# GROUP 26

# FRONT AXLE

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# GENERAL INFORMATION

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The front axle consists of front wheel hub assembly, knuckles and drive shafts, and has the following features:

- The wheel bearing incorporates a unit ball bearing (double-row angular contact ball bearing) for reduced friction.
- The front wheel hub assembly combines the hub, wheel bearing, housing, and oil seal in a single unit for fewer parts, better rigidity, improved assembly precision, and better structural organization.
- The drive shaft on wheel side incorporates an EBJ type constant velocity joint.
- The drive shaft on the differential side incorporates a TJ type constant velocity joint.
- ABS rotor for detecting the wheel speed is press-fitted to the EBJ.
- For environmental protection, a lead-free grease is used on the joints.

*NOTE:*

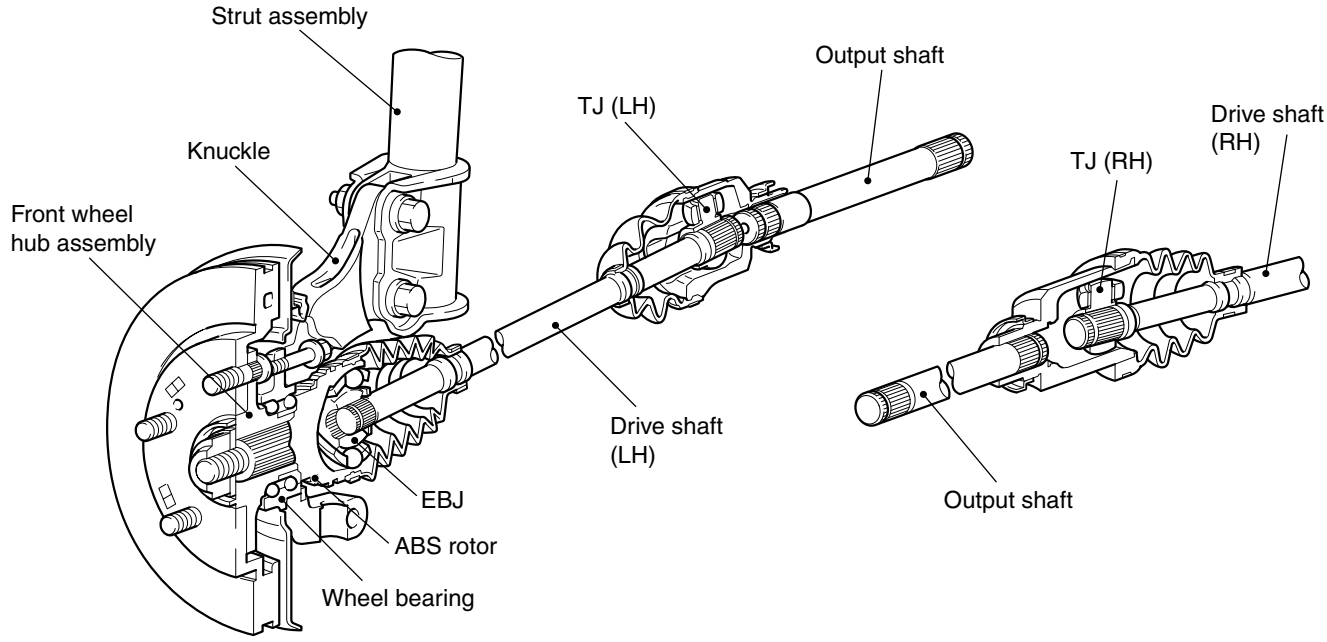
- *EBJ: Eight Ball Fixed Joint; The use of the smaller-sized eight balls inside the joint achieves weight saving and compact size compared with a BJ (Birfield Joint).*
- *TJ: Tripod Joint*

