

Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

5. Steering Gearbox

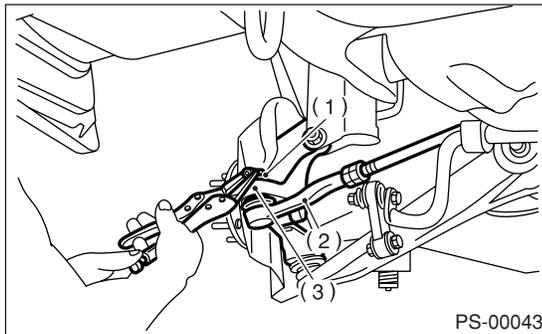
A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.
- 3) Loosen the front wheel nuts.
- 4) Lift-up the vehicle and remove the front wheels.
- 5) Remove the under cover. <Ref. to EI-26, REMOVAL, Front Under Cover.>
- 6) Remove the front exhaust pipe assembly. (Non-turbo model) <Ref. to EX(H4SO)-4, REMOVAL, Front Exhaust Pipe.>

WARNING:

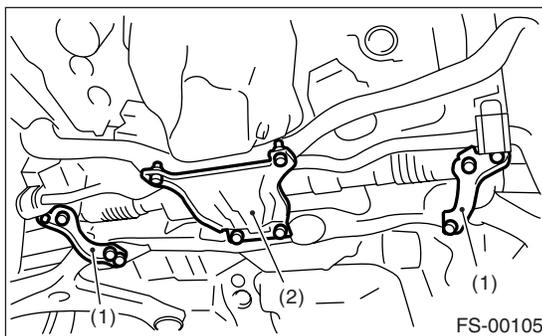
Be careful, not to burn your hand because the exhaust pipe is hot.

- 7) Using a puller, remove the tie-rod end from the knuckle arm after pulling off cotter pin and removing castle nut.



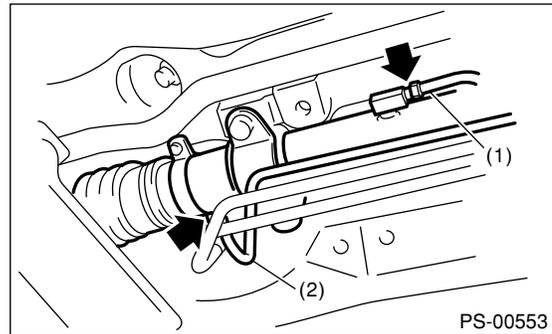
- (1) Castle nut
- (2) Tie-rod end
- (3) Knuckle arm

- 8) Remove the front crossmember support plate, jack-up plate and front stabilizer. <Ref. to FS-15, REMOVAL, Front Stabilizer.>



- (1) Crossmember support plate
- (2) Jack-up plate

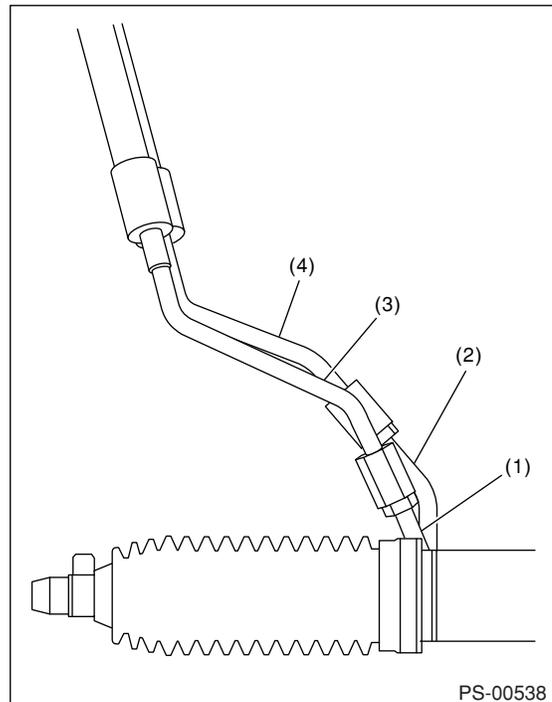
- 9) Remove the one pipe joint at the center of gearbox, and connect the vinyl hose to the pipe and the joint. Discharge the fluid by turning steering wheel fully clockwise and counterclockwise. Discharge the fluid similarly from other pipes.



- (1) Pipe A
- (2) Pipe B

- 10) Remove the universal joint. <Ref. to PS-15, REMOVAL, Universal Joint.>

- 11) Disconnect the pipe C from pressure hose first, and pipe D from return hose second.

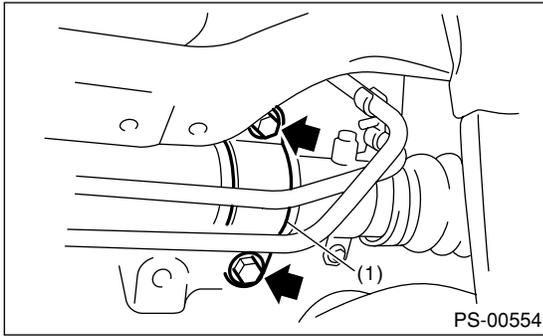


- (1) Pipe C
- (2) Pipe D
- (3) Pressure hose
- (4) Return hose

Steering Gearbox

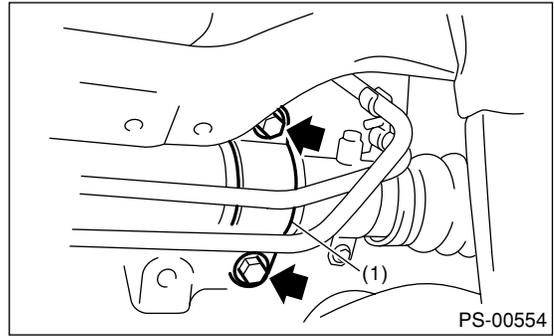
POWER ASSISTED SYSTEM (POWER STEERING)

12) Remove the clamp bolts securing gearbox to crossmember, and remove the clamp.



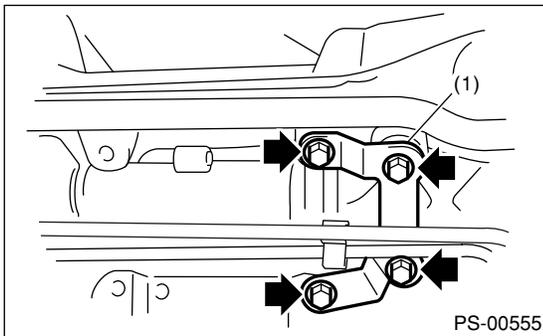
(1) Clamp

3) Tighten the gearbox to the crossmember bracket via clamp with bolt temporarily.



(1) Clamp

13) Remove the bolts which secure gearbox bracket, and remove the bracket and gearbox.



(1) Bracket

4) Tighten the bolts which temporary tightening the clamp and bracket of gearbox to specified torque.

Tightening torque:

60 N·m (6.1 kgf-m, 44.1 ft-lb)

5) Connect the pipe D to return hose first, and the pipe C to pressure hose second.

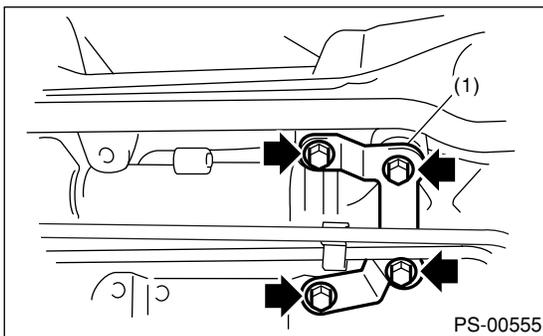
Tightening torque:

15 N·m (1.5 kgf-m, 10.8 ft-lb)

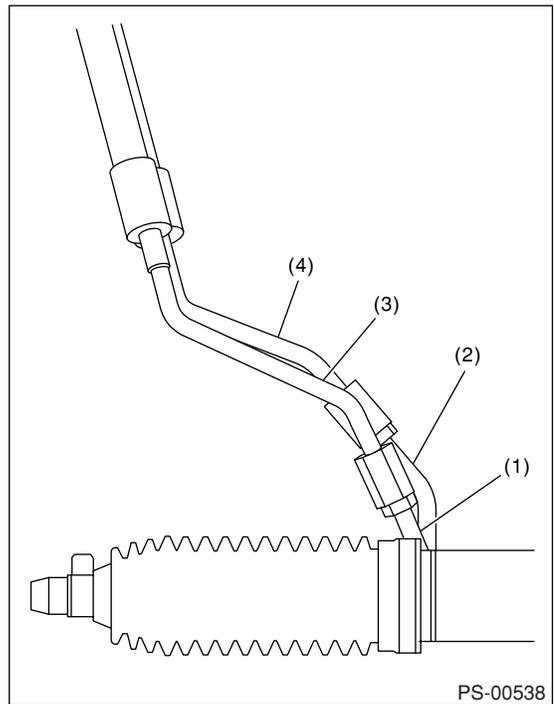
B: INSTALLATION

1) Insert the gearbox into crossmember, being careful not to damage gearbox boot.

2) Install the gearbox and bracket. Tighten the bolt temporarily.



(1) Bracket



- (1) Pipe C
- (2) Pipe D
- (3) Pressure hose
- (4) Return hose

6) Install the universal joint. <Ref. to PS-15, INSTALLATION, Universal Joint.>

7) Connect the tie-rod end and knuckle arm, and tighten with castle nut.

Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

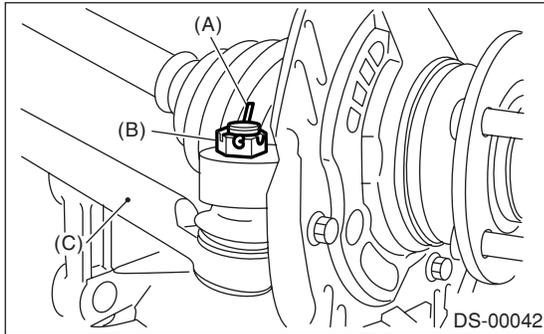
Castle nut tightening torque:

27 N·m (2.75 kgf·m, 19.9 ft·lb)

CAUTION:

When connecting, do not hit cap at the bottom of tie-rod end with hammer.

