GROUP 26

FRONT AXLE

CONTENTS

GENERAL INFORMATION

M1261000100422

The front axle consists of front hub unit bearings, knuckles and driveshafts, and it has the following features:

- The wheel bearing is a unit ball bearing (double-row angular contact ball bearing) for reduced friction.
- The wheel bearing incorporates vehicle speed detection magnetic encoder for ABS to reduce the quantity of parts.
- The front wheel hub assembly combines the hub, wheel bearing, housing, and oil seal in a single unit for fewer parts, better durability, improved assembly precision, and better structural organization.
- The driveshaft incorporates BJ-TJ type constant velocity joints with high transmission efficiency for low vibration and noise.
- The dynamic damper is mounted on the left driveshaft <M/T, A/T> and on the right driveshaft <A/T> to reduce differential gear noise.
- Due to the use of the inner shaft and bracket assembly, the right and left drive shafts are approximately the same in length. This reduces noise, vibration and torque steer. <M/T, LH drive vehicles with A/T− High ground clearance suspension (optional) >
- For environmental protection, a lead-free grease is used on the joints.

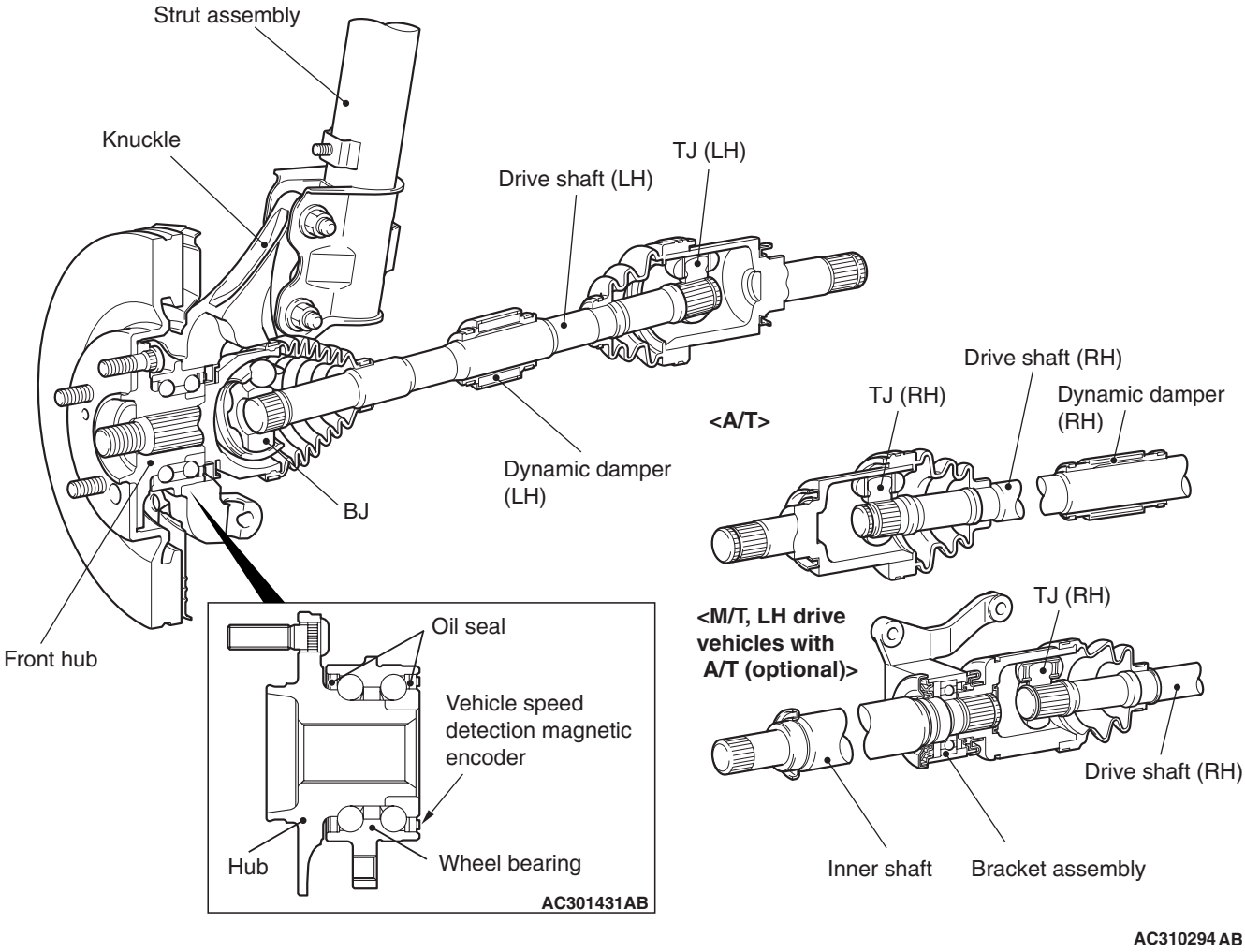
NOTE:

- *TJ: Tripod Joint*
- *BJ: Birfield Joint*

SPECIFICATIONS

Item			**M/T**	**A/T**
Wheel bearing	Type		Unit ball bearing (double-row angular contact ball bearing)	
Driveshaft	Joint type	Outer	BJ	
		Inner	TJ	
	Length (joint to joint) × diameter mm	LH	395.8 × 25.6	396.6 × 24
		RH	490.4 × 25.6	717.1 × 24 491.2 × 24 <Vehicles with High ground clearance suspension (optional)

CONSTRUCTION DIAGRAM



SERVICE SPECIFICATIONS

M1261000300493

Item	Standard value	Limit
Wheel bearing axial play mm	–	0.05
Hub starting torque N·m	–	2.1
Setting of TJ boot length mm	80.9 ± 3	–

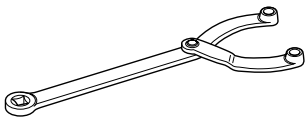
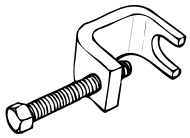
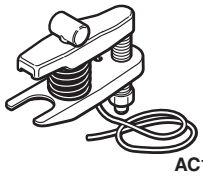
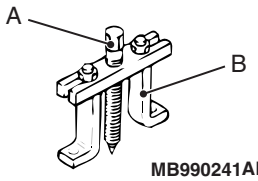
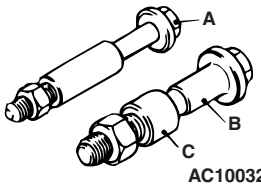
LUBRICANTS

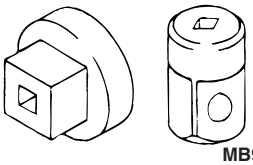
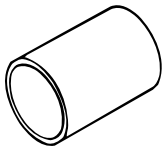
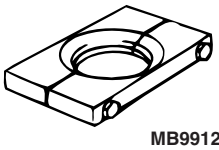
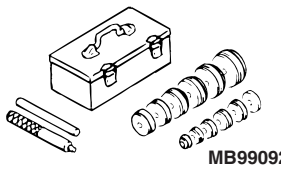
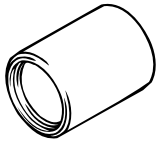
M1261000400478

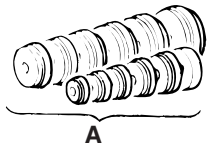
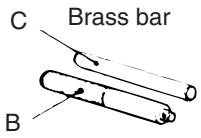
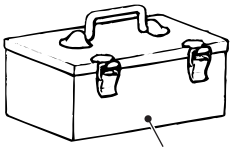
Item	Specified lubricant	Quantity
TJ boot grease	Repair kit grease	145 ± 5 g
BJ boot grease	Repair kit grease	130 ± 5 g
Dust seal inner grease	Repair kit grease	14 – 20 g
Dust seal outer grease	Repair kit grease	8 – 12 g

SPECIAL TOOLS

M1261000600513

Tool	Number	Name	Use
 B990767	MB990767	End yoke holder	Fixing of the hub
 MB991618	MB991618	Hub bolt remover	Removal of the hub bolt
 AC106827	MB991897	Ball joint remover	Knuckle and tie rod end ball joint disconnection *NOTE: Steering linkage puller (MB990635 or MB991113)is also used to disconnect knuckle and tie rod end ball joint.*
 MB990241AB	MB990241 A: MB990242 B: MB990244	Axle shaft puller A: Puller shaft B: Puller bar	Removal of the drive shaft
 MB991354	MB991354	Puller body	
 AC100320AB	A: MB991017 B: MB990998 C: MB991000	A, B: Front hub remover and installer C: Spacer	• Provisional holding of the wheel bearing • Measurement of wheel bearing starting torque • Measurement of wheel bearing axial play *NOTE: MB991000, which belongs to MB990998, should be used as a spacer.*

