

## V. Workshop manual of drive system

### First.Cautions

1.Matters needing attention when repairing the drive shaft

1)Non-overhaul parts such as steering knuckle are not removable.

2)Operate as much as possible on a dust-free workbench.

3)Please clean the outer surface of parts before removal and installation.

4)Be careful to avoid soiling the parts and prevent foreign matters from entering when working.

5)The disassembled parts must be carefully reassembled in the correct order. If the work is interrupted, the parts must be covered with a clean outer cover.

6)The paper cloth must be used to prevent cloth dust from adhering to the parts when using fiber woven fabric.

7)The disassembled parts (except rubber parts) should be cleaned with kerosene and blown dry or dried with paper cloth

2.Matters needing attention when inspecting, repairing,or replacing parts.

1)The fastener must be conducted with specified torque inspection after assembly.

2)The necessary alignment check must be conducted after the system is assembled.

3)The disposable parts can not be reused.

4)Conduct the thorough inspection before repairing or replacing the parts.

### General Matters:

	Items	Inner Side	Outer Side
Drive Shaft	Universal Joint Type	AAR	AC
	Maximum Allowable Angle	26°	45°

### Lubricating Grease:

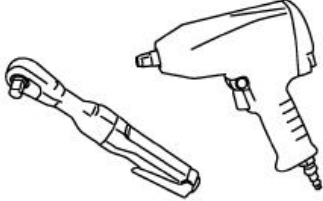
	Items	Lubricating Grease	Capacity
Drive Shaft	AAR	GRBN-1000	160±10g
	AC	Gadus 1452	145±10g

## II. Preparation Work

Removal and installation with suitable maintenance tools.

### 1、 Common Tools

Common Maintenance Tool List

No.	Tool	Outside View	Description
1	Power Tool		Installation and removal of bolts and nuts

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## III. Common Malfunction Diagnosis

Common Malfunction Diagnosis List

Malfunction Symptom	Possible Causes of Malfunction	Solution
Vehicle Deviation	Steering Knuckle Wear of Drive Shaft	Replacement
	Wheel bearing wear, friction or squeak	Replacement
	Defective front suspension and steering	Adjustment or replacement
Shock	Drive shaft wear, damage or bending	Replacement
	Abnormal sound in the drive shaft and hub spline	Replacement
	Wheel bearing wear and friction or squeak	Replacement
Loud noise	Drive shaft wear, damage or bending	Replacement
	Drive axle hub spline wear	Replacement
	Drive shaft hub spline wear	Replacement
	Wheel bearing wear, burning or abnormal noise	Replacement
	Wheel nut looseness	Adjustment or replacement

#### IV. Removal and Installation of Drive System

##### 1. Inspection on the vehicle

Confirm that whether the fixing condition (clearance) and wear condition of each component are normal or not.

##### 1) Wheel Bearing Inspection

■ Push the hub and bearing assembly axially by hand to confirm that whether the wheel bearing is loose or not. If any, it is recommended to replace or reassemble the bearing.

■ Rotate the hub to check for the abnormal noise or other abnormal condition. If any, it is recommended to replace the bearing.

##### 2. disassembly and installment

##### 1) Removal

- ① Lift the vehicle and disassemble the front tires.

Please refer to

“Wheel and Tire”

- Tightening Torque: 100Nm~120 Nm



- ② Loosen the self-locking nut of drive shaft.

- Tightening Torque: 250N·m~270N·m

- ③ Use hammer (or suitable tool) and wood block to knock

drive shaft softly, make the driving shaft move relatively to the wheel hub ring flange.

Attention:

■ The shell (universal joint units), shaft and other parts must be supported when place down the driving shaft.

