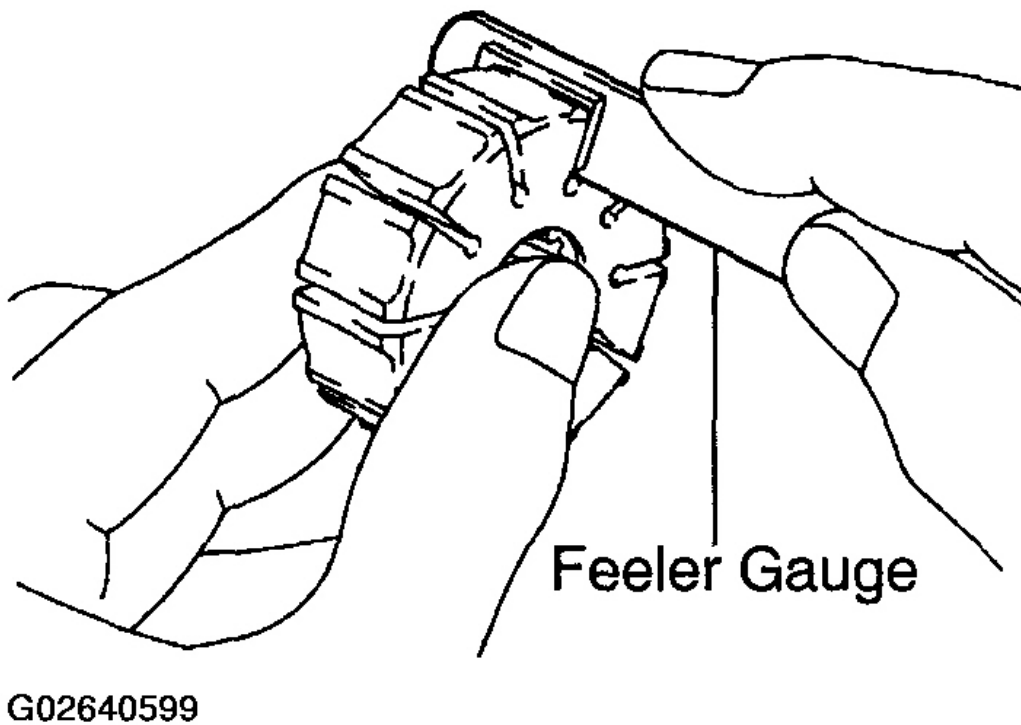


Fig. 64: Measuring Clearance Between Vane Pump Rotor Groove & Vane Plate
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

If it is more than the maximum, replace the vane plate and/or vane pump rotor with the one having the same mark stamped on the cam ring. See [Fig. 65](#).

Inscribed mark: 0, 1, 2, 3, or 4

HINT:

There are 5 vane plate lengths corresponding to the following vane pump rotor and cam ring marks:

INSCRIBED MARK SPECIFICATION

Vane pump rotor and cam ring.mark	Vane plate part number	Vane plate length mm (in.)
0	44345 - 32100	12.001 - 12.003 (0.47248 - 0.47256)
1	44345 - 32110	11.999 - 12.001 (0.47240 - 0.47248)
2	44345 - 32120	11.997 - 11.999 (0.47232 -

		0.47240)
3	44345 - 32130	11.995 - 11.997 (0.47224 - 0.47232)
4	44345 - 32140	11.993 - 11.995 (0.47216 - 0.47224)

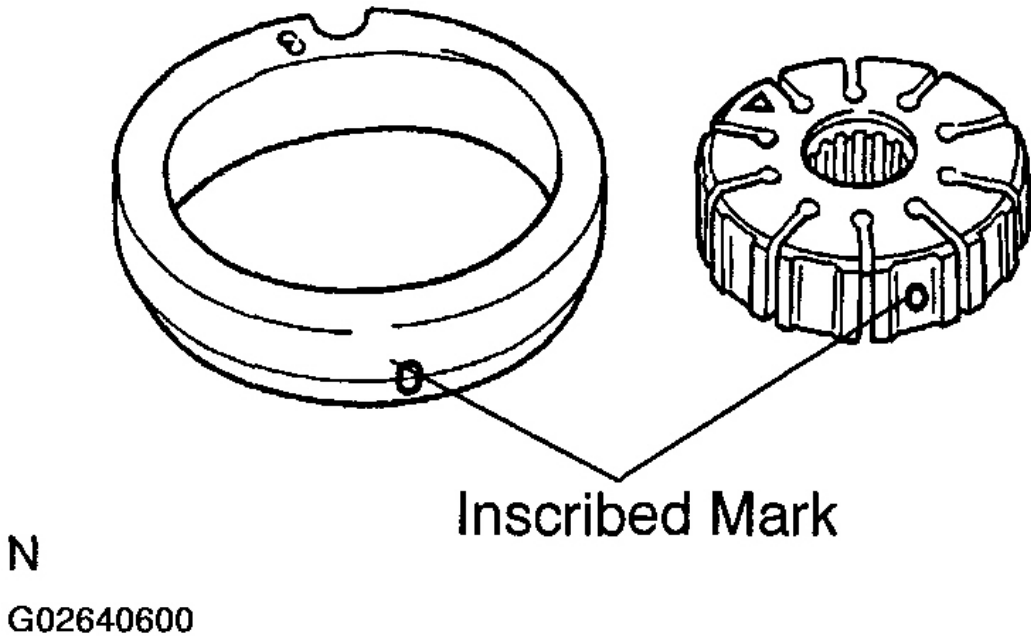
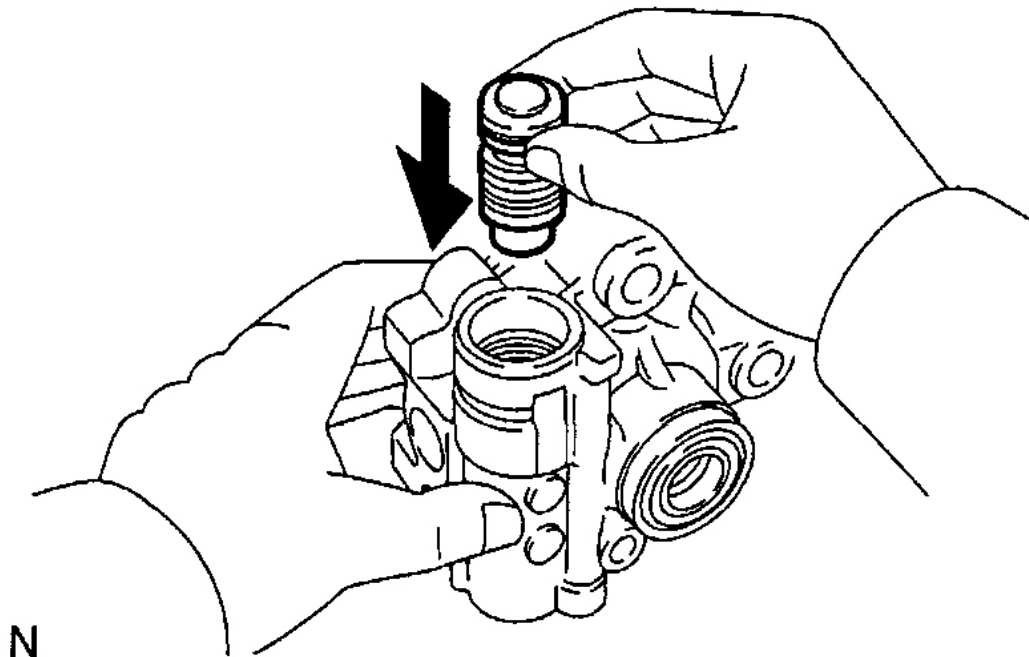


Fig. 65: Identifying Inscribed Mark On Cam Ring
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. INSPECT FLOW CONTROL VALVE
 - a. Coat the flow control valve with power steering fluid and check that it falls smoothly into the valve hole of the front housing by its own weight.

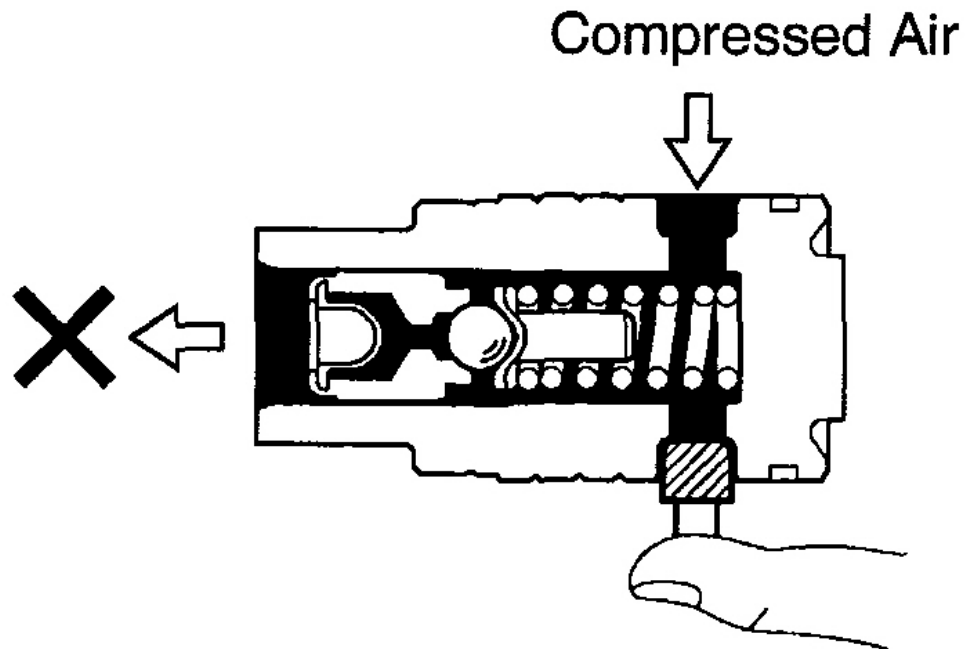


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Fig. 66: Checking Flow Control Valve Falls Smoothly Into Valve Hole
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Check the flow control valve for leakage. Close one of the holes and apply compressed air of 392 - 490 kPa (4 - 5 kgf/cm², 57 - 71 psi) into the opposite side hole, and confirm that air does not come out from the end hole.



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Fig. 67: Checking Flow Control Valve For Leakage
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

If necessary, replace the flow control valve with the one having the same letter as inscribed on the front housing.

Inscribed mark: A, B, C, D, E or F

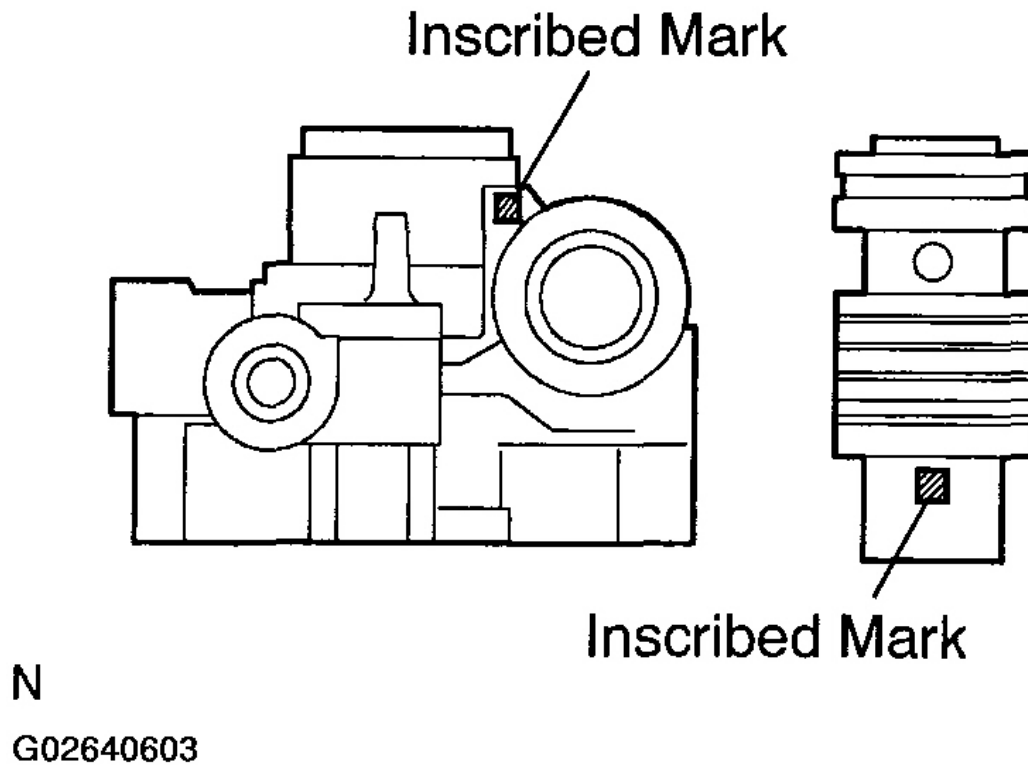


Fig. 68: Identifying Inscribed Mark Location
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. INSPECT SPRING

Using vernier calipers, measure the free length of the spring.

Minimum free length: 36.9 mm (1.453 in.)

If it is not within the specification, replace the spring.

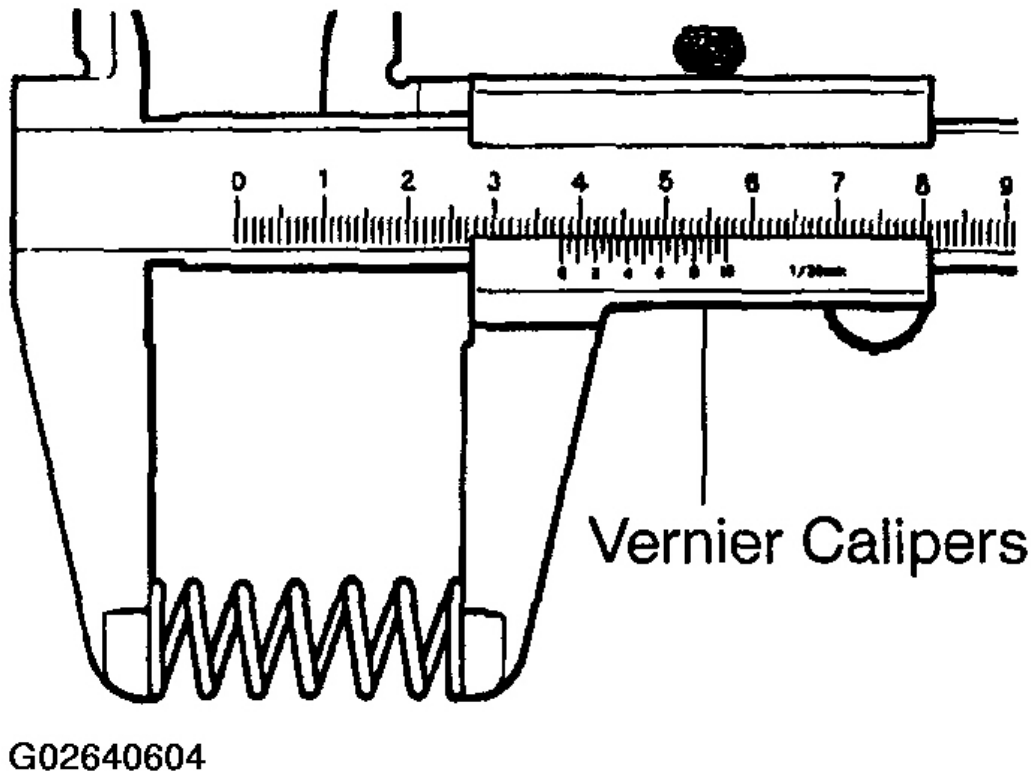


Fig. 69: Measuring Free Length Of Spring

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

REPLACEMENT

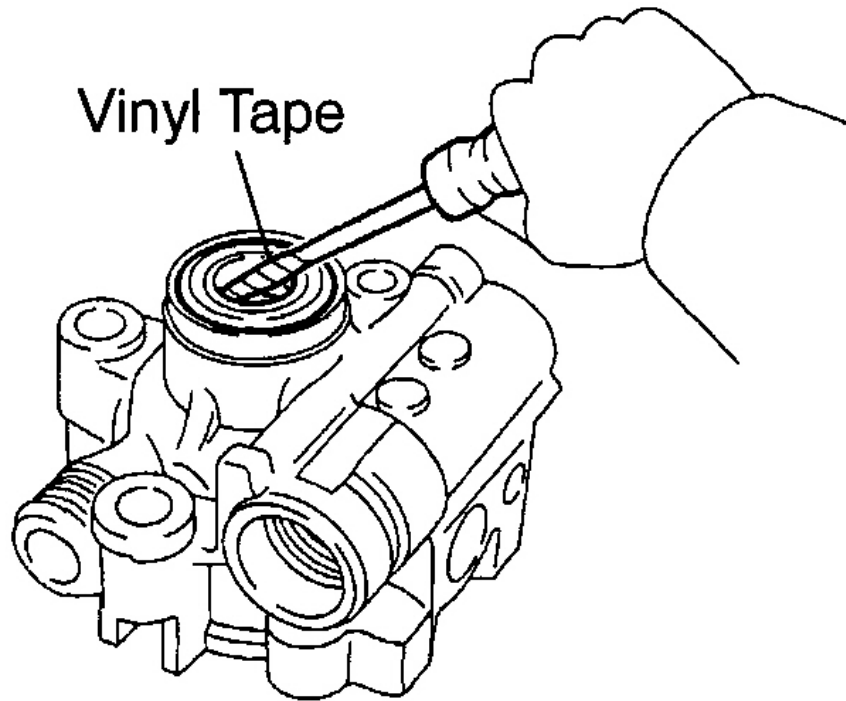
NOTE: When using a vise, do not overtighten it.

REPLACE FRONT HOUSING OIL SEAL

- Using a screwdriver with vinyl tape wound around its tip, remove the oil seal.

NOTE: Be careful not to damage the bushing of the front housing.

- Coat a new oil seal lip with power steering fluid.



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Fig. 70: Removing Oil Seal

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

- c. Using SST, press in the oil seal.

SST 09950-60010 (09951-00280), 09950-70010 (09951-07100)

NOTE: Make sure that the oil seal is installed facing in the correct direction.

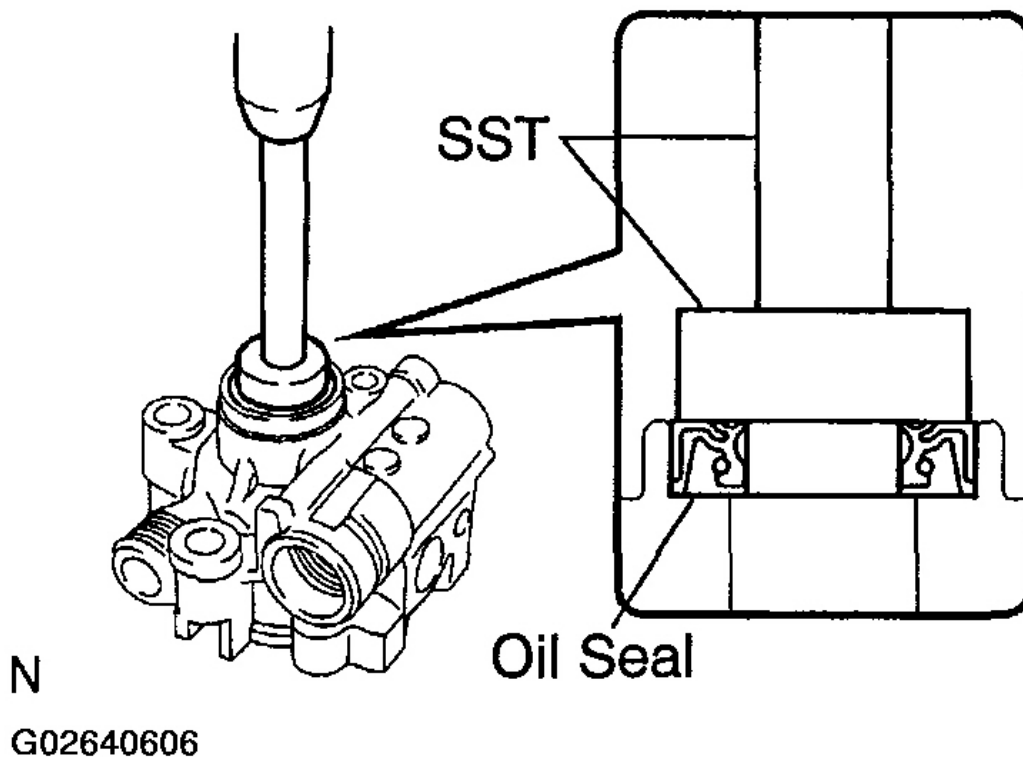


Fig. 71: Pressing In Oil Seal

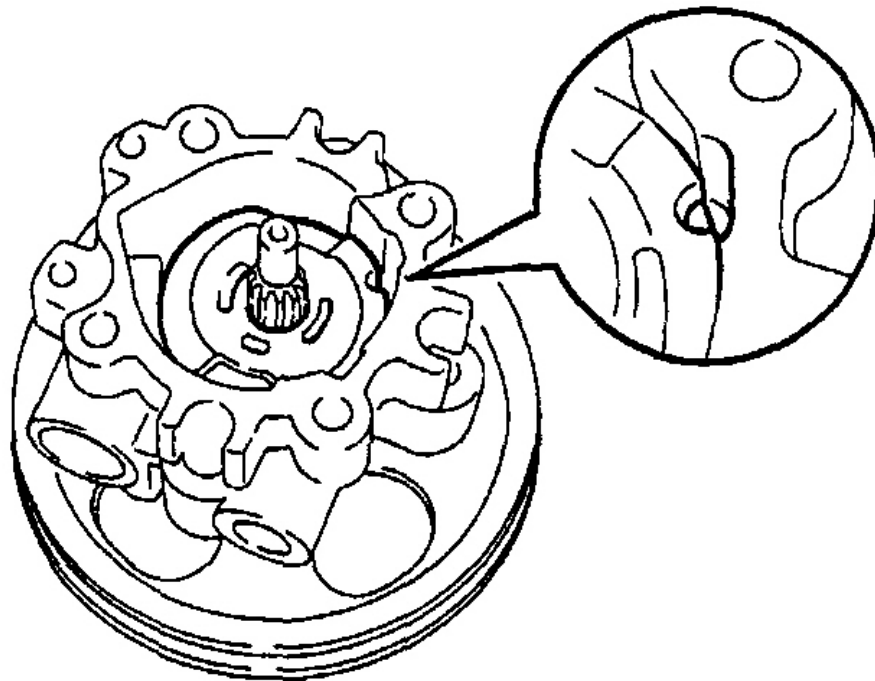
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REASSEMBLY

NOTE: When using a vise, do not overtighten it.

1. **COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID (See POWER STEERING VANE PUMP)**
2. **INSTALL VANE PUMP SHAFT WITH VANE PUMP PULLEY**
3. **INSTALL SIDE PLATE**
 - a. Coat 2 new O-rings with power steering fluid, and install them to the side plate.
 - b. Align the dent of the side plate with the dent of the front housing, and install the side plate.

NOTE: Make sure that the side plate is installed facing in the correct direction.



