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# SECTION PS

## POWER STEERING SYSTEM

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# PRECAUTIONS

## PRECAUTIONS

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### Precautions for Models with SRS Air Bag and Seat Belt Pre-tensioner

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#### **WARNING:**

- Before removing and installing components and harnesses of SRS air bag and seat belt pre-tensioner system, turn ignition switch OFF, disconnect battery ground cable, and wait at least 3 minutes. (This discharges electricity held in the air bag sensor unit's additional power circuit.)
- Do not use pneumatic or electric tools to remove and install the components.
- Do not solder SRS air bag and seat belt pre-tensioner system harnesses when making repairs. Make sure harness is not pinched and there is no contact with other components.
- When checking the SRS air bag and the seat belt pre-tensioner circuit or the components of each system, do not use an electric tester such as a circuit tester. (This is to prevent accidental triggering caused by the weak electric current of a tester.)
- Never insert foreign material (such as a screwdriver) in the air bag module and seat belt pre-tensioner connectors. (The units may be actuated by mistake by static electricity.)
- Seat belt pre-tensioner and SRS air bag harnesses can be distinguished from other harnesses by their yellow connectors.
- When servicing, refer to “SB Seat Belt” and “SRS Air Bag” for safety.

#### **Caution**

EGS000BC

- Always follow the warnings and the cautions below in disassembly procedures:
  - Work in a clean, dust-free place. No dust proof device is necessary.
  - Clean outside of unit before disassembly.
  - Clean parts to be disassembled. Be careful not to allow any dirt or other foreign materials to enter or contact with parts.
  - Assemble disassembled parts properly, following order shown in manual. If work has been suspended in the middle of assembly, place a clean cover over parts. This will prevent them from being contaminated.
  - Use paper towels when removing dirt and other foreign materials. Cloth shop towels can leave lint on cleaned parts that might affect operation of parts.
  - Clean disassembled parts (except rubber parts) with kerosene. Drain oil by blowing with air or absorbing with shop papers.
  - Before assembling, apply Nissan power steering fluid to O-rings and seals.
  - Replace gaskets and O-rings with new ones. Be careful not to damage any O-rings, oil seals, and gaskets during assembly.
- If following part is scratched after disassembly of steering pump, replace applicable part: case, rear body, side plate, pulley, rotor, vane, or flow control valve
- Mark source of fluid leak with a white marker for identification.
- Seals and copper washers must not be reused.

# PREPARATION

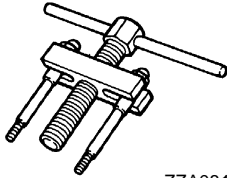
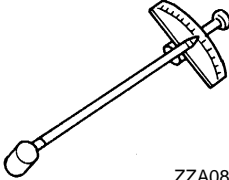
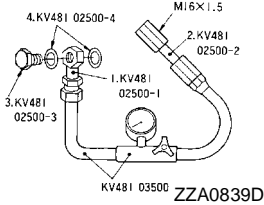
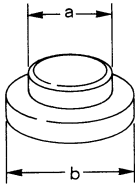
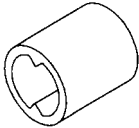
## PREPARATION

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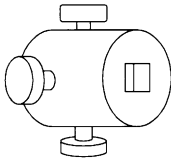
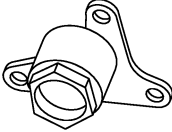
### Special Service Tools

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| Tool name  | Description  |
|--|--|
| Steering wheel puller<br>ST2718 0001<br> <p style="text-align: right;">ZZA0819D</p>   | Removing steering wheel  |
| Preload gauge<br>ST3127 S000<br> <p style="text-align: right;">ZZA0806D</p>   | Checking steering torque   |
| Hydraulic pressure gauge<br>KV481 03500<br>Hydraulic pressure gauge adapter<br>KV481 02500<br>1 KV481 02500-01<br>(I-joint)<br>2 KV481 02500-02<br>(Flare joint)<br>3 KV481 02500-03<br>(Bolt)<br>4 KV481 02500-04<br>(Washer) |  <p style="text-align: right;">ZZA0839D</p> Measuring oil pump relief pressure |
| Drift<br>ST3530 0000<br>a: $\phi 45.1$ mm<br>b: $\phi 59$ mm<br> <p style="text-align: right;">ZZA0881D</p>                                 | Installing drive shaft seal  |
| KV48100700<br>Torque adapter<br> <p style="text-align: right;">NT169</p>  | Measuring pinion rotating torque   |

# PREPARATION

| Tool name  | Description   |
|--|---|
| <p>KV48103400<br/>Torque adapter</p>  <p>NT236</p>  | <p>Measuring pinion rotating torque</p>                |
| <p>KV48105210<br/>Sprocket holder</p>  <p>NT809</p> | <p>Removing and Installing power steering oil pump</p> |

# NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

## NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

PF0:00003

### NVH Trouble Shooting Chart

EGS000BE

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

| Symptom |       | STEERING  | Possible cause and SUSPECTED PARTS |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   | Reference page |                            |                     |       |            |             |        |                                   |      |   |      |       |
|---------|-------|-----------|------------------------------------|-------------------------|----------------------------------|-----------------------------------|-----------------------------|-----------------------------|---------------------|----------------------------------|----------------------|-------------------------|---|-------------------------------|---------------------------------------|---|----------------|----------------------------|---------------------|-------|------------|-------------|--------|-----------------------------------|------|---|------|-------|
|         |       |           | Fluid level                        | Air in hydraulic system | Tie-rod ball joint tensile force | Tie-rod ball joint sliding torque | Tie-rod ball joint end play | Steering gear fluid leakage | Steering wheel play | Steering gear rack sliding force | Drive belt looseness | Improper steering wheel | Improper installation or looseness or tilt lock lever | Mounting rubber deterioration | Steering column deformation or damage | Improper installation or looseness of steering column |                | Steering linkage looseness | AXLE AND SUSPENSION | TIRES | ROAD WHEEL | DRIVE SHAFT | BRAKES |                                   |      |   |      |       |
| Noise   | Shake | Vibration | Shimmy                             | Judder                  | x                                | x                                 | x                           | x                           | x                   | x                                | x                    | x                       | x   | x                             | x                                     | x   | x              | x                          | x                   | x     | x          | x           | x      | x                                 | PS-6 |   |      |       |
|         |       |           |                                    |                         | x                                | x                                 | x                           | x                           | x                   | x                                | x                    | x                       | x   | x                             | x                                     | x   | x              | x                          | x                   | x     | x          | x           | x      | x                                 | x    | x | PS-6 |       |
|         |       |           |                                    |                         | x                                | x                                 | x                           | x                           | x                   | x                                | x                    | x                       | x   | x                             | x                                     | x   | x              | x                          | x                   | x     | x          | x           | x      | x                                 | x    | x | x    | PS-15 |
|         |       |           |                                    |                         | x                                | x                                 | x                           | x                           | x                   | x                                | x                    | x                       | x   | x                             | x                                     | x   | x              | x                          | x                   | x     | x          | x           | x      | x                                 | x    | x | x    | PS-15 |
|         |       |           |                                    |                         | x                                | x                                 | x                           | x                           | x                   | x                                | x                    | x                       | x   | x                             | x                                     | x   | x              | x                          | x                   | x     | x          | x           | x      | x                                 | x    | x | x    | PS-6  |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | PS-7                              |      |   |      |       |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | PS-15                             |      |   |      |       |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | -                                 |      |   |      |       |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | -                                 |      |   |      |       |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | PS-11                             |      |   |      |       |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | -                                 |      |   |      |       |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | PS-11                             |      |   |      |       |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | PS-13                             |      |   |      |       |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | NVH in FAX, RAX, FSU, RSU section |      |   |      |       |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | NVH in WT section                 |      |   |      |       |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | NVH in WT section                 |      |   |      |       |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | NVH in FAX section                |      |   |      |       |
|         |       |           |                                    |                         |                                  |                                   |                             |                             |                     |                                  |                      |                         |   |                               |                                       |   |                |                            |                     |       |            |             |        | NVH in BR section                 |      |   |      |       |

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# POWER STEERING FLUID

## POWER STEERING FLUID

PFP:KLF20

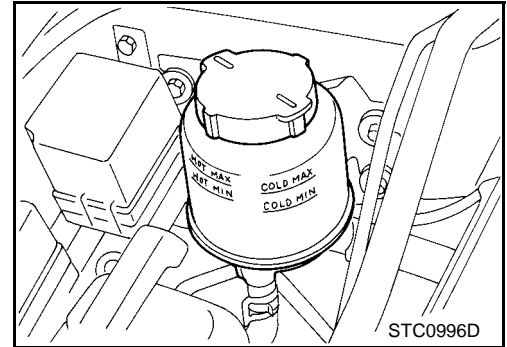
### Checking Fluid Level

EGS000BF

- Check the fluid level with the engine OFF.
- Check that fluid level is between MAX and MIN marks on tank. Fluid level should not exceed MAX mark. Excessive fluid will cause fluid to leak from cap.
- Note that fluid level can change depending on temperature of fluid. HIGH and LOW marks are shown on tank to indicate the proper level at high temperature and low temperature respectively.

