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# SPECIFICATIONS

## Steering wheel, steering shaft and power steering gear

Item		Specifications
Steering wheel	Type	2-spoke type
	Outer diameter mm {in.}	400 {15.7}
Steering shaft	Type	Universal joint type (tilt and telescopic type)
Power steering gear assembly	Manufacturer	Unisia JKC Steering Systems
	Type	Ball nut type
	Form	Integral form
	Item number	448-00203
	Gear ratio	22.7
	Cylinder diameter mm {in.}	85 {3.35}

## Power steering oil pump

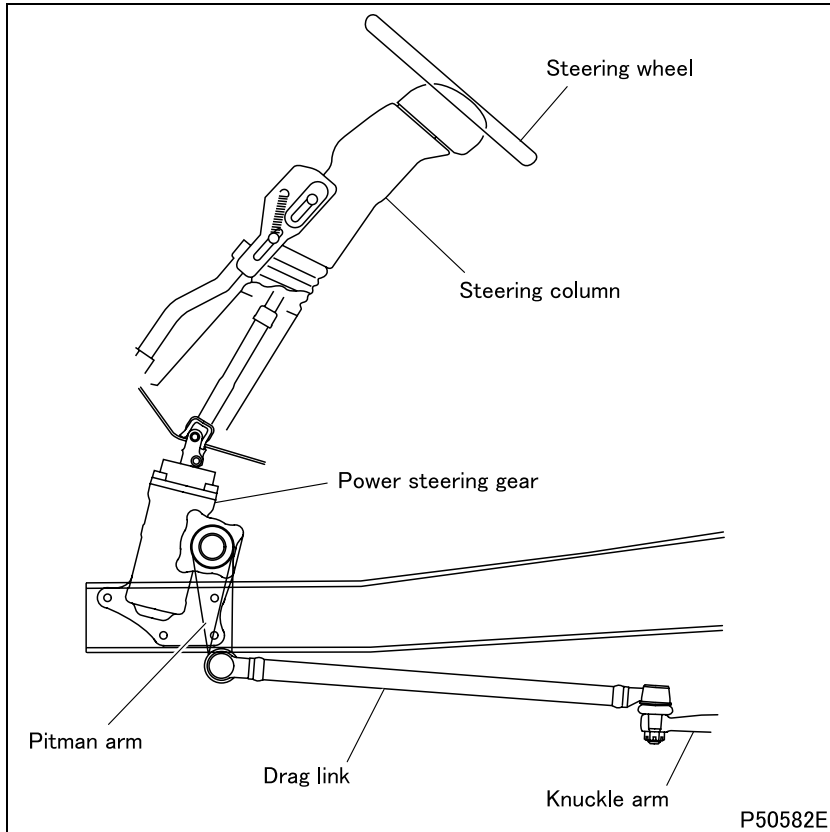
Item	Specifications	
	FE84	FE85
Manufacturer	Unisia JKC steering systems	KYB
Type	Vane type	
Manufacturer's item number	478-04302	B4220-13002
Delivery rate cm <sup>3</sup> {cu.in.}/rev.	9.6 {0.59}	13.6 {0.82}
Adjusted flow volume L {qts.}/min.	6 to 8 {6.3 to 8.5}	11 to 13 {12 to 14}
Adjusted pressure (relief valve) MPa {psi, kgf/cm <sup>2</sup> }	10.8 <sup>+0.20</sup> <sub>-0.49</sub> {1560 <sup>+29</sup> <sub>-71</sub> , 110 <sup>+2</sup> <sub>-5</sub> }	12.3 <sup>0</sup> <sub>-0.49</sub> {1780 <sup>0</sup> <sub>-71</sub> , 125 <sup>0</sup> <sub>5.0</sub> }
Permissible revolutions rpm	600 to 6500	

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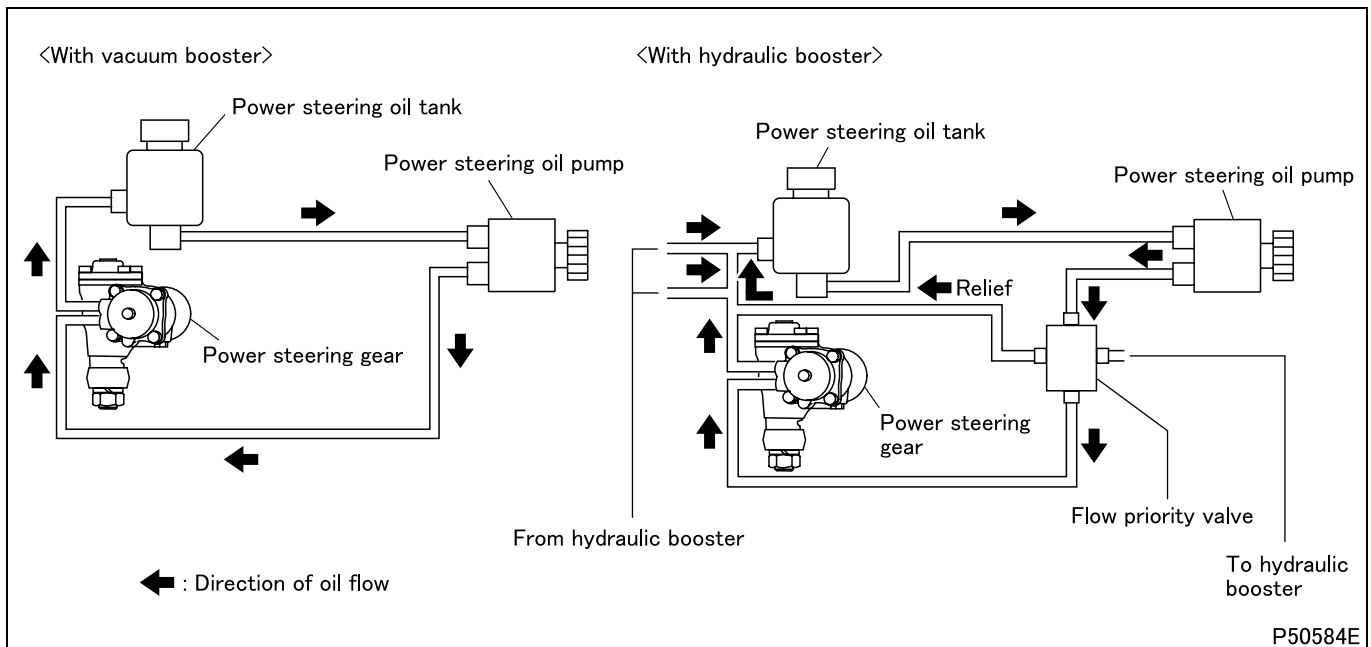
M E M O

# STRUCTURE AND OPERATION

## 1. Steering System

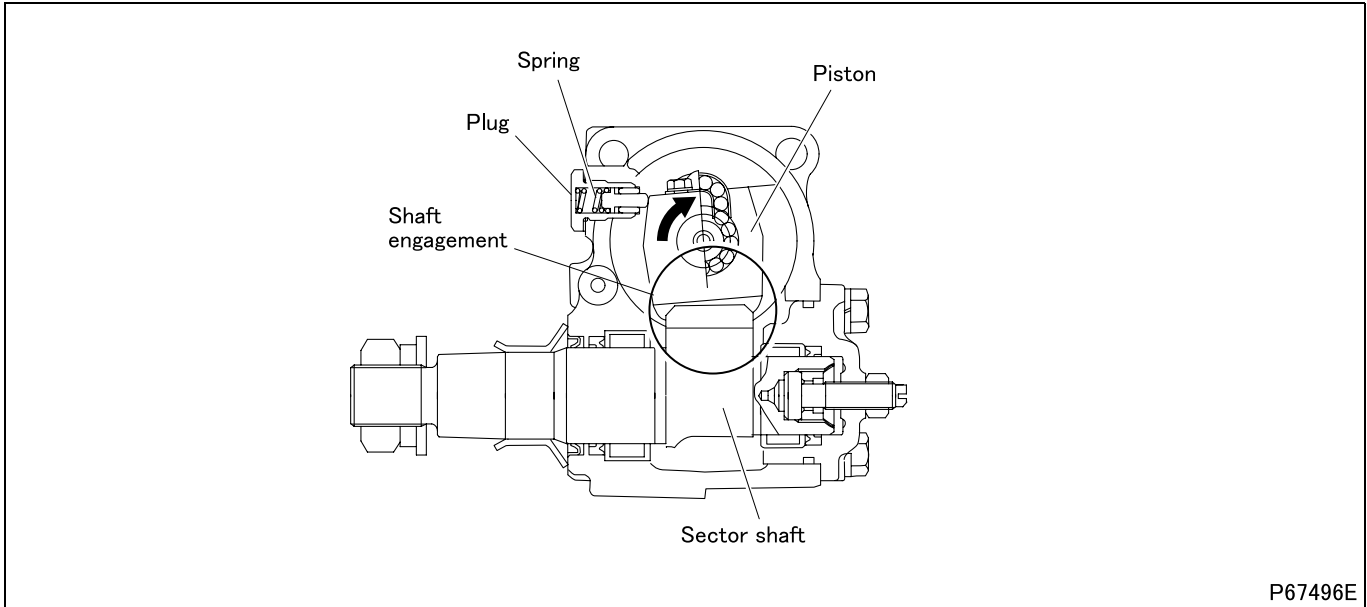


## 2. Oil Flow



- The power steering system with hydraulic booster is provided with a flow priority valve to reduce steering shock that occurs when the brakes are suddenly applied during steering wheel manipulation.

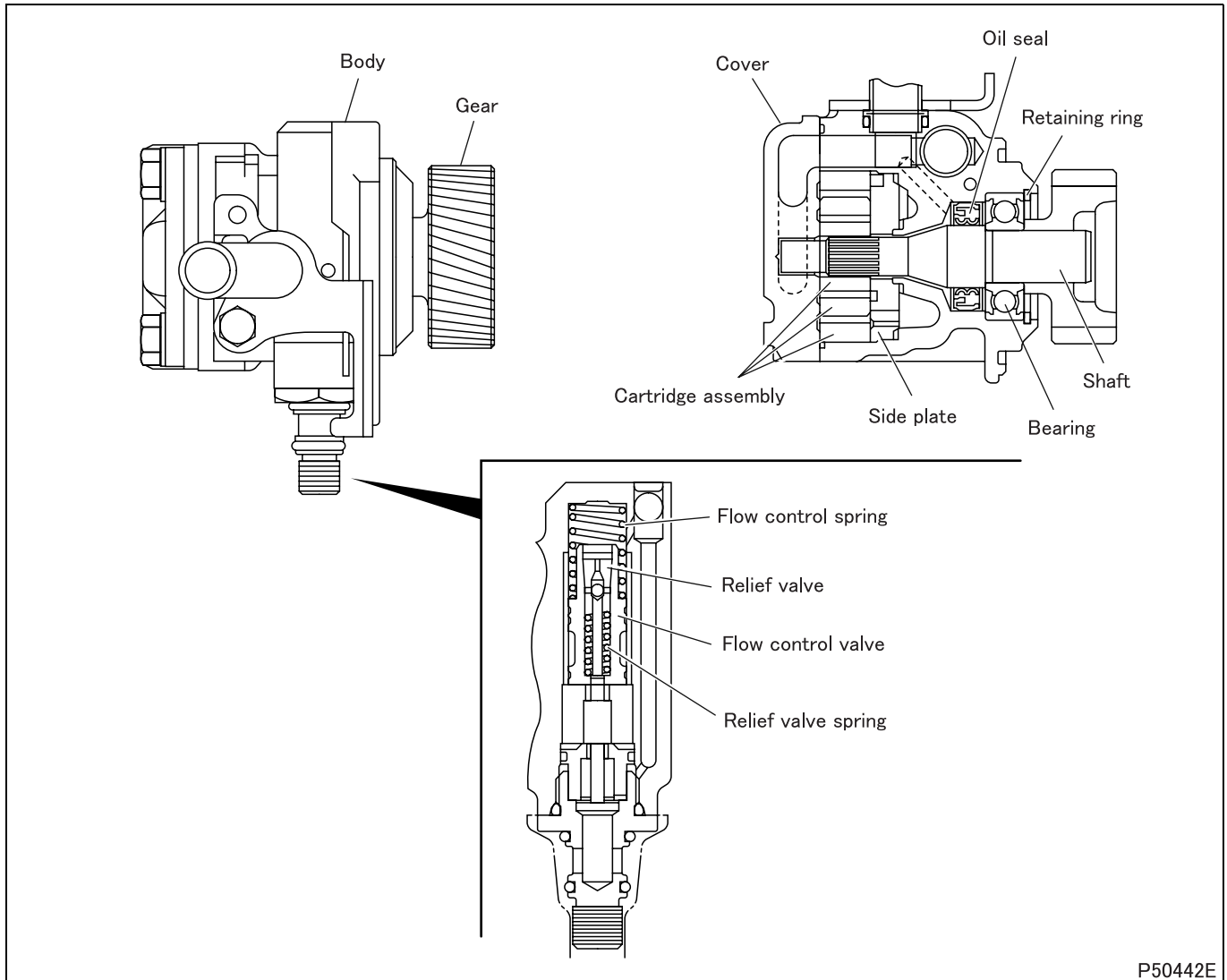
### 3. Power Steering Gear (Backlash Compensation Mechanism)



- The plug constantly presses the ball screw set shaft (piston in the case of Unisia JKC product) in the illustrated turning direction with the force of internal spring.
- This eliminates play between the ball screw set shaft and sector shaft where they are engaged to suppress backlash during straight travel, thus improving steerability.

# STRUCTURE AND OPERATION

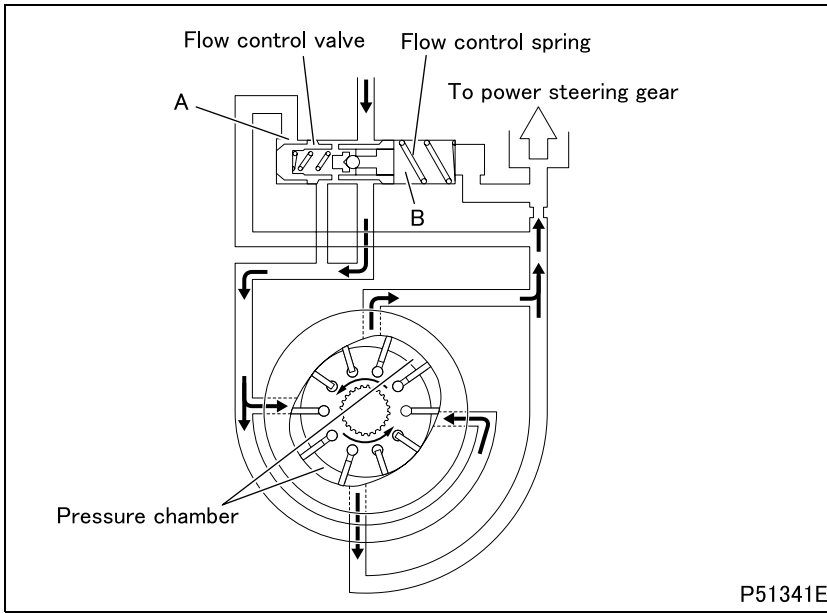
## 4. Power Steering Oil Pump <KYB Product>



P50442E

- The power steering oil pump is a hydraulic source pump with the vane in the rotor groove and is geared to the engine.
- The power steering oil pump consists of a cartridge assembly that discharges oil, a flow control valve that controls the oil flow rate and a relief valve that prevents free oil pressure rise.
- The flow control valve maintains constant the quantity of oil to the power steering gear during steering wheel manipulation.  
The relief valve is provided in the flow control valve to prevent oil pump pressure from rising beyond necessary level during stationary swing operation.

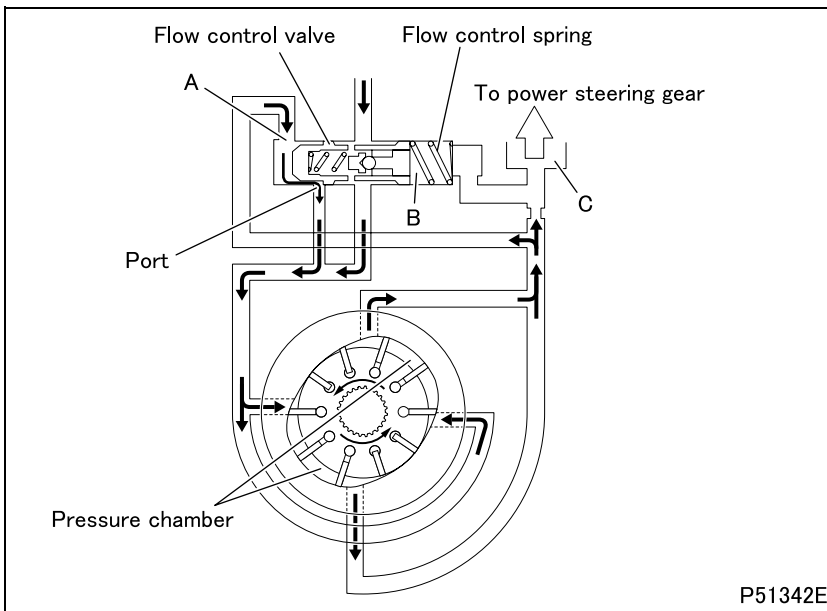
## 4.1 Flow control valve



### (1) Operation of flow control valve

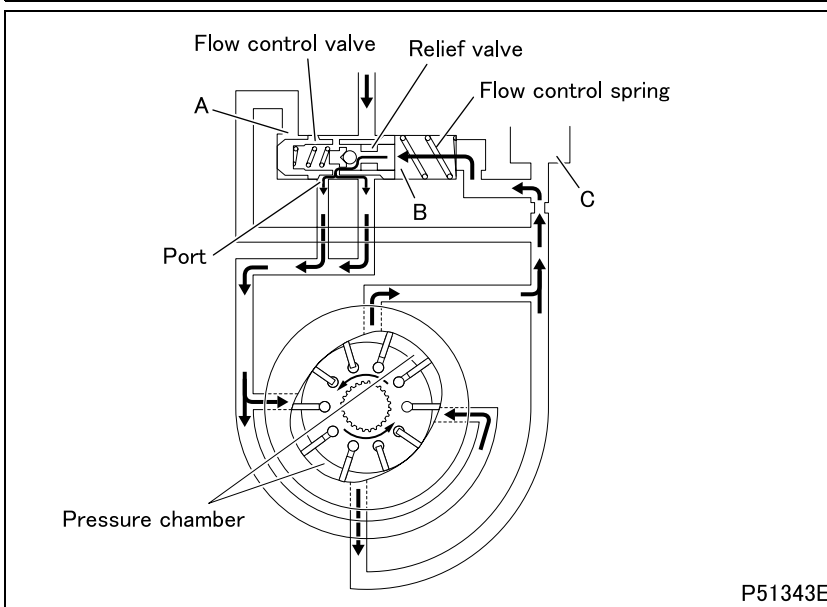
#### (1.1) When not functioning (oil pump in operation at low speed)

- Oil pressure in the chamber **A** is weaker than the combined force of oil pressure in the chamber **B** and tension of the flow control spring, and the flow control valve remains stationary.



