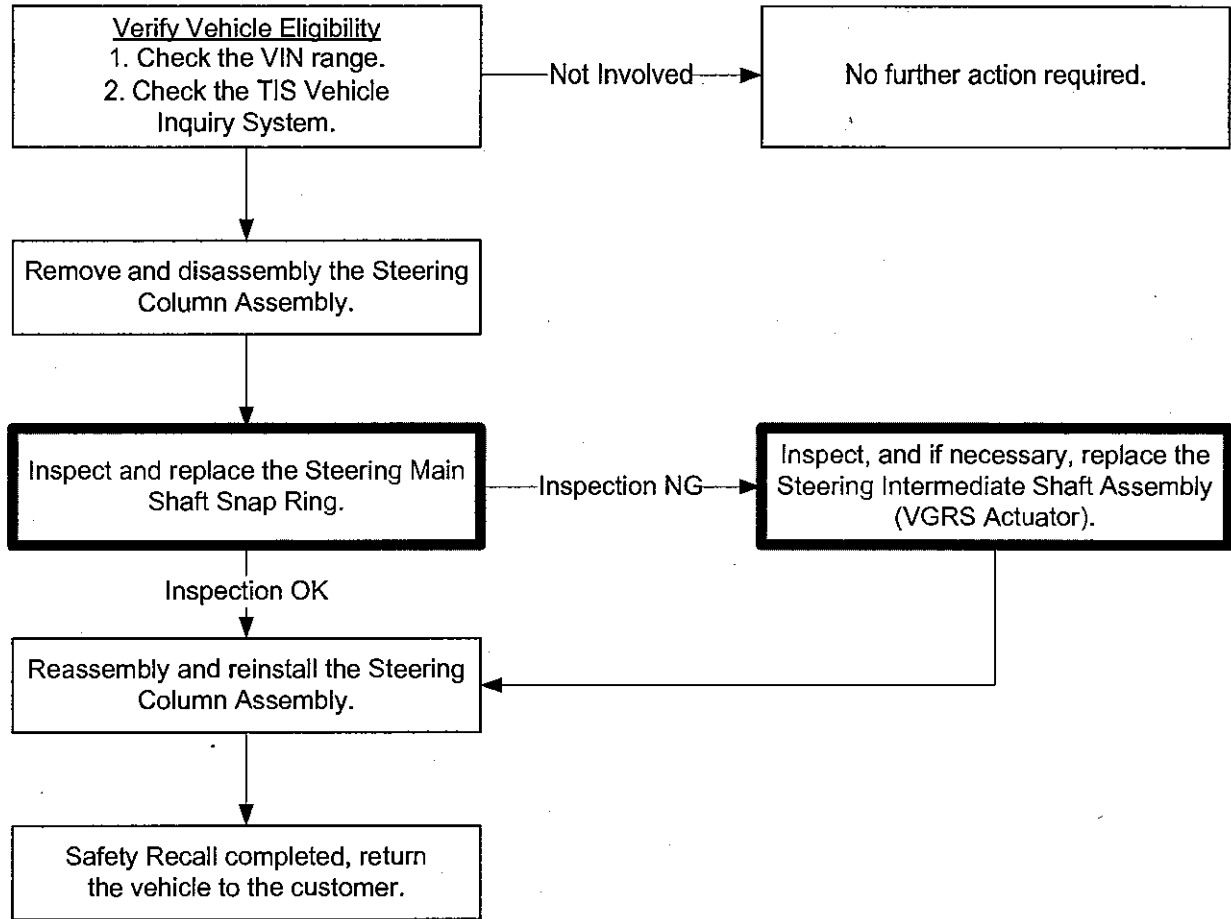


**TECHNICAL INSTRUCTIONS**  
**FOR**  
**SAFETY RECALL ALF**  
**STEERING MAIN SHAFT SNAP RING REPLACEMENT**  
**2003 – 2007 MODEL YEAR LX 470**

## I. OPERATION FLOWCHART



## II. IDENTIFICATION OF AFFECTED VEHICLES

### A. AFFECTED VIN RANGE

Model	WMI	Year	VIN Range	
			VDS	Range
LX 470	JTJ	2003	HT00W	3521286 – 3535572
		2004	HT00W	3535334 – 3548789
		2005	HT00W	3548477 – 3555881
				4000000 – 4003435
		2006	HT00W	4003120 – 4019991
2007	HT00W	4019996 – 4029735		

#### NOTE:

- Check the TIS Vehicle Inquiry System to confirm the VIN is involved in this Safety Recall, and that the campaign has not already been completed prior to dealer shipment or by another dealer.
- TMS warranty will not reimburse dealers for repairs conducted on vehicles that are not affected or were completed by another dealer.

### III. PREPARATION

#### A. PARTS

Part Number	Part Description	Quantity
04000-49260	Fitting Kit, Steering	1
<p><u>The kit above includes the following parts:</u>            45259-60020 = Steering Main Shaft Bearing Sheet = Quantity 1            45263-60040 = Shaft Snap Ring (For Steering Main Shaft) = Quantity 1            45264-60020 = No. 2 Ring Steering Column = Quantity 1</p>		

Part Number	Part Description	Quantity
04000-49360	Support Kit, Steering	1
<p><u>The kit above includes the following parts:</u>            45279-33030 = Attachment, Steering Column Tube, Lower = Quantity 1            45292-60160 = Main Shaft Lower Dust Seal = Quantity 1            45805-60020 = Tilt Steering Support Sub-Assembly = Quantity 1            45808-60010 = Steering Shaft Thrust Stopper Sub-Assembly = Quantity 1            45848-60010 = Tilt Steering Cushion = Quantity 1            90460-74003 = Clamp, Hose = Quantity 1</p>		

#### B. TOOLS & EQUIPMENT

- Nylon Pry Tools
- Protective Eyewear and Gloves
- Ruler
- Special Service Tool
  - 09950-50013 – Universal Puller Set C
    - (09951-05010 – Hanger 150)
    - (09952-05010 – Slide Arm)
    - (09953-05020 – Center Bolt 150)
    - (09954-05020 – Claw No. 2)
- Standard Hand Tools
- Steering Shaft Snap Ring Installer\*
- Techstream
- Torque Wrench
- Torx® T30 Socket
- VGRS Actuator Check Gauge\*

\* A tool set containing a Steering Shaft Snap Ring Installer and a VGRS Actuator Check Gauge will be provided to each dealership.

#### C. MATERIALS

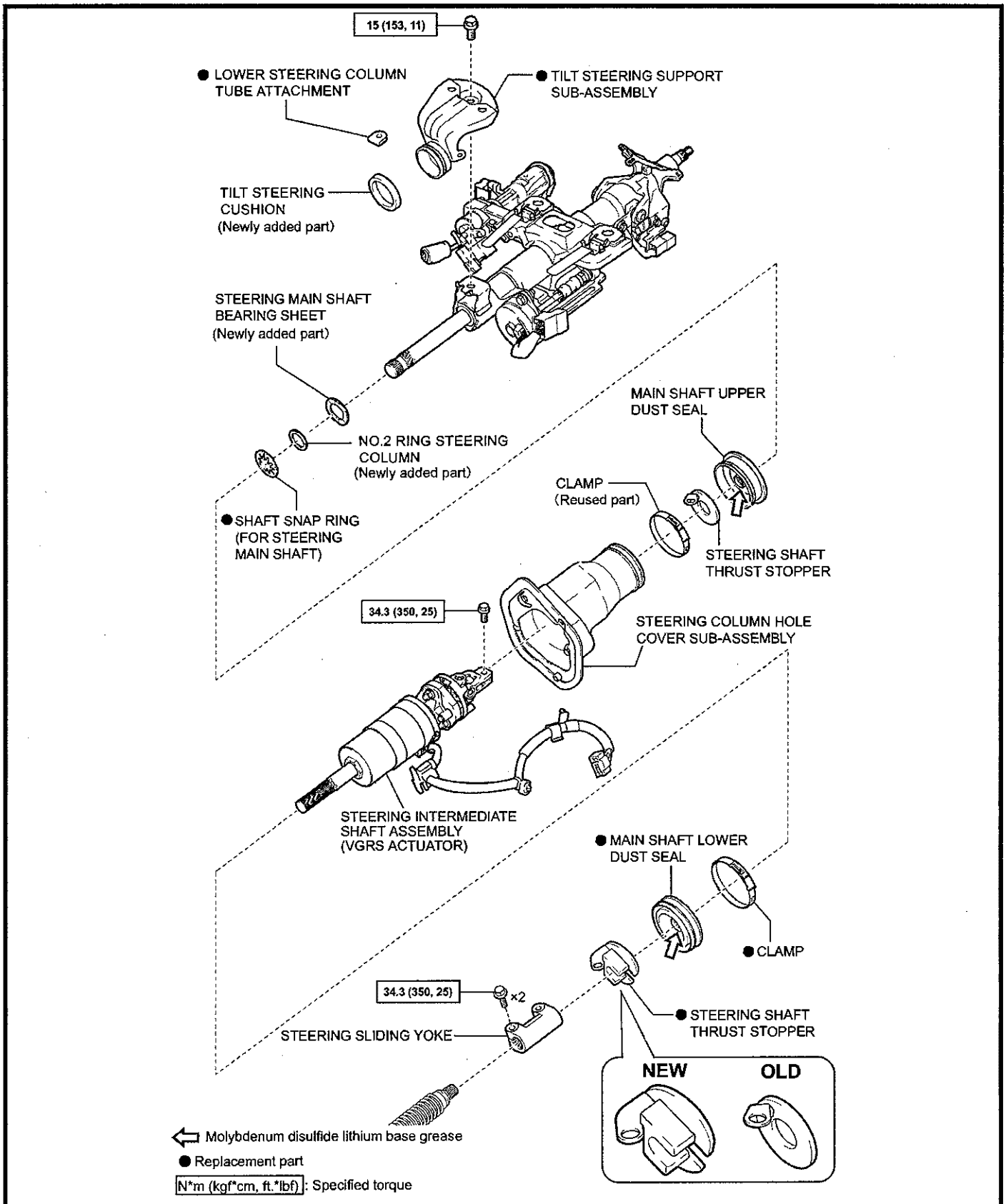
- Brake Clean
- Molybdenum Disulfide Lithium Base Grease or equivalent
- Shop Cloth
- Marking Pen
- Protective tape
- Tape

### IV. BACKGROUND

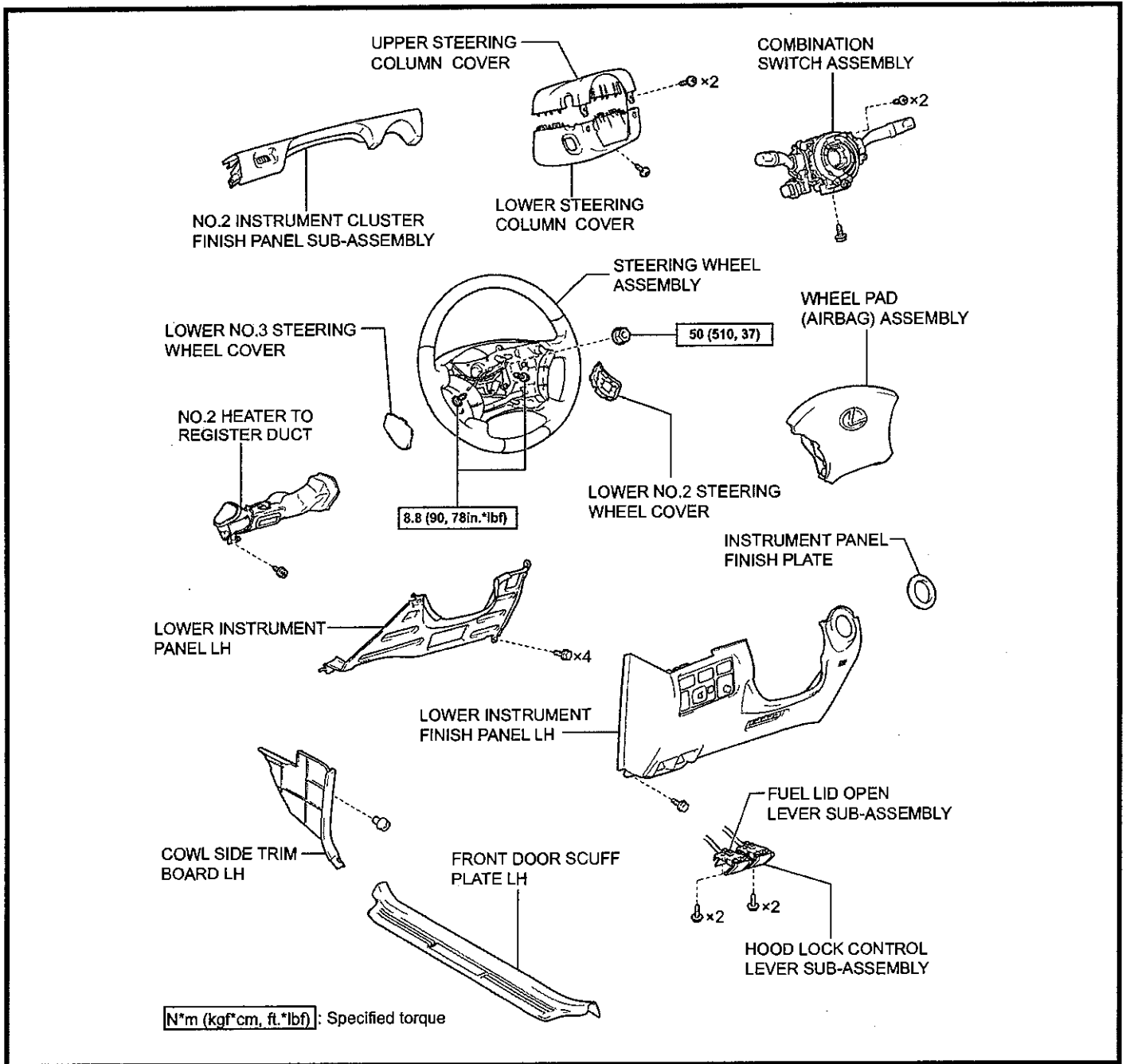
The construction of the steering shaft is such that the snap ring on the shaft may disengage when the vehicle experiences an unusually severe impact to the front wheels (for example, striking a deep pothole in the roadway). If the snap ring becomes disengaged and the steering wheel is then repeatedly turned to the full locked position, over time the steering shaft may become disconnected which could result in a loss of steering control.