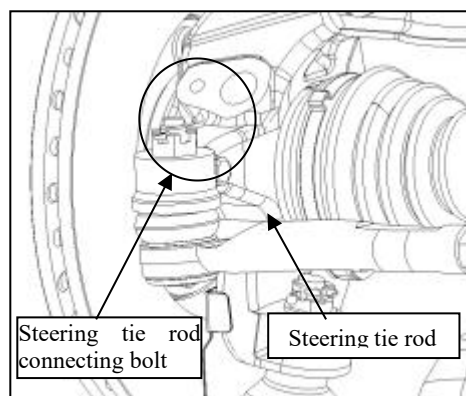
■ If the above operation can not separate the wheel hub and driving shaft, the puller can be used (or suitable tool).

- ④ remove the steering tie rod from the knuckle.

Attention:

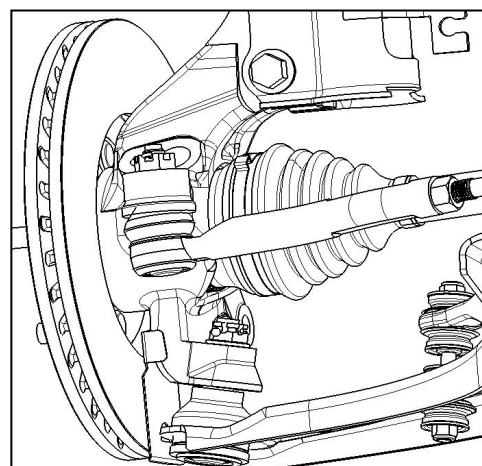
■ Must use special tool or proper tool, avoid to damage the ball joint protective sleeve.

- Tightening Torque: 50N·m~55N·m



⑤ Remove the lower swing arm from the steering knuckle.

- Tightening Torque:  $60\text{N}\cdot\text{m} \sim 72\text{N}\cdot\text{m}$



⑥ Remove the drive shaft from hub

Attention:

- The angle at which the drive shaft universal joint is placed should not be too large.

Avoid excessive stretching to prevent the ball-cage from falling off.

⑦ Insert the lever between the transmission case and universal-joint casing, separate the drive shaft from the transmission.

3) Inspection After Removal

Attention:

- Check if there is deformation, crack or other damage in the part. If there is situation above, please replace.
- Check if there is damage, large shaft clearance or distortion in tie rod outer ball joint protective sleeve. Please refer to “tie rod”.

4) Installation

■ Install in the reverse order of removal. For the tightening torque, please refer to “Maintenance Parameters”.

Note: Do not use damaged parts, use new part to replace the self-lock nut.

- When install the tie rod ball joint, fix the bolt to avoid rotating, and then tighten the nut.
- Under no-load condition, finally tighten each part that removed in front wheel hub and steering knuckle.
- Check the wheel alignment. Please refer to “Front Wheel Alignment Inspection”

## V. Removal and Installation of Driving Shaft Assembly

### 1. Replacement of driving shaft protective sleeve

1) Remove the protective sleeve clamp ring.

2) Insert the driving shaft puller(or suitable tool)

into universal joint assembly screw hole, pull out the universal

joint assembly from the shaft.

Attention:

■ If the universal joint assembly can not be pulled out,

please try after disassembling the driving shaft assembly from the vehicle.

3) Remove the snap ring from the driving shaft and take off the protective sleeve.

4) Use tissue to clean the lubricant oil on the universal joint assembly.

5) Paint the suitable amount lubricant oil in the gear type hole of the UNIVERSAL JOINT ASSY. until the lubricant oil flows out from the circular groove and gear type hole. After the lubricating grease has been smeared,

Use a rag to wipe the excurrent old lubricating grease.

6) Use adhesive tape to wreathe the spline to avoid damaging the protective sleeve.

Install the new protective sleeve and protective sleeve clamp ring on driving Drive shaft.

Attention:

■ Do not reuse the protective sleeve and protective sleeve clamp ring.

7) Disassemble the adhesive tape wreathe on shaft.

8) place the snap ring on the groove of the shaft edge. Align the intermediate axis of the shaft edge with the universal joint subassembly. Then use the snap ring to install the shaft on the universal joint subassembly.