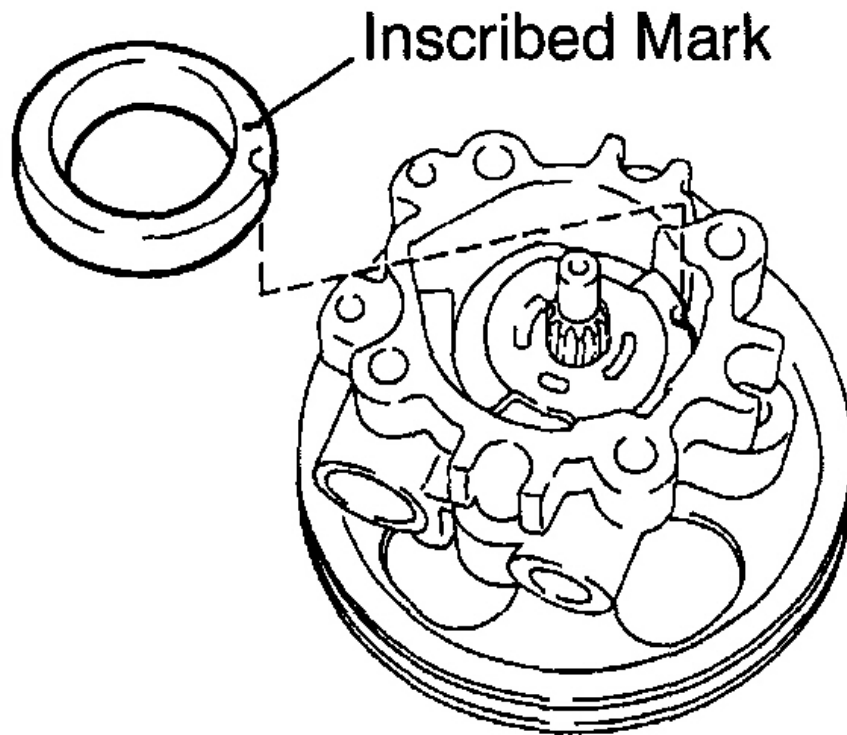
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Fig. 72: Aligning Dent Of Side Plate With Dent Of Front Housing
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. INSTALL CAM RING

Align the dent of the cam ring with the dent of the side plate, and install the cam ring with the inscribed mark facing outward.



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Fig. 73: Aligning Dent Of Cam Ring With Dent Of Side Plate

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

5. INSTALL VANE PUMP ROTOR

- a. Install the vane pump rotor with the inscribed mark facing outward.
- b. Install a new snap ring to the vane pump shaft.

6. INSTALL VANE PLATES

Install the 10 vane plates with the round end facing outward.

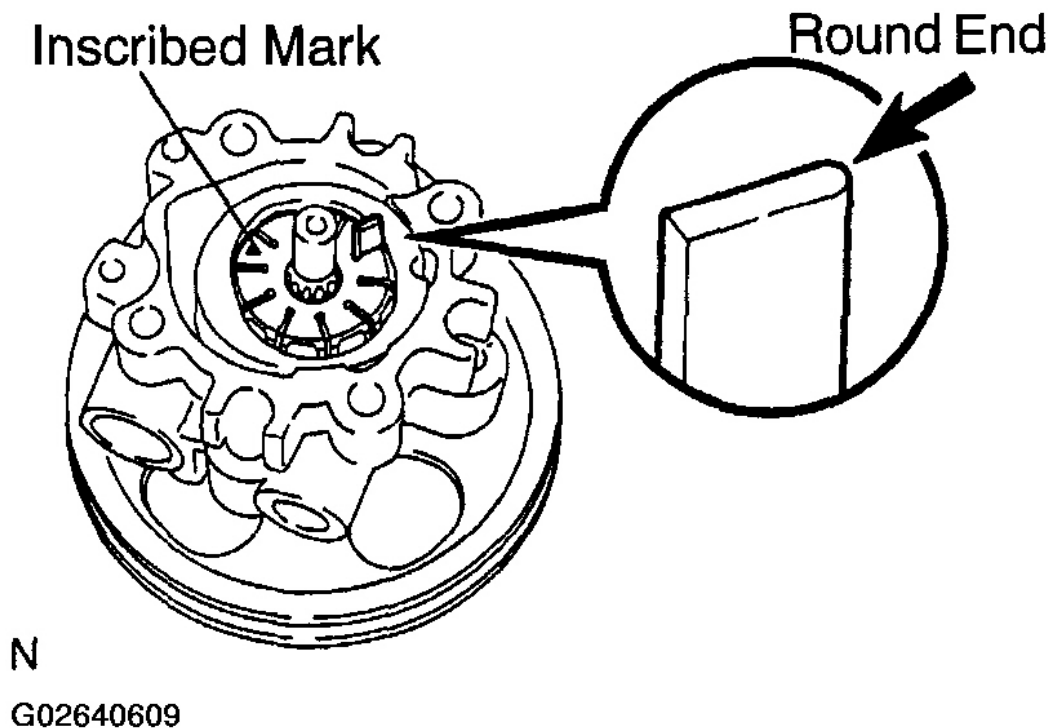


Fig. 74: Installing Vane Plates With Round End Facing Outward
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

7. INSTALL REAR HOUSING

- Coat a new O-ring with power steering fluid, and install it to the rear housing.
- Align the straight pin of the rear housing with the dents of the cam ring, side plate and front housing, and install the rear housing with the 4 bolts.

Torque: 22 N.m (220 kgf.cm, 16 ft.lbf)

8. INSTALL OIL PRESSURE SWITCH

Torque: 21 N.m (210 kgf.cm, 15 ft.lbf)

9. INSTALL SPRING, FLOW CONTROL VALVE AND PRESSURE PORT UNION

- Install the spring.
- Install the flow control valve facing in the correct direction (See **POWER STEERING VANE PUMP**).
- Coat a new O-ring with power steering fluid, and install it to the pressure port union.
- Install the pressure port union.

Torque: 69 N.m (700 kgf.cm, 51 ft.lbf)

10. INSTALL SUCTION PORT UNION

- a. Coat a new O-ring with power steering fluid, and install it to the suction port union.
- b. Install the suction port union with the bolt.

Torque: 12 N.m (120 kgf.cm, 9 ft.lbf)

11. MEASURE PS VANE PUMP ROTATING TORQUE (See DISASSEMBLY)

INSTALLATION

1. INSTALL PS VANE PUMP ASSEMBLY

- a. Insert the mounting bolt A to the PS vane pump assembly.
- b. Set the PS vane pump assembly in installation position.
- c. Using SST, install and torque the PS vane pump assembly mounting bolts.

SST 09248-63010

Torque: 30 N.m (305 kgf.cm, 22 ft.lbf)

HINT:

Use a torque wrench with a fulcrum length of 345 mm (13.58 in.)

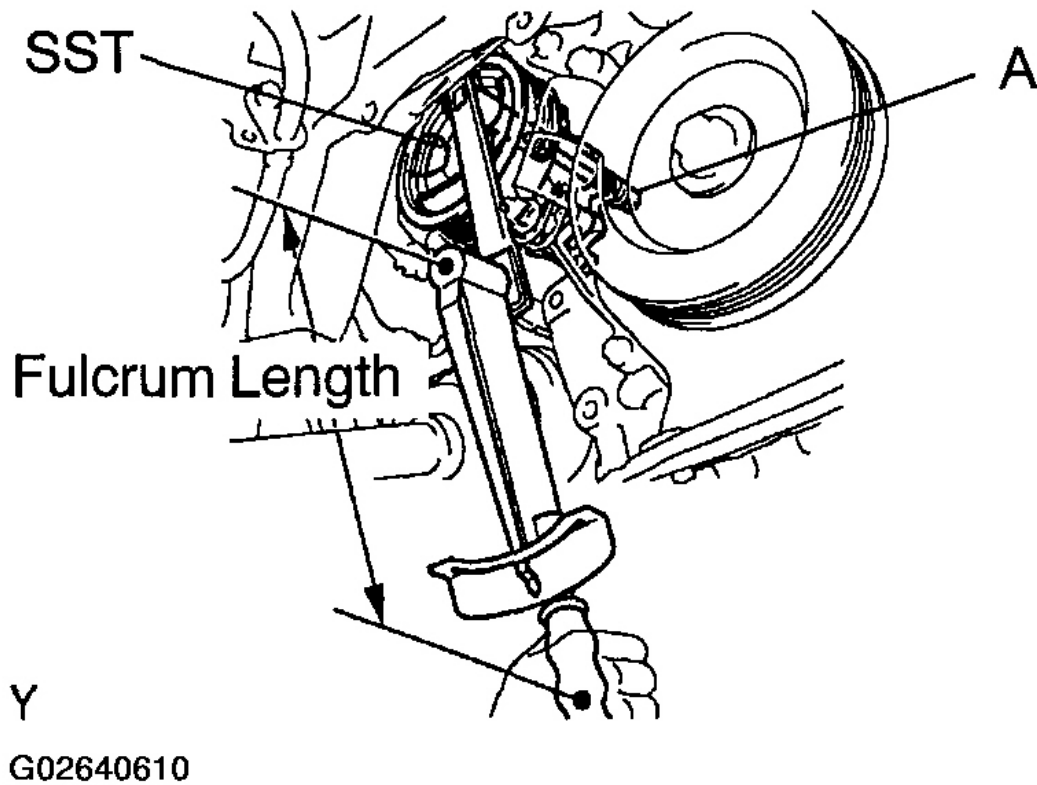


Fig. 75: Installing PS Vane Pump Assembly

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

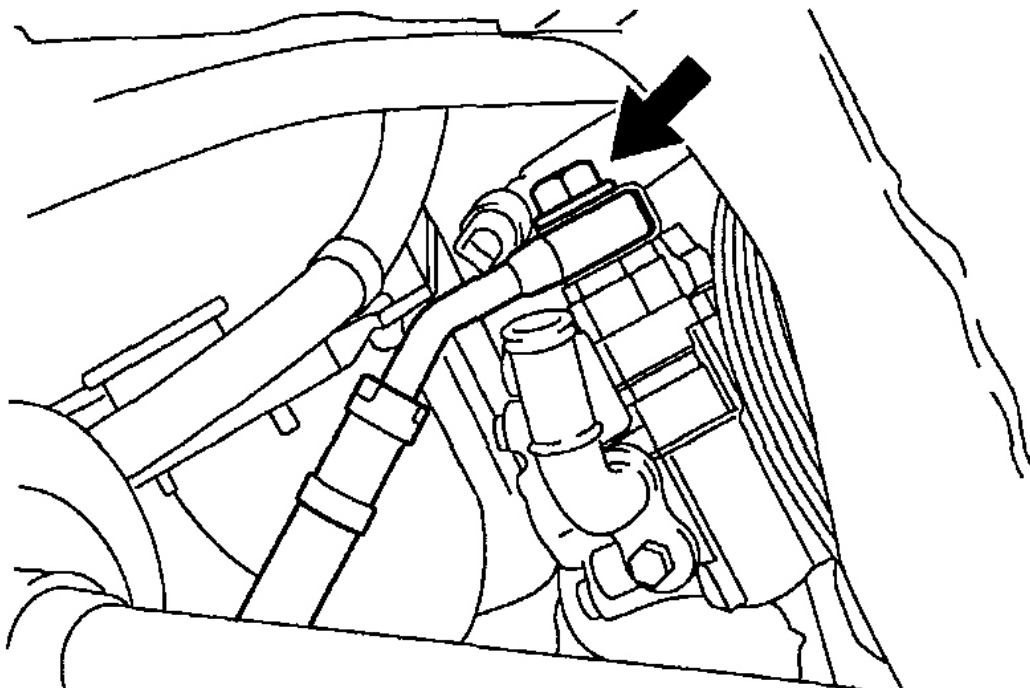
2. CONNECT OIL PRESSURE SWITCH CONNECTOR

NOTE: Be careful to prevent oil from being attached to the connector.

3. CONNECT PRESSURE FEED TUBE

Connect the pressure feed tube with the union bolt and new gasket.

Torque: 51.5 N.m (525 kgf.cm, 38 ft.lbf)



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Fig. 76: Connecting Pressure Feed Tube

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

4. CONNECT SUCTION HOSE

Connect the suction hose with the clip.

5. INSTALL DRIVE BELT

Hook SST on the hexagonal portion of the drive belt tensioner bracket and slowly compress the drive belt tension by turning the drive belt tensioner bracket clockwise, and install the drive belt.

SST 09249-63010

NOTE: Compress the drive belt tensioner by taking 3 seconds or more and installed the drive belt.

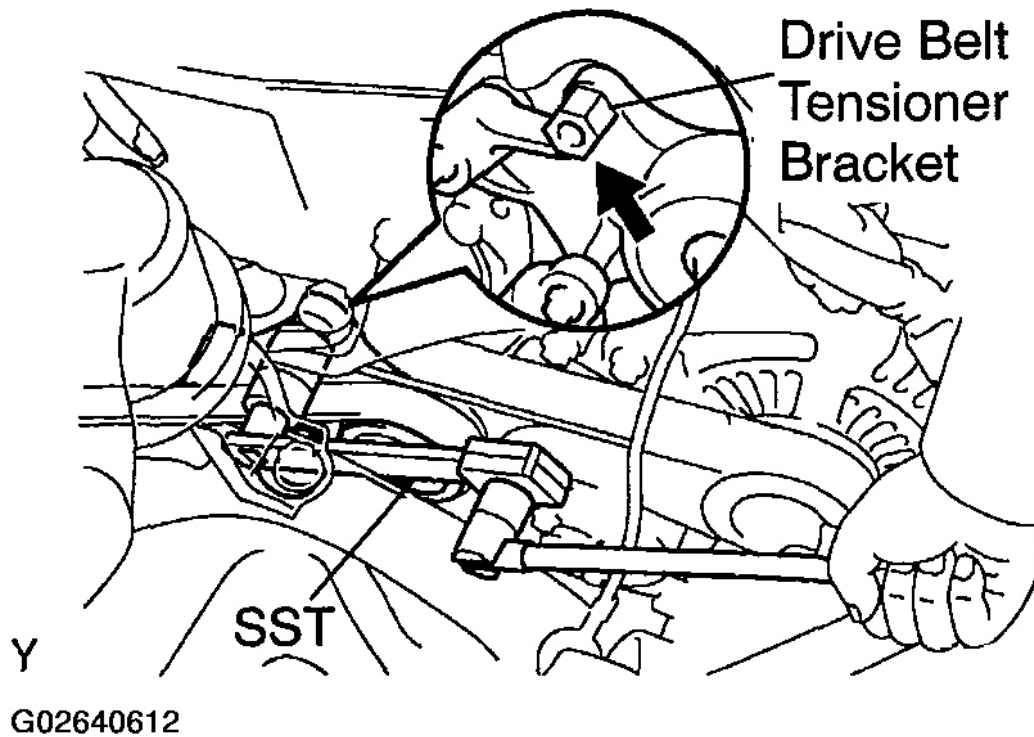


Fig. 77: Installing Drive Belt

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

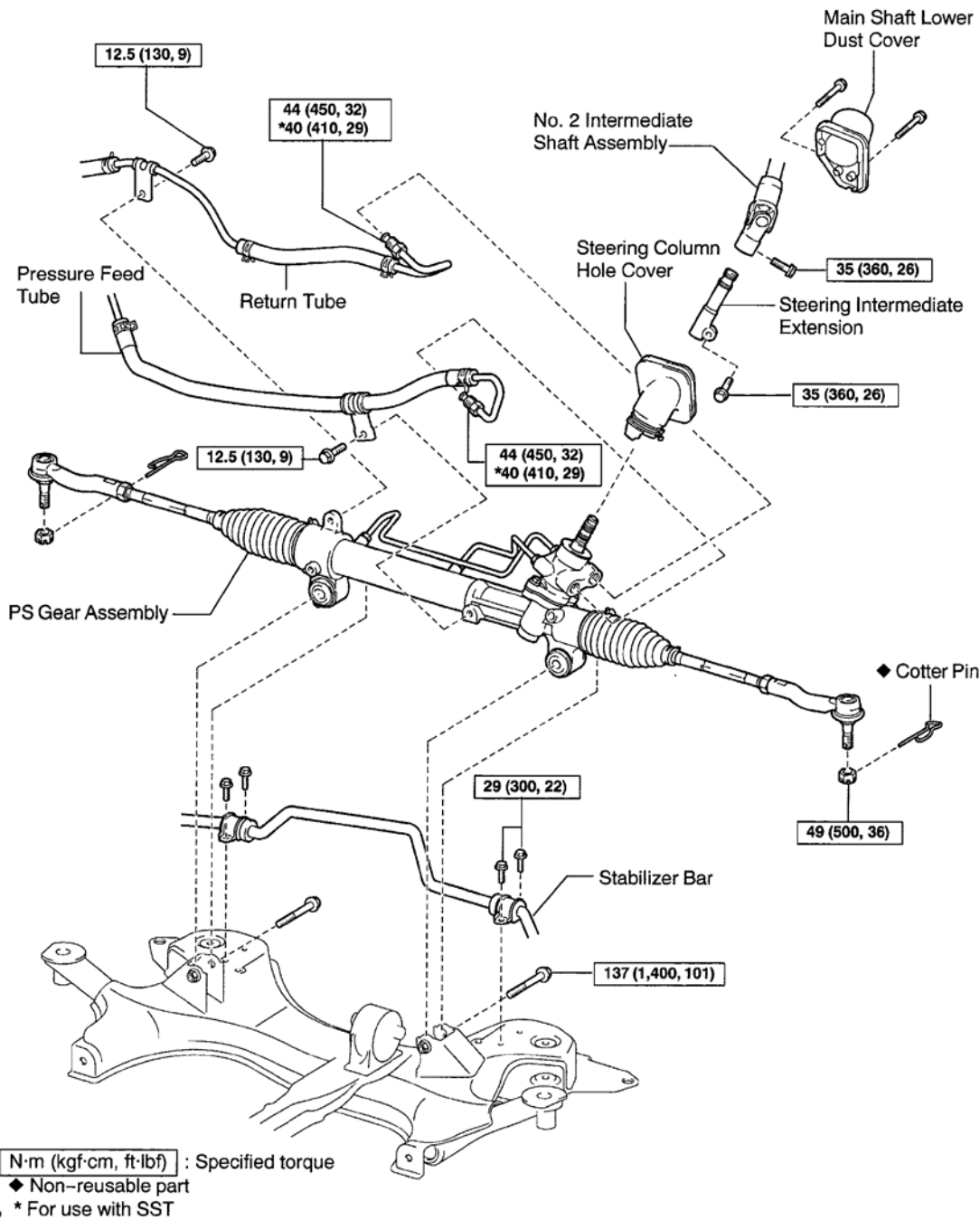
6. INSTALL RH ENGINE UNDER COVER
7. BLEED POWER STEERING SYSTEM (See POWER STEERING FLUID)

POWER STEERING GEAR

COMPONENTS

2005 Toyota RAV4

2005 STEERING Steering - RAV4

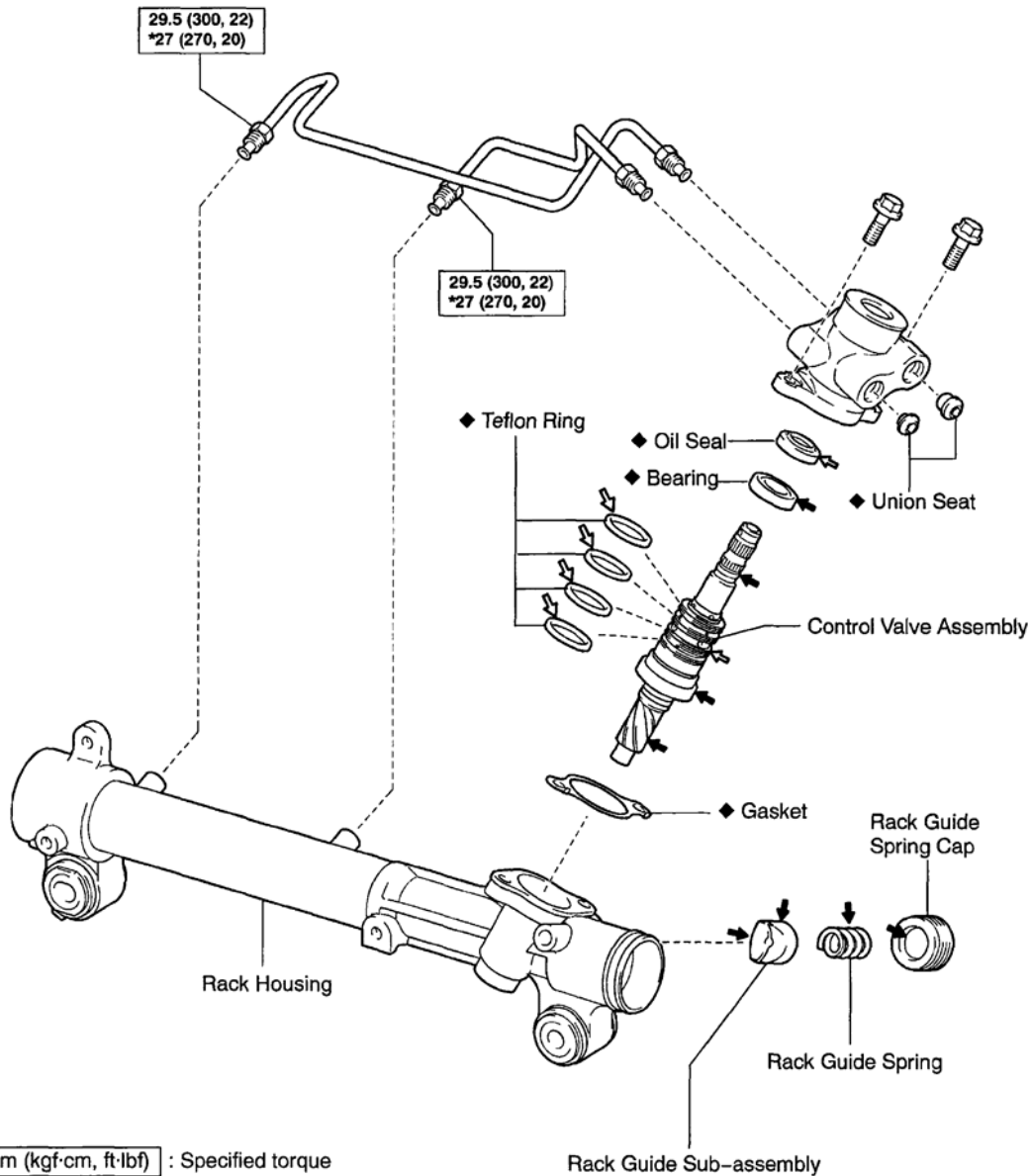


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Fig. 78: Identifying Power Steering Gear Components & Torque Specifications (1 Of 3)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2005 Toyota RAV4

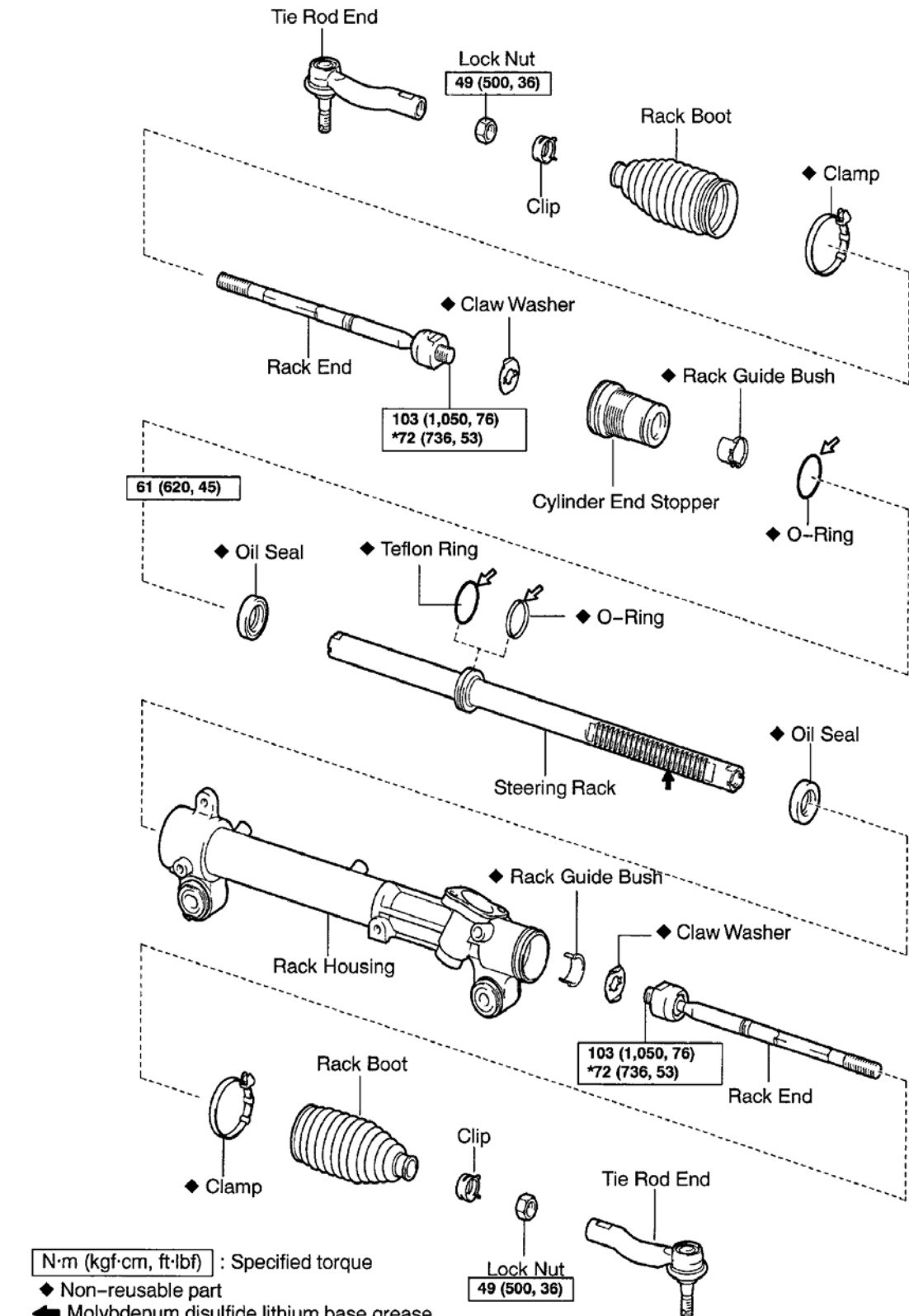
2005 STEERING Steering - RAV4



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Fig. 79: Identifying Power Steering Gear Components & Torque Specifications (2 Of 3)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2005 Toyota RAV4
2005 STEERING Steering - RAV4



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

← Molybdenum disulfide lithium base grease

← Power steering fluid

* For use with SST

Fig. 80: Identifying Power Steering Gear Components & Torque Specifications (3 Of 3)

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

REMOVAL

NOTE: Remove the steering wheel assembly before the steering gear removal, because there is possibility of breaking of the spiral cable.

1. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
2. **REMOVE STEERING WHEEL PAD (See REMOVAL)**
3. **REMOVE STEERING WHEEL (See REMOVAL)**
4. **DISCONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY (See REMOVAL)**
5. **DISCONNECT STEERING COLUMN HOLE COVER**
 - a. Loosen the clamp of the steering column hole cover.
 - b. Disconnect the steering column hole cover from the dash panel.
6. **DISCONNECT RH AND LH TIE ROD ENDS (See REMOVAL under FRONT AXLE HUB) .**
7. **DISCONNECT STABILIZER BAR**

Remove the 4 bolts and disconnect the stabilizer bar.

HINT:

Do not remove the stabilizer bar.

8. **DISCONNECT PRESSURE FEED AND RETURN TUBES**
 - a. Using SST, disconnect the pressure feed and return tubes from the PS gear.

SST 09023-12701
 - b. Remove the 2 bolts and disconnect the pressure feed and return tube from the PS gear.

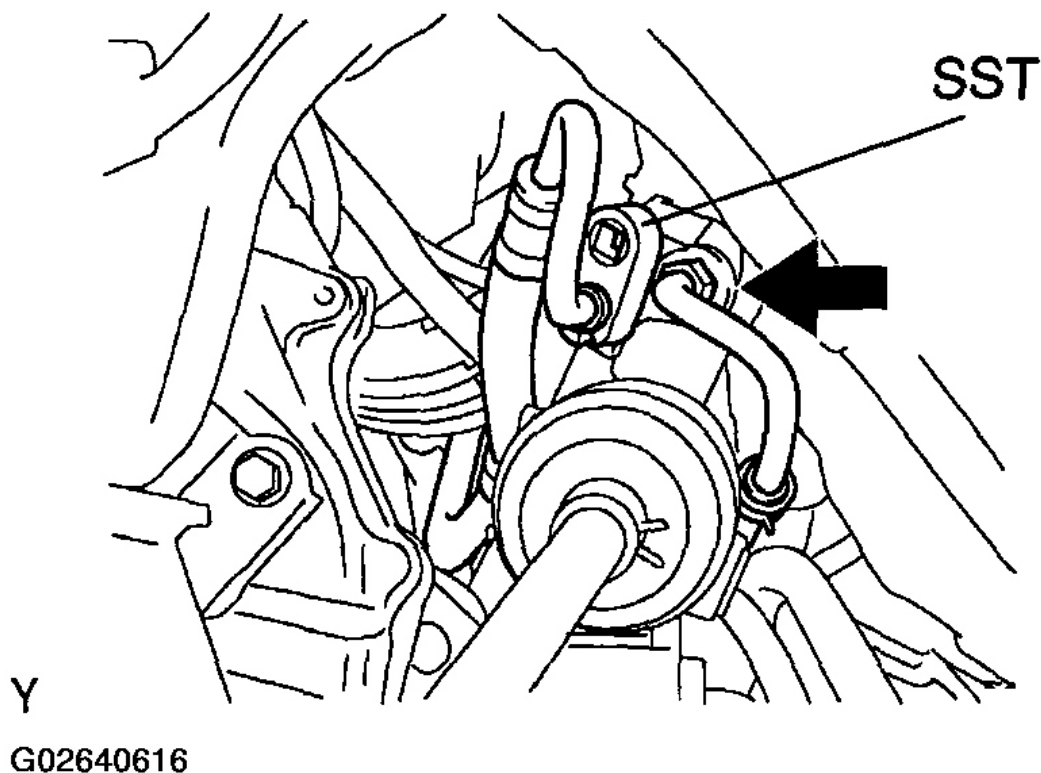


Fig. 81: Disconnecting Pressure Feed & Return Tube From PS Gear
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

9. REMOVE PS GEAR ASSEMBLY

- Remove the 2 PS gear assembly mounting bolts.
- Remove the steering column hole cover and clamp.
- Place matchmarks on the steering intermediate extension and control valve shaft.
- Remove bolt and steering intermediate extension.
- Remove the PS gear assembly.

NOTE: Do not damage the turn pressure tubes.

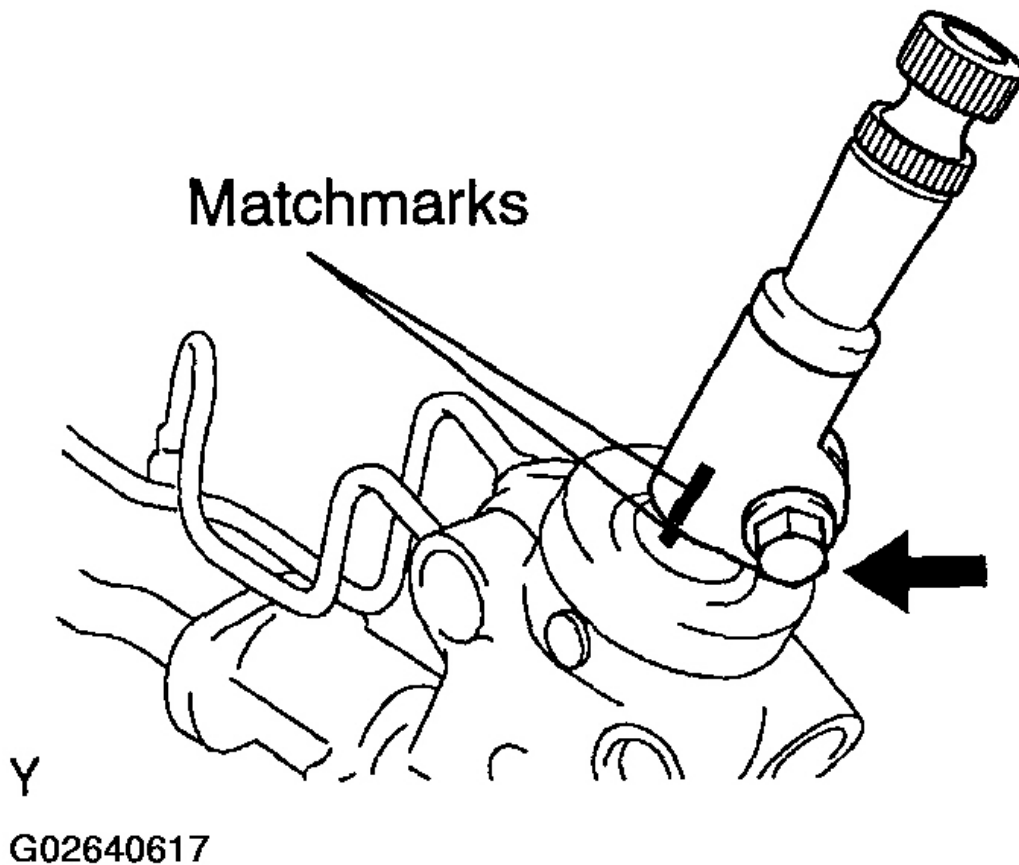


Fig. 82: Placing Matchmarks On Steering Intermediate Extension & Control Valve Shaft
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

DISASSEMBLY

NOTE: When using a vise, do not overtighten it.

1. REMOVE TURN PRESSURE TUBES

Using SST, remove the 2 turn pressure tubes.

SST 09023-38201

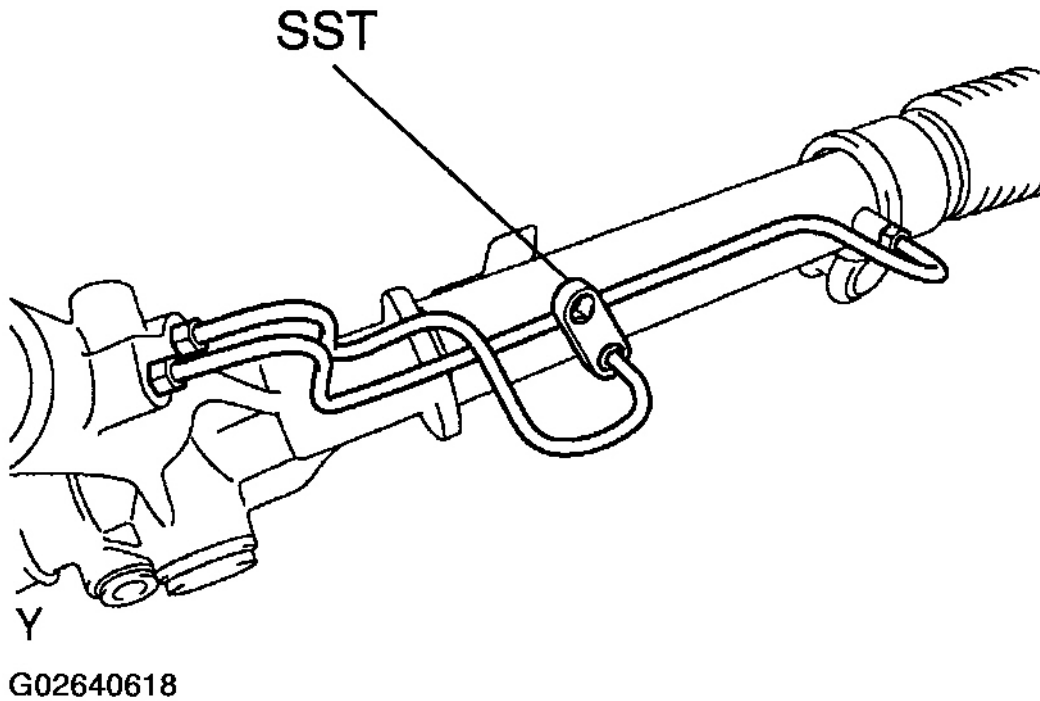


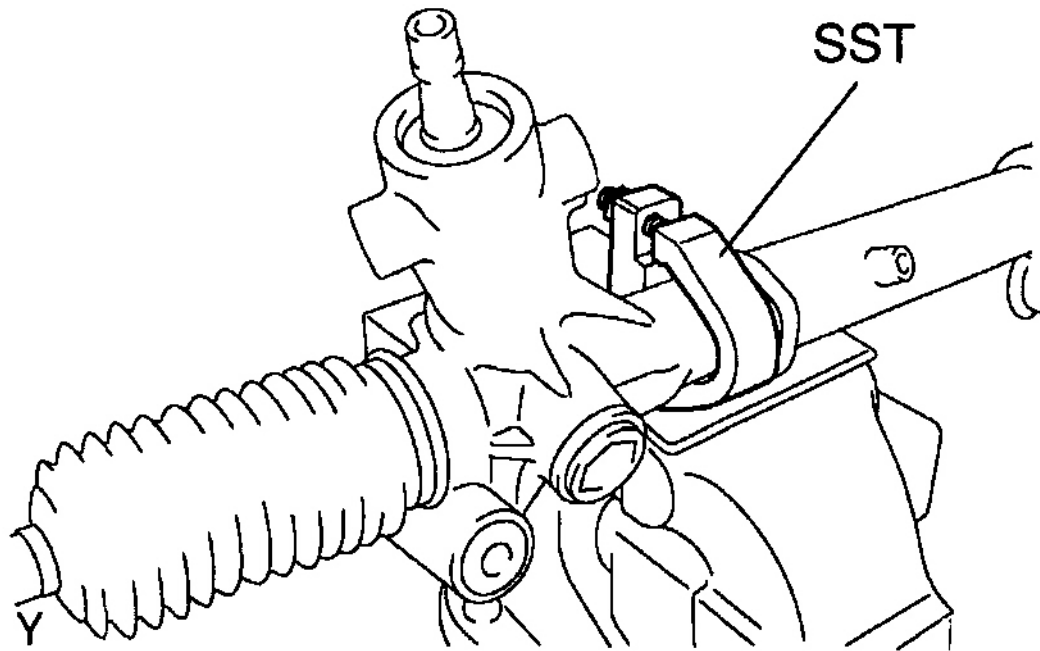
Fig. 83: Removing Turn Pressure Tubes

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

2. SECURE PS GEAR ASSEMBLY IN VISE

Using SST, secure the PS gear assembly in a vise.

SST 09612-00012



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Fig. 84: Placing PS Gear Assembly In Vise
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. **REMOVE RH AND LH TIE ROD ENDS AND LOCK NUTS**
 - a. Place matchmarks on the tie rod end and rack end.
 - b. Loosen the lock nut, and remove the tie rod end and lock nut.
 - c. Employ the same manner described above to the other side.

HINT:

Mark the RH and LH tie rod ends and lock nuts.

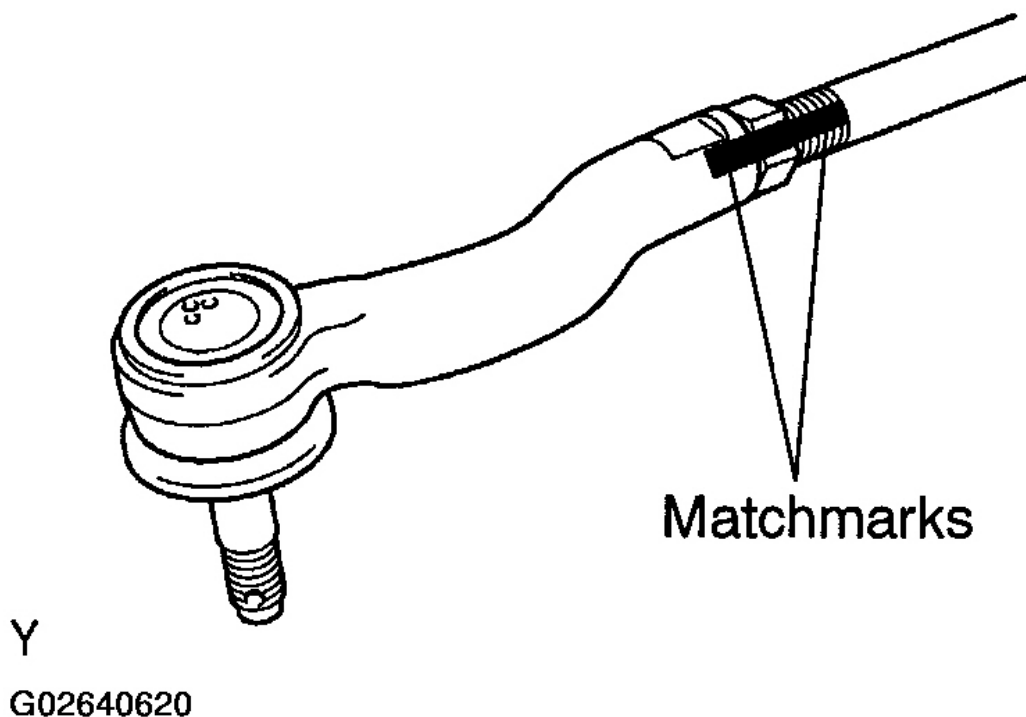


Fig. 85: Placing Matchmarks On Tie Rod End & Rack End
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. REMOVE RH AND LH CLIPS, CLAMPS AND RACK BOOTS

- a. Loosen the clamp screw.
- b. Remove the clip, clamp and rack boot.

NOTE: Be careful not to damage the boot.

- c. Employ the same manner described above to the other side.

HINT:

Mark the RH and LH rack boots.

5. REMOVE RH AND LH RACK ENDS AND CLAW WASHERS

- a. Using a screwdriver and a hammer, unstake the claw washer.

NOTE: Avoid any impact on the steering rack.

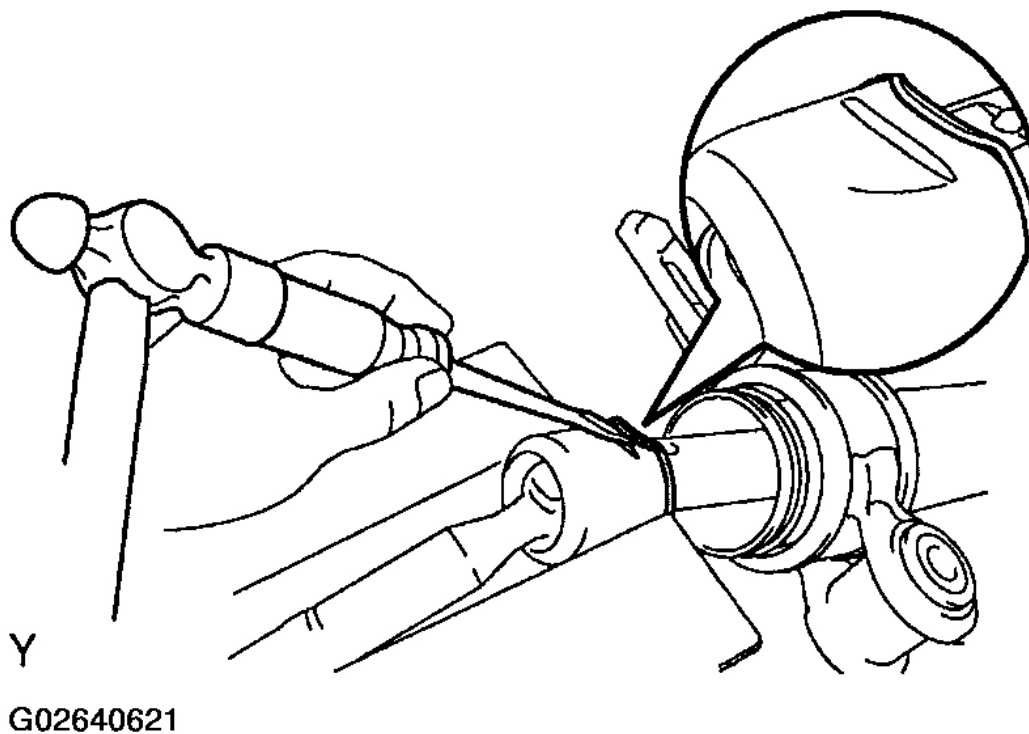


Fig. 86: Removing RH & LH Rack Ends & Claw Washers
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Using SST and spanner (22 mm), remove the power steering rack and claw washer. See **Fig. 87**.

SST 09922-10010

HINT:

Using spanner, hold the steering rack to remove the rack end and claw washer.

NOTE: Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Mark the RH and LH rack ends.

- c. Using 2 SST, remove the other rack end.

HINT:

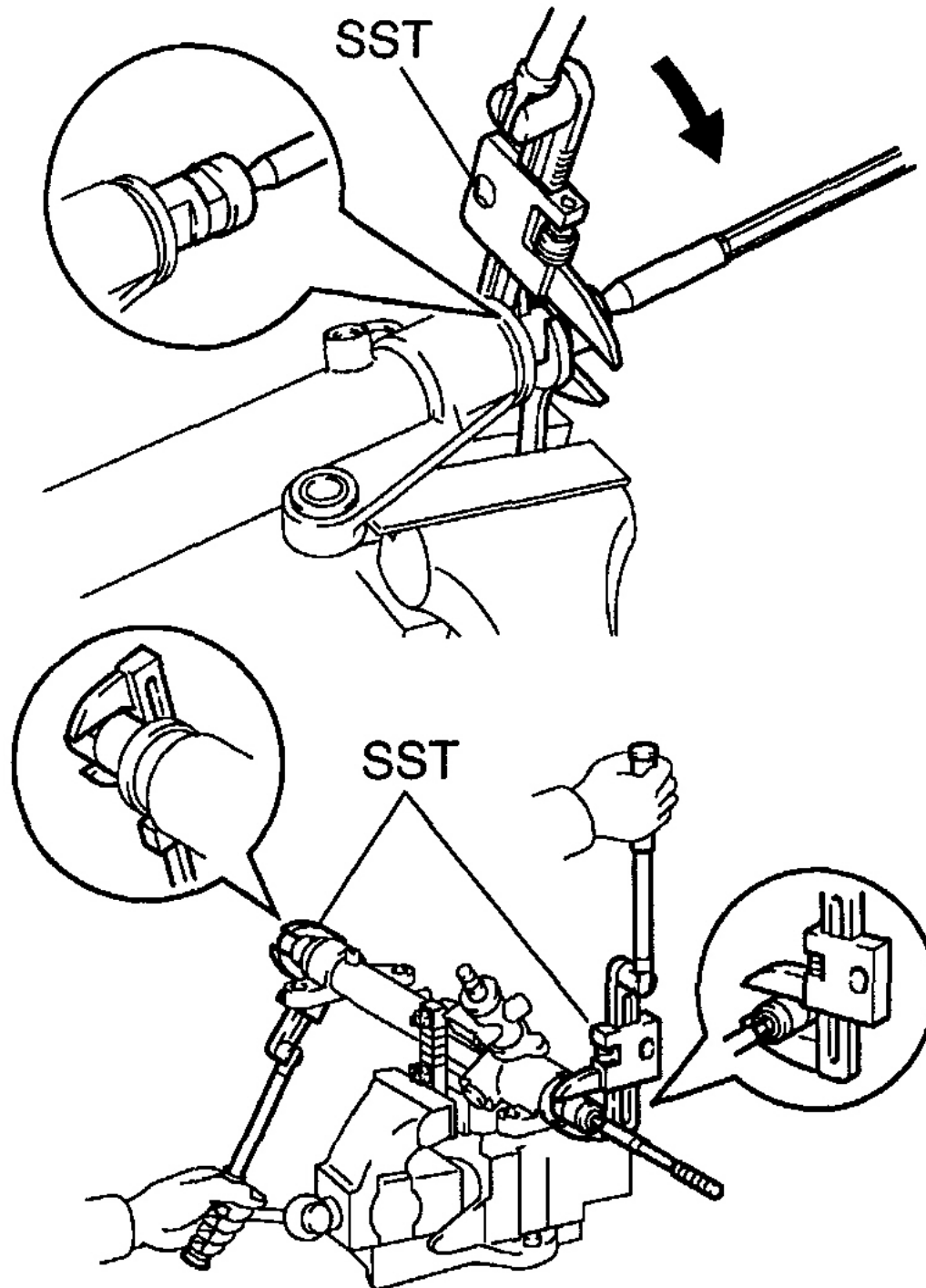
2005 Toyota RAV4

2005 STEERING Steering - RAV4

Using SST, hold the power steering rack to remove the rack end and claw washer.

6. REMOVE RACK GUIDE

- a. Using a straight hexagon wrench 24, remove the rack guide spring cap.
- b. Remove the rack guide spring and rack guide.