# V. WORK PROCEDURE

## A. COMPONENTS



**COMPONENTS CONTINUED...**



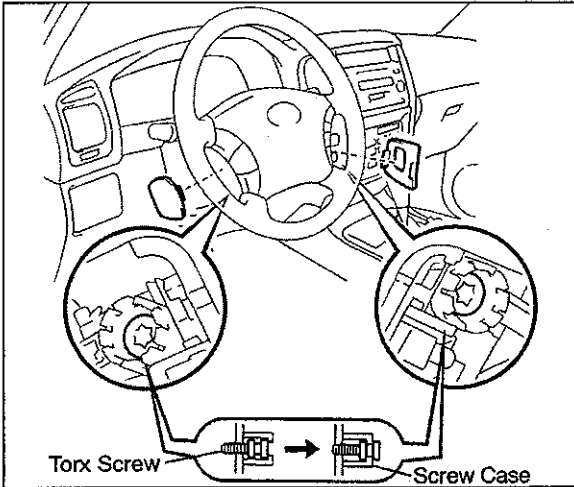
**B. REMOVE AND DISASSEMBLE THE STEERING COLUMN WITH INTERMEDIATE SHAFT (VGRS ACTUATOR) ASSEMBLY**

**1. DISCONNECT THE NEGATIVE BATTERY CABLE**

- a) Record the radio station presets.
- b) Disconnect the negative battery cable and wait 90 seconds.

**NOTE:**

Wait 90 seconds after the negative battery cable is disconnected before starting work on the SRS system. The SRS is equipped with a backup power source, if work is started within 90 seconds after disconnecting the negative battery cable, the SRS may be deployed.

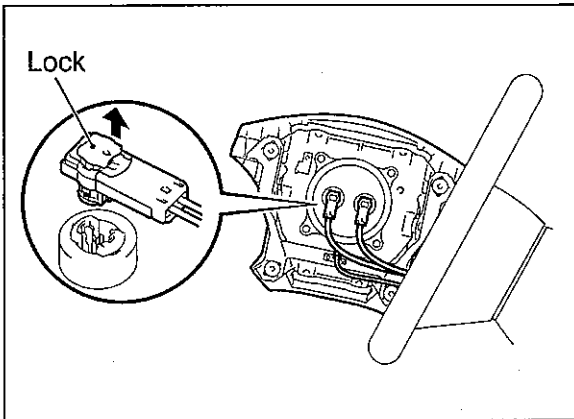


## 2. REMOVE THE STEERING WHEEL PAD (AIRBAG)

- Place the front wheels in a straight-ahead position.
- Using a nylon pry tool, remove the steering wheel lower cover No. 2 and No. 3.
- Loosen the 2 Torx® bolts.

### NOTE:

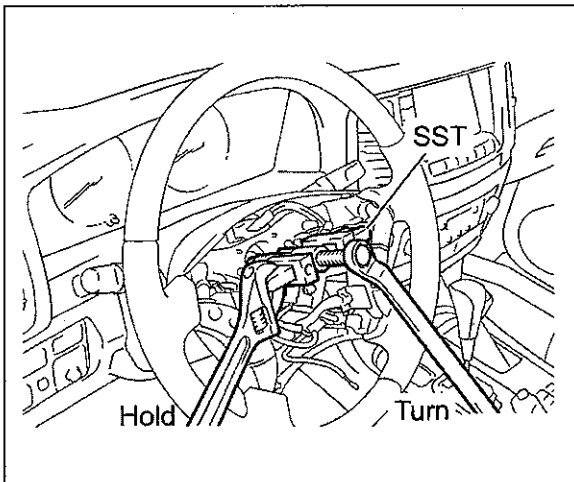
Loosen the Torx® screws until the groove along the circumference catches on the screw case as shown.



- Remove the wheel pad (airbag) from the steering wheel enough to access the 2 airbag connectors.
- Disconnect the 2 airbag connectors by pulling up on the lock.
- Disconnect the horn wire harness and remove the wheel pad (airbag).

### NOTE:

- When removing the wheel pad (airbag), take care not to pull on the airbag wire harness.
- When storing the wheel pad (airbag), keep the front surface facing upwards.
- Never disassemble the wheel pad (airbag).



## 3. REMOVE THE STEERING WHEEL

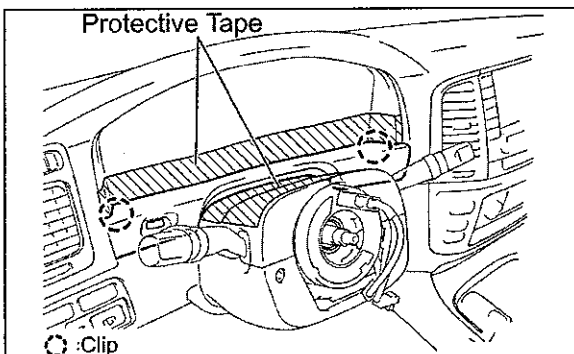
- Disconnect the connector from the spiral cable.
- Remove the nut.
- Remove the steering wheel using the SSTs listed.

### SST:

- 09951-05010 – Hanger 150
- 09952-05010 – Slide Arm
- 09953-05020 – Center Bolt 150
- 09954-05020 – Claw No. 2

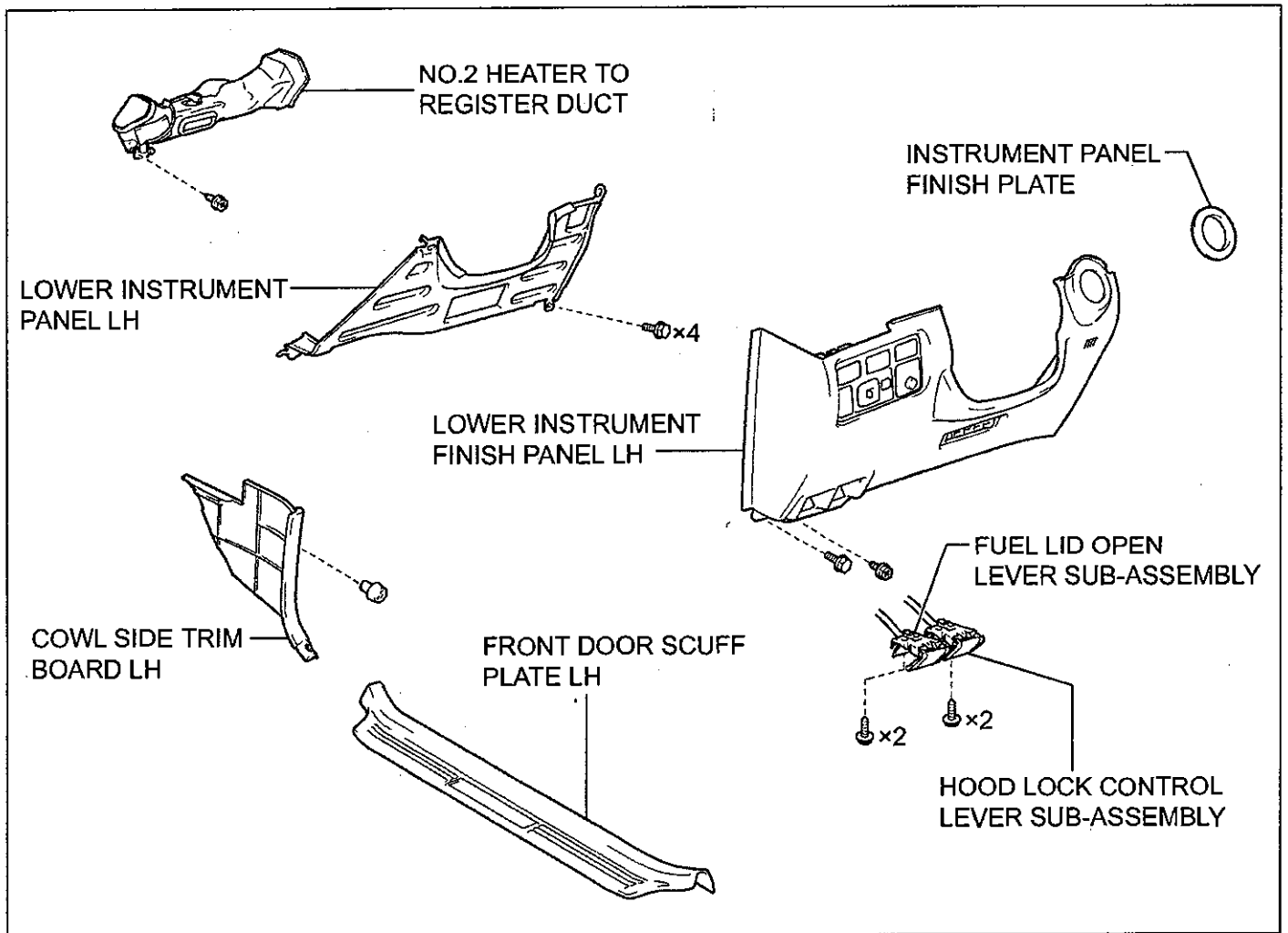
### NOTE:

Matchmarks are not required as VGRS initialization will place the steering wheel in the neutral (center) position.



## 4. REMOVE THE NO. 2 INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY

- Apply protective tape to the combination meter and the upper column cover.
- Using a nylon pry tool, disengage the 2 clips and remove the instrument cluster finish panel.
- Disconnect dimmer switch connector.



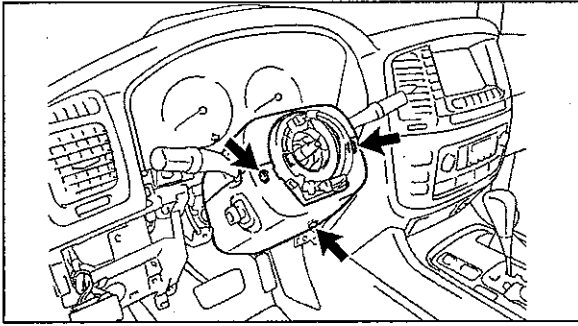
## 5. REMOVE THE FOLLOWING COMPONENTS

- a) Front Door Scuff Plate LH
- b) Cowl Side Trim Board LH
  - i. Remove clip and the cowl side trim board LH.
- c) Lower Instrument Finish Panel LH
  - ii. Using a nylon pry tool, remove the instrument panel finish plate.
  - iii. Remove the 4 screws and the hood and fuel lid lever assemblies.
  - iv. Remove the bolt and screw.
  - v. Using a nylon pry tool, disengage the 5 clips, release the 2 guides.
  - vi. Lower the left side instrument finish panel to access and disconnect the multiple connectors.
  - vii. Disconnect the room temperature sensor connector and hose, then remove the lower instrument finish panel.

### NOTE:

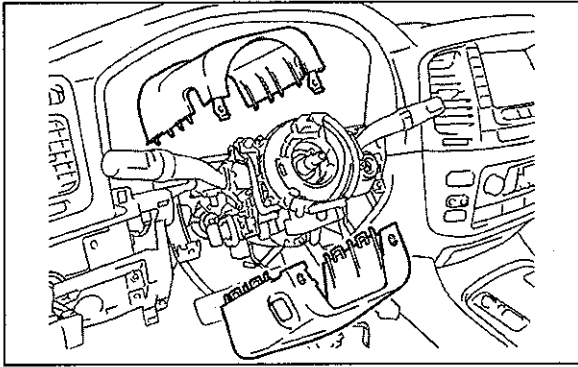
**DO NOT** damage the room temperature sensor when disconnecting the hose.

- d) Lower Instrument Panel LH
  - i. Remove the 4 bolts and lower instrument panel.
- e) No. 2 Heater To Register Duct
  - i. Disconnect the connector. (*With No.1 Interior Illumination Light Assembly Only*)
  - ii. Remove the screw and the heater to register duct.

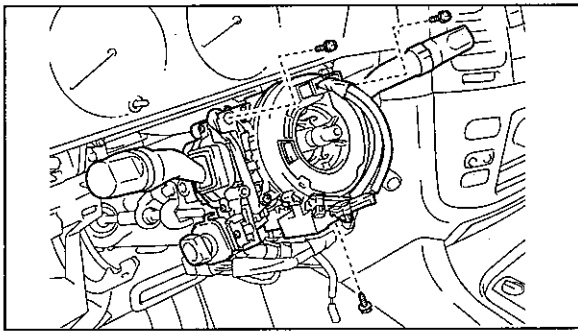


## 6. REMOVE THE STEERING COLUMN COVERS

a) Remove the 3 screws.