Caution:

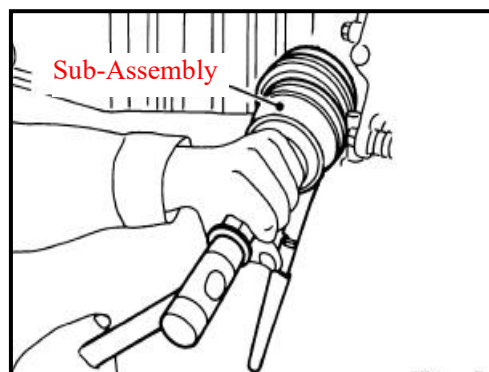
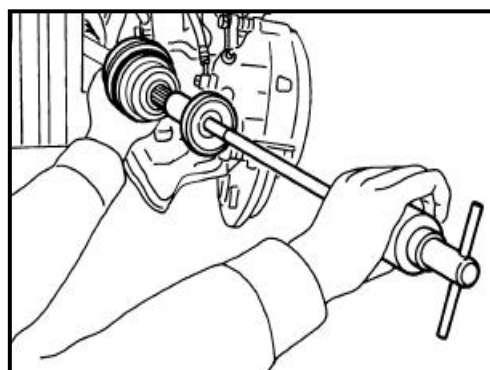
■ Please do not reuse the snap ring.

■ It is recommended to use the special tool as installing the snap ring.

17) Use rubber hammer to install the knuckle sub assembly on

On the drive shaft.

Attention:





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- Confirm that the universal joint subassembly has been properly engaged

When the drive shaft is rotated.

- 9) Spread suitable amount of lubricant oil in the protective sleeve

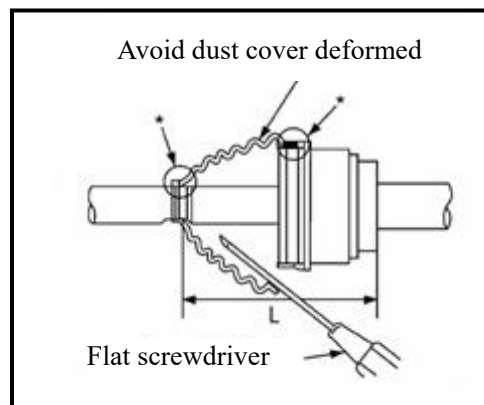
To the enclosed fitting inside.

10) Install the protective sleeve into the groove as shown in the picture.

Attention:

■ If the lubricating grease adheres to the fixing surface of protective sleeve (marked with \*), the protective sleeve may fall off. Wipe all the lubricating grease

On the surface of dirt-proof boot



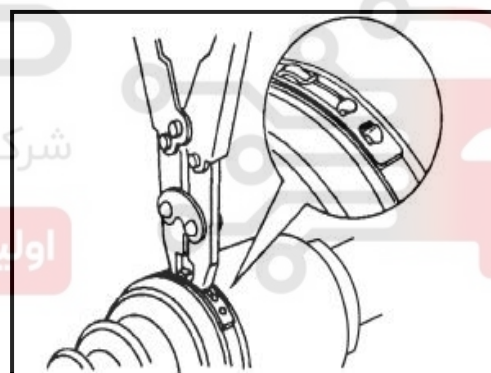
11) Insert a slotted screwdriver from the large diameter side of the protective sleeve, release the air inside, and adjust installation length of protective sleeve, and avoid deformation.

Attention:

■ If the installation length of protective sleeve is too long, it may cause The dirt-proof boot may be damaged.

■ Use a flat-blade screwdriver carefully and do not touch the

Inside of the dirt-proof boot.



12) Use tool to fasten the new protective sleeve clamp ring

Attention:

- Do not reuse the protective sleeve clamp ring.

13) Fasten the knuckle sub assembly and driving shaft, then confirm the correct position when rotating the protective sleeve.

Note: Please use the new protective sleeve clamp ring to reassemble when the protective sleeve installment position is wrong.

14) Make sure the snap ring on transmission driving axle side has already meshed completely.