Tool	Number	Name	Use
	MB990685	Torque wrench	Measurement of wheel bearing starting torque
 MB990326	MB990326	Preload socket	
 MB990810	MB990810	Side bearing puller	Removal of the centre bearing bracket
	MB991172	Inner shaft installer base	Press-fitting of the inner shaft
 MB991248	MB991248 or MD998801	Inner shaft remover	Removal of the inner shaft
	MB991460	Plug	Prevention of entry of foreign objects
 MB990925	MB990925	Bearing and oil seal installer set	• Removal and installation of the centre bearing • Press-fitting of the dust seal outer, inner
 MB990890	MB990890	Rear suspension bushing base	Press-fitting of the dust seal outer, inner

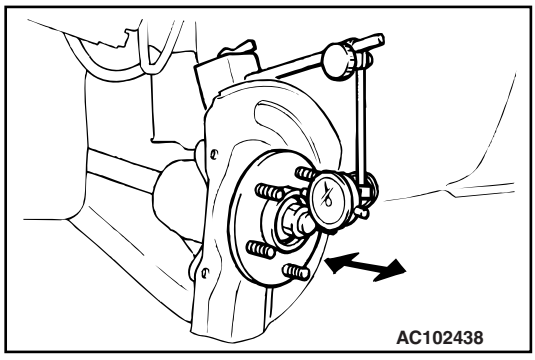
Tool	Type	Tool number	O D mm
MB990925  A Installer adapter  C Brass bar B Bar (snap-in type)  Tool box ACX02372AC	A	MB990926	39.0
		MB990927	45.0
		MB990928	49.5
		MB990929	51.0
		MB990930	54.0
		MB990931	57.0
		MB990932	61.0
		MB990933	63.5
		MB990934	67.5
		MB990935	71.5
		MB990936	75.5
		MB990937	79.0
	B	MB990938	–
	C	MB990939	–

ON-VEHICLE SERVICE

WHEEL BEARING AXIAL PLAY CHECK

M1261000900257

1. Remove the caliper assembly and suspend it with a wire.
2. Remove the brake disc from the front hub.



3. Attach a dial gauge as shown in the illustration, and then measure the axial play while moving the hub in the axial direction.

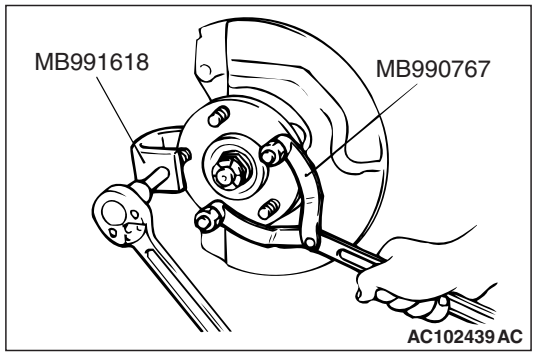
   Limit: 0.05 mm

4. If axial play exceeds the limit, disassemble the front hub assembly and check the parts.
5. Install the brake disc, caliper assembly and tighten the caliper assembly mounting bolts to the specified torque 100 ± 10 N·m.

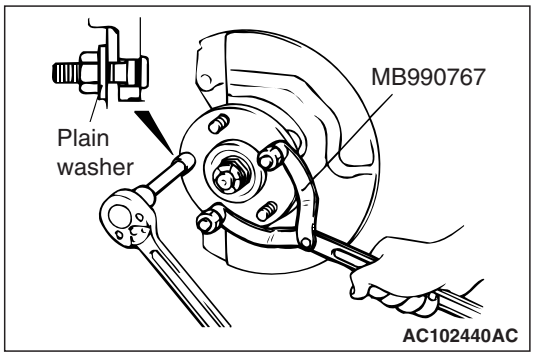
HUB BOLT REPLACEMENT

M1261001000321

1. Remove the caliper assembly and suspend it with wire so that it does not fall.
2. Remove the brake disc.



3. Use the following special tools to remove the hub bolts.
   - End yoke holder (MB990767)
   - Hub bolt remover (MB991618)



4. Install the plain washer to the new hub bolt, and install the bolt with a nut.

5. Install the brake disc, caliper assembly and tighten the caliper assembly mounting bolts to the specified torque 100 ± 10 N·m.

FRONT AXLE HUB ASSEMBLY

REMOVAL AND INSTALLATION

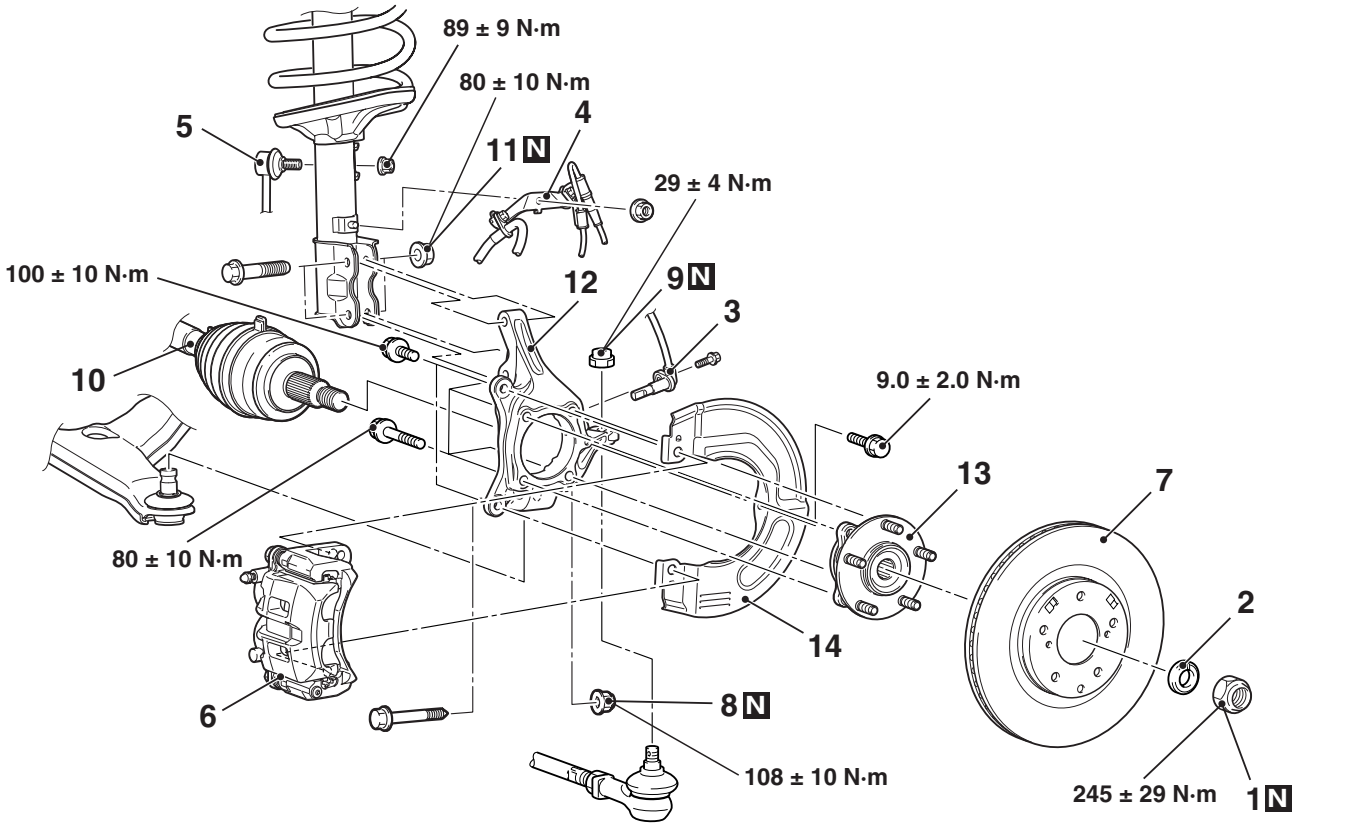
M1261001700450

⚠ CAUTION

- **Do not disassemble the front wheel hub assembly.**
- **The vehicle speed detection magnetic encoder collects any metallic particle easily, because it is magnetised. Make sure that the magnetic encoder should not collect any metallic particle. Check that there is not any trouble prior to reassembling it.**
- **When the front wheel hub assembly is removed and installed, make sure that the vehicle speed detection magnetic encoder does not contact with surrounding parts to avoid damage.**
- **When the front wheel speed sensor is removed and installed, make sure that its pole piece does not contact with surrounding parts to avoid damage.**

Post-installation Operation

- Check the dust cover for cracks or damage by pushing it with your finger.



