DRIVE SHAFT SYSTEM

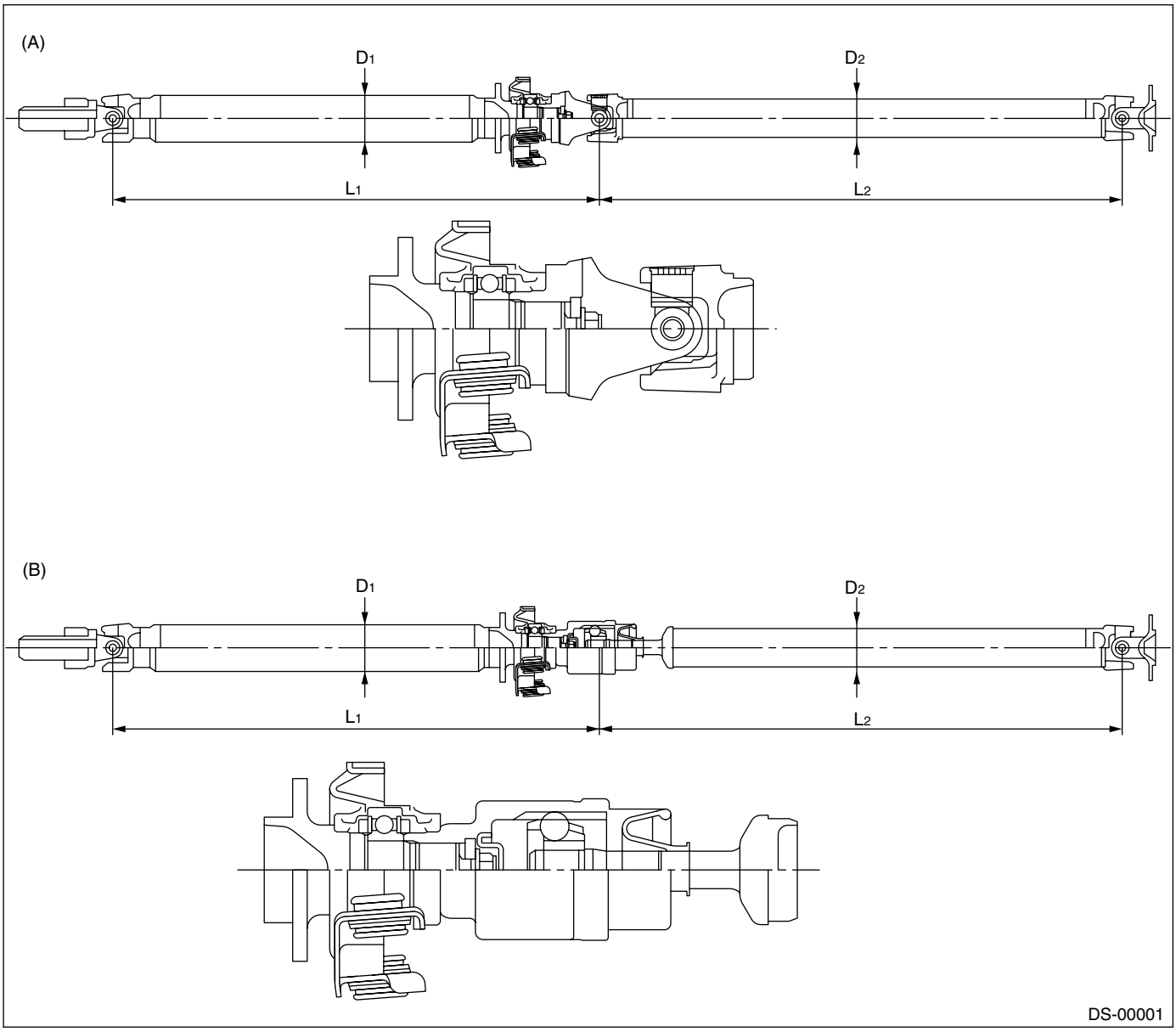
DS

1. General Description

A: SPECIFICATIONS

1. PROPELLER SHAFT

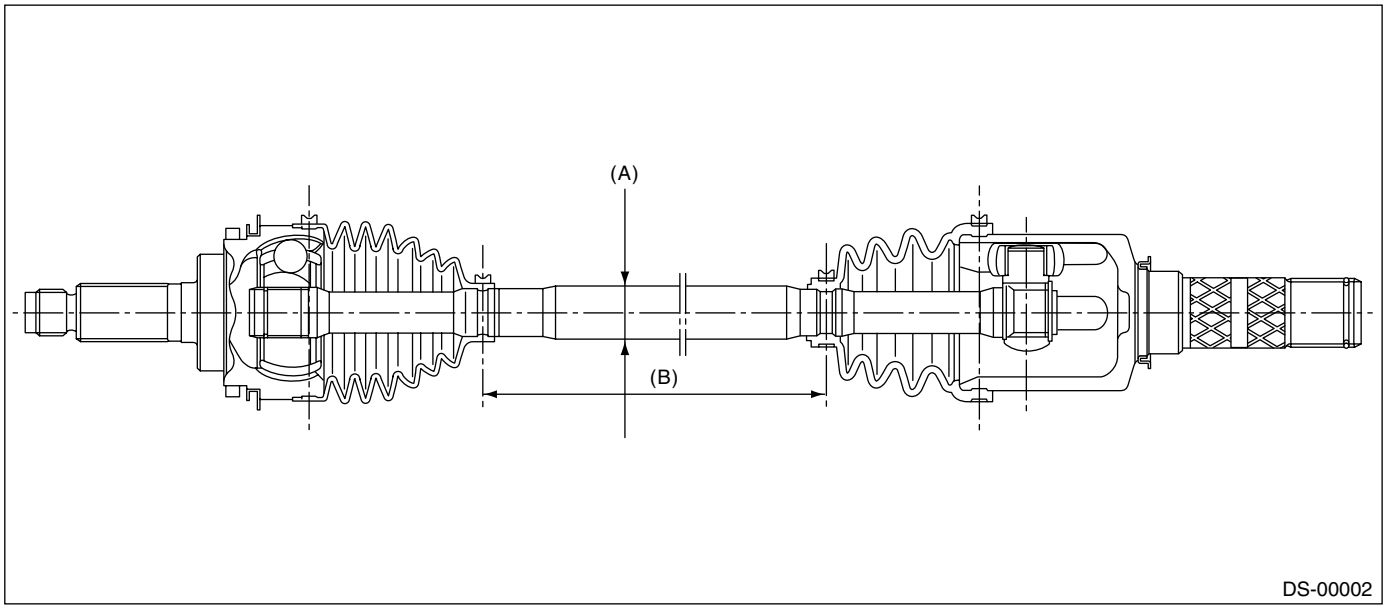
Propeller shaft type			DOJ type	3UJ type
Front propeller shaft Joint-to-joint length: L_1	mm (in)		580 (22.83)	644 (25.35)
Rear propeller shaft Joint-to-joint length: L_2		mm (in)	712 (28.03)	707 (27.83)
Outside diameter of tube:	mm (in)	D_1	63.5 (2.500)	
		D_2	57.0 (2.244)	



(A) 3UJ type (B) DOJ type

2. FRONT DRIVE SHAFT ASSEMBLY

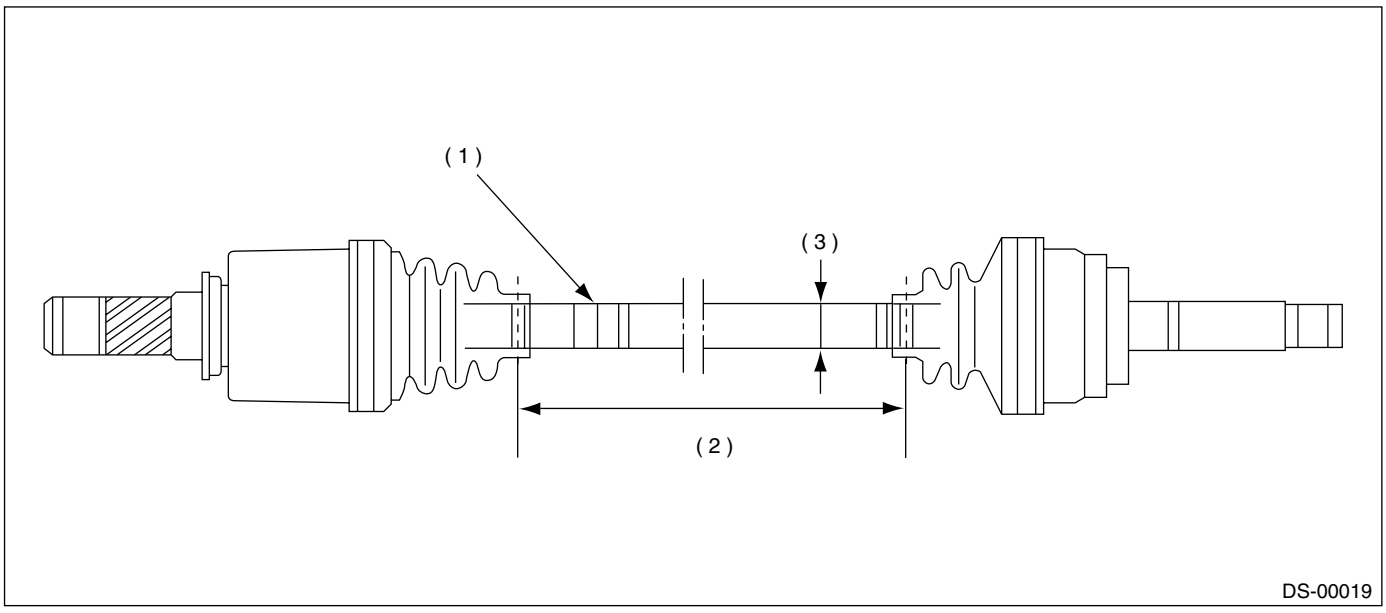
Size	Model	Identification color of shaft	L1 mm (in)	ϕ D mm (in)
AC2300/AAR2300i	Non-turbo AT, Turbo AT	—	513 (20.2)	24.9 (0.98)
AC2300/AAR2300i	Non-turbo MT	Yellow	513 (20.2)	28 (1.10)
AC2300/AAR2600i	Turbo MT	Pink	511.4 (20.13)	24.9 (0.98)



(A) L1 mm (in) (B) ϕ D mm (in)

3. REAR DRIVE SHAFT ASSEMBLY

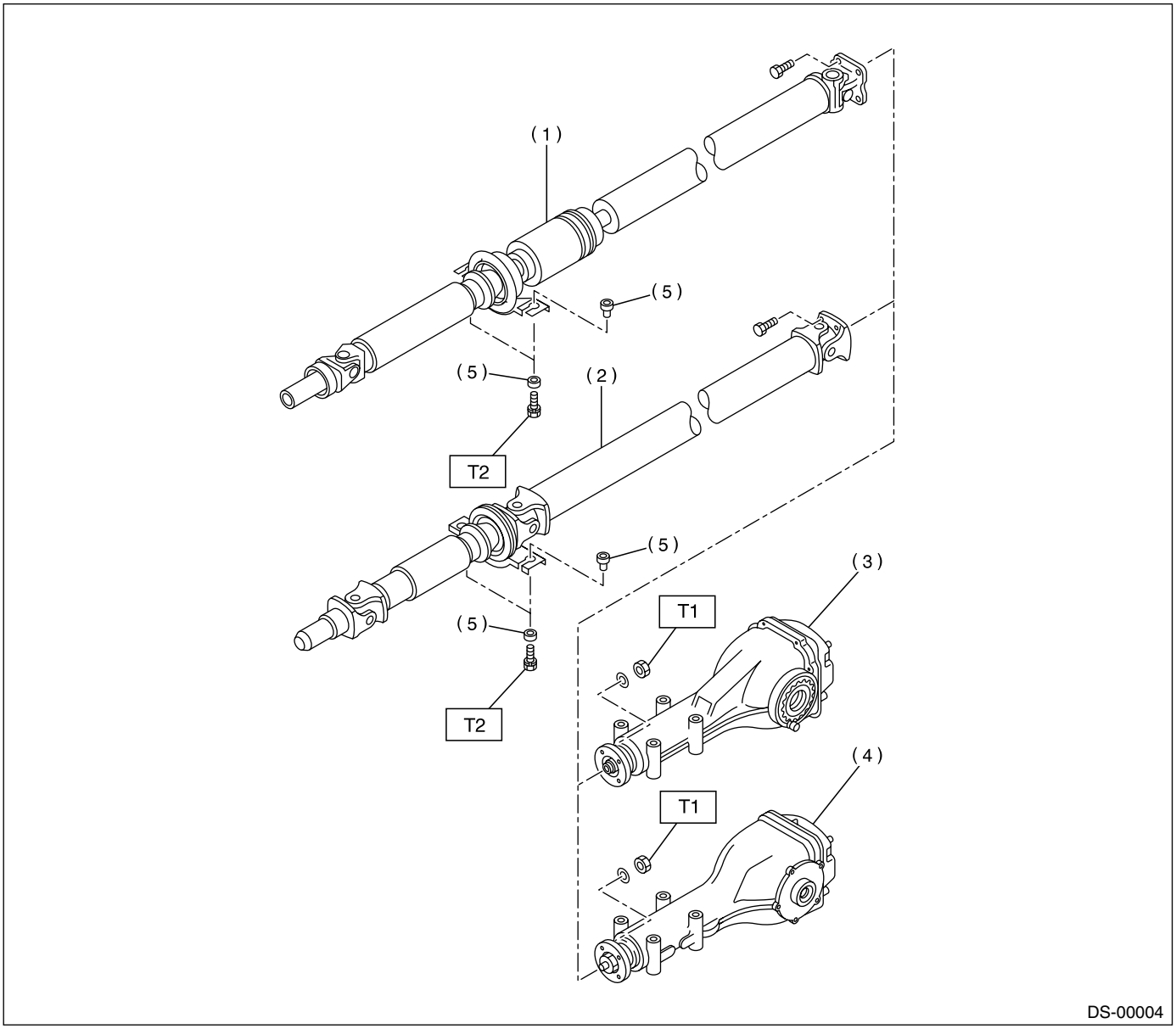
Size	Model	No. of identification groove on shaft	L1 mm (in)	ϕ D mm (in)
EBJ82/DOJ82 R160RH	Turbo MT&AT	2	363 (14.2)	24 (0.9)
BJ79/DOJ79 R152R/L	Non-turbo MT&AT	3	363 (14.2)	24 (0.9)
EBJ82/DOJ82 R160LH	Turbo MT&AT	1	353 (13.9)	24 (0.9)



(1) Identification groove (2) L1 mm (in) (3) ϕ D mm (in)

B: COMPONENT

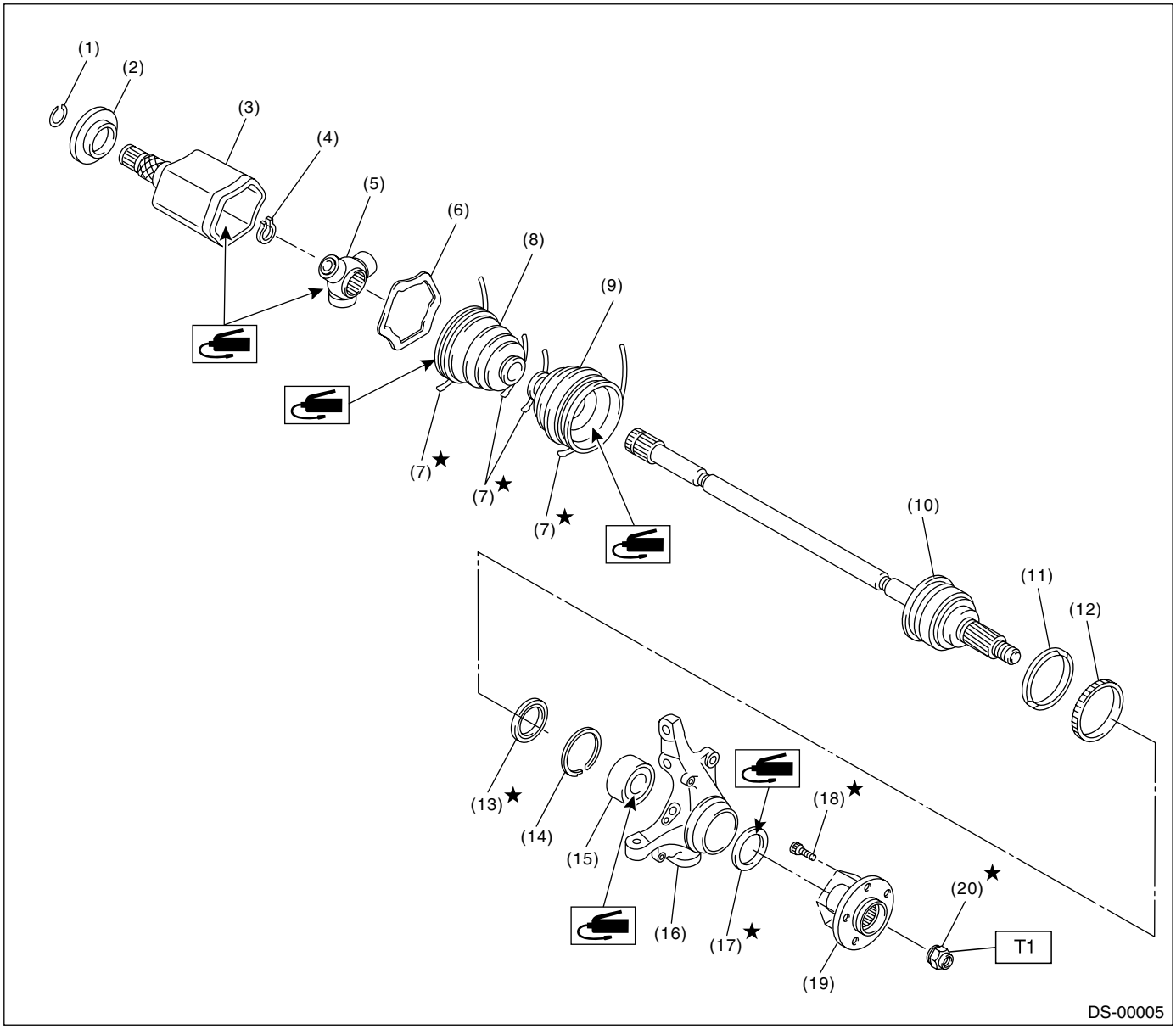
1. PROPELLER SHAFT



(1) Propeller shaft (DOJ type)
(2) Propeller shaft (3UJ type)
(3) Rear differential (VA-type)
(4) Rear differential (T-type)
(5) Bush

Tightening torque: N·m (kgf-m, ft-lb)
T1: 31 (3.2, 23.1)
T2: 52 (5.3, 38.3)