15) insert the driving shaft into wheel hub and bearing assembly and fasten the driving shaft self-lock nut.

16) Install the fastening bolt and nut of damper and knuckle.

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17) Install the steering tie rod, fasten the fastening nut as the requirement of the fastening torque.

Attention:

- Fasten the bolt to avoid the rotation first and then fasten the nut when in installment.

18 install the brake caliper, fasten the brake hose. Please refer to “front brake” and “brake pipeline”.

19 install the wheel speed sensor on knuckle. Please refer to “wheel speed sensor”.

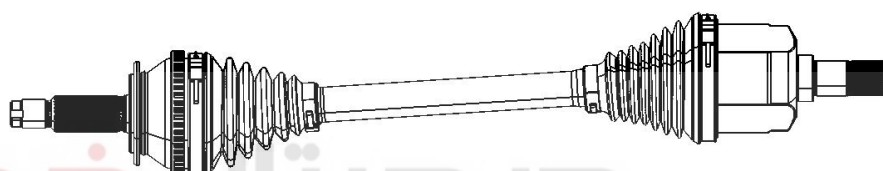
20) Fasten the driving shaft self-lock nut to standard torque.

- Tightening Torque: 250N·m~270N·m

21 install the tire and fasten as the standard torque. Maintenance parameters

### 3. Disassembly and installment

#### 1)Component



Drive Shaft Assembly Diagram

#### 2) Disassemble

① Lift the vehicle and disassemble the front tires. Please refer to “wheel and tire”.

2 disassemble the wheel speed sensor form the knuckle. Please refer to “wheel speed sensor”.

Attention:

- Please do not pull the wire harness of wheel speed sensor.

③ disassemble the front brake caliper. Please refer to chapter “front brake caliper”.

Attention:

- Do not step down the brake pedal after removing the brake caliper.

4. remove the brake disc.

5.Loosen the drive shaft self-locking nut.

⑥ Use hammer(or suitable tool) and wood block to kick the driving shaft slightly to separate the wheel hub and knuckle assembly, then disassemble driving shaft self-lock nut.

Attention:

- The shell(universal joint units), shaft and other parts must be supported when place down the driving shaft.

- If the above operation can not separate the wheel hub and driving shaft, the puller can be used(or suitable tool).

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⑦ Remove the steering tie rod ball head from the knuckle.

Attention:

■ The special tool should be used to avoid the damage of the ball head protective sleeve.

7 undo the fastening bolt and nut of the damper and knuckle.

9 remove the driving shaft from the wheel hub and bearing assembly.

⑩ Prize out the driving shaft from the transmission.

Attention:

■ The placing angle of the driving shaft knuckle should not be too large when disassemble the driving shaft. Be careful not to over-stretch the slider, so as to avoid the tripod dropping from the cage and damage the tripod.

Inspection after disassembly

1. Turn the joint to check whether the activity is flexible and whether there is serious loosening.

② Check the protective sleeve for cracks, damage and grease leaks.

3. In the event of a non-compliant condition, disassemble the drive shaft and replace the defective part.

4) Installation

Attention:

■ When install the driving shaft, replace the oil sealing at the transmission side.

① Front Drive Shaft

■ Install in the reverse order of removal. Please refer to the chapter “maintenance parameters” for tightening torque.

Note: Please do not reuse the non-reusable parts.

■ Avoid damaging the oil seal as inserting the drive shaft into the transmission side.

Attention:

■ Make sure that the snap ring on this side is completely engaged.