8) After tightening the castle nut to specified tightening torque, tighten it further within 60° until cotter pin hole is aligned with slot in the nut. Fit the cotter pin into nut, and then bend the pin to lock.



- (A) Cotter pin
- (B) Castle nut
- (C) Tie-rod end

9) Install the front stabilizer. <Ref. to FS-15, INSTALLATION, Front Stabilizer.>

10) Install the front crossmember support plate and jack-up plate.

11) Install the front exhaust pipe assembly. (Non-turbo model) <Ref. to EX(H4SO)-5, INSTALLATION, Front Exhaust Pipe.>

12) Install the under cover. <Ref. to EI-26, INSTALLATION, Front Under Cover.>

13) Install the front wheels.

14) Tighten the wheel nuts to specified torque.

Tightening torque:

90 N·m (9.1 kgf·m, 65.8 ft·lb)

15) Lower the vehicle.

16) Remove the steering wheel. <Ref. to PS-14, REMOVAL, Steering Wheel.>

17) Align the center of roll connector. <Ref. to AB-25, ADJUSTMENT, Roll Connector.>

18) Install the steering wheel. <Ref. to PS-14, INSTALLATION, Steering Wheel.>

19) Connect the battery ground cable to battery.

20) Pour fluid into the oil tank, and bleed air. <Ref. to PS-52, Power Steering Fluid.>

21) Check for fluid leaks.

22) Check the fluid level in oil tank.

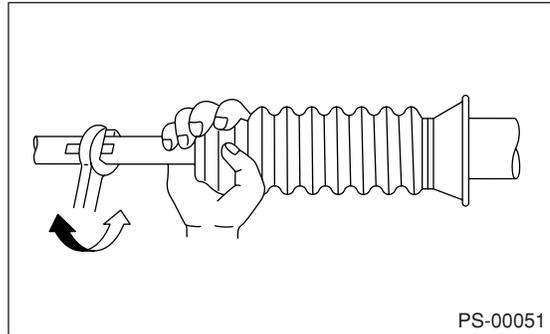
23) After adjusting toe-in and steering angle, tighten the lock nut on tie-rod end.

Tightening torque:

85 N·m (8.7 kgf·m, 62.7 ft·lb)

NOTE:

When adjusting toe-in, hold the boot as shown to prevent it from being rotated or twisted. If twisted, straighten it.



C: DISASSEMBLY

1. RACK HOUSING ASSEMBLY

1) Disconnect the four pipes from gearbox.

NOTE:

Remove the pipes C and D, which are fixed to clamp plate, as a single unit.

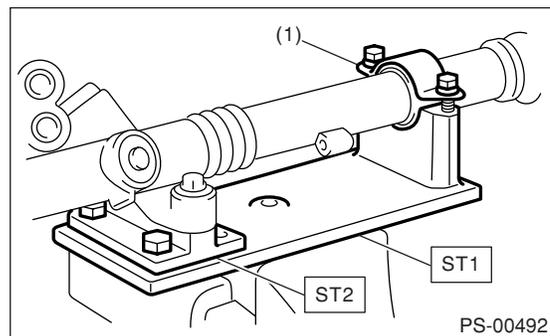
2) Secure the gearbox removed from vehicle in vice using ST.

ST1 926200000 STAND

ST2 34199AG000 BOSS D

CAUTION:

Secure the gearbox in a vise using ST as shown. Do not attempt to secure it without this ST.



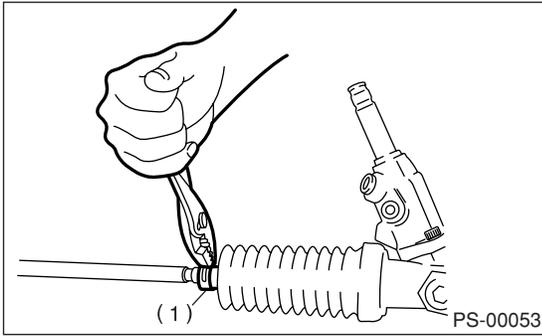
(1) Clamp

3) Remove the tie-rod end and lock nut from gearbox.

Steering Gearbox

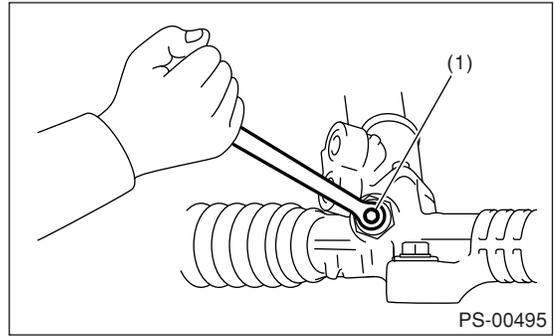
POWER ASSISTED SYSTEM (POWER STEERING)

4) Remove the small clip from the boot using pliers, and then move the boot to tie-rod end side.



(1) Clip

7) Tighten the adjusting screw until it no longer tightens.

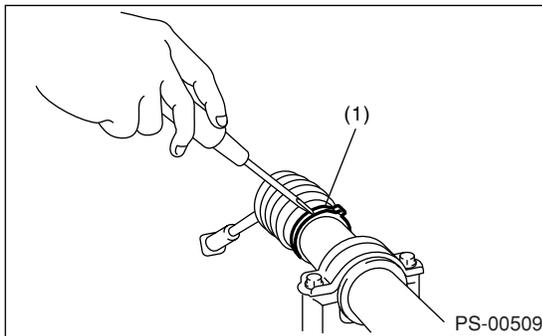


(1) Adjusting screw

5) Using a flat-tip screwdriver, remove the band from boot.

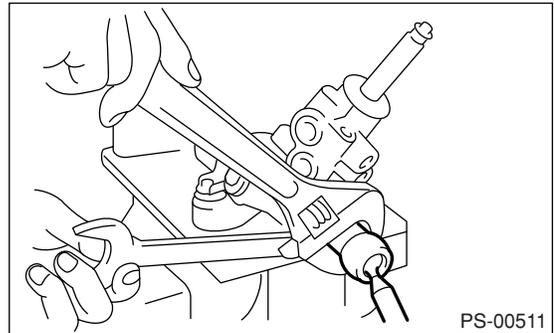
NOTE:

Replace the boot if there is damage, cracks or deterioration.



(1) Band

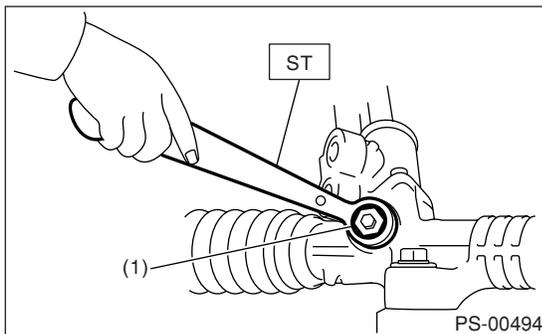
8) Hold the rack with a wrench [22 mm width across flats], and then remove the tie-rod using a wrench [32 mm width across flats] or adjustable wrench.



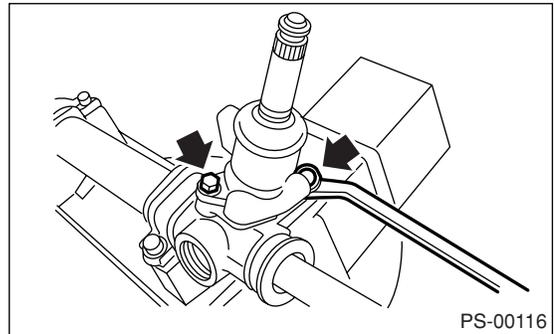
9) Loosen the adjusting screw, and then remove the spring and sleeve.

10) Remove the two bolts securing valve assembly.

6) Using the ST, loosen the lock nut.
ST 926230000 SPANNER



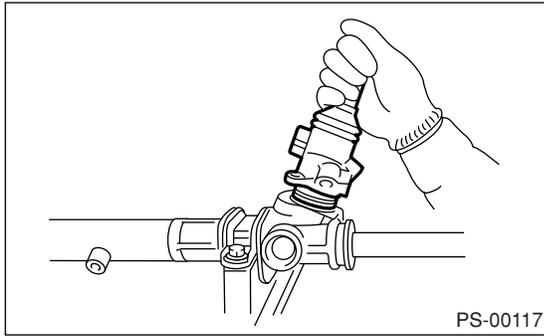
(1) Lock nut



Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

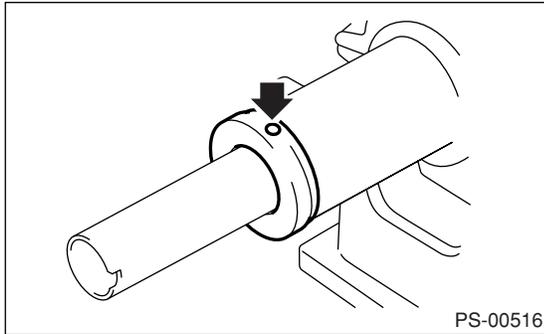
11) Carefully draw out the input shaft, and then remove the valve assembly.



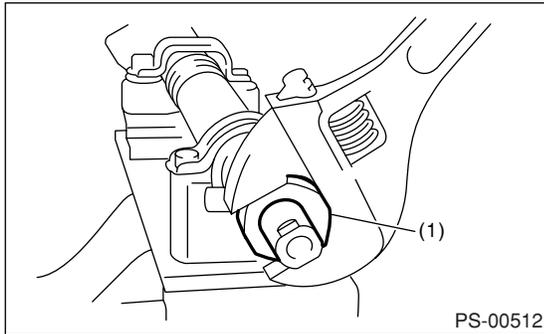
12) Using a drill, release the caulking of holder.

CAUTION:

Make a hole approx. 2 mm (0.08 in) depth using a drill bit of 3 mm (0.12 in) diameter.



13) Using a spanner [36 mm width across flats] or adjustable wrench, remove the holder.