## SPECIFICATIONS

| Item | | | Specification |
|---|---|---|---|
| Wheel bearing | Type | | Unit ball bearing (Double-row angular contact ball bearing) |
| Driveshaft | Joint type | Outer | EBJ |
| | | Inner | TJ |
| | Length (joint to joint) × diameter mm | Left | 352.5 × 26 |
| | | Right | 429.5 × 26 |

*NOTE: The wheel bearing is part of the hub, therefore its size is not listed here.*

## CONSTRUCTION DIAGRAM




AC211166 AB

# SERVICE SPECIFICATIONS

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| Item | | Standard value | Limit |
|---|---|---|---|
| Wheel bearing axial play mm | | – | 0.05 |
| Wheel bearing rotation starting torque N·m | | – | 1.03 |
| Setting of TJ boot length mm | | 85 ± 3 | – |
| Opening dimension of the special tool (MB991561) mm | When the EBJ boot band (small) is crimped | 2.9 | – |
| | When the EBJ boot band (large) is crimped | 3.2 | – |
| Crimped width of the EBJ boot band mm | | 2.4 – 2.8 | – |

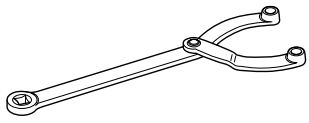
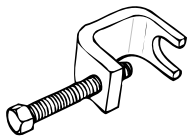
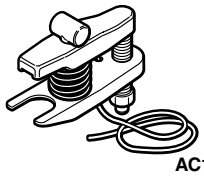
# LUBRICANTS

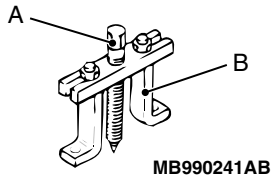
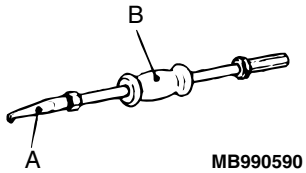
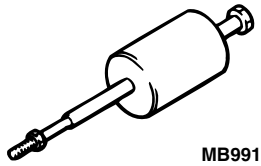
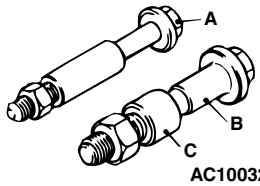
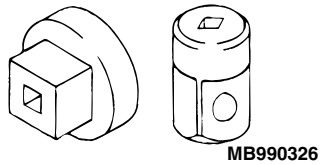
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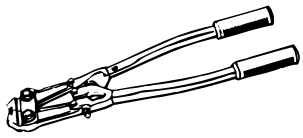
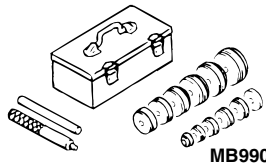
| Item | Specified lubricant | Quantity |
|---|---|---|
| TJ boot grease | Repair kit grease | 145 ± 10 g |
| EBJ boot grease | Repair kit grease | 100 ± 10 g |

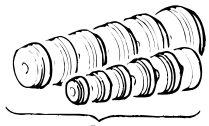
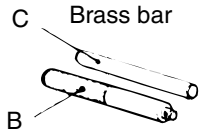
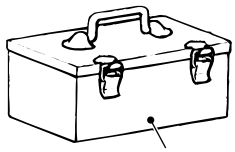
# SPECIAL TOOLS

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| 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<br>*NOTE: Steering linkage puller (MB990635 or MB991113)is also used to disconnect knuckle and tie rod end ball joint.* |

| Tool | Number | Name | Use |
|---|---|---|---|
|  | MB990241<br>A: MB990242<br>B: MB990244 | Axle shaft puller<br>A: Puller shaft<br>B: Puller bar | Removal of the drive shaft |
|  | MB991354 | Puller body | |
|  | MB990590<br>A: MB990212<br>B: MB990211 | Rear axle shaft oil seal remover<br>A: Adapter<br>B: Slide hammer | Removal of the front wheel hub |
|  | MB991721 | Slide hammer | Removal of the output shaft |
|  | A: MB991017<br>B: MB990998<br>C: MB991000 | A, B: Front hub remover and installer<br>C: Spacer | • Removal of the hub<br>• Provisional holding of the wheel bearing<br>• Measurement of hub starting torque<br>• Measurement of wheel bearing axial play<br>*NOTE: MB991000, which belongs to MB990998, should be used as a spacer.* |
|  | MB990685 | Torque wrench | Measurement of hub starting torque |
|  | MB990326 | Preload socket | |