**HOT** : Oil temperature 50 to 80°C (122 to 176°F)

**COLD** : Oil temperature 0 to 30°C (32 to 86°F)



### CAUTION:

- Never reuse drained power steering fluid.
- Use DEXRON™ III or equivalent. Never use Nissan Power Steering Fluid Special, Nissan Matic Fluid C, or D.

### Checking Fluid Leak

EGS000BG

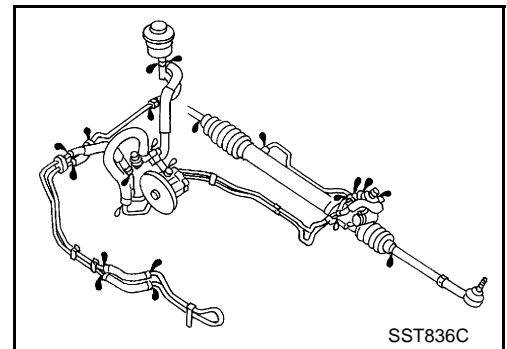
Check hydraulic connections for any leak, crack, damage, looseness, or wear.

1. Run engine until fluid temperature reaches 50 to 80°C (122 to 176°F) in reservoir tank. Keep engine speed at idle.
2. Turn steering wheel several times from stop to stop.
3. Turn the steering wheel clockwise or counterclockwise until it reaches the stop and hold it for five seconds. Check for fluid leak.

### CAUTION:

**Do not hold steering wheel at stop for 15 seconds or longer. Otherwise, pump may be damaged.**

4. If any leak is found on joint, loosen and retighten flair nut. Excessive tightening may damage O-ring, washer, or connector.



### Bleeding Hydraulic System

EGS000BH

1. Lift vehicle.
2. Fill tank up to MAX mark. Turn steering wheel several times from stop to stop. Add fluid if fluid level goes down. Repeat this step until there is no fluid decrease and no bubble in tank.
3. Start engine and repeat step above with engine at idle. Continue step until no decrease in fluid happens. If bleeding is not complete, following symptoms can be observed.
  - Bubbles are created in reservoir tank.
  - Rattling noise can be heard from oil pump.
  - Whining noise can be heard from oil pump.

Turn steering wheel slowly or stop vehicle. Sound of fluid movement may be heard from gear valve and pump. This sound has nothing to do with steering performance or durability.

# STEERING WHEEL

## STEERING WHEEL

PF:48430

### On-Vehicle Inspection and Service PLAY INSPECTION

EGS000C1

1. Turn steering wheel to straight-ahead position. Start engine and lightly turn steering wheel clockwise and counterclockwise until front wheels start moving. Measure travel to starting point on circumference of steering wheel.

**Steering wheel play inspection standard : 0 - 35 mm (0 - 1.38 in)**

2. If play is outside specifications, check following parts for proper installation: steering gear assembly, front suspension, axles, and steering column.

- Check steering wheel for vertical, horizontal, or axial play.

**Steering wheel axial end play : 0 mm (0 in)**

- Lift vehicle and check steering gear mounting bolts and nuts for looseness.

**Tightening torque : 145 - 185 N·m (15 - 18 kg·m, 107 - 136 ft·lb)**

### NEUTRAL POSITION INSPECTION

- After the wheel alignment inspection, carry out the neutral position inspection. Refer to [FSU-6, "Wheel Alignment"](#).
- Before removing steering wheel, check steering gear neutral position.
  1. Set vehicle to straight-ahead position, and check that steering wheel is in neutral position.
  2. If it is not in neutral position, remove steering wheel, and install again in properly.
  3. If it is not adjusted within two teeth from center of gear, loosen tie rod lock nut. Then turn it to opposite direction to adjust until amount of left and right becomes equal.

### STEERING TORQUE CHECK

1. Stop vehicle on a dry flat paved road and apply parking brake.
2. Start engine and wait until power steering fluid warms up. Using a preload gauge, check rotational torque of steering wheel.

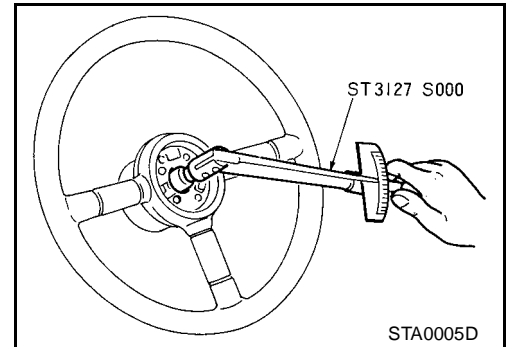
**Steering torque : 706 N·cm (72 kg·cm) or less**

3. If torque is outside specifications, check rack sliding torque and oil pump relief pressure.

**Rack sliding torque : 145 - 255 N (14.8 - 26.0 kg, 32.6 - 57.3 lb)**

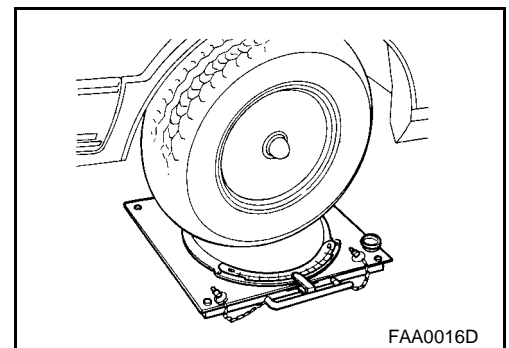
**Oil pump relief hydraulic pressure:**

|                      |  |
|----------------------|--|
| <b>QG, QR engine</b> | <b>: 8,800 + 400 - 200 kPa (88.0 + 4.0 - 2.0 bar, 89.76 + 4.08 - 2.04 kg/cm<sup>2</sup>, 1,276 + 58 - 29psi)</b> |
| <b>YD engine</b>     | <b>: 8,820 + 500 - 300 kPa (88.2 + 5.0 - 3.0 bar, 89.96 + 5.10 - 3.06 kg/cm<sup>2</sup>, 1,279 + 73 - 44psi)</b> |



### STEERING ANGLE INSPECTION

- After toe-in inspection, check steering angle. Place front wheels on turning radius gauges and rear wheels on stands. Level the vehicle. Check maximum inner and outer wheel steering angles for LH and RH road wheels.



# STEERING WHEEL

- Start engine. With engine at idle, turn steering wheel from stop to stop and measure steering angles.

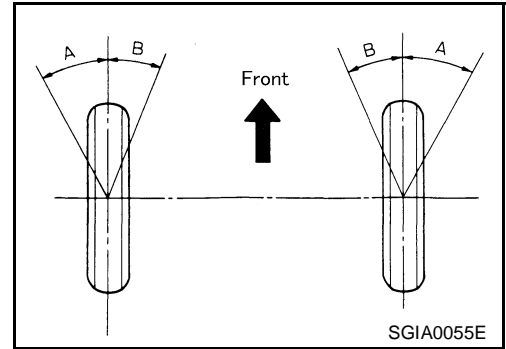
**Inner wheel** : 37.5° +1°  
-3°

**Outer wheel** : 30.5°

- If angles are outside specification, measure rack stroke.

**Rack stroke** : 68 mm (2.68 in)

- If rack stroke is outside of specification, disassemble steering gear to check rack stroke.
- Steering angles are not adjustable. If any of steering angles is different from specified value, check steering gear, the column and the front suspension components for wear or damage. If any abnormality exists, replace the malfunctioning parts.

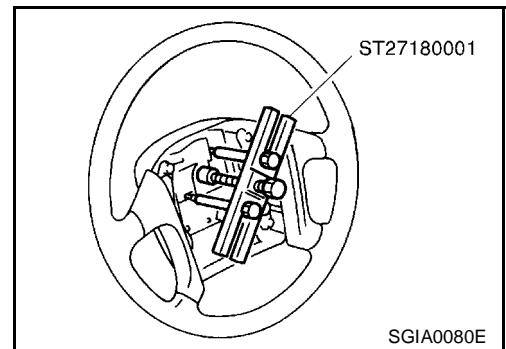


## Removal and Installation

### REMOVAL

1. Remove air bag module. Refer to [SRS-31, "Removal and Installation"](#).
2. Remove horn connector.
3. Remove steering wheel mounting nut and paint mating marks on steering wheel body and top of column shaft.
4. Using a steering wheel puller, remove steering wheel.

EGS000C2



### INSTALLATION

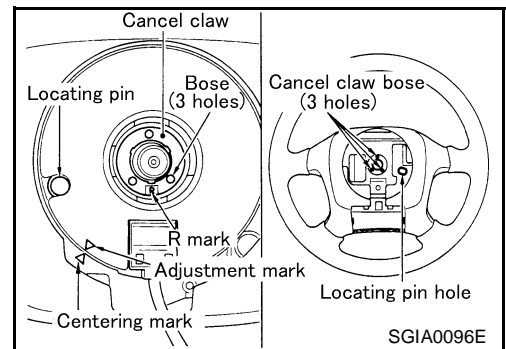
Paying attention to following items, install in the reverse order of removal.

#### NOTE:

- When reconnecting spiral cable, fix cable with a tape so that fixing case and rotating part keep aligned. This will omit neutral position alignment procedure during spiral cable installation.
- Neutral position (refer to figure)... Gently turn spiral cable clockwise until it comes to the stop. Then turn it counterclockwise (approximately 3.0 turns) until centering mark is aligned with adjustment mark. (Service part is fixed in neutral position with stopper. It can be installed onto steering wheel without alignment once stopper is removed.)