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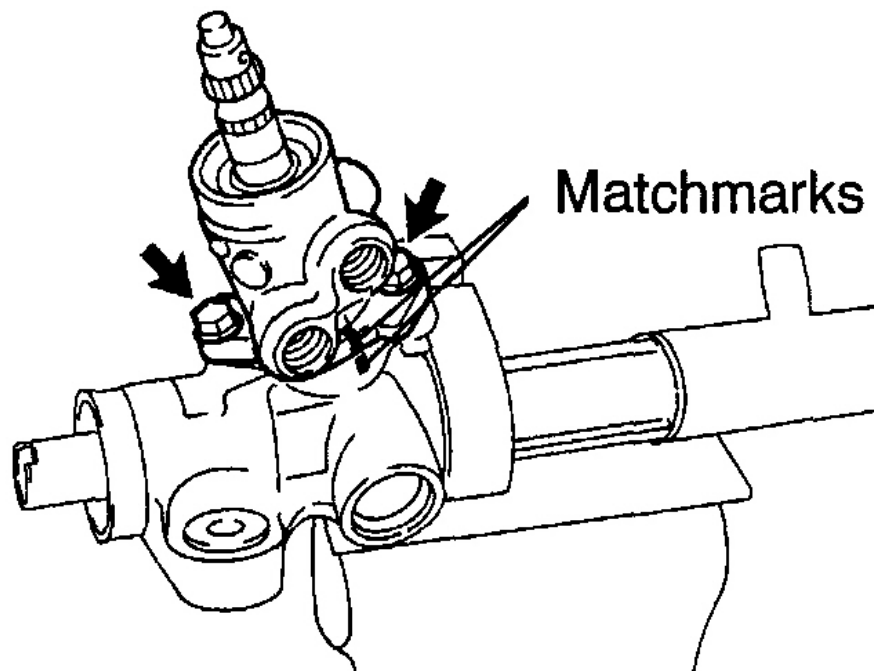
Fig. 87: Removing Rack Guide Spring Cap

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

7. REMOVE CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

- a. Place matchmarks on the control valve housing and rack housing.
- b. Remove the 2 bolts.
- c. Pull out the control valve housing with control assembly.
- d. Remove the gasket

SST 09616-00011



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Fig. 88: Placing Matchmarks On Control Valve Housing & Rack Housing

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

8. REMOVE CONTROL VALVE ASSEMBLY, UPPER OIL SEAL AND UPPER BEARING

- a. Wind vinyl tape on the control valve shaft.
- b. Press out the control valve assembly.

SST 09613-12010

NOTE:

- Be careful not to damage the oil seal lip.
- Place a shop rag between the valve housing and the blocks.
- Be careful not to drop the valve assembly.

c. Remove the oil seal and bearing from the control valve assembly.

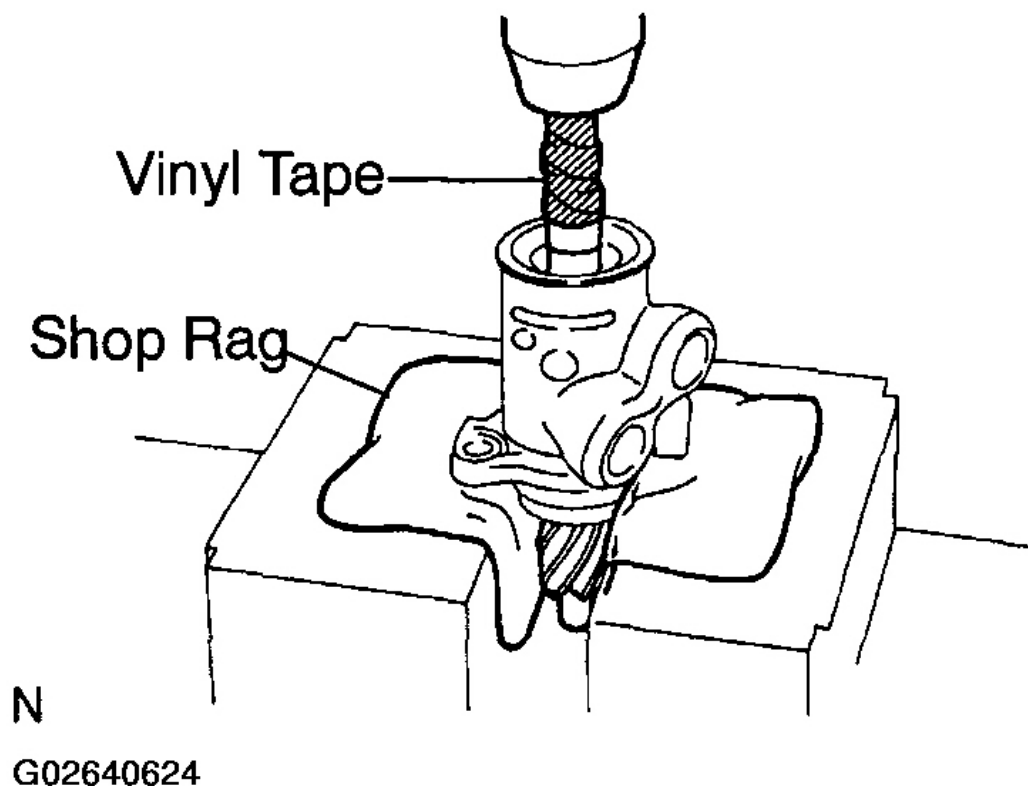


Fig. 89: Pressing Out Control Valve Assembly

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

9. REMOVE CYLINDER END STOPPER

a. Place rack housing in vise.

NOTE:

Hold the arrow part in the illustration in a vice. See [Fig. 90](#).

b. Using SST, remove the cylinder end stopper from the rack housing.

SST 09631-20120

- c. Using a screwdriver, remove the O-ring from the cylinder end stopper.

NOTE: Do not damage the cylinder end stopper.

- d. Using a screwdriver, remove the rack guide bush from the cylinder end stopper.

NOTE: Do not damage the cylinder end stopper.

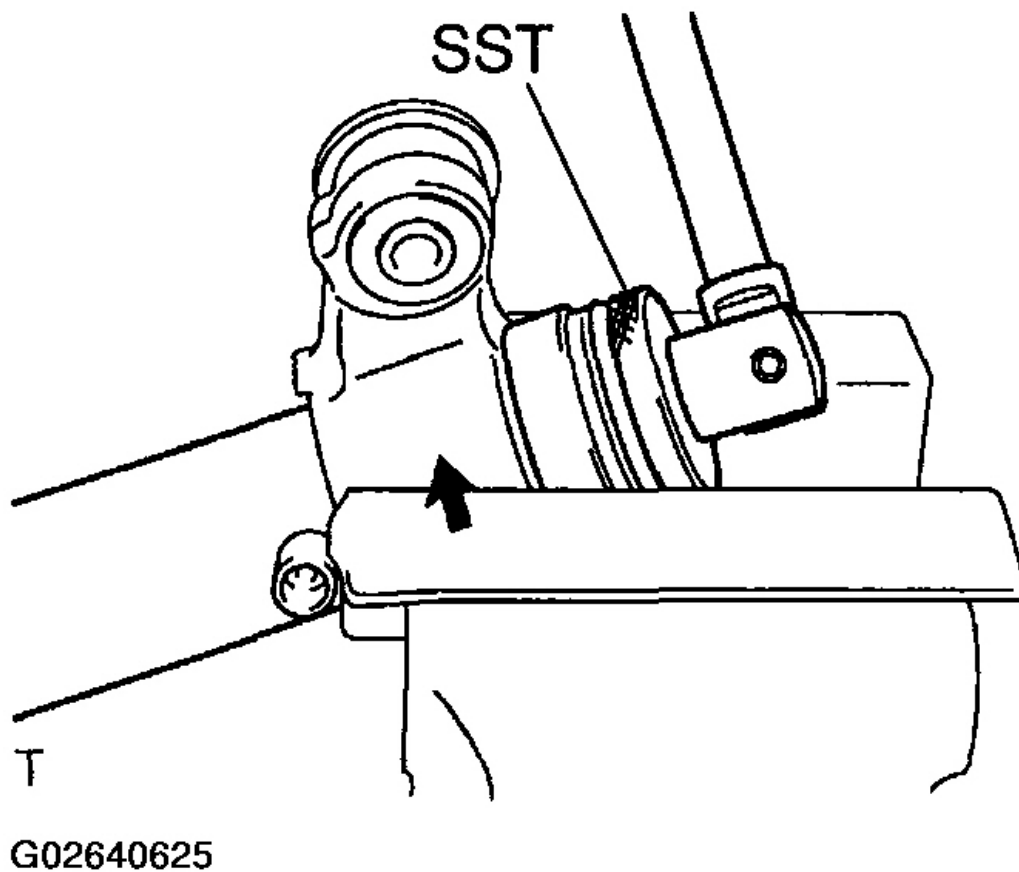


Fig. 90: Removing Cylinder End Stopper From Rack Housing
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

10. REMOVE POWER STEERING RACK

- a. Using a service bolt and press, remove the steering rack from the steering rack housing. See **Fig. 91**.

Recommended service bolt:**SERVICE BOLT SPECIFICATION**

Thread diameter	14 mm (0.55 in.)
Thread pitch	1.5 mm (0.059 in.)

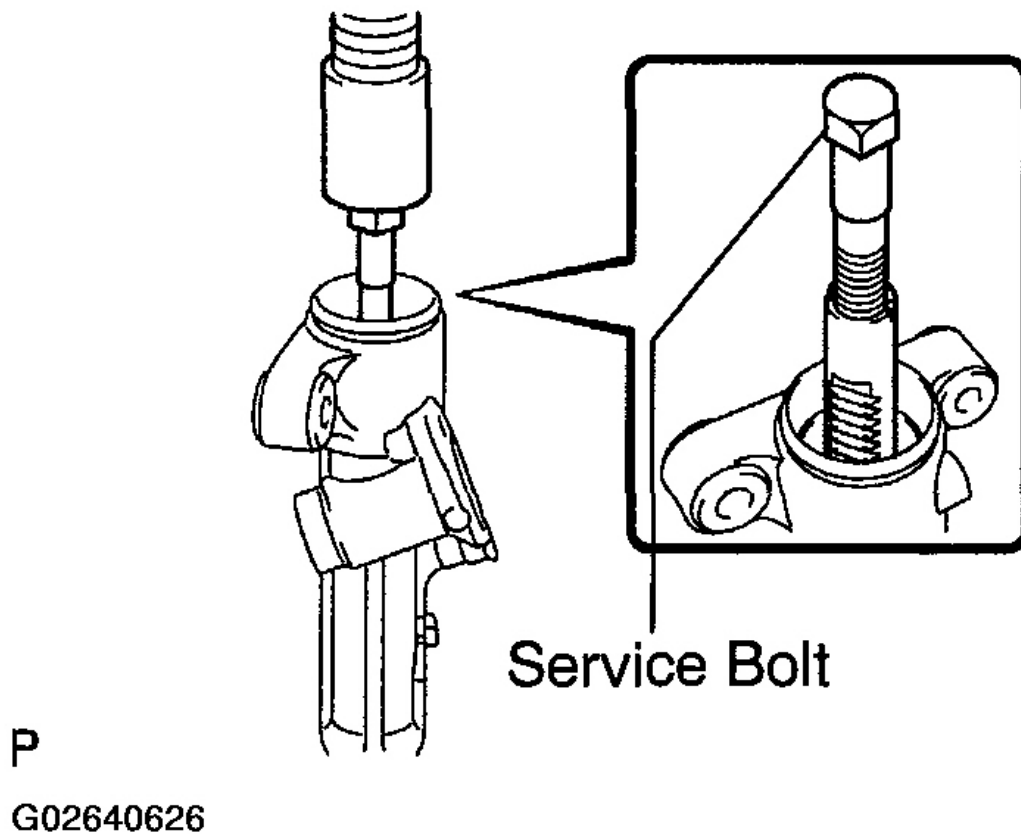


Fig. 91: Removing Steering Rack From Steering Rack Housing
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Using a screwdriver, remove the power piston oil seal and power piston O-ring from the steering rack.

NOTE: Do not damage the steering rack ring groove.

- c. Remove the cylinder end stopper oil seal from the steering rack.

11. REMOVE POWER STEERING CYLINDER TUBE OIL SEAL

- a. Using needle nose pliers, remove the bush from the rack housing.

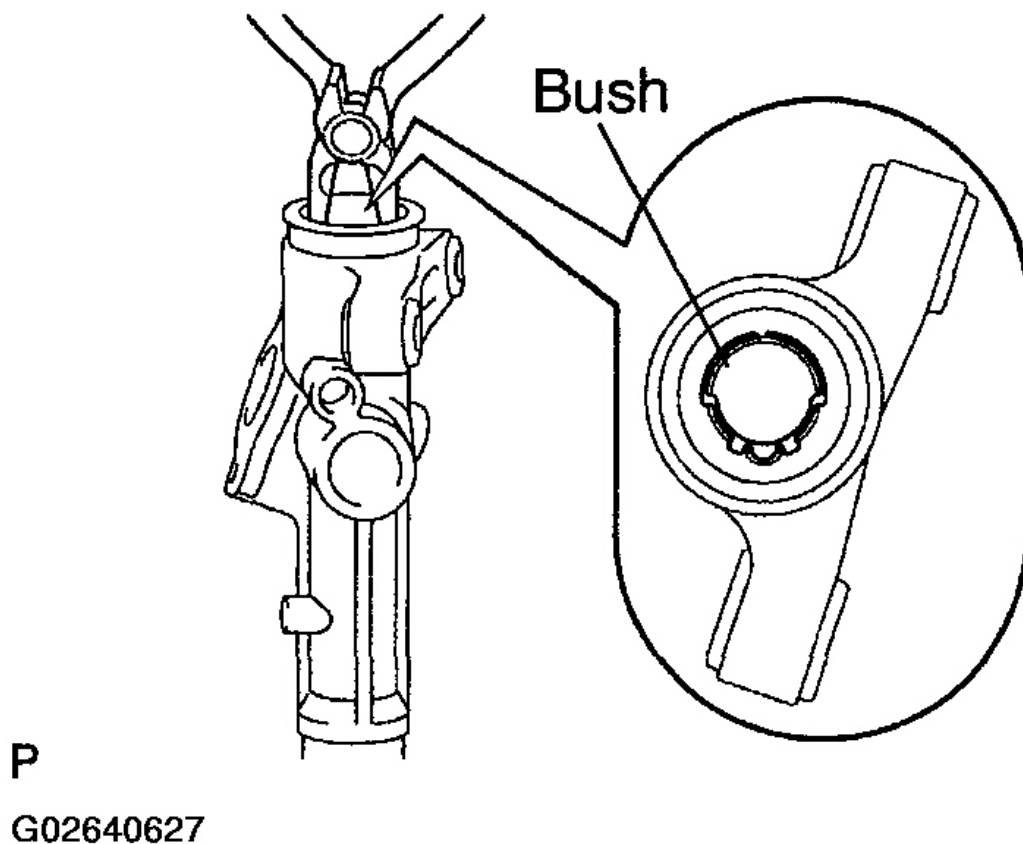


Fig. 92: Removing Bushing From Rack Housing

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

- b. Install SST (09612-07130) on SST (09612-07210). See **Fig. 93**.
- c. Diagonally insert SST (09612-07210) into the housing until it contacts with the oil seal, and then, further insert the SST (09612-07210) until the tip of SST (09612-07220) contacts with SST (09612-07130).

SST 09612-70100 (09612-07130, 09612-07210, 09612-07220)

NOTE: Do not damage the inside of the housing.

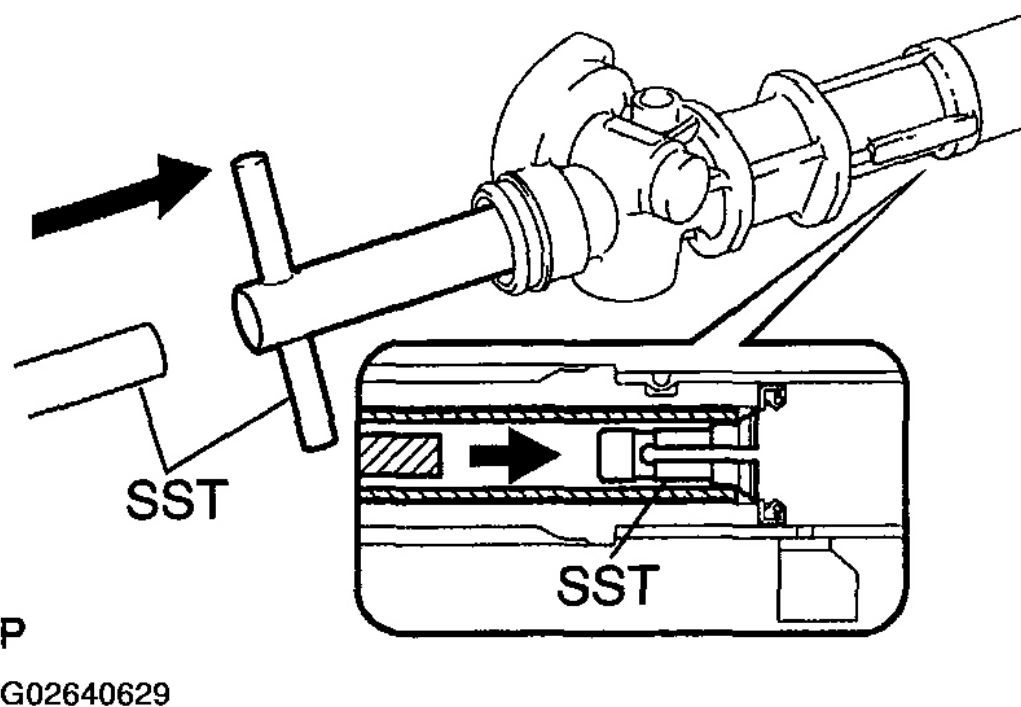


Fig. 93: Inserting SST Into Housing

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

- d. Secure SST (09612-07220), and pull SST (09612-07210) to place SST (09612-07130) in the housing.

SST 09612-70100 (09612-07130, 09612-07210, 09612-07220)

HINT:

Place SST on the chamfering position between the oil seal and rack housing.

- e. Remove the SST (09612-07210, 09612-07220).

SST 09612-07100 (09612-07210, 09612-07230)

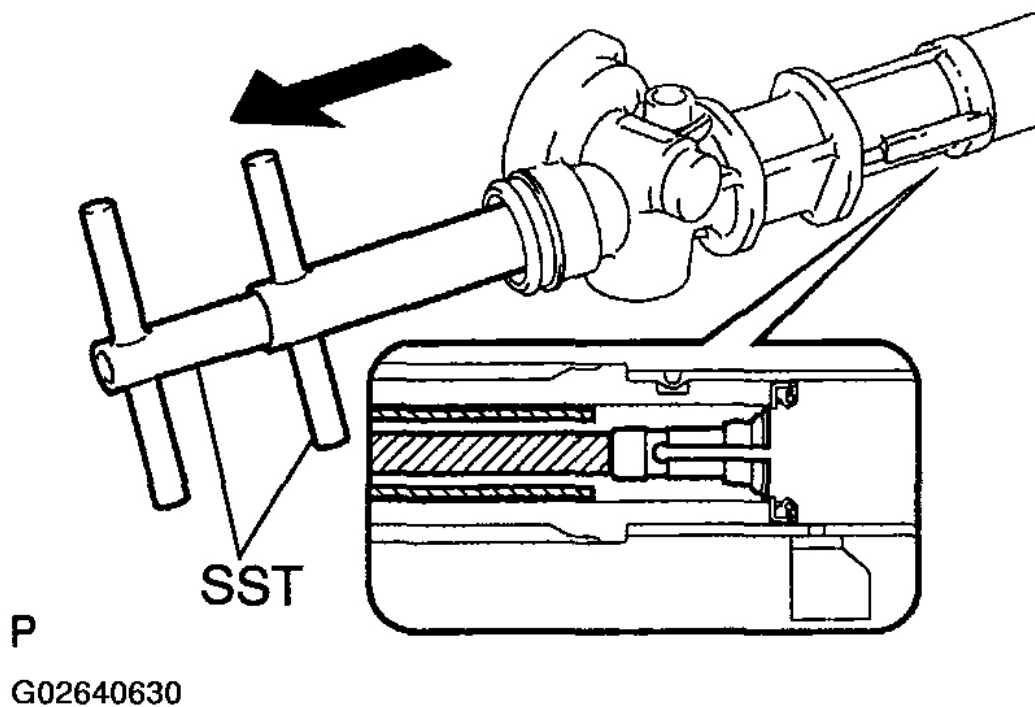


Fig. 94: Removing SST From Housing

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

- f. After installing SST (09612-07240) on SST (09612-07210), insert the tip of SST (09612-07230) in the service hole of SST (09612-07130).

SST 09612-70100 (09612-07130, 09612-07230, 09612-07240)

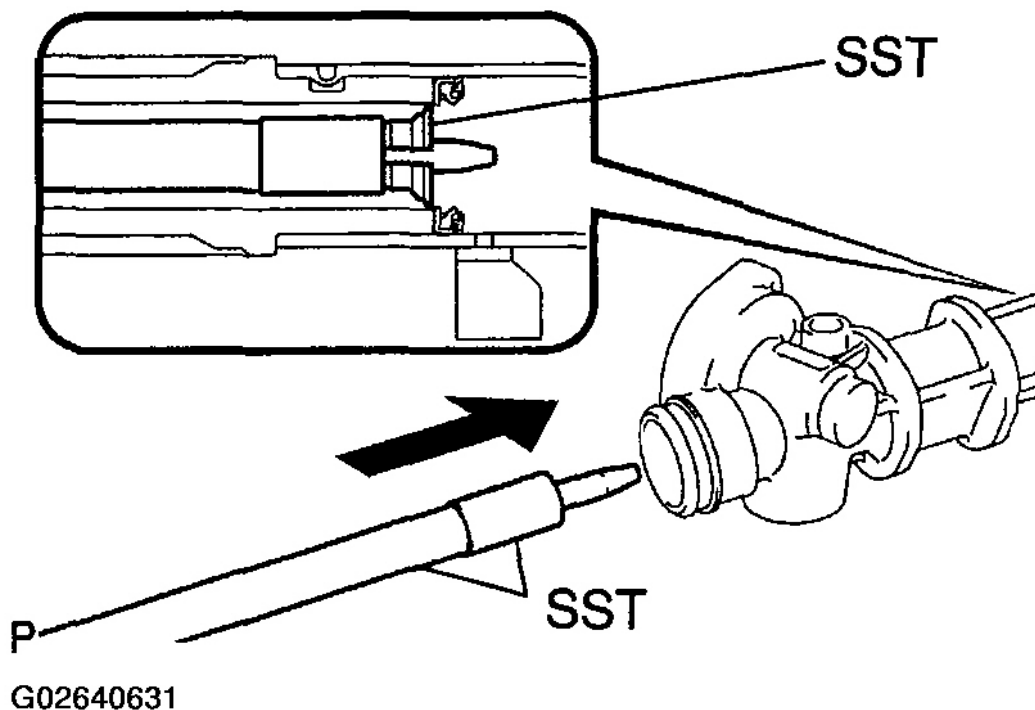


Fig. 95: Inserting Tip Of SST In Service Hole Of SST
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE:

- Before using them, apply a small dab of grease to the tip of SST (09612-07130).
- To prevent SST (09612-07130) from being damaged, be sure to install SST (09612-07240).
- Do not damage the inside of the rack housing.

g. Install SST (09951-07100) on SST (09612-07230) and remove the oil seal using a press.

SST 09612-70100 (09612-07130, 09612-07230, 09612-07240), 09950-70010 (09951-07100)

NOTE:

Do not damage the rack housing.

HINT:

Replace SST (09951-07100) with SST that is different in length in the set, if necessary.