| Tool | Number | Name | Use |
|---|---|---|---|
|  MB991561 | MB991561 | Boot band crimping tool | BJ boot (resin boot) band installation |
|  MB990925 | MB990925 | Bearing and oil seal installer set | • Removal of the wheel bearing<br>• Removal and installation of the centre bearing<br>• Press-fitting of the dust seal outer, inner |

| Tool | Type | Tool number | O D mm |
|---|---|---|---|
| MB990925<br><br>A<br>Installer adapter<br><br>C Brass bar<br>B<br>Bar (snap-in type)<br><br>Tool box<br>ACX02372 AC | 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

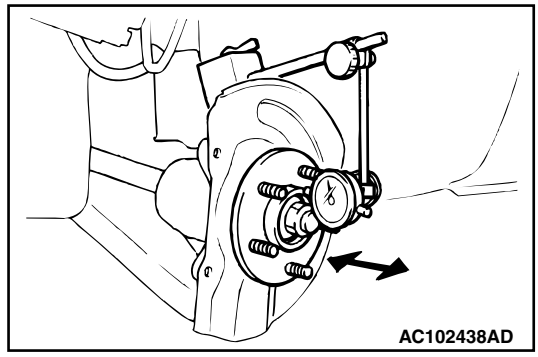
## WHEEL BEARING AXIAL PLAY CHECK

M1261000900268

**⚠ CAUTION**

**During maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched.**

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 108 ± 10 N·m.

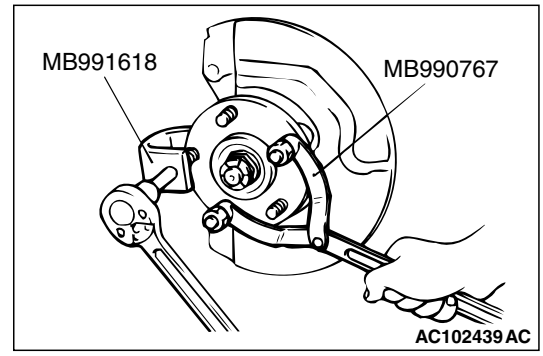
## HUB BOLT REPLACEMENT

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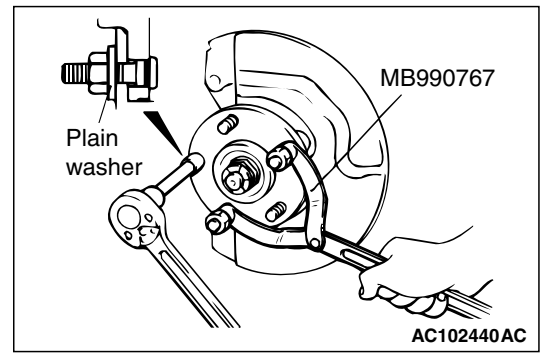
**⚠ CAUTION**

**During maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched.**

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 108 ± 10 N·m.