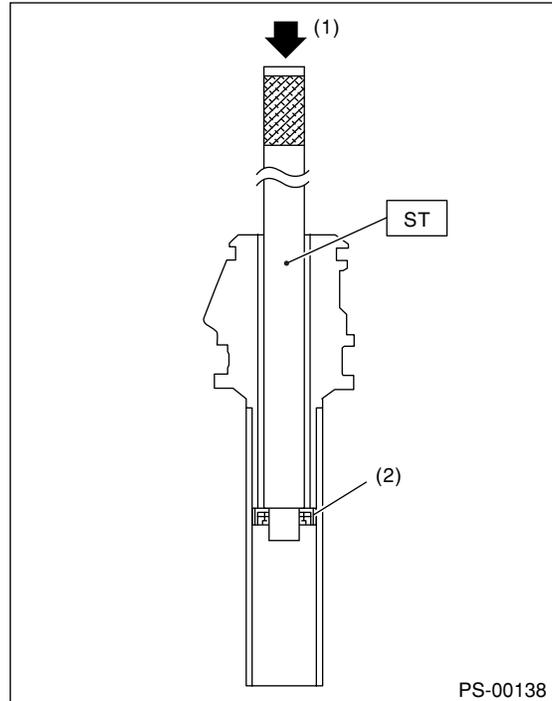


14) Remove the rack bushing and rack stopper from rack assembly.

15) Remove the oil seal from rack.

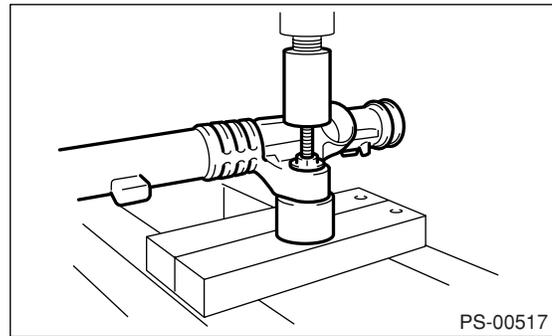
16) Insert the ST from pinion housing side, and then remove the oil seal using a press.

ST 34199AE050 OIL SEAL REMOVER



- (1) Press
- (2) Oil seal

17) Using a press, remove the bushing at gearbox installation portion.



2. CONTROL VALVE

- 1) Disconnect the pipes A and B from gearbox.
- 2) Secure the gearbox removed from the vehicle in vise using ST.

ST1 926200000 STAND

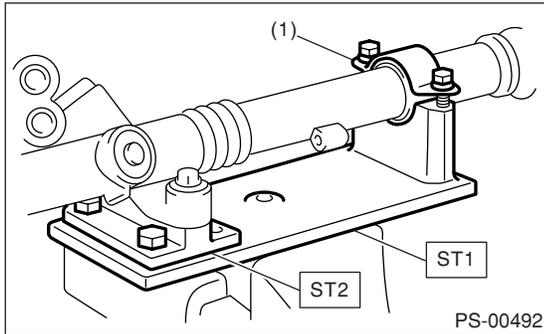
ST2 34199AG000 BOSS D

Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

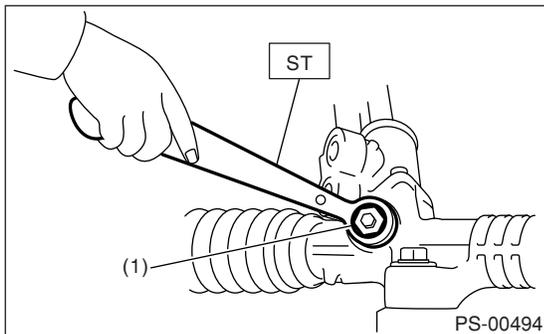
CAUTION:

Secure the gearbox in a vise using ST as shown. Do not attempt to secure it without this ST.



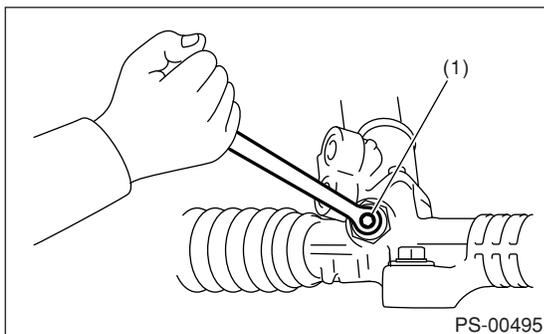
(1) Clamp

3) Using the ST, loosen the lock nut.
ST 926230000 SPANNER



(1) Lock nut

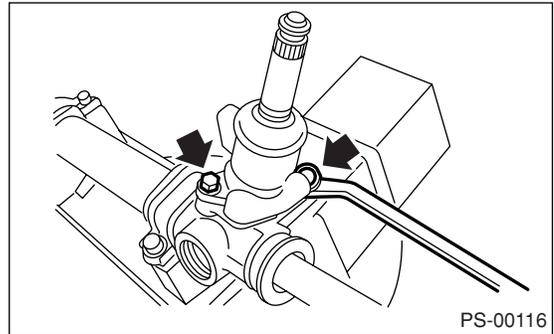
4) Tighten the adjusting screw until it no longer tightens.



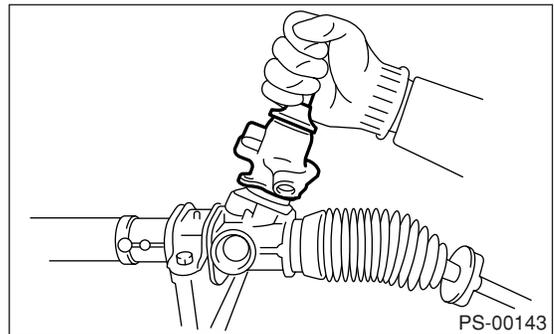
(1) Adjusting screw

5) Loosen the adjusting screw, and then remove the spring and sleeve.

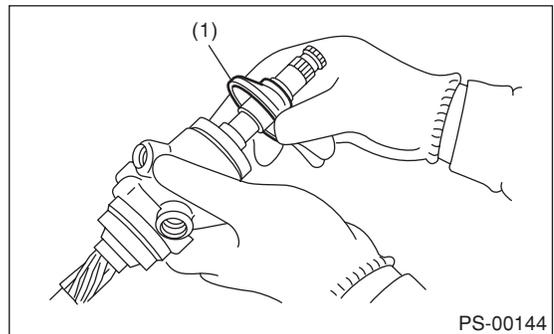
6) Remove the two bolts securing valve assembly.



7) Carefully draw out the input shaft, and then remove the valve assembly.



8) Wrap the tape to spline part, and slide the dust cover out.

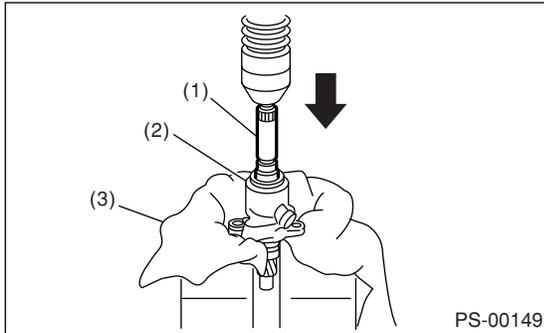


(1) Dust cover

Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

9) Using a press remove the pinion & valve assembly from valve housing.



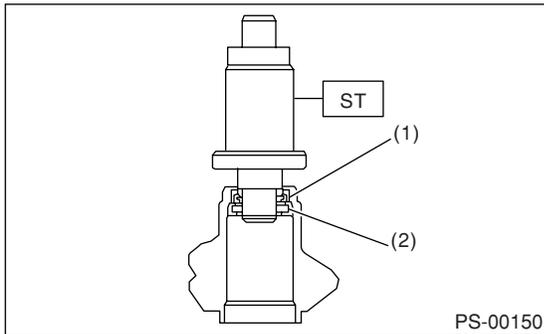
- (1) Pinion & valve ASSY
- (2) Valve housing
- (3) Cloth

10) Using the ST and press, remove the bushing and oil seal from valve housing.

ST 34199AG090 INSTALLER & REMOVER

CAUTION:

- Do not apply force to the end surface of valve housing.
- Do not reuse the oil seal after removal.

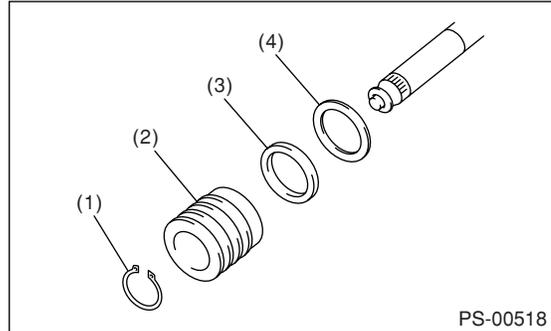


- (1) Oil seal
- (2) Bushing

11) Using a snap ring pliers, remove the snap ring, valve, oil seal and backup washer.

CAUTION:

Be careful not to scratch the pinion & valve assembly.

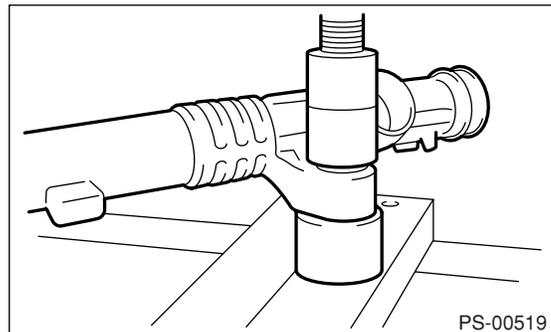


- (1) Snap ring
- (2) Valve
- (3) Oil seal
- (4) Backup ring

D: ASSEMBLY

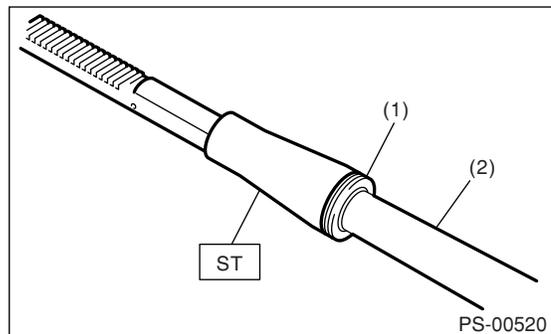
1. RACK HOUSING ASSEMBLY

1) Using a press, install the bushing to the gearbox installation portion.