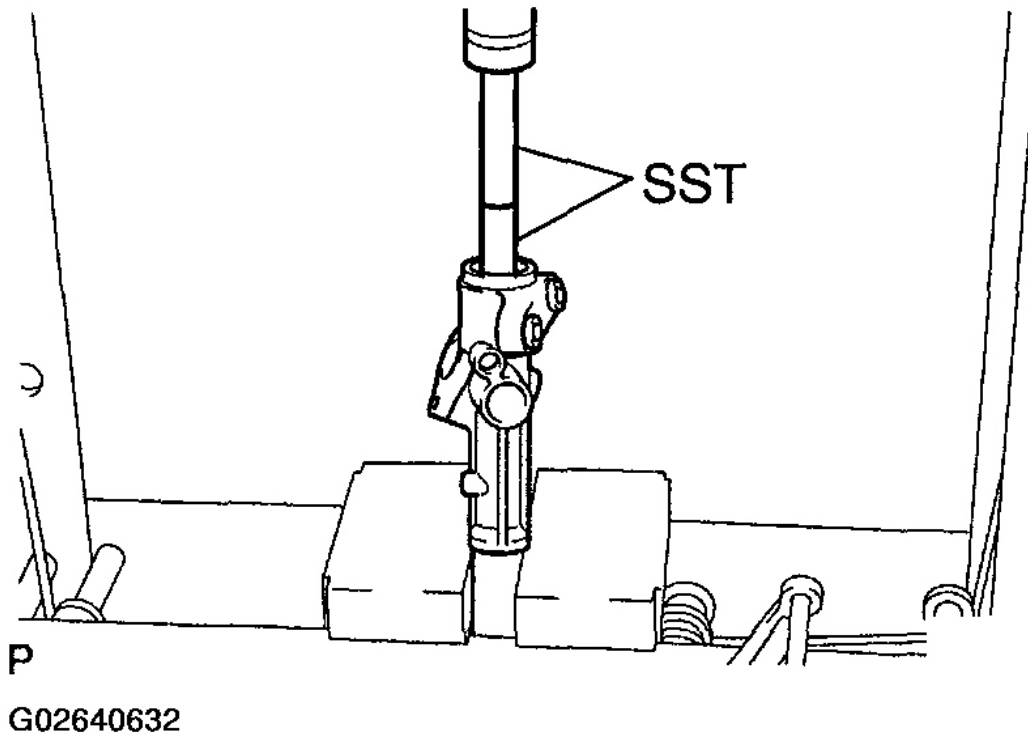


Fig. 96: Removing Oil Seal From Rack Housing
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION

NOTE: When using a vise, do not overtighten it.

1. INSPECT STEERING RACK

- a. Using a dial indicator, check the rack for runout, teeth wear and damage.

Maximum runout: 0.15 mm (0.006 in.)

- b. Check the back surface for wear and damage.

If necessary, replace the steering rack.

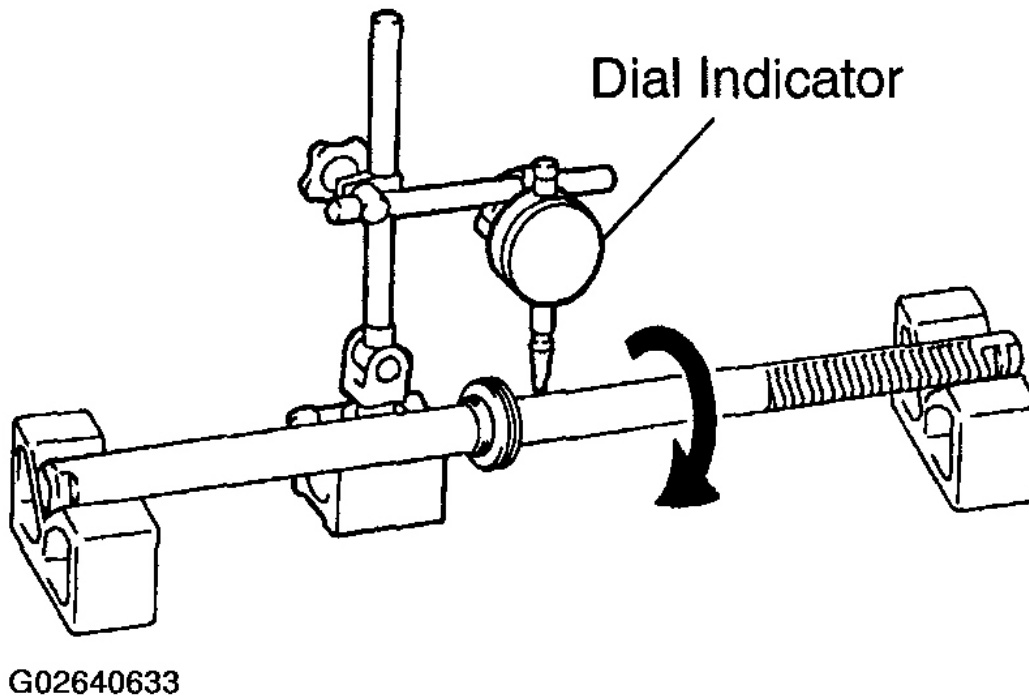


Fig. 97: Checking Rack For Runout

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

REPLACEMENT

NOTE: When using a vise, do not overtighten it.

1. IF NECESSARY, REPLACE OIL SEAL AND BEARING

- Using SST, press out the bearing and oil seal from the control valve housing.

SST 09950-60010 (09951-00250), 09950-70010 (09951-07100)

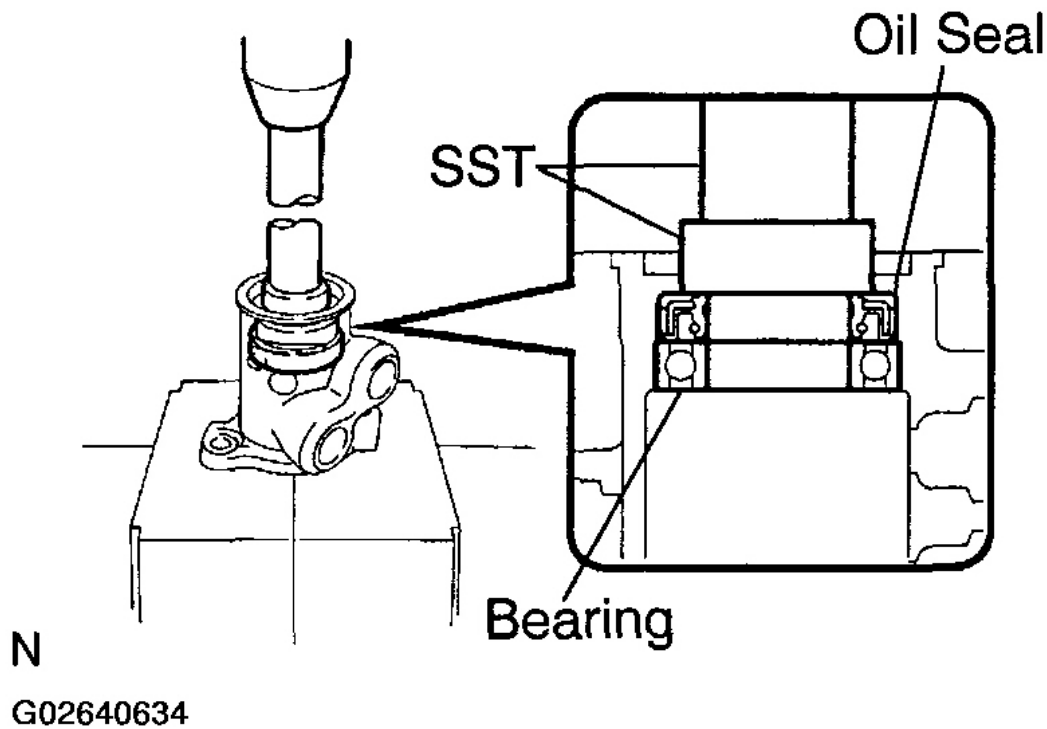


Fig. 98: Pressing Out Bearing From Control Valve Housing
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Coat a new oil seal lip with power steering fluid.
- c. Using SST, press in the oil seal.

SST 09950-60010 (09951-00180, 09951-00330, 09952-06010), 09950-70010 (09951-07150)

NOTE: Make sure that the oil seal is installed facing in the correct direction.

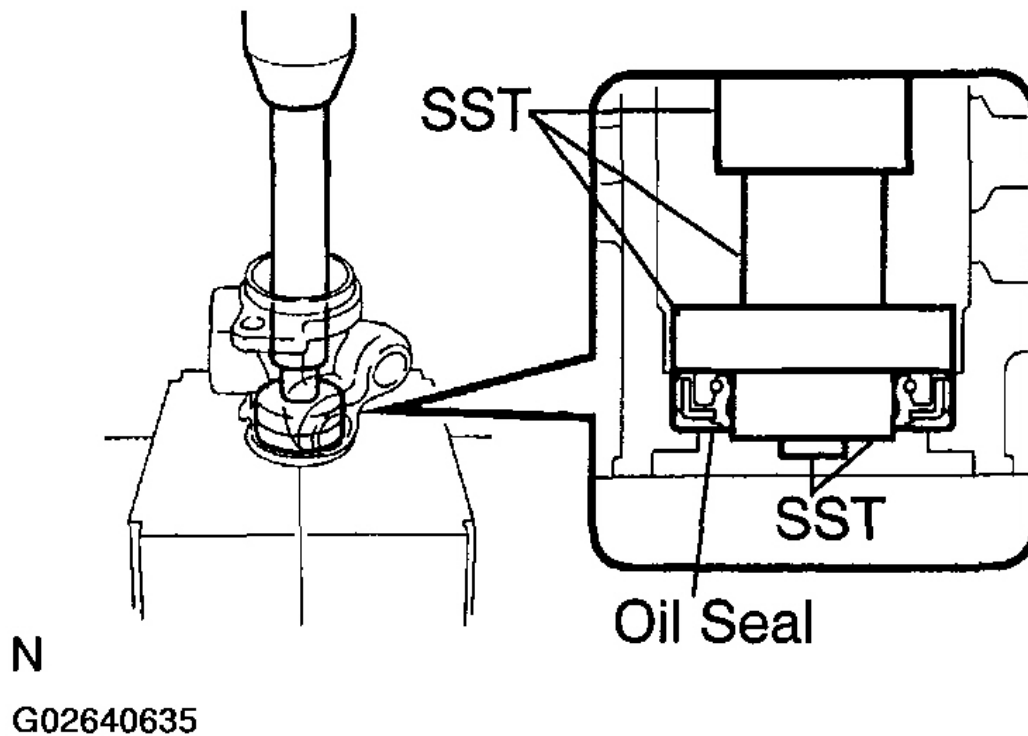


Fig. 99: Pressing In Oil Seal

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

- d. Coat a new bearing with molybdenum disulfide lithium base grease.
- e. Using SST, press in the bearing.

SST 09950-60100 (09951-00350), 09950-70010 (09951-07150)

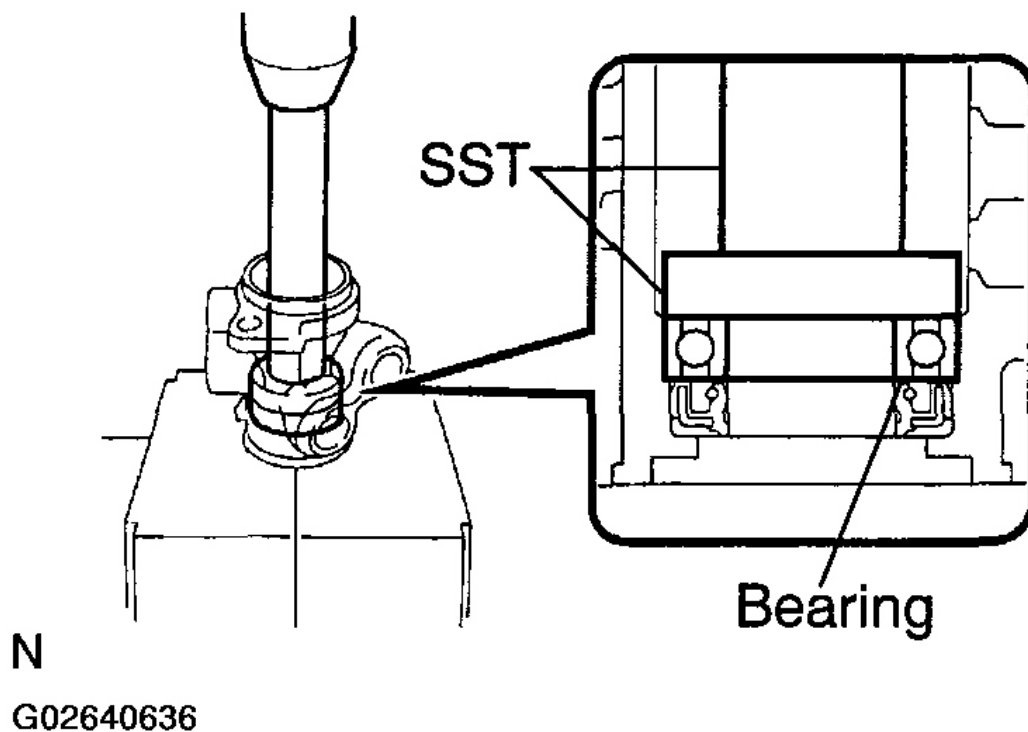


Fig. 100: Pressing In Bearing

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

2. IF NECESSARY, REPLACE OIL SEAL

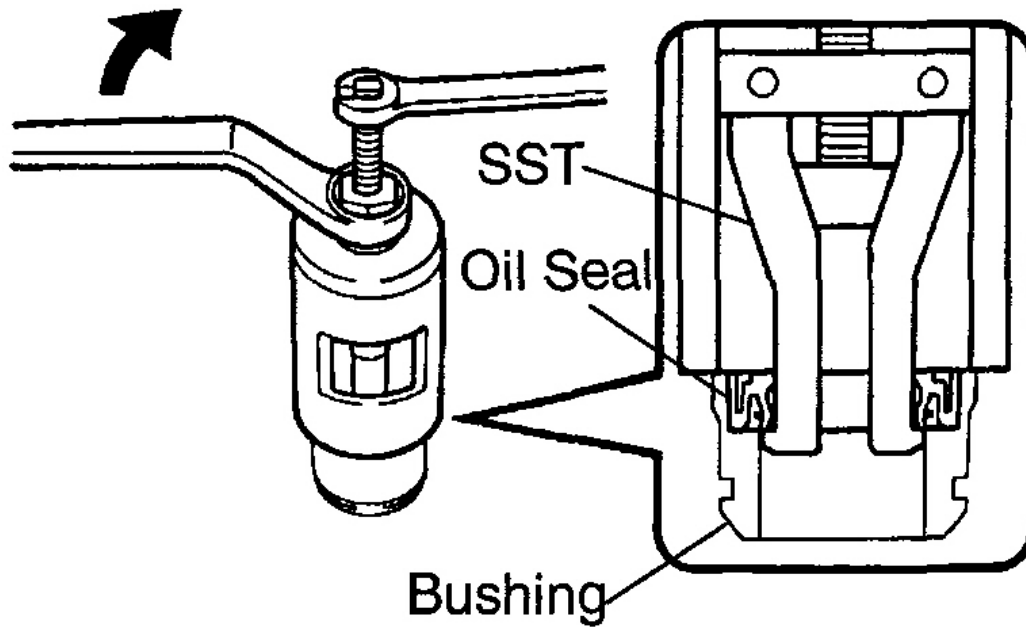
- a. Using SST, remove the oil seal from the bushing.

SST 09612-24014 (09613-22011)

NOTE: Be careful not to damage the bushing.

HINT:

As shown in the illustration, from the opposite side of SST confirm that its claws are firmly caught on the oil seal.



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Fig. 101: Removing Oil Seal From Bushing

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

- b. Coat a new oil seal lip with power steering fluid.
- c. Using SST, press in the oil seal.

SST 09950-60010 (09951-00210, 09951-00340, 09952-06010), 09950-70010 (09951-07100)

NOTE: Make sure that the oil seal is installed facing in the correct direction.

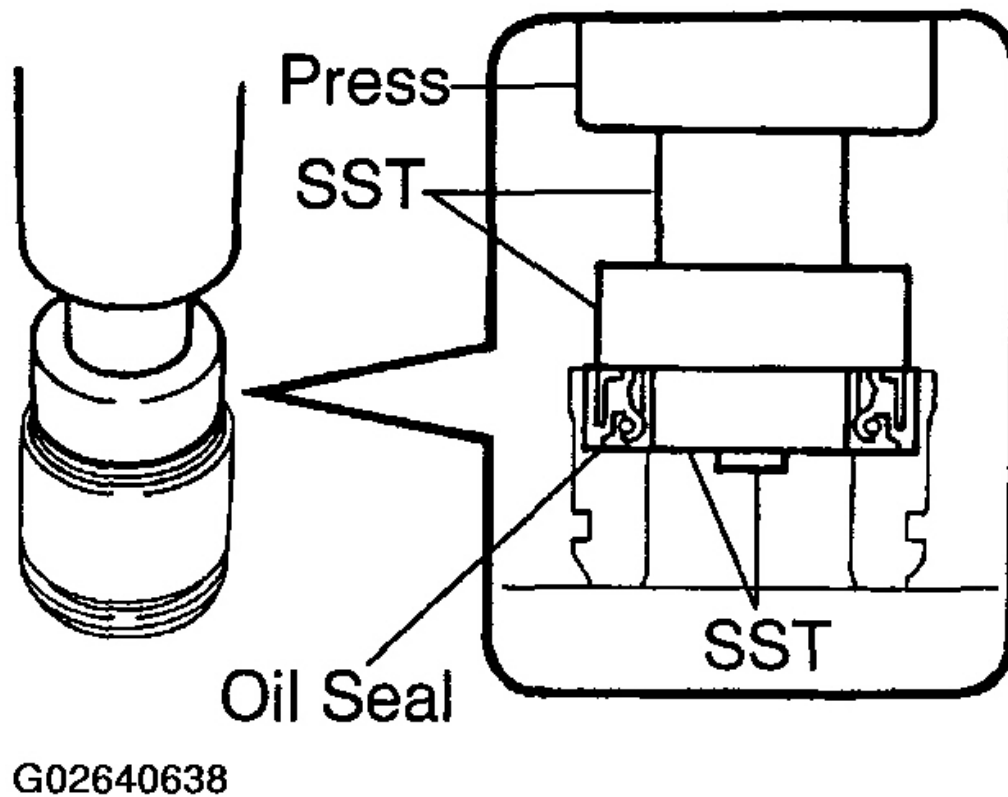
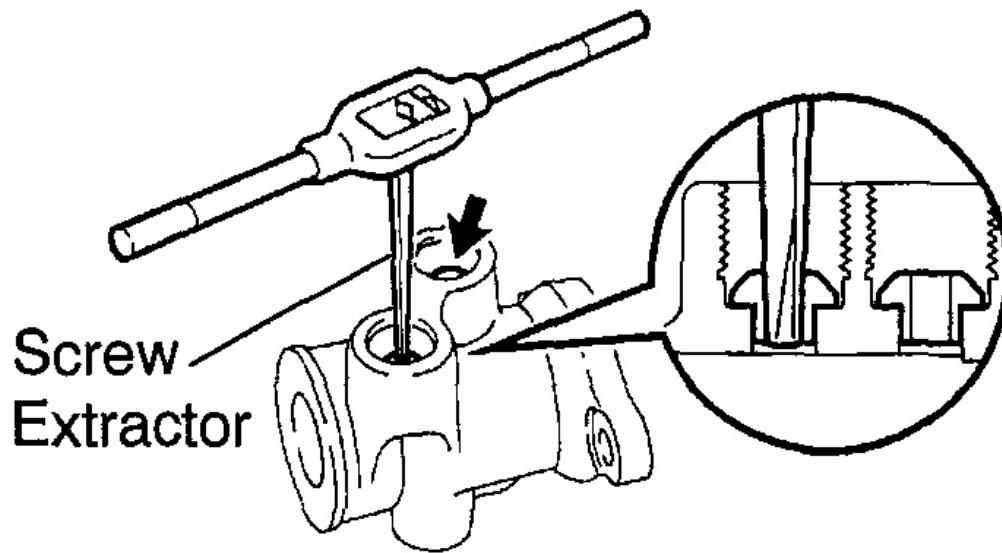


Fig. 102: Pressing In Oil Seal

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

3. IF NECESSARY, REPLACE 2 UNION SEATS

- a. Using a screw extractor, remove the union seat from the control valve housing.



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Fig. 103: Removing Union Seat From Control Valve Housing
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Using a plastic hammer and an extension bar, lightly tap in a new union seat.
- c. Employ the same manner described above to the other side.

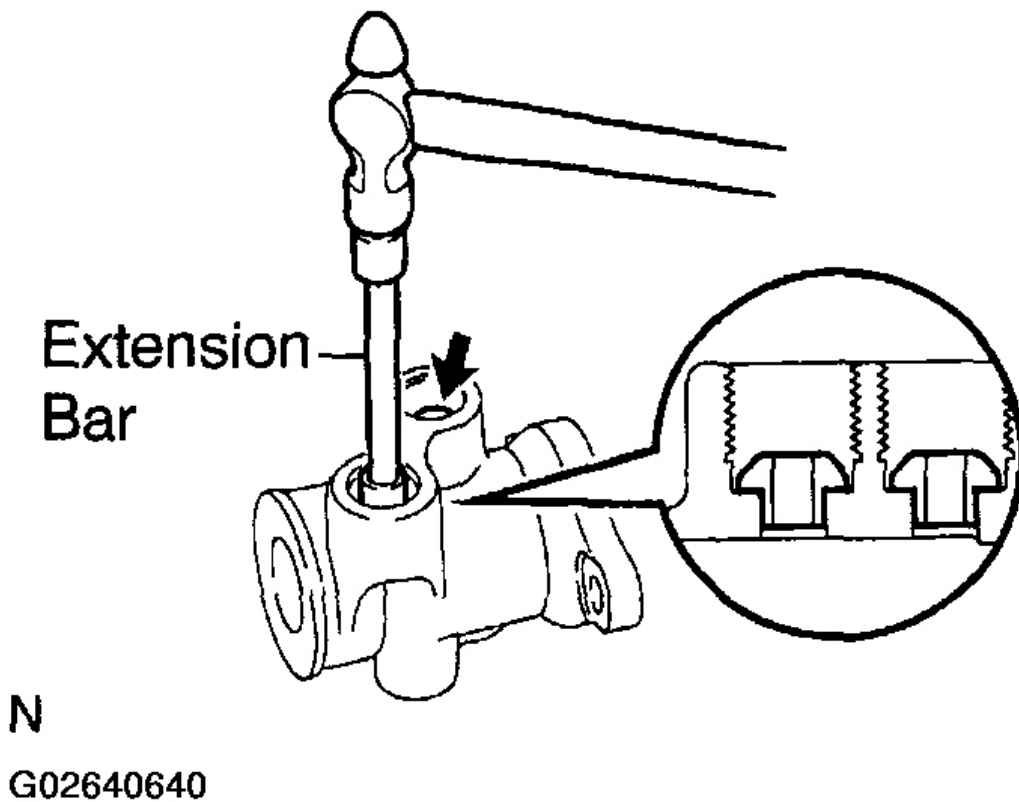


Fig. 104: Installing Union Seat

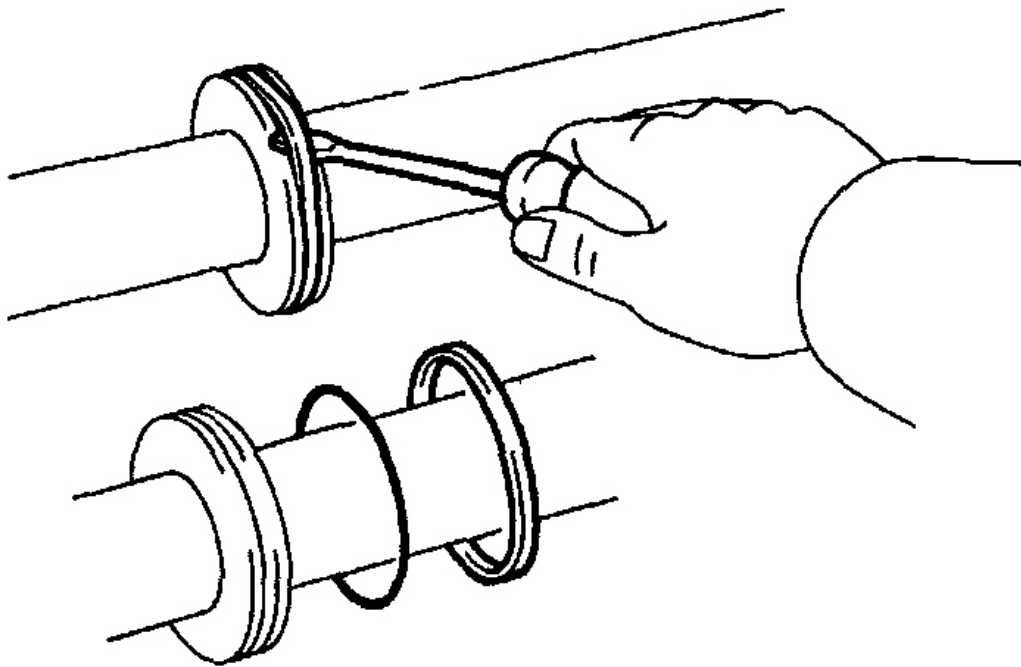
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. IF NECESSARY, REPLACE TEFLON RING AND O-RING

- a. Using a screwdriver, remove the teflon ring and O-ring from the steering rack.