AC311040AC

Removal steps

<<A>> >>A<< 1. Drive shaft nut
>>A<< 2. Washer
3. Front wheel speed sensor
4. Brake hose bracket
5. Stabilizer link connection
<<B>> 6. Caliper assembly
<<C>> 7. Brake disc
8. Self-locking nut (lower arm ball joint connection)

Removal steps (Continued)

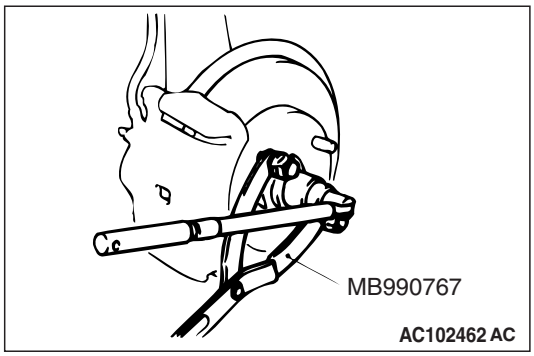
<<D>> 9. Self-locking nut (tie rod end connection)
<<E>> 10. Drive shaft
11. Nut (hub and knuckle to strut connection)
12. Knuckle
13. Front wheel hub assembly
14. Dust cover

REMOVAL SERVICE POINTS

<<A>> DRIVE SHAFT NUT REMOVAL

⚠ CAUTION

Do not apply pressure to wheel bearing by the vehicle weight to avoid possible damage when drive shaft nut is loosened.

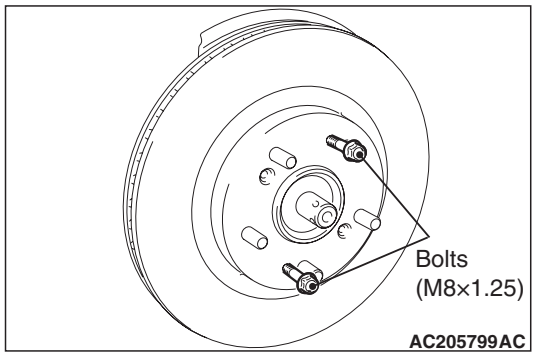


Use special tool end yoke holder (MB990767) to fix the hub and remove the drive shaft nut.

<<B>> CALIPER ASSEMBLY REMOVAL

Secure the removed caliper assembly with wire, etc.

<<C>> BRAKE DISC REMOVAL

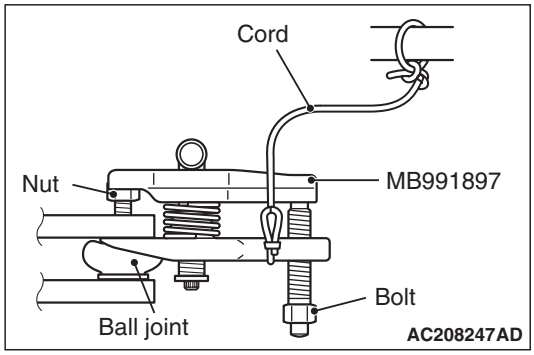


If the brake disc is seized, install a M8 x 1.25 bolts as shown, and remove the disc by tightening the bolts evenly and gradually.

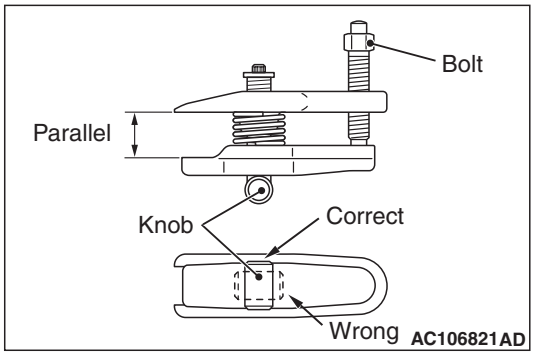
<<D>> SELF-LOCKING NUT (TIE ROD END CONNECTION) REMOVAL

⚠ CAUTION

- **Do not remove the nut from ball joint. Loosen it and use the special tool to avoid possible damage to ball joint threads.**
- **Hang the special tool with cord to prevent it from falling.**



1. Install special tool ball joint remover (MB991897) as shown in the figure.



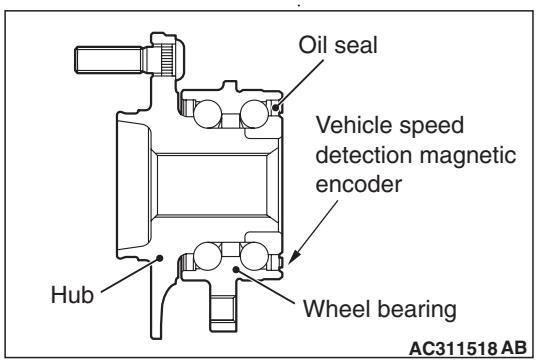
2. Turn the bolt and knob as necessary to make the jaws of special tool parallel, tighten the bolt by hand and confirm that the jaws are still parallel.

   NOTE: When adjusting the jaws in parallel, make sure the knob is in the position shown in the figure.

3. Tighten the bolt with a wrench to disconnect the tie rod end.

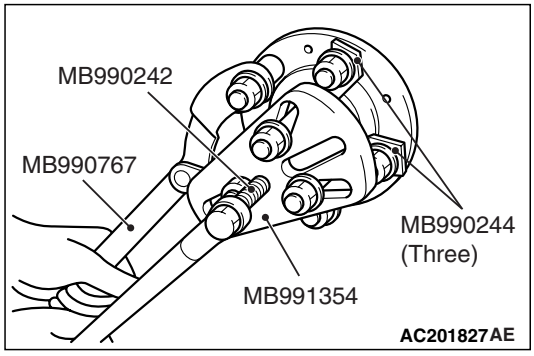
<<E>> DRIVE SHAFT REMOVAL

⚠ CAUTION



The vehicle speed detection magnetic encoder collects any metallic particle easily, because it is magnetised. Make sure that the magnetic encoder does not collect any metallic particle.

- **When the drive shaft is removed, make sure that it does not contact with the vehicle speed detection magnetic encoder to avoid damage.**



Use the following special tools to push out the drive shaft from the hub.

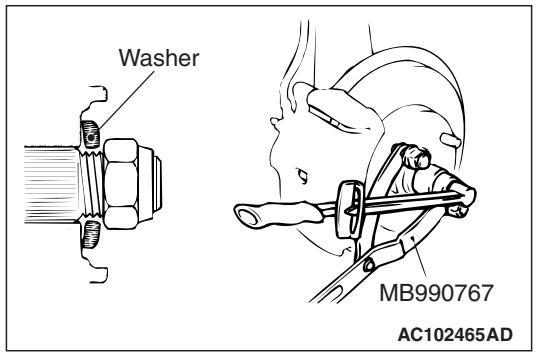
- Puller shaft (MB990242)
- Puller bar (MB990244)
- Puller body (MB991354)
- End yoke holder (MB990767)

INSTALLATION SERVICE POINT

>>A<< WASHER/ DRIVE SHAFT NUT INSTALLATION

⚠ CAUTION

- **The vehicle speed detection magnetic encoder collects any metallic particle easily, because it is magnetised. Make sure that the magnetic encoder should not collect any metallic particle. Check that there is not any trouble prior to reassembling it.**
- **When the drive shaft is installed, make sure that it does not contact with the vehicle speed detection magnetic encoder to avoid damage.**
- **Before securely tightening the drive shaft nuts, make sure there is no load on the wheel bearings. Otherwise the wheel bearings will be damaged.**



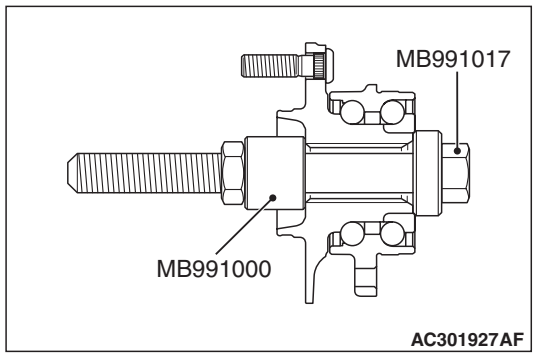
1. Be sure to install the drive shaft washer in the specified direction.
2. Using special tool end yoke holder (MB990767), tighten the drive shaft nut to the specified torque.