# FRONT AXLE HUB ASSEMBLY

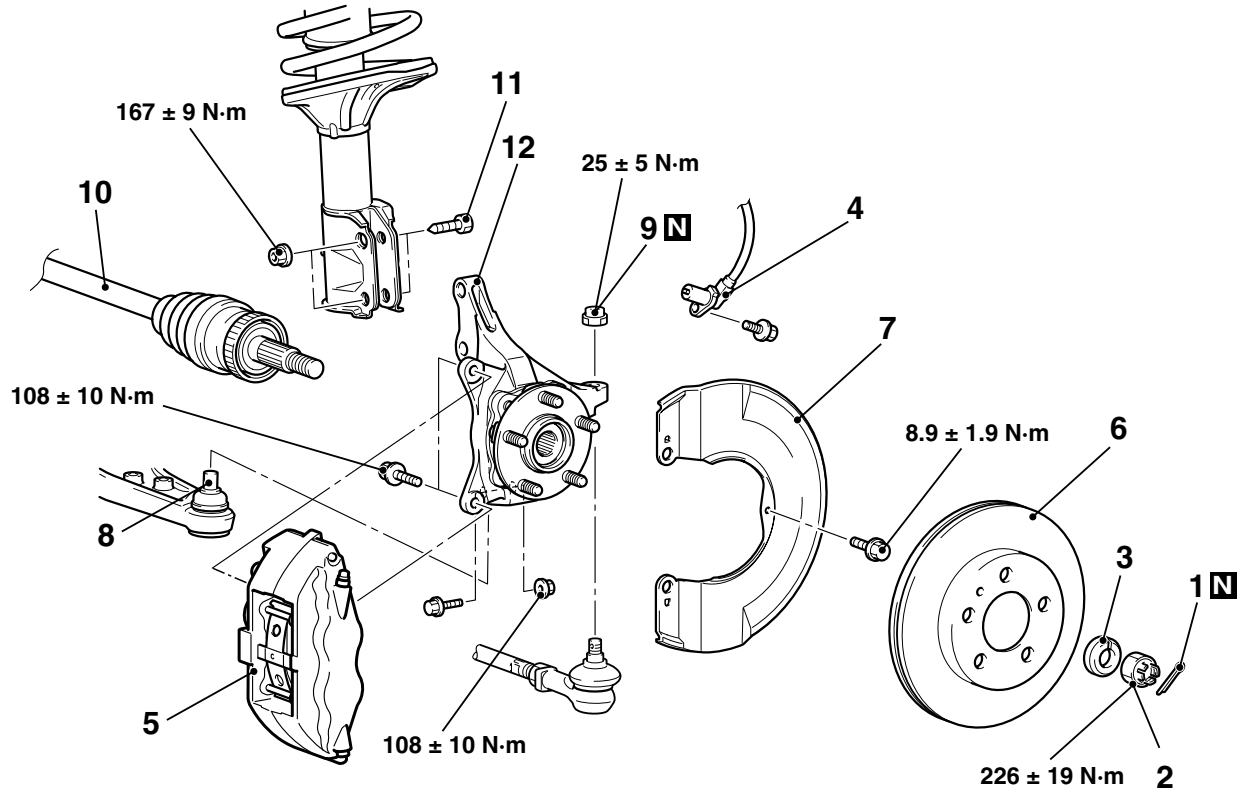
## REMOVAL AND INSTALLATION

M1261001700483

**⚠ CAUTION**

- **Do not strike the ABS rotors installed to the EBJ outer race of drive shaft against other parts when removing or installing the drive shaft. Otherwise the ABS rotors will be damaged.**
- **Be careful not to strike the pole piece at the tip of the front ABS sensor with tools during servicing work.**
- **During maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched. And if there is brake fluid on the caliper, wipe off quickly.**

| Pre-installation Operation | Post-installation Operation |
|---|---|
| • Front Under Cover, Side Under Cover Removal<br>• Transmission Oil Draining (Refer to GROUP22A, On-vehicle Service – Manual Transmission Oil P.22A-149. )<br>• Transfer Oil Draining (Refer to GROUP22A, On-vehicle Service –Transfer Oil P.22A-149. ) | • Check the dust cover for cracks or damage by pushing it with your finger.<br>• Transfer Oil Filling (Refer to GROUP 22A, On-vehicle Service–Transfer Oil P.22A-149. )<br>• Transmission Oil Filling (Refer to GROUP22A, On-vehicle Service – Manual Transmission Oil P.22A-149).<br>• Front Under Cover, Side Under Cover Installation |