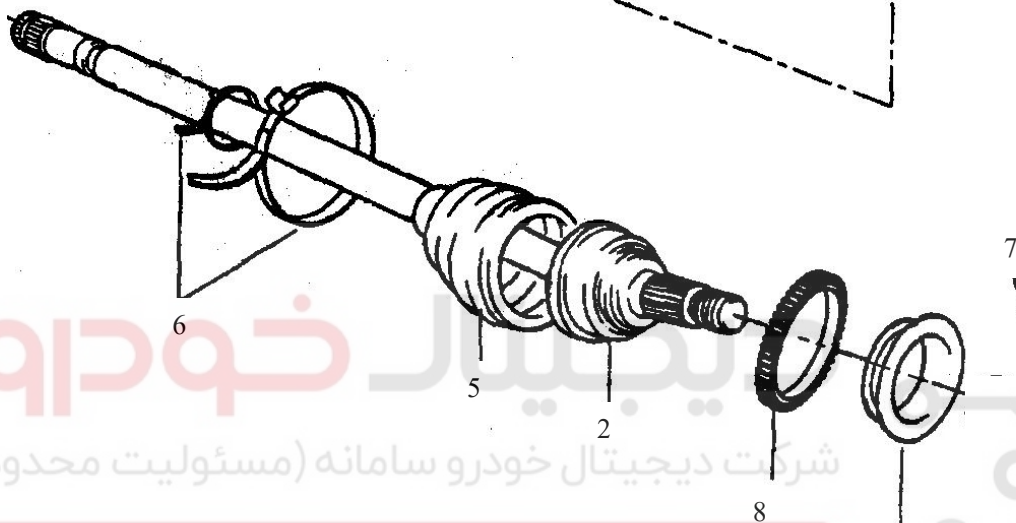
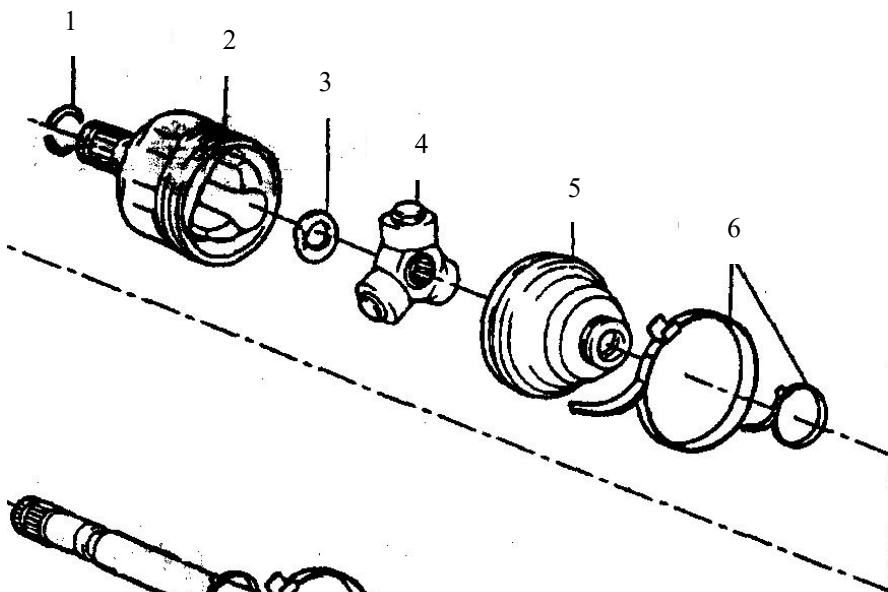
■ Smear the transmission gear oil on the drive shaft spline.

■ Make the opening of snap ring towards the downside before installing the drive shaft.

4. Disassembly and installation

1) Component





Exploded View of Drive Shaft

- 1-Snap Spring 2-Shell 3-Snap Ring 4-Tripod Assembly 5-Protective Sleeve 6-Protective Sleeve Clamp Ring
- 7-Locknut 8-Wheel Speed Sensor Gear Ring 9-Dust Cover

2) Disassembly

① Transmission Side

a. Fix the drive shaft in the caliper.