Tightening torque: 245 ± 29 N·m

INSPECTION

M1261001800275

WHEEL BEARING ROTATION STARTING TORQUE AND AXIAL PLAY CHECK

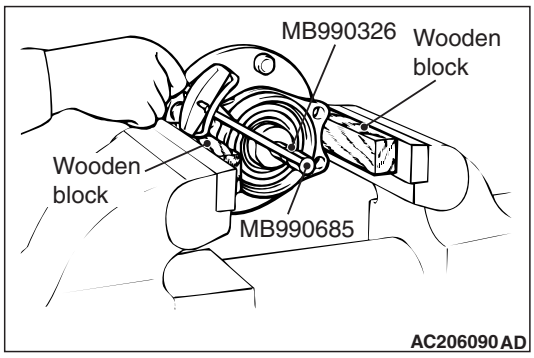


1. Install the following special tools and tighten them to the specified torque.
   - Front hub remover and installer (MB991017)

- Spacer (MB991000)

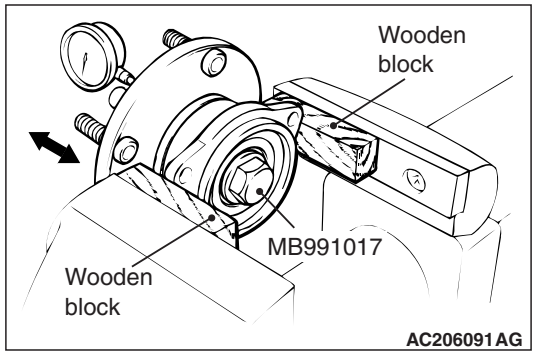
  Tightening torque: 245 ± 29 N·m

2. Hold front wheel hub assembly in a vice, using wooden blocks.
3. Rotate the hub in order to seat the bearing.



4. Measure the wheel bearing rotation starting torque by using the following special tools.
   - Preload socket (MB990326)
   - Torque wrench (MB990685)

   Limit: 2.1 N·m
5. If the rotation starting torque is not within the limit when the nut is tightened to 245 ± 29 N·m, replace the front wheel hub assembly. If there is any signs of binding or tight spots when the wheel bearing turns, replace it too.



6. Use the special tool to measure to determine whether the wheel bearing axial play is within the specified limit or not.

   Limit: 0.05 mm
7. If the play exceeds the limit when the nut is tightened to 245 ± 29 N·m, replace the front wheel hub assembly.

DRIVE SHAFT ASSEMBLY

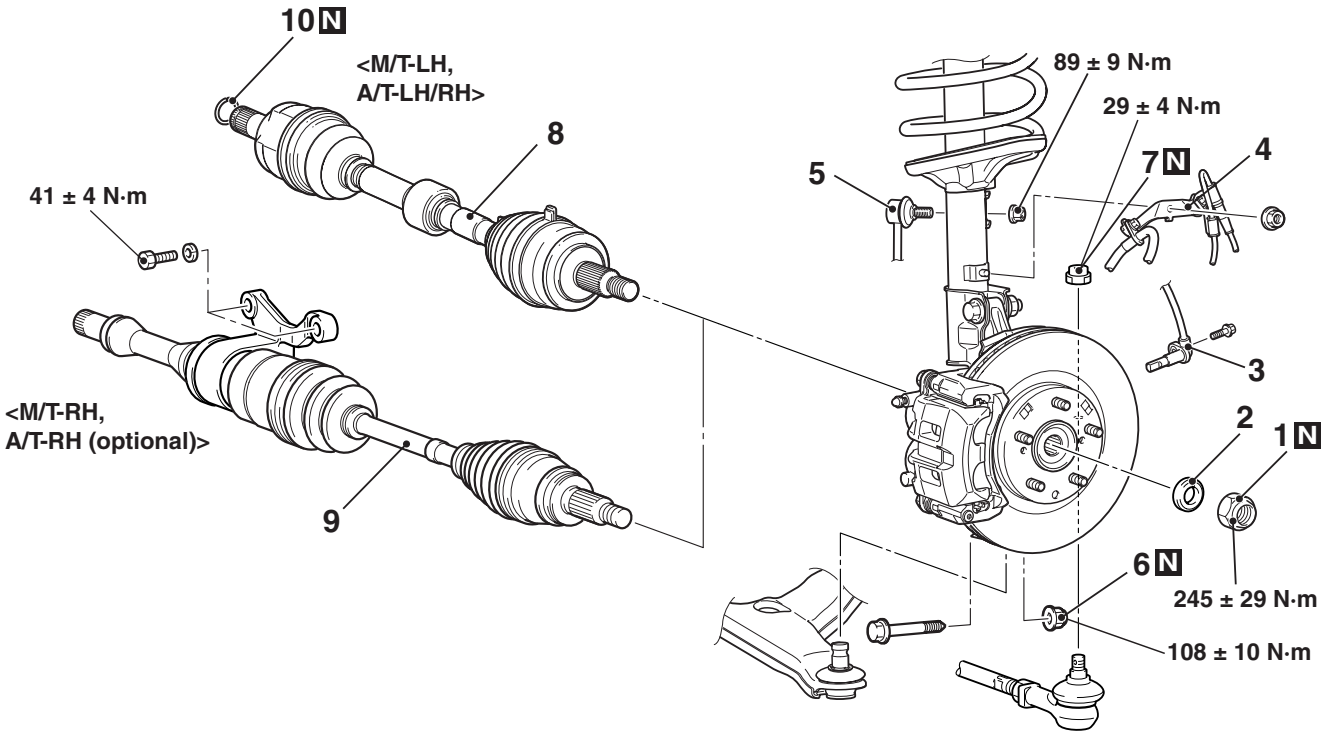
REMOVAL AND INSTALLATION

M1261003500504

⚠ CAUTION

- **The vehicle speed detection magnetic encoder collects any metallic particle easily, because it is magnetised. Make sure that the magnetic encoder should not collect any metallic particle. Check that there is not any trouble prior to reassembling it.**
- **When the drive shaft assembly is removed and installed, make sure that the vehicle speed detection magnetic encoder does not contact with surrounding parts to avoid damage.**
- **When the front wheel speed sensor is removed and installed, make sure that its pole piece does not contact with surrounding parts to avoid damage.**

Pre-installation Operation	Post-installation Operation
• Transmission Fluid Draining (Refer to GROUP 22A and 23A, On-vehicle Service – Transmission Oil Replacement P.22A-6, P.23A-126).	• Check the Ball Joint Dust Cover for cracks or damage by pushing it with your finger. • Transmission Fluid Filling (Refer to GROUP 22A and 23A, On-vehicle Service – Transmission Oil Replacement P.22A-6, P.23A-126).



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Removal steps

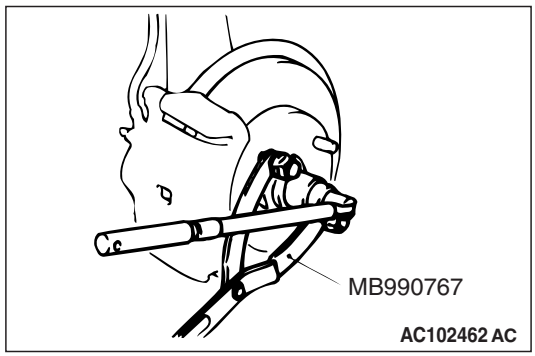
<<A>>	>>B<<	1.	Drive shaft nut
	>>B<<	2.	Washer
		3.	Front wheel speed sensor
		4.	Brake hose bracket
		5.	Stabilizer link connection
		6.	Self-locking nut (lower arm ball joint connection)
<<B>>		7.	Self-locking nut (tie rod end connection)
<<C>>	>>A<<	8.	Drive shaft
<<C>>	>>A<<	9.	Drive shaft and inner shaft assembly
		10.	Circlip

REMOVAL SERVICE POINTS

<<A>> DRIVE SHAFT NUT REMOVAL

⚠ CAUTION

Do not apply pressure to the wheel bearing by the vehicle weight to avoid possible damage when the drive shaft nut is loosened.