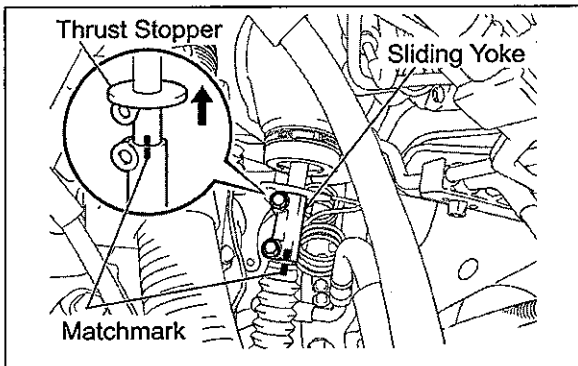
b) Release the tabs and remove the lower and upper column covers.



## 7. REMOVE THE COMBINATION SWITCH

a) Disconnect the 5 connectors.

b) Remove the 3 screws and combination switch.



## 8. REMOVE THE STEERING COLUMN WITH INTERMEDIATE SHAFT (VGRS ACTUATOR) ASSEMBLY

a) From the engine compartment, remove the upper bolt and slide the thrust stopper up.

b) Place matchmarks on between the following components.

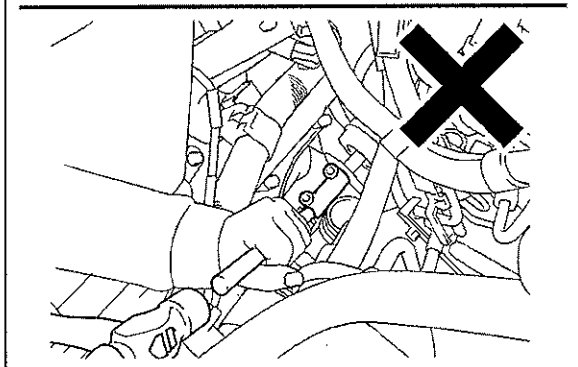
- Sliding yoke and No. 2 steering shaft.
- Sliding yoke and steering intermediate shaft (VGRS actuator)

c) Remove the lower bolt and sliding yoke.

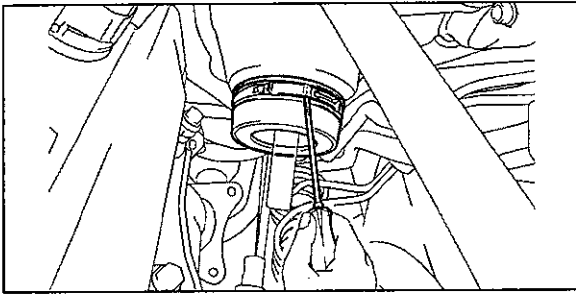
d) Remove and discard the thrust stopper.

### NOTE:

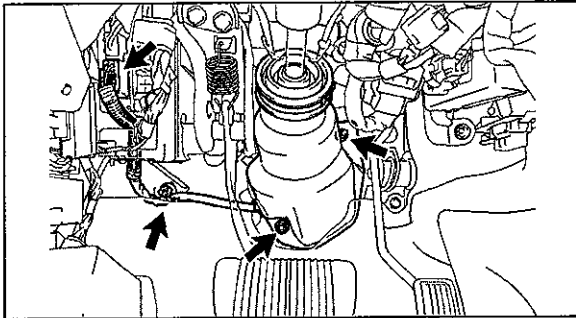
**DO NOT** strike the sliding yoke with a hammer or other tool, doing so may damage steering mechanism or joints.



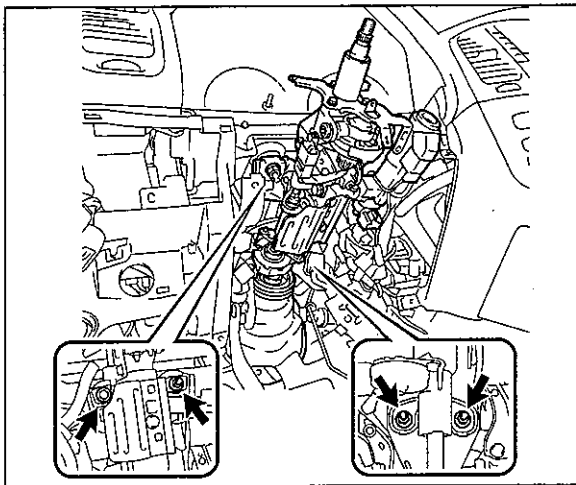




- e) Using a screwdriver, release and discard the clamp.
- f) Remove and discard the lower dust seal.
- g) Wipe off any grease on the steering shaft to prevent it from soiling the vehicle interior when removed.



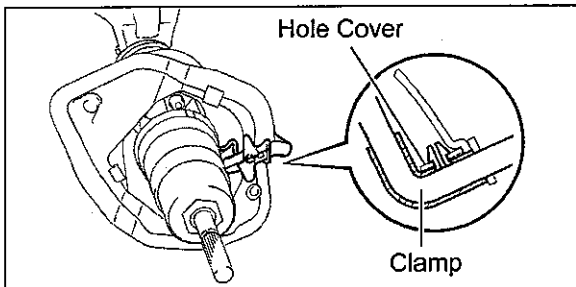
- h) From inside the vehicle, disconnect the connector and wire harness clamp.
- i) Remove the 2 nuts from the steering column hole cover.



- j) Disconnect the multiple connectors.
- k) Remove the 4 nuts and the steering column with intermediate shaft (VGRS actuator) assembly.

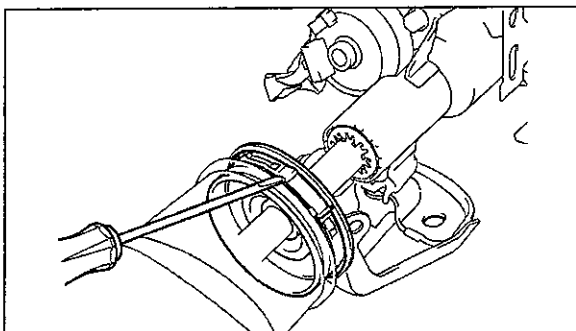
**NOTE:**

**Make sure to wear protective gloves when removing the steering column with intermediate shaft (VGRS actuator) assembly, as there may be sharp edges on the surrounding components.**

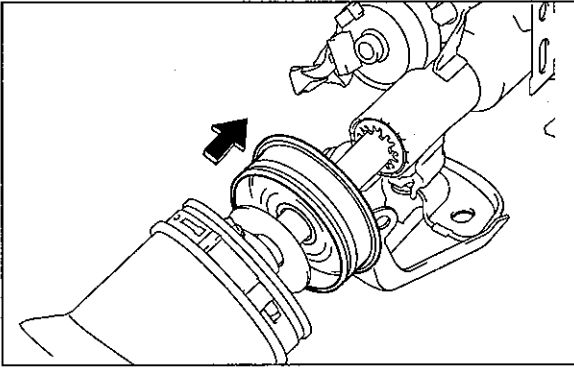


**9. REMOVE THE MAIN SHAFT UPPER SEAL**

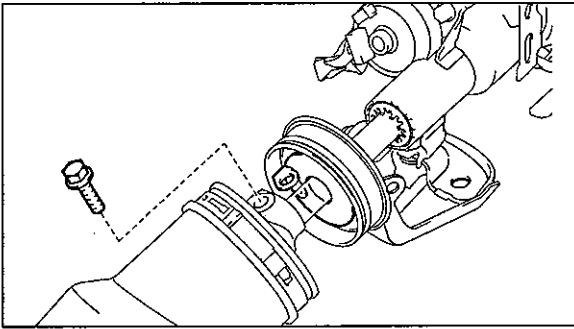
- a) Disconnect the wire harness clamp from the steering column hole cover.



- b) Using a screwdriver, disengage the claw to loosen the clamp.



- c) Slide the main shaft upper dust seal away from the steering column hole cover.

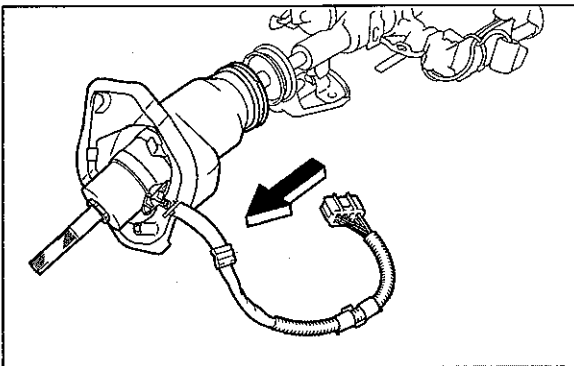


#### 10. REMOVE THE INTERMEDIATE SHAFT (VGRS ACTUATOR) ASSEMBLY

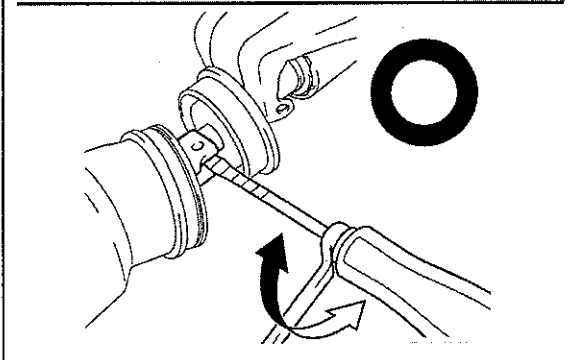
- a) Remove the bolt.

**NOTE:**

Matchmarks are not required as VGRS initialization will place the steering wheel in the neutral (center) position.

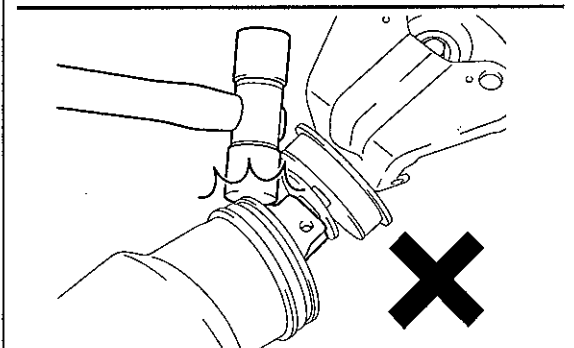


- b) Remove the intermediate shaft (VGRS actuator) assembly from the steering column.



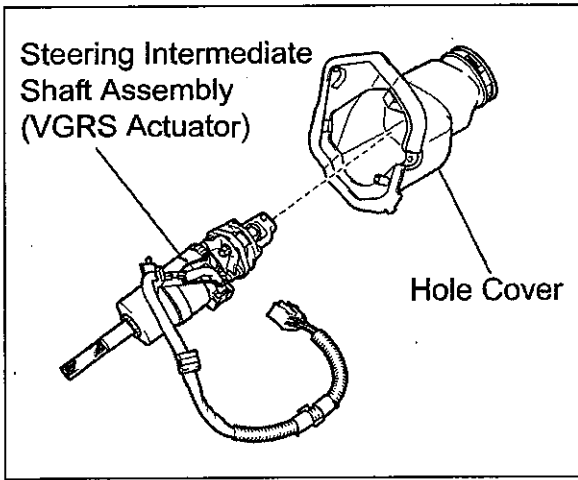
**NOTE:**

If the intermediate shaft (VGRS actuator) assembly is stuck, use a flathead screwdriver to pry it loose as shown.



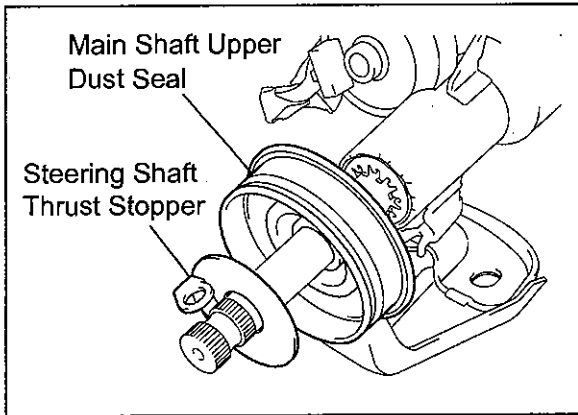
**NOTE:**

DO NOT strike the intermediate shaft (VGRS actuator) or steering column with a hammer or other tool, doing so may damage the components.



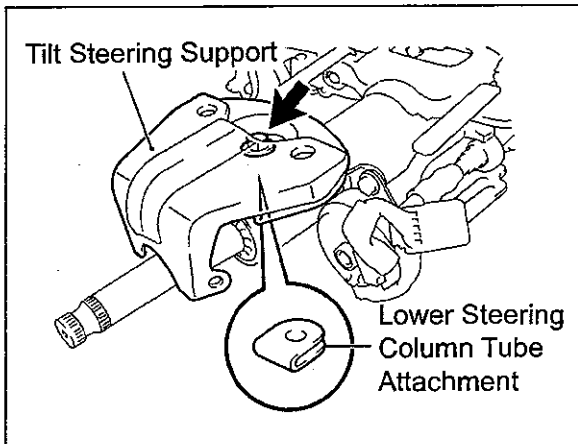
- c) Remove the steering column hole cover from the intermediate shaft.