NOTE: Be careful not to damage the groove for the teflon ring.

- b. Coat a new O-ring with power steering fluid and install it to the steering rack.

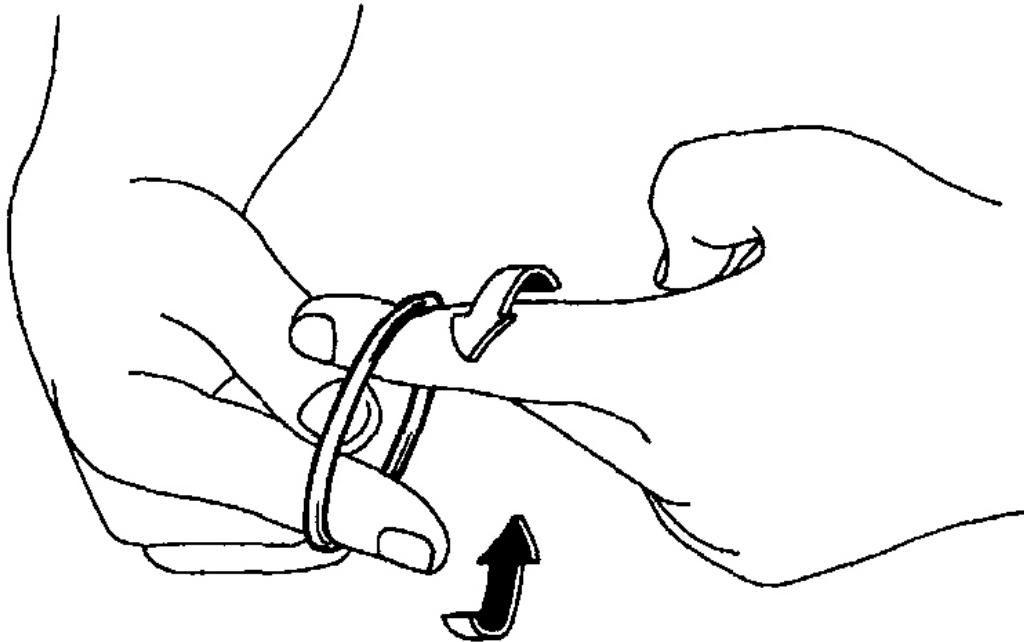


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Fig. 105: Removing Teflon Ring & O-Ring From Steering Rack
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Expand a new teflon ring with your fingers.

NOTE: Be careful not to overexpand the teflon ring.

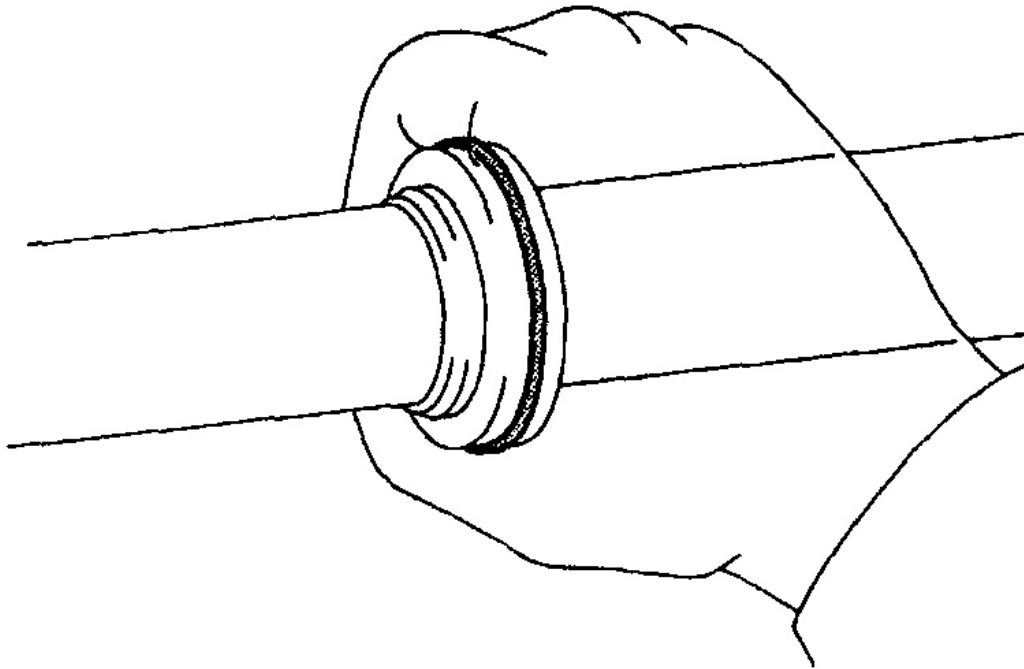


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Fig. 106: Expanding Teflon Ring

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

- d. Coat the teflon ring with power steering fluid.
- e. Install the teflon ring to the steering rack and settle it down with your fingers.



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Fig. 107: Installing Teflon Ring To Steering Rack
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

5. IF NECESSARY, REPLACE 4 TEFLON RINGS

- a. Using a screwdriver, remove the 4 teflon rings from the control valve assembly.

HINT:

Tape the screwdriver tip before use.

NOTE: Be careful not to damage the grooves for the teflon rings.

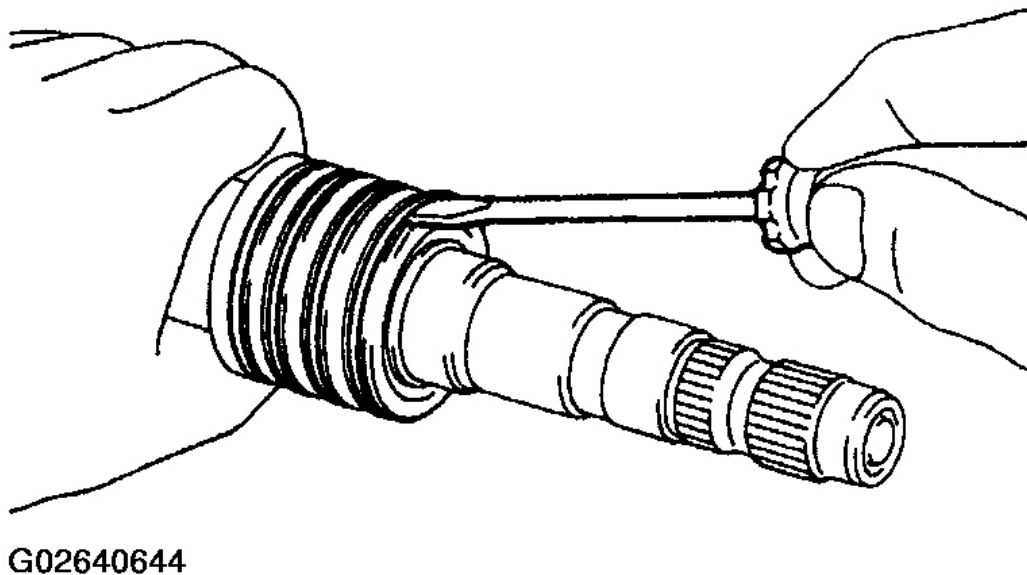


Fig. 108: Installing Teflon Rings To Control Valve Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Expand 4 new teflon rings with your fingers.

NOTE: Be careful not to overexpand the teflon ring.

- c. Coat the teflon rings with power steering fluid.
- d. Install the teflon rings to the control valve assembly and settle them down with your fingers.
- e. Carefully slide the tapered end of SST over the teflon rings until they fit to the control valve assembly.

SST 09631-20081

NOTE: Be careful not to damage the teflon rings.

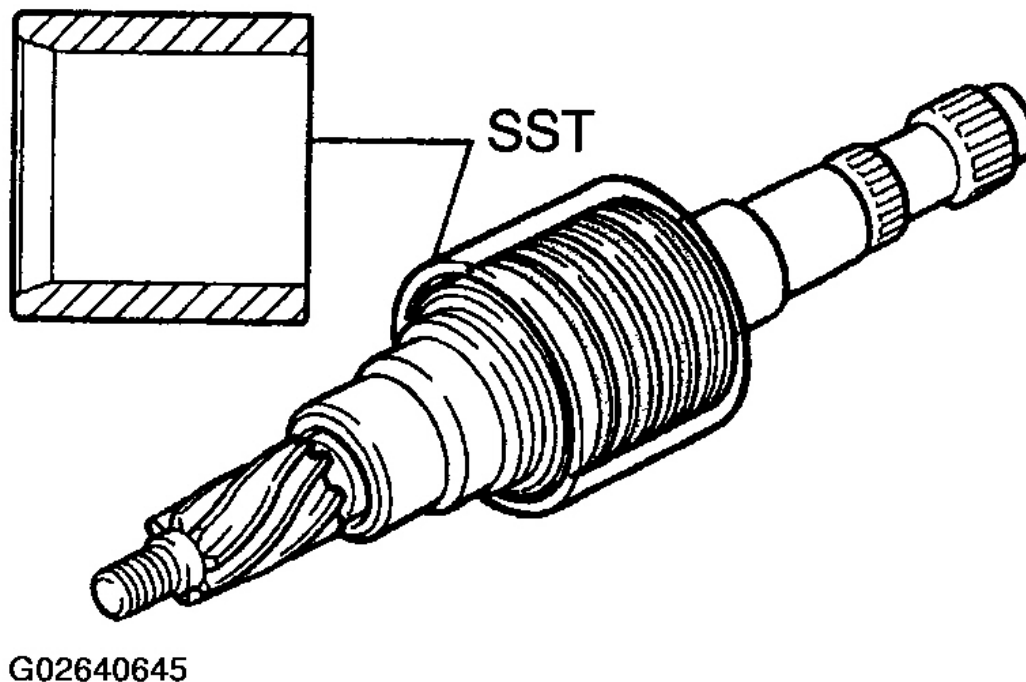


Fig. 109: Installing SST Over Teflon Rings
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REASSEMBLY

1. INSTALL POWER STEERING CYLINDER TUBE OIL SEAL

- Apply power steering fluid to a new oil seal, and install the oil seal on the rack housing at an angle.

NOTE: Install the oil seal in the correct direction.

HINT:

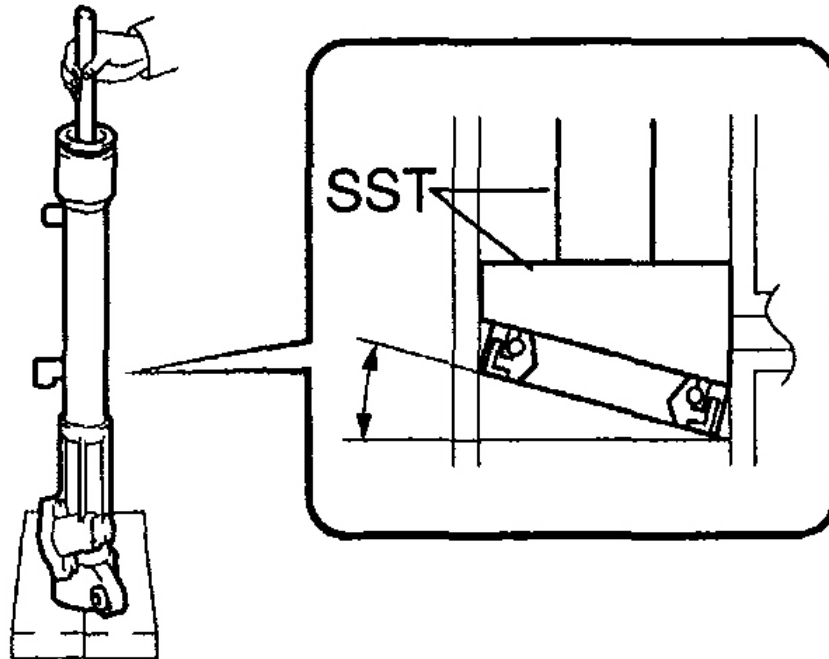
Install the oil seal so that the port faces downward with approximately 15 degrees.

- Using SST, push in the oil seal by hand until it passes through the 2 ports.

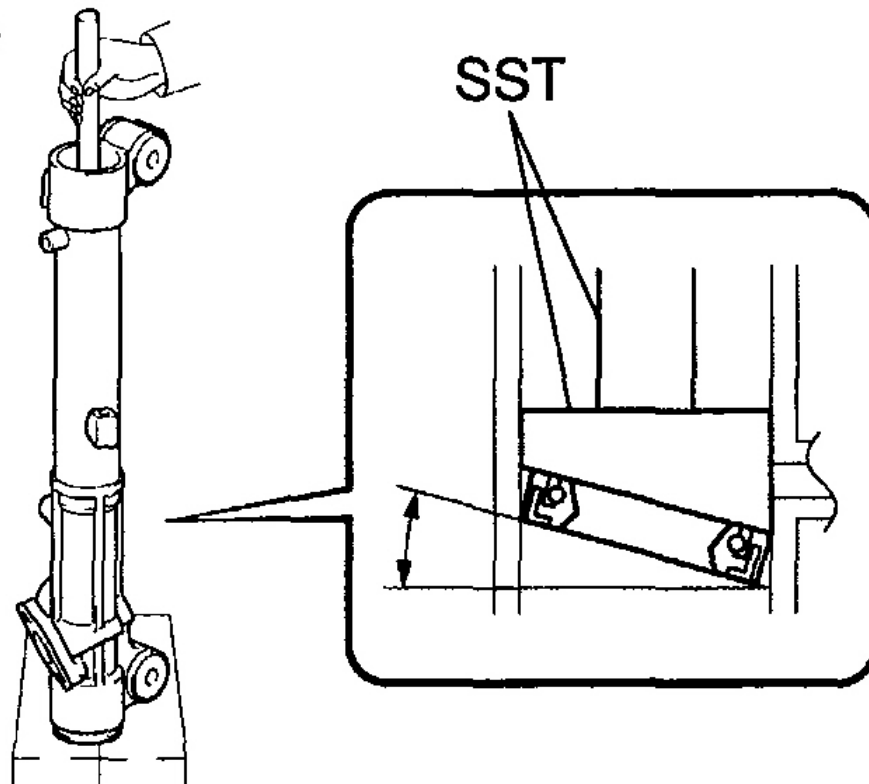
SST 09631-00180, 09950-70010 (09951-07360)

NOTE: Do not turn SST when inserting the oil seal.

2WD



4WD



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2005 STEERING Steering - RAV4

Fig. 110: Installing Oil Seal On Rack Housing

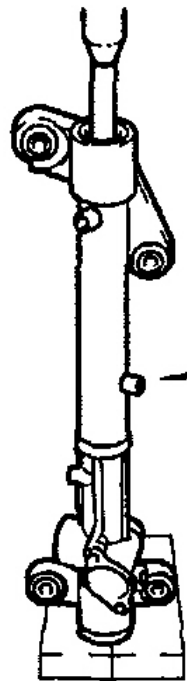
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. After the oil seal has passed through the ports, push in the oil seal by hand until it becomes level, using SST.

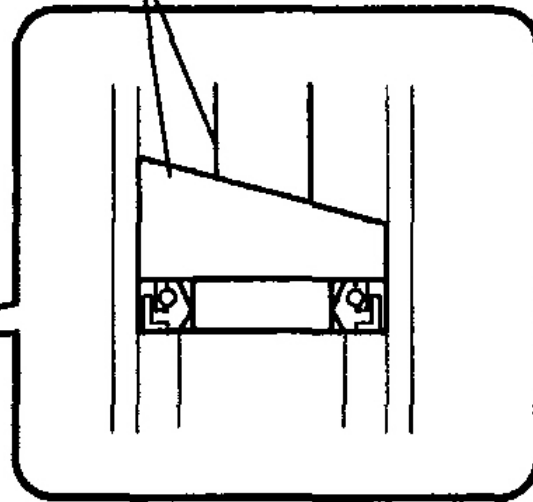
SST 09950-60010 (09951-00490), 09950-70010 (09951-07360)

NOTE: When SST is set, do not damage the inside surface of the rack housing.

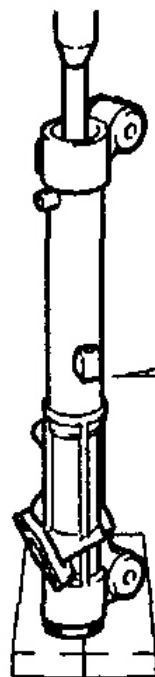
2WD



SST



4WD



SST

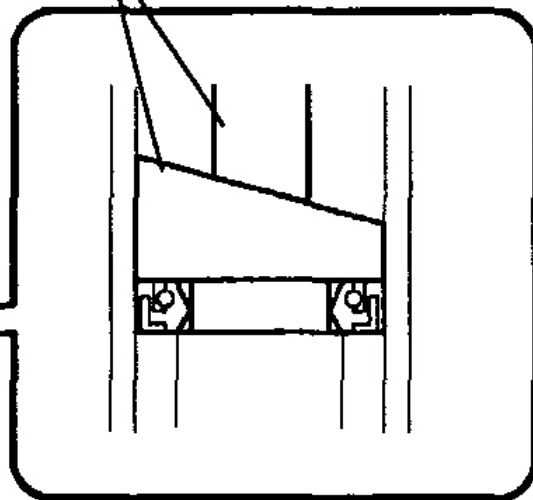


Fig. 111: Installing Oil Seal

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

- d. After the oil seal has become level, using SST and press, install the oil seal.

SST 09950-60010 (09951-00490), 09950-70010 (09951-07360)

- e. Coat new oil seal lip with power steering fluid.
- f. Using needle nose pliers, install the bush to the rack housing.

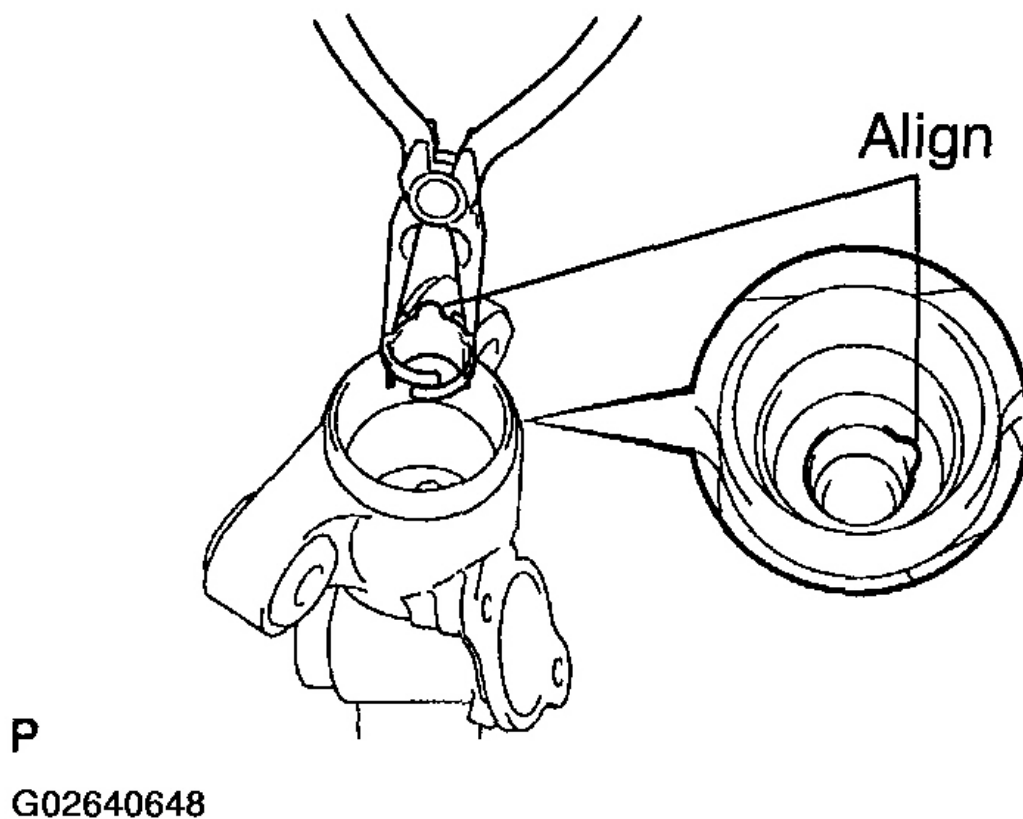


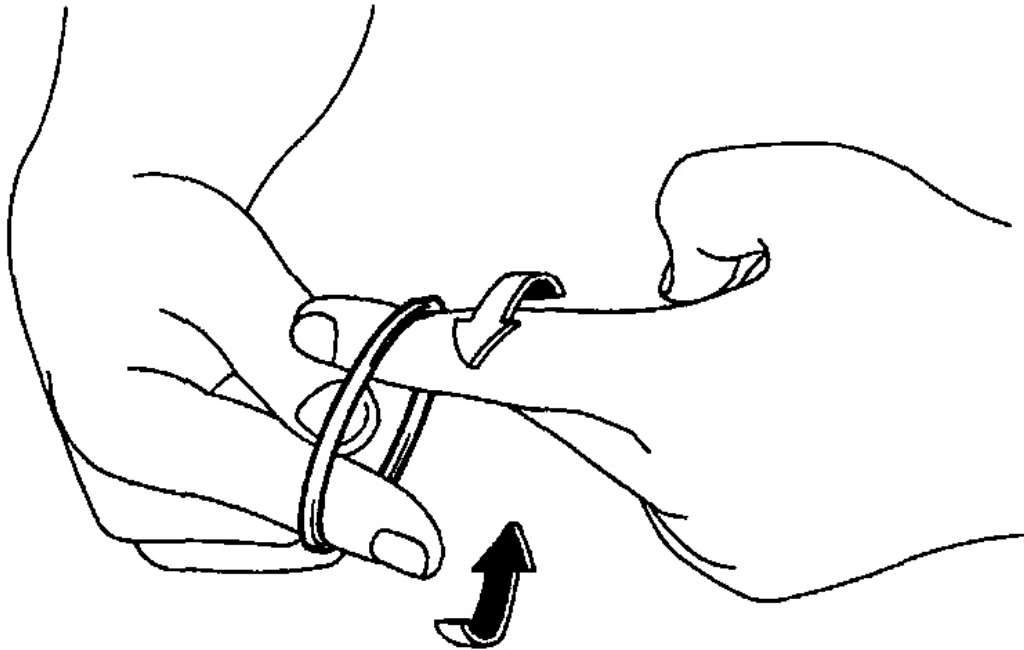
Fig. 112: Installing Bush To Rack Housing

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

2. INSTALL POWER STEERING RACK

- a. Coat a new power piston O-ring with power steering fluid and install it to the steering rack.
- b. Coat a new power piston oil seal with power steering fluid.
- c. Expand the power piston oil seal with your fingers.