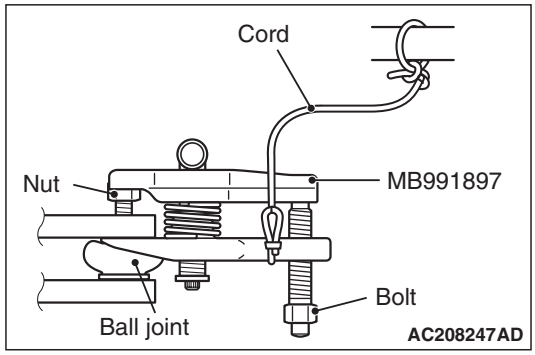


Use special tool end yoke holder (MB990767) to fix the hub and remove the drive shaft nut.

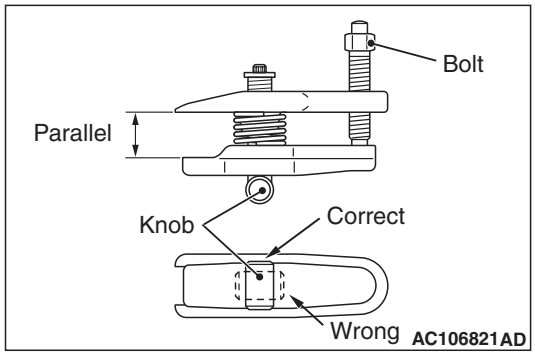
<<B>> SELF-LOCKING NUT (TIE ROD END CONNECTION) REMOVAL

⚠ CAUTION

- **Do not remove the nut from ball joint. Loosen it and use special tool to avoid possible damage to ball joint threads.**
- **Hang special tool with cord to prevent it from falling.**



1. Install special tool ball joint remover (MB991897) as shown in the figure.

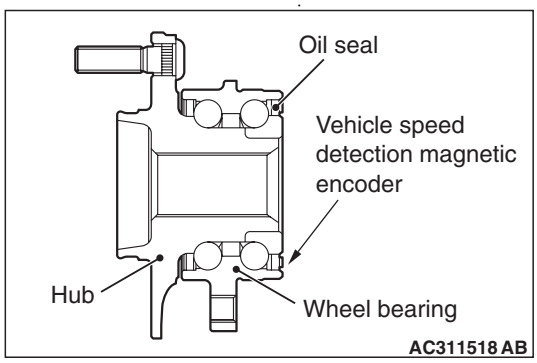


2. Turn the bolt and knob as necessary to make the jaws of special tool parallel, tighten the bolt by hand and confirm that the jaws are still parallel.

   NOTE: When adjusting the jaws in parallel, make sure the knob is in the position shown in the figure.
3. Tighten the bolt with a wrench to disconnect the tie rod end.

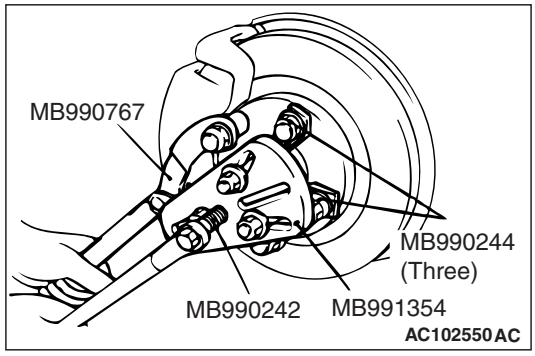
<<C>> DRIVE SHAFT/DRIVE SHAFT AND INNER SHAFT ASSEMBLY REMOVAL

⚠ CAUTION

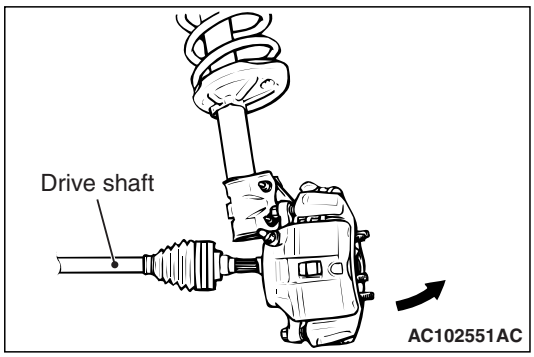


The vehicle speed detection magnetic encoder collects any metallic particle easily, because it is magnetised. Make sure that the magnetic encoder does not collect any metallic particle.

- **When the drive shaft or the drive shaft and inner shaft assembly is removed, make sure that it does not contact with the vehicle speed detection magnetic encoder to avoid damage.**



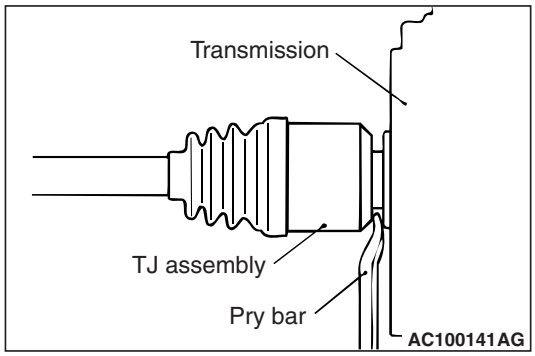
1. Use the following special tools to push out the drive shaft or the drive shaft and inner shaft assembly from the hub.
   - Puller shaft (MB990242)
   - Puller bar (MB990244)
   - Puller body (MB991354)
   - End yoke holder (MB990767)



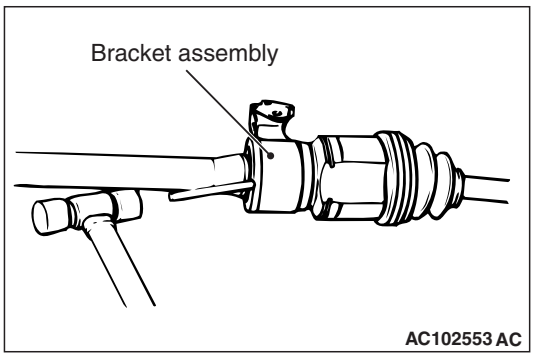
2. Remove the drive shaft from the hub by pulling the bottom of the brake disc towards you.

⚠ CAUTION

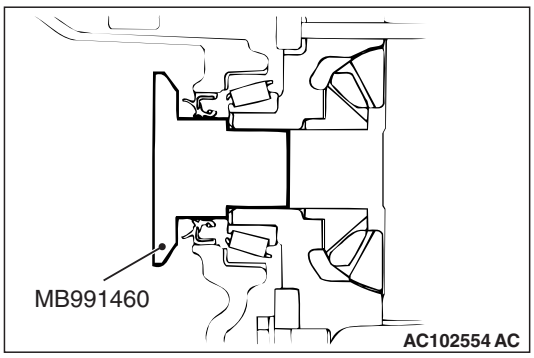
- **Do not pull on the drive shaft; doing so will damage the TJ; be sure to use the pry bar.**
- **When pulling the drive shaft out from the transmission, be careful that the spline part of the drive shaft does not damage the oil seal.**



3. Insert a pry bar between the transmission case and the drive shaft, and then pry and remove the drive shaft from the transmission.

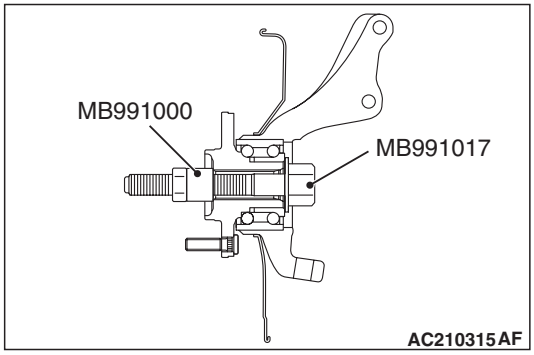


4. If the inner shaft is hard to remove from the transmission, strike the bracket assembly lightly with a plastic hammer and remove the inner shaft.



5. Use special tool plug (MB991460) to prevent the entry of foreign material into the transmission case.

⚠ CAUTION



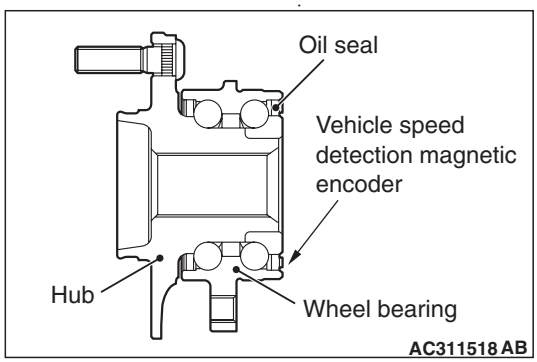
Do not apply pressure to the wheel bearing by the vehicle weight to avoid possible damage when the drive shaft is removed. If, however, vehicle weight must be applied to the bearing in moving the vehicle, temporarily secure the wheel bearing by using the following special tools.