#### (1.2) When functioning (oil pump in operation at middle to high speeds)

- Oil pressure in the chamber **A** overcomes the combined force of oil pressure in the chamber **B** and tension of the flow control spring, and the flow control valve is shifted.
- Port is made open to release oil pressure, and the flow rate from the chamber **C** is maintained constant.

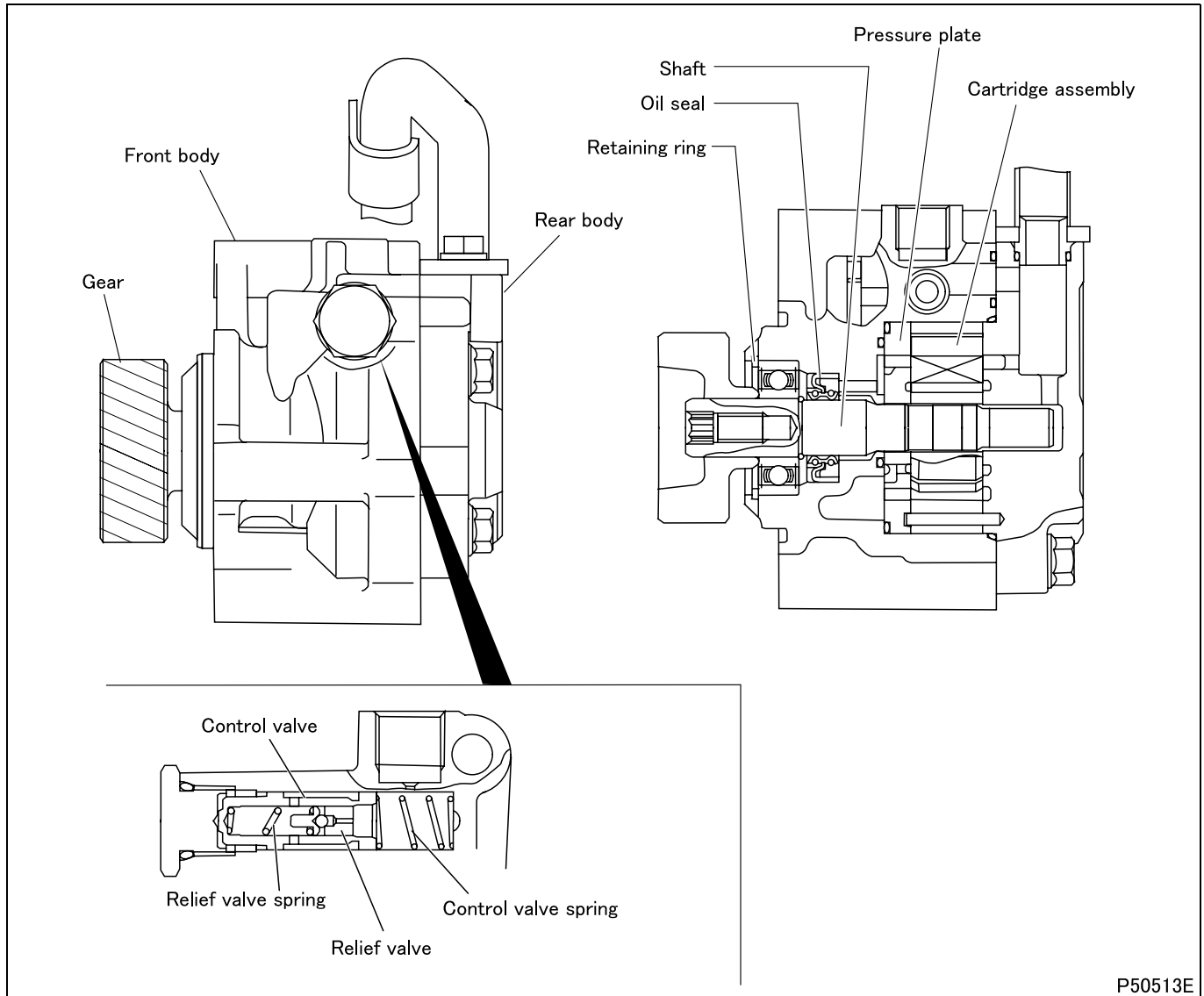


### (2) Operation of relief valve

- When the combined force of oil pressure in the chamber **B** and tension of the flow control spring overcomes oil pressure in the chamber **A**, the flow control valve is shifted. Further increased oil pressure in the chamber **B** pushes the relief valve to open port, thus preventing excessive oil pressure from going to the chamber **C**.

# STRUCTURE AND OPERATION

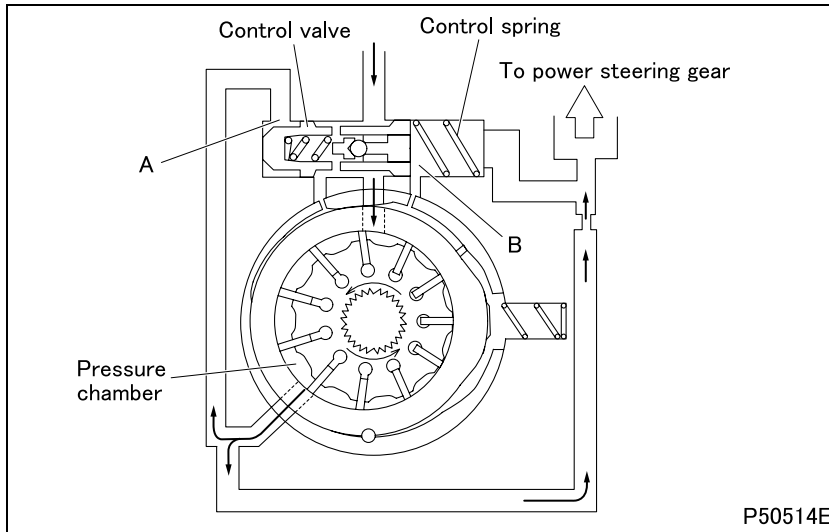
## 5. Power Steering Oil Pump <Unisia JKC Product>



- The power steering oil pump is a hydraulic source pump with the vane in the rotor groove and is geared to the engine.
- The power steering oil pump consists of a cartridge assembly that discharges oil, a control valve that control the oil flow rate and a relief valve that prevents free oil pressure rise.
- The control valve maintains constant the quantity of oil to the power steering gear during steering wheel manipulation. The relief valve is provided in the control valve to prevent oil pump pressure from rising beyond necessary level during stationary swing operation.



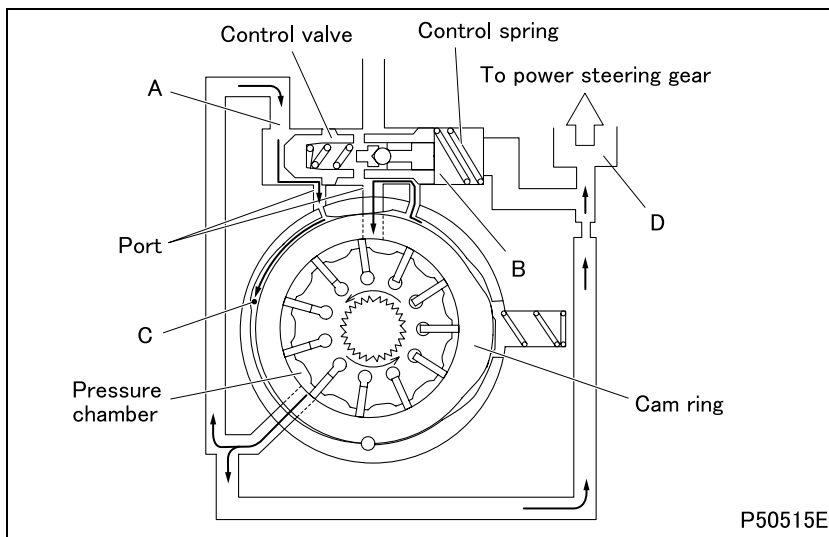
## 5.1 Control valve



### (1) Operation of control valve

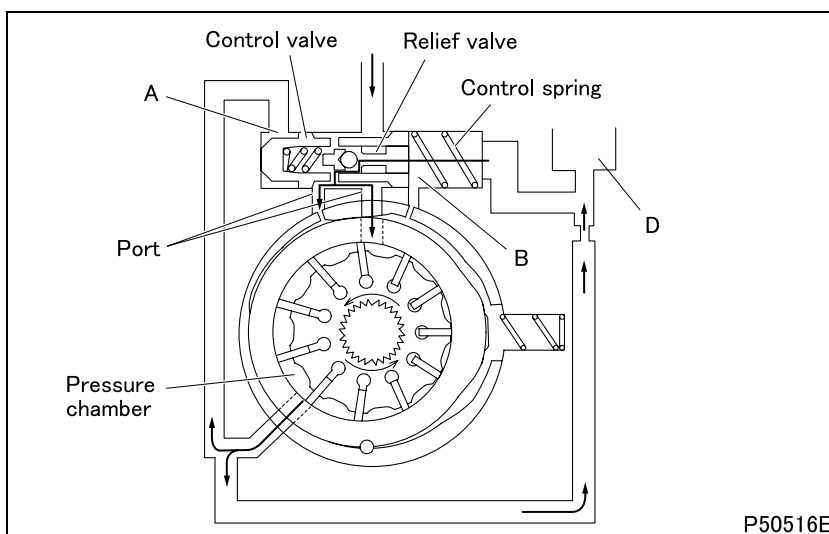
#### (1.1) When not functioning (oil pump in operation at low speed)

- Oil pressure in the chamber **A** is weaker than the combined force of oil pressure in the chamber **B** and tension of the control spring, and the control valve remains stationary.



#### (1.2) When functioning (oil pump in operation at medium to high speeds)

- Oil pressure in the chamber **A** overcomes the combined force of oil pressure in the chamber **B** and tension of the control spring, and shifts the control valve.
- Port is made open to release oil pressure in the chamber **A** into the chamber **C**, and the cam ring is shifted to right.
- This reduces the pressure chamber in capacity to decrease oil pump output per revolution, thus maintaining constant the flow rate from the chamber **D**.



### (2) Operation of relief valve

- The combined force of oil pressure in the chamber **B** and tension of the control spring overcomes oil pressure in the chamber **A**, and the control valve is shifted. Increased oil pressure in the chamber **B** pushes the relief valve to open port, thus preventing excessive oil pressure from going to the chamber **D**.

# TROUBLESHOOTING

Symptoms		Possible causes											Reference Gr						
		Steering wheel heavy to operate	Steering wheel play excessive and unstable	Steering wheel pulled to one side	Steering wheel vibration	Steering wheel return not smooth	Steering wheel does not turn	Steering angle insufficient or different between right and left	Oil leakage	Oil pump oil pressure abnormal	Noise from oil pump (grinding)	Noise from oil pump (squeaking)		Noise from oil pump (low whirring)					
Faulty power steering mechanism	Oil quantity insufficient	○	○																
	Oil quantity excessive								○										
	Air bleeding insufficient	○	○																
	Oil viscosity unsuitable	○																	
	Hydraulic circuit clogged	○																	
	Power steering gear assembly faulty	○	○	○	○	○	○												
	Power steering gear assembly improperly installed	○	○			○													
	Gear engagement rotating torque incorrectly adjusted	○				○													
	Pitman mounting position incorrect							○											
Faulty steering column and link mechanism	Steering shaft universal joint abnormally worn, or damaged	○	○																
	Link deformed	○								○									
	Drag link ball joint abnormally worn or damaged	○	○																
	Tie rod ball joint abnormally worn or damaged	○	○																
	Steering angle off center between left and right			○															
	Tie rod bent							○											
Faulty front axle, etc.	King pin poorly greased	○				○													
	Front wheel alignment (toe-in, camber and caster) incorrect	○		○	○	○													
	Thrust bearing damaged	○																	
	Wheel hub bearing worn out or damaged		○	○	○													Gr26	
	King pin or bushing worn out or damaged		○	○	○														
	Front axle deformed			○															
	Knuckle arm, tie rod arm, knuckle, etc. improperly tightened				○														
	Front spring U bolt, nut, etc. loose				○														Gr33A
	Front tire radial and lateral runout; static and dynamic balance incorrect				○														Gr31
	Front axle parts overtightened					○													
	Steering angle incorrectly adjusted						○	○											Gr26
Mounted parts, connections loose		○																	
Knuckle stopper bolt improperly adjusted								○											

Symptoms		Possible causes											Reference Gr		
		Steering wheel heavy to operate	Steering wheel play excessive and unstable	Steering wheel pulled to one side	Steering wheel vibration	Steering wheel return not smooth	Steering wheel does not turn	Steering angle insufficient or different between right and left	Oil leakage	Oil pump oil pressure abnormal	Noise from oil pump (grinding)	Noise from oil pump (squeaking)		Noise from oil pump (low whirring)	
Faulty oil pump	Oil pump housing faulty								O						
	O-ring, oil seal faulty								O						
	Bolt improperly tightened								O						
	Maximum generated oil pressure insufficient									O					
	Oil line crushed or clogged									O					
	Air caught in oil pump										O				
	Oil pump interior seized									O	O	O			
	Mounting bolt and nut loose													O	
	Pump body faulty													O	
	Valve malfunctioning									O					
Faulty oil tank	Oil leakage from oil tank due to filling beyond capacity								O						
	Oil leakage from oil tank due to air caught inside								O						
Other abnormalities	Load excessive forward of load-carrying platform	O													
	Load excessive rearward of load-carrying platform		O												
	Load excessive on one side of loading bed			O											
	Difference excessive in wheelbase between left and right			O											
	Propeller shaft runout excessive				O										Gr25
	Rear axle housing bent			O											Gr27
	Final drive gear and final drive pinion damaged or improperly engaged				O										Gr27
	Tire pressure insufficient	O													Gr31
	Tire pressure excessive		O												
	Difference excessive in degree of wear between left and right tires			O											
	Left and right tires different in outer diameter			O											
	Front tire radial and lateral runout, static and dynamic balance incorrect				O										
Braking force unbalanced			O											Gr35A, E	

# ON-VEHICLE INSPECTION AND ADJUSTMENT

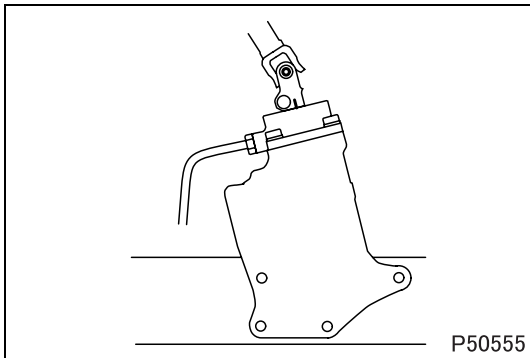
## 1. Change of Power Steering Fluid

Tightening torque (Unit: N·m {ft.lbs, kgf·m})

Mark	Parts to be tightened	Tightening torque	Remarks
-	Feed pipe and return pipe	11.8 to 17.6 {8.7 to 13, 1.2 to 1.8}	-

### Lubricant and/or sealant

Mark	Points of application	Specified lubricant and/or sealant	Quantity
-	Power steering oil tank	Automatic transmission fluid (DEXRON, DEXRON II or DEXRON III type)	Between MIN and MAX of power steering oil tank



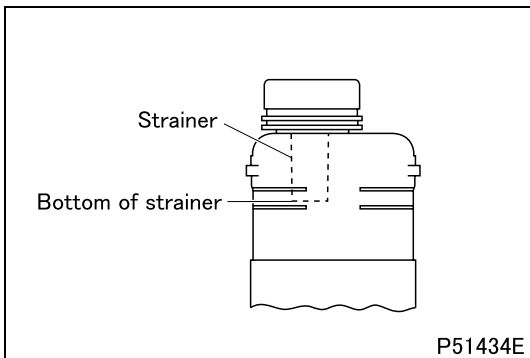
#### (1) Draining

- Jack up the front wheels.
- Loosen feed and return pipes connected to the power steering gear.

#### CAUTION

- **Clean the port area to prevent ingress of dirt, dust, and other foreign matters inside the power steering gear.**

- Repeatedly turn the steering wheel fully left and right to drain the fluid from the power steering gear.
- After draining the fluid, tighten the feed and return pipes to specified torque.



#### (2) Filling

- Pour fluid into the power steering oil tank up to the bottom of the strainer.

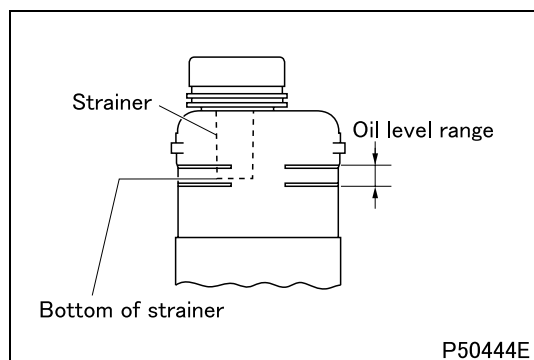
#### CAUTION

- **Power steering fluid is used for brake booster (hydraulic booster). Therefore, do not supply any other oil than power steering fluid such as brake fluid to the oil tank. <Hydraulic booster>**

- Bleed the power steering system of air.