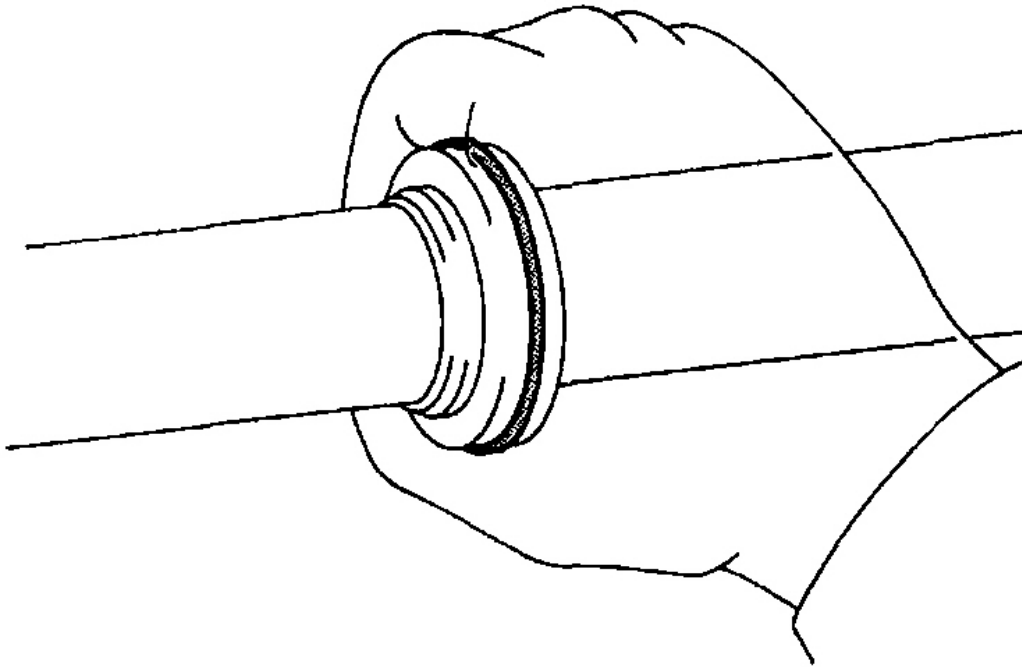
NOTE: Be careful not to over expand the power piston oil seal.



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Fig. 113: Expanding Power Piston Oil Seal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- d. Install the power piston oil seal to the steering rack, and settle it down with your fingers.



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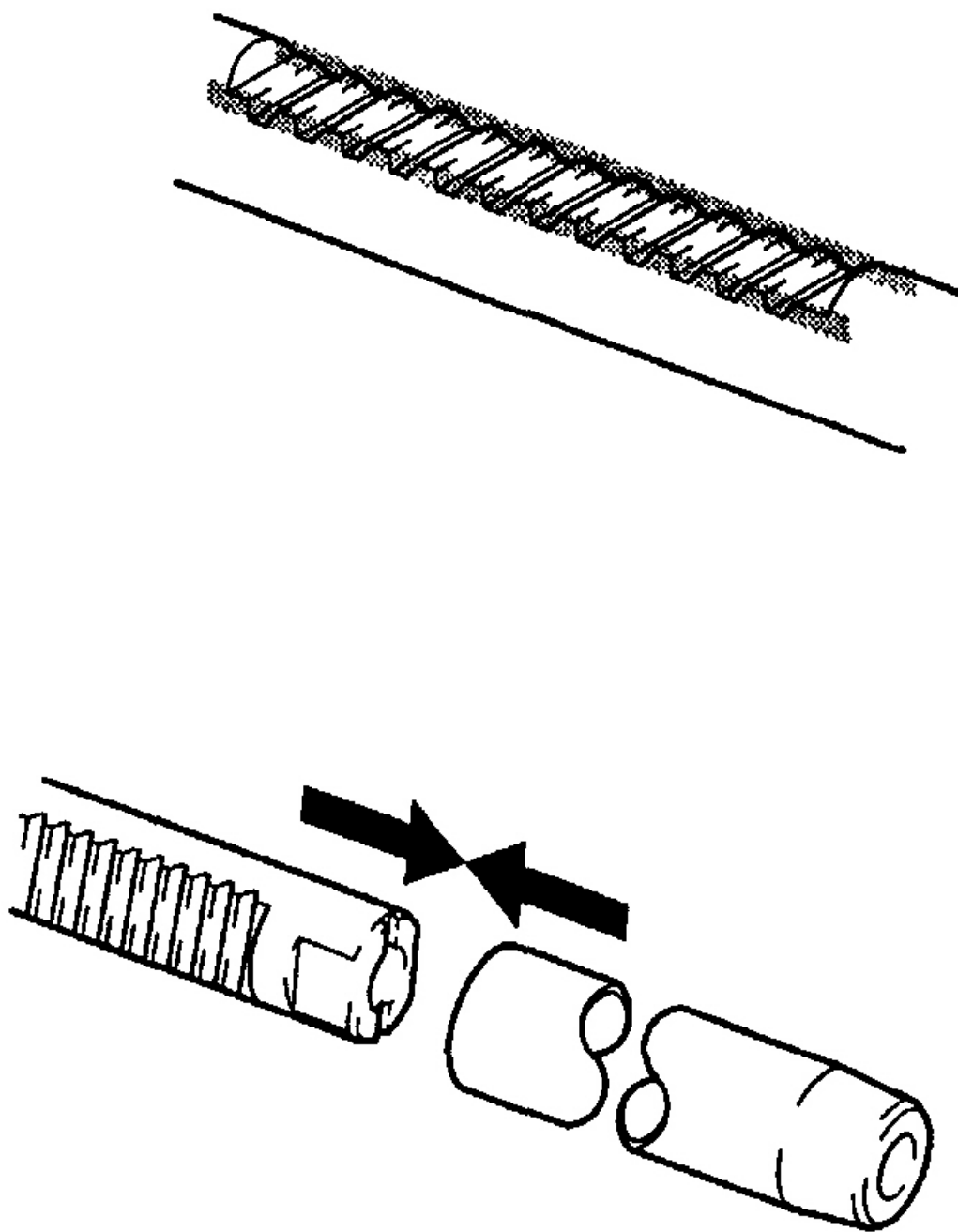
Fig. 114: Installing Power Piston Oil Seal To Steering Rack
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- e. Install SST to the steering rack.

SST 09631-20102

HINT:

If necessary, scrape the burrs off the steering rack teeth end and burnish.



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Fig. 115: Installing SST To Steering Rack
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- f. Coat the SST with power steering fluid.
- g. Install the steering rack into the rack housing.
- h. Remove the SST.

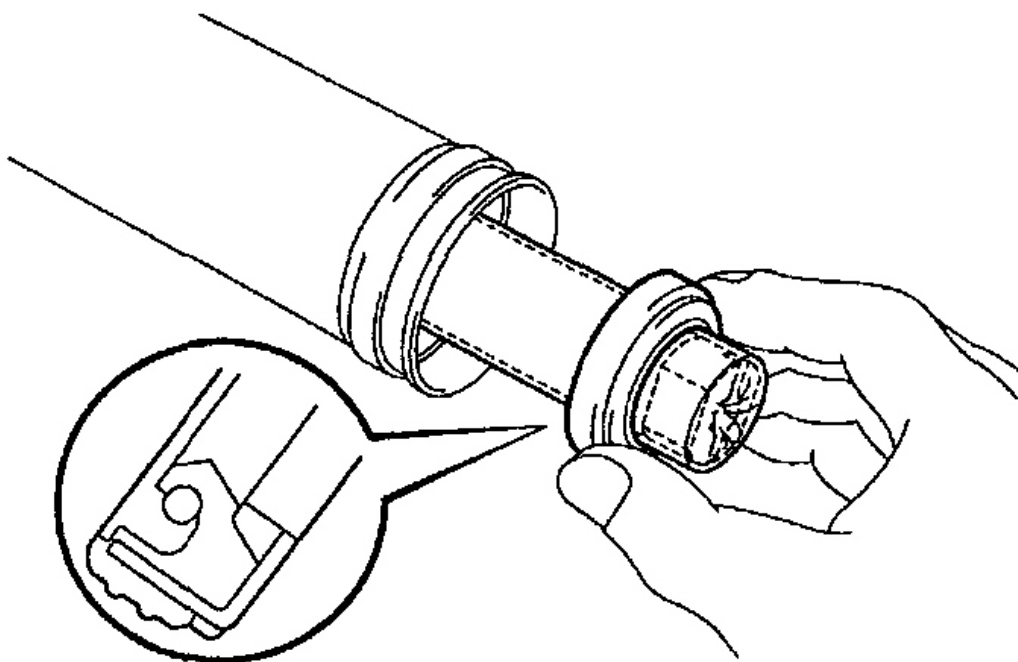
SST 09631-20102

3. INSTALL CYLINDER END STOPPER

- a. To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.
- b. Coat a new cylinder end stopper oil seal lip with power steering fluid.
- c. Install the cylinder end stopper oil seal by pushing it into the rack housing without tilting.

NOTE:

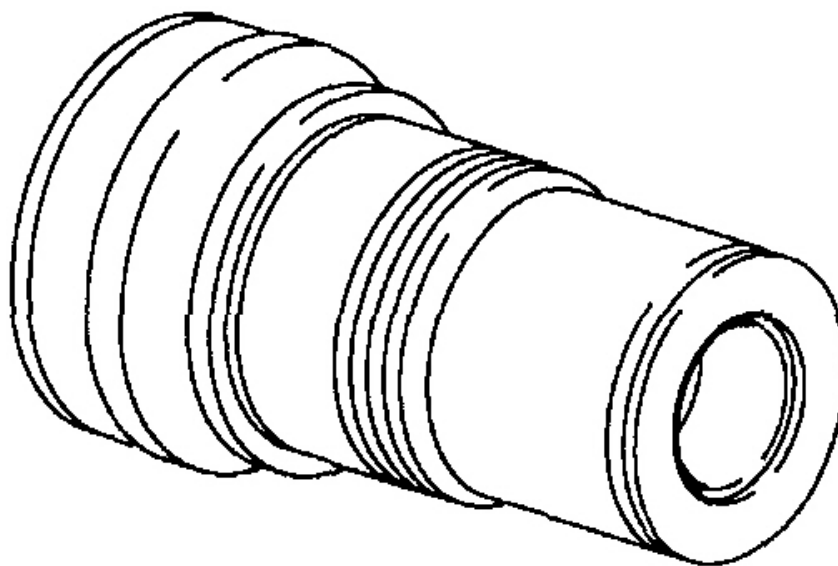
- Make sure that the oil seal is installed facing in the correct direction.
- Be careful not to damage the oil seal lip.



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Fig. 116: Installing Cylinder End Stopper Oil Seal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- d. Coat a new O-ring with power steering fluid.
- e. Install the O-ring to the cylinder end stopper.
- f. Install a new rack guide bush to the cylinder end stopper.
- g. Apply molybdenum disulfide lithium base grease to the inside of the bush.



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Fig. 117: Applying Molybdenum Disulfide Lithium Base Grease To Inside Of Bush
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

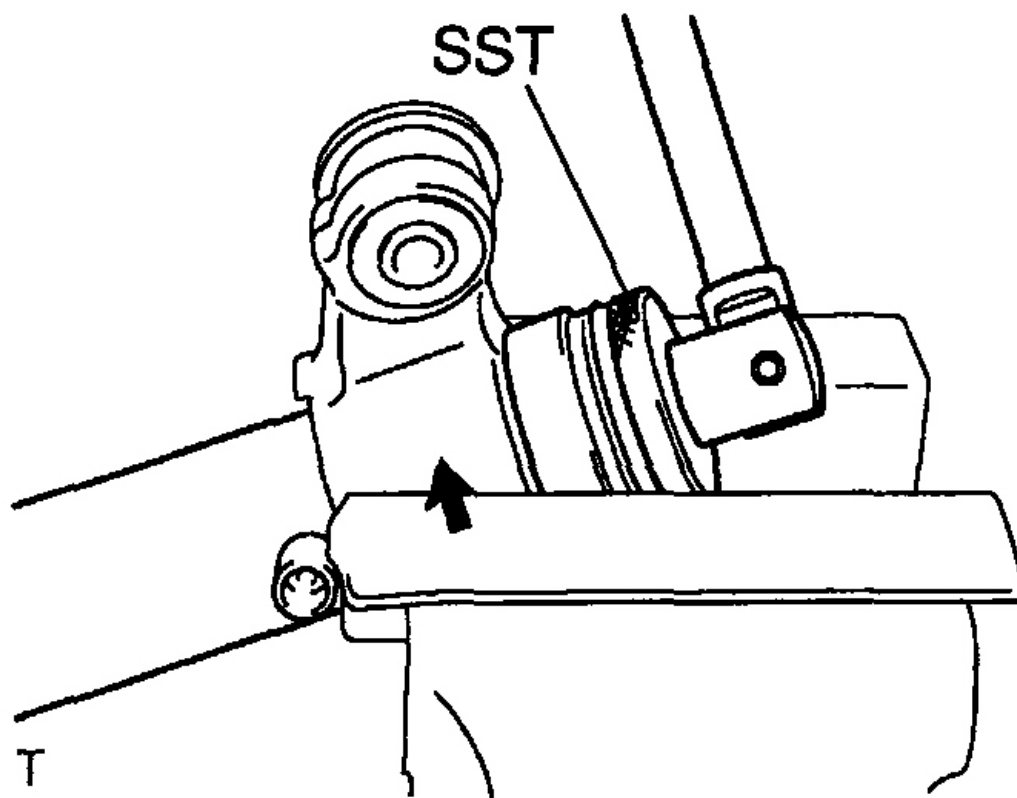
- h. Place rack housing in vise.

NOTE: Hold the arrow part in the illustration in a vise.

- i. Using SST, install the cylinder end stopper to rack housing.

SST 09631-20120

Torque: 60 N.m (612 kgf.cm, 44 ft.lbf)



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Fig. 118: Installing Cylinder End Stopper To Rack Housing
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. INSPECT RACK & PINION POWER STEERING GEAR ASSEMBLY

- a. Install SST to the rack housing.

SST 09631-12071 (09633-00010)

- b. Apply vacuum of 53 kPa (400 mm Hg, 15.75 in. Hg) for about 30 seconds.
- c. Check that there is no change in the vacuum.

If there is a change in the vacuum, check the installation of the oil seals.

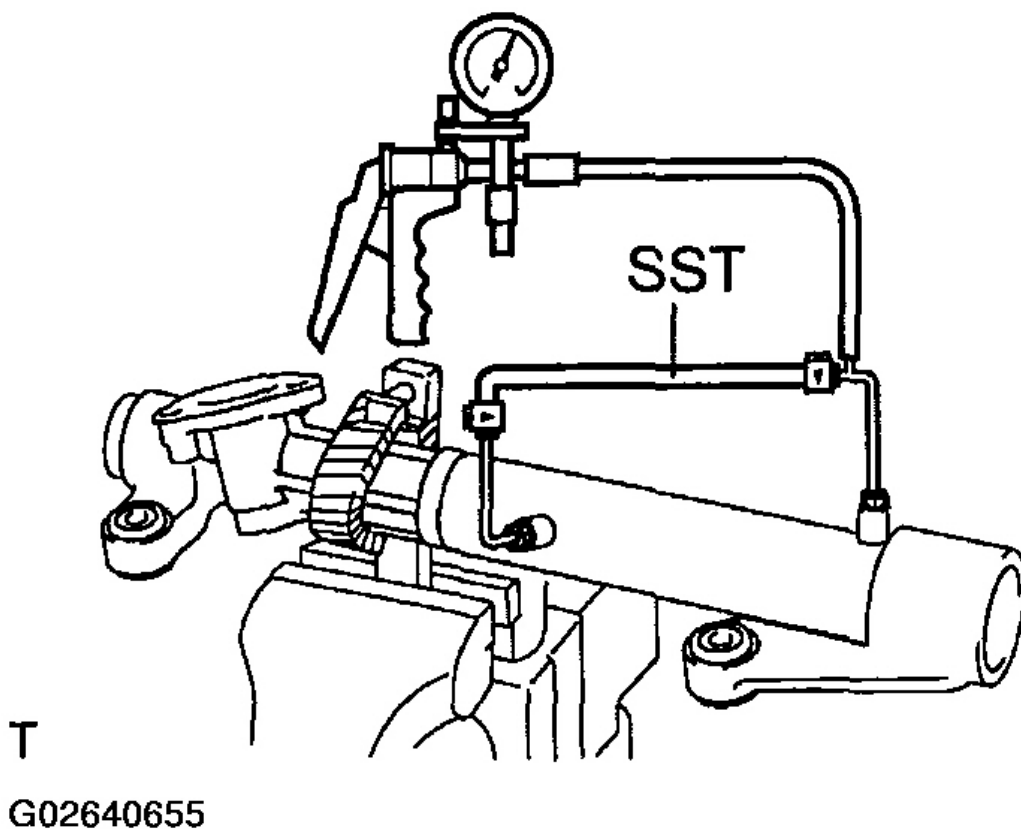


Fig. 119: Inspecting Rack & Pinion Power Steering Gear Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

5. INSTALL CONTROL VALVE ASSEMBLY

- a. Coat the teflon rings and oil seal lip with power steering fluid.
- b. Coat the bearing with molybdenum disulfide lithium base grease.
- c. To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.
- d. Using SST, press the control valve assembly into the control valve housing.

SST 09612-22011

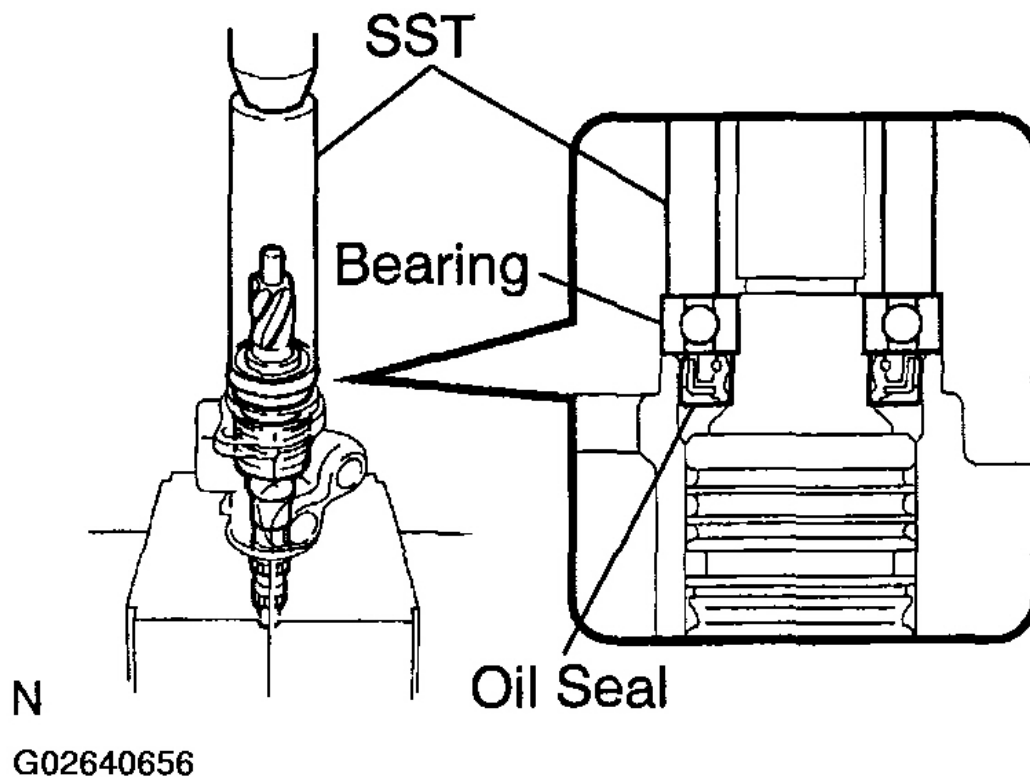


Fig. 120: Pressing Control Valve Assembly Into Control Valve Housing
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE: Be careful not to damage the teflon rings and oil seal lips.

6. INSTALL CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

- Install a new gasket.
- Align the matchmarks on the control valve housing and rack housing.
- Push into the control valve housing with control valve assembly.
- Install the 2 bolts.

Torque: 18 N.m (185 kgf.cm, 13 ft.lbf)

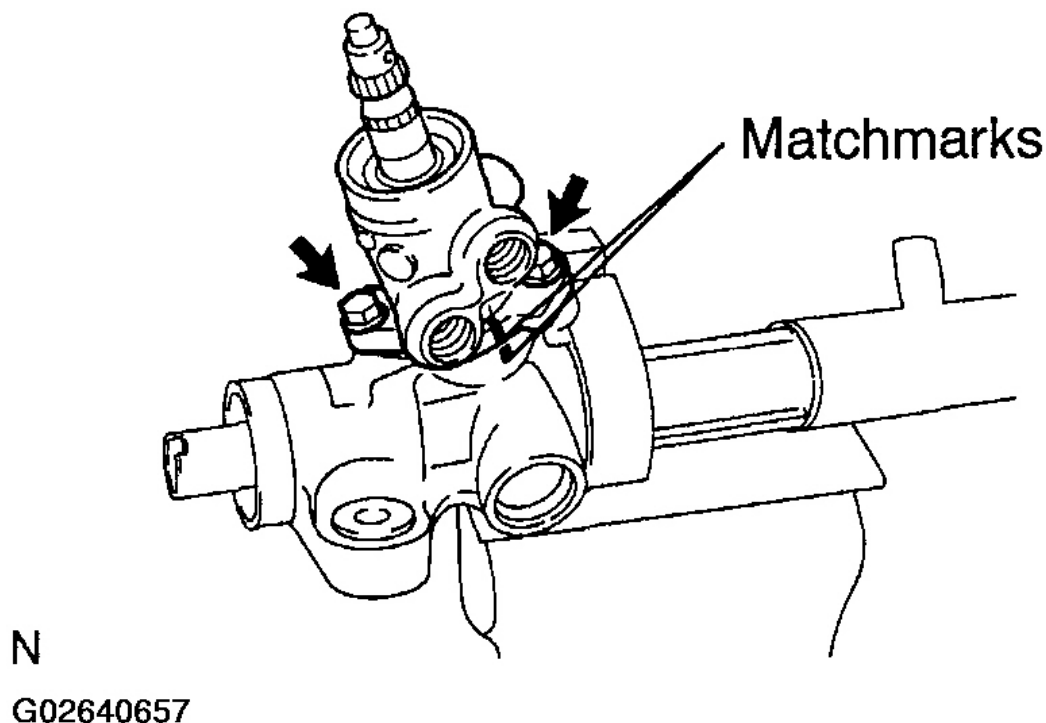


Fig. 121: Aligning Matchmarks On Control Valve Housing & Rack Housing
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

7. INSTALL RACK GUIDE SUB-ASSEMBLY

- Apply molybdenum lithium base grease to the contact surface of the power steering rack and of the rack guide.
- Install the rack guide and compression spring to the rack housing.
- Apply sealant to 2 or 3 threads of the rack guide spring cap.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- Temporarily install the rack guide spring cap.

8. ADJUST TOTAL PRELOAD

- To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH rack ends.
- Using a hexagon wrench (24 mm), torque the rack guide spring cap.

Torque: 83 N.m (851 kgf.cm, 62 ft.lbf)

- Using a hexagon wrench (19 mm), return the rack guide spring cap 12°

2005 Toyota RAV4

2005 STEERING Steering - RAV4

- d. Using SST, turn the control valve shaft right and left 1 or 2 times.
- e. Using a hexagon wrench (19 mm), loosen the rack guide spring cap until the rack guide spring is not functioning.
- f. Using SST, a torque wrench hexagon wrench (19 mm), tighten the rack guide spring cap until the preload is within the specification.

SST 09616-00010

Preload (turning): 1.0 to 1.6 N.m (10 to 17 kgf.cm, 9 to 15 in.lbf)

9. INSTALL STEERING RACK END SUB-ASSEMBLY

- a. Install 2 new claw washers, and temporally install the rack ends. See **Fig. 122**.

HINT:

Align the claws of the claw washer with the steering rack grooves.

- b. Apply MP grease to the rack end ball joint.
- c. Using 2 SST, install the rack end sub-assy (RH side).