- **Spacer (MB991000)**
- **Front hub remover and installer (MB991017)**

INSTALLATION SERVICE POINTS

>>A<< DRIVE SHAFT/DRIVE SHAFT AND INNER SHAFT ASSEMBLY INSTALLATION

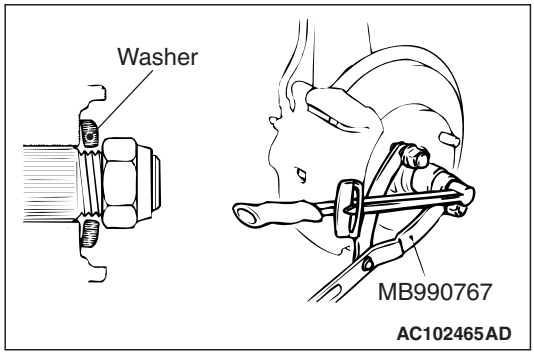
⚠ CAUTION



The vehicle speed detection magnetic encoder collects any metallic particle easily, because it is magnetised. Make sure that the magnetic encoder should not collect any metallic particle. Check that there is not any trouble prior to reassembling it.

- **When the drive shaft is installed, make sure that it does not contact with the vehicle speed detection magnetic encoder to avoid damage.**
- **When installing the drive shaft or the drive shaft and inner shaft assembly, be careful that the spline part of the drive shaft or the drive shaft and inner shaft assembly do not damage the oil seal.**

>>B<< WASHER/DRIVE SHAFT NUT INSTALLATION



1. Be sure to install the drive shaft washer in the specified direction.

⚠ CAUTION

Before securely tightening the drive shaft nuts, make sure there is no load on the wheel bearings. Otherwise the wheel bearing will be damaged.

2. Using special tool end yoke holder (MB990767), tighten the drive shaft nut to the specified torque.

Tightening torque: 245 ± 29 N·m

DISASSEMBLY AND REASSEMBLY

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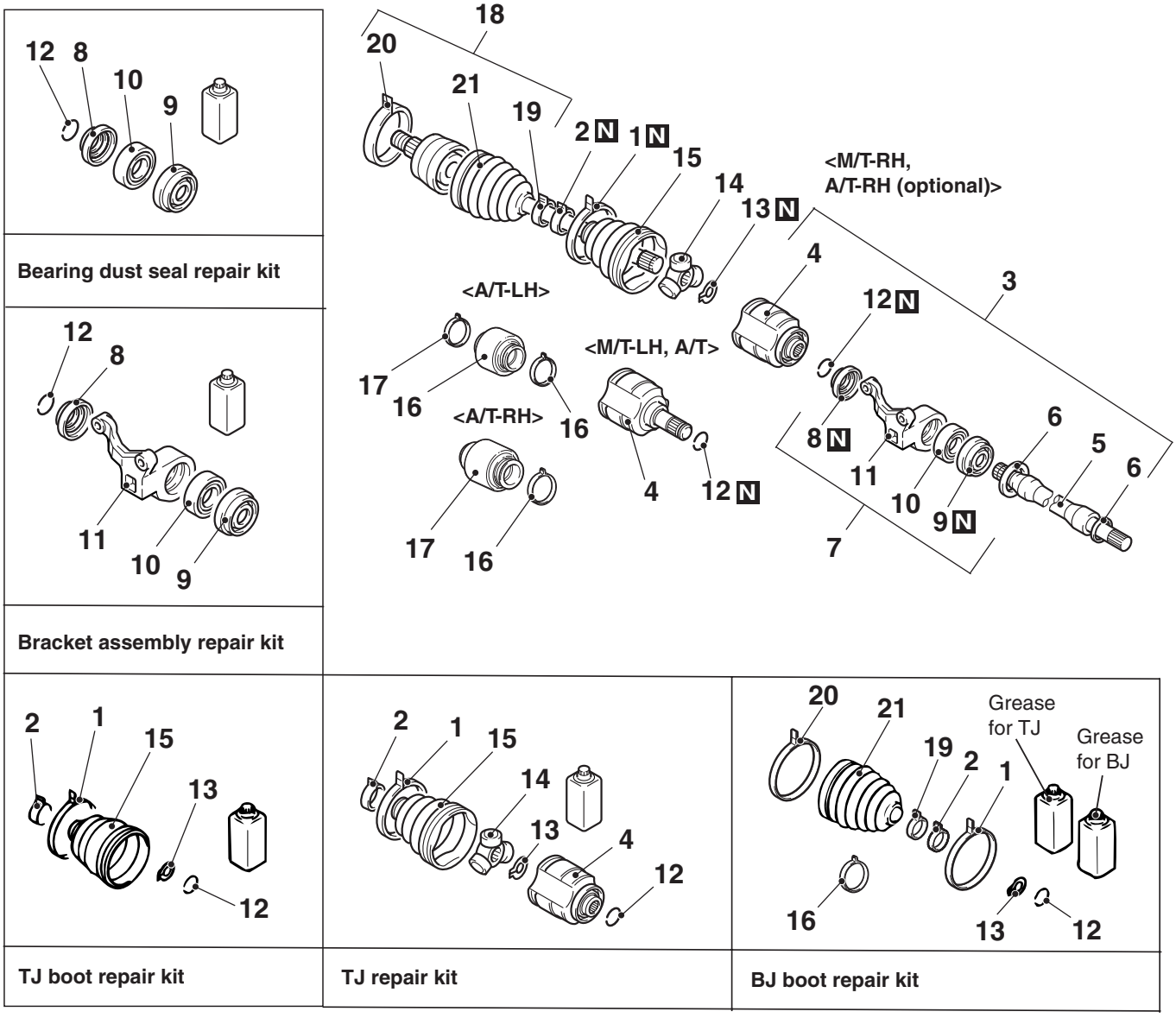
⚠ CAUTION

Never disassemble the BJ assembly except when replacing the BJ boot.



Disassembly steps

<<A>>	**>>G<<**	1.	TJ boot band (large)
<<A>>	**>>G<<**	2.	TJ boot band (small)
		3.	TJ case and inner shaft assembly <M/T-RH, A/T-RH (optional)>
<<B>>	**>>F<<**	4.	TJ case
<<C>>	**>>E<<**	5.	Inner shaft <M/T-RH, A/T-RH (optional)>
		6.	Dust cover <M/T-RH, A/T-RH (optional)>
		7.	Bracket assembly <M/T-RH, A/T-RH (optional)>
	>>D<<	8.	Dust sear outer <M/T-RH, A/T-RH (optional)>
	>>D<<	9.	Dust seal inner <M/T-RH, A/T-RH (optional)>
<<D>>	**>>C<<**	10.	Centre bearing <M/T-RH, A/T-RH (optional)>