#### CAUTION:

- **Place steering wheel as follows: Front wheels in straight-ahead position. R mark on the cancel claw faces down. 3 bosses align with 3 holes behind steering wheel assembly. Check that spiral cable is placed in neutral position and that locating pin on the left of the spiral cable is aligned with the locating pinhole behind the steering wheel assembly.**
- Do not rotate spiral cable more than necessary. Do not tighten them excessively. (The cable may be torn off.)
- After installation, check system for proper operation by observing air bag warning lamp.
- If air bag indicator indicates any abnormal condition, use self-diagnosis function or CONSULT-II to reset or cancel memory.





## STEERING WHEEL

- 
- If air bag warning lamp still shows abnormal condition even after operation above, diagnose system. Repair malfunctioning parts.

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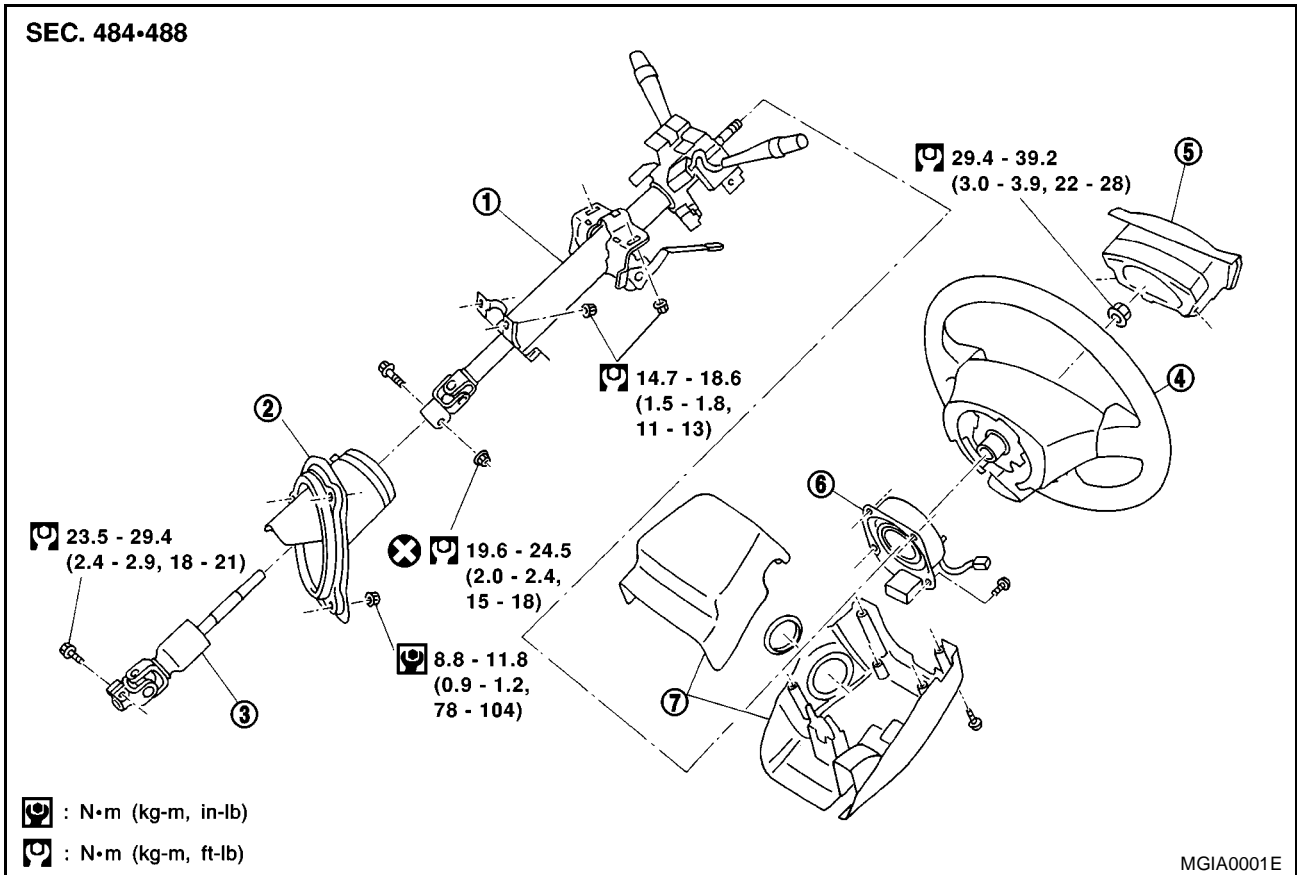
# STEERING COLUMN

## STEERING COLUMN

PFP:48810

### Removal and Installation

EGS000BK



- |                             |                   |                 |
|-----------------------------|-------------------|-----------------|
| 1. Steering column assembly | 2. Hole cover     | 3. Lower joint  |
| 4. Steering wheel           | 5. Air bag module | 6. Spiral cable |
| 7. Column cover             |                   |                 |

### CAUTION:

Care must be taken not to give axial impact to steering column assembly during removal and installation.

### REMOVAL OF LOWER JOINT AND HOLE COVER

1. Raise vehicle with front wheels in straight-ahead position.
2. Mark lower joint and steering gear with paint for easy installation. Remove pinch bolt from lower side of lower joint.
3. Remove mounting bolt and nut from upper side of lower joint.
4. Remove footrest.
5. Remove hole cover and lower joint from vehicle.
6. Remove clamp and lower seal cover from hole cover.

### INSTALLATION OF LOWER JOINT AND HOLE COVER

- Refer to component diagram for tightening torque. Install in the reverse order of removal.
- Connect lower joint onto steering gear with slot on lower portion of lower joint engaged with guide tip projection. Check guide tip is positioned as shown in the figure.

### REMOVAL OF STEERING COLUMN ASSEMBLY

1. Remove steering wheel and column cover. Refer to [PS-8, "Removal and Installation"](#).
2. Remove the instrument of the driver-side lower panel.
3. Remove spiral cable. Refer to [SRS-34, "Removal and Installation"](#).
4. Remove lower cover and mounting bolts and nuts on upper portion of lower joint.

# STEERING COLUMN

5. Remove the key interlock cable from the steering column assembly. Refer to [AT-402, "Removal"](#) .
6. Remove clamp and connector from steering column assembly.
7. Remove steering column assembly mounting nut and remove steering column assembly from vehicle.

**CAUTION:**

**Do not deform lower bracket on steering column assembly during removal or installation.**

## INSTALLING STEERING COLUMN ASSEMBLY

- Installation procedure should be used with steering lock unlocked.
1. Position on steering column assembly, and install steering column assembly to vehicle with mounting nuts.
  2. Attach mounting bolts and nuts on upper portion of lower joint.

**CAUTION:**

**Do not reuse mounting nuts.**

3. Connect clamp and connector.
4. Connect key interlock cable to steering column assembly. Refer to [AT-403, "Installation"](#) .
5. Connect spiral cable. Refer to [SRS-34, "Removal and Installation"](#) .
6. Install instrument lower driver panel.
7. Install steering wheel and column cover. Refer to [PS-8, "Removal and Installation"](#) .

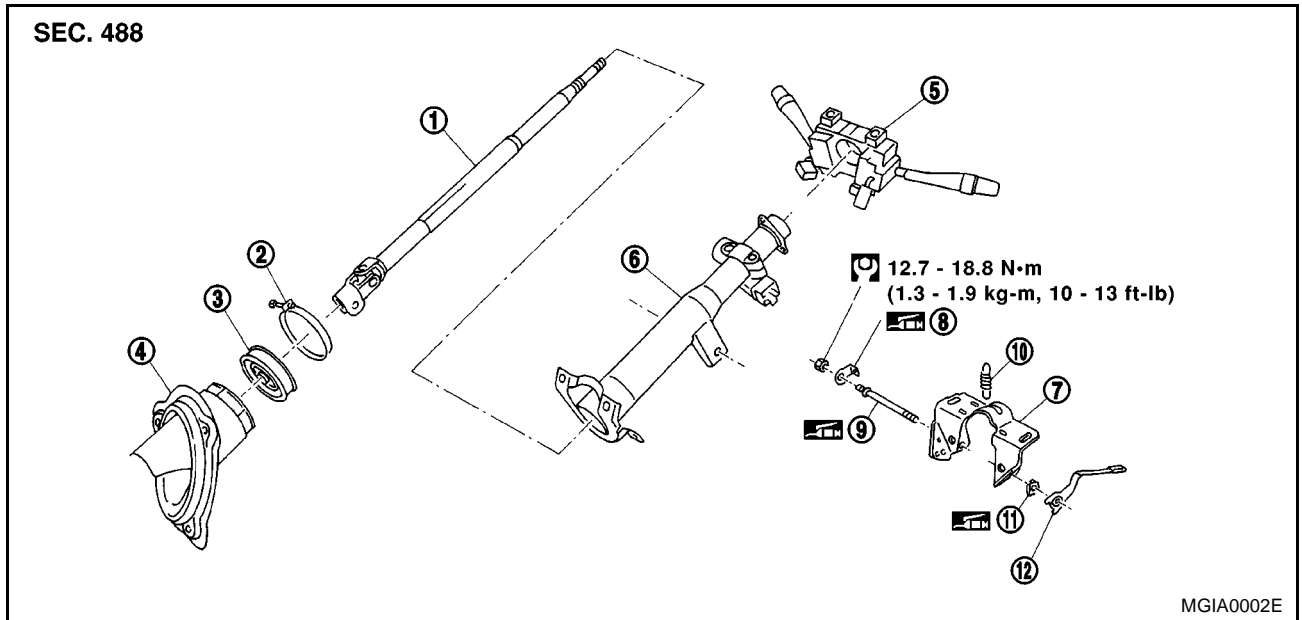
**CAUTION:**

**After installation, turn steering wheel. Be sure it turns smoothly with no disinterred condition, binding, noise or excessive steering effort.**