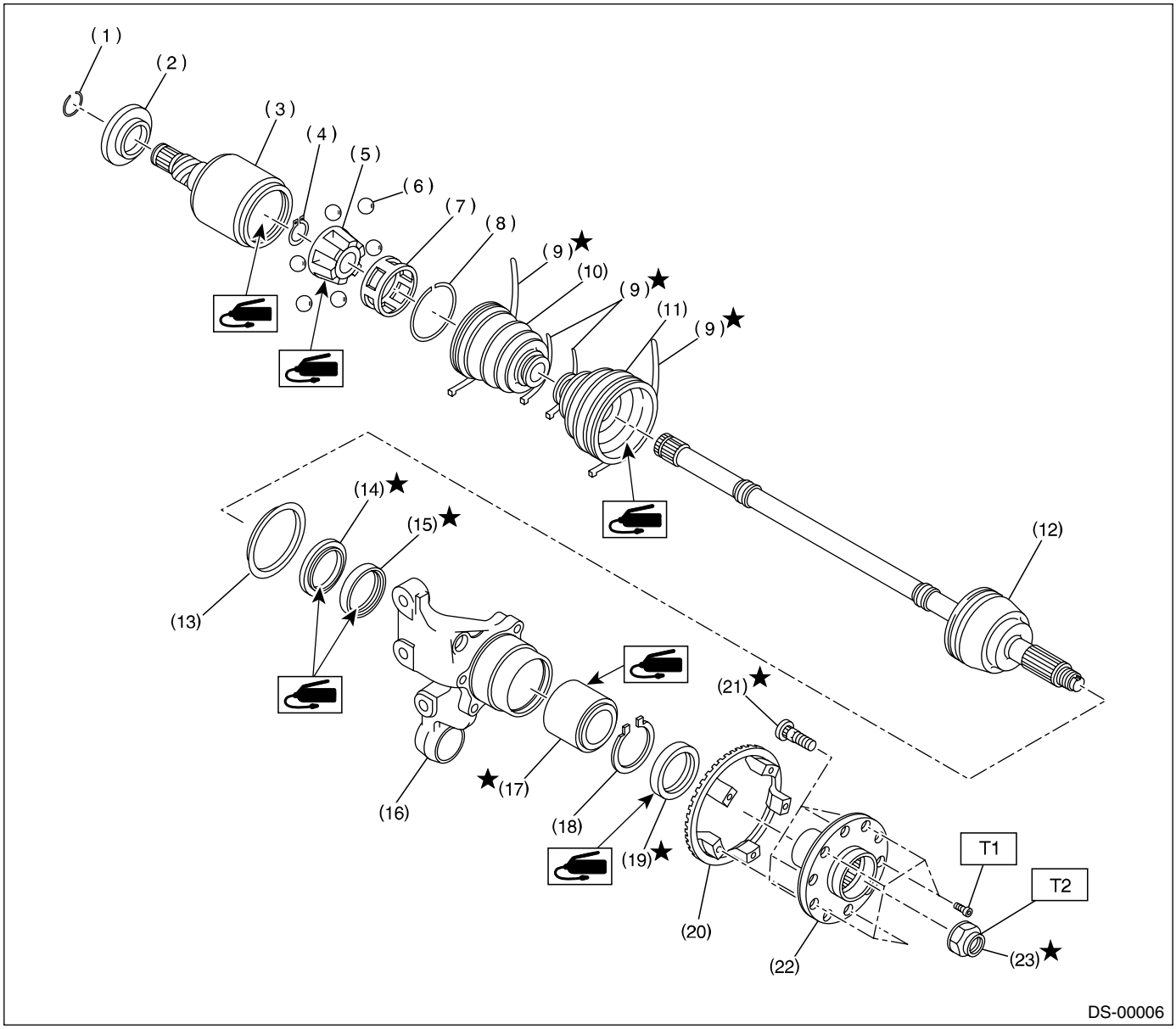
2. FRONT AXLE



(1) Spring pin
(2) Baffle plate (SFJ)
(3) Outer race (SFJ)
(4) Snap ring
(5) Trunnion
(6) Retainer
(7) Boot band
(8) Boot (AARi)
(9) Boot (AC)
(10) AC ASSY
(11) Tone whee
(12) Baffle plate
(13) Oil seal (IN)
(14) Snap ring
(15) Bearing
(16) Housing
(17) Oil seal (OUT)
(18) Hub bolt
(19) Hub
(20) Axle nut

Tightening torque: N·m (kgf-m, ft-lb)
T: 190 (19.4, 140)

3. REAR AXLE



(1) Circlip
(2) Baffle plate (DOJ)
(3) Outer race (DOJ)
(4) Snap ring
(5) Inner race
(6) Ball
(7) Cage
(8) Circlip
(9) Boot band
(10) Boot (DOJ)
(11) Boot
(12) BJ ASSY
(13) Baffle plate
(14) Oil seal (IN. No. 2)
(15) Oil seal (IN. No. 3)
(16) Housing
(17) Bearing
(18) Snap ring
(19) Oil seal (OUT)
(20) Tone wheel
(21) Hub bolt
(22) Hub
(23) Axle nut

Tightening torque: N·m (kgf-m, ft-lb)
T1: 13 (1.3, 9.4)
T2: 190 (19.4, 140)

C: CAUTION

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Use SUBARU genuine grease etc. or the equivalent. Do not mix grease etc. with that of another grade or from other manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Apply grease onto sliding or revolution surfaces before installation.
- Before installing snap rings, apply sufficient amount of grease to avoid damage and deformation.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vise.

D: PREPARATION TOOL

1. SPECIAL TOOLS

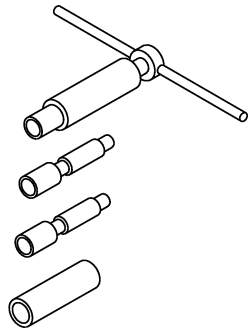
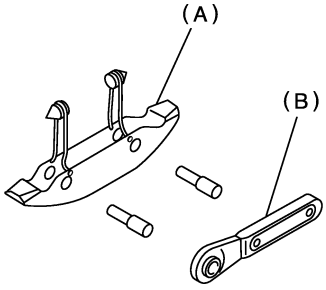
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-922431000	922431000	AXLE SHAFT INSTALLER	• Used for installing axle shaft into housing. • Used with ADAPTER (927390000).
 ST-925091000	925091000	BAND TIGHTENING TOOL	• Used for tightening boot band. (A) Jig for band (B) Ratchet wrench

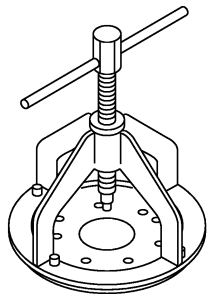
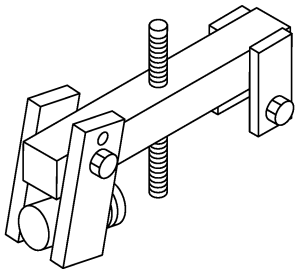
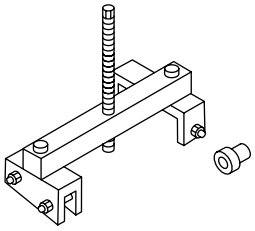
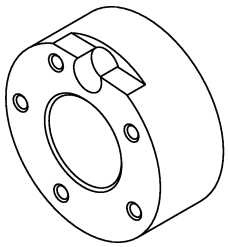
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-926470000	926470000	AXLE SHAFT PULLER	Used for removing axle shaft.
 ST-927060000	927060000	HUB REMOVER	• Used for removing front hub. • Used with HUB STAND (927080000).
 ST-927420000	927420000	HUB REMOVER	• Used for removing rear hub. • Used with HUB STAND (927080000).
 ST-927080000	927080000	HUB STAND	Used for disassembling and assembling hub bolt in hub.

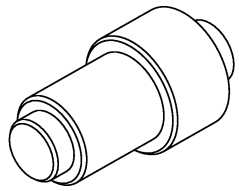
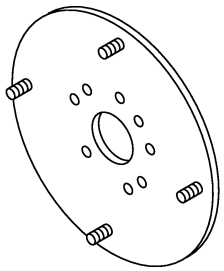
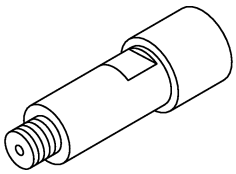
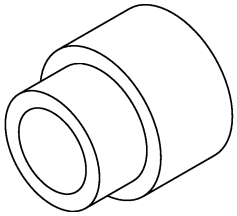
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-927100000	927100000	BEARING PULLER	• Used for disassembling and assembling front housing bearing. • Used with HOUSING STAND (927400000).
 ST-927140000	927140000	AXLE SHAFT PULLER PLATE	Same as plate 2 included in AXLE SHAFT PULLER (926470000).
 ST-927390000	927390000	ADAPTER	Used as an adapter for AXLE SHAFT INSTALLER (922431000).
 ST-927400000	927400000	HOUSING STAND	• Used for disassembling and assembling front housing bearing. • Used with BEARING PULLER (927100000).

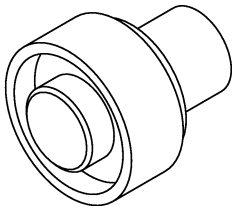
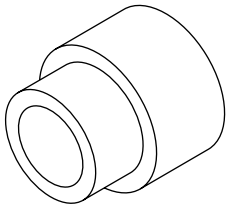
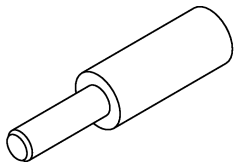
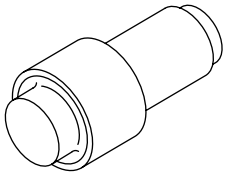
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-927410000	927410000	OIL SEAL INSTALLER	• Used for installing oil seal into front housing. • Used with HOUSING STAND (927400000).
 ST-927430000	927430000	HOUSING STAND	• Used for disassembling and assembling rear housing bearing. • Used with BEARING PULLER (927440000).
 ST-927120000	927120000	HUB INSTALLER	Used for installing hub.
 ST-927440000	927440000	BEARING REMOVER	• Used for disassembling and assembling rear wheel bearing. • Used with HOUSING STAND (927430000).

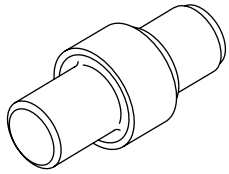
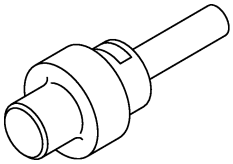
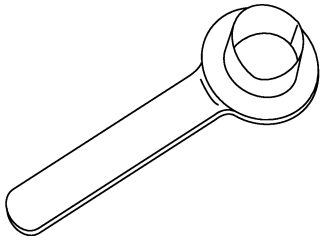
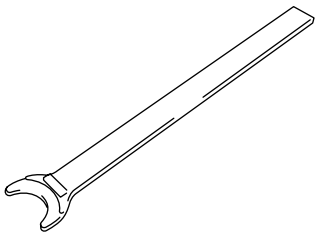
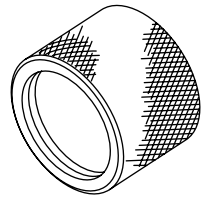
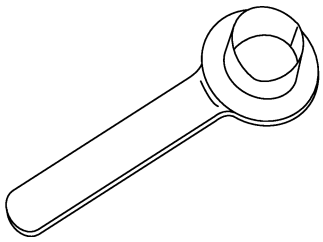
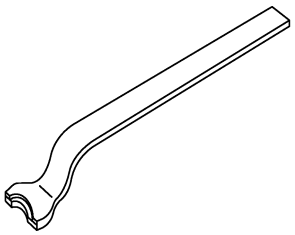
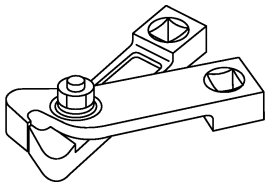
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-927460000	927460000	OIL SEAL INSTALLER	• Used for installing outer oil seal. • Used with HOUSING STAND (927430000).
 ST-927450000	927450000	HUB INSTALLER	• Used for pressing hub bearing into hub. • Used with HUB STAND (927080000).
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	• Used for installing front drive shaft into front differential. • For protecting oil seal.
 ST28399SA000	28399SA000	DRIVE SHAFT REMOVER	Used for removing front drive shaft from front differential.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing differential side retainer oil seal.
 ST28099PA090	28099PA090	OIL SEAL PROTECTOR	• Used for installing rear drive shaft into rear differential. • For protecting oil seal.
 ST28099PA100	28099PA100	DRIVE SHAFT REMOVER	Used for removing rear drive shaft from rear differential.
 ST28099AC000	28099AC000	BOOT BAND PLIERS	Used for tightening front BJ boot band.

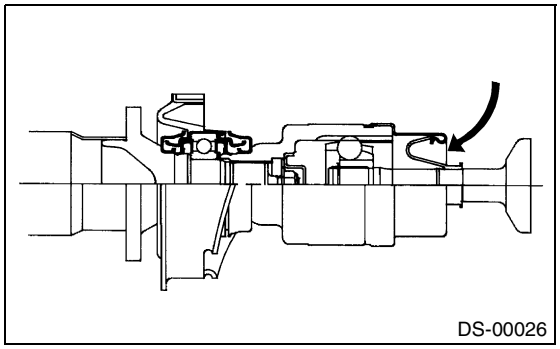
2. GENERAL PURPOSE TOOLS

TOOL NAME	REMERKS
Puller	Used for removing ball joint from knuckle arm.
Dial gauge	Used for inspecting propeller shaft run-out.
Snap ring pliers	Used for installing and removing snap ring.

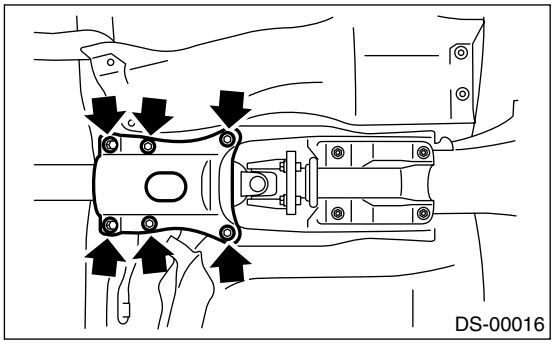
2. Propeller Shaft

A: REMOVAL

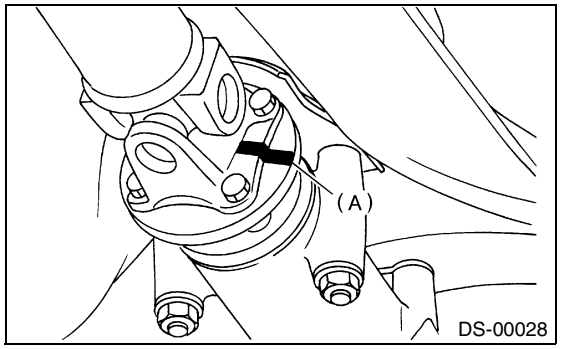
NOTE:
• Before removing the propeller shaft, wrap the metal parts with a cloth or rubber material.
• In case of DOJ type, before removing the propeller shaft, wrap the metal parts (installed at the rubber boot of center DOJ) with a cloth or rubber material, as shown in the figure. Rubber boot may be damaged due to interference with adjacent metal parts while bending the DOJ during removal.


DS-00026

1) Disconnect the ground cable from battery.
2) Move the select lever or gear shift lever to “N”.
3) Release the parking brake.
4) Jack-up the vehicle and support it with sturdy racks.
5) Remove the center exhaust pipes.
6) Remove the rear exhaust pipe and muffler.
7) Remove the differential mount front cover.


DS-00016

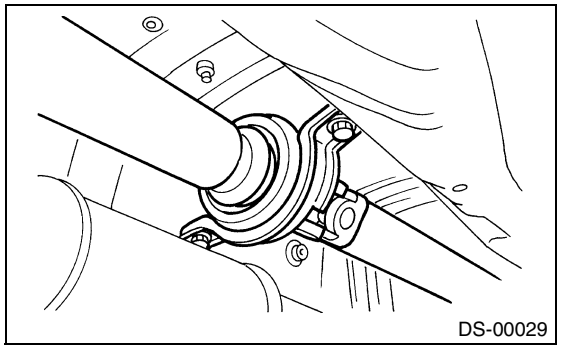
8) Make matching marks on affected parts before removal.



DS-00028

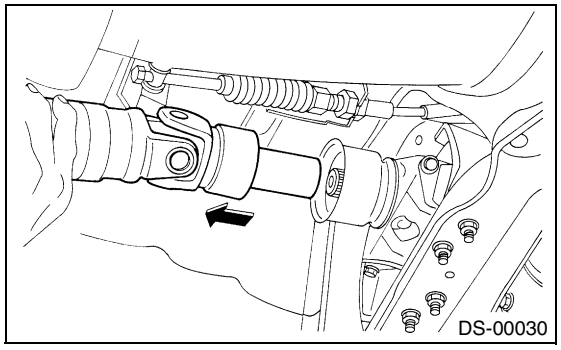
(A) Matching mark

9) Remove the three bolts which hold propeller shaft to rear differential.
10) Remove the remaining bolt.
11) Remove the two bolts which hold center bearing to vehicle body.


DS-00029

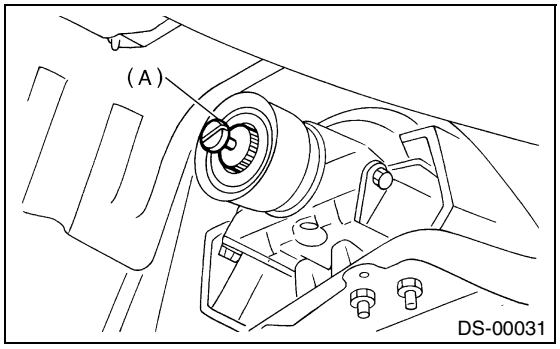
12) Remove the propeller shaft from transmission.

CAUTION:
• Be careful not to damage the oil seals and frictional surface of sleeve yoke.
• Cover the center exhaust pipe with a cloth to keep off any ATF or oil spilled from transmission when removing the propeller shaft.


DS-00030

13) Install the extension cap to transmission.

NOTE:
If the extension cap is not available, place a vinyl bag over opening and fasten with string to prevent gear oil or ATF from leaking.

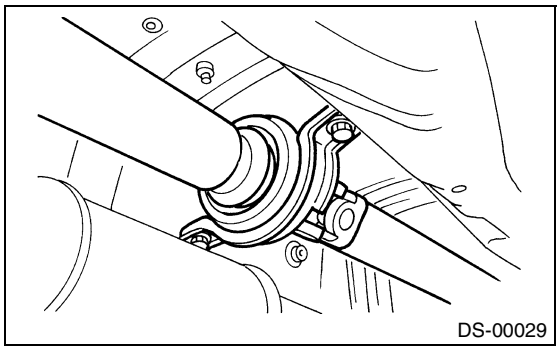


(A) Extension cap

B: INSTALLATION

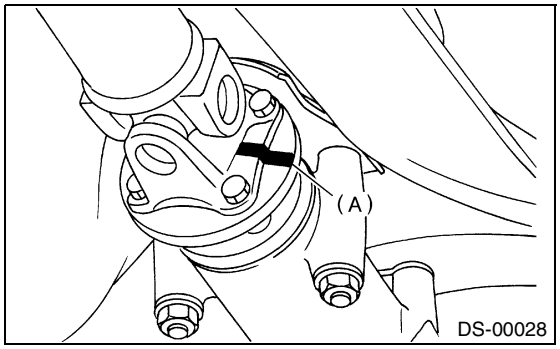
1) Insert the sleeve yoke into transmission, and then attach the center bearing to body.