## 2. Bleeding of Power Steering System Lubricant and/or sealant

Mark	Points of application	Specified lubricant and/or sealant	Quantity
-	Power steering oil tank	Automatic transmission fluid (DEXRON, DEXRON II or DEXRON III type)	Between MIN and MAX of power steering oil tank



- Pour fluid to the power steering oil tank up to the bottom of the strainer.

### CAUTION

- **Power steering fluid is used for brake booster (hydraulic booster). Therefore, do not supply any other oil than power steering fluid such as brake fluid to the oil tank. <Hydraulic booster>**

- With the engine stopped, jack up the front wheels.
- Repeatedly turn the steering wheel fully left and right. When the fluid level has dropped, add fluid enough to maintain the fluid level within the specified range.
- Start the engine to idle.
- When the fluid level has dropped, stop the engine and add fluid enough to maintain the fluid level within the specified range.
- Restart the engine. While checking for a drop in fluid level, turn the steering wheel fully left and right and add fluid as much as necessary. Repeat this practice until the fluid level is stabilized within the specified range.
- Fully press the brake pedal (with a foot force of approximately 250 N {55 lbs., 25 kgf or more}) a few times. Repeat this until the fluid level is stabilized within the specified range. (In this case, there is no need to operate the steering wheel.) <Hydraulic booster>
- Turn the steering wheel fully left and right repeatedly.

### CAUTION

- **To avoid seizure of the power steering oil pump, do not keep the steering wheel turned fully to left or right for more than 10 seconds when the engine is running.**

- If there is any abnormal noise or a fluid level fluctuation, air should be still trapped in the power steering system. Turn the steering wheel several times to raise the fluid temperature to approximately 60 to 80°C {140 to 175°F}.
- Stop the engine and wait for approximately five minutes.
- Lower the front wheels and turn the steering wheel several times. If there is no noise or fluid level fluctuation, the bleeding of the power steering system is completed.
- With the engine stopped, press the brake pedal several times and bleed the brake booster (hydraulic booster) by means of emergency pump. <Hydraulic booster>
- Repeat starting and stopping the engine several times to remove small air bubbles left in the power steering oil tank.
- If air bubbles are not removed completely, drive the vehicle for a while, then check for abnormal noise and oil level fluctuation.
- When bleeding is finished, check that fluid in the power steering oil tank is within the specified level range. Also check pipe and hose connections for fluid leaks.
- After bleeding is finished, check the brake booster (hydraulic booster) for performance (input and output characteristics). <Hydraulic booster>

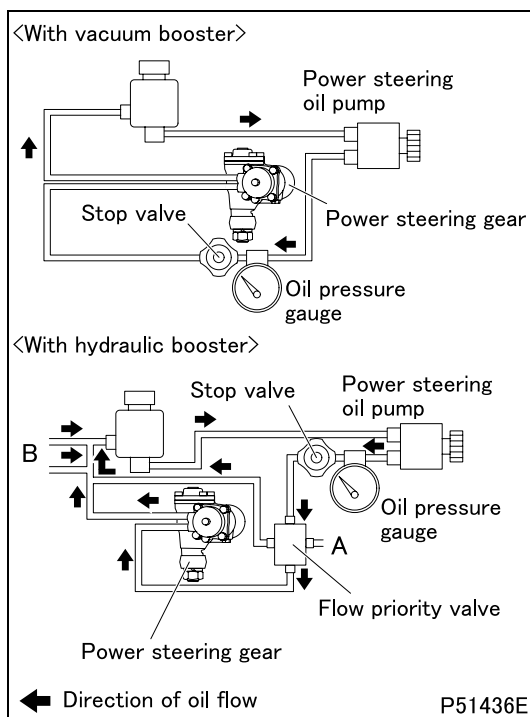
# ON-VEHICLE INSPECTION AND ADJUSTMENT

## 3. Performance Verification Test of Power Steering System

### Service standards

Location	Maintenance item	Standard value	Limit	Remedy
-	Power steering system fluid pressure (with hands off steering wheel)	With vacuum booster 490 kPa {71 psi, 5.0 kgf/cm <sup>2</sup> }	-	Repair*
		With hydraulic booster 980 kPa {140 psi, 10.0 kgf/cm <sup>2</sup> }	-	
-	Relief set pressure	With vacuum booster 10.8 <sup>+0.20</sup> <sub>-0.49</sub> MPa {1560 <sup>+29</sup> <sub>-71</sub> psi, 110 <sup>+2</sup> <sub>-5</sub> kgf/cm <sup>2</sup> }	-	Replace
		With hydraulic booster 12.3 <sup>0</sup> <sub>-0.49</sub> MPa {1780 <sup>0.0</sup> <sub>-71</sub> psi, 125 <sup>0</sup> <sub>-5</sub> kgf/cm <sup>2</sup> }	-	

\*Check the power steering gear assembly and hydraulic circuit for clogging.



- Perform the following tests to verify normal operation of the power steering gear assembly and power steering oil pump.
  - A:** To hydraulic booster
  - B:** From hydraulic booster
- Install oil pressure gauge capable of measuring upward of 13.2 MPa {1910 psi, 135 kgf/cm<sup>2</sup>} and stop valve between power steering oil pump and power steering gear <with vacuum booster> or flow priority valve <with hydraulic booster>, then bleed air.
- Start engine to idle.
- Turn steering wheel left and right several times to raise fluid temperature up to 50 to 60°C {122 to 140°F}.
- With the engine idling, fully open stop valve.

### CAUTION

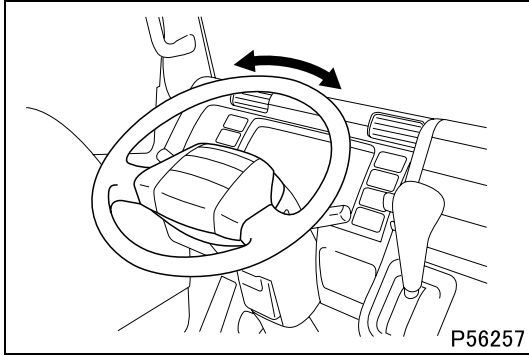
- To avoid seizure of the power steering oil pump, never close the stop valve for more than 10 seconds.

Test item	Test procedure	Assembly standard
Verification of smooth operation	<ul style="list-style-type: none"> <li>• Jack up front wheels and turn steering wheel fully left and right.</li> </ul>	Smooth operation throughout test
Measurement of fluid pressure in power steering system	<ul style="list-style-type: none"> <li>• Measure fluid pressure with hands off steering wheel.</li> </ul>	Specified standard value
Measurement of relief set pressure	<ul style="list-style-type: none"> <li>• Gradually increase engine speed to 1000 to 1500 rpm, then close stop valve and measure maximum fluid pressure.</li> <li>• Do not close stop valve for longer than 10 seconds.</li> </ul>	Specified standard value

## 4. Steering Wheel Play

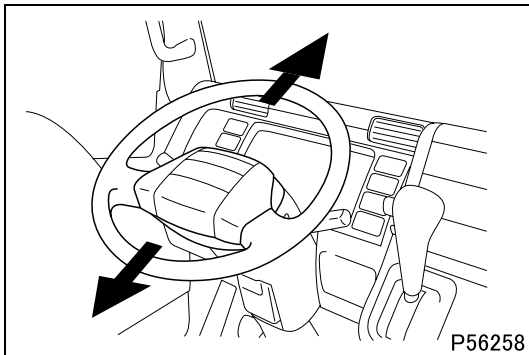
### Service standards (Unit: mm {in.})

Location	Maintenance item	Standard value	Limit	Remedy
-	Steering wheel play (measure at the periphery of steering wheel)	5 to 50 {0.2 to 2.0}	-	Adjust



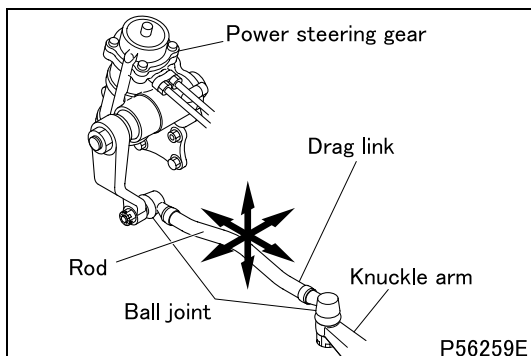
- With vehicle placed straight forward, start the engine and gently turn the steering wheel left and right to measure its peripheral play.
- If the play deviates from the standard value, check tightening points and the power steering gear.

## 5. Steering Column Looseness



- Push and pull the steering wheel by hand to check the steering column for looseness.
- With the steering column tilted all the way forward, pull the steering wheel backward and check the steering column for looseness.
- If the steering column is loose, adjust the tilting and telescoping lever.

## 6. Inspection of Drag Link Ball Joint



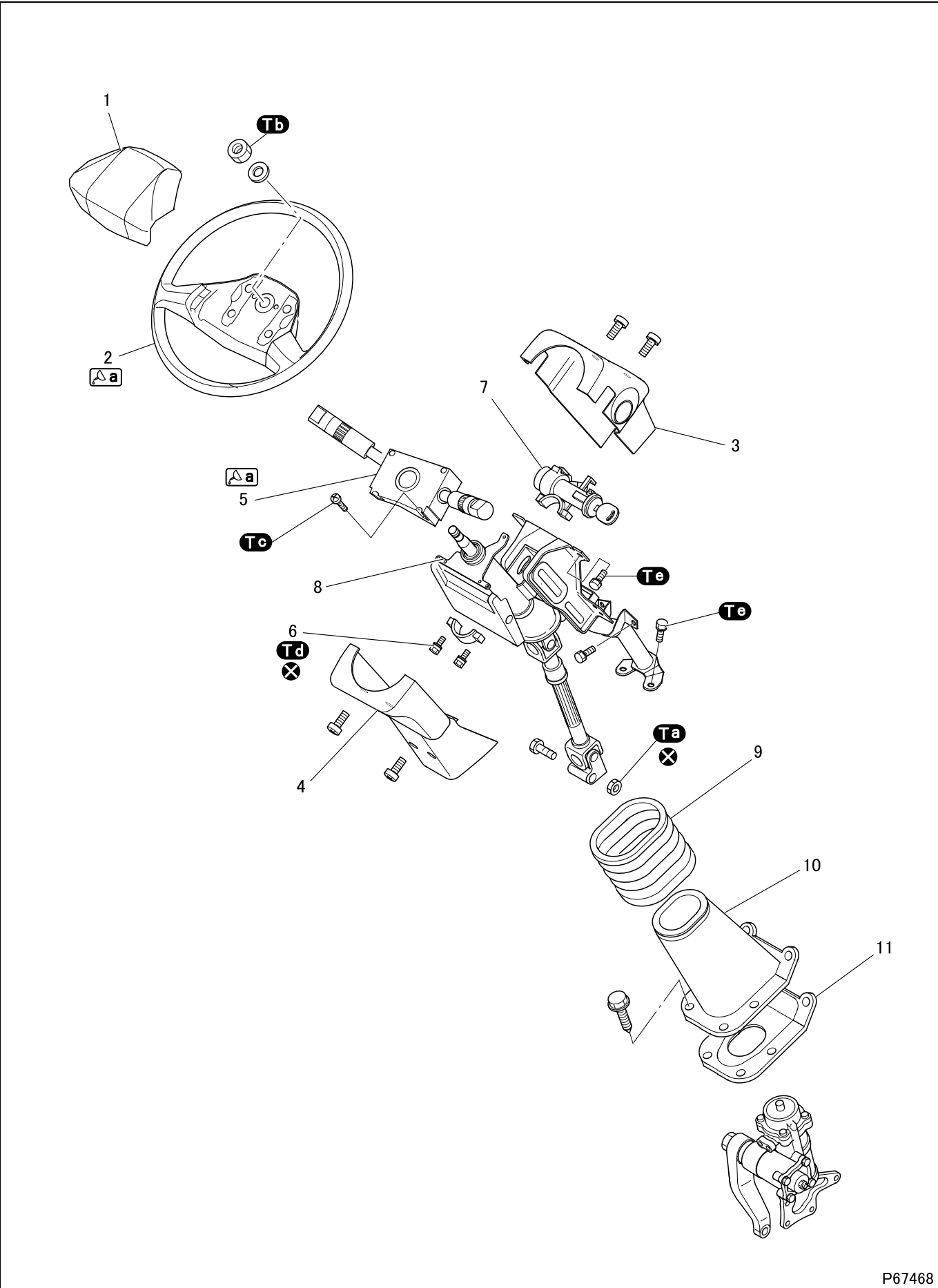
### (1) Back lash

- With the vehicle in the stationary state, move the drag link by the rod in the forward, backward, vertical and lateral directions of the vehicle and check for play at the ball joints with the gear power steering gear and knuckle arm.
- If play is excessive, replace the drag link.

### (2) Dust cover

- Check the dust cover for wear, cracks and other damage.
- If there is any abnormality, replace the dust cover.

# STEERING COLUMN





● **Removal sequence**

- |                      |  |
|----------------------|--|
| 1 Horn pad           | 8 Steering column<br>(For details, see later pages.) |
| 2 Steering wheel     | 9 Dust cover   |
| 3 Front column cover | 10 Dust cover  |
| 4 Rear column cover  | 11 Dust cover  |
| 5 Combination switch |  |
| 6 Twist-off bolt     |  |
| 7 Starter switch     | ⊗: Non-reusable parts                                |

● **Installation sequence**

Follow the removal sequence in reverse.

**CAUTION** ⚠

- After installation, check the steering column for looseness. (See ON-VEHICLE INSPECTION AND ADJUSTMENT.)

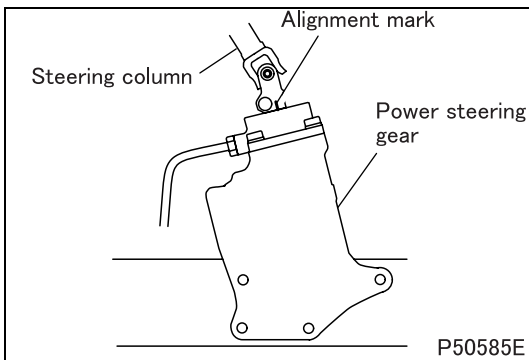
**Tightening torque (Unit: N·m {ft.lbs, kgf·m})**

Mark	Parts to be tightened	Tightening torque	Remarks
<b>Ta</b>	Nut (steering column and power steering gear mounting)	22 to 31 {16 to 23, 2.2 to 3.2}	–
<b>Tb</b>	Nut (steering wheel mounting)	39 to 49 {29 to 36, 4.0 to 5.0}	–
<b>Tc</b>	Screw (combination switch mounting)	2.5 ± 0.5 {1.8 ± 0.4, 0.3 ± 0.1}	–
<b>Td</b>	Twist-off bolt (starter switch mounting)	14.2 ± 1.5 {10 ± 1.1, 1.4 ± 0.2}	–
<b>Te</b>	Bolt (steering column assembly mounting)	17 to 25 {12 to 19, 1.7 to 2.6}	–
<b>Tf</b>	Bolthorn (horn pad mounting)	7 to 11 {5.2 to 8.1, 0.7to 1.1}	–

**Lubricant and/or sealant**

Mark	Points of application	Specified lubricant and/or sealant	Quantity
Ⓐa	Contact ring under steering wheel	Wheel bearing grease [NLGI No. 2 (Li soap)]	As required
	Horn contact piece on combination switch side		

◆ **Work before removal** ◆

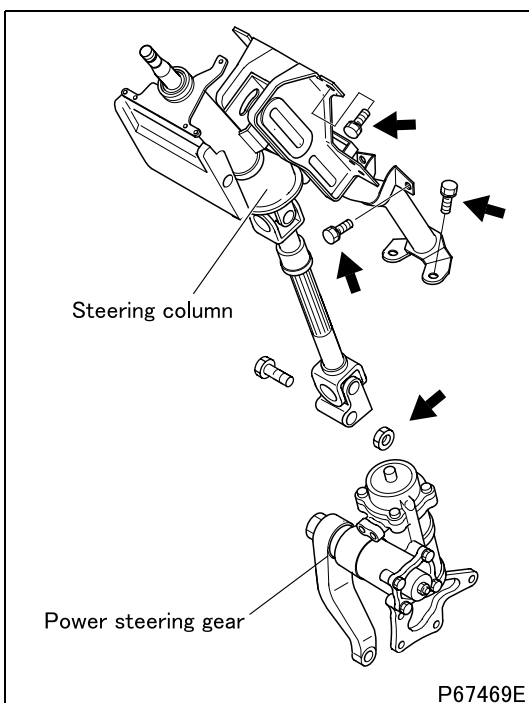
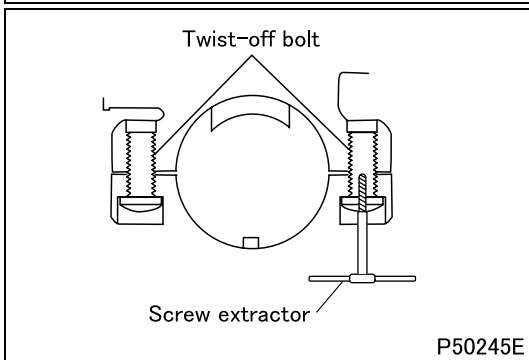
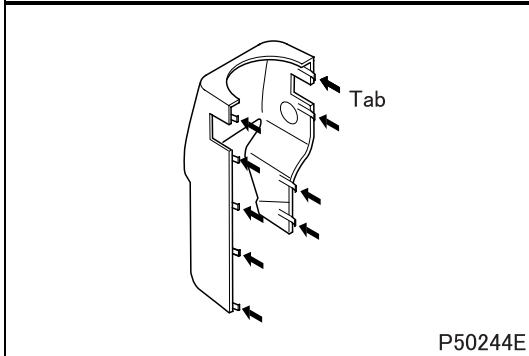
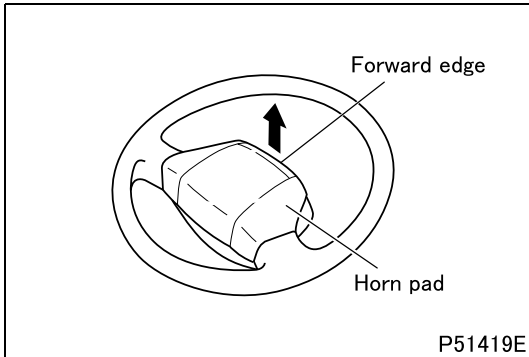


■ **Alignment mark: Steering column and power steering gear**

- Provide alignment marks on the steering column and power steering gear.