## Disassembly and Assembly

### DISASSEMBLY

EGS000BL



- |                   |                        |                            |
|-------------------|------------------------|----------------------------|
| 1. Column shaft   | 2. Clip                | 3. Lower seal cover        |
| 4. Hole cover     | 5. Combination switch  | 6. Jacket tube             |
| 7. Mount assembly | 8. Adjust stopper      | 9. Steering adjusting bolt |
| 10. Spring        | 11. Tilt lever stopper | 12. Tilt lever             |

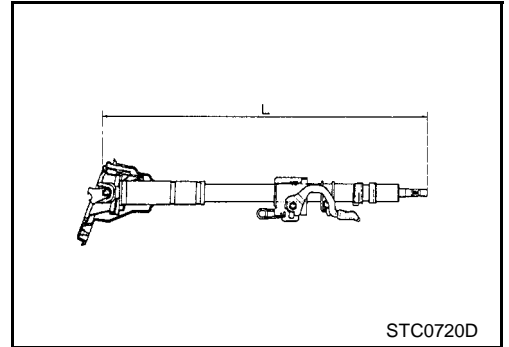
- Disassembly and assembly procedures should be done with steering lock unlocked.
1. Remove combination switch from jacket tube.
  2. Remove jacket tube-to-column shaft mounting nut and remove column shaft from jacket tube.
  3. Remove spring from mount assembly.
  4. Remove mounting nut and adjusting stopper.
  5. Remove steering adjusting bolt and remove tilt lever stopper and tilt lever.

# STEERING COLUMN

## INSPECTION AFTER DISASSEMBLY

- If steering wheel does not turn smoothly, check the following and replace malfunctioning part.
- 1. Check column shaft bearing for damage and other malfunctions. Lubricate with grease or replace column shaft if necessary.
- 2. Check jacket tube for deformation and cracks, and replace if necessary.
- If vehicle has slightly crashed, measure dimension L as shown. If outside standard, replace steering column assembly.

**Dimension L : 560.9 mm (22.08 in)**



## ASSEMBLY

- Refer to component parts drawing for tightening torque and reverse disassembly procedure for assembly.
- After assembling steering column, check tilt mechanism.

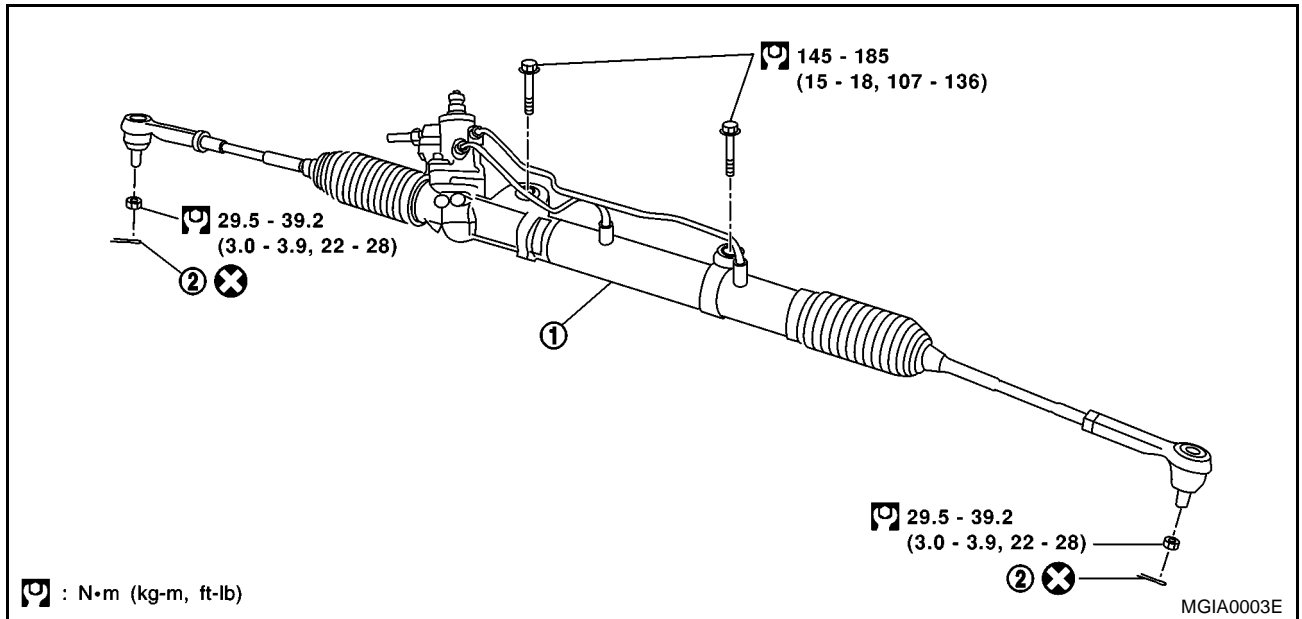
# POWER STEERING GEAR AND LINKAGE

## POWER STEERING GEAR AND LINKAGE

PFP:49001

### Removal and Installation

EGS000BM



1. Power steering gear assembly
2. Cotter pin

### REMOVAL

1. Remove front wiper arm. Refer to [WW-4, "FRONT WIPER AND WASHER SYSTEM"](#) , [WW-17, "FRONT WIPER AND WASHER SYSTEM \(WITH RAIN SENSOR\)"](#) .
2. Remove cotter pin, and loosen mounting nut. Remove tie rod from steering knuckle with a pitman arm puller.

#### CAUTION:

- Be careful not to damage dust boot at ball joint of tie rod.
  - Before using pitman arm puller (multi-purpose tool), loosely tighten nut for temporary holding.
3. Mark lower joint and steering gear with paint for easy installation. Remove pinch bolt from gear side of lower joint.
  4. Remove high pressure-side tube and low pressure-side hose of hydraulic piping from steering gear. (Plug tube and hose to prevent oil leakage.)
  5. Remove steering gear assembly mounting bolts. Remove power steering tube bracket and steering gear assembly from suspension member.
  6. Loosen suspension member mounting nuts and bolts to lower it a bit from vehicle.
  7. Tilt steering gear to prevent any contact with other parts. Then remove it from right side of vehicle. (Remove from left side for LHD models and right side for RHD models.)

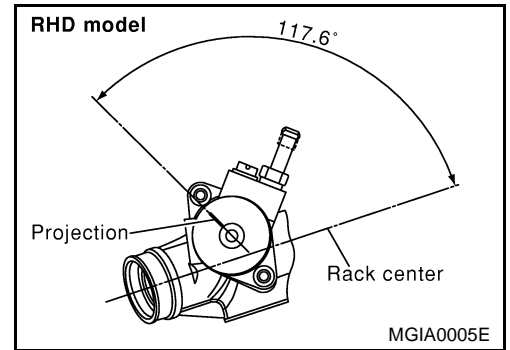
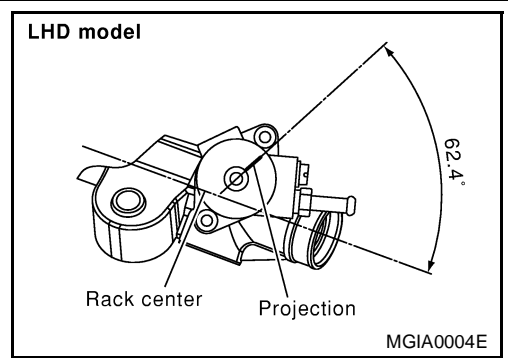
### INSTALLATION

Paying attention to following items, install in the reverse order of removal.

- After installation, bleed air. Refer to [PS-6, "Bleeding Hydraulic System"](#) .
- Remove mounting bolt and nut from upper portion of lower joint. This will facilitate installation of lower joint to steering gear. Then slide lower joint in place.