Tightening torque:
52 N·m (5.3 kgf-m, 38.3 ft-lb)



2) Align the matching marks, and then connect the flange yoke and rear differential.

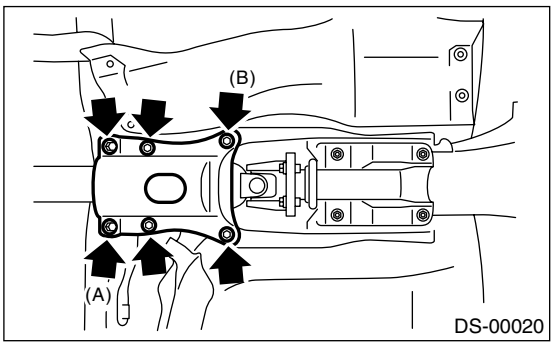
Tightening torque:
31 N·m (3.2 kgf-m, 23.1 ft-lb)



(A) Matching mark

3) Using new bolts, install the differential mount front cover.
(1) Temporarily tighten the bolt (A) while pushing cover forward.
(2) Tighten the bolt (B) to specified torque.
(3) Tighten the bolt (A) to specified torque.
(4) Tighten the remaining bolts to specified torque.

Tightening torque:
90 N·m (9.2 kgf-m, 66 ft-lb)



4) Install the center exhaust pipes.
5) Install the rear exhaust pipe and muffler.

C: INSPECTION

NOTE:
Do not disassemble the propeller shaft. Check the following and replace if necessary.

1) Tube surfaces for dents or cracks
2) Splines for deformation or abnormal wear
3) Joints for non-smooth operation or abnormal noise
4) Center bearing for free play, noise or non-smooth operation
5) Oil seals for abnormal wear or damage
6) Center bearing for breakage

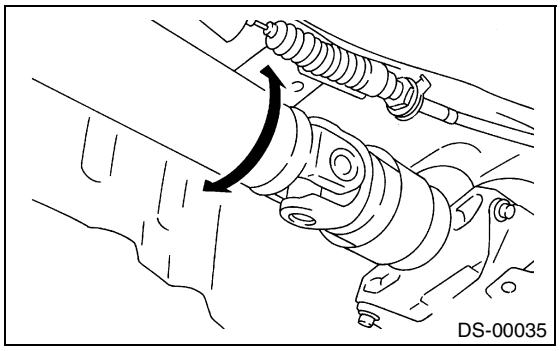
Check the following points with propeller shaft installed in vehicle.

1. JOINTS AND CONNECTIONS

1) Remove the center exhaust pipes.
2) Remove the heat shield cover.
3) Check for any looseness of the yoke flange mounting bolts which connect to rear differential and center bearing bracket mounting bolts.

2. SPLINES AND BEARING LOCATIONS

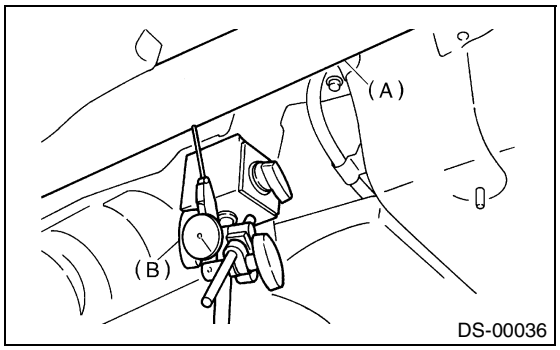
1) Remove the center exhaust pipes.
2) Remove the rear exhaust pipe and muffler.
3) Remove the heat shield cover.
4) Turn the propeller shaft by hand to see if abnormal free play exists at splines. Also move the yokes to see if abnormal free play exists at spiders and bearings.



3. RUNOUT OF PROPELLER SHAFT

1) Remove the center exhaust pipes.
2) Remove the rear exhaust pipe and muffler.
3) Remove the heat shield cover.
4) Set the dial gauge with its indicator stem at center of propeller shaft tube.
5) Turn the propeller shaft slowly by hands to check for "runout" of propeller shaft.

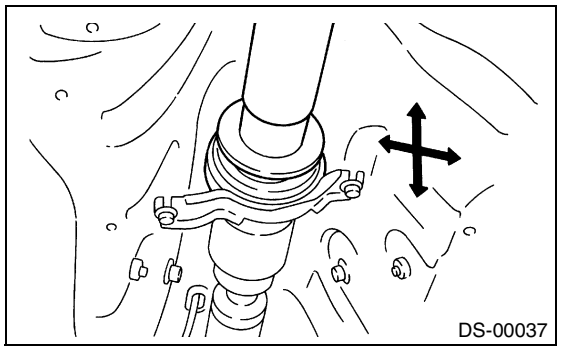
Runout:
Limit 0.6 mm (0.024 in)



(A) Propeller shaft
(B) Dial gauge

4. CENTER BEARING FREE PLAY

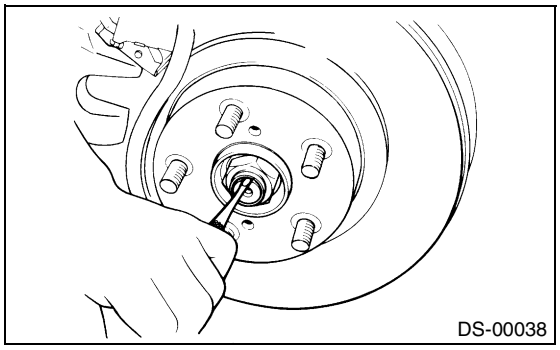
1) Remove the front and center exhaust pipes.
2) Remove the rear exhaust pipe and muffler.
3) Remove the heat shield cover.
4) Move the propeller shaft near center bearing up and down, and left and right with your hand to check for any abnormal bearing free play.



3. Front Axle

A: REMOVAL

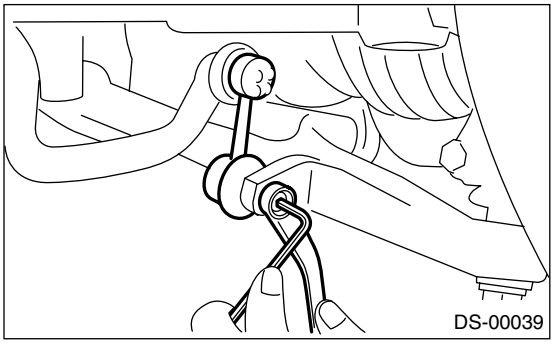
1) Lift-up the vehicle and remove the front wheels.
2) Unlock the axle nut.



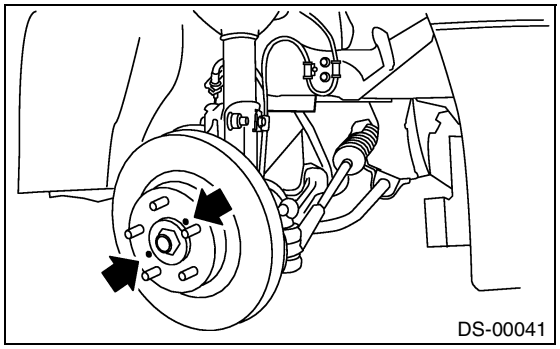
3) Remove the axle nut using a socket wrench.

CAUTION:
Remove the axle nut with vehicle weight not applied on axle. Failure to follow this rule may damage the wheel bearings.

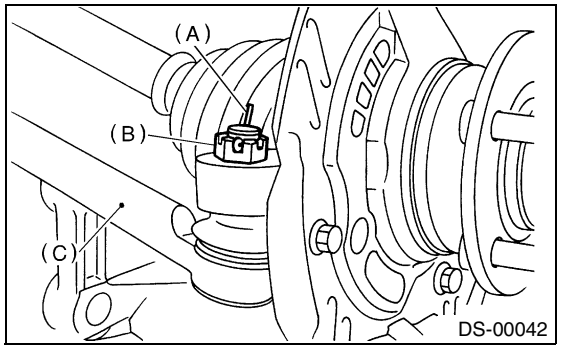
4) Remove the stabilizer link.



5) Remove the disc brake caliper from housing, and suspend it from strut using a wire.
6) Remove the disc rotor from hub.
If the disc rotor seizes up within hub, drive disc rotor out by installing an 8-mm bolt in screw hole on the rotor.

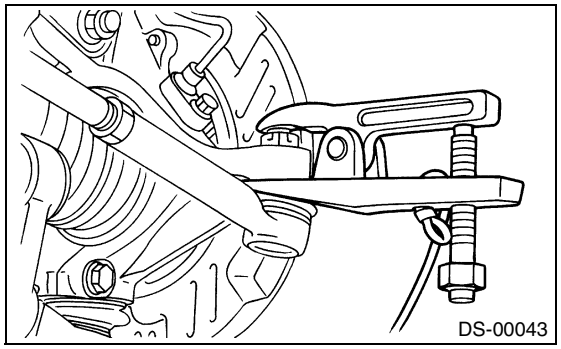


7) Remove the cotter pin and castle nut which secure tie-rod end to housing knuckle arm.

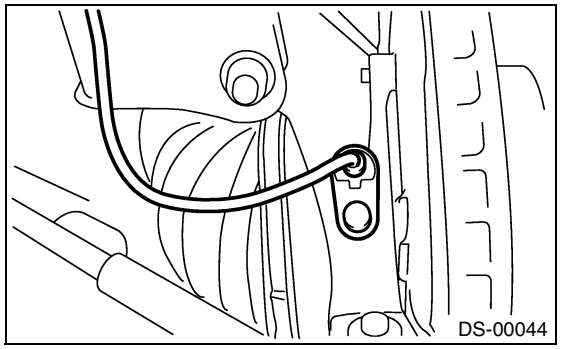


(A) Cotter pin
(B) Castle nut
(C) Tie-rod

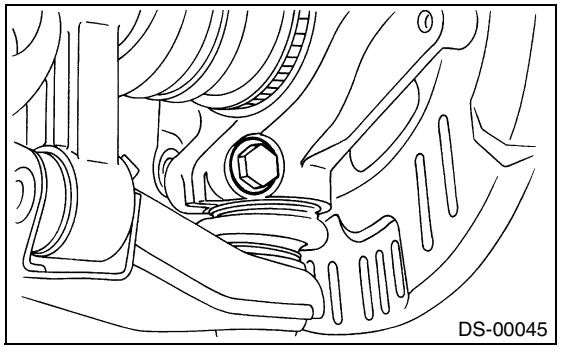
8) Using a puller, remove the tie-rod ball joint from knuckle arm.



9) Remove the ABS sensor assembly and harness.



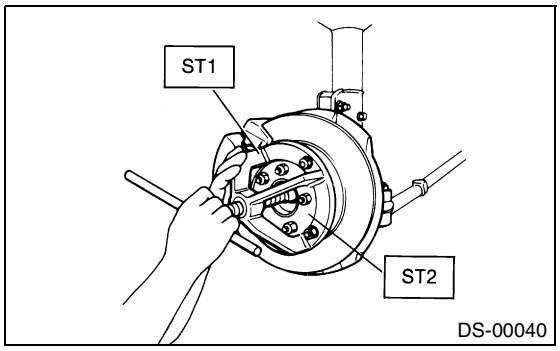
10) Remove the transverse link ball joint from housing.



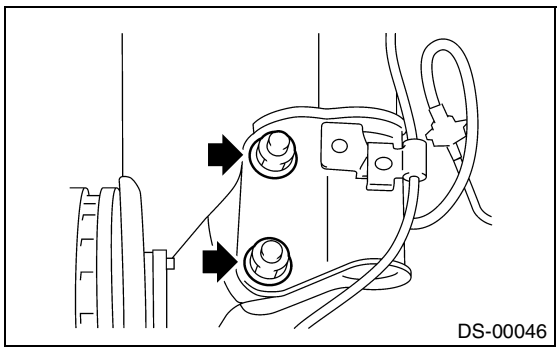
11) Remove the front drive shaft assembly from hub. If it is hard to remove, use the STs.

ST1	926470000	AXLE SHAFT PULLER
ST2	927140000	AXLE SHAFT PULLER PLATE

CAUTION:
• Be sure to replace the differential side retainer oil seal at transmission side with a new one when removing front drive shaft .
• Suspend the front drive shaft to vehicle body using a wire.



12) After scribing an alignment mark on the camber adjusting bolt head, remove the bolts which connect housing and strut, and disconnect housing from strut.



B: INSTALLATION

1) Temporarily tighten the front axle to front strut.
2) Insert the front drive shaft into front axle.
3) Temporarily tighten the axle nut.
4) Install the transverse link ball joint to housing.

Tightening torque:
50 N·m (5.1 kgf-m, 37 ft-lb)

5) While aligning the alignment mark on the camber adjusting bolt head, tighten the housing and strut using a new self-locking nut.

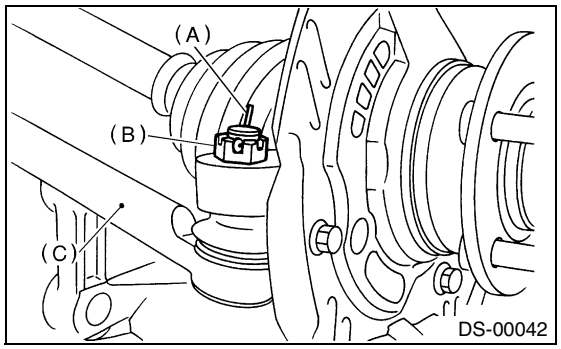
Tightening torque:
175 N·m (17.8 kgf-m, 129 ft-lb)

6) Connect the tie-rod end ball joint to the knuckle arm with a castle nut.

Tightening torque:
27.0 N·m (2.75 kgf-m, 19.9 ft-lb)

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

7) Tighten the castle nut to the specified torque and tighten further within 60° until pin hole is aligned with the slot in nut. Bend the cotter pin to lock.



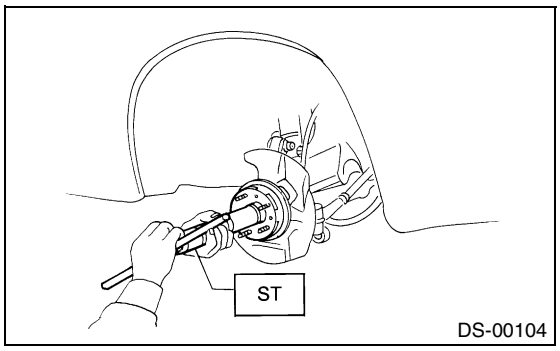
(A) Cotter pin
(B) Castle nut
(C) Tie-rod

8) Install the disc rotor on hub.
9) Install the disc brake caliper on housing.

Tightening torque:
80 N·m (8.2 kgf-m, 59 ft-lb)

10) Connect the stabilizer link.

11) Using the ST1 and ST2, pull the front drive shaft into place.
ST1 922431000 AXLE SHAFT INSTALLER
ST2 92739000 ADAPTER

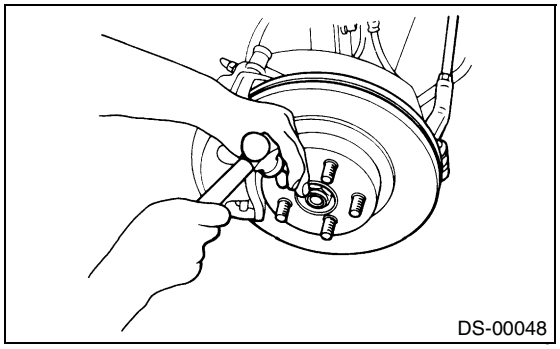


12) While depressing the brake pedal, tighten a new axle nut to the specified torque and lock it securely.

Tightening torque:
190 N·m (19.4 kgf-m, 140 ft-lb)

CAUTION:
Be sure to tighten the axle nut to specified torque. Do not overtighten it as this may damage wheel bearing.

13) After tightening the axle nut, lock it securely.



14) Install the ABS sensor on housing.

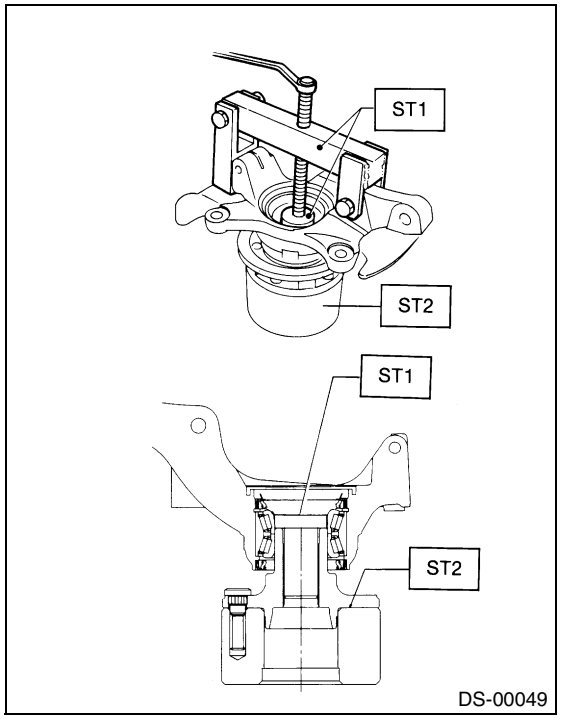
Tightening torque:
32 N·m (3.3 kgf-m, 23.9 ft-lb)

15) Install the wheel and tighten wheel nuts to specified torque.

Tightening torque:
88 N·m (9 kgf-m, 65 ft-lb)

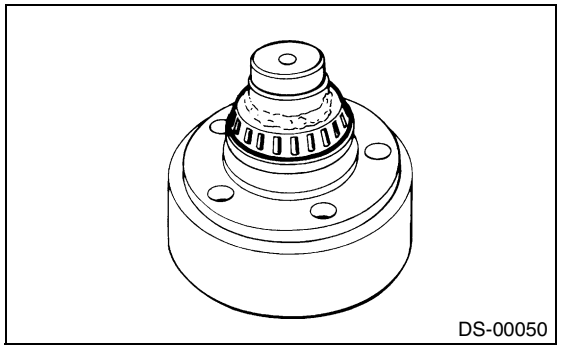
C: DISASSEMBLY

1) Using the ST1, support the housing and hub securely.
2) Attach the ST2 to housing and drive hub out.
ST1 927060000 HUB REMOVER
ST2 927080000 HUB STAND

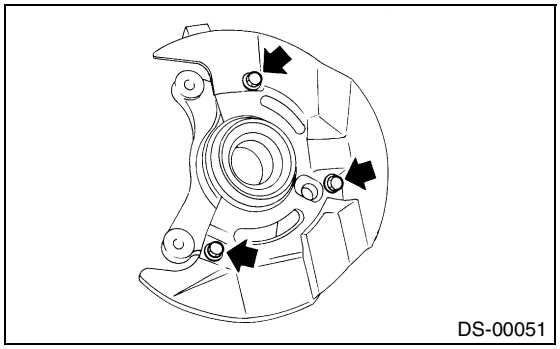


If inner bearing race remains in the hub, remove it with a suitable tool (commercially available).