### C. INSPECT AND REPLACE THE STEERING MAIN SHAFT SNAP RING



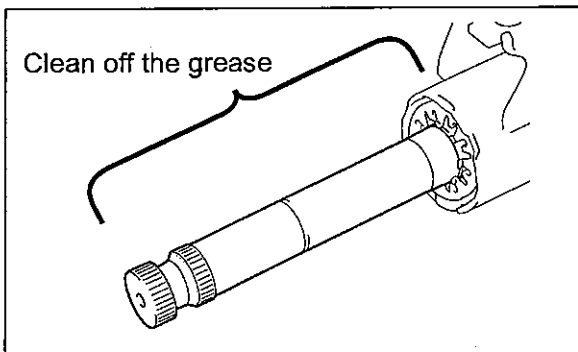
#### 1. REMOVE THE STEERING SHAFT THRUST STOPPER AND MAIN SHAFT UPPER DUST SEAL

- a) Remove the thrust stopper and upper dust seal.



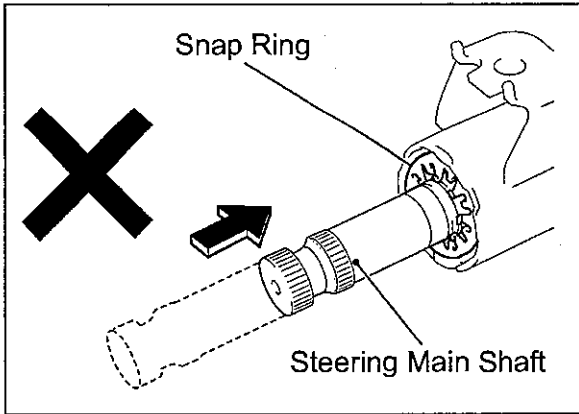
#### 2. REMOVE THE TILT STEERING SUPPORT SUB-ASSEMBLY

- a) Disconnect the wire harness clamp.
- b) Remove the bolt.
- c) Remove and discard the steering support and column tube attachment.

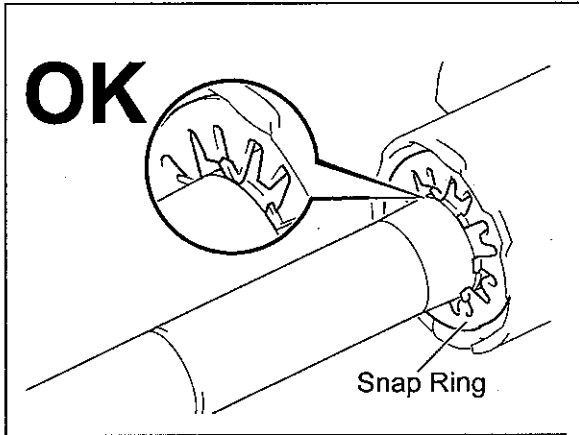


#### 3. CLEAN THE STEERING MAIN SHAFT

- a) Wipe off the grease on the main shaft.



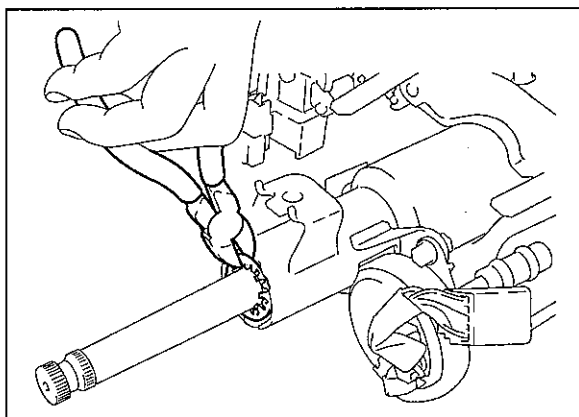
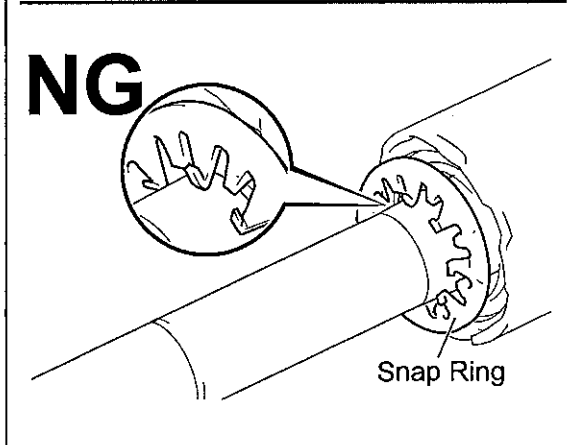
**NOTE:**  
**DO NOT** push in the steering main shaft. Doing so may release the snap ring, causing the main shaft to become stuck in the retracted position.



**4. INSPECT THE STEERING MAIN SHAFT SNAP RING**

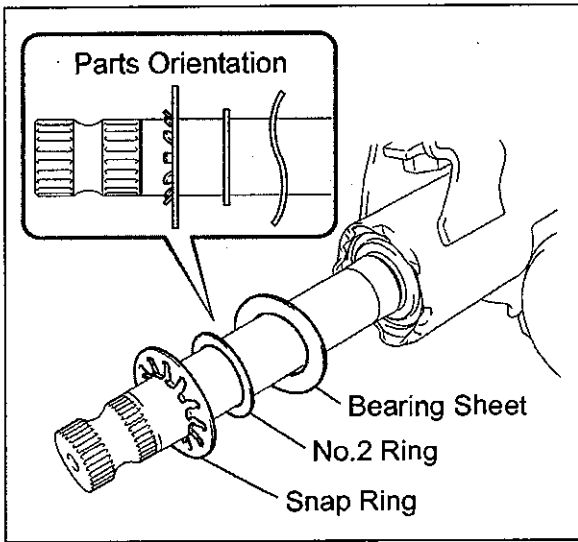
a) Inspect the snap ring as shown.

Judgement Criteria	Result	Action
Snap ring engaged	OK	Replace the snap ring
Snap ring disengaged	NG	Replace the snap ring <i>then</i> inspect the intermediate shaft assembly (VGRS actuator)



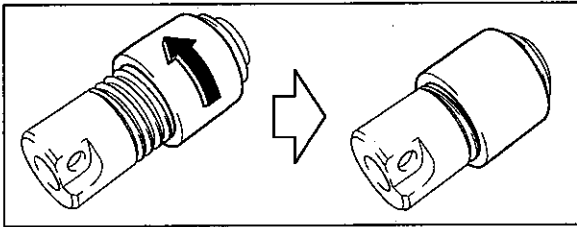
**5. REMOVE THE STEERING MAIN SHAFT SNAP RING**

a) Cut off and discard the snap ring.

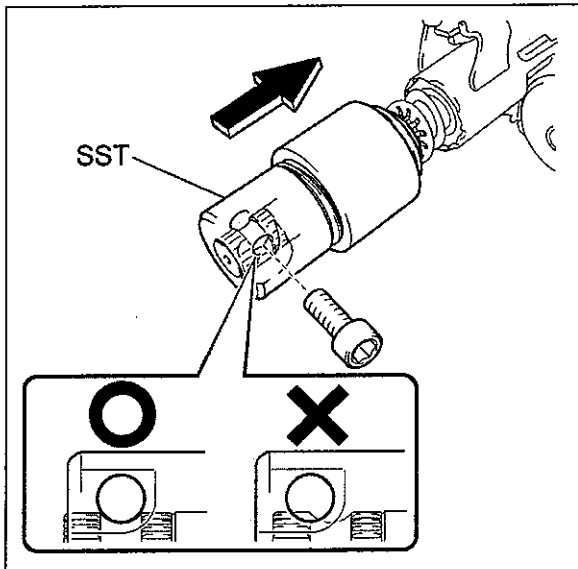


## 6. INSTALL THE NEW STEERING MAIN SHAFT SNAP RING

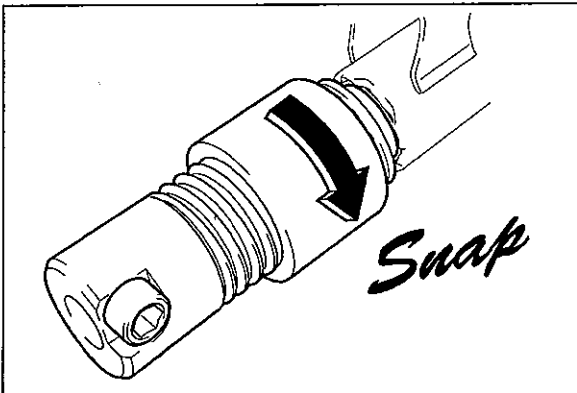
- a) Install the **NEW** bearing sheet, **NEW** No. 2 ring and **NEW** snap ring onto the main shaft in the correct orientation as shown.



- b) Shorten Steering Shaft Snap Ring Installer.



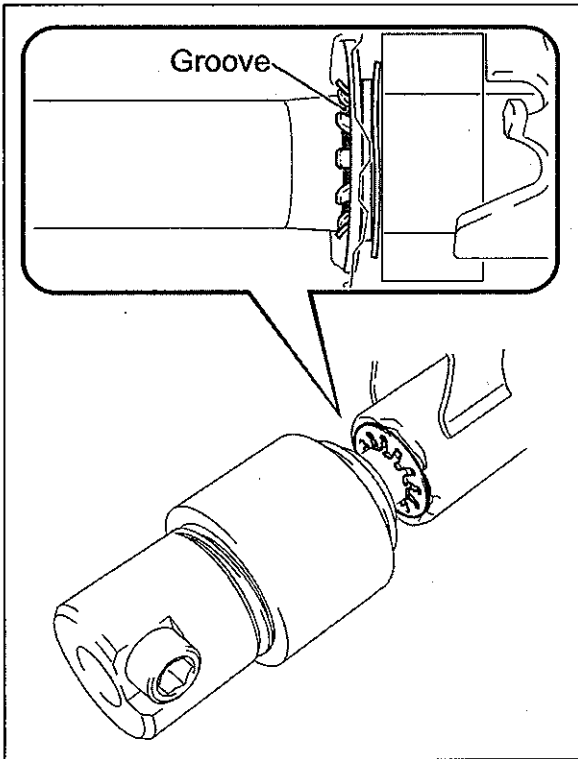
- c) Place the Steering Shaft Snap Ring Installer on the main shaft aligning it with the groove, then install the bolt as shown.



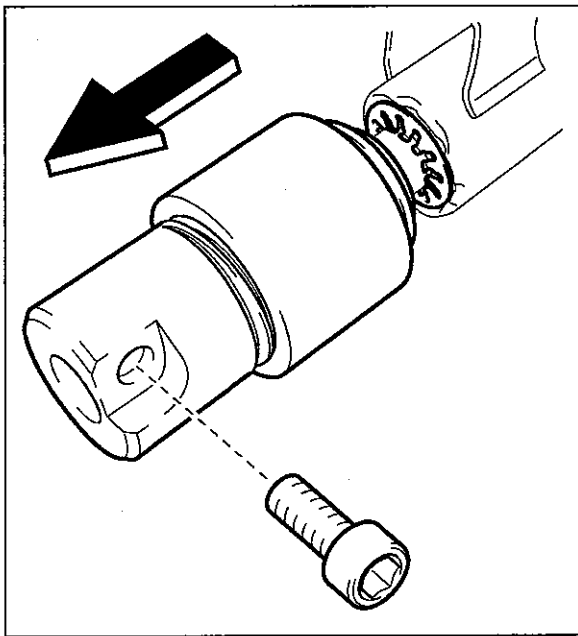
- d) Turn the Steering Shaft Snap Ring Installer to push the snap ring until it engages with the groove and a "snap" sound occurs.

### NOTES:

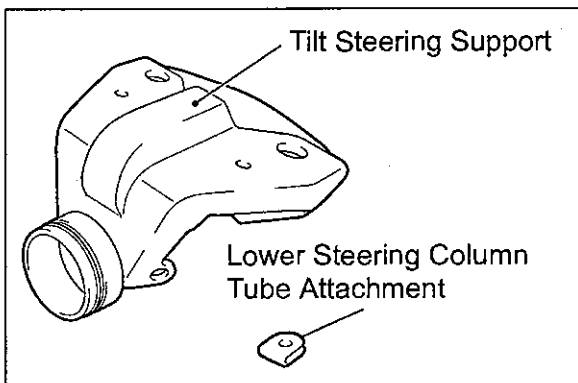
- Due to tab variations a softer "snap" sound may be followed by a louder one once the snap ring is fully seated.
- **DO NOT** turn SST more than what is necessary, doing so may damage the snap ring.



- e) Confirm all the snap ring tabs are engaged in the main shaft groove.



- f) Remove the bolt and the SST from the main shaft.