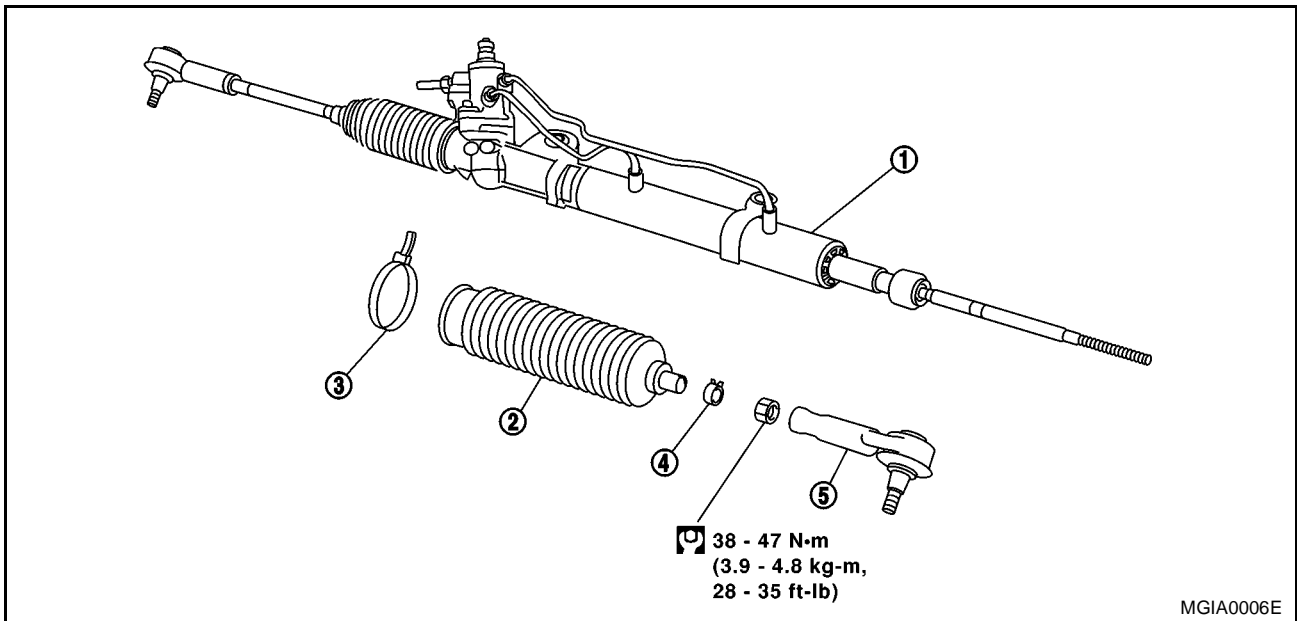
# POWER STEERING GEAR AND LINKAGE

- Check lower slit of lower joint is engaged with projection on rear cover cap. Install pinch bolt for lower portion of lower joint. Check steering gear is in straight-ahead position. Also check rear cover is in position shown in figure. Then install lower joint to steering gear.



## Components MODEL PR25T

EGS000C3



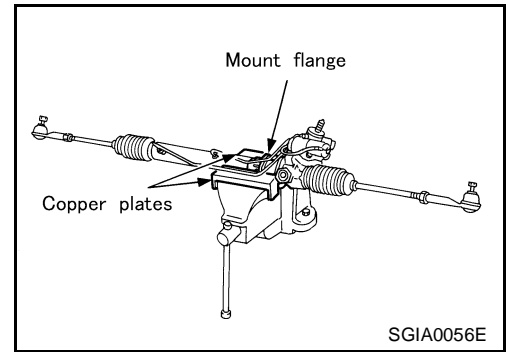
- |                           |                 |              |
|---------------------------|-----------------|--------------|
| 1. Steering gear assembly | 2. Dust boot    | 3. Boot band |
| 4. Boot band              | 5. Outer socket |              |

# POWER STEERING GEAR AND LINKAGE

## Disassembly and Assembly DISASSEMBLY

EGS000B0

1. To disassemble and assemble power steering gear, fix steering gear mount flange in a vise with copper plates.



2. Remove tie rod outer socket and boot.

### CAUTION:

- Do not reuse boot.
- When removing boot, do not damage boot mounting grooves by tool. If it damaged, it may cause oil leak. Replace tie rod inner socket and gear housing assembly.

## INSPECTION AFTER DISASSEMBLY

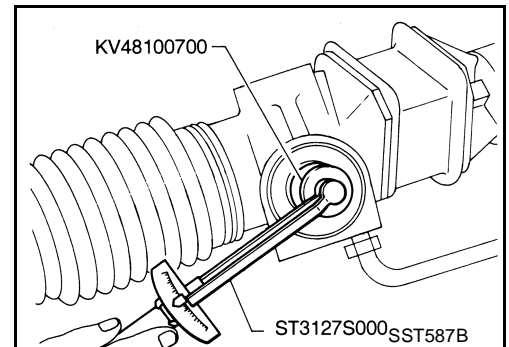
### Boot

Check boot for tear, wrinkle, and deformation. Replace it, if necessary.

### Steering Gear Assembly

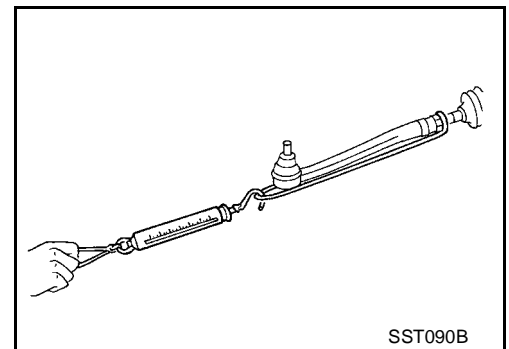
- Check for smooth operation through a full stroke.
- Check rack and tie-rod for cracks, deformation or other damage.
- Using a preload gauge, measure rotational torque of pinion gear. Check that reeding is within range specified.

**Pinion rotating torque** : 0.85 - 1.45 N·m (0.09 - 0.14 kg·m, 8 - 12 in·lb)



- Check rack sliding force.

**Rack sliding force** : 145 - 255 N (14.8 - 26.0 kg, 32.6 - 57.3 lb)



### Gear Housing Cylinder

Check gear housing cylinder for damage and scratch (inner wall). Replace it, if necessary.

### Tie Rod Ball Joint

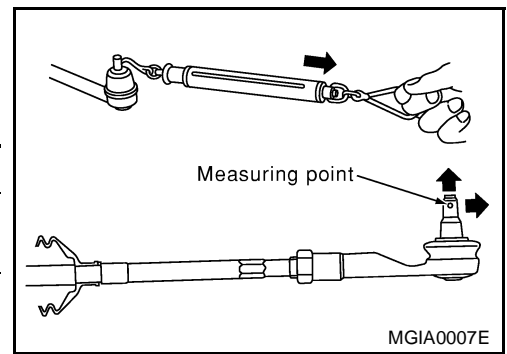
1. Tensile force

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M

# POWER STEERING GEAR AND LINKAGE

- Hook spring scale at the position indicated in the figure. Confirm the reading at the moment the ball stud begins moving is within specifications. If the value is outside the standard, replace outer and inner sockets.

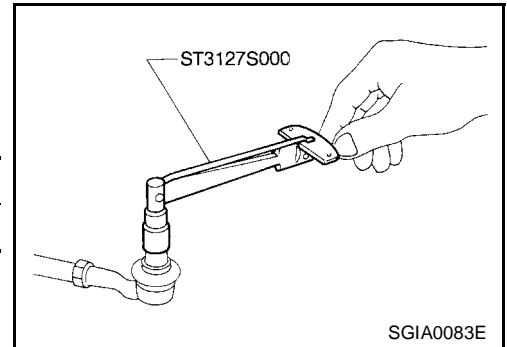
|                               | Outer socket                                   | Inner socket                                   |
|-------------------------------|--|--|
| Oscillating torque            | 0.3 - 2.9 N·m (0.03 - 0.29 kg·m, 3 - 25 in-lb) | 0.1 - 7.8 N·m (0.01 - 0.79 kg·m, 1 - 69 in-lb) |
| Measurement on spring balance | 6.6 - 63.7 N (0.67 - 65.0 kg, 1.48 - 14.32 lb) | 0.3 - 24.3 N (0.03 - 2.48 kg, 0.07 - 5.46 lb)  |



## 2. Sliding torque

- Using a preload gauge, check reading is within range specified below. If the value is outside the standard, replace outer and inner sockets.

| Outer socket   | PR25T  |
|----------------|--|
| Sliding torque | 0.3 - 2.9 N·m (0.03 - 0.29 kg·m, 3 - 25 in-lb) |

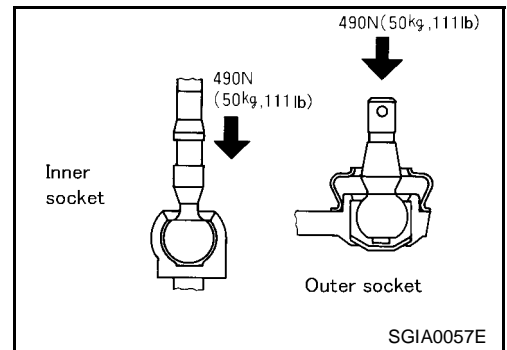


## 3. Axial end play

- Apply load of 490 N (50 kg, 110.6 lb) to ball stud axially. Measure amount of movement that stud makes by using a dial gauge. Check reading is within range specified below. If not, replace outer and inner sockets.