SST 09922-10010

Torque: 72 N.m (736 kgf.cm, 53 ft.lbf)

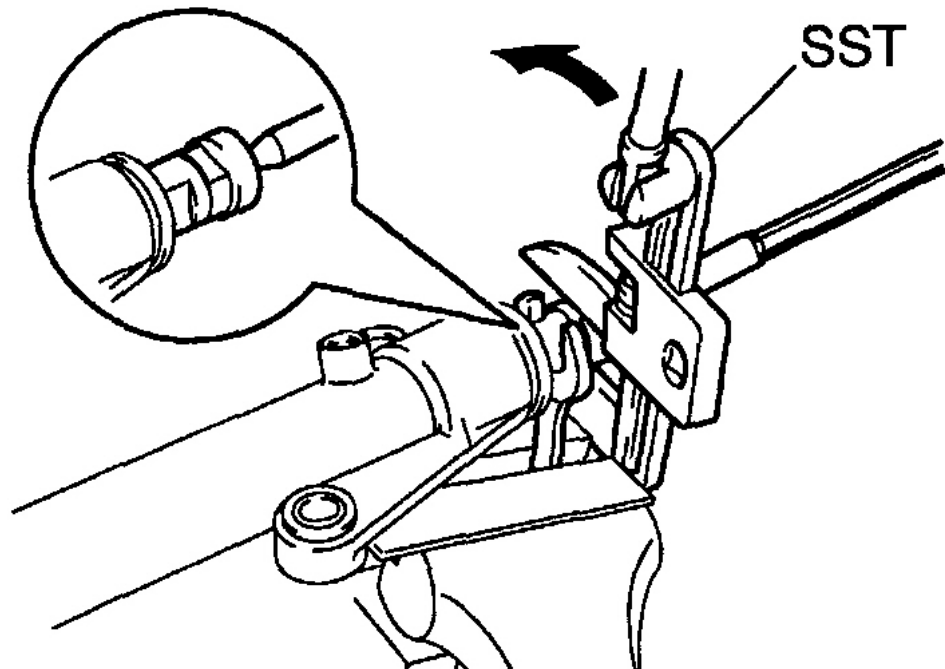
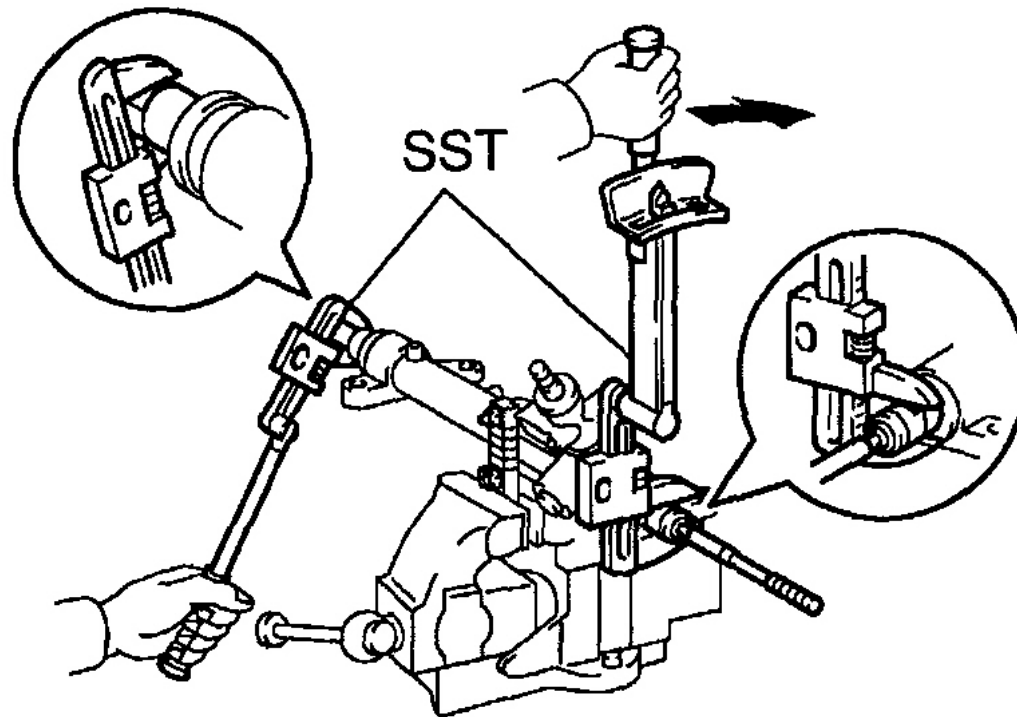
NOTE: Use SST 09922-10010 in the direction shown in the illustration.

HINT:

- Using SST, hold the rack and install the rack end sub-assy.
 - Use a torque wrench with a fulcrum length of 425 mm (16.73 in.).
- d. Using SST and a spanner (22 mm), tighten the rack end (LH side).

Torque: 72 N.m (736 kgf.cm, 53 ft.lbf)

NOTE: Use SST 09922-10010 in the direction shown in the illustration.



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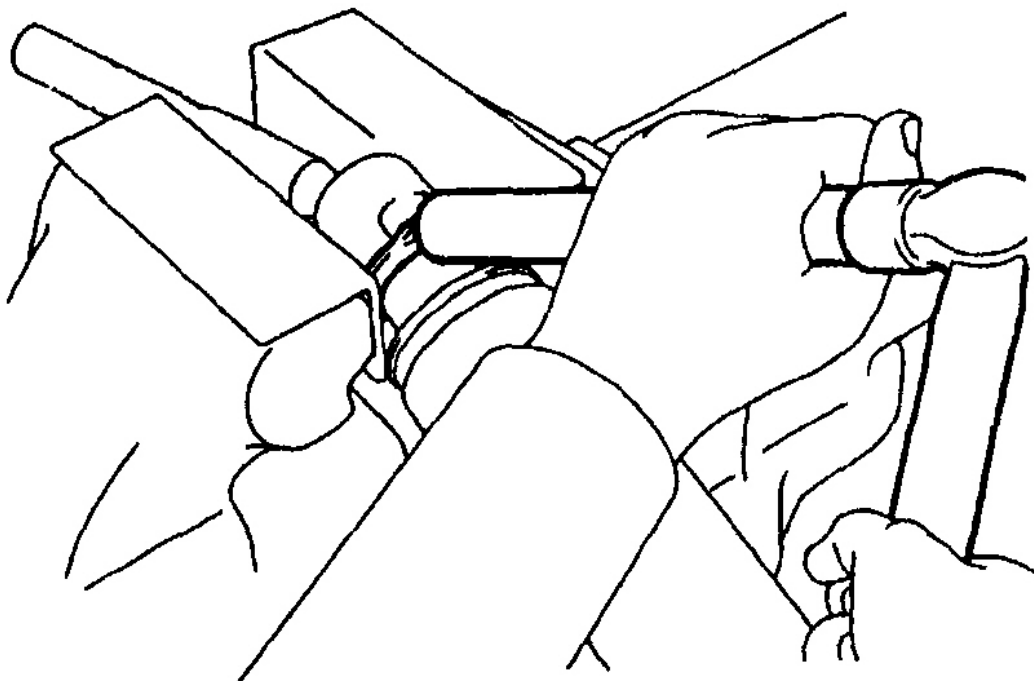
Fig. 122: Tightening Rack End

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

HINT:

- Using SST, hold the rack and install the rack end.
 - Use a torque wrench with a fulcrum length of 425 mm (16.73 in.).
- e. Using a brass bar and a hammer, stake the 2 claw washers.

NOTE: **Avoid any impact to the steering rack.**



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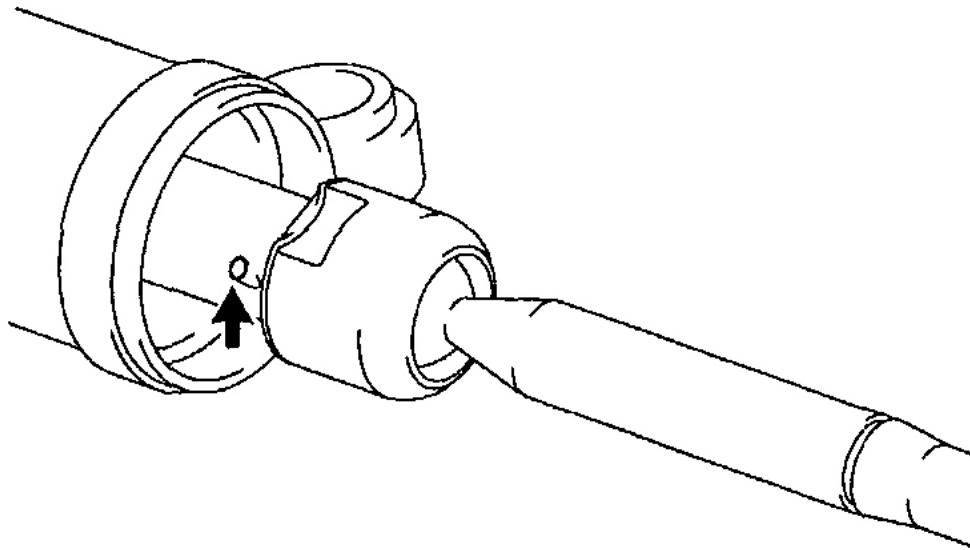
Fig. 123: Staking Claw Washers

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

- f. Ensure that the steering rack hole is not clogged with grease.

HINT:

If the hole is clogged, the pressure inside the boot will change after it is assembled and steering wheel is turned.



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Fig. 124: Identifying Rack Hole

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

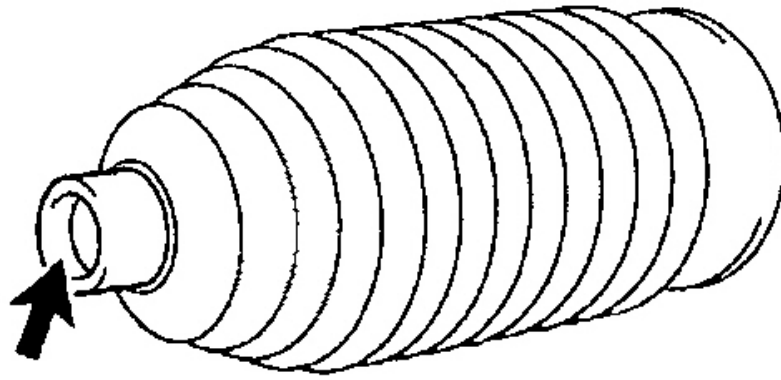
10. INSTALL STEERING RACK BOOT NO. 2

- a. Apply silicon grease to the inside small caliber of steering rack boots No. 2
- b. Install the steering rack boots No. 2 to the groove on the rack housing.

11. INSTALL STEERING RACK BOOT NO. 1

HINT:

Install the rack boot No. 1 by the same procedures with rack boot No. 2.



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Fig. 125: Applying Silicon Grease To Inside Small Caliber Of Steering Rack Boots No. 2
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

12. INSTALL STEERING RACK BOOT NO. 2 CLAMP

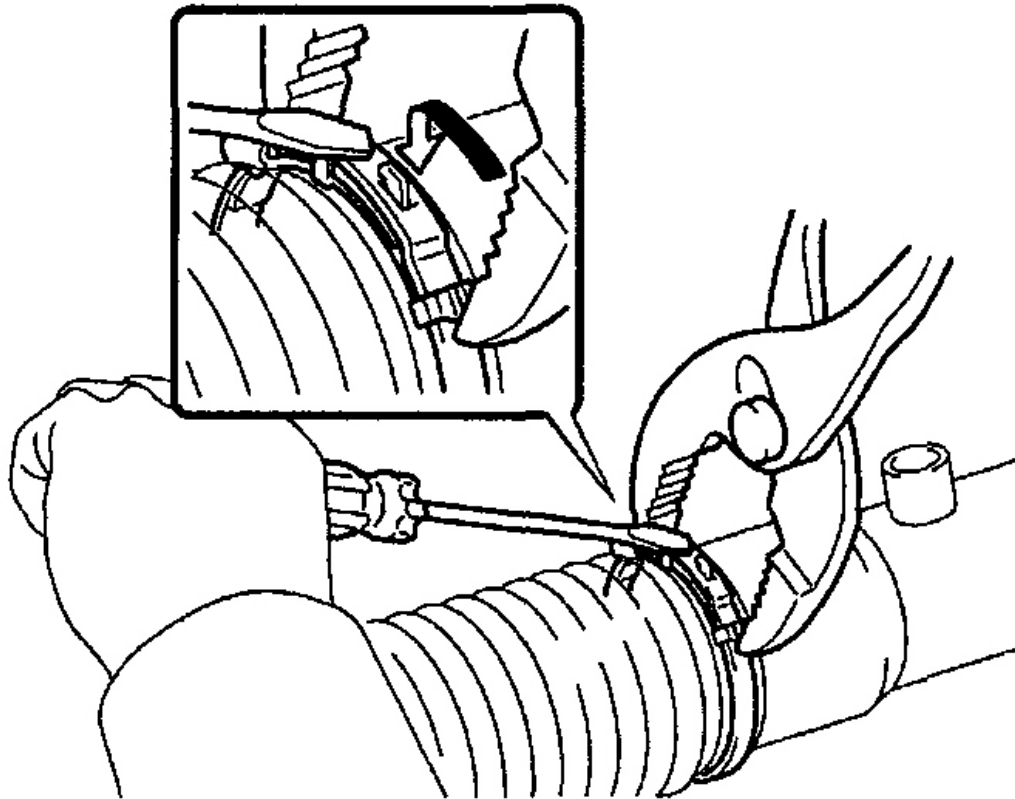
- a. Using pliers and a screwdriver, install a new rack boot No. 2 clamp. See **Fig. 126**.

NOTE: Be careful not to damage or twist the rack boot.

13. INSTALL STEERING RACK BOOT NO. 1 CLAMP

HINT:

Install the rack boot No. 1 clamp by the same procedures with rack boot No. 2 clamp.



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Fig. 126: Installing Rack Boot No. 2 Clamp
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

14. INSTALL STEERING RACK BOOT CLIP

- a. Using pliers, install the 2 boot clips.
- b. Using SST, turn the control valve, and check that the rack boots expand and contract smoothly.

SST 09616-00011

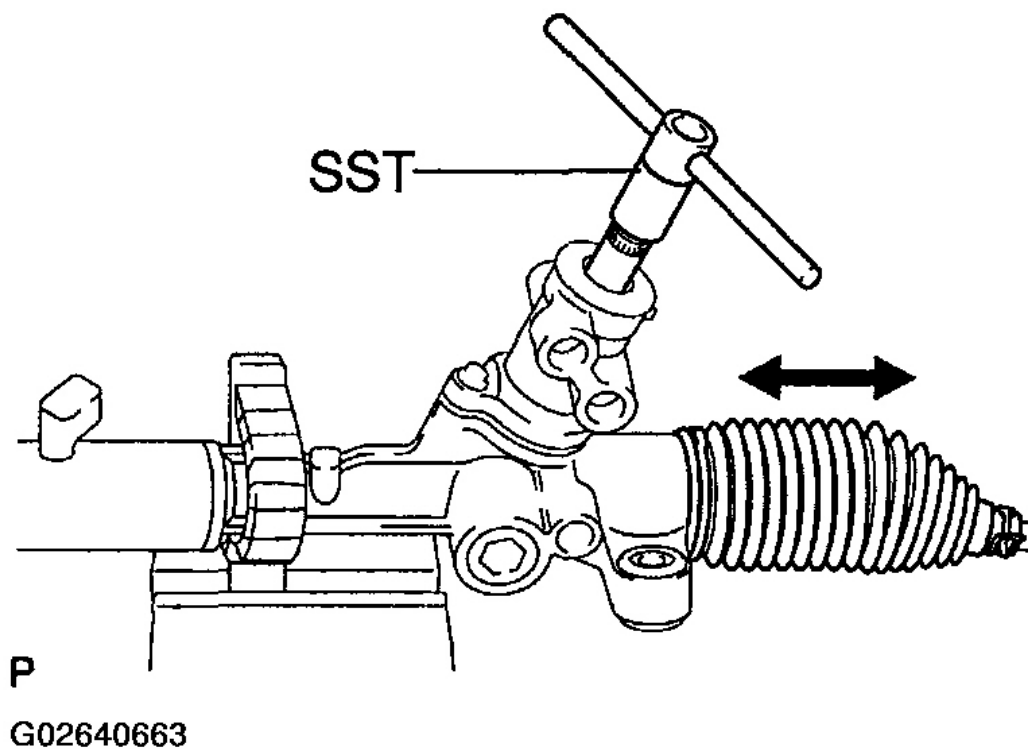


Fig. 127: Checking Movement Of Rack Boots
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

15. INSTALL TIE ROD END SUB-ASSEMBLY LH

- a. Screw the lock nut and tie rod end sub-assy LH onto the rack end until the matchmarks are aligned. See **Fig. 128**.

HINT:

After adjusting toe-in, torque the lock nut.

16. INSTALL TIE ROD END SUB-ASSEMBLY RH

HINT:

Install the RH side by the same procedures with LH side.



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Fig. 128: Aligning Match Mark Between Lock Nut & Tie Rod End Sub-Assy
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSTALLATION

1. INSTALL PS GEAR ASSEMBLY

- Place the PS gear assembly in installation position.

NOTE: Do not damage the turn pressure tubes.

- Align the matchmarks on the steering intermediate extension and control valve shaft.

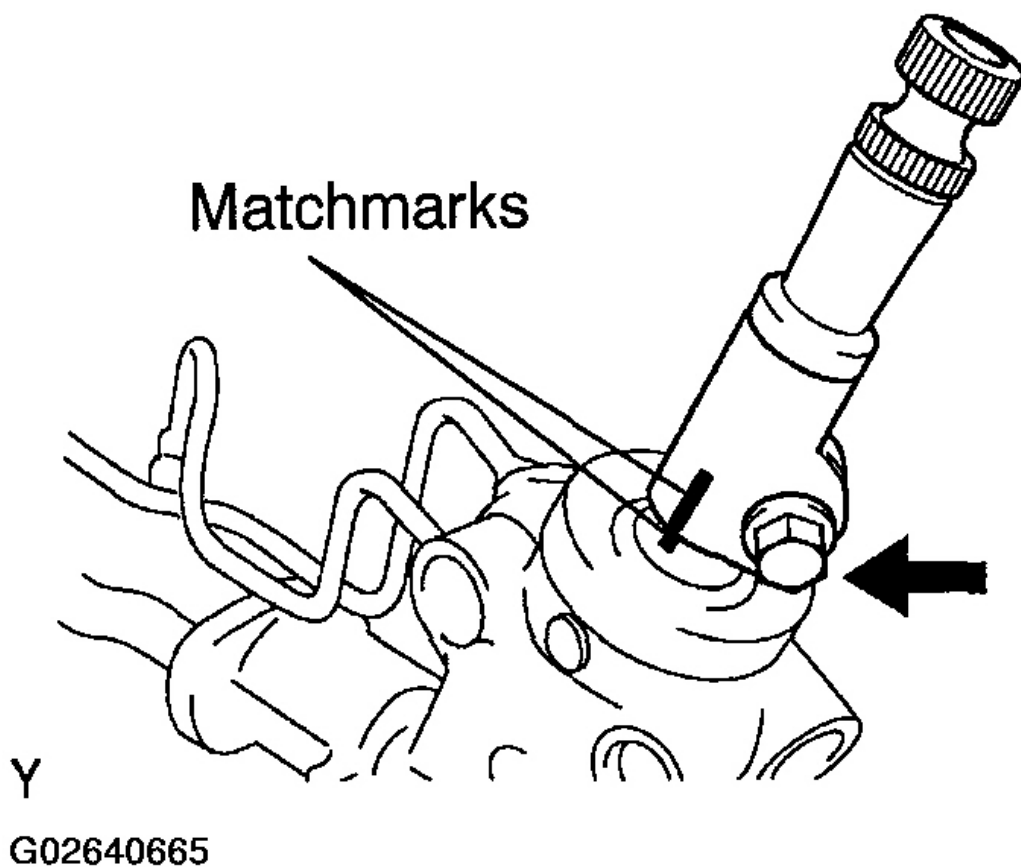


Fig. 129: Aligning Matchmarks On Steering Intermediate Extension & Control Valve Shaft
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Install the bolt.

Torque: 35 N.m (360 kgf.cm, 26 ft.lbf)

- d. Place the steering column hole cover clamp and cover on the control valve shaft.
e. Install the PS gear assembly with the 2 bolts.

Torque: 137 N.m (1,400 kgf.cm, 101 ft.lbf)

2. CONNECT PRESSURE FEED AND RETURN TUBES

- a. Connect the pressure feed and return tubes to the PS gear with the 2 bolts.

Torque: 12.5 N.m (130 kgf.cm, 9 ft.lbf)

- b. Using SST, connect the pressure feed and return tubes.

SST 09023-12701

HINT:

Torque: 40 N.m (410 kgf.cm, 29 ft.lbf)

HINT:

Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

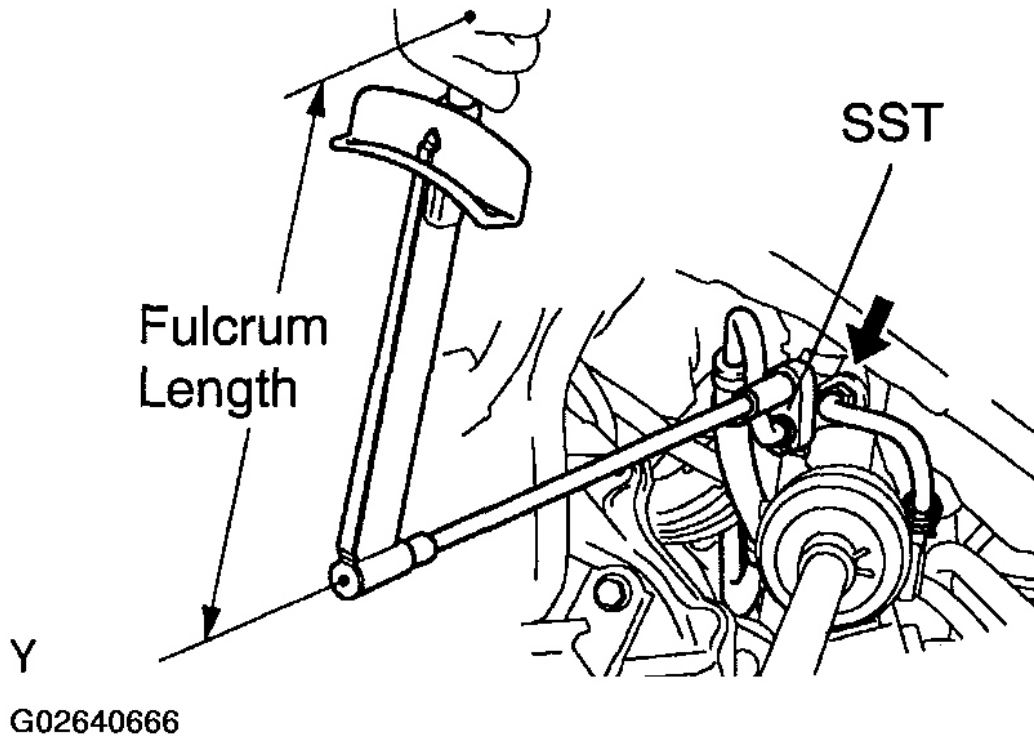


Fig. 130: Connecting Pressure Feed & Return Tubes
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. CONNECT STABILIZER BAR

Connect the stabilizer bar with the 4 bolts.

Torque: 29 N.m (300 kgf.cm, 22 ft.lbf)

2005 Toyota RAV4

2005 STEERING Steering - RAV4

4. **CONNECT RH AND LH TIE ROD ENDS (See INSTALLATION) .**
5. **CONNECT STEERING COLUMN HOLE COVER**
 - a. Connect the steering column hole cover to the dash panel.
 - b. Tighten the clamp of the steering column hole cover.
6. **CONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY (See INSTALLATION)**
7. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**

HINT:

Do it with the front of the vehicle jacked up.

8. **CENTER SPIRAL CABLE (See INSTALLATION)**
9. **INSTALL STEERING WHEEL**
 - a. Align the matchmarks on the steering wheel and steering column main shaft.
 - b. Temporarily tighten the steering wheel set nut.
10. **BLEED POWER STEERING SYSTEM (See POWER STEERING FLUID)**
11. **CHECK STEERING WHEEL CENTER POINT**
12. **TORQUE STEERING WHEEL SET NUT**

Torque: 50 N.m (510 kgf.cm, 37 ft.lbf)

13. **INSTALL STEERING WHEEL PAD (See INSTALLATION)**
14. **CHECK FRONT WHEEL ALIGNMENT (See FRONT WHEEL ALIGNMENT)**