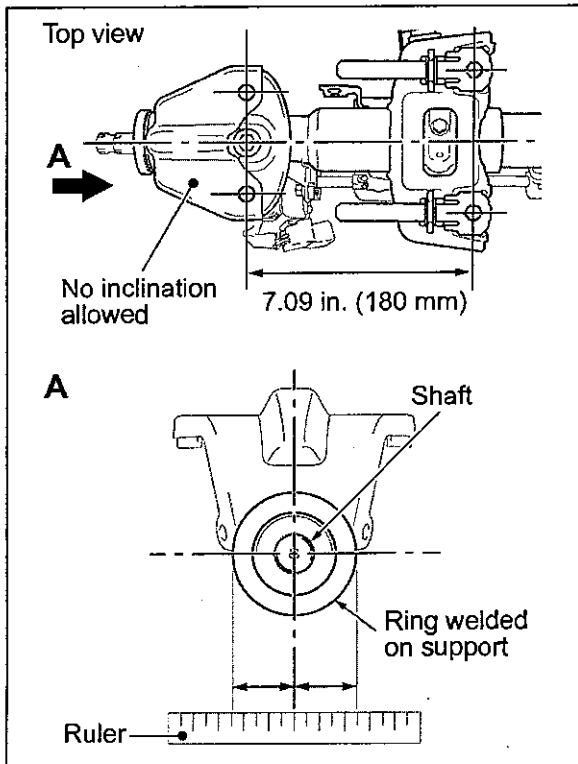
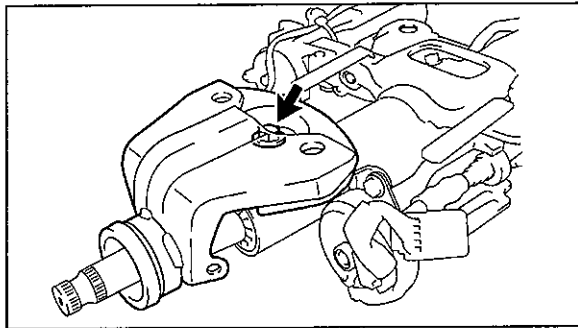
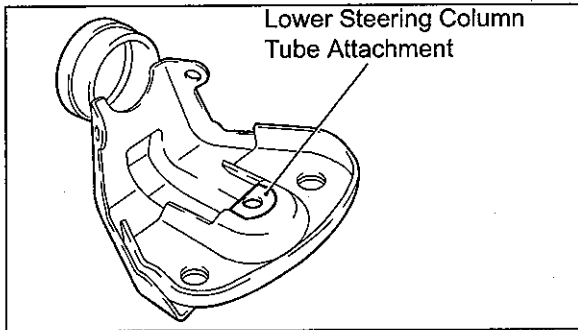
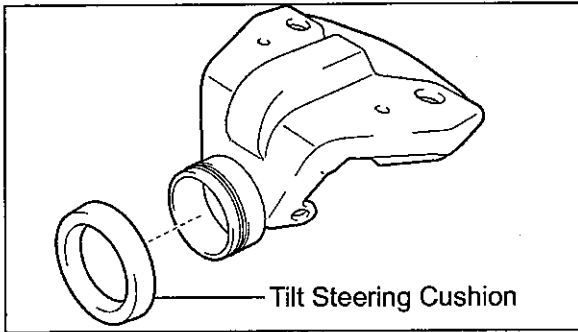


7. CLEAN THE **NEW** TILT STEERING SUPPORT AND **NEW** COLUMN TUBE ATTACHMENT OF ANTICORROSION OIL

**NOTE:**

Anticorrosion oil is applied to the **NEW** tilt steering support and **NEW** column tube attachment.

- a) Using brake clean, remove the anticorrosion oil from around the bolt holes of the tilt steering support and the entire surface of the column tube attachment.



## 8. INSTALL THE **NEW** TILT STEERING SUPPORT SUB-ASSEMBLY

- a) Install the **NEW** tilt steering cushion to the **NEW** tilt steering support.
- b) Install the **NEW** column tube attachment to the **NEW** tilt steering support.
- c) Temporarily install the **NEW** tilt steering support to the steering column assembly with the bolt.

d) Confirm the following with the tilt steering support...

- The support is level (no inclination).
- The support is centered on the main shaft.
- The distance between the 2 sets of steering column mounting bolt holes is 7.09 in. (180 mm).

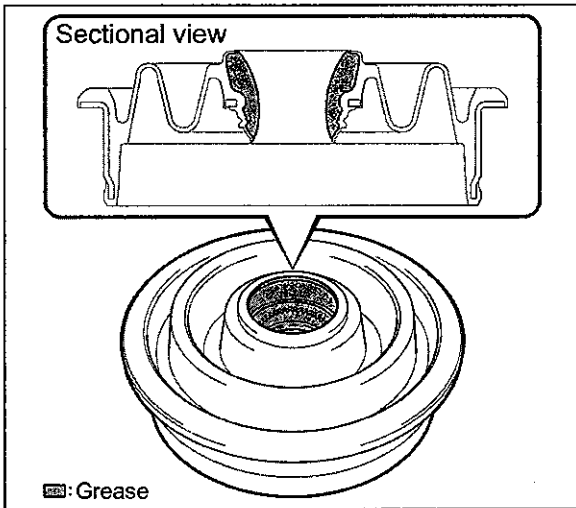
### NOTE:

If the spacing is not 7.09 in. (180 mm), there may be difficulty installing the steering column assembly to the vehicle.

e) Hold the support in place and torque the bolt to spec.

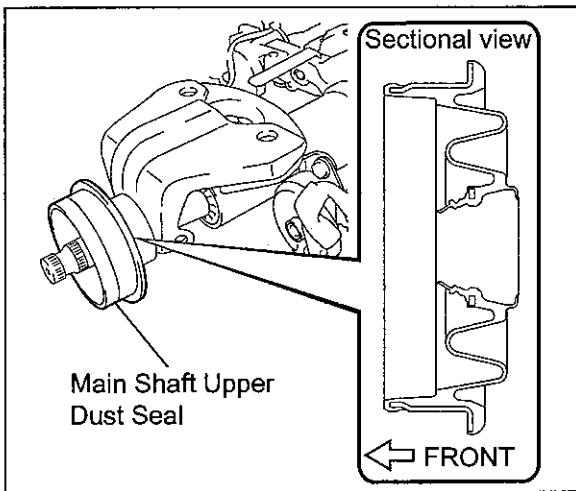
**Torque Spec: 15 N\*m (153 kgf\*cm, 11 ft.\*lbf)**

- f) Reconnect the wire harness clamp.
- g) Confirm the tilt steering support is installed correctly.

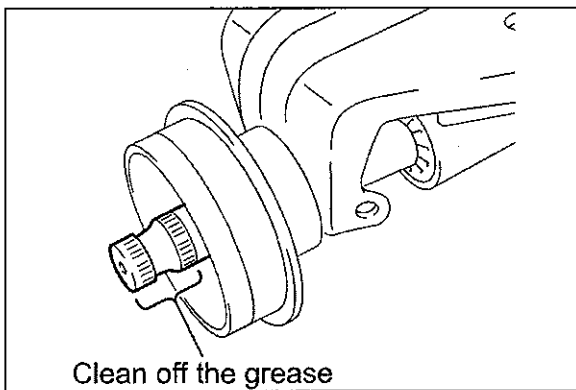


**9. REINSTALL THE MAIN SHAFT UPPER DUST SEAL**

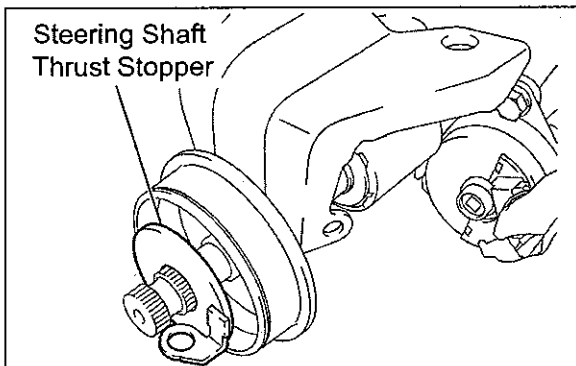
- a) Fill the upper dust seal as shown with molybdenum disulfide lithium base grease or equivalent.



- b) Temporarily reinstall the upper dust seal to the main shaft in the direction shown.



- c) Using brake clean, remove any grease from the splines of the main shaft left from the reinstallation of the upper dust seal.



**10. REINSTALL THE STEERING SHAFT THRUST STOPPER**



### D. INSPECT THE STEERING INTERMEDIATE SHAFT ASSEMBLY (VGRS ACTUATOR)



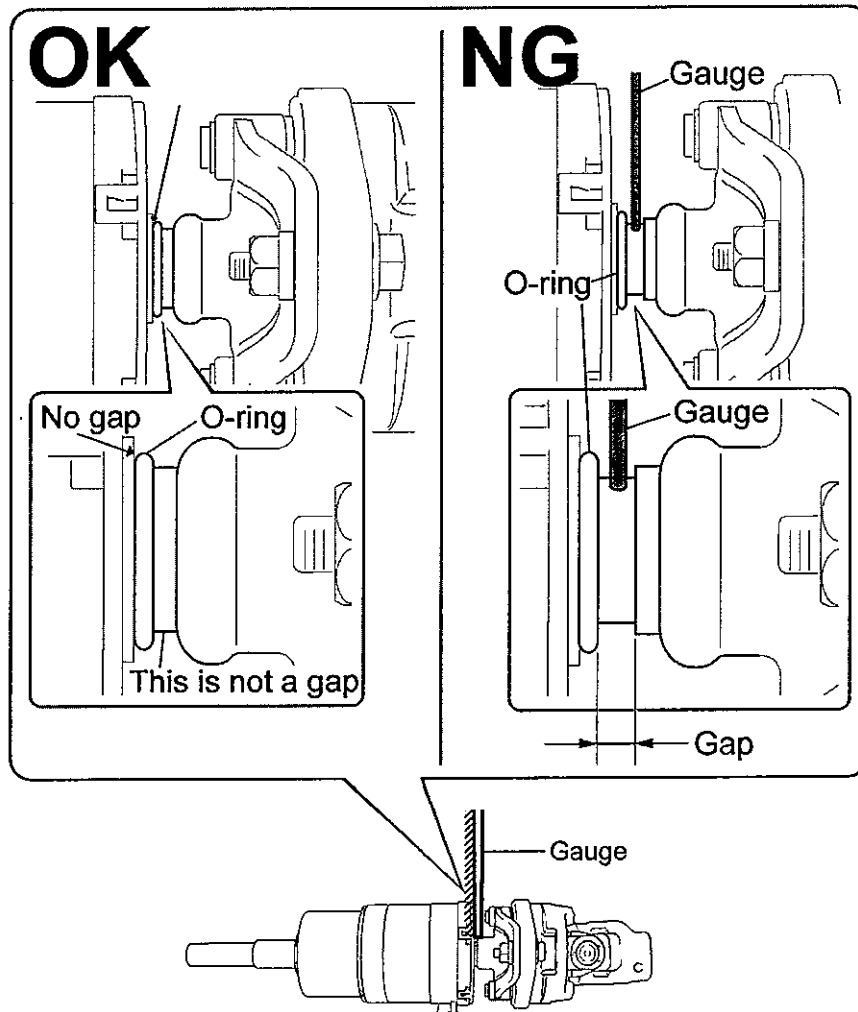
- The following inspection of the steering intermediate shaft assembly is **ONLY** required if the snap ring was disengaged.
- This inspection will determine if the steering intermediate shaft (VGRS actuator) can be reused or if replacement is required for vehicles found with a disengaged snap ring.

Move the o-ring towards the spiral cable case and check the clearance gap using the VGRS Actuator Check Gauge as shown.

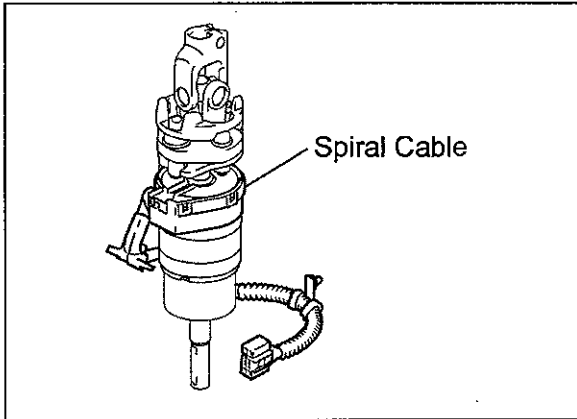
**NOTE:**

- **DO NOT** force the feeler gauge into the gap, doing so may deform and/or damage the o-ring.
- If you cannot move the o-ring there is no gap to check.

Judgement Criteria	Result	Action				
No gap or gap less than 0.08 in. (2.0 mm)	OK	Reuse the steering intermediate shaft (VGRS actuator)				
Gap more than 0.08 in. (2.0 mm)	NG	Replace the steering intermediate shaft (VGRS actuator) utilizing the replacement part below.				
		<table border="1"> <thead> <tr> <th>Part Number</th> <th>Part Description</th> <th>Qty</th> </tr> </thead> <tbody> <tr> <td>04000-49460*</td> <td>Shaft Assembly, Steering Intermediate</td> <td>1</td> </tr> </tbody> </table> <p>* Only a small number of vehicles will require the replacement of the Steering Intermediate Shaft Assembly. Make sure to follow the inspection instructions prior to replacement.</p>	Part Number	Part Description	Qty	04000-49460*
Part Number	Part Description	Qty				
04000-49460*	Shaft Assembly, Steering Intermediate	1				



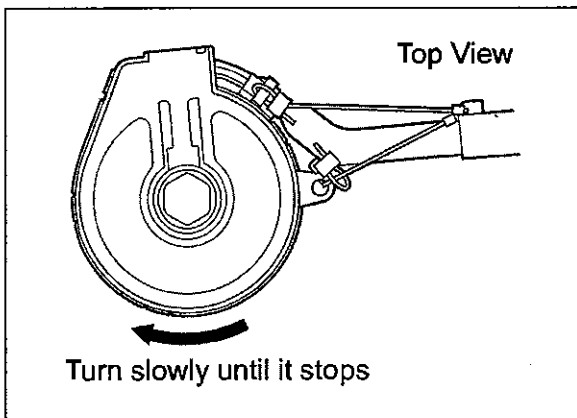
## E. REASSEMBLE AND REINSTALL THE STEERING COLUMN WITH INTERMEDIATE SHAFT (VGRS ACTUATOR) ASSEMBLY



### 1. CENTER THE SPIRAL CABLE

#### NOTE:

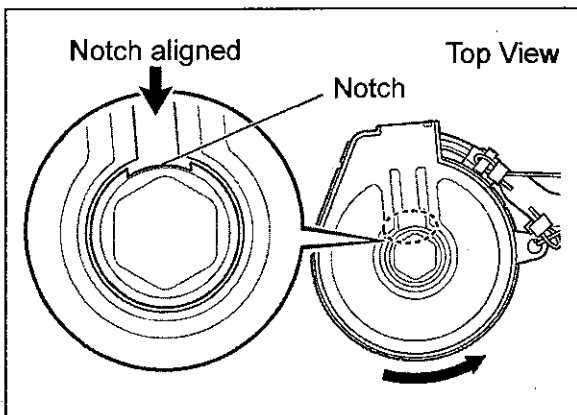
- Perform Step 1 **ONLY** when reusing the steering intermediate shaft (VGRS actuator).
- This step is not required when installing a **NEW** steering intermediate shaft (VGRS actuator), as the spiral cable is already centered and secured with tape to prevent the case from rotating.
- Proceed to Step 2 when installing a **NEW** steering intermediate shaft (VGRS actuator).