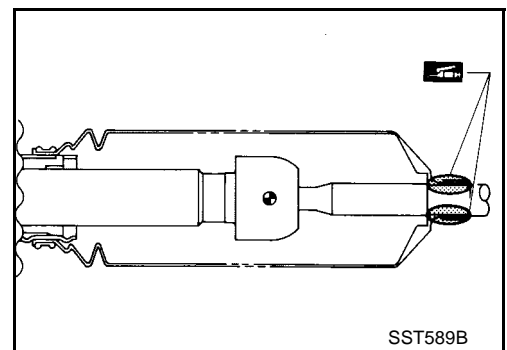
**Outer socket : 0.1 mm (0.004 in) or less**

**Inner socket : 0.1 mm (0.004 in) or less**



## ASSEMBLY

1. Apply multi-purpose grease to both large- and small- diameter sides.
2. Install large- and small- diameter side of boot to inner socket boot mounting groove.
3. Install boot band to large- and small- diameter side of boot.





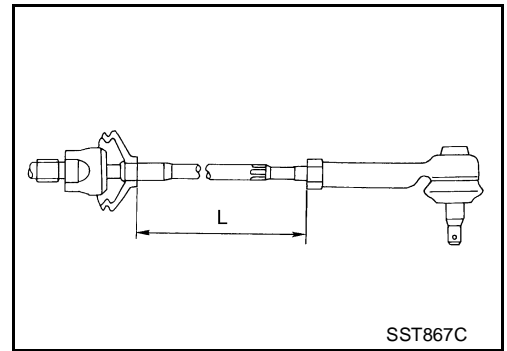
## POWER STEERING GEAR AND LINKAGE

4. Connect lock nut and outer socket to inner socket. Temporarily tighten lock nut until length of tie rod is within specification.

**Tie rod length (L) : 130 mm (5.12 in)**

**CAUTION:**

Perform toe-in adjustment after this procedure. Length achieved after toe-in adjustment is not necessarily value given here.



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# POWER STEERING OIL PUMP

PFP:49110

## POWER STEERING OIL PUMP

### On-Vehicle Inspection and Service OIL PUMP PULLEY HYDRAULIC PRESSURE INSPECTION

EGS000BP

Before starting following procedure, check tension of belt.

1. Raise vehicle. Connect oil pressure gauge between oil pump discharge connector and high pressure hose. Then bleed the hydraulic circuit.
2. Start engine. Run engine until oil temperature reaches 50°C - 60°C (122 - 140°F)

#### CAUTION:

- Leave valve of hydraulic pressure gauge fully open while starting and running engine. If engine is started with valve closed, hydraulic pressure in oil pump goes up. This will relief pressure along with abnormal increase of oil temperature.
  - Care must be taken to keep hose clear of belt and other parts when engine is started.
3. Fully close hydraulic pressure gauge valve with engine at idle. Measure relief pressure.

|                                |               |  |
|--------------------------------|---------------|--|
| Relief pressure specification: | QG, QR engine | : 8,800 + 400 - 200 kPa<br>(88.0 + 4.0 - 2.0 bar, 89.76 + 4.08 - 2.04kg/cm <sup>2</sup> , 1.276 + 58 - 29 psi) |
|                                | YD engine     | : 8,820 + 500 - 300 kPa<br>(88.2 + 5.0 - 3.0 bar, 89.96 + 5.10 - 3.06kg/cm <sup>2</sup> , 1,279 + 73 - 44 psi) |
|                                |               |  |
|                                |               |  |

4. After measurement, open valve slowly.

#### CAUTION:

Never keep valve closed for 15 seconds or longer.

- If relief pressure is outside specification, disassemble and service oil pump.
5. After inspection, remove oil pressure gauge from hydraulic circuit. Add fluid. Be sure to bleed the system completely. Refer to [PS-6, "Bleeding Hydraulic System"](#).

### Removal and Installation (QG, QR engine model)

EGS000BQ

#### REMOVAL

1. Loosen adjusting screw and oil pump mounting bolt. Then, remove belt.
2. Remove union bolt and hose for oil pump.
3. Remove oil pump bracket attaching bolt.
4. Remove oil pump from vehicle.

#### INSTALLATION

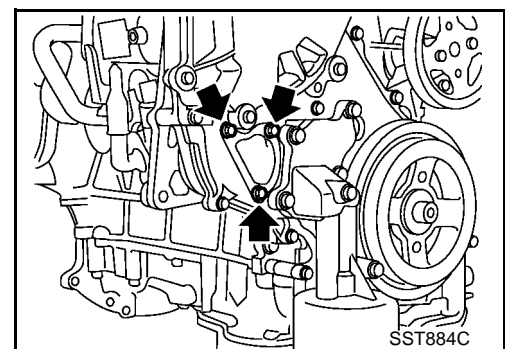
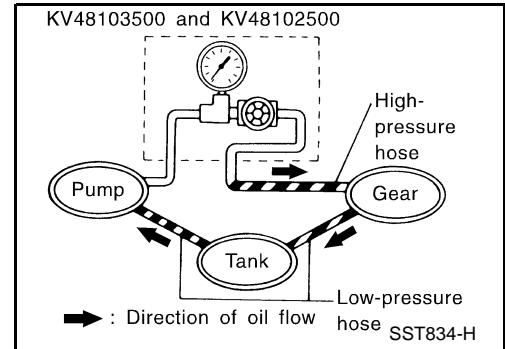
Paying attention to following items, install in the reverse order of removal.

- After installation, adjust belt tension. Refer to "Accessory belt" in "B1 Engine Body".
- After installation, be sure to bleed system. Refer to [PS-6, "Bleeding Hydraulic System"](#).

### Removal and Installation (YD engine model)

EGS000BR

1. Remove chain case cover.

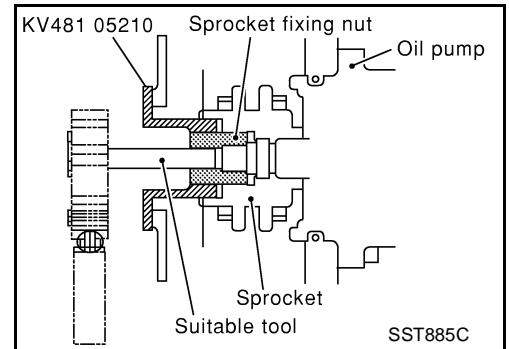


## POWER STEERING OIL PUMP

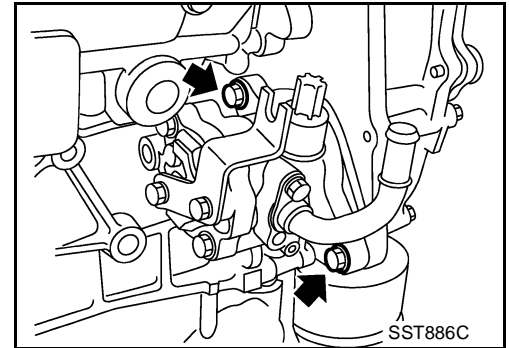
2. Revolving crank pulley, set tool.
3. Fix tool with chain cover fixing bolts.
4. Using suitable tool, remove sprocket fixing nut and washer.

**CAUTION:**

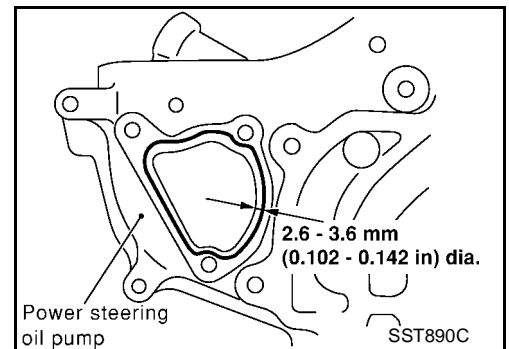
**Do not remove tool while power steering oil pump is removed.**



5. Remove power steering pump fixing bolts, then remove it.



6. Apply gasket to the installation surface of the engine chain case cover as shown in the figure before installing the chain case cover to the engine.
7. Bleed air after installation. Refer to [PS-6, "Bleeding Hydraulic System"](#) .