NOTE:
Be careful not to scratch the polished area of hub.

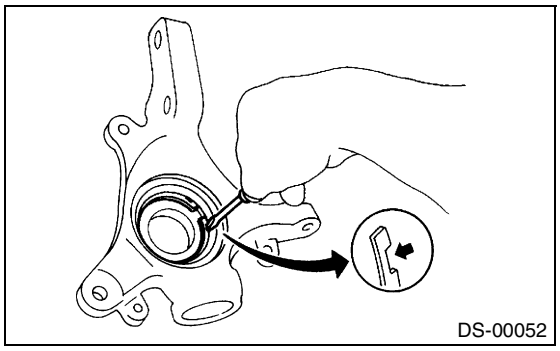


3) Remove the disc cover from housing.

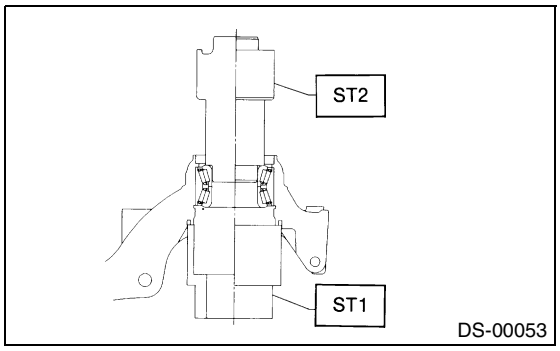


4) Using a standard screwdriver, remove the outer and inner oil seals.
5) Using a flat tip screwdriver, remove the snap ring.

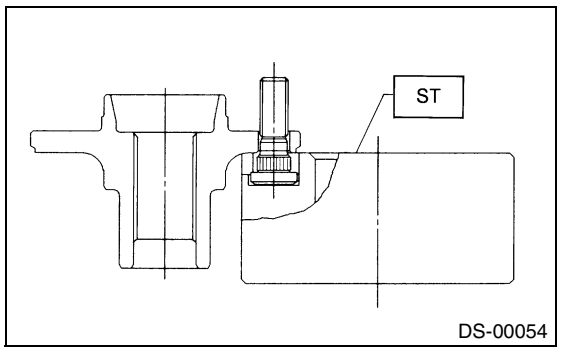
NOTE:
Be careful not to damage the housing at removal.



6) Using the ST1, support the housing securely.
7) Using the ST2, hold the inner race to drive out outer race of bearing.
ST1 927400000 HOUSING STAND
ST2 927100000 BEARING PULLER



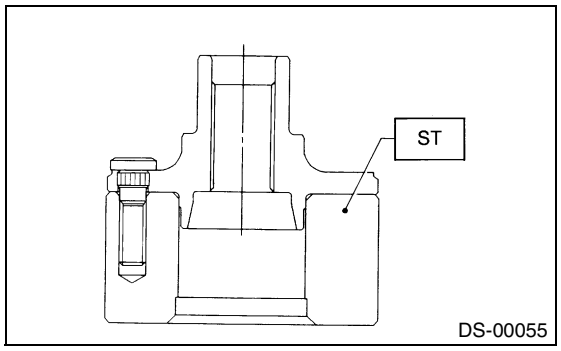
8) Using the ST and a hydraulic press, drive the hub bolts out.
ST 927080000 HUB STAND



D: ASSEMBLY

NOTE:
When the hub is to be removed from housing, replace the bearing set and oil seal with new ones.

1) Attach the hub to ST securely.
ST 927080000 HUB STAND



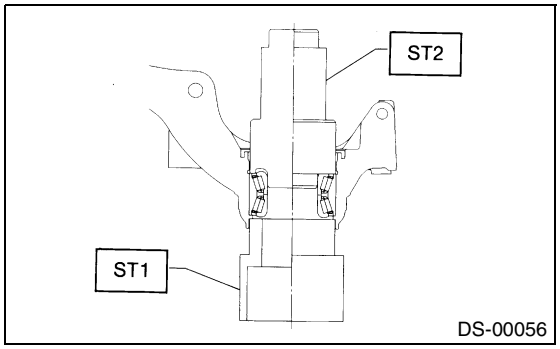
2) Using a hydraulic press, press new hub bolts untill their seating surfaces contact hub.

NOTE:
Use 12 mm (0.47 in) dia. holes in HUB STAND to prevent bolts from tilting.

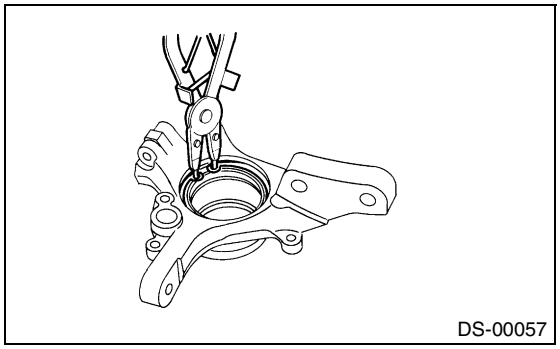
3) Clean dust or foreign particles from inside the housing.

4) Using the ST1 and ST2, press a new bearing into place.
ST1 927400000 HOUSING STAND
ST2 927100000 BEARING PULLER

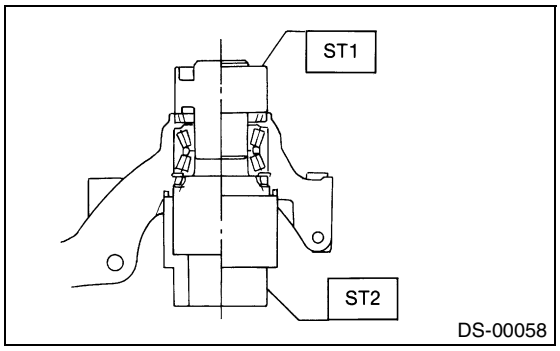
NOTE:
• Always press the outer race when installing bearing.
• Be careful not to remove the plastic lock from inner race when installing bearing.



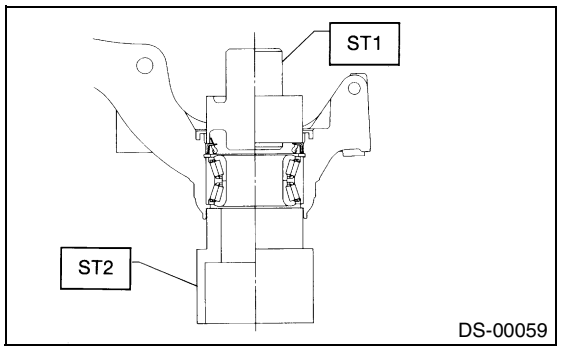
5) Using pliers, install the snap ring firmly.



6) Using the ST1 and ST2, press the outer oil seal until it contacts the bottom of housing.
ST1 927410000 OIL SEAL INSTALLER
ST2 927400000 HOUSING STAND



7) Using the ST1 and ST2, press the inner oil seal until it contacts circlip.
ST1 927410000 OIL SEAL INSTALLER
ST2 927400000 HOUSING STAND



8) Invert the ST and housing.
ST 927400000 HOUSING STAND
9) Apply sufficient grease to the oil seal lip.

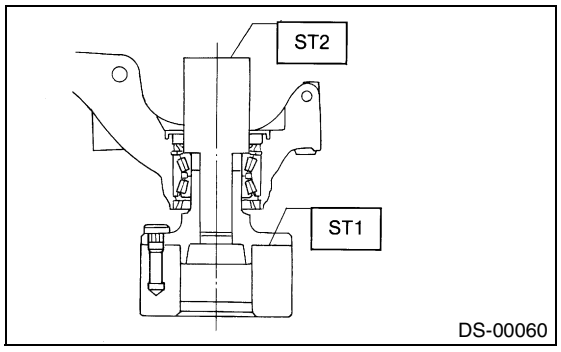
Specified grease:
SHELL 6459N

NOTE:
• If specified grease is not available, remove the bearing grease and apply Auto Rex A instead.
• Do not mix different types of grease.

10) Install the disc cover to housing with three bolts.

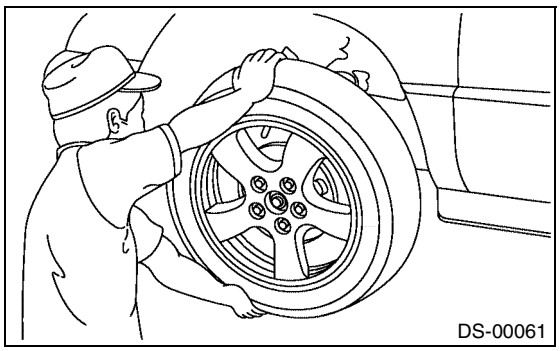
Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)

11) Attach the hub to ST1 securely.
12) Clean dust or foreign particles from the polished surface of hub.
13) Using the ST2, press the bearing into hub by driving inner race.
ST1 927080000 HUB STAND
ST2 927120000 HUB INSTALLER



E: INSPECTION

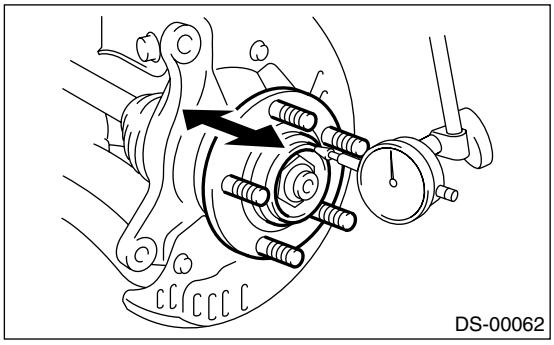
1) Moving the front tire up and down by hand, check that there is no backlash in the bearing, and check that the wheel rotates smoothly.



2) Inspect the lean of axis direction using a dial gauge. Replace the hub bearing if the load range exceed the limitation.

Limit:

Maximum: 0.05mm (0.0020 in)



4. Rear Axle

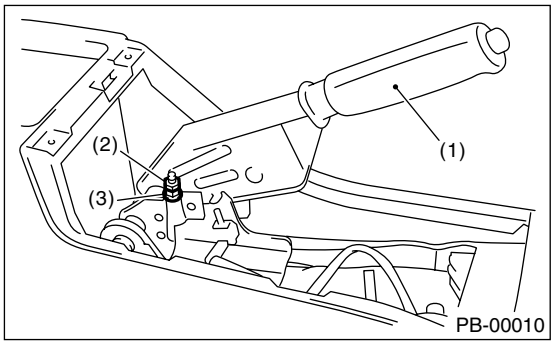
A: REMOVAL

1. DISC BRAKE

1) Disconnect the ground cable from battery.
2) Lift-up the vehicle, and remove the rear wheel.
3) Unlock the axle nut.
4) Remove the axle nut using a socket wrench with brake pedal depressed.

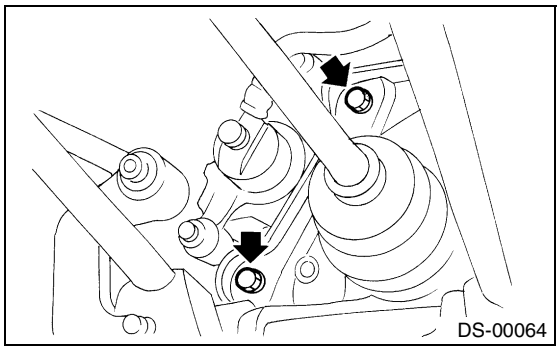
CAUTION:
Remove the axle nut with vehicle weight not applied on axle. Failure to follow this rule may damage the wheel bearings.

5) Return the parking brake lever and loosen adjusting nut.



(1) Parking brake lever
(2) Lock nut
(3) Adjusting nut

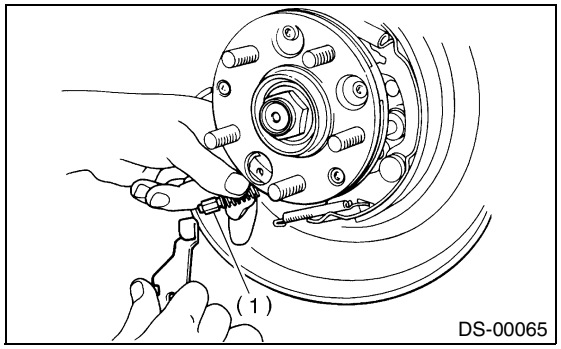
6) Remove the disc brake caliper from back plate, and suspend it from strut using a piece of wire.



7) Remove the disc rotor from hub.

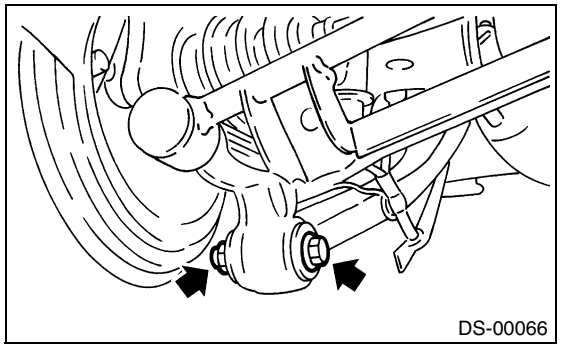
NOTE:
If the disc rotor seizes up within hub, drive it out by installing an 8-mm bolt into bolt hole in disc rotor.

8) Disconnect the parking brake cable end.

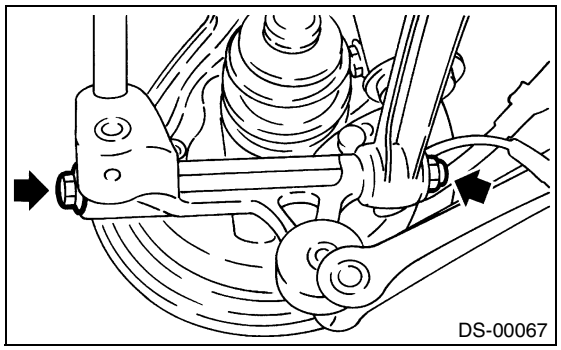


(1) Cable end

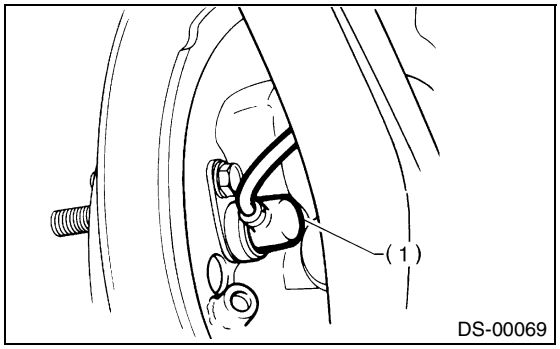
9) Disconnect the rear stabilizer from rear lateral link.
10) Remove the bolts which secure trailing link assembly to rear housing.



11) Remove the bolts which secure lateral assembly to rear housing.



12) Remove the rear ABS sensor from back plate.

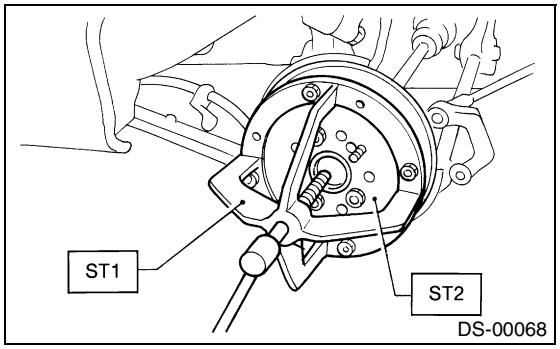


(1) ABS sensor

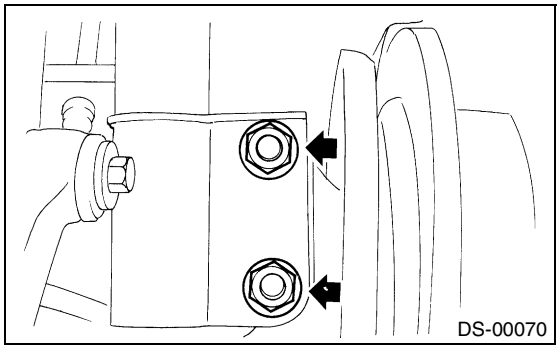
13) Disengage the BJ from housing splines, and then remove the rear drive shaft assembly.
If it is hard to remove, use the STs.

ST1	926470000	AXLE SHAFT PULLER
ST2	927140000	AXLE SHAFT PULLER PLATE

NOTE:
• Be careful not to damage the oil seal lip when removing rear drive shaft.
• When the rear drive shaft is to be replaced, also replace the inner oil seal with a new one.



14) Remove the bolts which secure rear housing to strut, and separate the two.

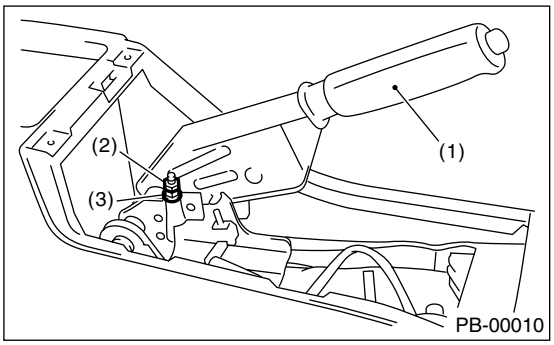


2. DRUM BRAKE

1) Disconnect the ground cable from battery.
2) Lift-up the vehicle, and remove rear wheel cap and wheels.
3) Unlock the axle nut.
4) Remove the axle nut using a socket wrench.

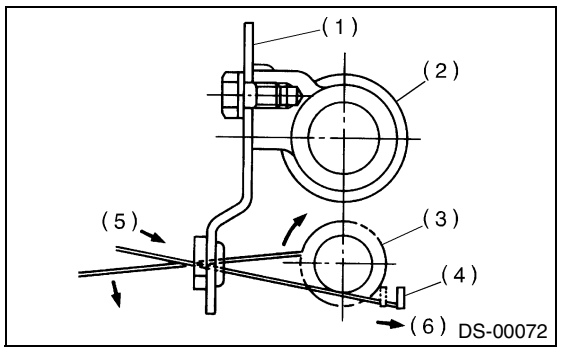
CAUTION:
Failure to follow this rule may damage the wheel bearings.

5) Return the parking brake lever and loosen adjusting nut.



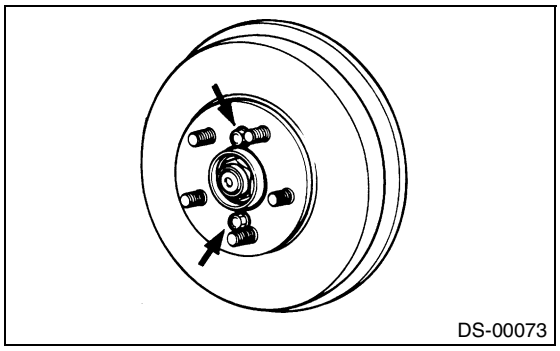
(1) Parking brake lever
(2) Lock nut
(3) Adjusting nut

6) Remove the brake drum from hub.
7) If it is difficult to remove the brake drum, remove the adjusting hole cover from back plate, and then turn the adjusting screw using a flat tip screwdriver until brake shoe separates from the drum.