# STEERING COLUMN

## ◆ Removal procedure ◆



### ■ Removal: Horn pad

- Lift up the horn pad by the forward edge to remove from the steering wheel.

### ■ Removal: Front column cover

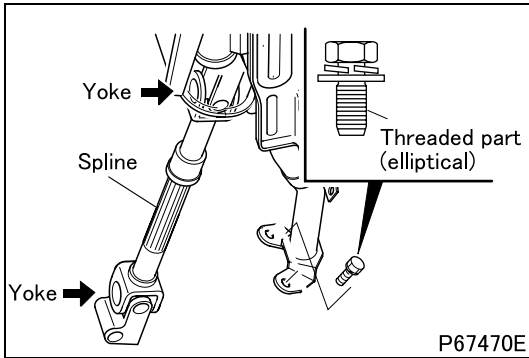
### ■ Removal: Starter switch

- Drill a hole of 5.5 to 6 mm {0.22 to 0.24 in.} in diameter to a depth of 10 to 15 mm {0.39 to 0.59 in.} in the twist-off bolt.
- Using the drilled hole, screw the screw extractor counterclockwise into the twist-off bolt and remove it.

### ■ Removal: Steering column

- To remove the steering column, remove the nut connecting it to the power steering gear, in addition to mounting bolts in the cab.

## ◆ Installation procedure ◆



### ■ Installation: Steering column

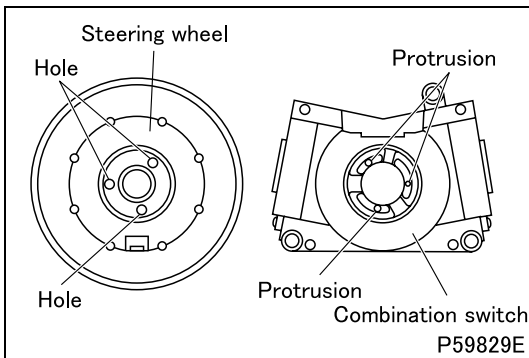
- If the spline is off the steering column, assemble them with the yokes facing in the same direction.
- Install the steering column using the illustrated bolts. The threaded portion of these bolts is elliptical for grounding the horn circuit properly.

### ■ Installation: Starter switch

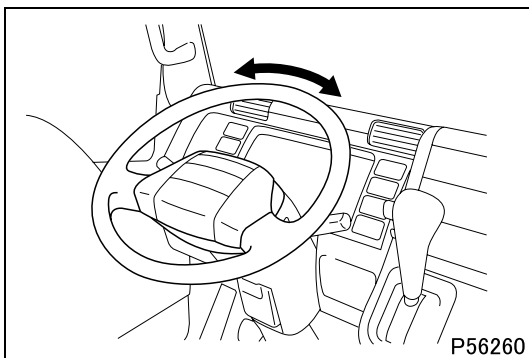
- Install the starter switch using new twist-off bolts. Tighten the bolts to specified torque to snap off their heads.

### ■ Installation: Steering wheel

- Align the three holes of the steering wheel with three protrusions of the cancel cam on the combination switch to attach the steering wheel.



## ◆ Inspection after installation ◆

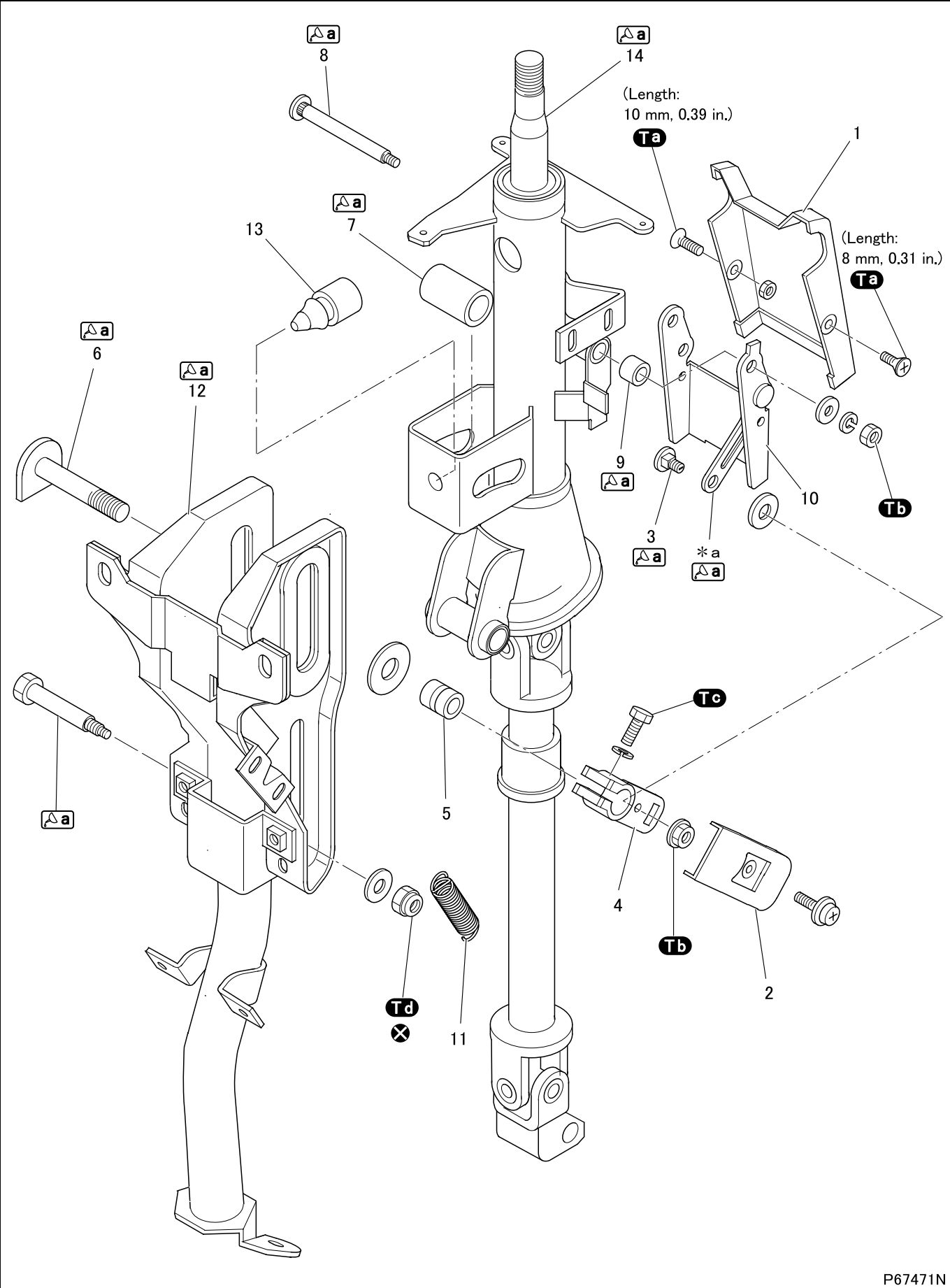


### ■ Inspection: Noise from steering wheel

- Lightly turn the steering wheel left and right and check for noise and other abnormalities.
- If any abnormality is found, disassemble the steering wheel, remove the cause and reinstall.

# STEERING COLUMN

## Steering Column



● **Disassembly sequence**

- |                   |                                  |                           |
|-------------------|----------------------------------|---------------------------|
| 1 Lever cover     | 7 Spacer                         | 13 Shock absorbing rubber |
| 2 Lever protector | 8 Pin                            | 14 Steering column        |
| 3 Pin             | 9 Collar                         |                           |
| 4 Lock lever      | 10 Tilting and telescoping lever |                           |
| 5 Nut             | 11 Spring                        | *a: Link plate            |
| 6 Bolt            | 12 Steering column support       | ⊗: Non-reusable parts     |

● **Assembly sequence**

Follow the disassembly sequence in reverse.

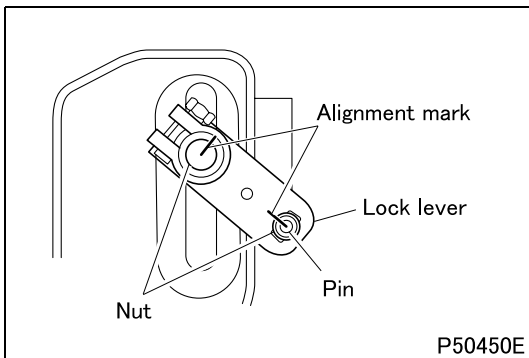
**Tightening torque (Unit: N-m {ft.lbs, kgf-m})**

Mark	Parts to be tightened	Tightening torque	Remarks
<b>Ta</b>	Screw (lever cover mounting)	1.0 to 1.5 {0.7 to 1.1, 0.1 to 0.2}	–
<b>Tb</b>	Nut (lock lever mounting)	3.9 to 5.9 {2.9 to 4.4, 0.4 to 0.6}	–
	Nut (tilting and telescoping lever mounting)		–
<b>Tc</b>	Bolt (lock lever mounting)	16 to 20 {12 to 15, 1.6 to 2.0}	–
<b>Td</b>	Nut (steering column support mounting)	9 to 14 {6.6 to 10, 0.9 to 1.4}	–

**Lubricant and/or sealant**

Mark	Points of application	Specified lubricant and/or sealant	Quantity
<b>a</b>	Friction surface of pin	Wheel bearing grease [NLGI No. 2 (Li soap)]	As required
	Friction surface of collar		
	Staked area of link plate		
	Friction surface and thread of bolt		
	Friction surface of spacer		
	Friction surfaces of steering column support and steering column		
	Friction surface of bolt		

◆ **Work before removal** ◆

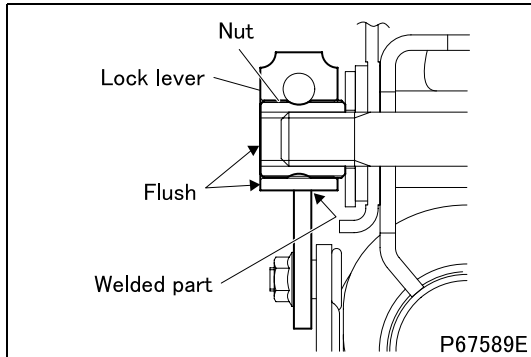


■ **Alignment mark: Nut and lock lever**

- Be sure to provide alignment marks on the lock lever and nuts before removal.

# STEERING COLUMN

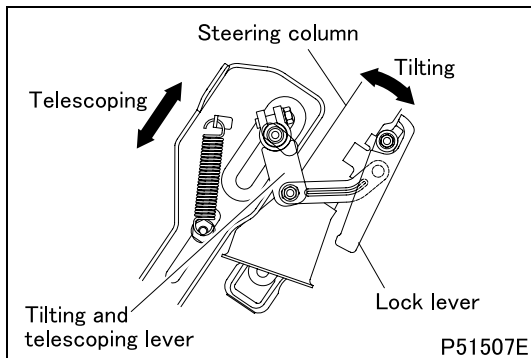
## ◆ Installation procedure ◆



### ■ Installation: Lock lever

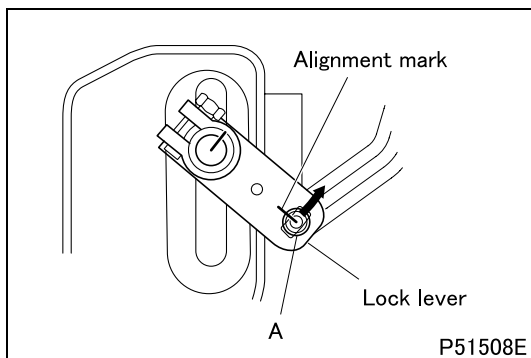
- Install the lock lever flush with the nut, with the welded part facing in the illustrated direction.

## ◆ Inspection after installation ◆



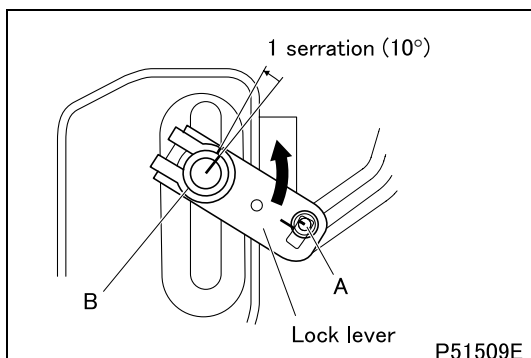
### ■ Inspection: Tilting and telescoping lever operating force

- Tilt the steering column all the way forward and telescope it to the mid-point of the movable range.
- Push the tilting and telescoping lever in and lock the steering column. In this state, check that the force required to operate the tilting and telescoping lever is 140 N {31 lbs, 14 kgf} or more.
- Push the steering column forward by hand to check that it is securely held.
- Adjust the installed position of the lock lever if necessary.



### ■ Adjustment: Lock lever

- Loosen nut **A**.
- Move the lock lever to relocate the nut **A** in the slot from the alignment mark in the arrow direction, then tighten the nut **A** in that position.

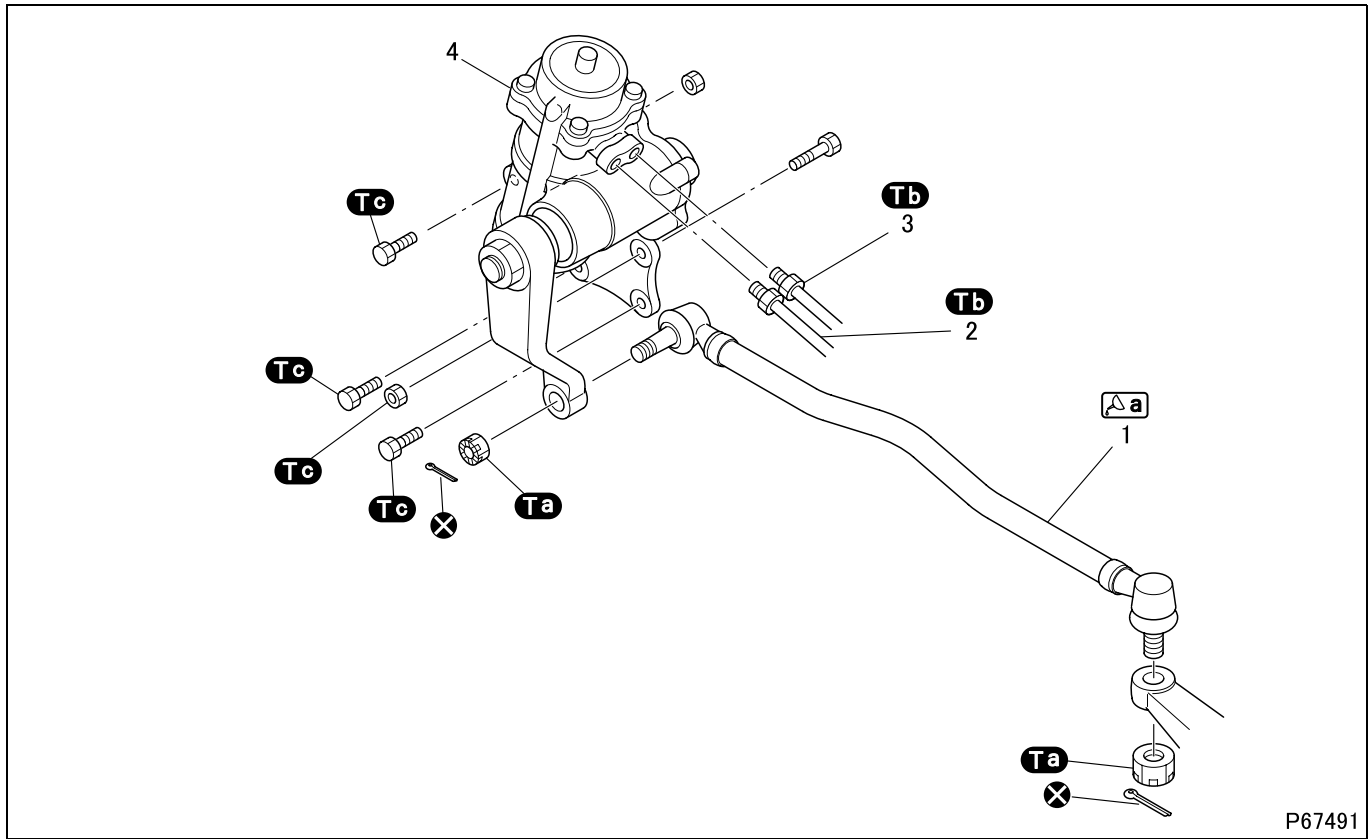


- If the nut **A** is already at the end of the slot in the lock lever and cannot be relocated, remove the lock lever and turn the nut **B** one serration (10°) from the alignment mark in the arrow direction, then reinstall the lock lever.
- Adjust the tightening position of the nut **A** so that the tilting and telescoping lever operating force becomes 140 N {31 lbs, 14 kgf} or more.

---

M E M O

# POWER STEERING GEAR AND DRAG LINK



## ● Removal sequence

- 1 Drag link
- 2 Feed pipe
- 3 Return pipe
- 4 Power steering gear

⊗ : Non-reusable parts

## CAUTION ⚠

- When removing the drag link, take care not to deform or damage the dust cover.
- Do not attempt to disassemble the drag link because it is of a unit construction.

## ● Installation sequence

Follow the removal sequence in reverse.