- a) Turn the spiral cable case clockwise until it stops.

#### NOTE:

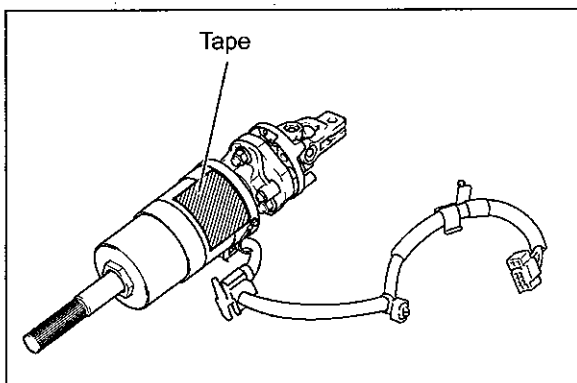
The spiral cable can be turned approximately 5 times.



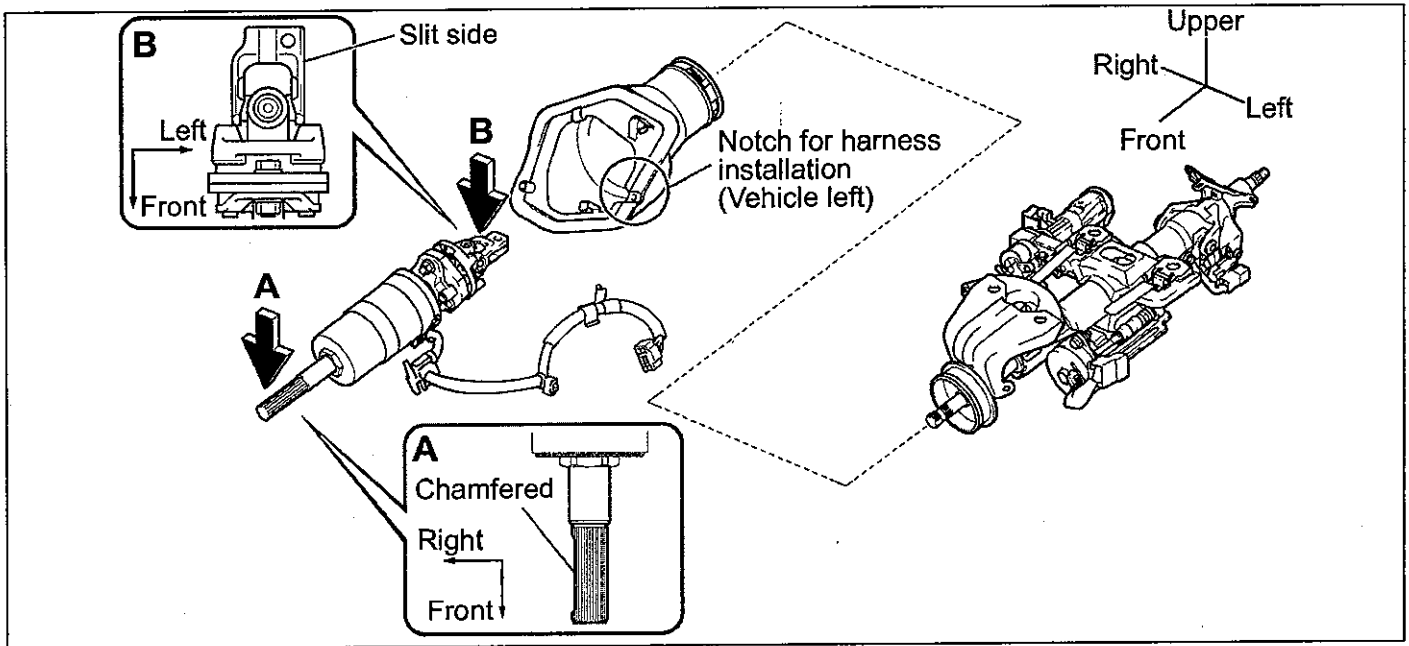
- b) Turn the spiral cable 2.5 turns counterclockwise to align the notch as shown.

#### NOTE:

If the notch is not seen after turning the case 2.5 times move the cable slightly to the left and to the right to help locate it.



- c) Apply tape to the spiral cable case to prevent it from rotating out of the center (neutral) position.

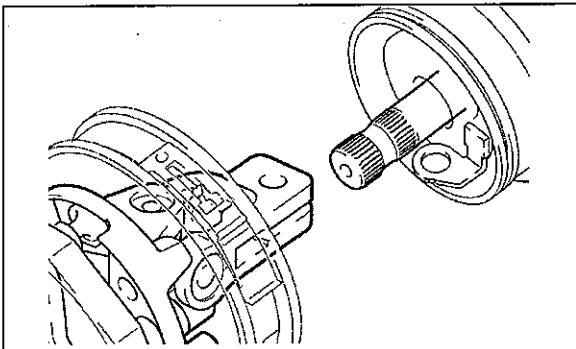


## 2. REINSTALL THE STEERING INTERMEDIATE SHAFT (VGRS ACTUATOR) ASSEMBLY

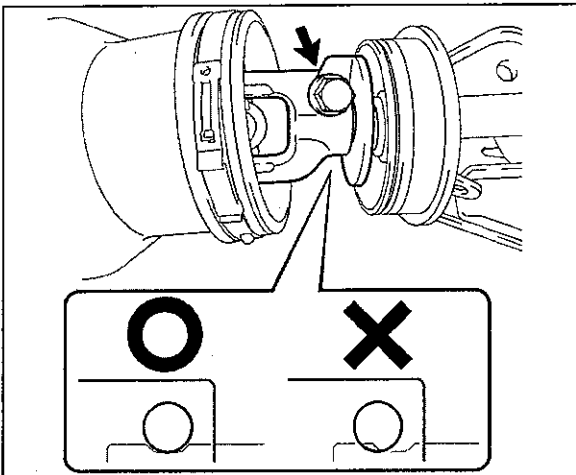
- Confirm the clamp is on the column hole cover.
- Reinstall the column hole cover to the intermediate shaft in the orientation shown above.

### NOTE:

**DO NOT** force the column hole cover onto the steering intermediate shaft, doing so may break the tape holding the spiral cable in the center (neutral) position.

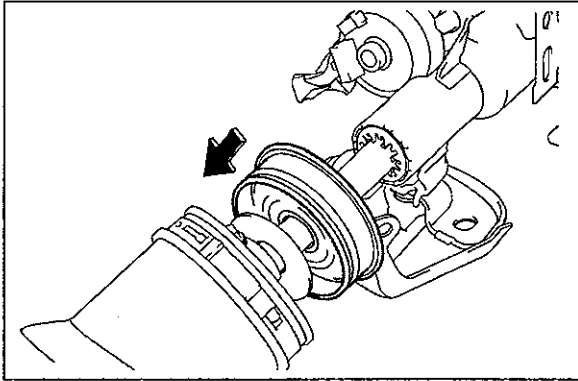


- Reconnect the intermediate shaft (VGRS actuator) to the steering column.



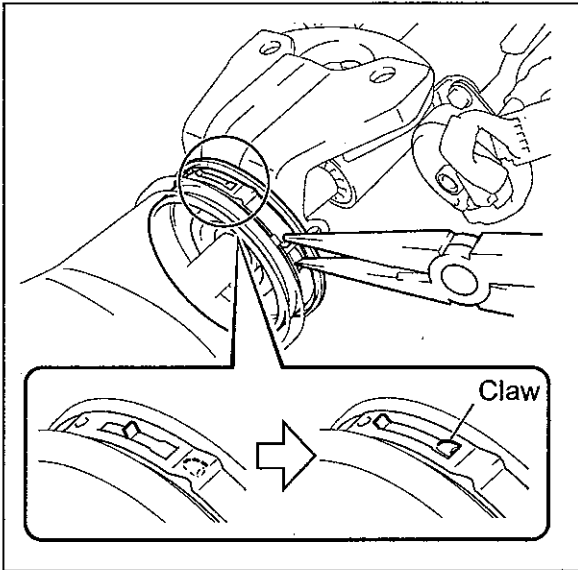
- Clean the bolt of any grease.
- Align the thrust washer and steering intermediate shaft (VGRS actuator) hole with the main shaft groove, then install the bolt and torque to spec.

**Torque Spec: 34 N\*m (347 kgf\*cm, 25 ft.\*lbf)**

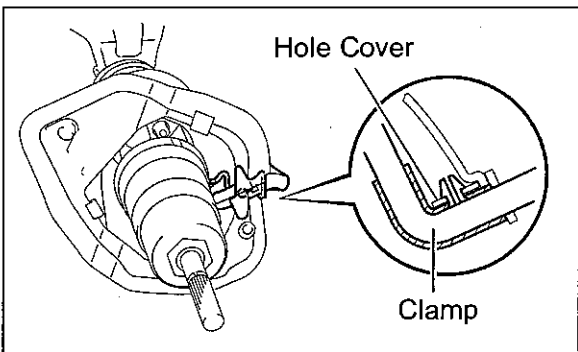


### 3. REINSTALL THE MAIN SHAFT UPPER SEAL

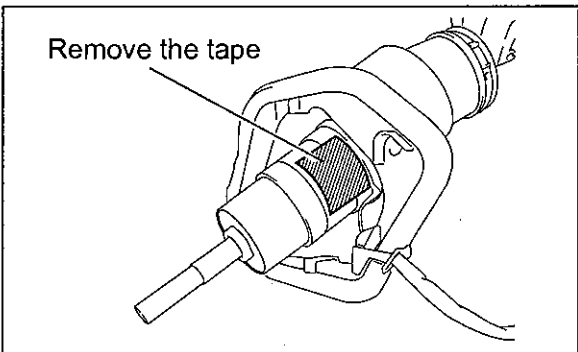
a) Slide the main shaft upper dust seal onto the steering column hole cover.



b) Engage the claw to tighten the clamp.

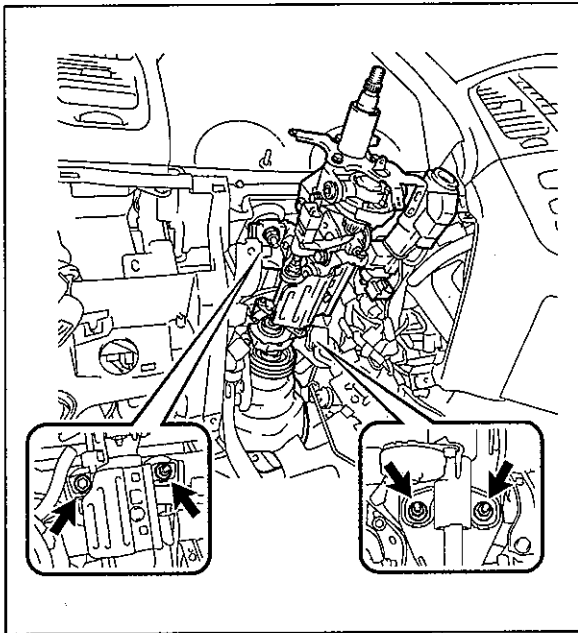


c) Confirm the wire harness is not twisted inside the steering hole cover.  
 d) Reconnect the wire harness clamp to the steering hole cover.



e) Remove the tape holding the spiral cable in place, **applies only if reusing the intermediate shaft (VGRS actuator).**

**NOTE:**  
 When installing a **NEW** steering intermediate shaft (VGRS actuator) there is no need to remove the tape holding the spiral cable in place, as it will break off once the steering wheel is turned.



**4. REINSTALL THE STEERING COLUMN WITH INTERMEDIATE SHAFT (VGRS ACTUATOR) ASSEMBLY**

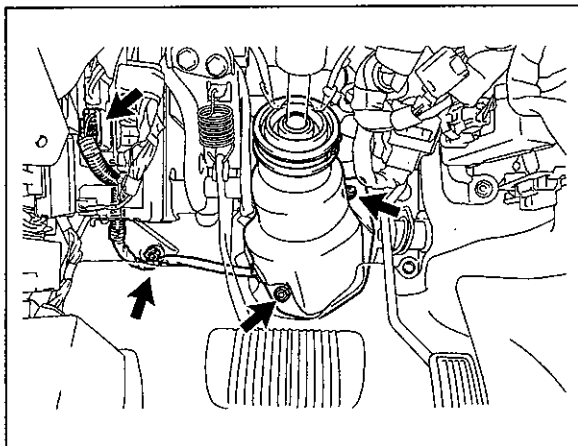
- a) Reinstall the steering column with intermediate shaft (VGRS actuator) assembly with the 4 bolts.
- b) Tighten the 4 bolts evenly and torque to spec.