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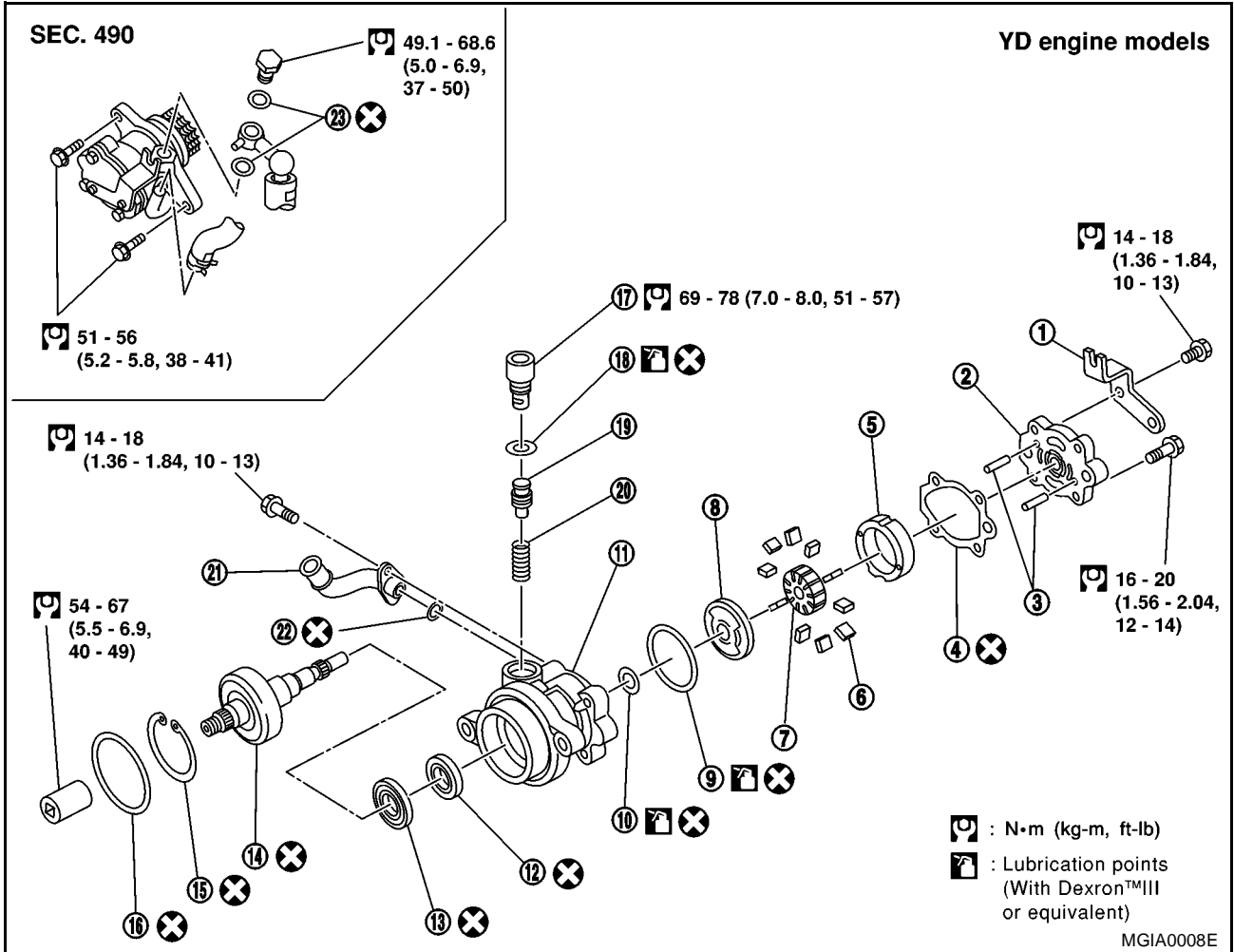
L

M

# POWER STEERING OIL PUMP

## Disassembly and Assembly (YD engine model)

EGS000BS

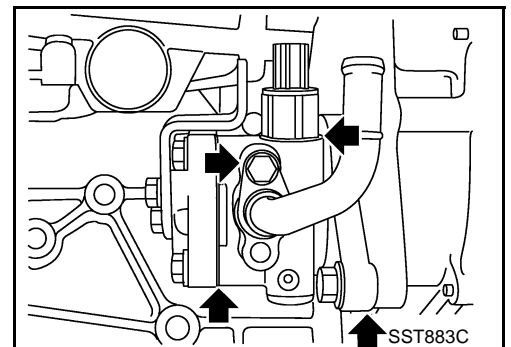


- |                                |                               |                               |
|--------------------------------|-------------------------------|-------------------------------|
| 1. Rear bracket                | 2. Rear body                  | 3. Dowel pin                  |
| 4. Side plate seal             | 5. Cam ring                   | 6. Vane                       |
| 7. Rotor                       | 8. Side plate                 | 9. O-ring (Outer)             |
| 10. O-ring (Inner)             | 11. Front body                | 12. Drive shaft rear oil seal |
| 13. Drive shaft front oil seal | 14. Drive shaft               | 15. Snap ring                 |
| 16. O-ring                     | 17. Outlet connector          | 18. Connector seal            |
| 19. Flow control valve         | 20. Flow control valve spring | 21. Inlet connector           |
| 22. O-ring                     | 23. Washer                    |                               |

### INSPECTION BEFORE DISASSEMBLY

Disassemble power steering oil pump only when any of following cases meets.

- If oil leak is found on oil pump.
- Oil pump pulley is deformed or damaged.
- Performance of oil pump is low.



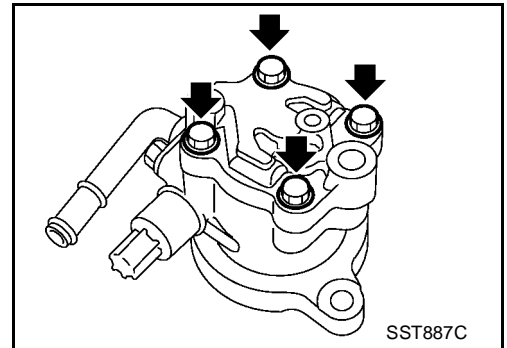
# POWER STEERING OIL PUMP

## DISASSEMBLY

### CAUTION:

- Parts which can be disassembled are strictly limited. Never disassemble parts other than those specified.
- Disassemble in as clean a place as possible.
- Clean your hands before disassembly.
- Do not use rags; use nylon cloths or paper towels.
- Follow the procedure and cautions in the Service Manual.
- When disassembling and reassembling, do not let foreign matter enter or contact the parts.

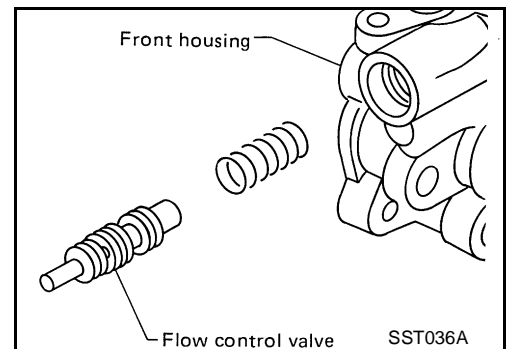
1. Remove rear bracket and rear body.
2. Remove side plate seal, cam ring vane, rotor side and plate.



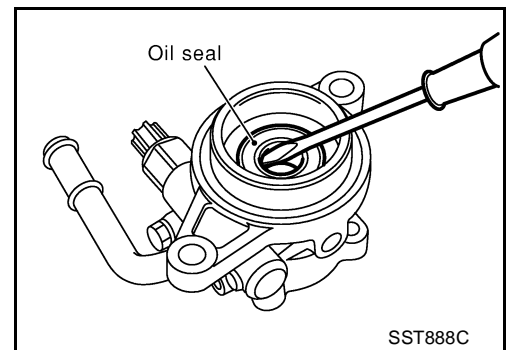
3. Remove inlet connector and outlet connector with spring.

### CAUTION:

- Be careful not to drop the flow control valve.
- Do not disassemble the flow control valve.



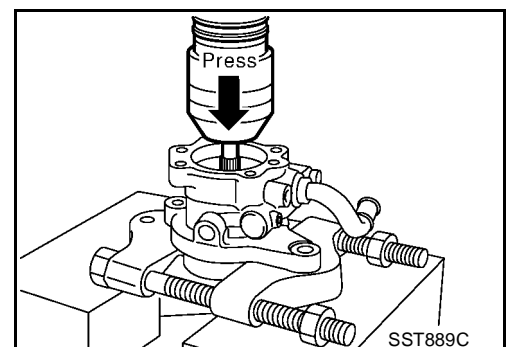
4. Remove oil seal.



5. Remove snap ring, then draw drive shaft.

### CAUTION:

- Be careful not to drop drive shaft.



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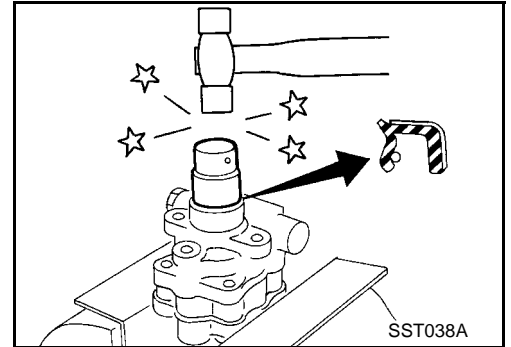
# POWER STEERING OIL PUMP

## INSPECTION AFTER DISASSEMBLY

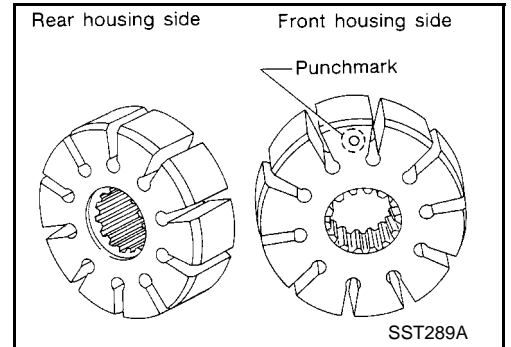
- If pulley is cracked or deformed, replace it.
- If an oil leak is found around pulley shaft oil seal, replace the seal.
- If serration on pulley or pulley shaft is deformed or worn, replace it.