AC211630 AC

**Removal steps**

1. Split pin
<<A>> >>A<< 2. Drive shaft nut
>>A<< 3. Washer
4. Front ABS sensor
<<B>> 5. Caliper assembly
<<C>> 6. Brake disc
7. Dust cover

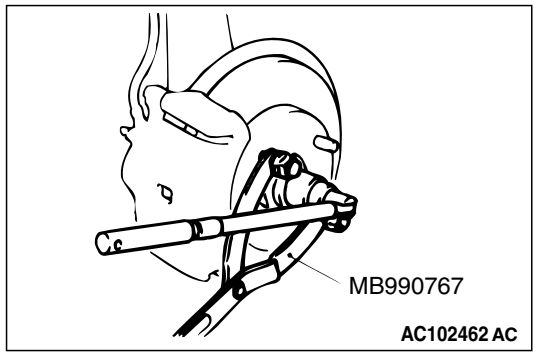
**Removal steps (Continued)**

8. Connection for lower arm ball joint
<<D>> 9. Self-locking nut (tie rod end connection)
<<E>> 10. Drive shaft
11. Nut (hub and knuckle to strut connection)
12. Hub and knuckle assembly

## 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.**

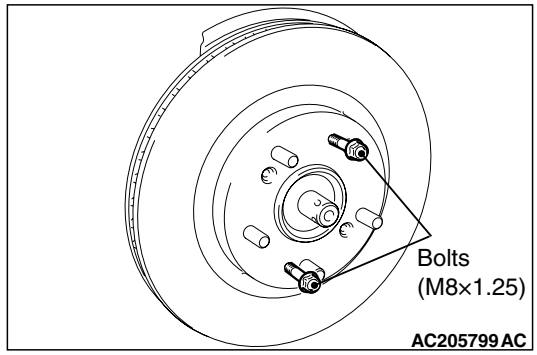



Use special tool end yoke holder (MB990767) to fix the hub and remove the drive shaft nut.

### <<B>> CALIPER ASSEMBLY REMOVAL

**⚠ CAUTION**
**During maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched.**
Secure the removed caliper assembly with wire, etc.

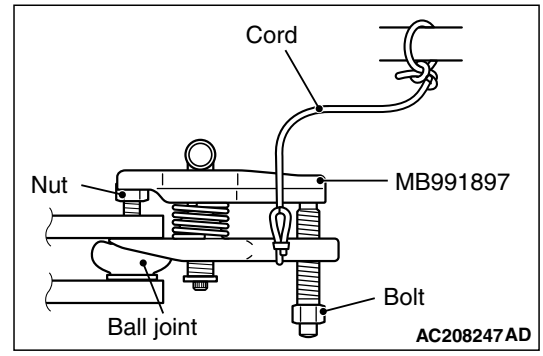
### <<C>> BRAKE DISC REMOVAL



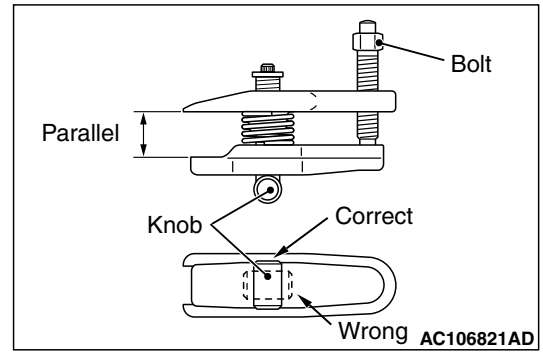

If the brake disc is seized, install a M8×1.25 mm bolts as shown, and remove the disc by tightening the bolts evenly and gradually.