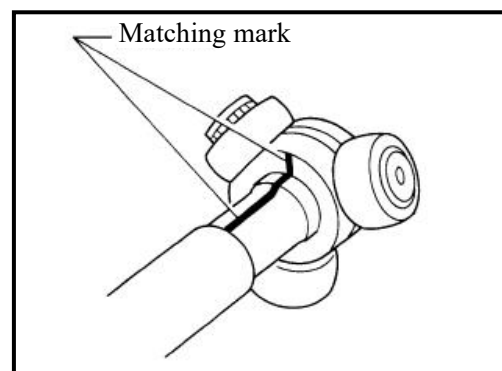
Caution:

■ When fixing the drive axle in the caliper,

Please use aluminum or copper plate to protect the drive shaft.

b. Remove the protective sleeve clamp ring and then remove

the protective sleeve from the shell.



c. Make the assembly marks on the shell and drive shaft,

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And then pull out the shell from the drive shaft.

Attention:

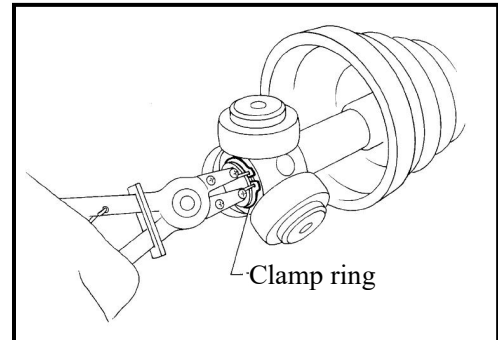
- Use oil paint or similar materials for marking. Please

Do not scratch the surface.

d. Remove the snap ring and then remove the tripod assembly from the drive shaft.

e. Remove the protective sleeve from the driving shaft.

f. Use the tissue to wipe the old lubricating grease on the shell.



## ② Wheel Side

a. Fix the drive shaft in the caliper.

Caution:

■ When fixing the drive axle in the caliper, please use aluminum or copper plate to protect the drive shaft.

b. Remove the protective sleeve clamp ring and take the protective sleeve out of the universal joint sub-assembly.

c. Screw the drive shaft puller (or a suitable tool) into the universal joint subassembly thread and then pull the universal joint subassembly out of the drive shaft.

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■ If the universal joint subassembly can not be disassembled for several times, please replace the drive shaft assembly.

d. Remove the clamp ring from the driving shaft and take out the protective sleeve.

e. Remove the wheel speed sensor gear ring from the drive shaft.

f. Rotate the ball-cage and use the tissue to wipe the old lubricating grease on the universal joint subassembly.

## 3) Inspection After Disassembly

### ① Drive Shaft

Check the drive shaft for runout, crack or other damage. If any, please replace the drive shaft assembly.

#### a. Universal Joint Subassembly (Wheel Side)

Check the following items:

■ Check the universal joint subassembly for excessive rotation, check the drive shaft for excessive looseness.

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- Check the universal joint subassembly for foreign matters entering.
- Check the universal joint subassembly for compression, crack or internal damage.

In the event of non-compliance, please replace the universal joint subassembly.

b. Shell and tripod assembly (transmission side)

If the rolling contact surface of the shell or the rolling contact surface of the tripod pin is scratched or worn, replace the shell and the tripod assembly.

Note:

The shell and the tripod assembly are used in one device.

② Protective sleeve and wheel speed sensor

■ Check the enclosed fitting and wheel speed sensor gear ring for crack or other damage. If any, please replace it.

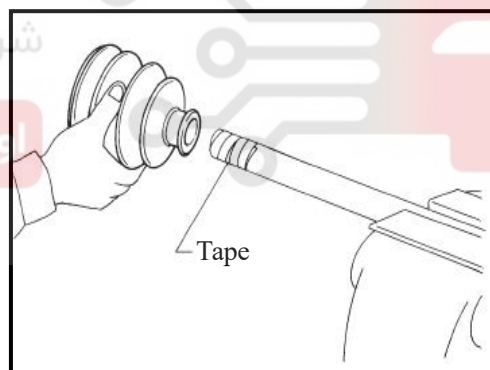
4) Assembly

① Transmission Side

a. Use adhesive tape to wreathe the spline on the driving shaft to avoid damaging the protective sleeve. Install the new protective sleeve and protective sleeve clamp ring on driving shaft.