**Torque Spec: 25 N\*m (255 kgf\*cm, 18 ft.\*lbf)**

- c) Reconnect the multiple connectors.

**NOTE:**

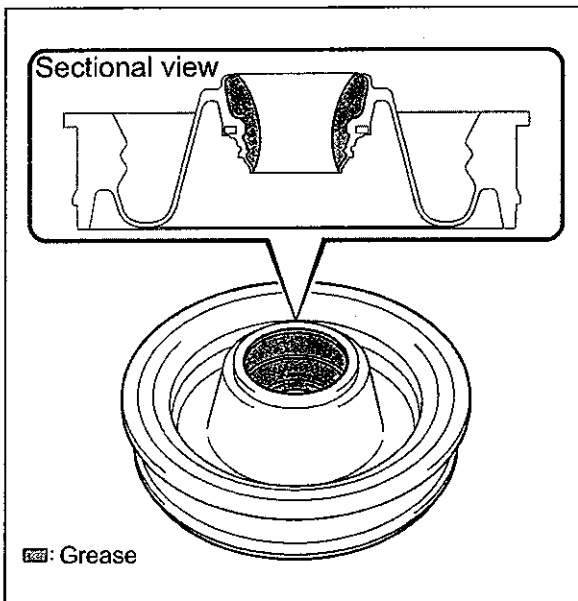
**Make sure to wear protective gloves when reinstalling the steering column with intermediate shaft (VGRS actuator) assembly, as there may be sharp edges on the surrounding components.**



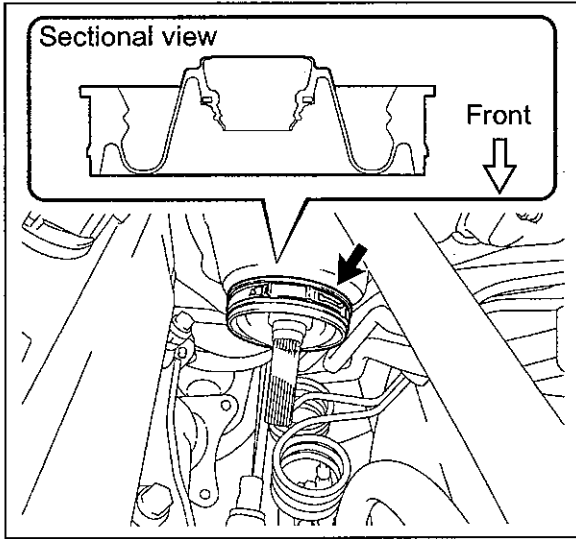
- d) Reinstall the steering column hole cover with the 2 nuts and torque to spec.

**Torque Spec: 13 N\*m (133 kgf\*cm, 9.6 ft.\*lbf)**

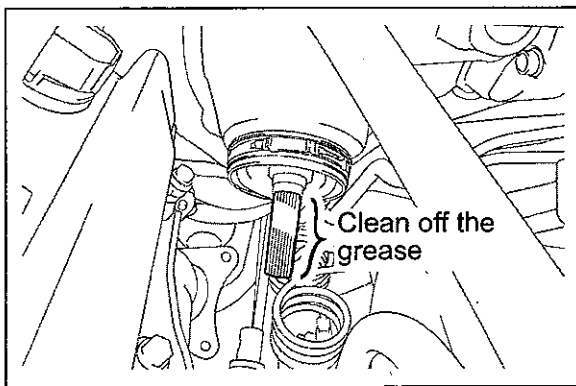
- e) Reconnect the connector and wire harness clamp.



- f) Fill the **NEW** lower dust seal as shown with molybdenum disulfide lithium base grease or equivalent.



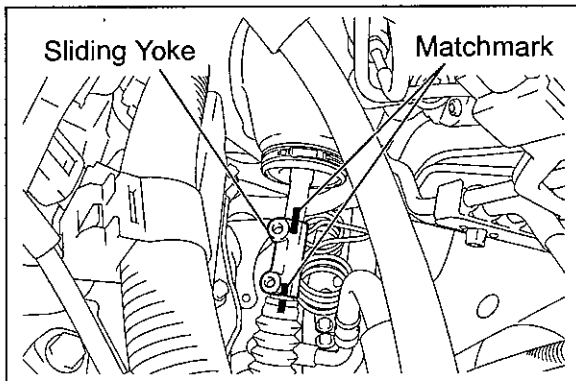
- g) Install the **NEW** lower dust seal with the **NEW** clamp to the steering intermediate shaft (VGRS actuator) in the direction shown.



- h) Using brake clean, remove any grease from the splines of the steering intermediate shaft (VGRS actuator) left from the installation of the **NEW** lower dust seal.

**NOTE:**

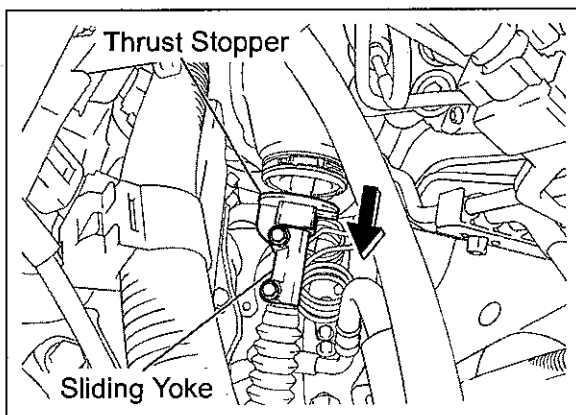
It is OK if the matchmark disappear during the cleaning process, as they are used to assist in the reassembly process. In addition, the sliding yoke can only be connected in only one position.



- i) Insert the key in the ignition and turn it to the ACC position to release the steering lock.  
j) Utilizing the matchmarks, reinstall the sliding yoke.

**NOTE:**

When reinstalling the sliding yoke to a **NEW** steering intermediate shaft (VGRS actuator) it may be necessary to turn the shaft slightly (as little as possible, less than 90°) to assist in installation.

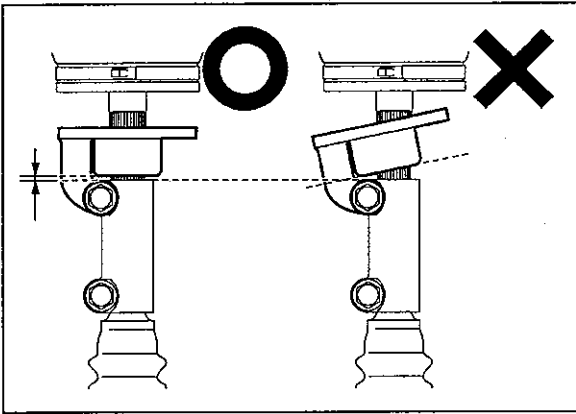


- k) Using brake clean, remove any grease from the 2 bolts.  
l) Install the **NEW** thrust stopper to the sliding yoke and temporarily install the 2 bolts.  
m) Pushing the sliding yoke down onto the steering shaft and torque to lower bolt to spec.

**Torque Spec: 34 N\*m (347 kgf\*cm, 25 ft.\*lbf)**

- n) Pushing the thrust washer down onto the sliding yoke and torque to upper bolt to spec.

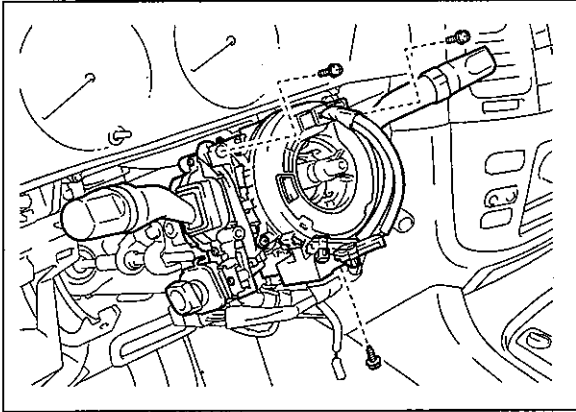
**Torque Spec: 34 N\*m (347 kgf\*cm, 25 ft.\*lbf)**



- o) Confirm the thrust stopper is installed parallel with and as close as possible to the sliding yoke as shown.

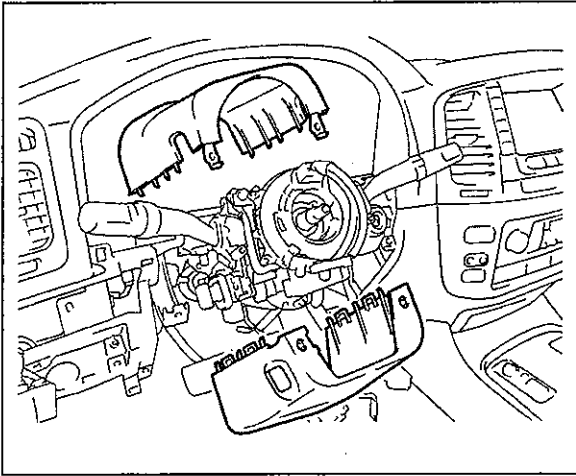
**NOTE:**

It is OK if to have the thrust stopper and sliding yoke in contact with one another.



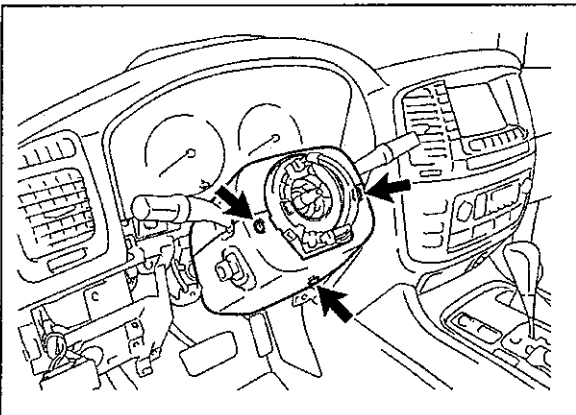
**5. REINSTALL THE COMBINATION SWITCH**

- a) Remove the key from the in ignition switch.
- b) Reinstall the combination switch with the 3 screws.
- c) Reconnect the 5 connectors.

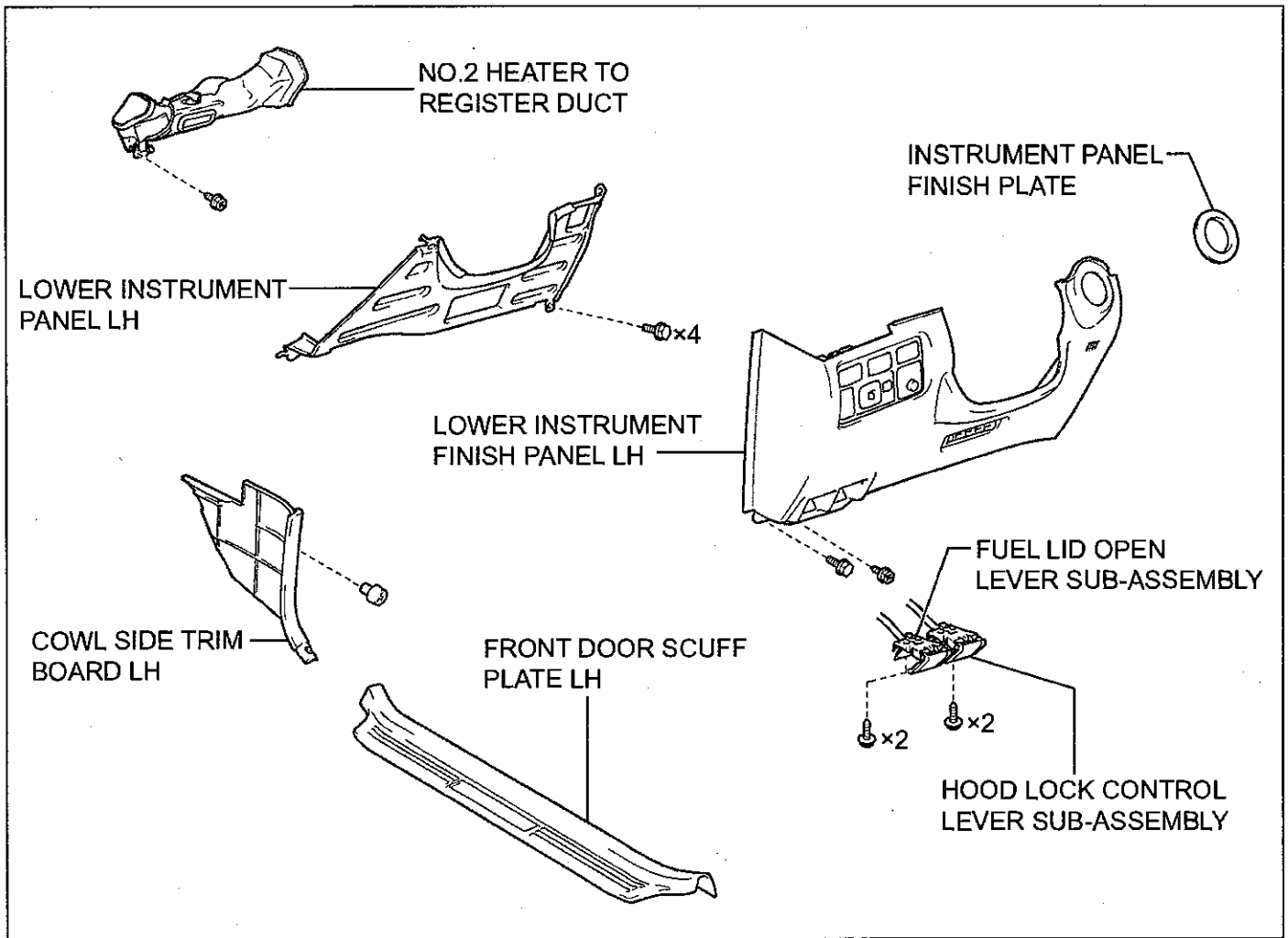


**6. REINSTALL THE STEERING COLUMN COVERS**

- a) Reinstall the Lower and upper steering column covers.