2) Insert the ST into rack.

ST 34199AG030 GUIDE



- (1) Seal ring
- (2) Rack

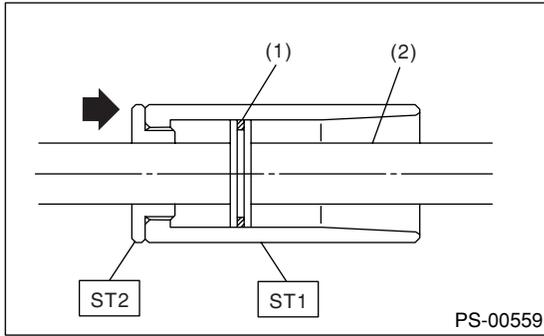
3) Install the seal ring to piston portion of rack.

(1) Using the ST, form the seal ring properly
ST1 34199AG080 FORMER PISTON

Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

ST2 34199AG050 GUIDE G (24)



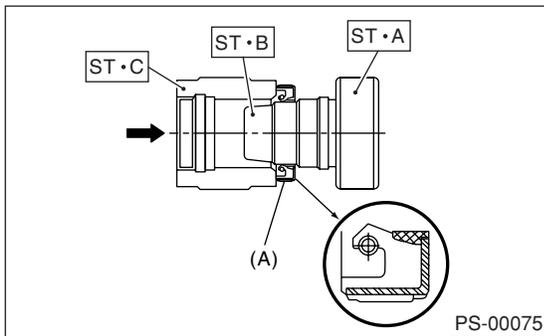
- (1) Seal ring
- (2) Rack

(2) Using ST-B and ST-C, install the oil seal to ST-A.

ST 927490000 INSTALLER A, B, C

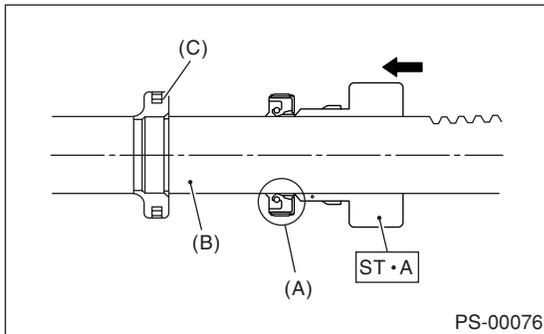
NOTE:

Face the oil seal in the direction as shown in the figure.



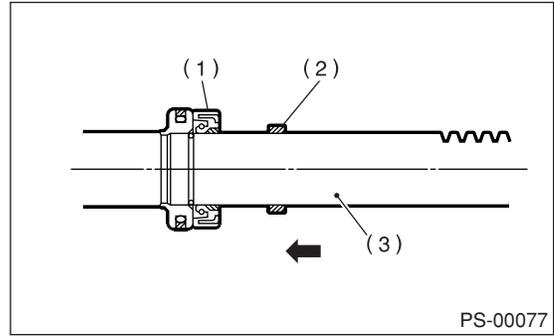
- (A) Oil seal

(3) Insert the ST-A with oil seal assembled from the gear side of rack. Remove the oil seal from ST-A near piston, and then remove the ST-A from rack.



- (A) Oil seal
- (B) Rack
- (C) Piston

4) Install the backup washer from gear side of rack.



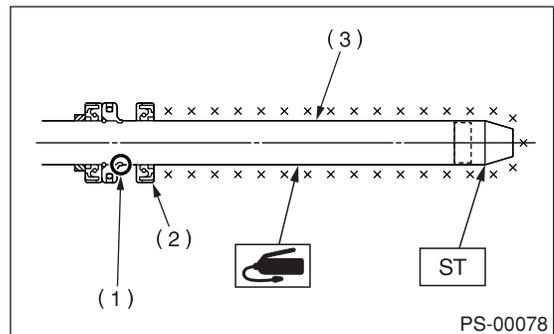
- (1) Oil seal
- (2) Backup washer
- (3) Rack

5) Install the ST on rack, and equally apply a thin coat of grease to the rack and ST, then install the oil seal.

ST 926250000 GUIDE

CAUTION:

Be careful not to scratch the oil seal lips with the inner ring section of piston.



- (1) Rack piston inner ring
- (2) Outer side oil seal
- (3) Rack

6) Apply a coat of grease to the grooves in rack, sliding surface of sleeve and sealing surface of piston. Then insert the rack into steering body from cylinder side.

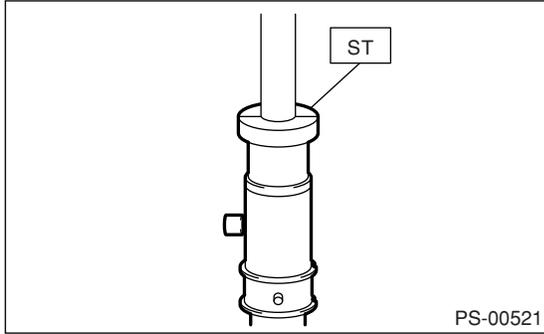
7) Check the thread part of holder and end of gearbox cylinder for burrs and scratches. Correct if necessary.

8) Insert the ST into gearbox cylinder, and then press-fit the oil seal.

Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

ST 34199AG010 INSTALLER

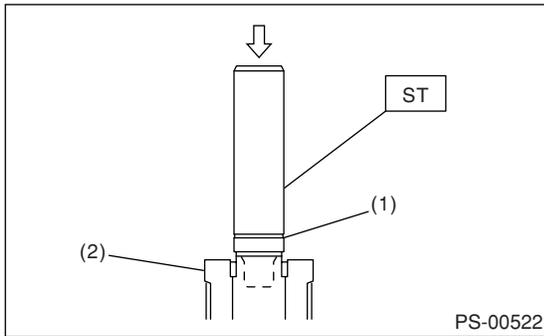


9) Temporarily install the holder to gearbox cylinder.

10) Set the ST to the end of rack.

ST 34099FA030 INSTALLER & REMOVER

11) Using a press, press-fit until the groove of ST reaches the end of holder.

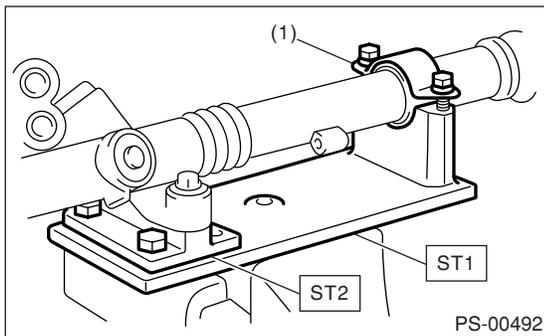


- (1) Groove
- (2) Holder

12) Secure the gearbox in a vice using ST.

ST1 926200000 STAND

ST2 34199AG000 BOSS D

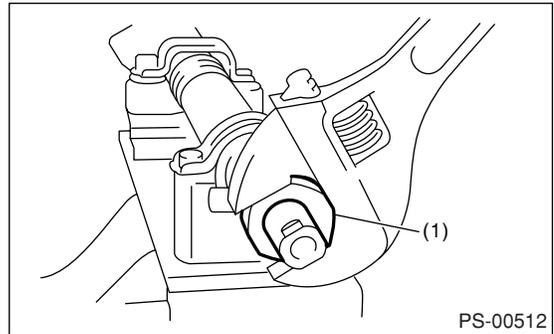


- (1) Clamp

13) Tighten the holder.

Tightening torque:

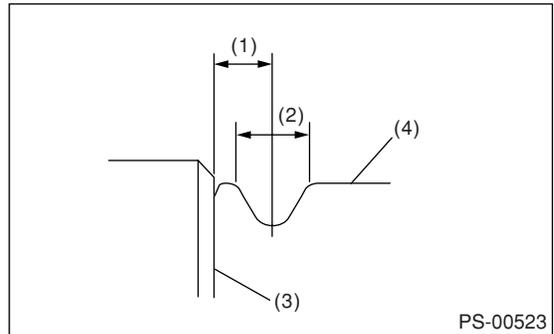
90 N·m (9.1 kgf·m, 65.8 ft·lb)



- (1) Holder

14) Using ST, caulk the gearbox cylinder at 2 mm (0.08 in) from end to make punch hole 2 to 2.5 mm (0.08 to 0.10 in) in diameter.

ST 34099FA060 PUNCH HOLDER

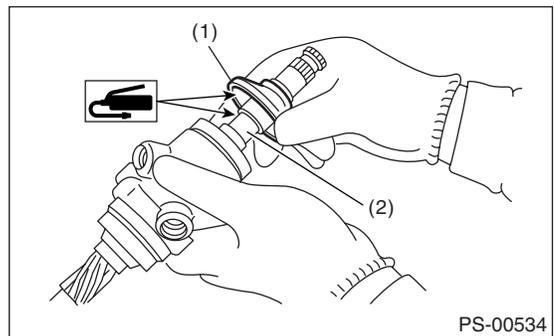


- (1) 2 mm (0.08 in)
- (2) Diameter: 2 — 2.5 mm (0.08 — 0.10 in)
- (3) End of cylinder
- (4) Holder

15) Apply vinyl tape to spline portion, and apply genuine grease to dust cover, and then install the dust cover to valve assembly.

CAUTION:

Be sure to install the dust cover to groove on shaft properly.

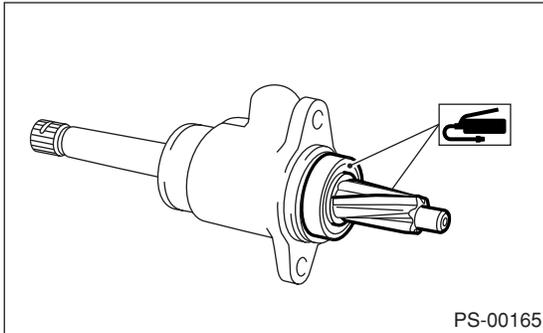


- (1) Dust cover
- (2) Groove

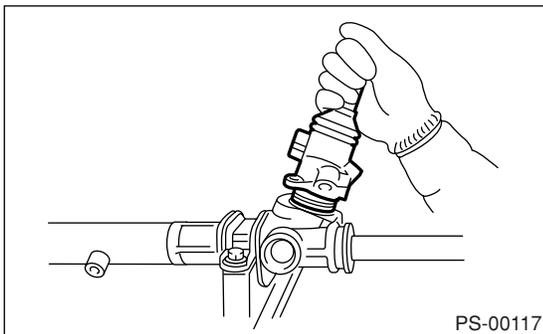
Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

16) Apply genuine grease to the pinion gear and bearing of valve assembly.