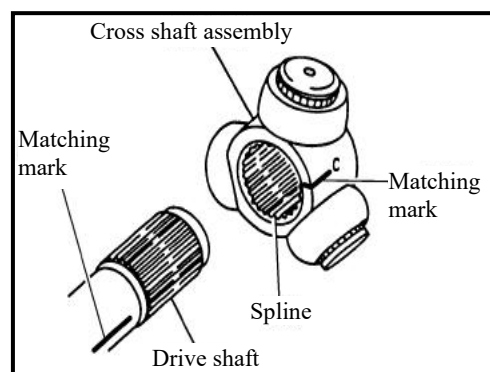
Note: Do not reuse the protective sleeve and protective sleeve clamp ring.

b. Remove the adhesive tape around the drive shaft spline.

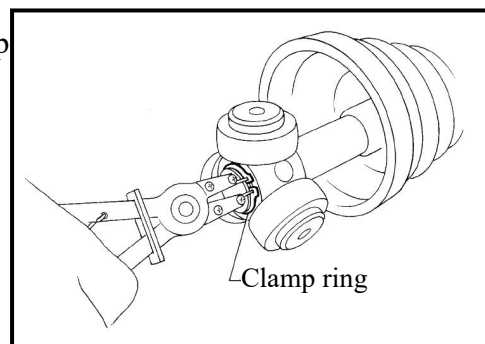


c. Align the paint matching mark when installing the tripod assembly.

Install the tripod assembly with the chamfer toward the shaft.



- d. Fix the tripod assembly on the shell with a snap ring.
- e. Use the recommended lubricating oil to smear the tripod sliding surface.
- f. Install the shell on the tripod assembly, then make use of recommended lubricating oil.

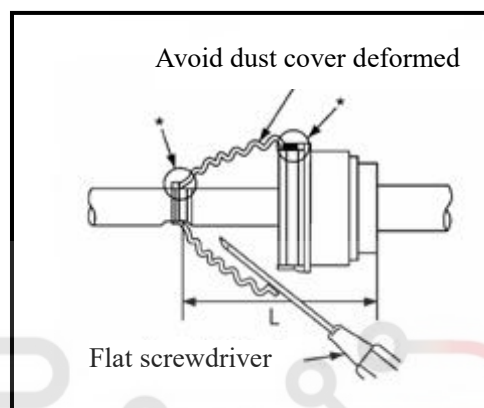


- g. Install the clamp into the groove as shown in the figure.

Attention:

- If the lubricating grease adheres to the fixing surface of protective sleeve, the dirt-proof boot may fall off. Wipe all the lubricating grease on the surface.

- h. Insert a slotted screwdriver from the large diameter side of the protective sleeve, release the air inside, and adjust installation length of protective sleeve, and avoid deformation.



Attention:

- If the installation length of protective sleeve is too long, it may cause protective sleeve damage.

- Carefully use the slotted screwdriver and do not touch the internal part of the protective sleeve.

- i. Use special tool to fasten the new protective sleeve clamp ring.

Attention:

- Do not reuse the protective sleeve clamp ring.

- j. Fasten the shell and driving shaft, then confirm the correct position when rotating the protective sleeve.

Note: Please use the new protective sleeve clamp ring to reassemble when the protective sleeve installment position is wrong.

- k. Install the wheel speed sensor gear ring and protective sleeve on the housing.

## ② Wheel Side

Assemble according to steps from 14 to 23 in “the replacement of driving shaft protective sleeve”.

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## Attention:

- When installing, ensure that the universal joint sub-assembly and the drive shaft are on the same line.
- When in installment, make sure wheel speed sensor gear ring has completely meshed with the shell.

**VI. Maintenance Parameters**

## Tightening Torque Table

Project	torque (N·m)	Item	torque (N·m)
Self-Locking Nut of Drive Shaft	250~270	Wheel speed sensor	10~15
Steering knuckle and shock absorber connecting nut	100~120	Wheel Nut	90~110
Lower suspension arm ball and steering knuckle connecting nut	100~120	Steering knuckle and steering tie rod ball	50~55

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