- b) Reinstall the 3 screws.



## 7. REINSTALL THE FOLLOWING COMPONENTS

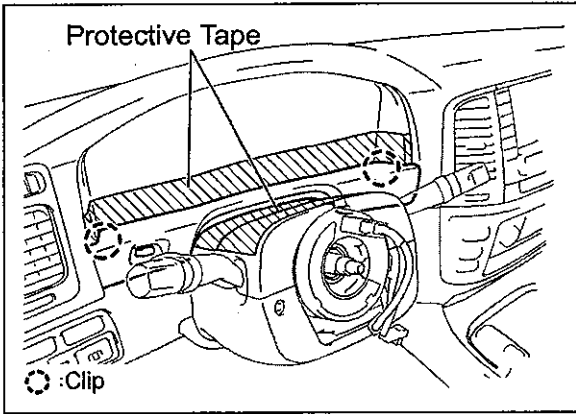
- a) No. 2 Heater To Register Duct
  - i. Reinstall the heater to register duct with the screw.
  - ii. Reconnect the dimmer switch connector.
- b) Lower Instrument Panel LH
  - i. Reinstall the lower instrument panel with the 4 bolts and torque to spec.
- c) Lower Instrument Finish Panel LH
  - i. Reconnect the room temperature sensor hose and connector.
  - ii. Reconnect the multiple connectors.
  - iii. Reinstall the lower instrument finish panel by engaging the 5 clips and 2 guides.
  - iv. Reinstall the screw and bolt.
  - v. Reinstall the hood and fuel lid lever assemblies with the 4 screws.
  - vi. Reinstall the instrument panel finish plate.

### NOTE:

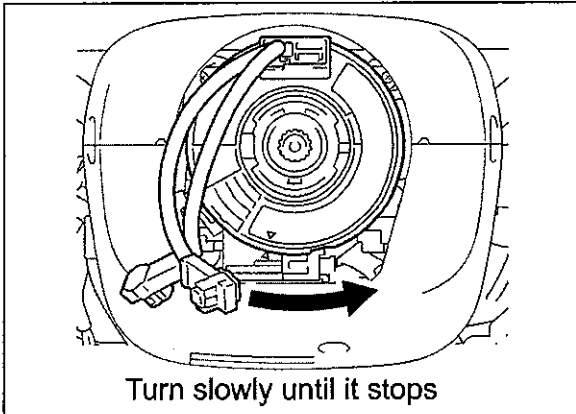
**DO NOT damage the room temperature sensor when reconnecting the hose.**

- d) Cowl Side Trim Board LH
  - i. Reinstall the cowl side trim board LH with the clip.
- e) Front Door Scuff Plate LH

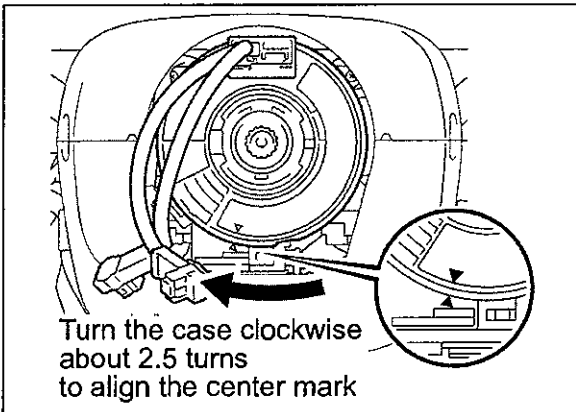




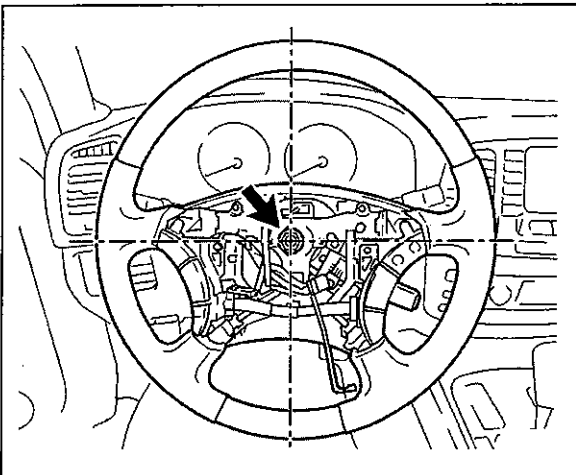
- 8. REINSTALL THE NO. 2 INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY**
- Reconnect the dimmer switch connector.
  - Reinstall the instrument cluster finish panel by engaging the 2 clips.
  - Remove the protective tape.



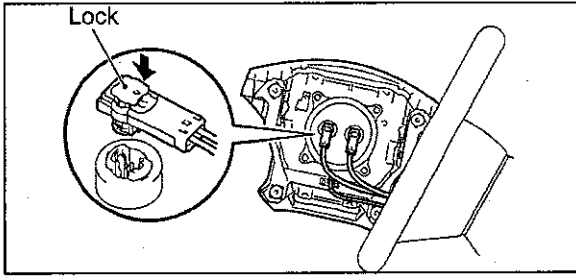
- 9. CENTER THE SPIRAL CABLE SUB-ASSEMBLY**
- Turn the spiral cable counterclockwise until it stops.
- NOTE:**  
The spiral cable can be turned approximately 5 times.



- Turn the spiral cable 2.5 turns clockwise to align the marks as shown.



- 10. REINSTALL THE STEERING WHEEL**
- Reinstall the steering wheel in the centered position.
  - Reinstall the nut and torque to spec.
- Torque Spec: 50 N\*m (510 kgf\*cm, 37 ft.\*lbf)**
- Reconnect the spiral cable connector.



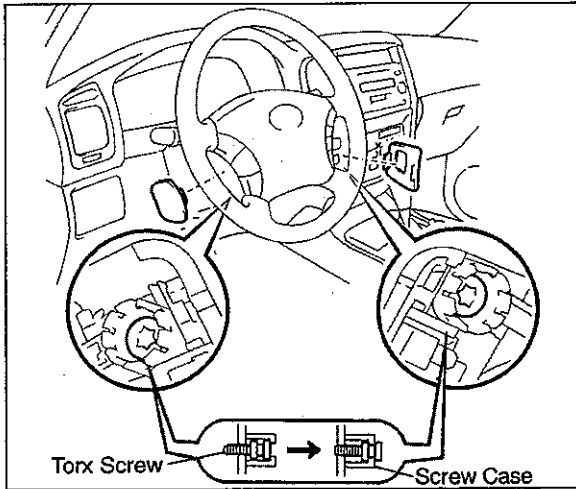
## 11. REINSTALL THE STEERING WHEEL PAD (AIRBAG)

- Reconnect the horn wire harness.
- Reconnect the 2 airbag connectors by pushing down on the lock.
- Reinstall the wheel pad (airbag).

- Reinstall the 2 Torx® bolts and torque to spec.

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

- Reinstall the steering wheel lower cover No. 2 and No. 3.



## 12. RECONNECT THE NEGATIVE BATTERY CABLE

- Reconnect the negative battery cable.
- Set the radio station presets and the clock.
- Reinitialize the vehicle system(s) as outlined in the repair manual on TIS.

## 13. CONFIRM THE OPERATION OF THE SRS WARNING LIGHT

- With the ignition ON, confirm the warning light turns on and turns off approximately 6 seconds later.

### NOTE:

If the SRS light stays on after 6 seconds diagnose the system as outlined in the repair manual on TIS.

## F. INITIALIZE THE VGRS ACTUATOR

### 1. STEERING WHEEL ANGLE ADJUSTMENT

- Confirm the front tires are in the straight-ahead position.
- Connect the Techstream to the DLC3.
- Enter the following menu: Chassis / VGRS / Steering Angle Adjust.
- Test drive the vehicle to confirm if the steering wheel is centered, if not, proceed to step a) to repeat the process.

### NOTE:

- After confirming the front tires are in a straight-ahead position, DO NOT center the steering wheel if it is off center.
- During the steering angle adjustment process the coupling between the steering wheel and the tire is disconnected inside the VGRS actuator, so the steering wheel move freely.
- The VGRS warning light may turn on with DTC 1515/15 (VGRS actuator neutral position is not initialized), please disregard this condition.
- If the steering wheel is not turned to the left and to the right approximately 5°, DTC C1568/68 (lock holder deviation detection) may occur.

## 2. ACQUIRE THE STEERING SENSOR ZERO POINT

- a) Connect the Techstream to the DLC3.
- b) Enter the following menu: Chassis / VGRS / Data List to monitor the Steering Angle Valid Flag. (Invalid: the zero point is not acquired / Valid: the zero point is acquired)
- c) Drive the vehicle at the speed of 35 km/h (22 mph) or more for 5 or more seconds to confirm the Steering Angle Valid Flag on the data list is valid.

### NOTE:

- If DTC C1515/15 (VGRS actuator neutral position is not initialized) occurs, the steering sensor zero point acquisition cannot be performed.
- Some vehicles have a VGRS warning light blinking (1 Hz) function to indicate that the steering sensor zero point has not been acquired. But when the steering wheel angle sensor is performed the warning light will turn OFF even if the zero point has not been acquired. Due to this all vehicles need to be checked with the Techstream.
- When the ignition is turned OFF and ON after acquiring the steering sensor zero point, the Techstream may show that it has not been acquired (invalid), please disregard this condition.

## 3. CHECK FOR LOCK HOLDER DEVIATION

- a) Turn the ignition to the ON position (do not start the engine) and check that the VGRS warning light turns on and then goes off.
- b) Start the engine.
- c) From the center/neutral position, turn the steering wheel to the left and then to the right until it stops (approximately 2.4 turns in each direction from the center/neutral position). Return the steering wheel to the center/neutral position and turn ignition OFF.
- d) Start the engine.
- e) Turn the steering wheel 90° to the left and return it to the center/neutral position.
- f) Turn the steering wheel 90° to the right and return it to the center/neutral position.
- g) Keep the steering wheel in the center/neutral position for 3 seconds or more.
- h) Stop the engine (by turning the ignition to the ACC position) while slowly turning the steering to the wheel left for 3 seconds or more. (Turning the ignition key to ACC will prevent the steering wheel from locking during this step.)
- i) Repeat steps d) through h) 15 times.

### NOTE:

- When the Steering Wheel Angle Adjustment is performed, the specified lock holder position inside the actuator is learned.
- The lock holder does not move automatically to the specified position to be learned. The lock holder is set to the specified position by turning the steering wheel to the left and to the right by approximately 5° depending on the direction.
- If the specified lock holder position is not correctly learned due to insufficient turning of the steering wheel, DTC C1568/68 (lock holder deviation detection) may occur turning on the VGRS warning light.
- If the specified lock holder position is not detected during a proper test perform the following procedures in order to check that DTC C1568/68 has not occurred.

## 4. CHECK FOR DTCs

- a) Check for DTC, and confirm the VGRS warning light is turns off.
- b) If DTC C1568/68 (lock holder deviation detection) occurs, return to step 1 "STEERING WHEEL ANGLE ADJUSTMENT" and perform the work procedure again.

## 5. PERFORM TEST MODE CHECK

- a) Select the following menu items: Chassis / VGRS / Signal Check and then perform the test mode check according to the display screen.
- b) Perform the following procedure to check each signal and clear the DTC.
  - Drive the vehicle at speeds of 10 km/h (6 mph) or more.
  - Turn the steering wheel to the left or right by 36° or more.
- c) If all the DTCs can be cleared, the VGRS warning light will operate as follows.
  - Drive the vehicle at speeds of 4 km/h (2.5 mph) or more: The warning light goes out
  - Drive the vehicle at speeds of less than 4 km/h (2.5 mph) or stopping: The warning light blinks fast (4 Hz)
- d) The test mode is complete.

### NOTE:

When test mode is activated the following 4 DTCs will occur, and the VGRS warning light will blink at (4Hz). When the condition to clear is met, the code will be erased.

DTC No.	Diagnosis	Condition to clear
C1571/71	Vehicle speed sensor malfunction (FLO)	10 km/h (6 mph) or more.
C1572/72	Vehicle speed sensor malfunction (FRO)	-
C1575/75	Steering angle sensor malfunction	Signal for left or right steering angle of 36° or more occurs in test mode.
C1576/76	DC motor revolution sensor malfunction	Signal for left or right motor turning angle of 36° or more occurs in test mode.

– CAMPAIGN COMPLETE –