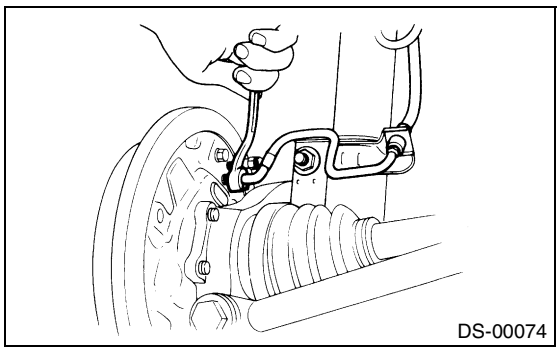


(1) Back plate
(2) Wheel cylinder
(3) Adjuster ASSY pawls
(4) Adjusting lever
(5) Tightening direction
(6) Push

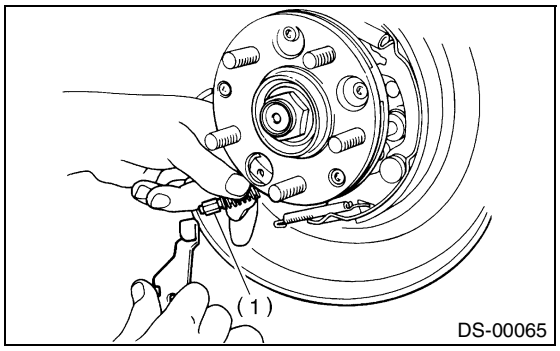
NOTE:
If the brake drum is difficult to remove, drive it out by installing two 8-mm bolts into bolt hole in brake drum.



8) Using a flare-nut wrench, disconnect the brake hose from wheel cylinder. Cover the open end of wheel cylinder to prevent entry of foreign particles.

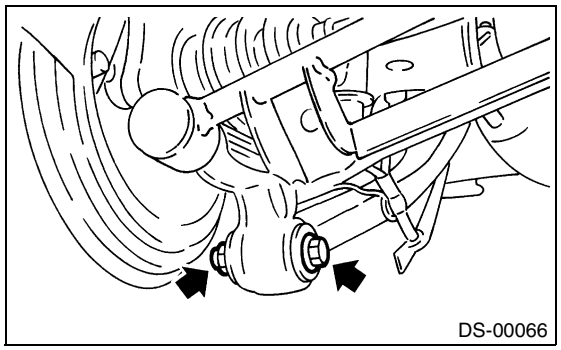


9) Cover the open end of brake pipe with vinyl sheet or equivalent to prevent brake fluid from spilling.
10) Disconnect the parking brake cable end.

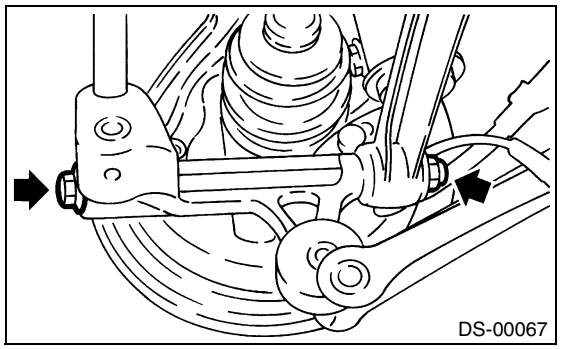


(1) Cable end

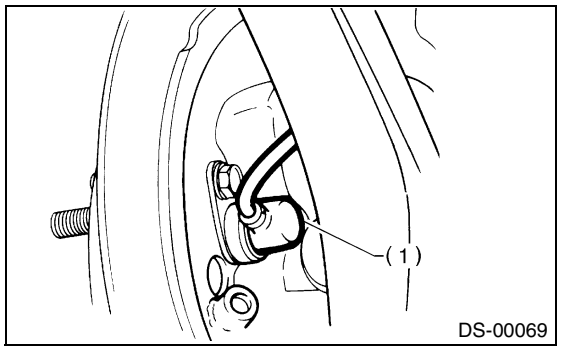
11) Disconnect the rear stabilizer from rear lateral link. Remove the bolts which secure trailing link assembly to rear housing.



12) Remove the bolts which secure lateral link assembly to rear housing.



13) Remove the rear ABS sensor from back plate.

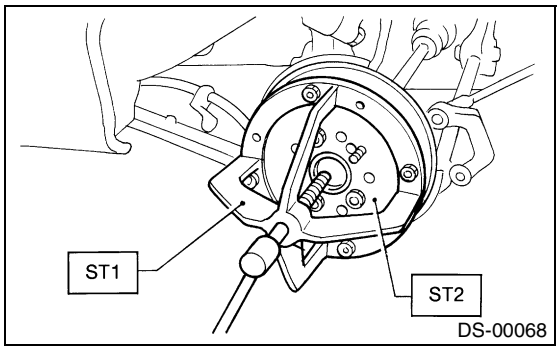


(1) ABS sensor

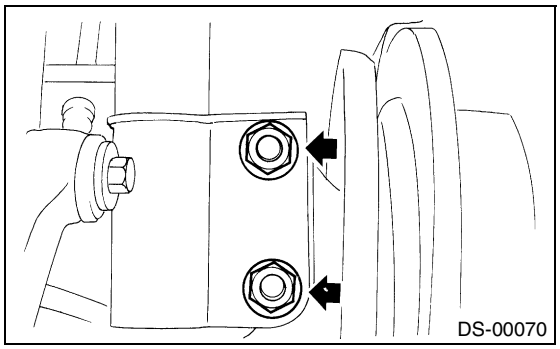
14) Disengage the BJ from housing splines, and remove the rear drive shaft assembly.
If it is hard to remove, use the STs.

ST1	926470000	AXLE SHAFT PULLER
ST2	927140000	AXLE SHAFT PULLER PLATE

CAUTION:
• Be careful not to damage the oil seal lip when removing rear drive shaft.
• When the rear drive shaft is to be replaced, also replace the inner oil seal with a new one.



15) Remove the bolts which secure rear housing to strut, and separate the two.



B: INSTALLATION

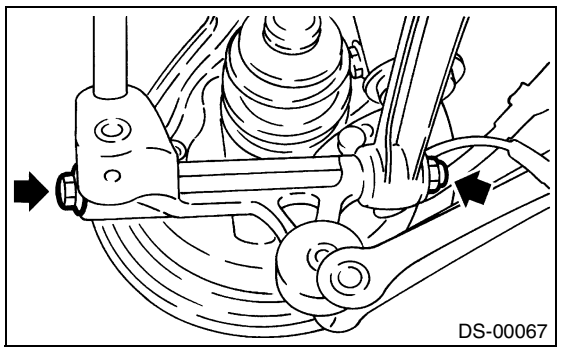
1. DISC BRAKE

1) Temporarily tighten the rear axle to strut.
2) Insert the rear drive shaft into rear axle.

NOTE:
Be careful not to damage the inner oil seal lip.

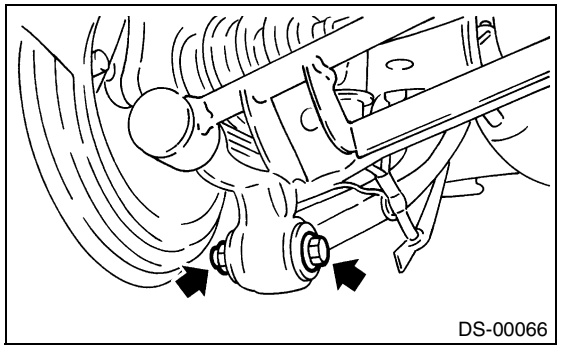
3) Temporarily tighten the axle nut.
4) Using a new self-locking nut, install the rear housing assembly and lateral link assembly.

Tightening torque:
137 N·m (14 kgf-m, 101 ft-lb)



5) Using a new self-locking nut, install the rear housing assembly and trailingl link assembly.

Tightening torque:
113 N·m (11.5 kgf-m, 83 ft-lb)



6) Tighten the rear housing assembly and strut assembly using a new self-locking nut.

Tightening torque:
196 N·m (20 kgf-m, 145 ft-lb)

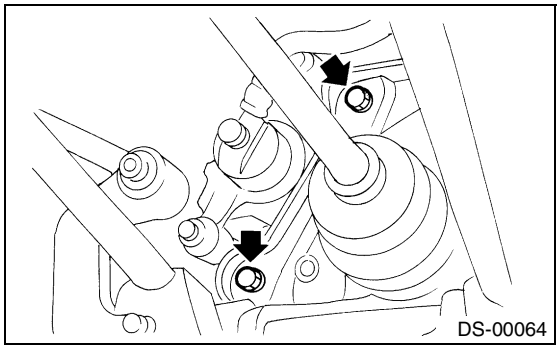
7) Using a new self-locking nut, install the rear stabilizer and rear lateral link.

Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb)

8) Connect the parking brake cable to parking brake.
9) Install the disc rotor on rear housing assembly.

10) Install the disc brake caliper on back plate.

Tightening torque:
52 N·m (5.3 kgf-m, 38.3 ft-lb)

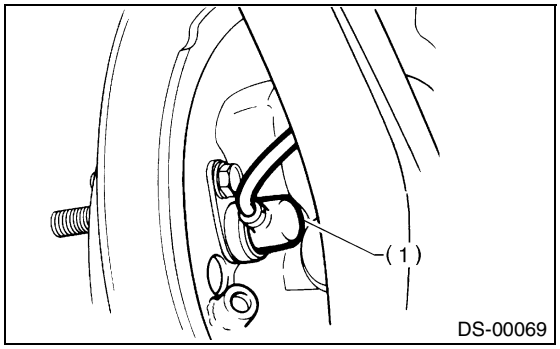


11) Adjust the parking brake lever stroke by turning adjuster.
12) Move the brake lever back to apply brakes. While depressing the brake pedal, tighten axle nut using a socket wrench. Lock the axle nut after tightening.

Tightening torque:
186 N·m (19 kgf-m, 137 ft-lb)

CAUTION:
Do not overtighten it as this may damage the wheel bearing.

13) Install rear ABS sensor.



(1) ABS sensor

14) Install the wheel, and then tighten the wheel nuts to specified torque.

Tightening torque:
88 N·m (9.0 kgf-m, 65 ft-lb)

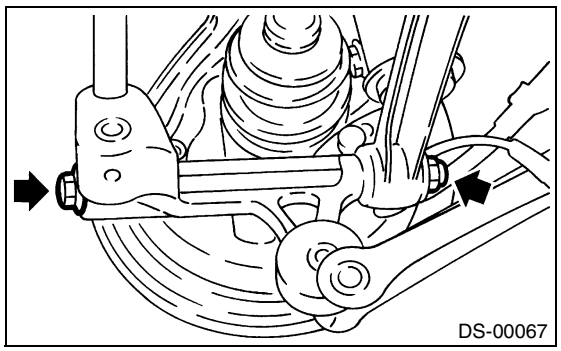
2. DRUM BRAKE

1) Temporarily tighten the rear axle to strut.
2) Insert the rear drive shaft to rear axle.

NOTE:
Be careful not to damage the inner oil seal lip.

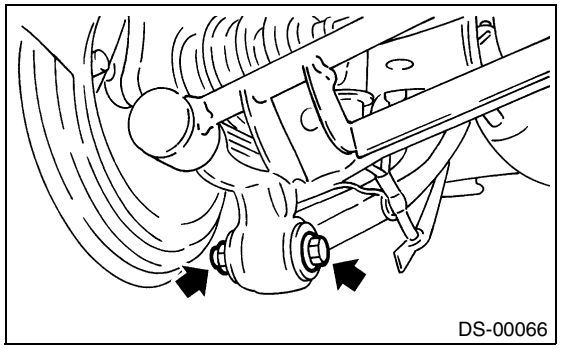
3) Temporarily tighten the axle nut.
4) Using a new self-locking nut, install the rear housing assembly and lateral link assembly.

Tightening torque:
137 N·m (14 kgf-m, 101 ft-lb)



5) Using a new self-locking nut, install the rear housing assembly and trailingl link assembly.

Tightening torque:
113 N·m (11.5 kgf-m, 83 ft-lb)



6) Tighten the rear housing assembly and strut assembly using a new self-locking nut.

Tightening torque:
196 N·m (20 kgf-m, 145 ft-lb)

7) Using a new self-locking nut, install the rear stabilizer and rear lateral link.

Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb)

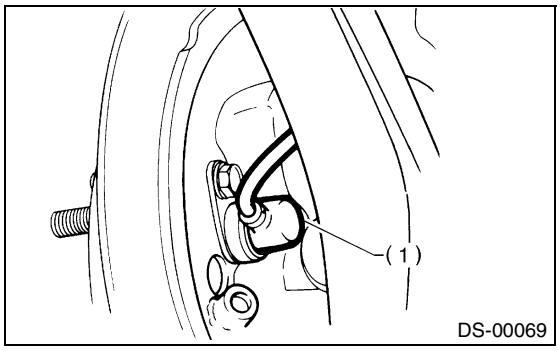
8) Connect the parking brake cable to parking brake.
9) Clean the brake pipe connection. Using a flare-nut wrench, connect the brake pipe to wheel cylinder.
10) Connect the parking brake cable to lever.
11) Install the brake drum on rear housing assembly.

12) Bleed the air from brake system. <Ref. to BR-43, REPLACEMENT, Brake Fluid.>
13) Adjust the parking brake lever stroke by turning adjuster.
14) Move the brake lever back to apply brakes. While depressing the brake pedal, tighten axle nut using a socket wrench. Lock the axle nut after tightening.

Tightening torque:
186 N·m (19 kgf-m, 137 ft-lb)

CAUTION:
Do not overtighten it as this may damage the wheel bearing.

15) Connect the rear ABS sensor to back plate.



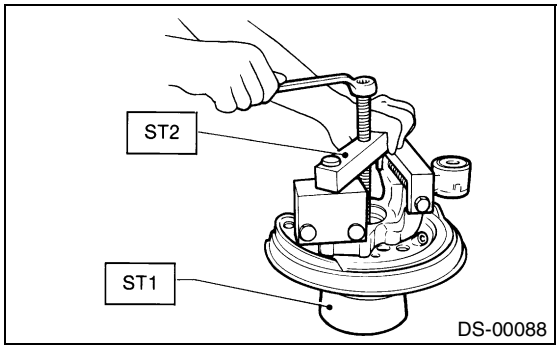
(1) ABS sensor

16) Install the wheel, and then tighten the wheel nuts to specified torque.

Tightening torque:
88 N·m (9.0 kgf-m, 65 ft-lb)

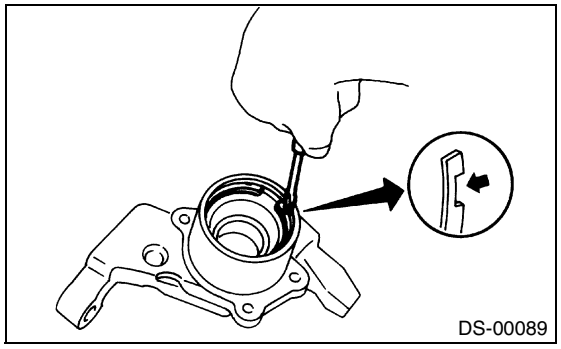
C: DISASSEMBLY

1) Using the ST1 and ST2, remove the hub from rear housing.
ST1 927080000 HUB STAND
ST2 927420000 HUB REMOVER

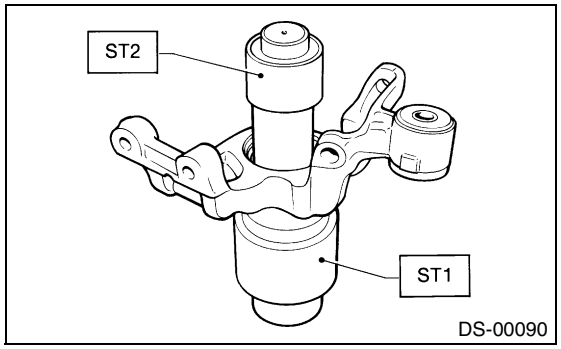


2) Remove the back plate from rear housing.
3) Using a standard screwdriver, remove the outer and inner oil seals.
4) Using a flat tip screwdriver, remove the snap ring.

NOTE:
Be careful not to damage the housing at removal.

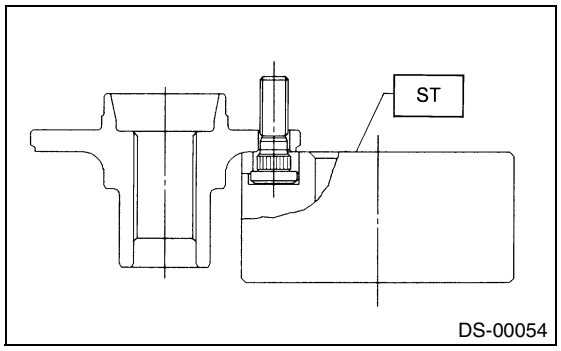


5) Using the ST1 and ST2, remove the bearing by pressing inner race.
ST1 927430000 HOUSING STAND
ST2 927440000 BEARING REMOVER



6) Remove the tone wheel bolts, and then remove the tone wheel from hub (only vehicle equipped with ABS).
7) Using the ST, press the hub bolt out.
ST 927080000 HUB STAND

CAUTION:
Be careful not to hammer the hub bolts. This may deform the hub.



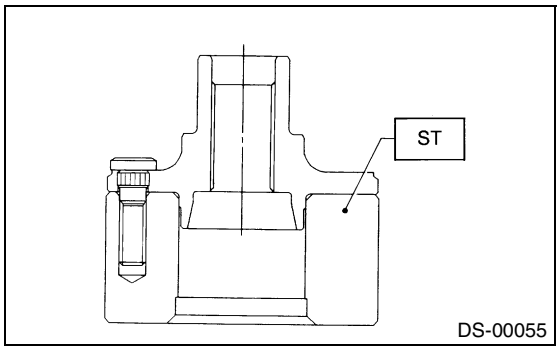
D: ASSEMBLY

NOTE:
When the hub is to be removed from housing, replace the bearing set and oil seal with new ones.

1) Using the ST, press the new hub bolt into place.

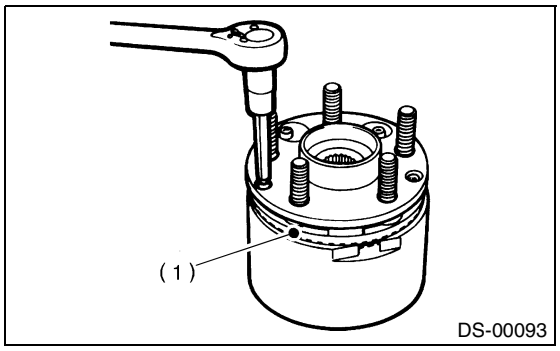
NOTE:
- Ensure the hub bolt closely contacts hub.
- Use a 12 mm (0.47 in) hole in the ST to prevent the hub bolt from tilting during installation.

ST 927080000 HUB STAND



2) Remove foreign particles (dust, rust, etc.) from mating surfaces of the hub tone wheel, and then install the tone wheel to hub (only vehicle equipped with ABS).