## ASSEMBLY

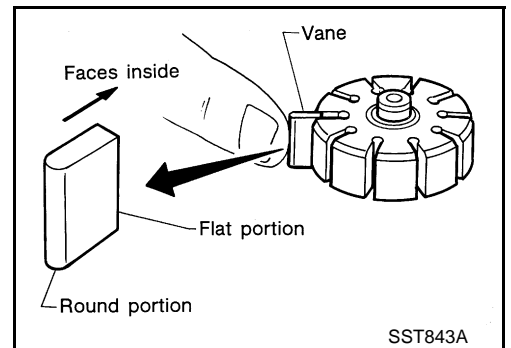
1. Assemble oil pump, noting the following instructions.
  - Make sure O-rings and oil seal are properly installed.
  - Always install new O-rings and oil seal.
  - Be careful of oil seal direction.
  - Cam ring, rotor and vanes must be replaced as a set if necessary.
  - Coat each part with DEXRON™ III or equivalent when assembling.



2. Pay attention to the direction of rotor.



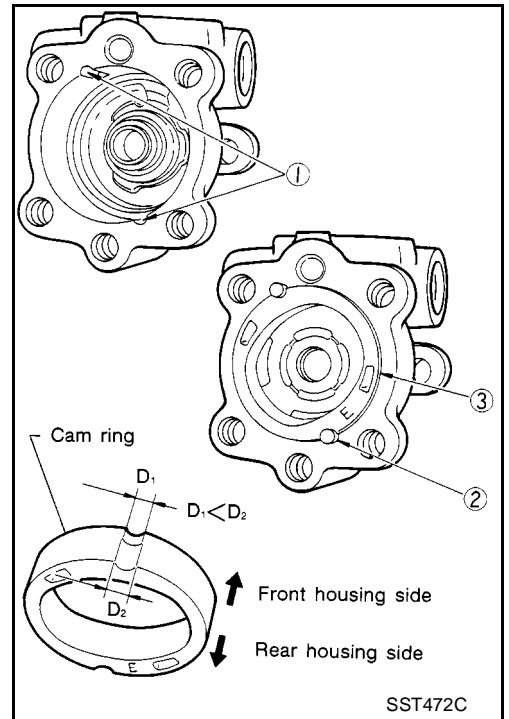
3. When assembling vanes to rotor, rounded surfaces of vanes must face cam ring side.



# POWER STEERING OIL PUMP

4. Insert pin 2 into pin groove 1 of front housing and front side plate. Then install cam ring 3 as shown at left.

**Cam ring** :  $D_1$  is less than  $D_2$



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# HYDRAULIC LINE

PFP:49721

EGS000BT

## HYDRAULIC LINE

### Removal and Installation

#### (1) QG engine model

**SEC. 497**

Install with position mark facing top of vehicle.

Install plastic clip in hole of side member.

For low pressure

For high pressure

Pump

Pressure sensor

View A

Install with position mark facing top of vehicle.

3.0 - 3.9 (0.31 - 0.39, 27 - 34)

20 - 25 (2.1 - 2.5, 15 - 18)

For low pressure

For high pressure

14.8 - 24.5 (1.6 - 2.4, 11 - 17)

O-ring

Detail A

16.6 - 23.5 (1.7 - 2.3, 13 - 17)

Install with position mark facing vehicle rear.

Install PS hose junction to pump bracket point exactly.

Copper washer

49.1 - 68.6 (5.0 - 6.9, 37 - 50)

Detail pump parts

Install hose to spool of another tube exactly. Do not apply fluid. Clamp position is H length (3 - 8 mm, 0.12 - 0.31 in) from hose edge.

Spool

Hose

H

Another tube MGIA0009E

: Lubrication points (With Dexron™ III or equivalent)

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)



# HYDRAULIC LINE

## (2) QR engine model

**SEC. 497**

Install with position mark facing top of vehicle.

For high pressure

Pressure sensor

3.0 - 3.9 (0.31 - 0.39, 27 - 34)

View A

For low pressure

Pump

Install plastic clip in hole of side member.

Install with position mark facing top of vehicle.

For low pressure

20 - 25 (2.1 - 2.5, 15 - 18)

For high pressure

14.8 - 24.5 (1.6 - 2.4, 11 - 18)

Detail A

50 - 70 (5.1 - 7.1, 37 - 51)

36.3 - 51.9 (3.7 - 5.2, 27 - 38)

49.1 - 68.6 (5.0 - 6.9, 37 - 50)

Detail pump parts

Install hose to spool of another tube exactly. Do not apply fluid. Clamp position is H length (3 - 8 mm, 0.12 - 0.31 in) from hose edge.

Spool

Hose

Another tube MGIA0010E

: Lubrication points (With Dexron™ III or equivalent)  
 : N·m (kg-m, in-lb)  
 : N·m (kg-m, ft-lb)

## (3) YD engine model

**SEC. 497**

Install with position mark facing bottom of vehicle.

For low pressure

Pressure sensor

3.0 - 3.9 (0.31 - 0.39, 27 - 34)

View A

For high pressure

Pump

Install with position mark facing top of vehicle.

For low pressure

20 - 25 (2.1 - 2.5, 15 - 18)

For high pressure

14.8 - 24.5 (1.6 - 2.4, 11 - 18)

Detail A

49.1 - 68.6 (5.0 - 6.9, 37 - 50)

Detail pump parts

Install hose to spool of another tube exactly. Do not apply fluid. Clamp position is H length (3 - 8 mm, 0.12 - 0.31 in) from hose edge.

Spool

Hose

Another tube MGIA0011E

: Lubrication points (With Dexron™ III or equivalent)  
 : N·m (kg-m, in-lb)  
 : N·m (kg-m, ft-lb)

# SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

### Steering Wheel

EGS000BU

|                                |                         |
|--------------------------------|-------------------------|
| Steering wheel axial end play: | 0 mm (0 in)             |
| Steering wheel free play       | 0 - 35 mm (0 - 1.38 in) |

### Steering Angle

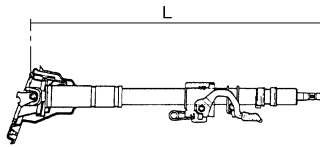
EGS000BV

|             |                  |
|-------------|------------------|
| Inner wheel | 37.5° +1°<br>-3° |
| Outer wheel | 30.5°            |

### Steering Column

EGS000BW

|                          |                     |
|--------------------------|---------------------|
| Steering column length L | 560.9 mm (22.08 in) |
|--------------------------|---------------------|

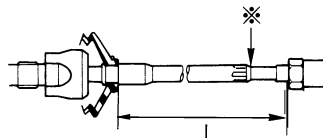


STC1136D

### Steering Linkage

EGS000BX

| Steering gear type              |   | PR25T  |
|---------------------------------|---|--|
| Tie rod ball joint outer socket | Tensile force   | 0.3 - 2.9 N·m (0.03 - 0.29 kg·m, 3 - 25 in·lb) |
|                                 | Measurement on spring balance (Measuring point: stud bolt hole) | 6.6 - 63.7N (0.67 - 6.50 kg, 1.48 - 14.32 lb)  |
|                                 | Sliding torque  | 0.3 - 2.9 N·m (0.03 - 0.29 kg·m, 3 - 25 in·lb) |
|                                 | Axial end play  | 0.1 mm (0.004 in) or less                      |
| Tie rod ball joint inner socket | Tensile force   | 0.1 - 7.8 N·m (0.01 - 0.79 kg·m, 1 - 69 in·lb) |
|                                 | Measured value of spring scale (measuring point: mark)          | 0.3 - 24.3 N (0.03 - 2.48 kg, 0.07 - 5.46 lb)  |
|                                 | Axial end play  | 0.1 mm (0.004 in) or less                      |
| Tie rod length L                |   | 130 mm (5.12 in)                               |

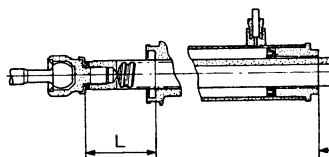


STC1006D

### Steering Gear

EGS000BY

| Steering gear model                  | PR25T           |
|--------------------------------------|-----------------|
| Rack neutral position, dimension (L) | 68 mm (5.12 in) |



STC0101D

# SERVICE DATA AND SPECIFICATIONS (SDS)

|                        |  |
|------------------------|--|
| Steering gear model    | PR25T  |
| Pinion rotating torque | 0.85 - 1.45 N·m (0.09 - 0.14 kg·m, 8 - 12 in-lb) |
| Rack sliding force     | 145 - 255 N·m (14.8 - 26.0 kg, 32.6 - 57.3 lb)   |

A  
B  
C  
D  
E  
F  
PS  
H  
I  
J  
K  
L  
M

## Oil Pump

EGS000C4

|  |               |  |
|--|---------------|--|
| Oil pump relief hydraulic pressure kPa (bar, kg/cm <sup>2</sup> , psi) | QG, QR engine | 8,800 + 400 - 200 (88.0 + 4.0 - 2.0, 89.76 + 4.08 - 2.04, 1,276 + 58 - 29) |
|  | YD engine     | 8,820 + 500 - 300 (88.2 + 5.0 - 3.0, 89.96 + 5.10 - 3.06, 1,279 + 73 - 44) |

## Steering Fluid

EGS000C0

|                |                            |
|----------------|----------------------------|
| Fluid capacity | Approx. 1.0 ℓ (7/8 Imp qt) |
|----------------|----------------------------|

## SERVICE DATA AND SPECIFICATIONS (SDS)

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