## Service standards

Location	Maintenance item	Standard value	Limit	Remedy	
1	Drag link ball joint	Play (± 980 N {220 lbs ± 100 kgf} loaded)	0.1 to 5.9 N·m {0.1 to 4.4 ft.lbs, 0.01 to 0.6 kgf·m}	—	Replace
		Rotational Torque	1.0 to 5.9 N·m {0.1 to 4.4 ft.lbs, 0.1 to 0.6 kgf·m}		

## Tightening torque (Unit: N·m {ft.lbs, kgf·m})

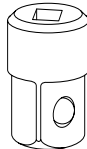
Mark	Parts to be tightened	Tightening torque	Remarks
<b>Ta</b>	Nut (drag link mounting)	137 to 196 {100 to 145, 14 to 20}	—
<b>Tb</b>	Feed pipe and return pipe	11.8 to 17.6 {8.7 to 13, 1.2 to 1.8}	—
<b>Tc</b>	Bolt or nut (power steering gear mounting)	83.5 to 108 {61 to 80, 8.5 to 11}	—



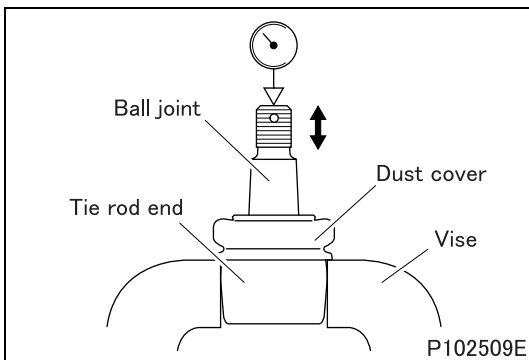
**Lubricant and/or sealant**

Mark	Points of application	Specified lubricant and/or sealant	Quantity
	Lip area of drag link ball joint dust cover	Wheel bearing grease [NLGI No. 2 (Li soap)]	As required

**Special tools**

Mark	Tool name and shape	Part No.	Application
	Preload socket 	MB990326 P48876	Measurement of drag link ball joint turning torque

**◆ Inspection procedure ◆**



**■ Inspection: Drag link**

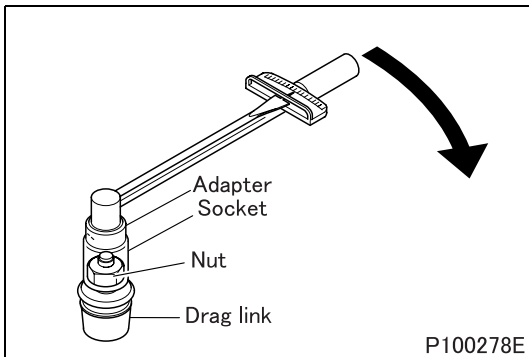
**(1) Play**

- Fix the tie drag link with a vise.

**CAUTION**

- **Take care not to deform or damage the dust cover when fixing it with a vise.**

- If measured value deviates from the standard value with applying the specified load (push and pull) to the ball joint, replace the tie drag link.



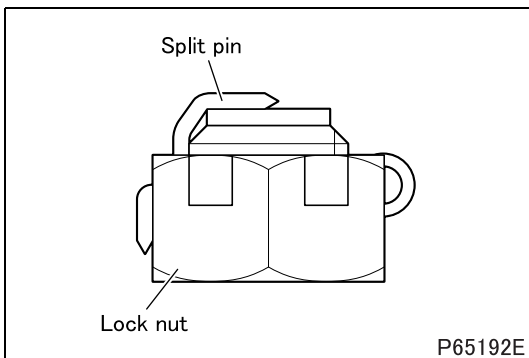
**(2) Rotation torque**

- Install the drag link mounting nut on the drag link.
- Install the socket, adapter and torque wrench to measure the rotation torque.
- If the measured value deviates from the standard value, replace the drag link.

**(3) Dust cover**

- Check the dust cover for wear, cracks and other damage. These abnormalities may cause water infiltration to the ball joint and wear out it at early stage.
- If any abnormality is found in the dust cover, replace the drag link.

**◆ Installation procedure ◆**

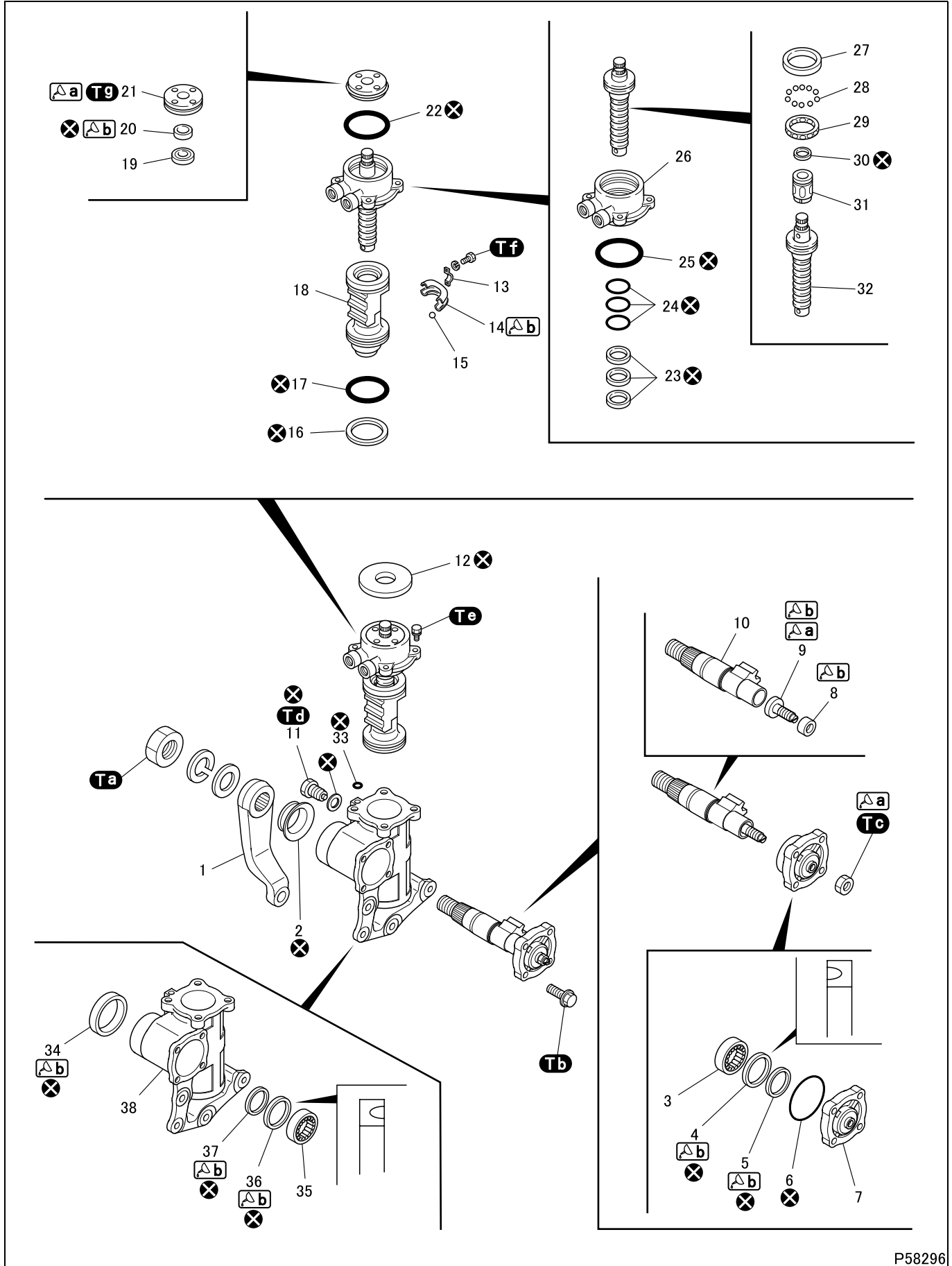


**■ Installation: Drag link**

- Align a slot in the lock nut with the split pin hole in the ball joint by turning the lock nut in the tightening direction while checking the torque is within the specified range, then install the split pin as shown in the illustration.

# POWER STEERING GEAR AND DRAG LINK

## Power Steering Gear



## ● Disassembly sequence

1 Pitman arm	15 Steel ball	29 Bearing cage
2 Dust cover	16 Seal ring	30 Seal ring
★3 Needle bearing	17 O-ring	31 Rotor
4 Y-packing	18 Piston	32 Worm and stub shaft
5 Backup ring	19 Ball bearing	33 O-ring
6 O-ring	20 Oil seal	34 Oil seal
7 Side cover	21 Adjusting plug	★35 Needle bearing
★8 Retainer	22 O-ring	36 Y-packing
★9 Adjusting screw	23 Seal ring	37 Backup ring
10 Sector shaft	24 O-ring	38 Body
11 Plug	25 O-ring	
12 Dust cover	26 Valve housing	⊗: Non-reusable parts
13 Ball tube clip	27 Side race	
14 Ball tube	28 Steel ball	

## NOTE

- Do not remove parts marked ★ unless absolutely necessary.

## CAUTION

- When holding the body with a vise, take care not to scratch the gasket seated surface of plug.

## ● Assembly sequence

Follow the disassembly sequence in reverse.

Repair kit: Repair kit

## Service standards (Unit: mm {in.})



Location	Maintenance item	Standard value	Limit	Remedy	
-	Power steering gear	Starting torque	0.88 N·m {0.6 ft.lbs, 0.1 kgf·m} or less	-	Adjust
		Engaging torque	0 to 0.25 N·m {0 to 0.2 ft.lbs, 0 to 0.03 kgf·m}	-	
		Normal turning torque	0.15 to 0.78 N·m {0.1 to 0.6 ft.lbs, 0.02 to 0.1 kgf·m}	-	
9, 10	Play between adjusting screw and sector shaft	0.1 {0.0039} or less	-	Replace	
10	Sector shaft outer diameter	Adjusting screw side	φ34.975 {1.38}	φ34.875 {1.37}	Replace
		Pitman side	φ44.975 {1.77}	φ44.875 {1.77}	
18, 32	Play in diametric direction between piston and worm and stub shaft	-	0.5 {0.020} or less	Replace	
18, 38	Clearance between piston and body	0.11 {0.0043}	0.16 {0.0063}	Replace	
31, 32	Clearance between rotor and worm and stub shaft	0.02 {0.00079}	0.03 {0.0012}	Replace	

# POWER STEERING GEAR AND DRAG LINK


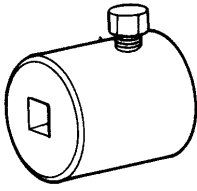

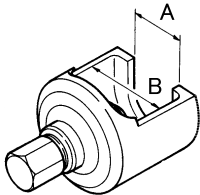

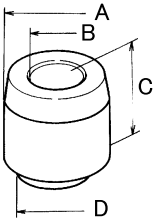

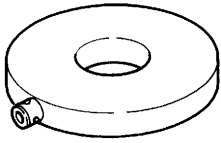

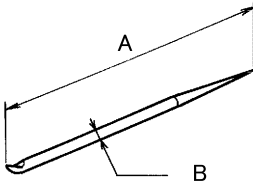

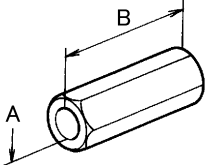
## Tightening torque (Unit: N·m {ft.lbs, kgf·m})

Mark	Parts to be tightened	Tightening torque	Remarks
<b>Ta</b>	Lock nut (pitman arm fastening)	294 to 343 {215 to 255, 30 to 35}	–
<b>Tb</b>	Bolt (sector shaft mounting)	53.9 to 63.7 {40 to 47, 5.5 to 6.5}	–
<b>Tc</b>	Nut (adjusting screw tightening)	63.7 to 73.5 {47 to 54, 6.5 to 7.5}	–
<b>Td</b>	Plug	73.6 to 83.4 {54 to 62, 7.5 to 8.5}	–
<b>Te</b>	Bolt (valve housing attaching)	98.1 to 107.9 {72 to 80, 10 to 11}	–
<b>Tf</b>	Screw (ball tube clip fitting)	4.41 to 5.39 {3.3 to 4.0, 0.4 to 0.5}	–
<b>Tg</b>	Adjusting plug	147 to 166 {110 to 120, 15 to 17}	–

## Lubricant and/or sealant

Mark	Points of application	Specified lubricant and/or sealant	Quantity
 a	Nut threads and contact surface of side cover	Hermetic seal 101Y or ThreeBond 1102	As required
	Adjusting screw threads		
	Periphery of adjusting plug		
 b	Inner periphery of backup ring	Multi-purpose type grease [NLGI No. 2 (Li soap)]	As required
	Inner periphery of Y-packing		
	Inner periphery of retainer		
	Adjusting screw threads and contact surface of sector shaft		
	Inner surface of ball tube		
	Inner periphery of oil seal		

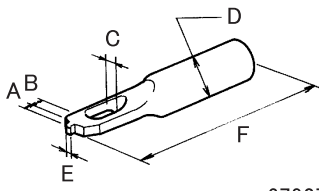
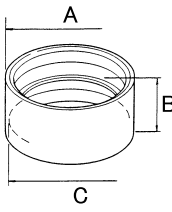
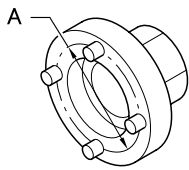
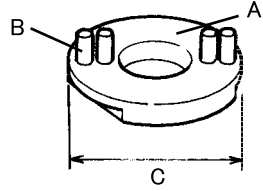
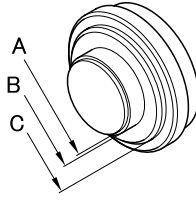
**Special tools (Unit: mm {in.})**

Mark	Tool name and shape	Part No.	Application								
	Preload socket 	MB991006 10028	Measurement of power steering gear starting torque								
	Pitman arm puller <table border="1" data-bbox="256 569 440 674"> <tr> <th>A</th> <th>B</th> </tr> <tr> <td>49 {1.93}</td> <td>76 {2.99}</td> </tr> </table> 	A	B	49 {1.93}	76 {2.99}	MH062472 01355	Removal of pitman arm				
A	B										
49 {1.93}	76 {2.99}										
	Insert tool assembly  <table border="1" data-bbox="256 953 618 1058"> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> <tr> <td>φ35 {1.38}</td> <td>φ25 {0.98}</td> <td>53.5 {2.11}</td> <td>φ33 {1.30}</td> </tr> </table>	A	B	C	D	φ35 {1.38}	φ25 {0.98}	53.5 {2.11}	φ33 {1.30}	MH062881 *910-21719 01358	Forming of backup ring
A	B	C	D								
φ35 {1.38}	φ25 {0.98}	53.5 {2.11}	φ33 {1.30}								
	Insert tool assembly 	MC811971 *910-11001 01356	Forming of backup ring and installation of oil seal								
	Needle <table border="1" data-bbox="256 1415 440 1520"> <tr> <th>A</th> <th>B</th> </tr> <tr> <td>120 {4.72}</td> <td>φ3 {0.12}</td> </tr> </table> 	A	B	120 {4.72}	φ3 {0.12}	MC811948 *910-21200 02288	Removal of O-ring and seal ring				
A	B										
120 {4.72}	φ3 {0.12}										
	Bar <table border="1" data-bbox="256 1656 440 1761"> <tr> <th>A</th> <th>B</th> </tr> <tr> <td>φ16.5 {0.65}</td> <td>57 {2.24}</td> </tr> </table> 	A	B	φ16.5 {0.65}	57 {2.24}	MC811955 *910-22811 01360	Turning of retainer				
A	B										
φ16.5 {0.65}	57 {2.24}										

\*: Unisia JKC part numbers


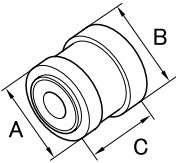

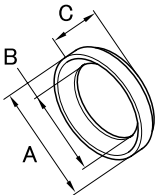

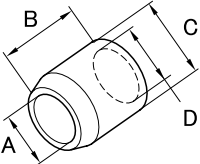

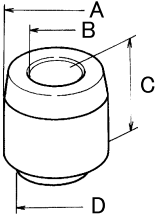
# POWER STEERING GEAR AND DRAG LINK

## Special tools (Unit: mm {in.})

Mark	Tool name and shape	Part No.	Application												
<b>g</b>	<p>Squeeze tool</p>  <p>67927</p> <table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>5 {0.20}</td> <td>8 {0.31}</td> <td>18 {0.71}</td> <td>φ30 {1.18}</td> <td>6 {0.24}</td> <td>160 {6.30}</td> </tr> </tbody> </table>	A	B	C	D	E	F	5 {0.20}	8 {0.31}	18 {0.71}	φ30 {1.18}	6 {0.24}	160 {6.30}	MC811950 *910-21801	Crimping of retainer
A	B	C	D	E	F										
5 {0.20}	8 {0.31}	18 {0.71}	φ30 {1.18}	6 {0.24}	160 {6.30}										
<b>h</b>	<p>Insert tool</p>  <p>02289</p> <table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>φ98 {3.86}</td> <td>50 {1.97}</td> <td>φ85.05 {3.35}</td> </tr> </tbody> </table>	A	B	C	φ98 {3.86}	50 {1.97}	φ85.05 {3.35}	MC8131516 *910-21718	Forming of piston seal ring						
A	B	C													
φ98 {3.86}	50 {1.97}	φ85.05 {3.35}													
<b>i</b>	<p>Wrench assembly</p>  <p>P51270</p> <table border="1"> <thead> <tr> <th>A</th> </tr> </thead> <tbody> <tr> <td>φ52 {2.05}</td> </tr> </tbody> </table>	A	φ52 {2.05}	MH062883 *910-10745	Removal and installation of adjusting plug										
A															
φ52 {2.05}															
<b>j</b>	<p>Attachment assembly (A: Adapter) (B: Bolt (pin))</p>  <p>02290</p> <table border="1"> <thead> <tr> <th>C</th> </tr> </thead> <tbody> <tr> <td>φ147 {5.79}</td> </tr> </tbody> </table>	C	φ147 {5.79}	MC811969 *910-10671 (A: *910-23581) (B: *910-23194)	Fixing of valve housing										
C															
φ147 {5.79}															
<b>k</b>	<p>Press-fit tool</p>  <p>P51271</p> <table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>φ29.7 {1.17}</td> <td>φ31.8 {1.25}</td> <td>φ45 {1.77}</td> </tr> </tbody> </table>	A	B	C	φ29.7 {1.17}	φ31.8 {1.25}	φ45 {1.77}	MH062884 *910-20405	Installation of oil seal						
A	B	C													
φ29.7 {1.17}	φ31.8 {1.25}	φ45 {1.77}													