17) Install a new gasket on valve assembly. Insert the valve assembly into place while facing the rack teeth toward pinion.



18) Tighten the bolts alternately to secure valve assembly.

Tightening torque:

20 N·m (2.0 kgf·m, 14.8 ft·lb)

CAUTION:

Be sure to alternately tighten the bolts.

19) Temporarily install the rack, and then operate it from lock to lock two or three times to make it fit in. Remove the grease blocking air vent hole.

CAUTION:

If operating the rack from lock to lock without installing tie-rod, it may damage the oil seal. Always install the tie-rods LH and RH.

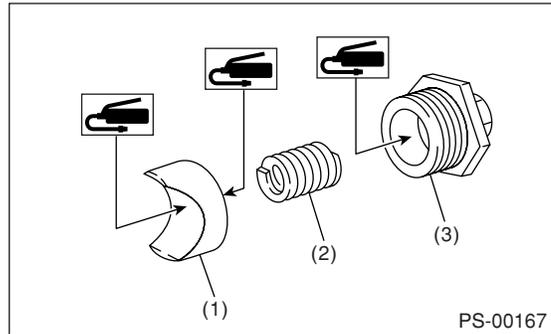
20) Apply liquid gasket to at least 1/3 of the entire perimeter of adjusting screw thread.

Liquid gasket:

THREE BOND 1141

21) Apply a coat of grease to the sliding surface of sleeve and seating surface of spring, and then insert sleeve into steering body.

Charge the adjusting screw with grease, and then insert the spring into adjusting screw and install on steering body.



- (1) Sleeve
- (2) Spring
- (3) Adjusting screw

22) Tighten the adjusting screw to specified torque.

Tightening torque:

3.9 N·m (0.4 kgf·m, 2.9 ft·lb)

23) After tightening the adjusting screw with the specified tightening torque, loosen it by 20°.

24) Remove the tie-rod.

25) Adjust the turning resistance of gearbox so that it is within specification using adjusting screw. <Ref. to PS-37, TURNING RESISTANCE OF GEARBOX, INSPECTION, Steering Gearbox.>

26) Apply liquid gasket to lock nut and install it into adjusting screw. While holding the adjusting screw with a wrench, tighten lock nut using ST.

Liquid gasket:

THREE BOND 1141

ST 926230000 SPANNER

Tightening torque (Lock nut):

25 N·m (2.5 kgf·m, 18.1 ft·lb)

NOTE:

Hold the adjusting screw with a wrench to prevent it from turning while tightening lock nut.

27) Extend the rack approx. 40 mm (1.57 in) beyond side of steering body.

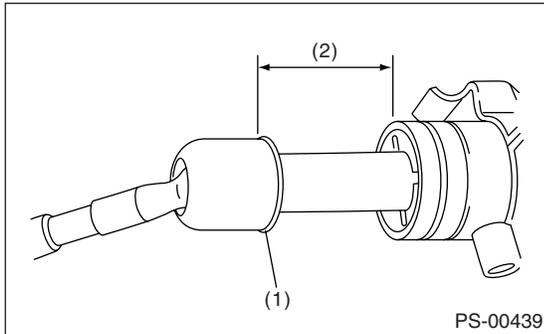
28) Install the tie-rod and a new lock washer into rack.

Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

Tightening torque:

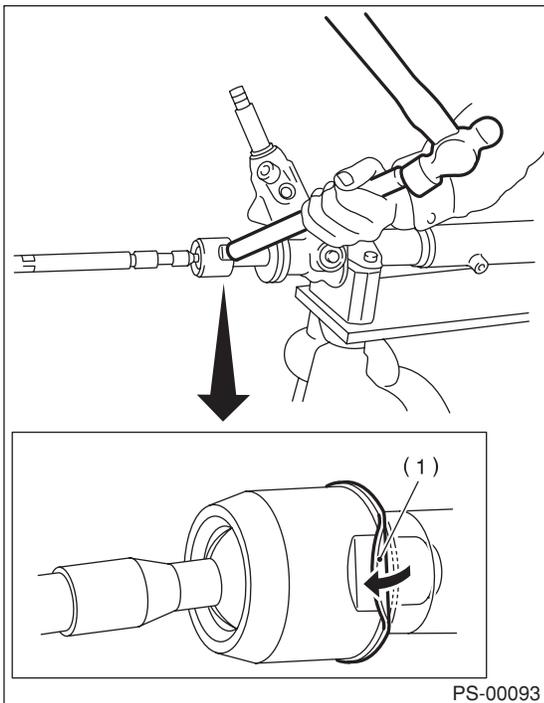
90 N·m (9.1 kgf·m, 65.8 ft·lb)



- (1) Lock washer
- (2) Approx. 40 mm (1.57 in)

29) Bend the lock washer.

CAUTION:
Be careful not to scratch the rack when bending lock washer.

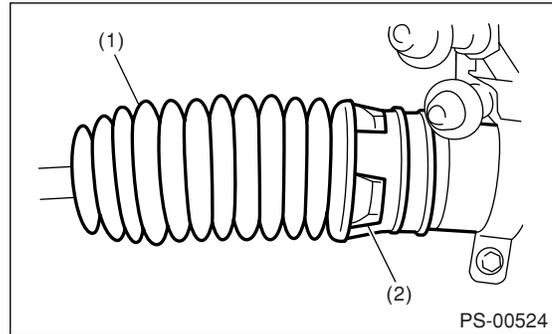


- (1) Lock washer

30) Apply a coat of grease to the tie-rod groove, and then install the boot to housing.

CAUTION:

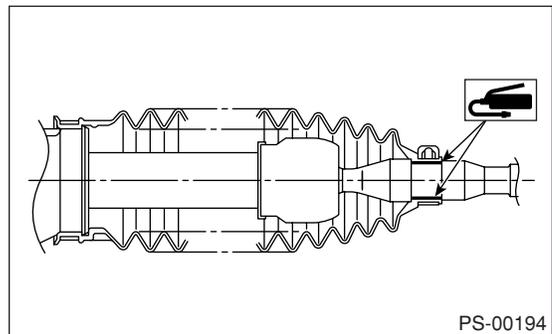
Right side boot has groove for identification.
Be sure to install the boots after identifying left and right boots.



- (1) Right side boot
- (2) Groove for identification

NOTE:

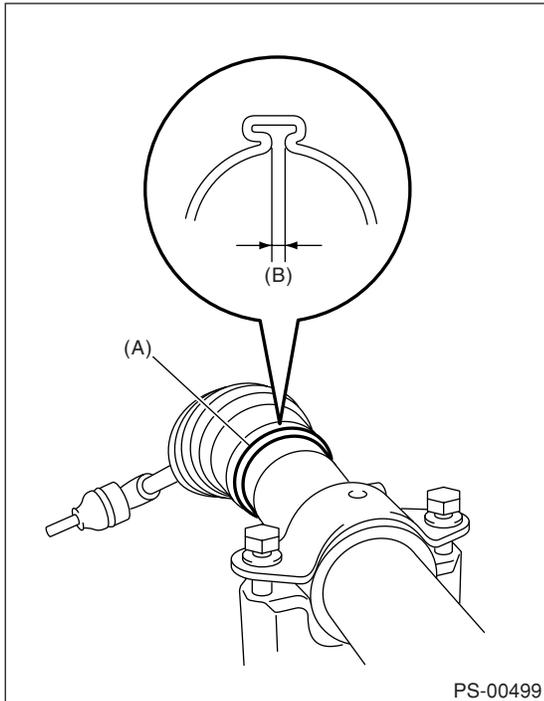
Make sure that the boot is installed without unusual inflation or deflation.



Steering Gearbox

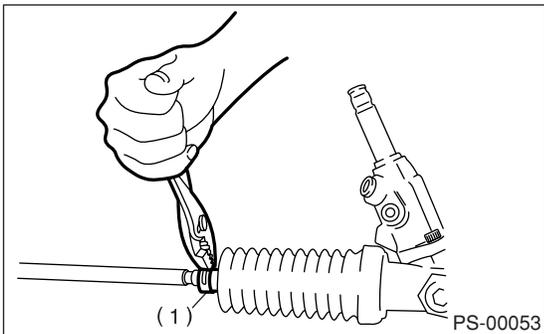
POWER ASSISTED SYSTEM (POWER STEERING)

31) Install a new boot band. Using band clamp pliers, caulk the boot band until caulking part clearance is 2 mm (0.079 in) or less.



- (A) Boot band
- (B) 2 mm (0.079 in) or less

32) Fix the boot end with clip (small).

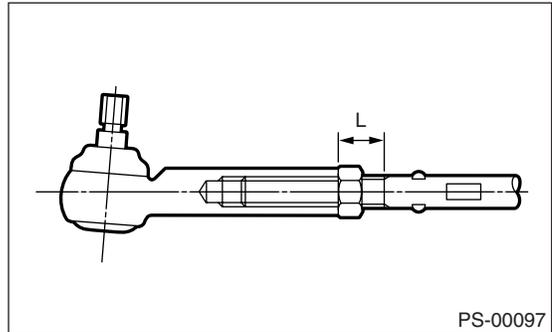


- (1) Clip

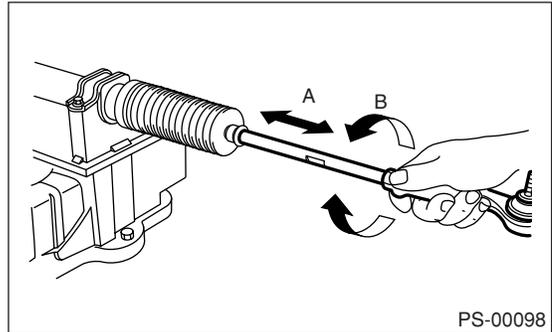
33) After installing, check the boot end is positioned into groove on tie-rod.