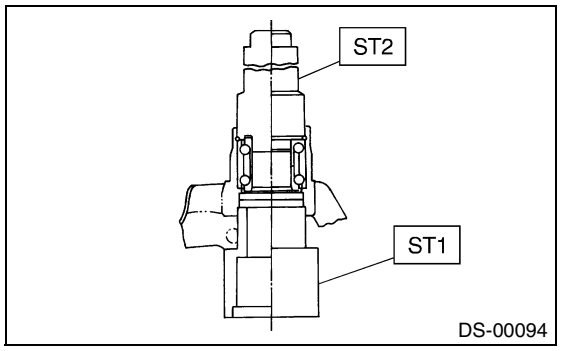
NOTE:
- Ensure the tone wheel closely contacts hub.
- Be careful not to damage the tone wheel teeth.



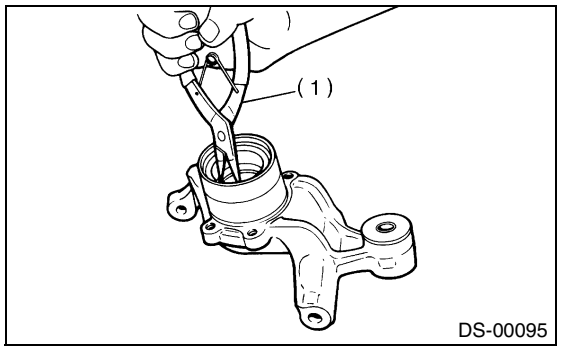
(1) Tone wheel

3) Clean the housing interior completely. Using the ST1 and ST2, press the bearing into housing.
ST1 927430000 HOUSING STAND
ST2 927440000 BEARING REMOVER

NOTE:
- Always press the outer race when installing bearing.
- Be careful not to remove the plastic lock from inner race when installing bearing.

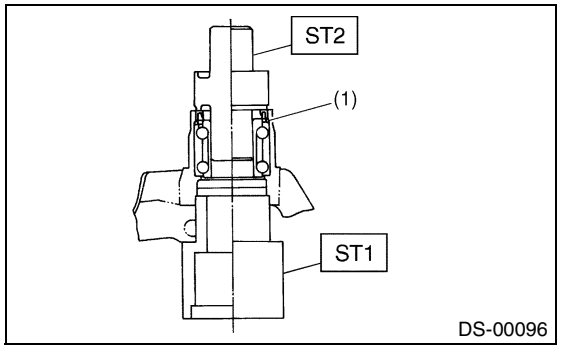


4) Using pliers, install the snap ring firmly.



(1) Pliers

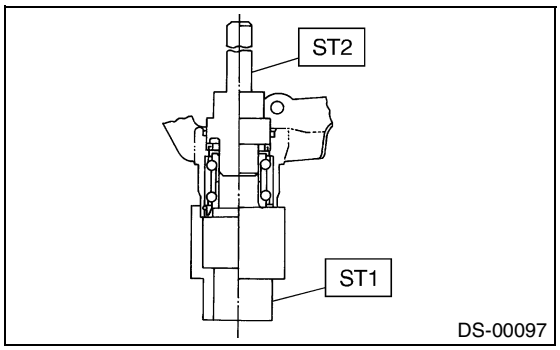
5) Using the ST1 and ST2, press the outer oil seal unit it comes in contact with snap ring.
ST1 927430000 HOUSING STAND
ST2 927460000 OIL SEAL INSTALLER



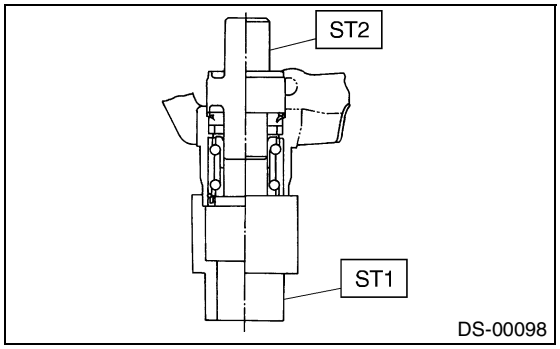
(1) Snap ring

6) Invert both ST1 and housing.

7) Using the ST2, press the inner oil seal into housing until it touches bottom.
ST1 927430000 HOUSING STAND
ST2 927460000 OIL SEAL INSTALLER



8) Using the ST1 and ST2, press the sub seal into place.
ST1 927430000 HOUSING STAND
ST2 927460000 OIL SEAL INSTALLER



9) Apply sufficient grease to oil seal lip.

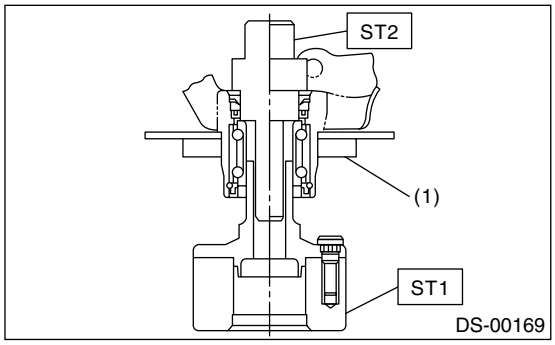
Specified grease:
SHELL 6459N

NOTE:
• If specified grease is not available, remove the bearing grease and apply Auto Rex A instead.
• Do not mix different types of grease.

10) Install the back plate to rear housing.

Tightening torque:
52 N·m (5.3 kgf-m, 38.3 ft-lb)

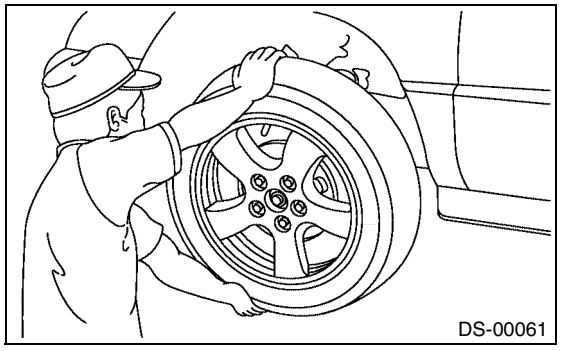
11) Using the ST1 and ST2, press the bearing into hub.
ST1 927080000 HUB STAND
ST2 927450000 HUB INSTALLER



(1) Back plate

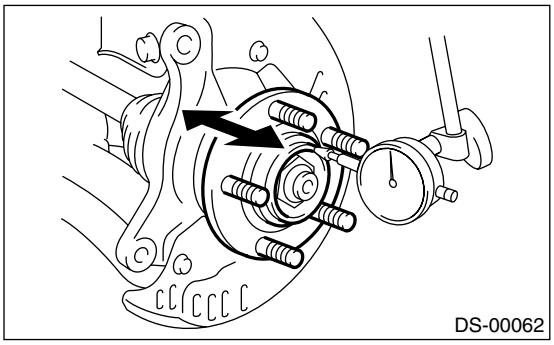
E: INSPECTION

1) Moving the front tire up and down by hand, check that there is no backlash in the bearing, and check that the wheel rotates smoothly.



2) Inspect the lean of axis direction using a dial gauge. Replace the hub bearing if the load range exceed the limitation.

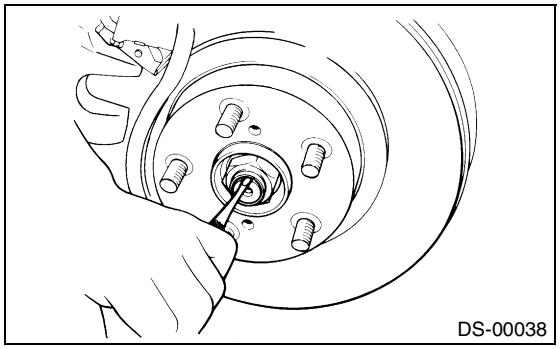
Limit:
Maximum: 0.05mm (0.00020 in)



5. Front Drive Shaft

A: REMOVAL

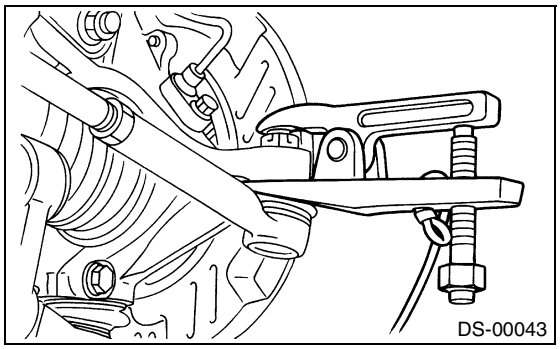
1) Lift-up the vehicle, and then remove the front wheels.
2) Drain the transmission oil.
3) Unlock the axle nut.



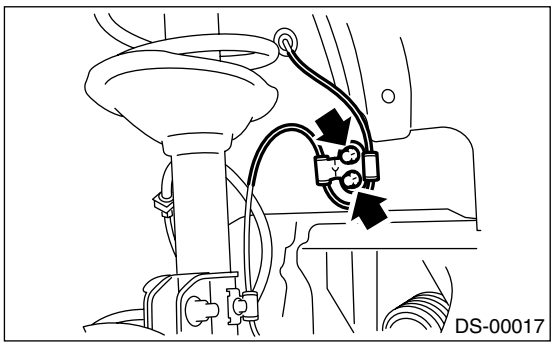
4) Remove the axle nut using a socket wrench with brake pedal depressed.

CAUTION:
Remove the axle nut with vehicle weight not applied on axle.

5) Remove the cotter pin and castle nut. Remove the tie-rod end using a puller.

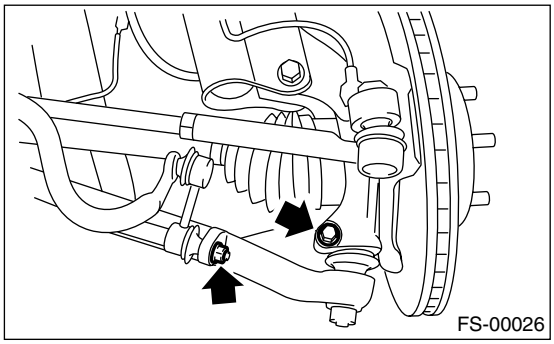


6) Remove the ABS sensor bracket.



7) Remove the front stabilizer link from transverse link.

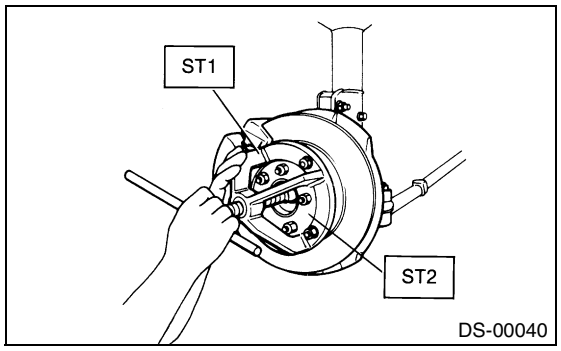
8) Remove the bolt securing ball joint, and then remove the transverse link from front housing.



9) Remove the front drive shaft from front axle. If it is hard to remove, remove the brake disk rotor using the ST1 and ST2.

ST1	926470000	AXLE SHAFT PULLER
ST2	927140000	AXLE SHAFT PULLER PLATE

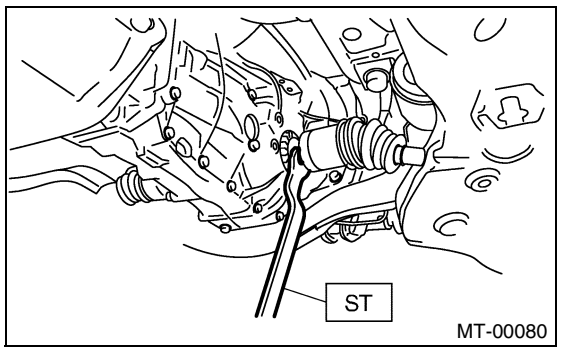
CAUTION:
• Do not hammer the drive shaft when removing.
• Do not damage the oil seal and tone wheel.



10) Remove the front drive shaft from transmission using ST.

ST	28399SA000	DRIVE SHAFT REMOVER

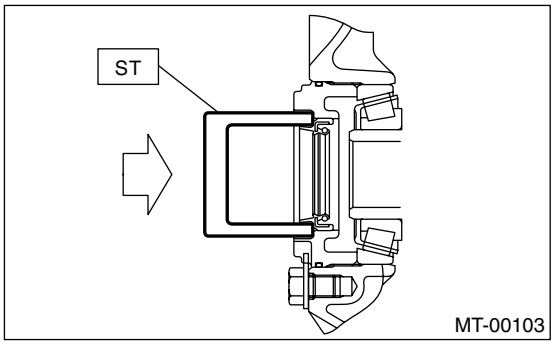
NOTE:
• ST usage is different depending on type of transmission equipped.
• For AT vehicles, face the “AT” letter stamped on ST to transmission side. For MT vehicles, face the “MT” letter stamped on ST to transmission side.
• Do not contact the ST to holder area.



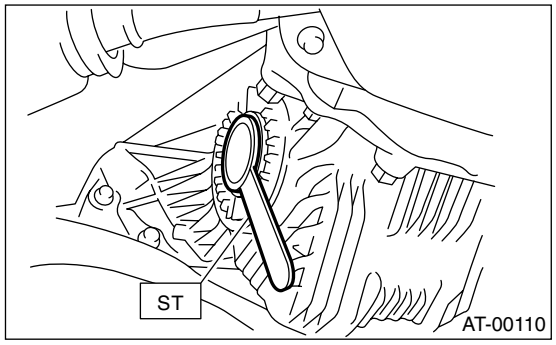
B: INSTALLATION

1) Using the ST, replace the differential side retainer oil seal with a new one.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:
Be sure to replace the oil seal with a new one when removing drive shaft.



2) Insert the front drive shaft into front axle.
3) Temporarily tighten the axle nut.
4) Install the front drive shaft to transmission using ST.
ST 28399SA010 OIL SEAL PROTECTOR

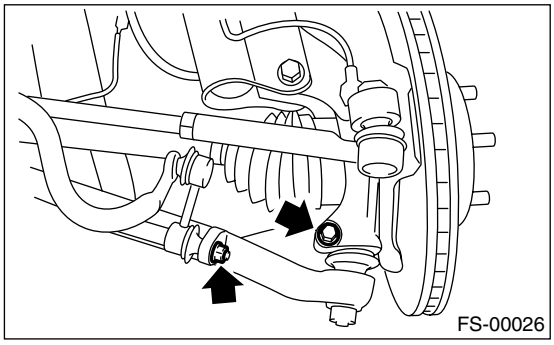


5) Install the ball joint to front axle.

Tightening torque (self-locking nut):
50 N·m (5.1 kgf-m, 37 ft-lb)

6) Install the stabilizer link.

Tightening torque (self-locking nut):
45 N·m (4.6 kgf-m, 33 ft-lb)

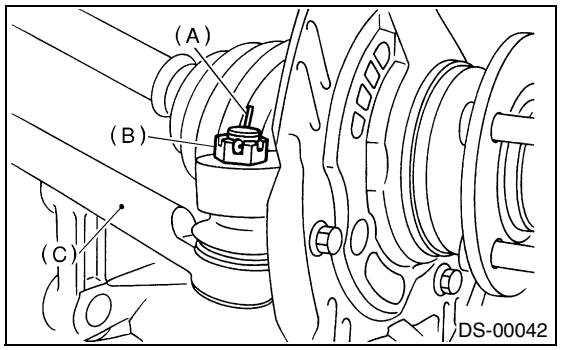


7) Install the tie-rod end.

Tightening torque (self-locking nut):
27 N·m (2.75 kgf-m, 19.9 ft-lb)

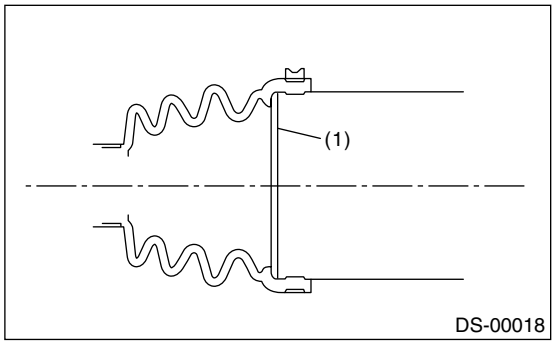
CAUTION:
When connecting, do not hit the cap at bottom of tie-rod with hammer.

8) Tighten the castle nut to the specified torque and tighten further within 60° until pin hole is aligned with the slot in nut. Bend the cotter pin to lock.



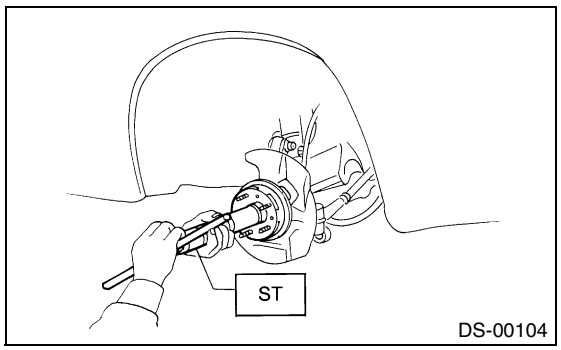
(A) Cotter pin
(B) Castle nut
(C) Tie-rod end

9) Make sure the AARi retainer is in proper position.



(1) Retainer

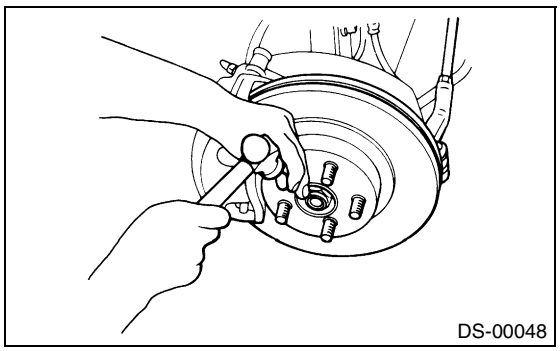
10) Using the ST1 and ST2, pull the front drive shaft into place.
ST1 922431000 AXLE SHAFT INSTALLER
ST2 927390000 ADAPTER



11) Tighten a new axle nut to the specified torque with brake pedal depressed.

Tightening torque:
186 N·m (19 kgf-m, 137 ft-lb)

12) Lock the axle nut.


DS-00048

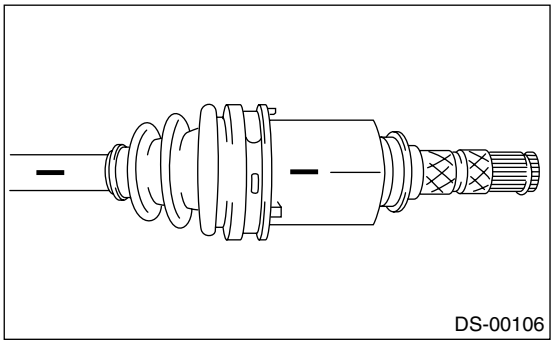
13) Install the ABS sensor bracket.