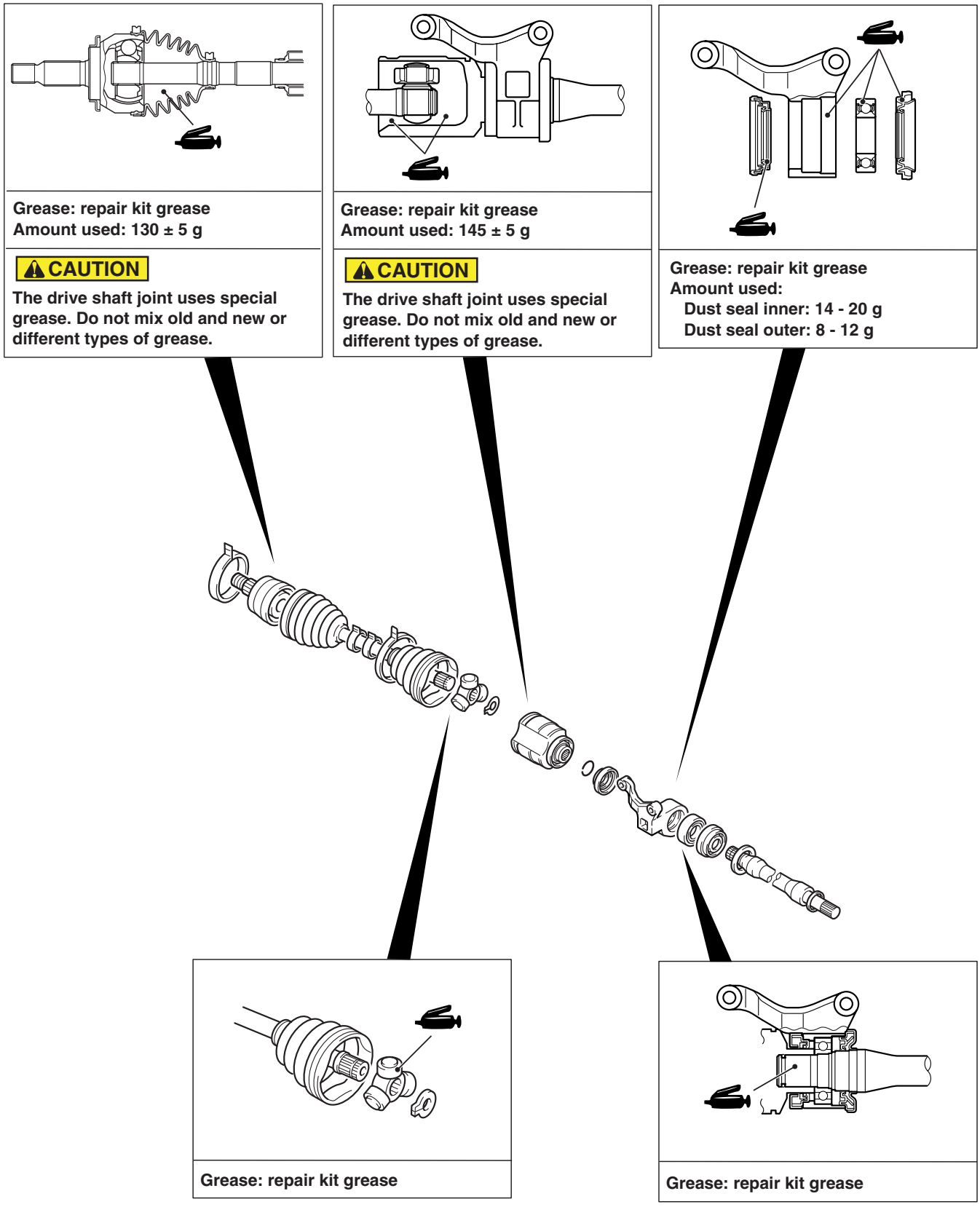
Disassembly steps (Continued)

		11.	Centre bearing bracket <M/T-RH, A/T-RH (optional)>
		12.	Circlip
		13.	Snap ring
<<B>>	**>>B<<**	14.	Spider assembly
<<E>>	**>>A<<**	15.	TJ boot
	>>A<<	16.	Damper band
	>>A<<	17.	Dynamic damper
		18.	BJ assembly
		19.	BJ boot band (small)
		20.	BJ boot band (large)
		21.	BJ boot

NOTE:

- *TJ: Tripod Joint*
- *BJ: Birfield Joint*

LUBRICATION POINTS



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DISASSEMBLY SERVICE POINTS

<<A>> TJ BOOT BAND(LARGE)/TJ BOOT BAND (SMALL) REMOVAL

Use the pincers for low profile clamps <recommendable tool: OETIKER> to remove the TJ boot band (large) and TJ boot band (small).

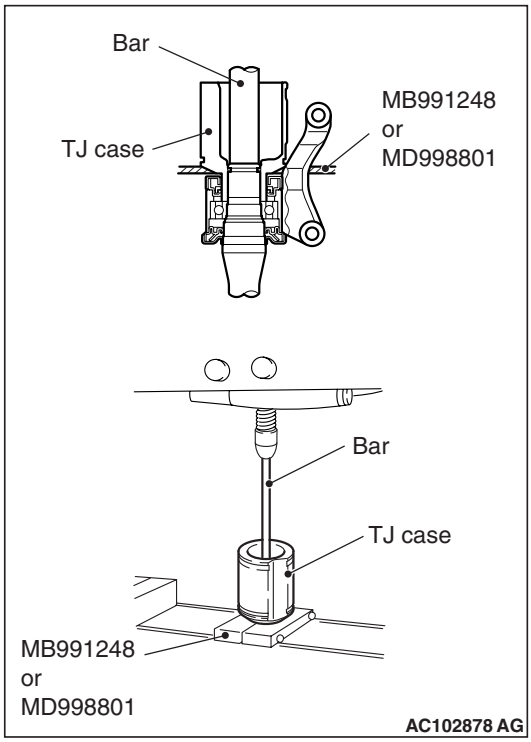
<<B>> TJ CASE/SPIDER ASSEMBLY REMOVAL

⚠ CAUTION

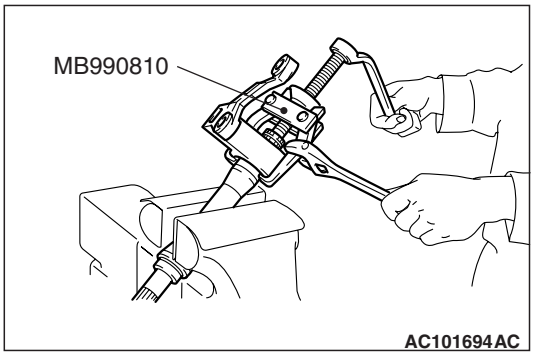
Do not disassemble the spider assembly.

1. Wipe off grease from the spider assembly and the inside of the TJ case.
2. Always clean the spider assembly when the grease contains water or foreign material.

<<C>> INNER SHAFT <M/T-RH, A/T-RH (OPTIONAL)> REMOVAL

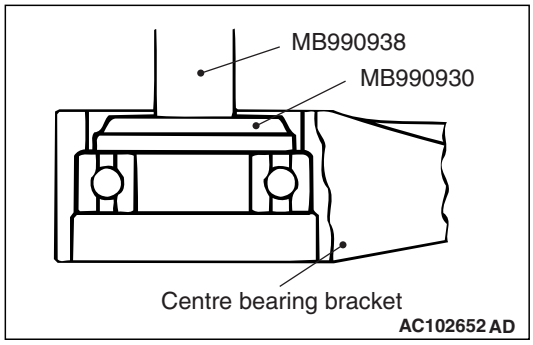


1. Use special tool inner shaft remover (MB991248 or MD998801) to remove the inner shaft assembly from the TJ case.



2. Use special tool side bearing puller (MB990810) to remove the centre bearing bracket from the inner shaft.

<<D>> CENTRE BEARING <M/T-RH, A/T-RH (OPTIONAL)> REMOVAL



Use the following special tools to remove the centre bearing from the centre bearing bracket.

- Bar (MB990938)
- Installer adapter (MB990930)

<<E>> TJ BOOT REMOVAL

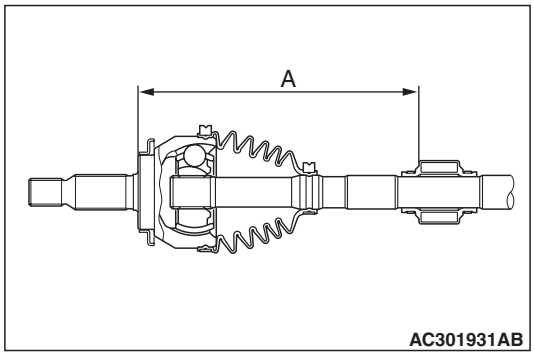
1. Wipe off grease from the shaft spline.
2. When reusing the TJ boot, wrap plastic tape around the shaft spline to avoid damaging the boot.

REASSEMBLY SERVICE POINTS

>>A<< DYNAMIC DAMPER/DAMPER BAND/TJ BOOT INSTALLATION

⚠ CAUTION

There should be no grease adhered to the rubber part of the dynamic damper.



1. Install the dynamic damper in the position (A) shown in the figure .

   A: 218.5 ± 3 mm <M/T-LH>
   A: 230 ± 3 mm <A/T-LH>, 383.5 ± 3 mm <A/T-RH>

2. Secure the damper bands.
3. Wrap plastic tape around the shaft spline, and then install the TJ boot band (small) and TJ boot.