### <<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.**

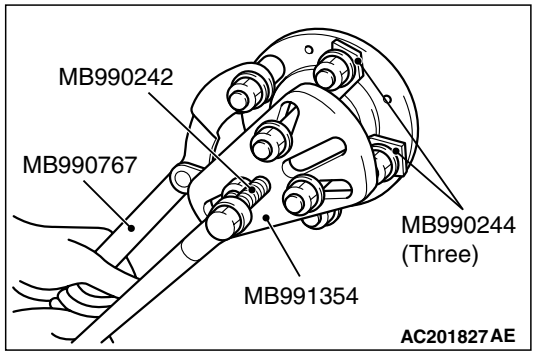



1. Install special tool ball joint remover (MB991897) as shown in the figure.

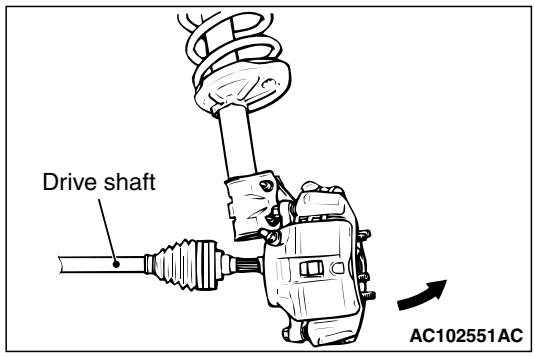



2. Turn the bolt and knob as necessary to make the jaws of special tool parallel, tighten the bolt by hand and confirm that the jaws are still parallel.
   *NOTE: When adjusting the jaws in parallel, make sure the knob is in the position shown in the figure.*
3. Tighten the bolt with a wrench to disconnect the tie rod end.

## <<E>> DRIVE SHAFT REMOVAL




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

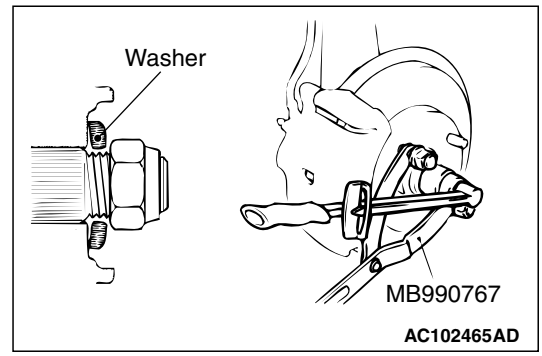



2. Withdraw the drive shaft from the hub by pulling the bottom of the hub and knuckle towards you.
3. Hang the drive shaft on the vehicle body with a rope.

## INSTALLATION SERVICE POINT

## >>A<< WASHER/ DRIVE SHAFT NUT INSTALLATION

**⚠ CAUTION**
**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: 226 ± 19 N·m**

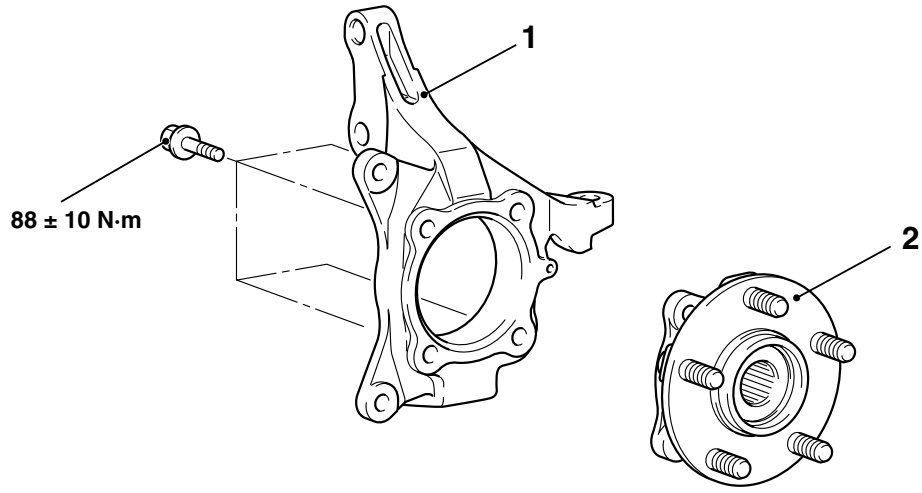
## INSPECTION

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- Check the hub for cracks and spline for wear.
- Check the knuckle for cracks.