\*: Unisia JKC part numbers

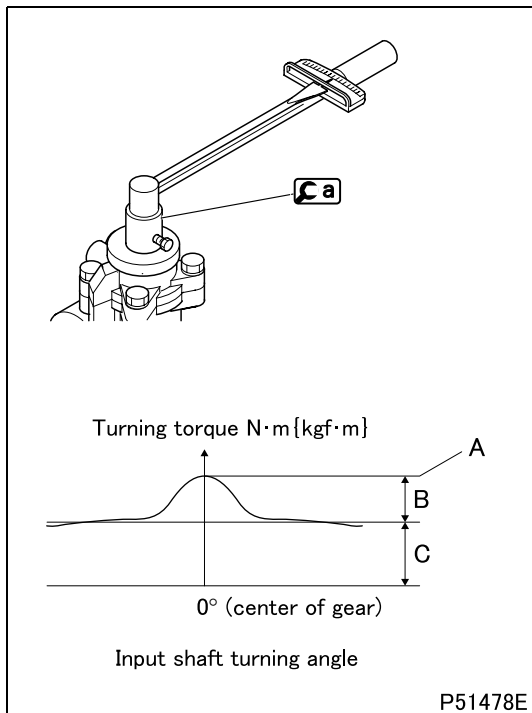
**Special tools (Unit: mm {in.})**

Mark	Tool name and shape	Part No.	Application								
	Adjusting tool  <table border="1" data-bbox="256 327 529 436"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>φ59.5 {2.34}</td> <td>φ65.5 {2.58}</td> <td>65 {2.56}</td> </tr> </tbody> </table> <p style="text-align: right;">P51272</p>	A	B	C	φ59.5 {2.34}	φ65.5 {2.58}	65 {2.56}	MH062885 *910-22997	Assembly of thrust bearing		
	A	B	C								
φ59.5 {2.34}	φ65.5 {2.58}	65 {2.56}									
	Guide assembly  <table border="1" data-bbox="256 569 529 678"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>φ76 {2.99}</td> <td>φ56 {2.20}</td> <td>13 {0.51}</td> </tr> </tbody> </table> <p style="text-align: right;">P51273</p>	A	B	C	φ76 {2.99}	φ56 {2.20}	13 {0.51}	MH062886 *910-23051			
A	B	C									
φ76 {2.99}	φ56 {2.20}	13 {0.51}									
	Insert tool  <table border="1" data-bbox="256 953 618 1062"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>φ28.1 {1.11}</td> <td>45 {1.77}</td> <td>φ40 {1.57}</td> <td>φ30.3 {1.19}</td> </tr> </tbody> </table> <p style="text-align: right;">P51274</p>	A	B	C	D	φ28.1 {1.11}	45 {1.77}	φ40 {1.57}	φ30.3 {1.19}	MH062882 *910-22776	Forming of rotor seal ring and valve housing seal ring
A	B	C	D								
φ28.1 {1.11}	45 {1.77}	φ40 {1.57}	φ30.3 {1.19}								
	Insert tool  <table border="1" data-bbox="256 1314 618 1423"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>φ45 {1.77}</td> <td>φ20 {0.79}</td> <td>45 {1.77}</td> <td>φ33 {1.30}</td> </tr> </tbody> </table> <p style="text-align: right;">55473</p>	A	B	C	D	φ45 {1.77}	φ20 {0.79}	45 {1.77}	φ33 {1.30}	MH062880 *910-21716	Forming of backup ring
A	B	C	D								
φ45 {1.77}	φ20 {0.79}	45 {1.77}	φ33 {1.30}								

\*: Unisia JKC part numbers

# POWER STEERING GEAR AND DRAG LINK

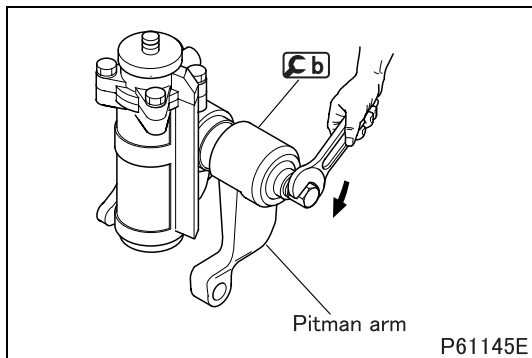
## ◆ Inspection before removal ◆



### ■ Inspection: Starting torque

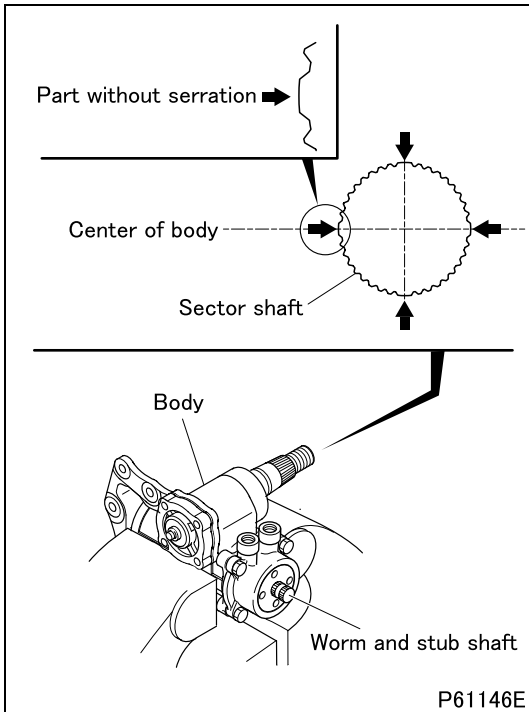
- Using **Ca**, measure the starting torque of the power steering gear for reference at the time of reassembly before removal.
  - A**: Starting torque (= engaging torque + normal turning torque)
  - B**: Engaging torque
  - C**: Normal turning torque

## ◆ Removal procedure ◆



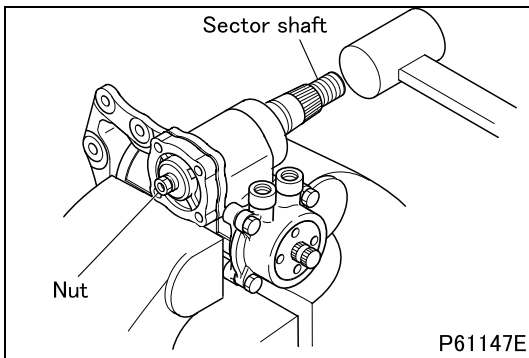
### ■ Removal: Pitman arm





#### ■ Removal: Sector shaft

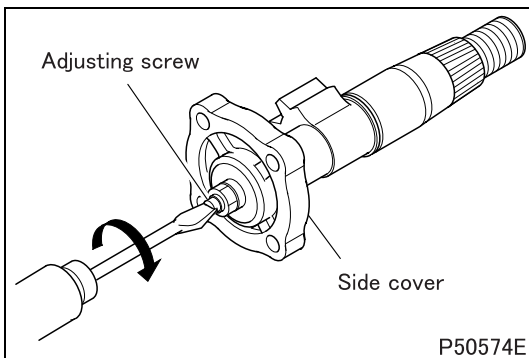
- Before removing, set the sector shaft in neutral position as follows.
- Turn the worm and stub shaft counterclockwise into the lock position, then back it up roughly 2.6 turns to bring the serration missing part of the serrated portion of the sector shaft into parallelism with the center of the body as shown.



- Loosen nut, and remove the sector shaft by tapping the shaft end with a plastic hammer.

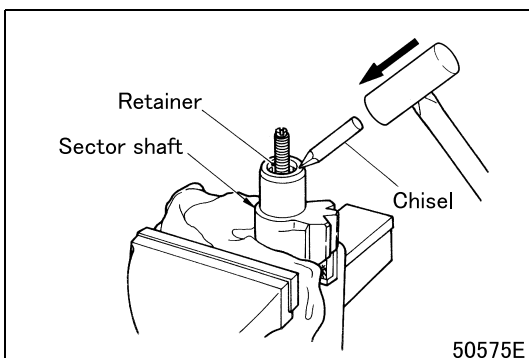
#### CAUTION ⚠

- If the sector shaft is stuck, it should be out of neutral position. In such a case, do not attempt to force it out by hammering but redo the neutral positioning procedure.



#### ■ Removal: Side cover

- Remove the side cover by screwing in the adjusting screw.



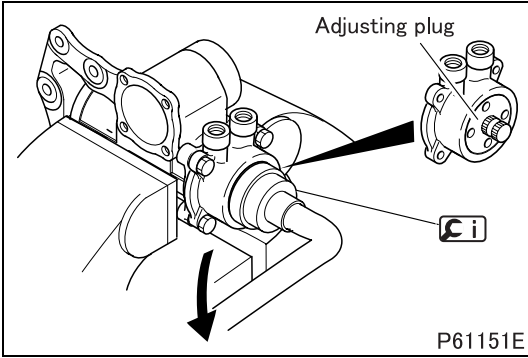
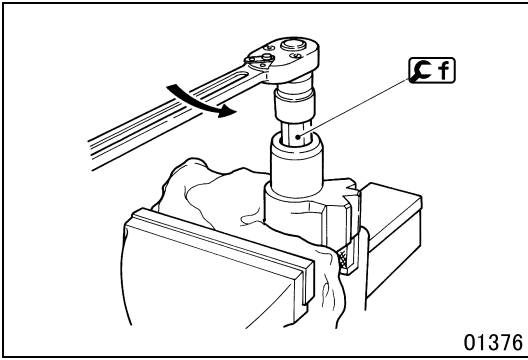
#### ■ Removal: Retainer

- Undo the crimp of the retainer (at 2 points) using a chisel.

#### CAUTION ⚠

- When holding the sector shaft with a vise, be sure to cover it with a cloth or the like for protection.

# POWER STEERING GEAR AND DRAG LINK

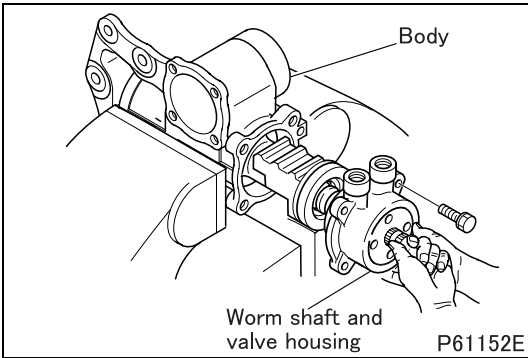


## ■ Removal: Worm shaft and valve housing

- Before removing the ball screw and valve housing, back up the adjusting plug by roughly 180° with **f**.

### CAUTION ⚠

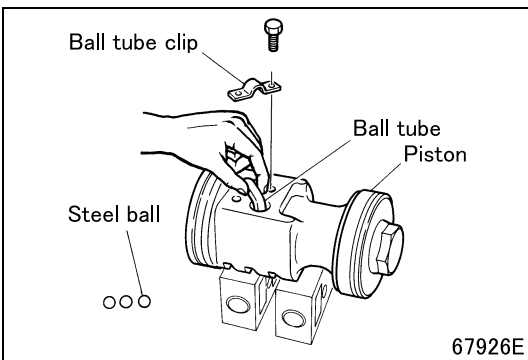
- Do not remove the adjusting plug. If it is removed, bearing in the valve housing may pop out.



- Remove the ball screw and valve housing from the body.

### CAUTION ⚠

- Take care so that balls in the ball screw and valve housing do not pop out.
- Take care not to scratch or otherwise damage the inner surface of the body and piston.

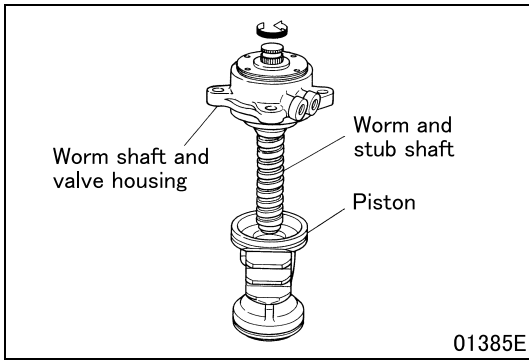


## ■ Removal: Ball tube and steel ball

- First remove steel balls from the piston, then remove ball tube clip. Hold the ball tube between fingers and remove it from the piston moving it lightly.

### CAUTION ⚠

- Be careful not to lose the steel balls (28 pieces in all).

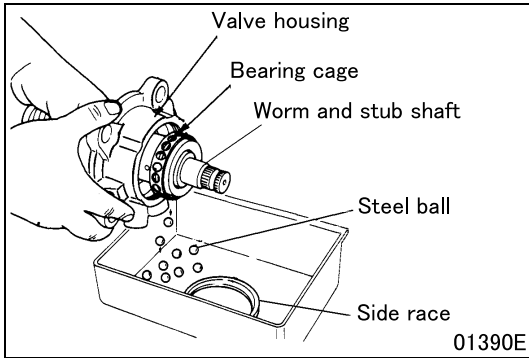


#### ■ Removal: Piston

- Holding the worm shaft and valve housing with the piston downward, turn the worm and stub shaft, and remove the piston.

#### CAUTION ⚠

- **Be careful not to tilt the piston during removal. If it is tilted, steel balls will fall off the race of the piston and worm and stub shaft into the piston.**



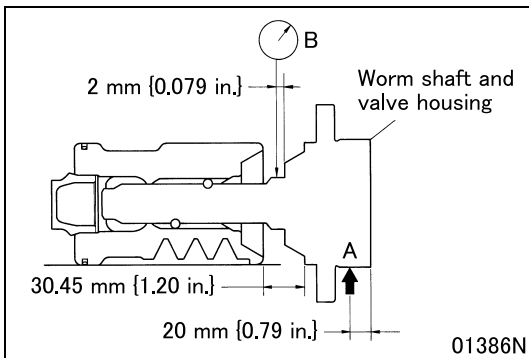
#### ■ Removal: Worm and stub shaft

- Remove the worm and stub shaft by pushing its piston-side end out.

#### CAUTION ⚠

- **Use a suitable receptacle not to lose the side race, steel balls and bearing cage that fall off in separated pieces.**

#### ◆ Inspection procedure ◆

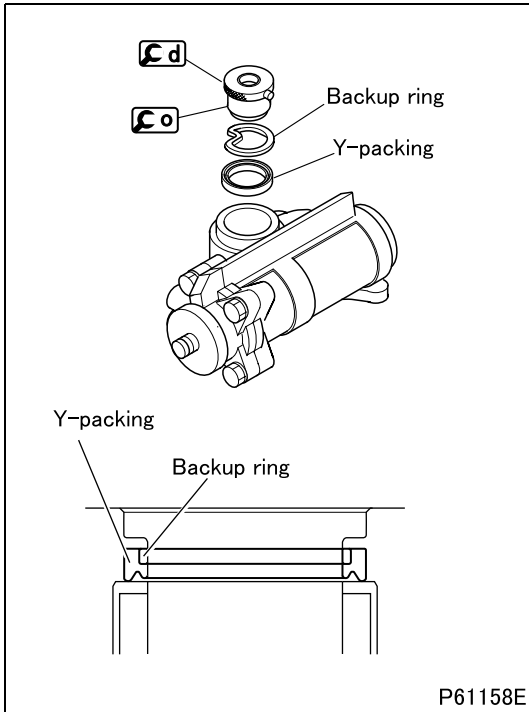


#### ■ Inspection: Side play of piston and worm and stub shaft

- Apply a force of 49 N {11 lbs, 5.0 kgf} to the illustrated point A and measure play B (play in the diametric direction) of the worm shaft and valve housing.
- If the measurement exceeds the limit, replace the faulty parts.

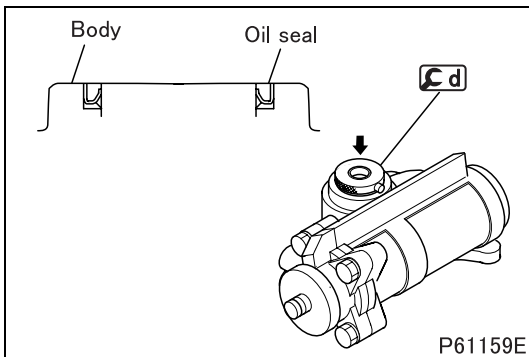
# POWER STEERING GEAR AND DRAG LINK

## ◆ Installation procedure ◆



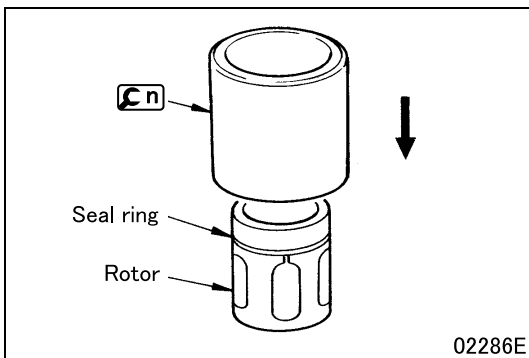
### ■ Installation: Backup ring and Y-packing

- Fill grease in the groove of Y-packing and install Y-packing in the illustrated direction.
- Install backup ring, formed as shown, using **C d** and **C o**.



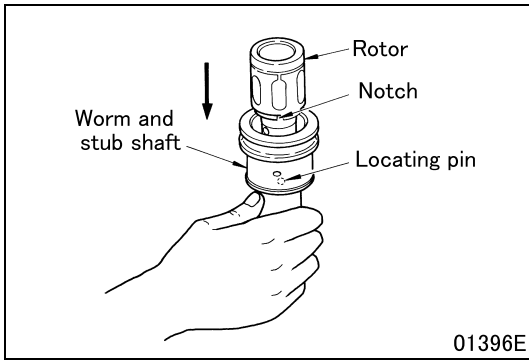
### ■ Installation: Oil seal

- Install the oil seal to the body in the illustrated direction.



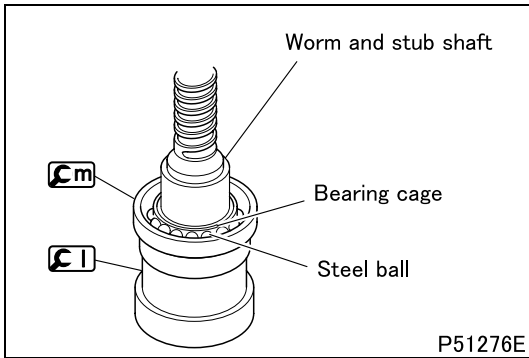
### ■ Installation: Seal ring

- Install the seal ring onto the rotor.
- Form the seal ring to fit the rotor using **C n**.