Tightening torque:
32 N·m (3.3 kgf-m, 24 ft-lb)

14) Add the transmission oil.
15) Install the wheel.

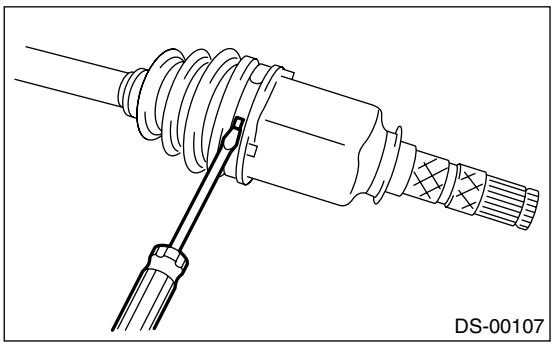
C: DISASSEMBLY

1) Place alignment marks on the shaft and outer race.

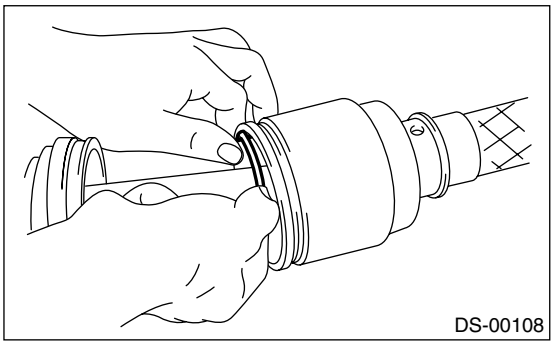

DS-00106

2) Remove the AAR boot band and boot.

NOTE:
Be careful not to damage the boot.


DS-00107

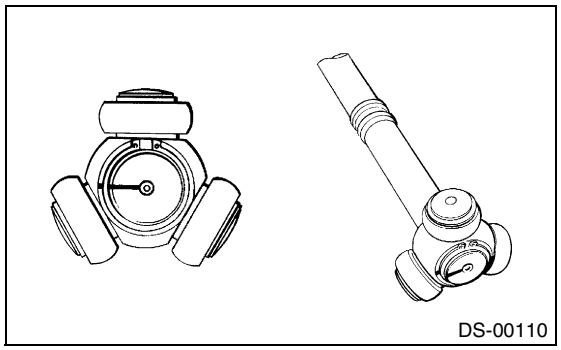
3) Remove the retainer from AAR outer race.


DS-00108

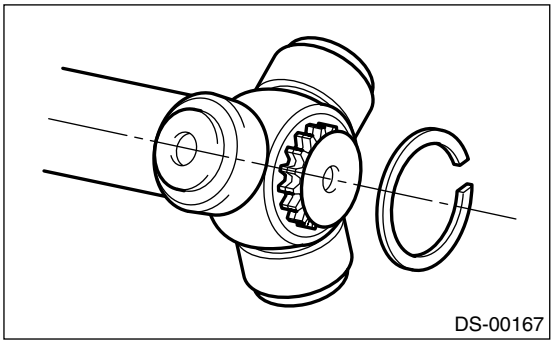
4) Remove the AAR outer race from shaft assembly.
5) Wipe off the grease.

NOTE:
The grease is a special grease. Do not confuse with other greases.

6) Place an alignment mark on the trunnion and shaft.


DS-00110

7) Remove the snap ring and trunnion.


DS-00167

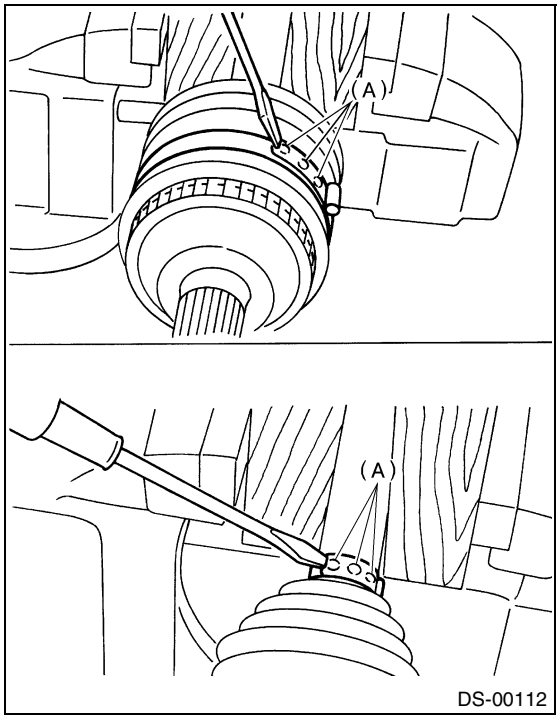
8) Remove the spider.

NOTE:
Be sure to wrap the shaft splines with vinyl tape to prevent boot from scratches.

9) Remove the AAR boot.
10) Place the drive shaft in a vise between wooden blocks.

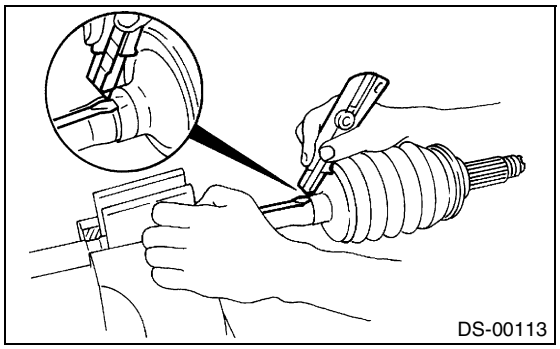
NOTE:
Do not place the drive shaft directly in the vise; use wooden block.

11) Raise the boot band claws by means of screwdriver and hammer.



(A) Boot band claws

12) Cut and remove the boot.



13) Hit the AC joint inner race with hammer to remove AC joint from shaft.

D: ASSEMBLY

NOTE:
Use specified grease.

AC side:
HTBJ GREASE (Part No. 28395SA010)

AAR side:
ONE LUBER C GREASE (Part No. 28395SA000)

1) Place the AC boot and small boot band on AC side of shaft.

NOTE:
Be sure to wrap the shaft splines with vinyl tape to prevent boot from scratches.

2) Place the drive shaft in a vise.

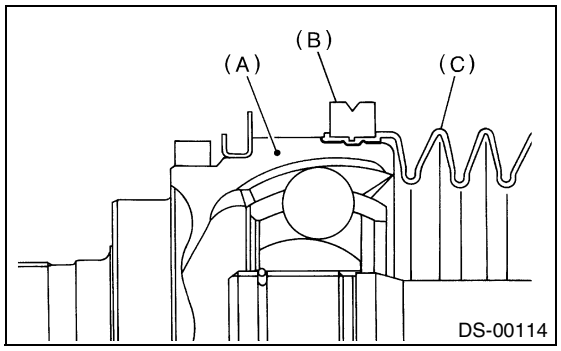
NOTE:
Do not place the drive shaft directly in the vise; use wooden blocks.

3) Apply a coat of specified grease [80 to 85 g (2.82 to 3.0 oz)] to AC.

4) Apply an even coat of specified grease [20 to 30 g (0.71 to 1.06 oz)] to the entire inner surface of boot. Also apply grease to the shaft.

NOTE:
The inside of the larger end of AC boot and boot groove shall be cleaned so as to be free from grease and other substances.

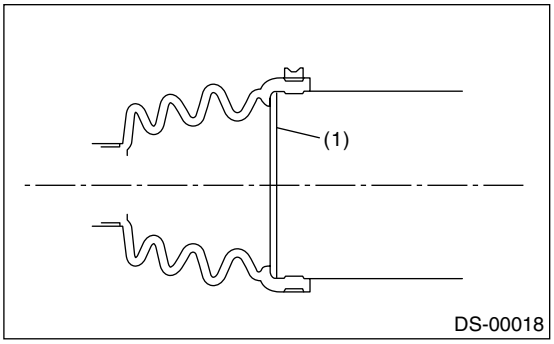
5) Install the boot projecting portion to AC groove.



(A) AC
(B) Large boot band
(C) Boot

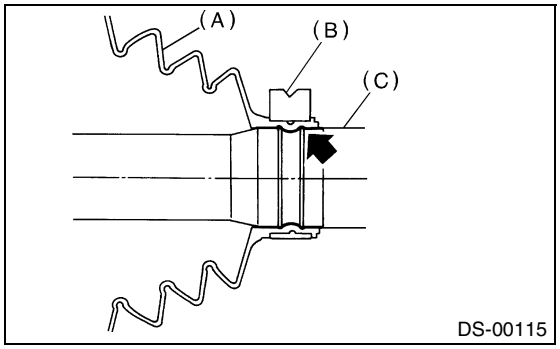
6) Set the large boot band in place.

NOTE:
Make sure to recognize the position of retainer.



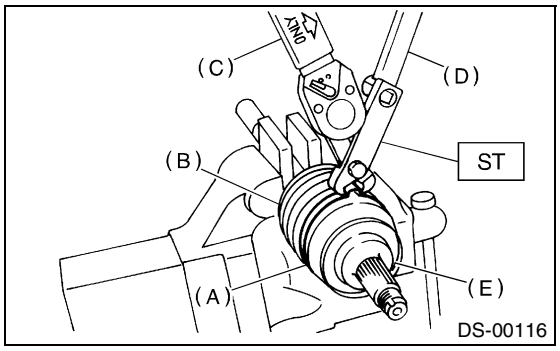
(1) Retainer

7) Install the boot projecting portion to shaft groove.



(A) Boot
(B) Small boot band
(C) Shaft

8) Tighten the boot bands using ST, torque wrench and socket flex handle.
ST 28099AC000 BOOT BAND PLIER

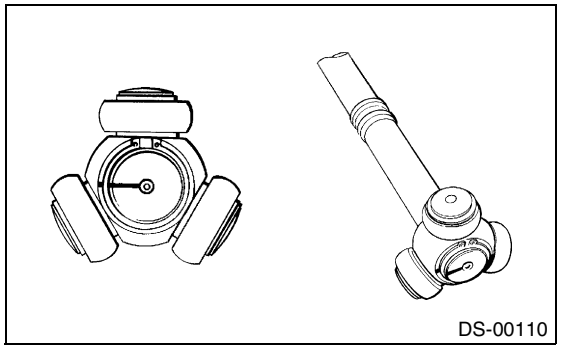


(A) Large boot band
(B) Boot
(C) Torque wrench
(D) Socket flex handle
(E) AC

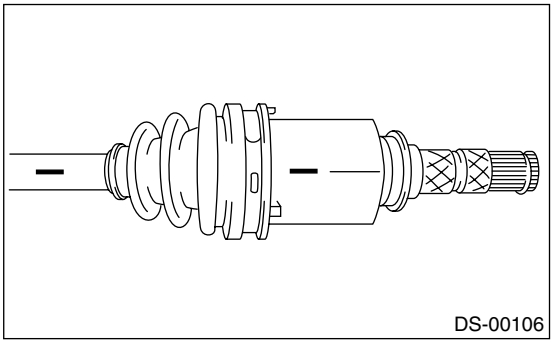
Caulking portion clearance of boot band:
Large boot band
1.3 mm (0.051 in) or more
Small boot band
1.3 mm (0.051 in) or more

9) Fit the AAR boot and retainer to shaft, and then position to center of shaft.

10) Align the alignment marks, and then install the trunnion on shaft.



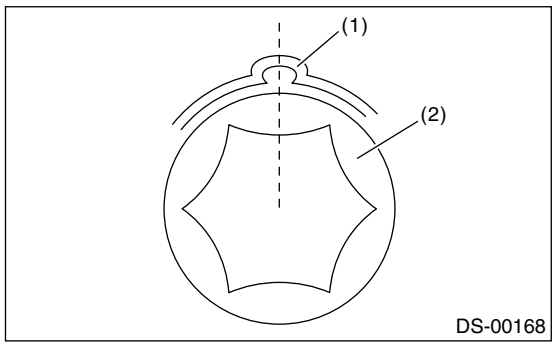
11) Fill 100 to 110 g (3.53 to 3.88 oz) of specified grease into the interior of AAR outer race.
12) Apply a coat of specified grease to the free ring and trunnion.
13) Align the alignment marks on shaft and outer race, and then install the outer race.



14) Apply an even coat of the specified grease 30 to 40 g (1.06 to 1.41 oz) to the entire inner surface of boot.
15) Install the AAR boot taking care not to twist it.

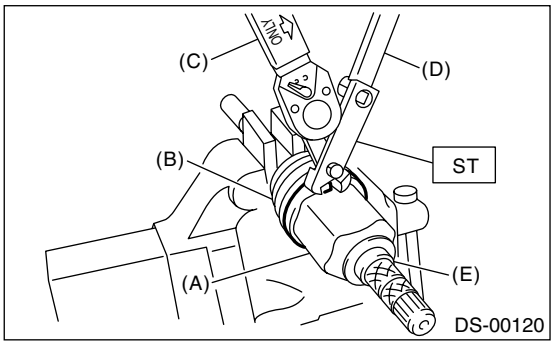
NOTE:
• The inside of the larger end of AAR boot and boot groove shall be cleaned so as to be free from grease and other substances.
• When installing the AAR boot, position the outer race of AAR at center of its travel.

16) Install a new large boot band and small boot band in specified position. Install the caulking part of large boot band and boot as shown in the figure.



(A) Caulking part of boot band
(B) Boot

17) Using the ST, torque wrench and socket flex handle, tighten the boot band.
ST 28099AC000 BOOT BAND PLIERS



(A) Large boot band
(B) Boot
(C) Torque wrench
(D) Socket flex handle
(E) AAR

Caulking portion clearance of boot band:
Large boot band
1 mm (0.04 in) or less
Small boot band
1 mm (0.04 in) or less

18) Extend and retract the AAR to provide equal grease coating.

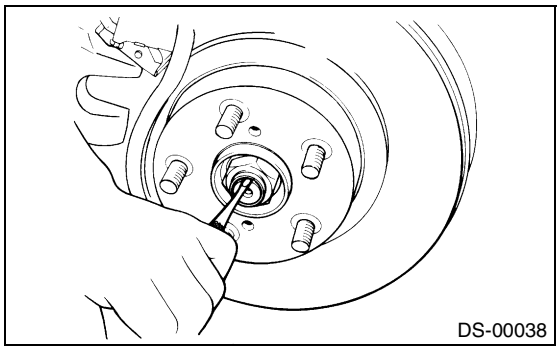
E: INSPECTION

Check the removed parts for damage, wear, corrosion etc. If faulty, repair or replace.
1) AAR
Check seizure, corrosion, damage and excessive play.
2) Shaft
Check excessive bending, twisting, damage and wear.
3) AC
Check seizure, corrosion, damage and excessive play.
4) Boot
Check for wear, warping, breakage or scratches.
5) Grease
Check for discoloration or fluidity.

6. Rear Drive Shaft

A: REMOVAL

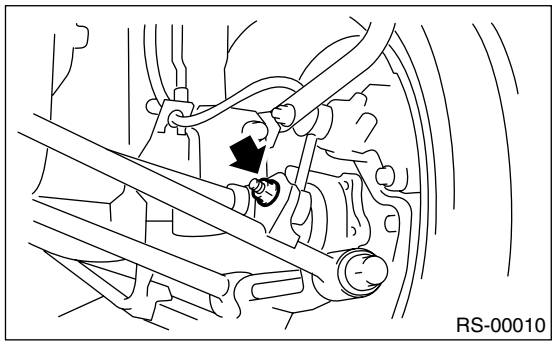
1) Disconnect the ground cable from battery.
2) Lift-up the vehicle, and remove the rear wheel.
3) Unlock the axle nut.



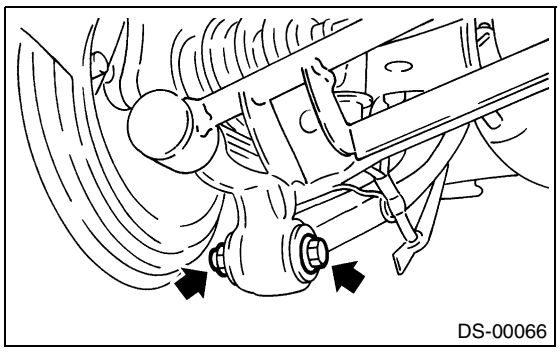
4) Remove the axle nut using a socket wrench with brake pedal depressed.

CAUTION:
Remove the axle nut with vehicle weight not applied on axle.

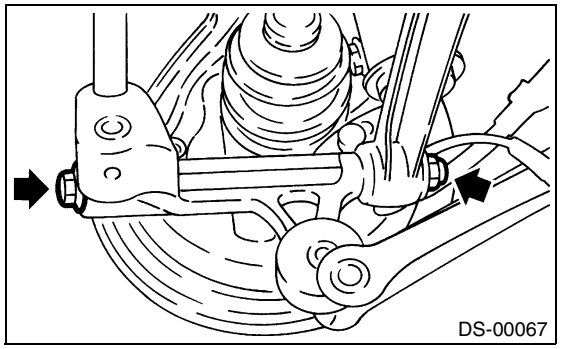
5) Disconnect the stabilizer link.



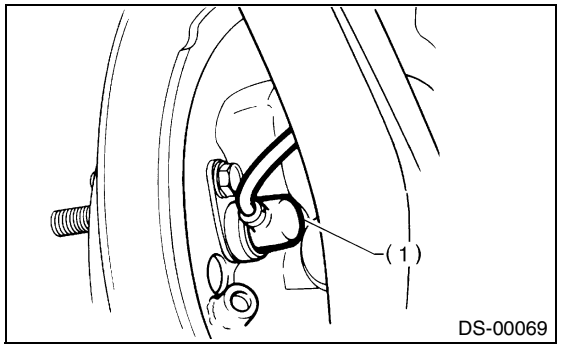
6) Remove the bolt which secures trailing link to housing.



7) Remove the bolts which secure front lateral link and rear lateral link to housing.



8) Remove the rear ABS sensor from back plate.

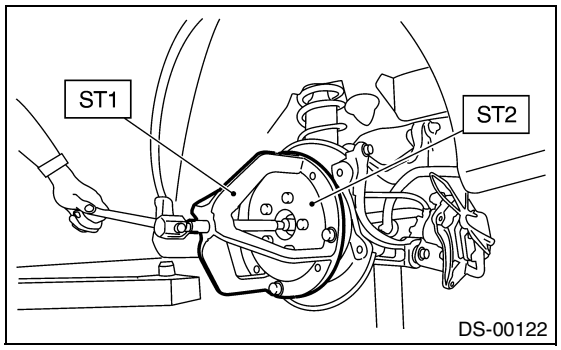


(1) ABS sensor

9) Remove the rear drive shaft from rear axle. If it is hard to remove, remove the brake disk rotor using the ST1 and ST2.