34) If the tie-rod end has been removed, screw in the lock nut and tie-rod end to screwed portion of tie-rod, and then tighten the lock nut temporarily in a position as shown in the figure.

Installed tie-rod length L:
31 mm (1.22 in)



35) Inspect the gearbox as follows:
“A” Holding the tie-rod end, repeat lock to lock two or three times as quickly as possible.
“B” Holding the tie-rod end, turn it slowly at a radius one or two times as large as possible.
After all, make sure that the boot is installed in specified position without deflation.



36) Remove the gearbox from ST.

ST1 926200000 STAND

ST2 34199AG000 BOSS D

37) Install the four pipes on gearbox.

- (1) Connect the pipe A and B to four pipe joints of gearbox.

Tightening torque:

Refer to COMPONENT. <Ref. to PS-4, POWER ASSISTED SYSTEM, COMPONENT, General Description.>

- (2) Connect the pipe C and D to gearbox.

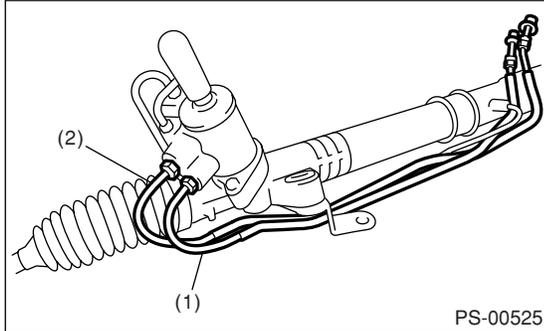
Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

Tightening torque:

Pipe C: 37 N·m (3.8 kgf-m, 27.3 ft-lb)

Pipe D: 29 N·m (3.0 kgf-m, 21.4 ft-lb)



(1) Pipe C

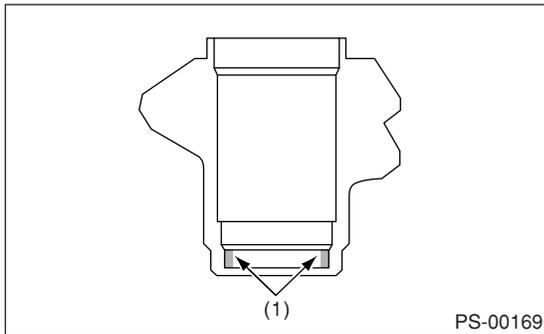
(2) Pipe D

2. CONTROL VALVE ASSEMBLY

Specified steering grease:

VALIANT GREASE M2 (Part No. 003608001)

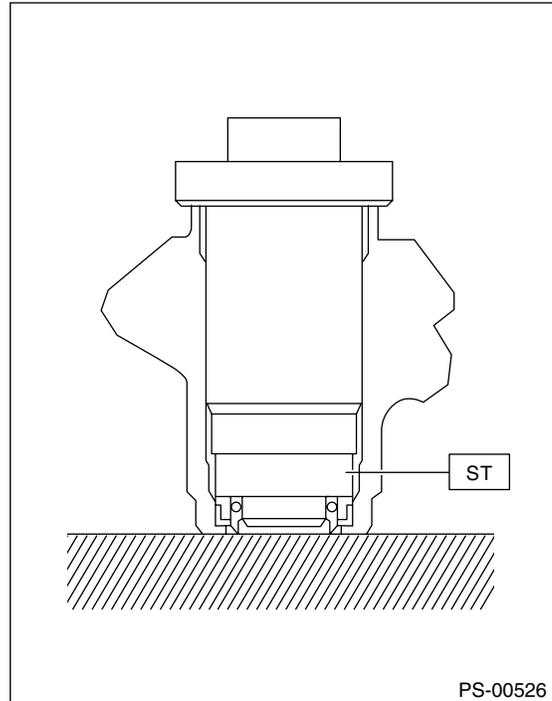
- 1) Clean all parts and tools before reassembling.
- 2) Apply a coat of specified power steering fluid to the inner wall of valve housing.



(1) Apply fluid.

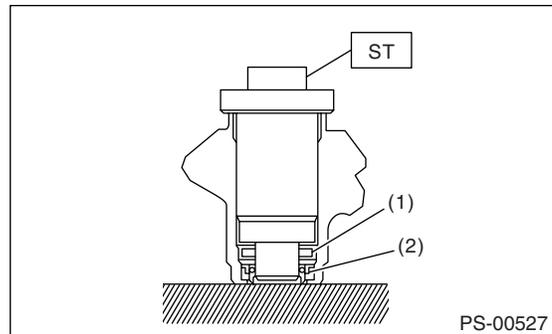
- 3) To avoid scratching the oil seal, apply a coat of grease to the contact surface of installer and oil seal.
 - 4) Verify the oil seal direction.
- Attach the oil seal to installer and position in valve housing before pressing into place.
- 5) Press the oil seal into place using a press.

ST 34199AG090 INSTALLER & REMOVER



- 6) Attach the bearing to ST, and then position in value housing. Using the ST and press, install the special bearing in valve housing.

ST 34199AG090 INSTALLER & REMOVER



(1) Special bearing

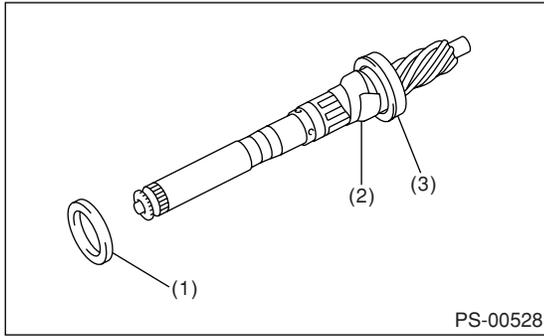
(2) Oil seal

- 7) Apply vinyl tape to the groove portion of pinion.

Steering Gearbox

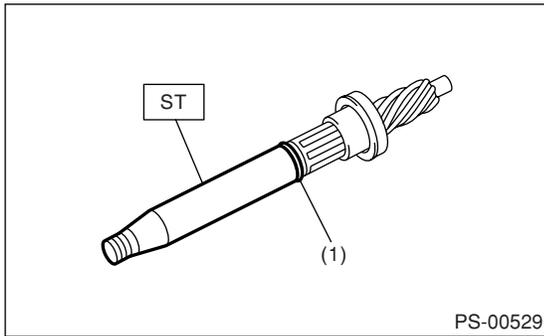
POWER ASSISTED SYSTEM (POWER STEERING)

8) Install the backup ring and oil seal to pinion, and then remove the vinyl tape.



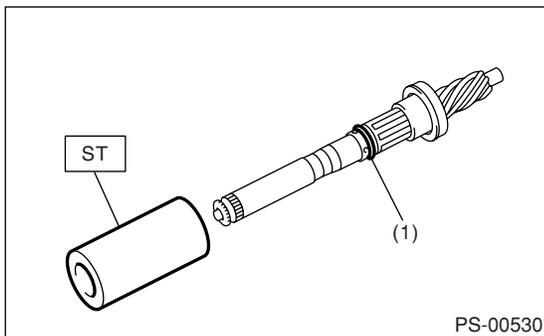
- (1) Oil seal
- (2) Vinyl tape
- (3) Backup ring

9) Set the ST to pinion, and install the seal ring.
ST 34199AG020 GUIDE



- (1) Seal ring

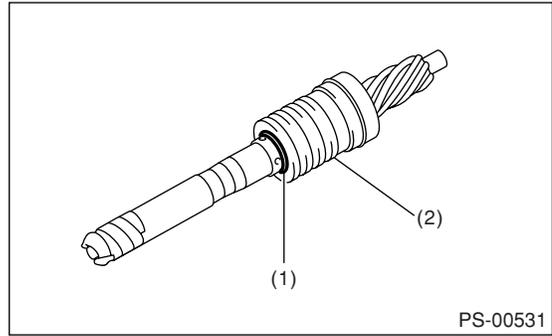
10) Remove the ST GUIDE, and form the seal ring properly using ST FORMER.
ST 34199AG070 FORMER



- (1) Seal ring

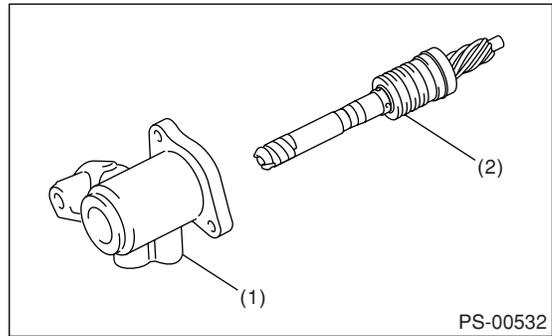
11) Put vinyl tape around the pinion shaft splines to protect oil seal from damage.

12) Install the valve to pinion, and install the snap ring.



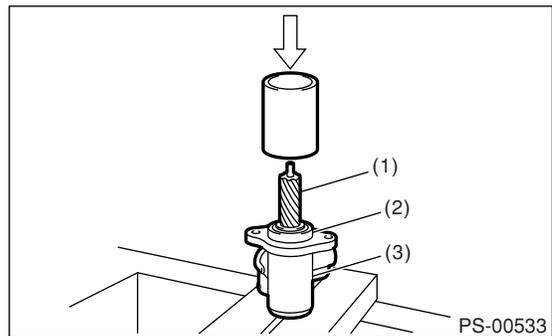
- (1) Snap ring
- (2) Valve

13) Fit the pinion & valve assembly into valve housing.



- (1) Valve housing
- (2) Pinion & valve ASSY

14) Using a press, press-fit the pinion & valve assembly into housing by pressing the bearing outer race.



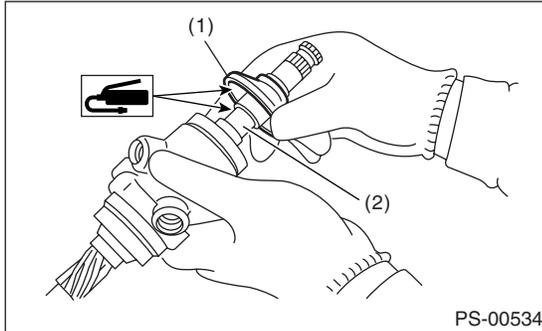
- (1) Pinion & valve ASSY
- (2) Bearing
- (3) Housing

15) Apply the specified grease to dust cover.
16) Install the dust cover on valve assembly.