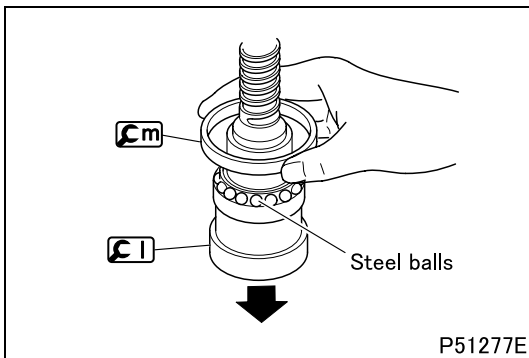
#### ■ Installation: Rotor

- Install the rotor aligning its notch with the locating pin of the worm and stub shaft.

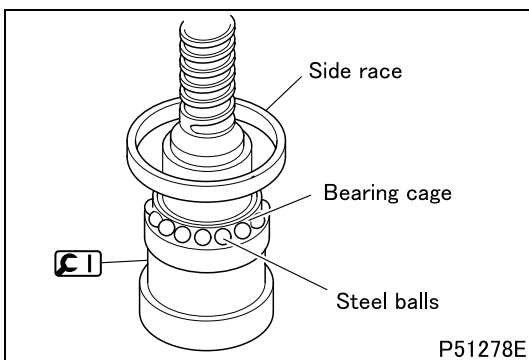


#### ■ Installation: Side race, steel balls and bearing cage

- Using  and  assembled, install the worm and stub shaft in the illustrated direction.
- Install the bearing cage and steel balls onto the worm and stub shaft.

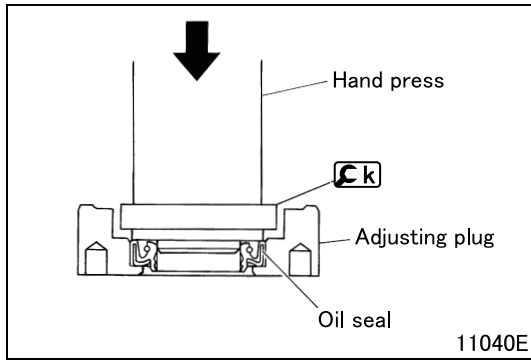


- Holding  with hand, slide  downward to have steel balls set in place.



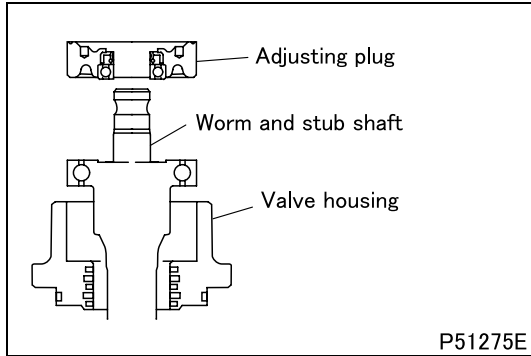
- Install the side race onto the steel balls and bearing cage.

# POWER STEERING GEAR AND DRAG LINK



## ■ Installation: Oil seal

- Using **Ck**, press oil seal in the illustrated direction into the adjusting plug.

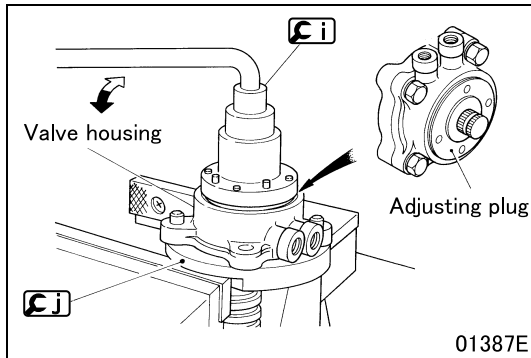


## ■ Installation: Worm and stub shaft

- Install the valve housing onto the worm and stub shaft and secure it in place with adjusting plug.

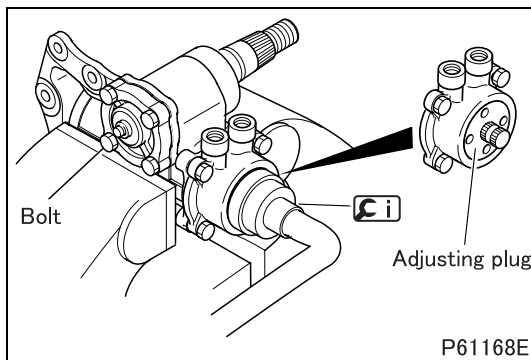
## CAUTION

- Take care not to damage the seal rings with the ball race of the worm and stub shaft.

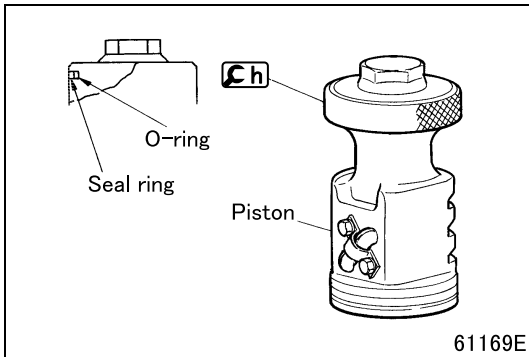


## ■ Installation: Adjusting plug

- Hold **Cj** with a vise and secure the valve housing to it.
- Tighten the adjusting plug to the specified torque using **Ci**, then back it up by approximately 180°.

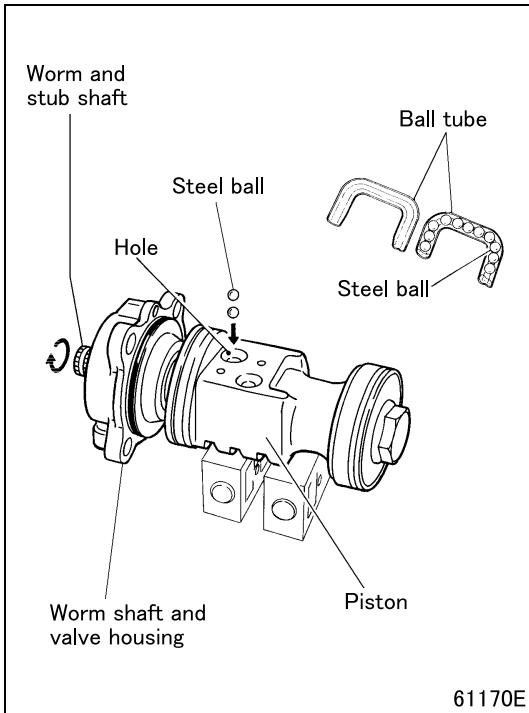


- Tighten bolt to the specified torque, then retighten the adjusting plug using **Ci**.



#### ■ Installation: Seal ring and O-ring

- Install seal ring and O-ring in the outer surface grooves of the piston, and form the seal ring to fit in place using .

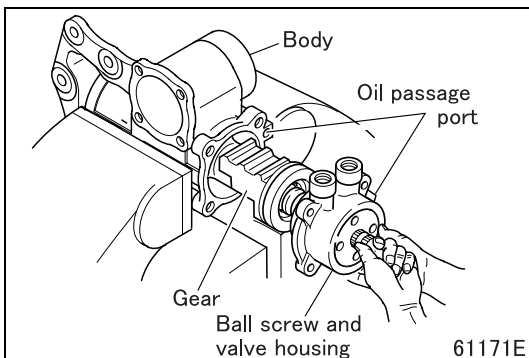


#### ■ Installation: Ball tube

- Pack grease in one half of the ball tube, place 10 to 11 steel balls in it and put the other half upon it.
- Place the piston on a flat workbench, align the positions of the worm shaft and valve housing and piston ball race, then while turning the worm and stub shaft, let steel balls fall from the ball tube hole.

#### CAUTION

- Do not draw out the worm shaft and valve housing until its end passes over the ball tube hole during installation. Otherwise the steel balls will come out of the ball race.



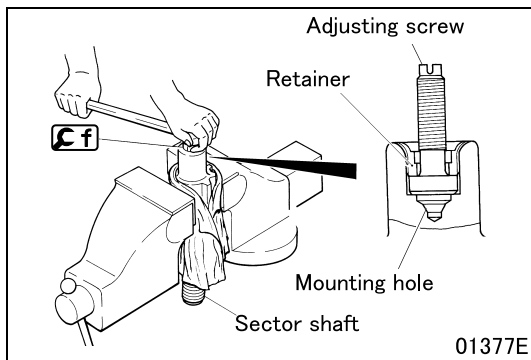
#### ■ Installation: Ball screw and valve housing

- Position the gear toothed portion of the ball screw and valve housing in the illustrated direction so that it engages with the sector shaft.
- Install the ball screw and valve housing to the body, lightly holding it with hand so that its gear portion does not turn out of position. When installing, align the oil passage ports of the ball screw and valve housing and body.

#### CAUTION

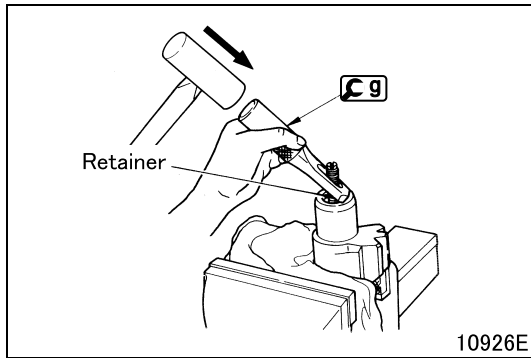
- Be careful not to damage the seal ring on the piston and the inner surface of the body.

# POWER STEERING GEAR AND DRAG LINK

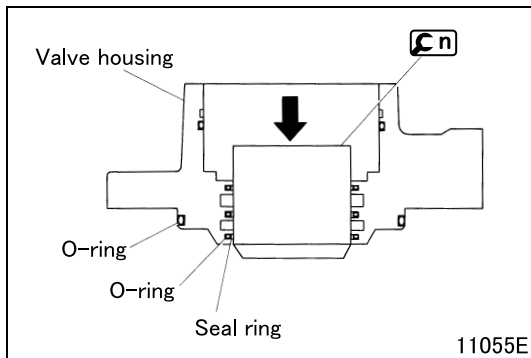


## ■ Installation: Retainer

- Pack grease in the adjusting screw mounting hole on the sector shaft.
- Install the adjusting screw into the sector shaft.
- Using **cf**, tighten the retainer into place in the sector shaft.
- Back up the retainer by 180°, retighten it to a torque of 39 N·m {29 ft.lbs, 4 kgf·m}, then back it up again by 20°.
- Check that the adjusting screw turns smoothly.

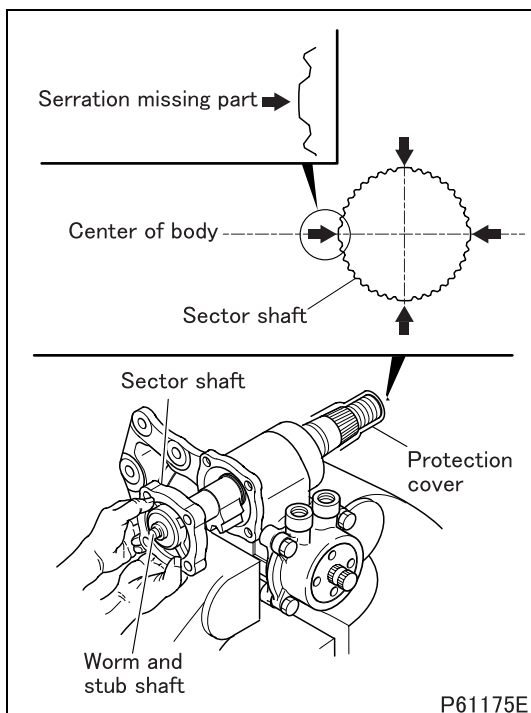


- Using **cg**, crimp the retainer at two places.



## ■ Installation: Seal ring and O-rings

- Install seal ring and O-rings to the valve housing.
- Form seal ring to fit the valve housing using **cn**.



## ■ Installation of sensor shaft

- Set the sector shaft in the neutral position and install it into the body.

## CAUTION ⚠

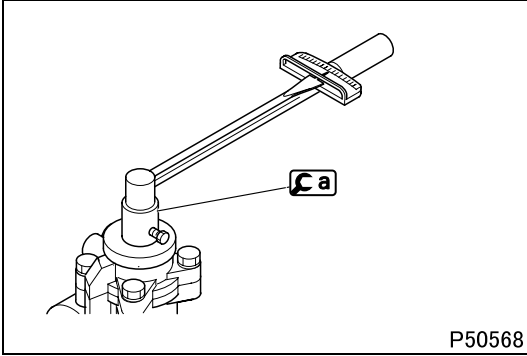
- When installing the sector shaft, cover up its threaded end and serration portions for protection.

## NOTE

- Turn the worm and stub shaft to check that it makes roughly five turns lock to lock.
- If the number of turns is less, check engagement of the worm and stub shaft with the sector shaft, and correct if necessary.



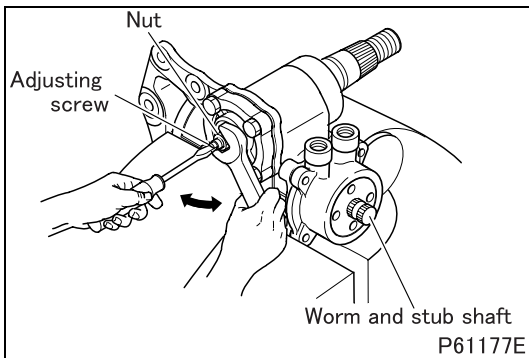
## ◆ Adjustment after installation ◆



### ■ Inspection: Starting torque

#### [Inspection]

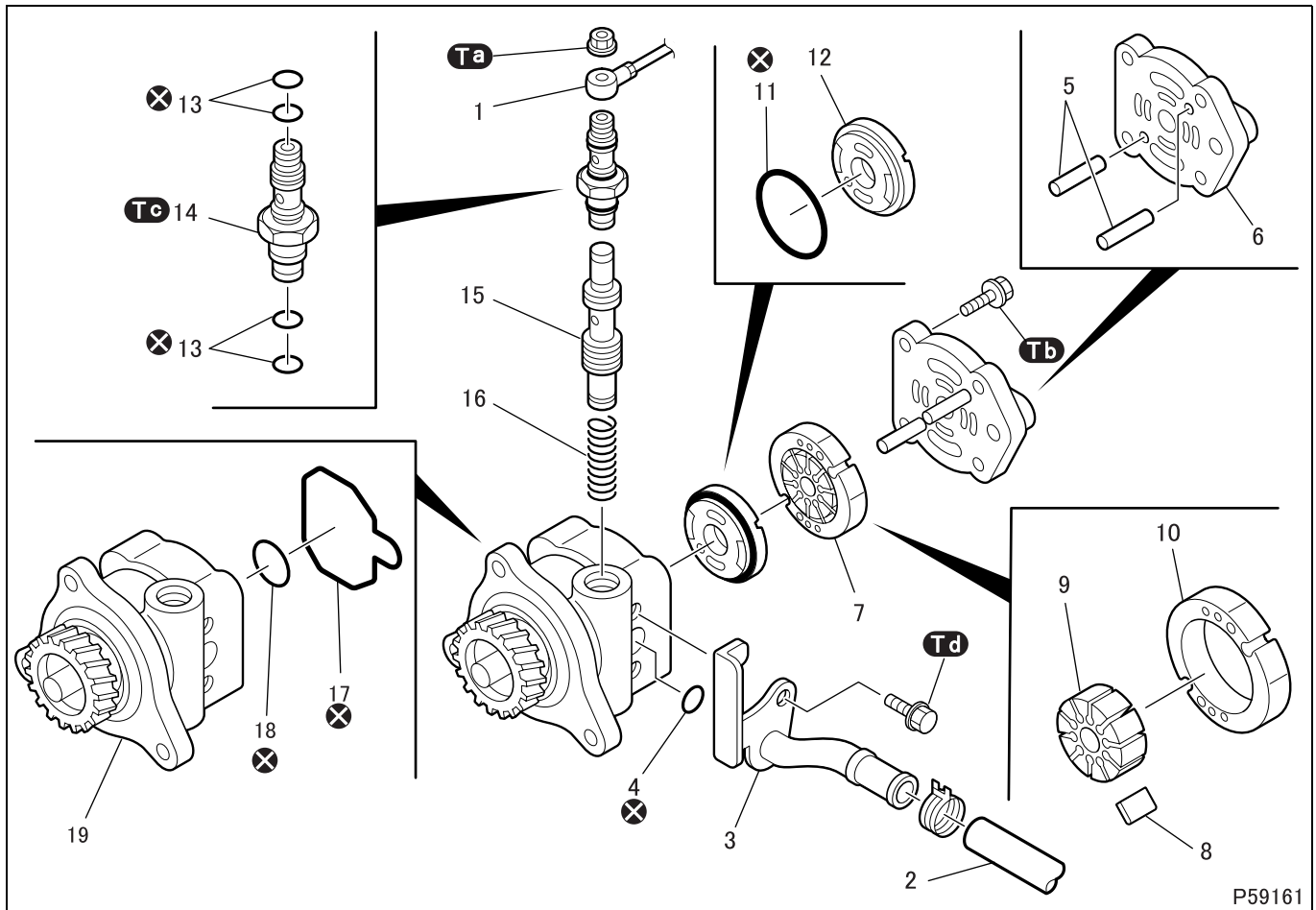
- Using **Ca**, measure the starting torque of the power steering gear in the same manner as the measurement before removal. If the measurement deviates from the standard value, adjust the power steering gear for proper starting torque or replace.



#### [Adjustment]

- Loosen nut.
- Rotating the worm and stub shaft approximately 1/4 turns left and right, make adjustment for proper starting torque with the adjusting screw.

# POWER STEERING OIL PUMP <KYB Product>



P59161

## ● Disassembly sequence

- |                      |               |                        |
|----------------------|---------------|------------------------|
| 1 Pipe               | 8 Vane        | 15 Flow control valve  |
| 2 Hose               | 9 Rotor       | 16 Flow control spring |
| 3 Suction connector  | 10 Cam ring   | 17 O-ring              |
| 4 O-ring             | 11 O-ring     | 18 O-ring              |
| 5 Pin                | 12 Side plate | 19 Body                |
| 6 Cover              | 13 O-ring     |                        |
| 7 Cartridge assembly | 14 Connector  |                        |

⊗: Non-reusable parts

## NOTE

- See Gr11 for removal and installation of the power steering oil pump.