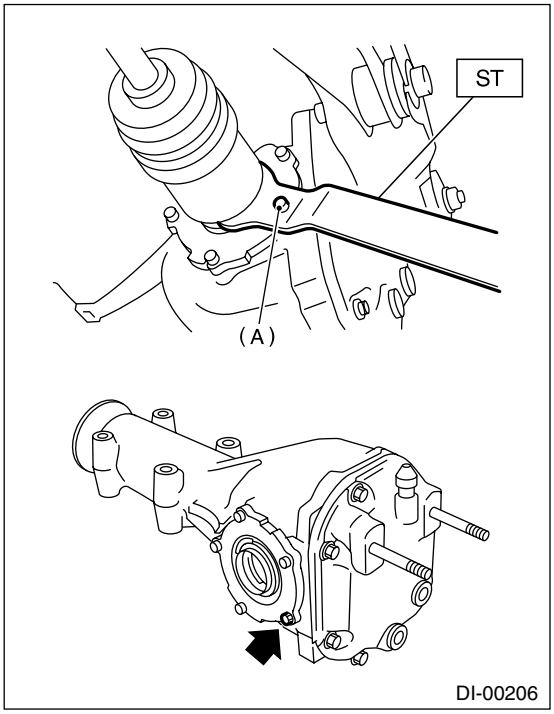
ST1	926470000	AXLE SHAFT PULLER
ST2	927140000	AXLE SHAFT PULLER PLATE

CAUTION:
- **Do not hammer the drive shaft when removing.**
- **Do not damage the oil seal and tone wheel.**



10) Remove the rear drive shaft from rear differential using ST.
ST 208099PA100 DRIVE SHAFT REMOVER

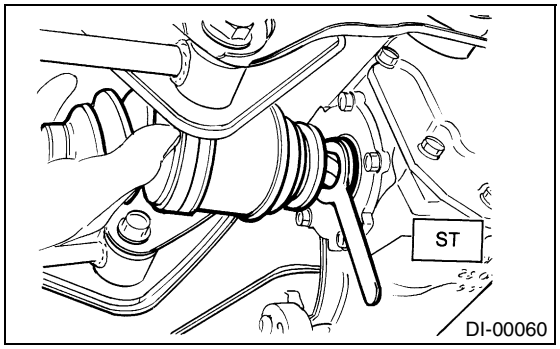
NOTE:
Fit ST to the bolt (A) as shown in the figure to avoid damage on the side bearing retainer.



(A) Bolt

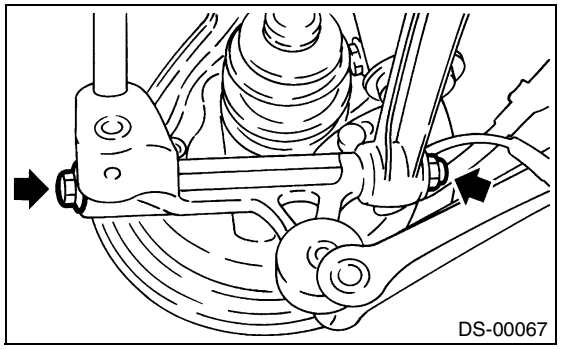
B: INSTALLATION

1) Insert the rear drive shaft into rear axle.
2) Temporarily tighten the axle nut.
3) Install the rear drive shaft to rear differential using ST.
ST 28099PA090 OIL SEAL PROTECTOR



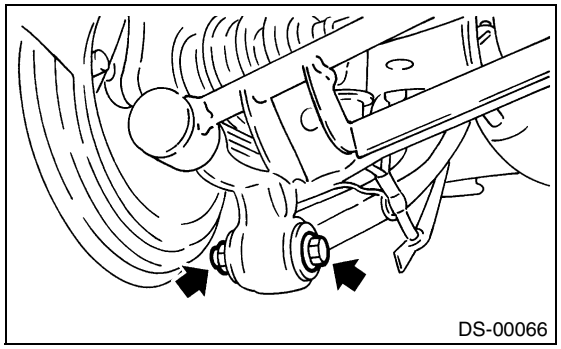
4) Attach the front lateral link and rear lateral link to housing using a new self-locking nuts.

Tightening torque:
137 N·m (14 kgf-m, 101 ft-lb)



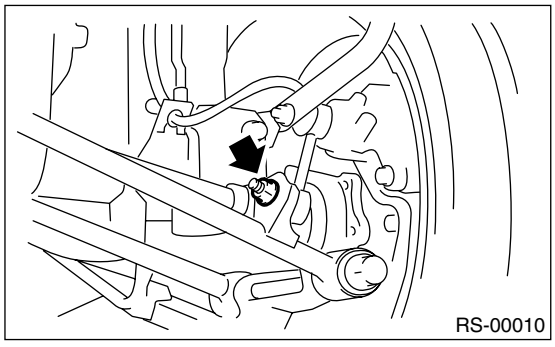
5) Attach the trailing link to housing using a new self-locking nut.

Tightening torque:
113 N·m (11.5 kgf-m, 83 ft-lb)



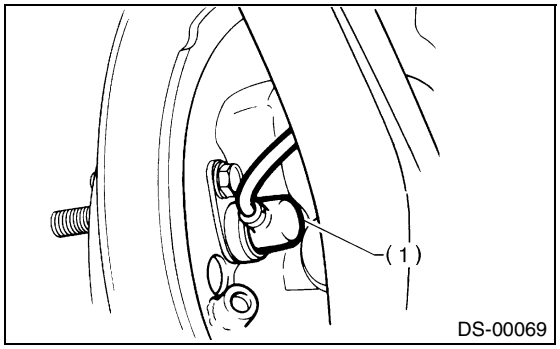
6) Install the stabilizer link.

Tightening torque:
45 N·m (4.6 kgf-m, 33 ft-lb)



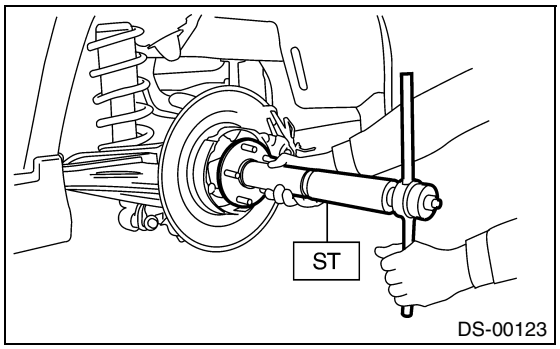
7) Install the ABS sensor.

Tightening torque:
32 N·m (3.3 kgf-m, 24 ft-lb)



(A) ABS sensor

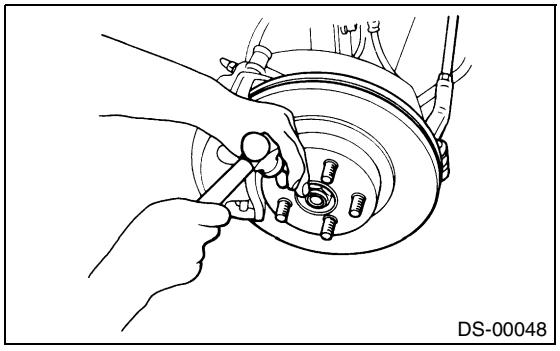
8) Using the ST1 and ST2, pull the rear drive shaft into place.
ST1 922431000 AXLE SHAFT INSTALLER
ST2 927390000 ADAPTER



9) Tighten a new axle nut to the specified torque with brake pedal depressed.

Tightening torque:
186 N·m (19 kgf-m, 137 ft-lb)

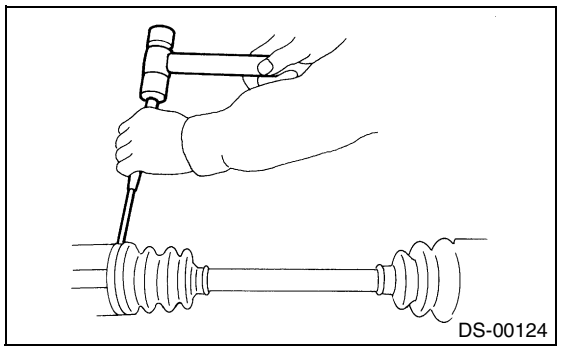
10) Lock the axle nut.



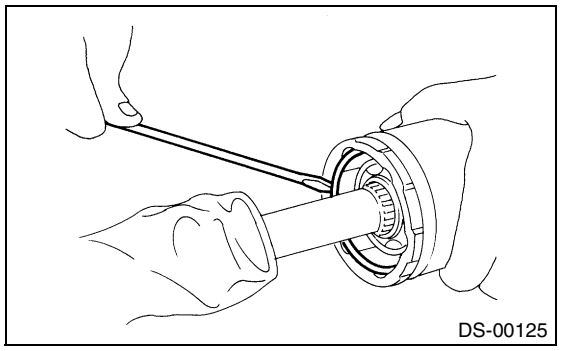
11) Install the wheel.

C: DISASSEMBLY

1) Straighten the bent claw of larger end of DOJ boot.
2) Loosen the band by means of screwdriver or pliers with care of not damaging boot.



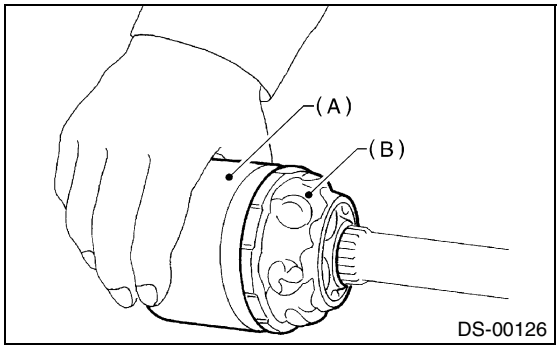
3) Remove the boot band on the small end of DOJ boot in the same manner.
4) Remove the larger end of DOJ boot from DOJ outer race.
5) Pry and remove the round circlip located at neck of DOJ outer race with a screwdriver.



6) Take out the DOJ outer race from shaft assembly.

7) Wipe off the grease, and then take out the balls.

NOTE:
• The grease is a special grease (grease for constant velocity joint). Do not confuse with other greases.
• Disassemble with exercising care not to lose balls (6 pcs).



(A) Outer race
(B) Grease

8) To remove the cage from inner race, turn the cage by a half pitch to the track groove of inner race and shift the cage.
9) Remove the snap ring, which fixes inner race to shaft, by using pliers.
10) Take out the DOJ inner race.
11) Take off the DOJ cage from shaft and remove DOJ boot.
12) Wrap the shaft splines with vinyl tape.
13) Remove the BJ boot in same procedure as DOJ boot.
14) Thus, disassembly of axle is completed, but the BJ is unable to be disassembled.

D: ASSEMBLY

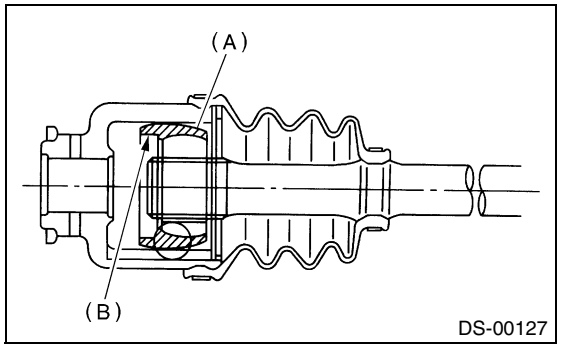
NOTE:
Use specified grease.

BJ side:
Molylex No. 2 (Part No. 723223010)

DOJ side:
VU-3A702 (Yellow) (Part No. 23223GA050)

1) Install the BJ boot in specified position, and fill it with 60 to 70 g (2.12 to 2.47 oz) of specified grease.
2) Place the DOJ boot at the center of shaft.
3) Wrap the shaft splines with vinyl tape.
4) Insert the DOJ cage onto shaft.

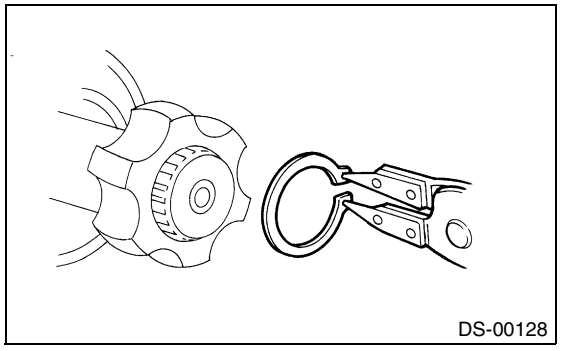
NOTE:
Insert the cage with cut-out portion facing the shaft end, since the cage has an orientation.



(A) Cage
(B) Cut-out portion

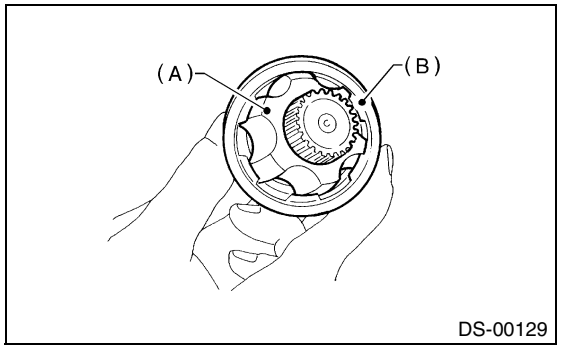
5) Install the DOJ inner race on shaft and fit snap ring with pliers.

NOTE:
Confirm that the snap ring is completely fitted in shaft groove.



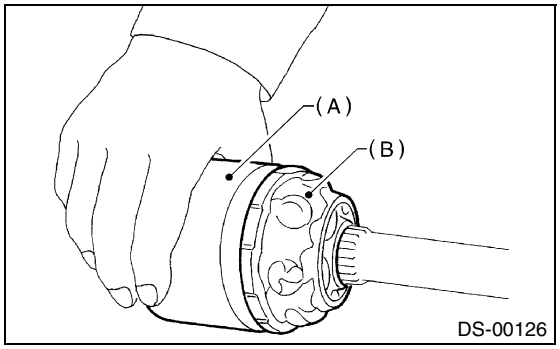
6) Install the cage, which was previously fitted, to inner race fixed upon shaft.

NOTE:
Fit the cage with protruded part aligned with the track on inner race, and then turn by a half pitch.



(A) Inner race
(B) Cage

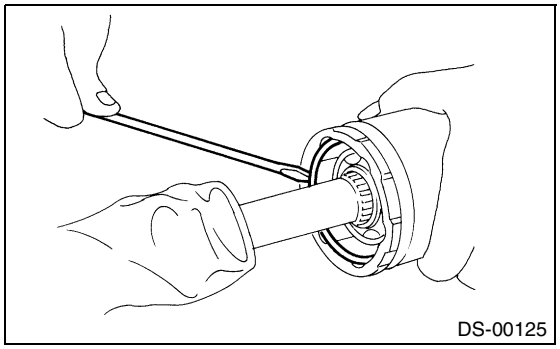
7) Fill 80 to 90 g (2.82 to 3.17 oz) of specified grease into the interior of DOJ outer race.
8) Apply a coat of specified grease to the cage pocket and six balls.
9) Insert six balls into the cage pocket.
10) Align the outer race track and ball positions and place in the part where shaft, inner race, cage and balls are previously installed, and then fit outer race.



(A) Outer race
(B) Grease

11) Install the circlip in the groove on DOJ outer race.

NOTE:
• Assure that the balls, cage and inner race are completely fitted in the outer race of DOJ.
• Exercise care not to place the matched position of circlip in the ball groove of outer race.
• Pull the shaft lightly and assure that the circlip is completely fitted in the groove.



12) Apply an even coat of the specified grease [20 to 30 g (0.71 to 1.06 oz)] to the entire inner surface of boot. Also apply grease to shaft.
13) Install the DOJ boot taking care not to twist it.

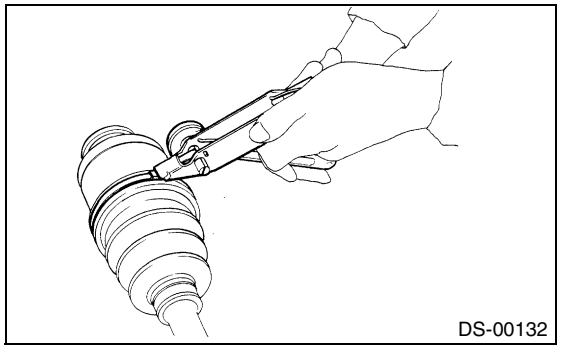
NOTE:
• The inside of the larger end of DOJ boot and boot groove shall be cleaned so as to be free from grease and other substances.
• When installing the DOJ boot, position the outer race of DOJ at center of its travel.

14) Put a new band through the clip and wind twice in alignment with band groove of boot.
15) Pinch the end of band with pliers. Hold the clip and tighten securely.

NOTE:
When tightening the boot, exercise care so that air within the boot is appropriate.

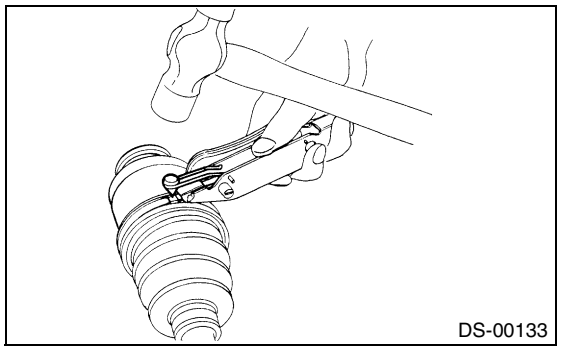
16) Tighten the band by using ST.
ST 925091000 BAND TIGHTENING TOOL

NOTE:
Tighten the band until it cannot be moved by hand.



17) Tap on the clip with the punch provided at the end of ST.
ST 925091000 BAND TIGHTENING TOOL

NOTE:
Tap to an extent that the boot underneath is not damaged.



18) Cut off the band with an allowance of about 10 mm (0.39 in) left from the clip and bend this allowance over the clip.

NOTE:
Be careful so that the end of the band is in close contact with clip.

19) Fix up the boot on BJ in the same manner.
20) Extend and retract the DOJ to provide equal grease coating.

E: INSPECTION

Check the removed parts for damage, wear, corrosion etc. If faulty, repair or replace.
1) DOJ (Double Offset Joint)
Check seizure, corrosion, damage, wear and excessive play.
2) Shaft
Check excessive bending, twisting, damage and wear.
3) BJ (Bell Joint)
Check seizure, corrosion, damage and excessive play.
4) Boot
Check for wear, warping, breakage or scratches.
5) Grease
Check for discoloration or fluidity.

7. General Diagnostic Table

A: INSPECTION

NOTE:
Vibration while cruising may be caused by an unbalanced tire, improper tire inflation pressure, improper wheel alignment, etc.

Symptom	Possible cause	Remedy
1. Vibration of propeller shaft NOTE: Vibration is caused by propeller shaft during operation and is transferred to vehicle body. Generally vibration increase in proportion to vehicle speed.	(1) Worn or damaged universal joint.	Replace.
	(2) Unbalanced propeller shaft due to bend or dent.	Replace.
	(3) Loose installation of propeller shaft.	Retighten.
	(4) Worn or damaged center bearing and damaged center mounting rubber.	Replace.
2. Tapping when starting and noise while cruising, caused by propeller shaft.	(1) Worn or damaged universal joint.	Replace.
	(2) Worn spline of sleeve yoke.	Replace.
	(3) Loose installation of propeller shaft.	Retighten.
	(4) Loose installation of joint.	Replace.
	(5) Worn or damaged center bearing and damaged center mounting rubber.	Replace.