Steering Gearbox

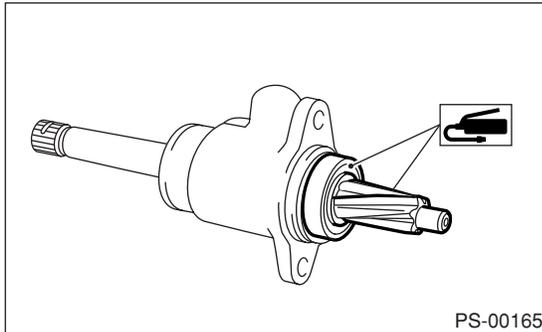
POWER ASSISTED SYSTEM (POWER STEERING)

CAUTION:
Be sure to install the dust cover to groove on shaft properly.

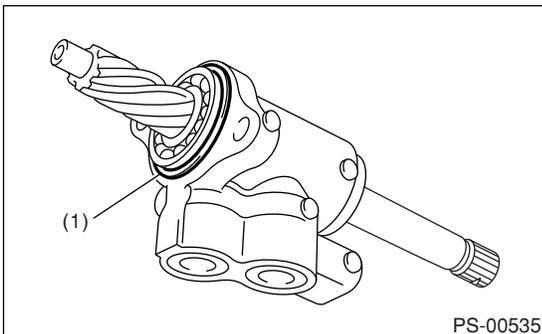


- (1) Dust cover
- (2) Groove

17) Apply genuine grease to the pinion gear and bearing of valve assembly.

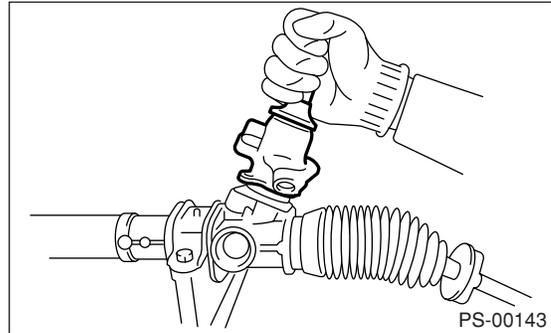


18) Install a new O-ring on valve assembly.



- (1) O-ring

19) Insert the valve assembly into place while facing rack teeth toward pinion.



20) Tighten the bolts alternately to secure valve assembly.

Tightening torque:
20 N·m (2.0 kgf-m, 14.8 ft-lb)

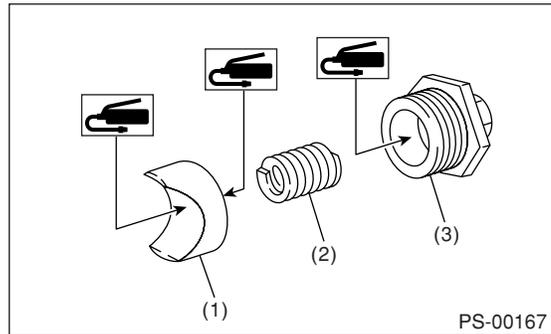
CAUTION:
Be sure to alternately tighten the bolts.

21) Apply liquid gasket to at least 1/3 of the entire perimeter of adjusting screw thread.

Liquid gasket:
THREE BOND 1141 (Part No. 004403006)

22) Apply a coat of grease to the sliding surface of sleeve and seating surface of spring, and then insert the sleeve into steering body.

Charge the adjusting screw with grease, and then insert the spring into adjusting screw and install on steering body.



- (1) Sleeve
- (2) Spring
- (3) Adjusting screw

23) Tighten the adjusting screw with specified torque.

Tightening torque:
3.9 N·m (0.4 kgf-m, 2.9 ft-lb)

24) After tightening to the specified tightening torque, loosen it by 20°.

Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

25) Adjust the turning resistance of gearbox so that it is within specification using adjusting screw. <Ref. to PS-37, TURNING RESISTANCE OF GEARBOX, INSPECTION, Steering Gearbox.>

26) Apply liquid gasket to lock nut and install it into adjusting screw. While holding the adjusting screw with a wrench, tighten the lock nut using ST.

Liquid gasket:

THREE BOND 1141

ST 926230000 SPANNER

Tightening torque (Lock nut):

25 N·m (2.5 kgf-m, 18.1 ft-lb)

NOTE:

Hold the adjusting screw with a wrench to prevent it from turning while tightening lock nut.

27) Remove the gearbox from ST.

ST1 926200000 STAND

ST2 34199AG000 BOSS D

28) Install the four pipes on gearbox.

- (1) Connect the pipe A and B to the gearbox.

Tightening torque:

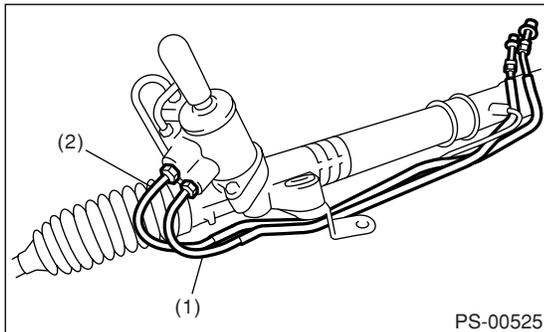
Refer to COMPONENT. <Ref. to PS-4, POWER ASSISTED SYSTEM, COMPONENT, General Description.>

- (2) Connect the pipe C and D to gearbox.

Tightening torque:

Pipe C: 37 N·m (3.8 kgf-m, 27.3 ft-lb)

Pipe D: 29 N·m (3.0 kgf-m, 21.4 ft-lb)



(1) Pipe C

(2) Pipe D

Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

E: INSPECTION

1. BASIC INSPECTION

1) Clean all disassembled parts, and check for wear, damage or any other faults, then repair or replace as necessary.

2) When disassembling, check the inside of gearbox for water. If any water is found, carefully check the boot for damage, input shaft dust seal, adjusting screw and boot clips for poor sealing. If faulty, replace with new parts.

No.	Parts	Inspection	Corrective action
1	Input shaft	(1) Bend of input shaft (2) Damage on serration	If the bend or damage is excessive, replace the entire gearbox.
2	Dust seal	(1) Crack or damage (2) Wear	If the outer wall slips, the lip is worn out or damage is found, replace it with a new one.
3	Rack & pinion	Poor mating of rack with pinion	(1) Adjust the backlash properly. By measuring the turning torque of gearbox and sliding resistance of rack, check if rack & pinion engage uniformly and smoothly with each other. (Refer to "Service limit".) (2) Keeping the rack pulled out all the way so that all teeth emerge, check teeth for damage. Even if abnormality is found in either (1) or (2), replace the entire gearbox.
4	Gearbox unit	(1) Bend of rack shaft (2) Bend of cylinder portion (3) Crack or damage on cast iron portion	Replace the gearbox with a new one.
		(4) Wear or damage on rack bush	If the free play of rack shaft in radial direction is out of the specified range, replace the gearbox with a new one. (Refer to "Service limit".)
		(5) Wear on input shaft bearing	If the free plays of input shaft in radial and axial directions are out of the specified ranges, replace the gearbox with a new one. (Refer to "Service limit".)
5	Boot	Crack, damage or deterioration	Replace.
6	Tie-rod	(1) Looseness of ball joint (2) Bend of tie-rod	Replace.
7	Tie-rod end	Damage or deterioration on dust seal	Replace.
8	Adjusting screw spring	Deterioration	Replace.
9	Boot clip	Deterioration	Replace.
10	Sleeve	Damage	Replace.
11	Pipes	(1) Damage to flared surface (2) Damage to flare nut (3) Damage to pipe	Replace.

Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

2. SERVICE LIMIT

Make a measurement as follows. If it exceeds the specified service limit, adjust or replace.

NOTE:

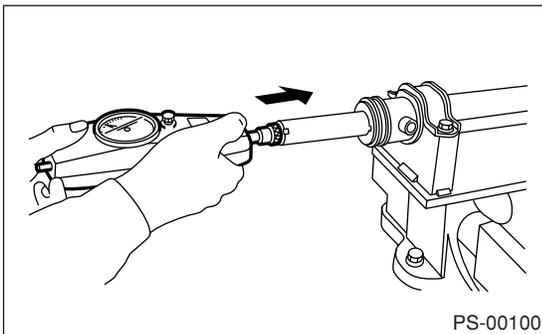
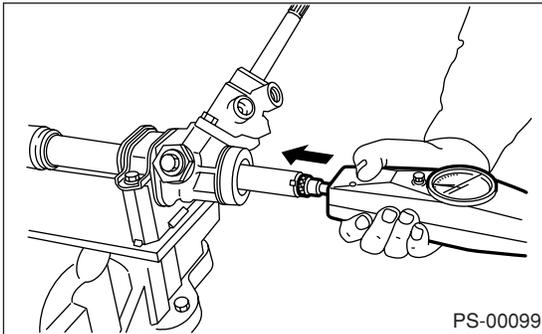
When making a measurement, vise the gearbox using ST. Never vise the gearbox by inserting aluminum plates, etc. between vise and gearbox.