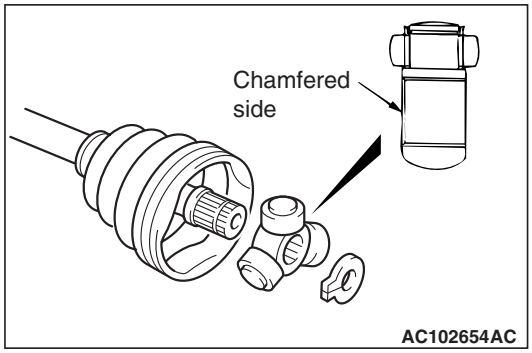
>>B<< SPIDER ASSEMBLY INSTALLATION

⚠ CAUTION

- **The drive shaft joint use special grease. Do not mix old and new or different types of grease.**
- **If the spider assembly has been cleaned, take special care to apply the specified grease.**

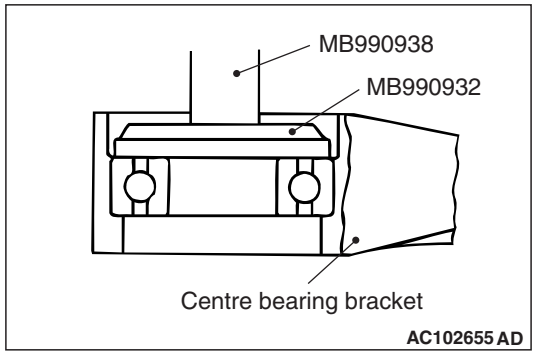
1. Apply the specified grease furnished in the repair kit to the spider assembly between the spider axle and the roller.

   Specified grease: Repair kit grease



2. Install the spider assembly to the shaft from the direction of the spline chamfered side.

>>C<< CENTRE BEARING <M/T-RH, A/T-RH (OPTIONAL)> INSTALLATION



Use the following special tools to press-fit the centre bearing into the centre bearing bracket.

- Bar (MB990938)
- Installer adapter (MB990932)

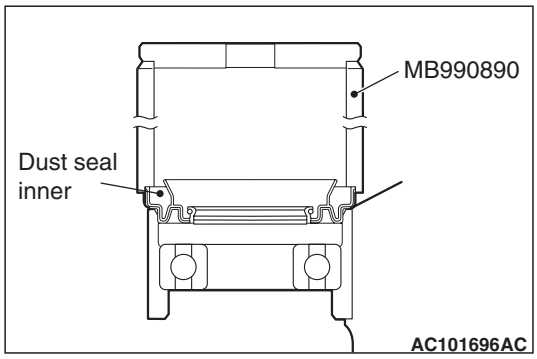
>>D<< DUST SEAL INNER <M/T-RH, A/T-RH (OPTIONAL)> /DUST SEAL OUTER <M/T-RH, A/T-RH (OPTIONAL)> INSTALLATION

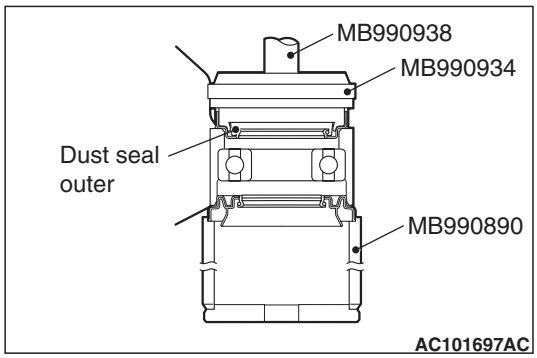
⚠ CAUTION

When applying grease, make sure that it does not adhere to anything outside the lip.

1. Apply the specified grease to the rear surface of all dust seals.

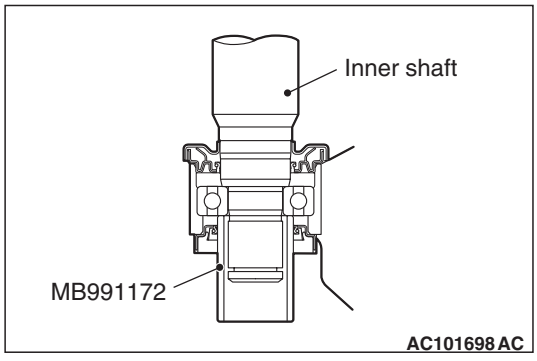
   Specified grease: Repair kit grease
   Amount used (Dust seal inner): 14 – 20 g
   Amount used (Dust seal outer): 8 – 12 g



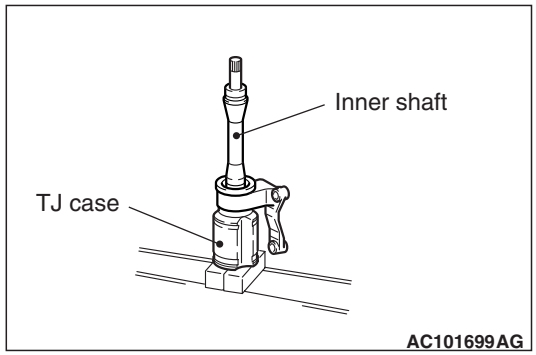


2. Use the following special tools to press the dust seals into the centre bearing bracket until they are flush with each other.
   - Rear suspension bushing base (MB990890)
   - Bar (MB990938)
   - Installer adapter (MB990934)
3. Apply repair kit grease to the lip of each dust seal.

>>E<< INNER SHAFT <M/T-RH, A/T-RH (OPTIONAL)> INSTALLATION



1. Use special tool inner shaft installer base (MB991172) to hold the centre bearing inner race, and then press-in the inner shaft.



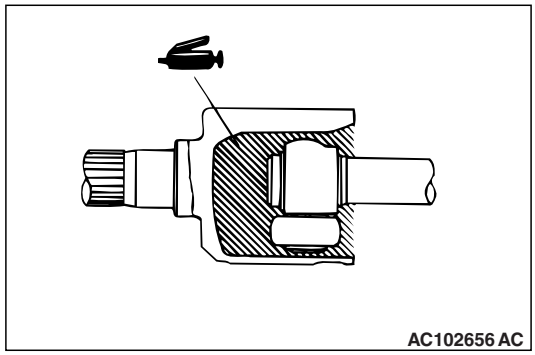
2. Apply repair kit grease to the inner shaft spline, then press fit it into the TJ case.

   NOTE: When press-fitting the inner shaft into the TJ case, apply a thin coat of repair kit grease to the dust seal outer lip part and the outside edge of the TJ axial part.

>>F<< TJ CASE INSTALLATION

⚠ CAUTION

The drive shaft joint use special grease. Do not mix old and new or different types of grease.

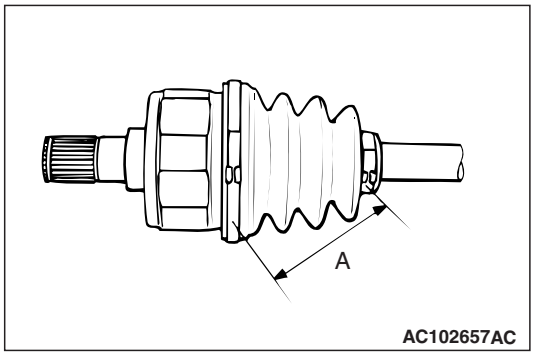


After applying the specified grease to the TJ case, insert the drive shaft and apply grease one more time.

Specified grease: Repair kit grease
Amount to use : 145 ± 5 g

NOTE: The grease in the repair kit should be divided in half for use, respectively, at the joint and inside the boot.

>>G<< TJ BOOT BAND (SMALL)/TJ BOOT BAND (LARGE) INSTALLATION



1. Set the TJ boot bands at the specified distance in order to adjust the amount of air inside the TJ boot, and then tighten the TJ boot band (small), TJ boot band (large) securely.

   Standard value (A): 80.9 ± 3

2. Use the pincers for low profile clamps <recommendable tool: OETIKER> to remove the TJ boot band (large) and TJ boot band (small).

INSPECTION

M1261003800204

- Check the drive shaft for damage, bending or corrosion.
- Check the inner shaft for damage, bending or corrosion.
- Check the drive shaft spline part for wear or damage.
- Check the inner shaft spline part for wear or damage.
- Check the spider assembly for roller rotation, wear or corrosion.
- Check the groove inside TJ case for wear or corrosion.
- Check the dynamic damper for damage or cracking.
- Check the boots for deterioration, damage or cracking.
- Check the centre bearing for seizure, discolouration or roughness of rolling surface.
- Check the dust cover for damage or deterioration.

BJ BOOT (RESIN BOOT) REPLACEMENT

M1261005200479

Use the pincers for low profile clamps <recommendable tool: OETIKER> to replace BJ boot band.