## CAUTION ⚠

- Do not disassemble the flow control valve and body.

## ● Assembly sequence

Follow the disassembly sequence in reverse.

Repair kit: Seal repair kit

**Service standards (Unit: mm {in.})**

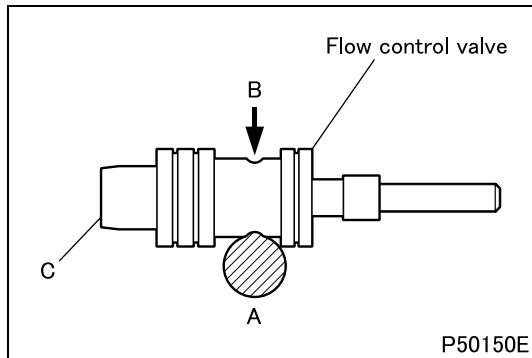
Location	Maintenance item	Standard value	Limit	Remedy
6	Stepped wear on rotor and vane contact surfaces of cover	–	0.05 {0.0020}	Replace*
8, 9	Clearance between vane and rotor	0.01 {0.00039}	0.06 {0.0024}	Replace
12	Stepped wear on rotor and vane contact surfaces of side plate	–	0.05 {0.0020}	Replace*
15, 19	Clearance between flow control valve and body	0.01 to 0.02 {0.00039 to 0.00079}	0.03 {0.0012}	Replace*
16	Free length of flow control spring	36.5 {1.44}	33.5 {1.32}	Replace

\*: Replace the power steering oil pump.

**Tightening torque (Unit: N-m {ft.lbs, kgf-m})**

Mark	Parts to be tightened	Tightening torque	Remarks
<b>Ta</b>	Nut (pipe mounting)	29.4 to 39.2 {22 to 29, 3 to 4}	–
<b>Tb</b>	Bolt (cover mounting)	18 to 22 {13 to 16, 1.8 to 2.2}	–
<b>Tc</b>	Connector	49 to 69 {36 to 51, 5.0 to 7.0}	–
<b>Td</b>	Bolt (suction connector mounting)	7.8 to 11.8 {5.8 to 8.7, 0.8 to 1.2}	–

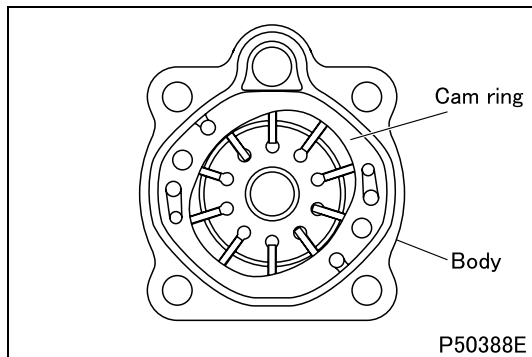
**◆ Inspection procedure ◆**



**■ Inspection: Flow control valve**

- Cover port **A** of the flow control valve with a finger.
- Apply air pressure (390 to 490 kPa {57 to 71 psi, 4.0 to 5.0 kgf/cm<sup>2</sup>}) to port **B**.
- Check for a leak of air from port **C**.
- If there is an air leakage, replace the power steering oil pump.

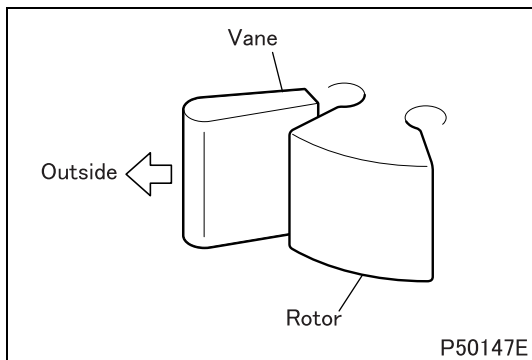
**◆ Installation procedure ◆**



**■ Installation: Cam ring**

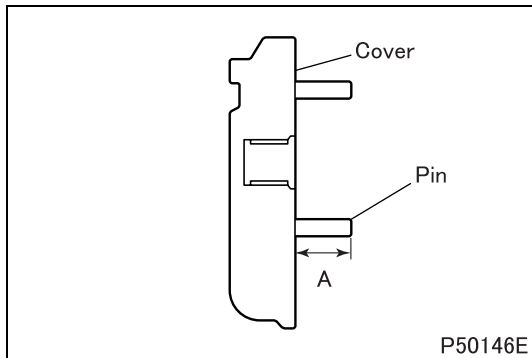
- Install the cam ring in the illustrated direction to the body.

# POWER STEERING OIL PUMP <KYB Product>



## ■ Installation: Vane

- Fit the vane into the rotor, with its round edge facing toward outside.



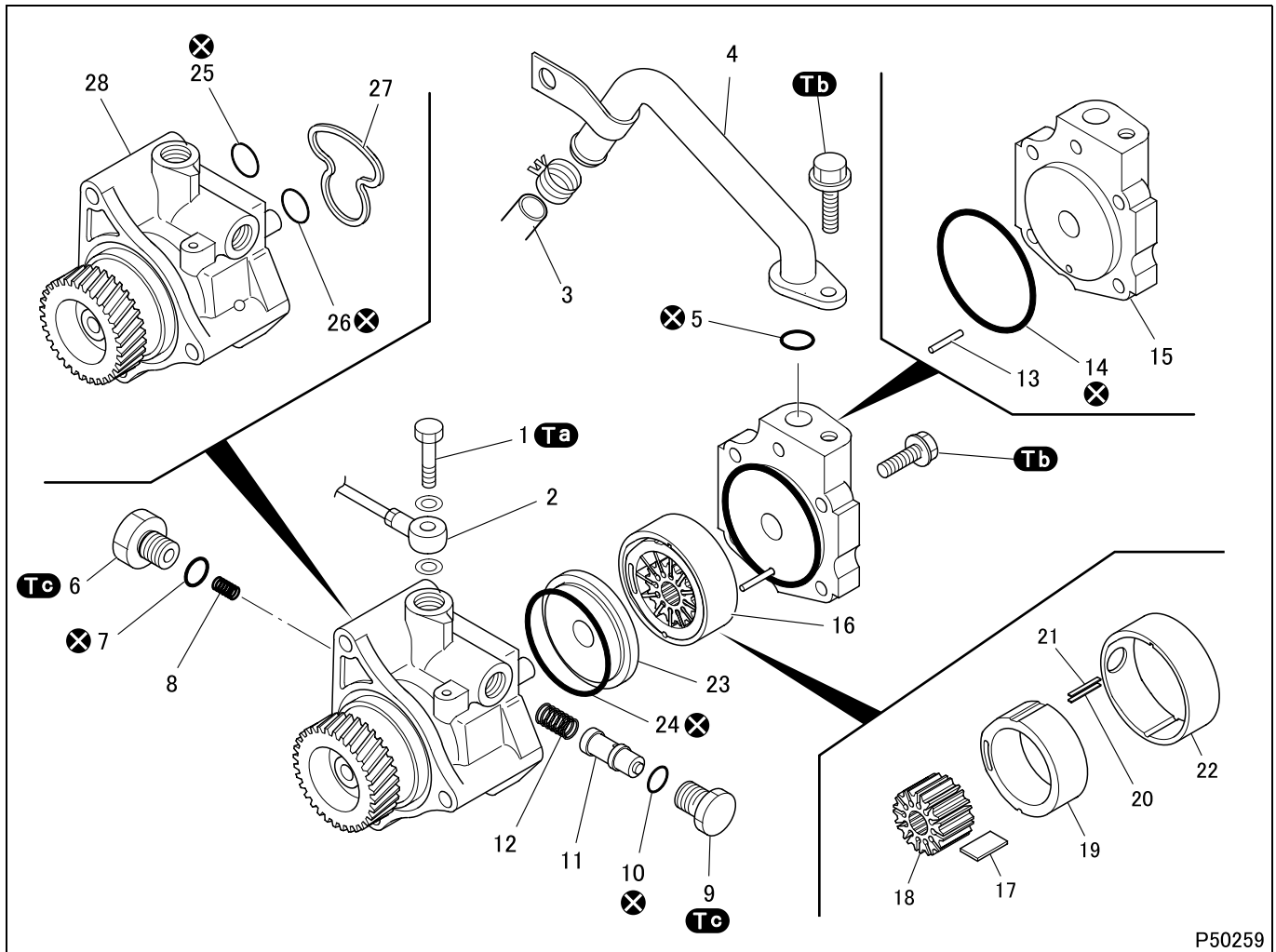
## ■ Installation: Pin

- Fit the pins into the cover so that they protrude to the illustrated length **A** from the cover.  
**A:** 18.1 mm {0.71 in.}

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M E M O

# POWER STEERING OIL PUMP <UNISIA JKC Product>



P50259

## ● Disassembly sequence

- |                     |                         |                   |
|---------------------|-------------------------|-------------------|
| 1 Eyebolt           | 11 Control valve        | 21 Rubber spring  |
| 2 Pipe              | 12 Control valve spring | 22 Adapter        |
| 3 Hose              | 13 Straight pin         | 23 Pressure plate |
| 4 Suction connector | 14 O-ring               | 24 O-ring         |
| 5 O-ring            | 15 Rear body            | 25 O-ring         |
| 6 Plug              | 16 Cartridge assembly   | 26 O-ring         |
| 7 O-ring            | 17 Vane                 | 27 Seal ring      |
| 8 Spring            | 18 Rotor                | 28 Front body     |
| 9 Plug              | 19 Cam ring             |                   |
| 10 O-ring           | 20 Seal                 |                   |
- ⊗: Non-reusable parts

## NOTE

- See Gr11 for removal and installation of the power steering oil pump.

## CAUTION ⚠

- Do not disassemble the control valve and front body.
- If the cartridge assembly is difficult to disassemble, not attempt to pry it out but heat the side surface of the front body with a dryer.

● **Assembly sequence**

Follow the disassembly sequence in reverse.

Repair kit: Repair kit

**Service standards (Unit: mm {in.})**

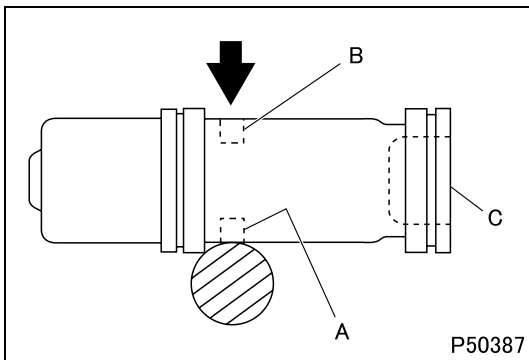
Location	Maintenance item	Standard value	Limit	Remedy
8	Free length of spring	24 {0.94}	23 {0.91}	Replace
11, 28	Clearance between control valve and front body	0.02 {0.00079}	0.03 {0.0012}	Replace*
12	Free length of control valve spring	26.2 {1.03}	23.6 {0.93}	Replace
15	Stepped wear on rotor and vane contact surfaces of rear body	–	0.01 {0.00039}	Replace*
17, 18	Clearance between vane and rotor	0.02 {0.00079}	0.03 {0.0012}	Replace
23	Stepped wear on rotor and vane contact surfaces of pressure plate	–	0.01 {0.00039}	Replace*

\*: Replace the power steering oil pump.

**Tightening torque (Unit: N·m {ft.lbs, kgf·m})**

Mark	Parts to be tightened	Tightening torque	Remarks
<b>Ta</b>	Eyebolt (pipe mounting)	49.0 to 63.7 {36 to 47, 5.0 to 6.5}	–
<b>Tb</b>	Bolt (suction connector mounting)	17.7 to 24.5 {13 to 18, 1.8 to 2.5}	–
	Bolt (rear body mounting)		
<b>Tc</b>	Plug	29.4 to 39.2 {22 to 29, 3.0 to 4.0}	–

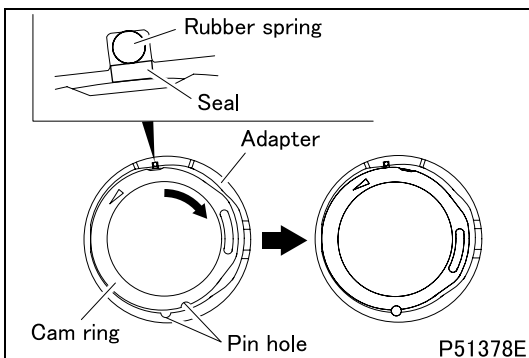
◆ **Inspection procedure** ◆



■ **Inspection: Control valve**

- Cover port **A** of the control valve with a finger.
- Apply air pressure (390 to 490 kPa {57 to 71 psi, 4.0 to 5.0 kgf/cm<sup>2</sup>}) to port **B**.
- Check for a leak of air from port **C**.
- If there is an air leakage, replace the control valve.

◆ **Installation procedure** ◆

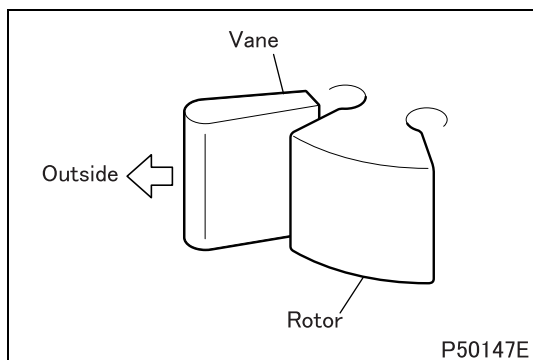


■ **Installation: Seal and rubber spring**

- Align the peripheral groove of the cam ring to the inner groove of the adapter, then fit the rubber spring (black) into the adapter and the seal (white) into the cam ring.
- Turn the cam ring clockwise to align pin holes.

# POWER STEERING OIL TANK <UNISIA JKC Product>

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## ■ Installation: Vane

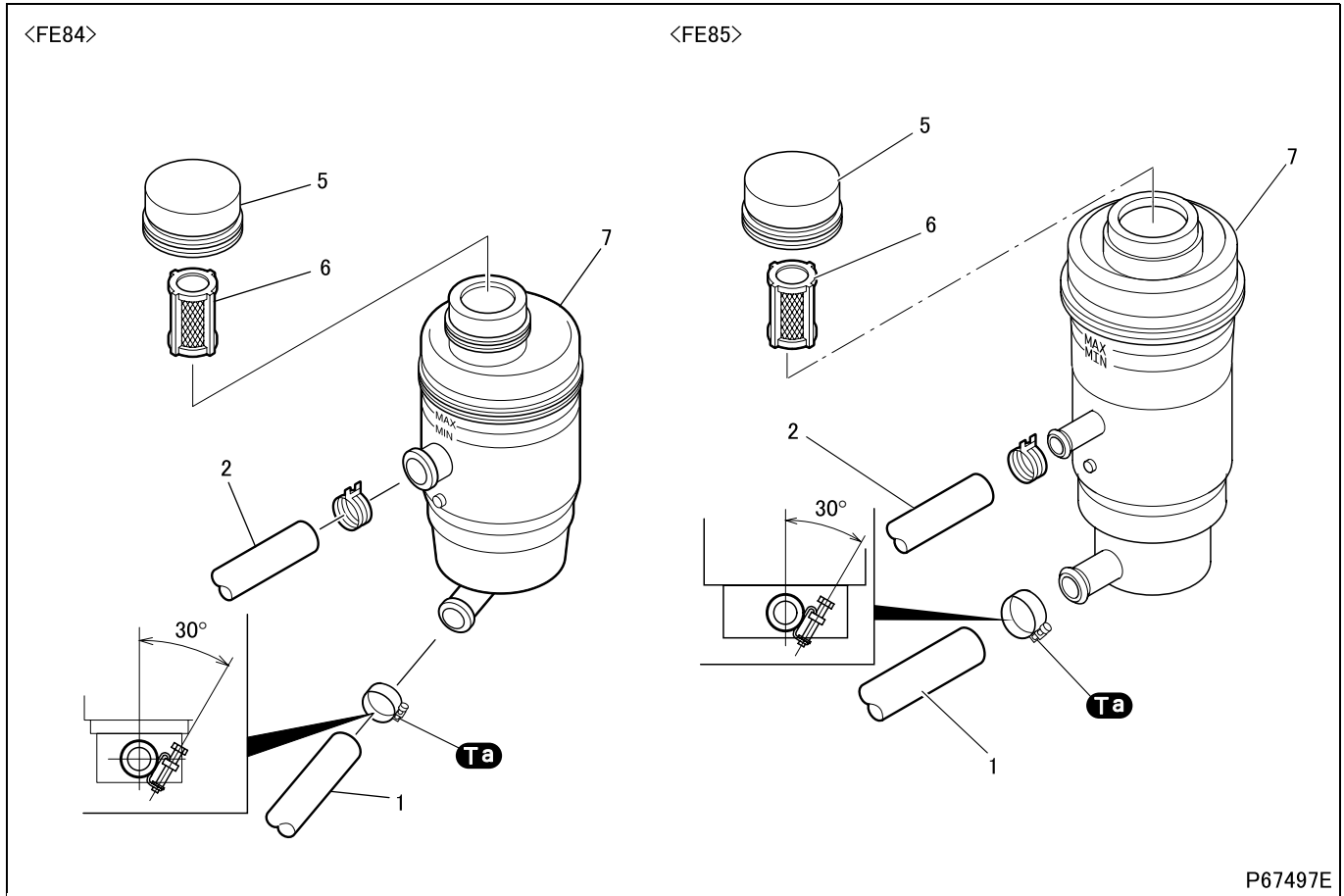
- Fit the vane into the rotor, with its round edge facing toward outside.



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M E M O

# POWER STEERING TANK



P67497E

## ● Disassembly sequence

- |        |            |
|--------|------------|
| 1 Hose | 4 Strainer |
| 2 Hose | 5 Body     |
| 3 Cap  |            |

## ● Assembly sequence

Follow the disassembly sequence in reverse.

## Tightening torque (Unit: N-m {ft.lbs, kgf-m})

Mark	Parts to be tightened	Tightening torque	Remarks
<b>Ta</b>	Clamp	2.0 to 2.5 {1.5 to 1.8, 0.20 to 0.25}	-