ST1 926200000 STAND
ST2 34199AG000 BOSS D

Sliding resistance of rack shaft:

Service limit

400 N (41 kgf, 90 lb) or less



3. RACK SHAFT PLAY IN RADIAL DIRECTION

Right-turn steering:

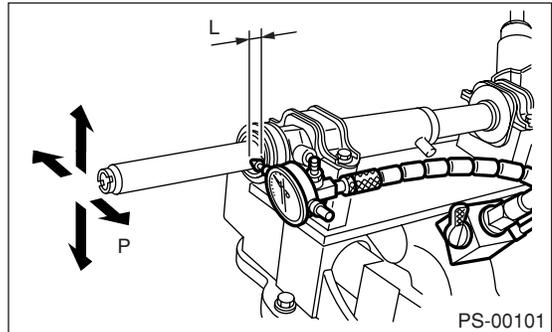
Service limit

0.19 mm (0.0075 in) or less

On condition

L: 5 mm (0.20 in)

P: 122.6 N (12.5 kgf, 27.6 lb)



Left-turn steering:

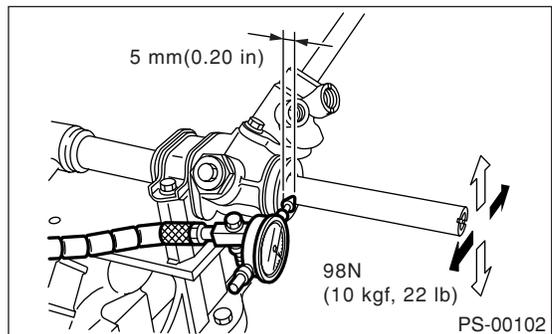
Service limit

Direction ← →

0.6 mm (0.024 in) or less

Direction ← →

0.4 mm (0.016 in) or less



4. INPUT SHAFT PLAY

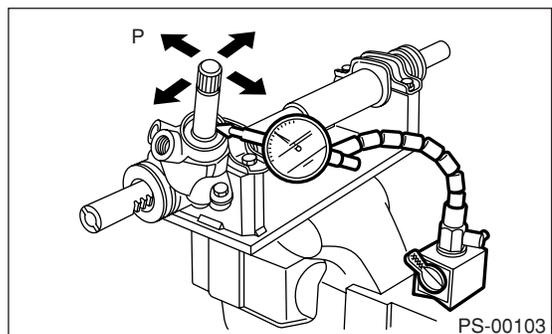
In radial direction:

Service limit

0.18 mm (0.0071 in) or less

On condition

P: 98 N (10 kgf, 22 lb)



In axial direction:

Service limit

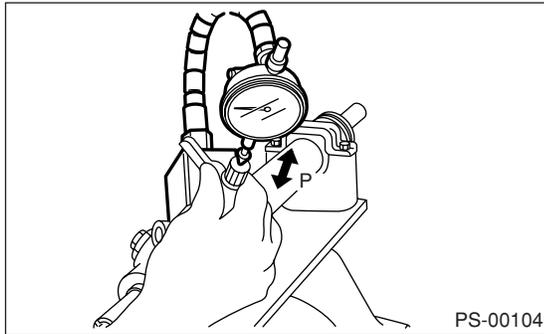
0.27 mm (0.0106 in) or less

Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

On condition

P: 20 — 49 N (2 — 5 kgf, 4 — 11 lb)



5. TURNING RESISTANCE OF GEARBOX

Using the ST, measure the gearbox turning resistance.

ST 34099PA100 SPANNER

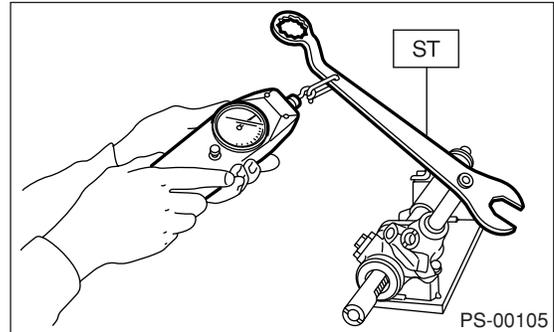
Service limit:

Maximum allowable resistance:

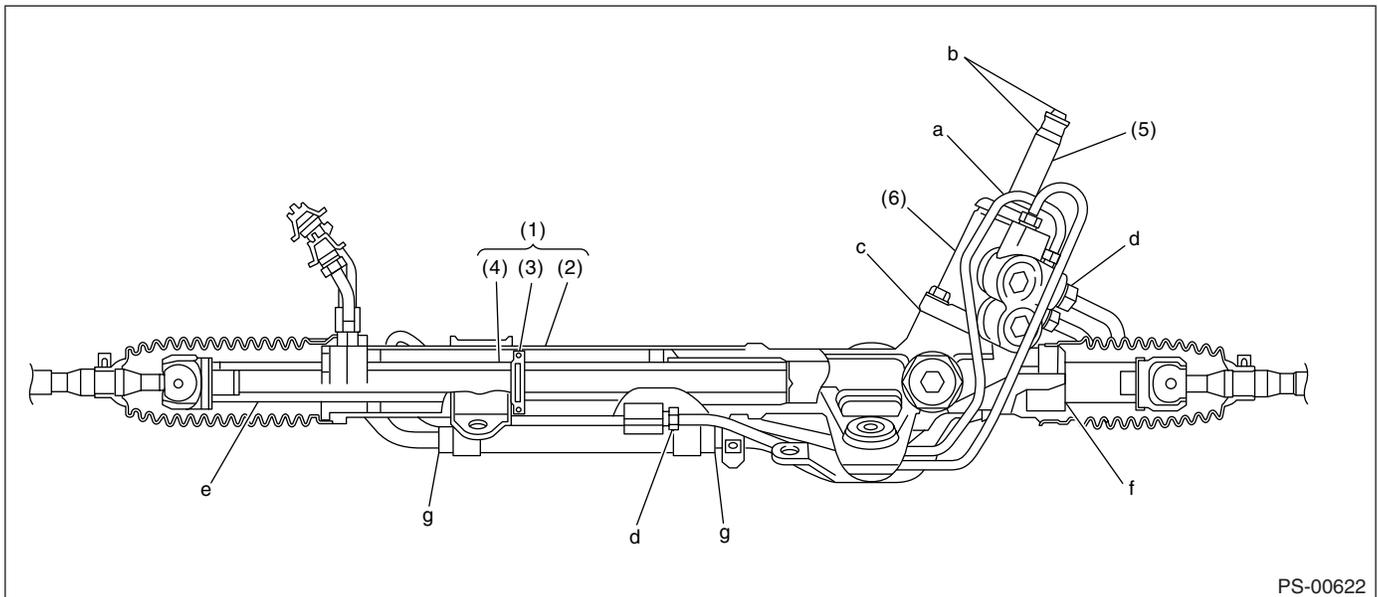
10.5 N (1.1 kgf, 2.4 lb) or less

Difference between right and left turning resistance:

20% or less



6. OIL LEAKING



(1) Power cylinder

(3) Rack piston

(5) Input shaft

(2) Cylinder

(4) Rack axle

(6) Valve housing

1) Lift up the vehicle.

2) Even if the location of leak can be easily found by observing the leaking condition, it is necessary to thoroughly remove the fluid from the suspected portion and turn the steering wheel from lock to lock about thirty to forty times with engine running, then make comparison of the suspected portion between immediately after and several hours after this operation.

3) Cause and measure for oil leakage from "a"

The oil seal is damaged. Replace the valve assembly with a new one.

4) Cause and measure for oil leakage from "b"
The torsion bar O-ring is damaged. Replace the valve assembly with a new one.

5) Cause and measure for oil leakage from "c"
The oil seal is damaged. Replace the valve assembly or oil seal with a new one.

6) Cause and measure for oil leakage from "d"

Steering Gearbox

POWER ASSISTED SYSTEM (POWER STEERING)

The pipe is damaged. Replace the faulty pipe or O-ring.

7) Cause and measure for oil leakage from "g"

The hose is damaged. Replace the hose with a new one.

8) If leak is other than a, b, c, d, or g, and if oil is leaking from the gearbox, move the right and left boots toward tie-rod end side, respectively, with the gearbox mounted to the vehicle, and remove fluid from the surrounding portions. Then, turn the steering wheel from lock to lock about thirty to forty times with the engine running, and make comparison of the leaked portion immediately after and several hours after this operation.

(1) Leakage from "e"

The cylinder seal is damaged. Replace the rack bush with a new one.

(2) Leakage from "f"

There are two possible causes. Take the following step first. Remove the pipe assembly B from the valve housing, and close the circuit with ST.

ST 926420000 PLUG

Turn the steering wheel from lock to lock about thirty to forty times with the engine running, then make comparison of the leaked portion between immediately after and several hours after this operation.

- If leakage from "f" is noted again:

The oil seal of pinion & valve assembly is damaged. Replace the pinion & valve assembly with a new one. Or replace the oil seal and parts that are damaged during disassembly with new ones.

- If oil stops leaking from "f":

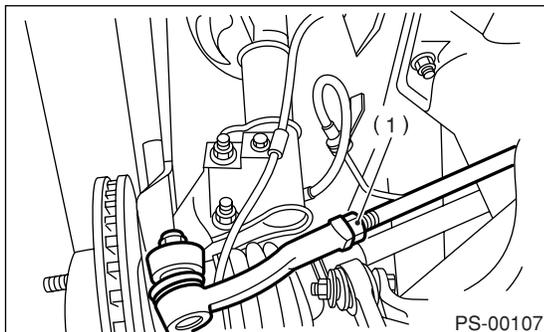
The oil seal of rack housing is damaged. Replace the oil seal and the parts that are damaged during disassembly with new ones.

F: ADJUSTMENT

1) Adjust the front toe. <Ref. to FS-11, FRONT WHEEL TOE-IN, INSPECTION, Wheel Alignment.>

Standard of front toe:

IN 3 — OUT 3 mm (IN 0.12 — OUT 0.12 in)



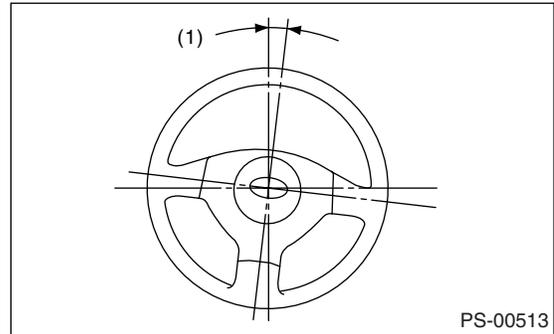
(1) Lock nut

2) Adjust the steering angle of wheels.

Standard of steering angle:

Model	Except for OUTBACK	OUTBACK
Inner wheel	37.2°±1.5°	38.0°±1.5°
Outer wheel	33.0°±1.5°	33.7°±1.5°

3) If the steering wheel spokes are not horizontal when wheels are set in the straight ahead position, and error is more than 5° on the periphery of steering wheel, correctly re-install the steering wheel.



(1) Within 5°

4) If the steering wheel spokes are not horizontal with vehicle set in the straight ahead position after this adjustment, correct it by turning the right and left tie-rods in opposite direction by same angle.