## DISASSEMBLY AND REASSEMBLY

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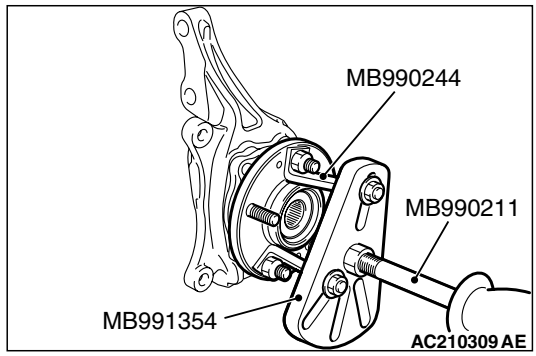

AC211631 AC

| | Disassembly steps |
|---|---|
| | 1. Knuckle |
| <<A>> | 2. Front wheel hub assembly |

## DISASSEMBLY SERVICE POINTS

### <<A>> FRONT WHEEL HUB ASSEMBLY REMOVAL

1. If the front wheel hub is seized, remove the knuckle together with front wheel hub and fix them with a vise.

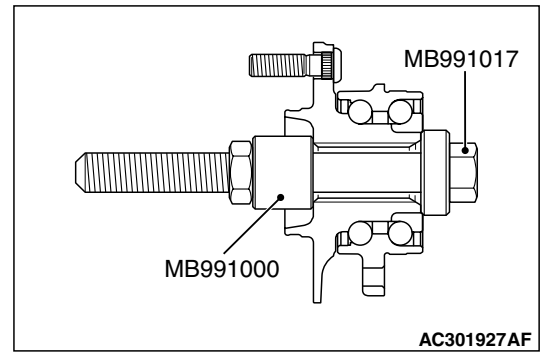



2. Use the following special tools to pull out the front wheel hub from the knuckle.
   - Puller bar (MB990244)
   - Puller body (MB991354)
   - Slide hammer (MB990211)

## INSPECTION

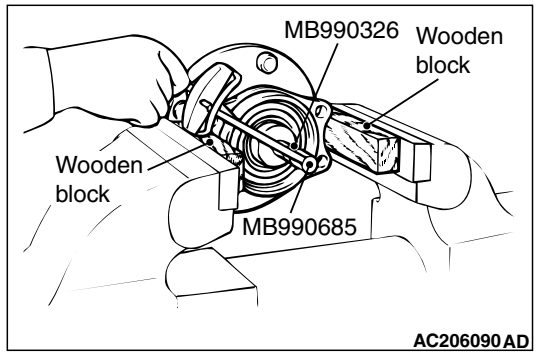
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### WHEEL BEARING ROTATION STARTING TORQUE AND AXIAL PLAY CHECK



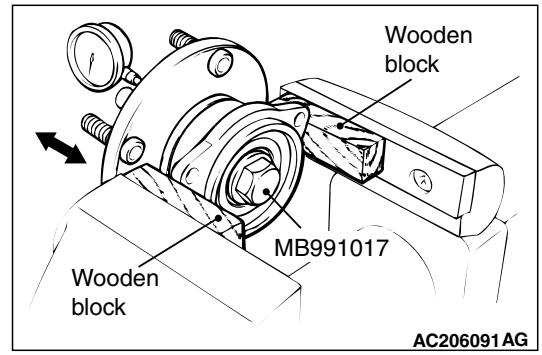

1. Tighten the following special tools to the specified torque.
   - Front hub remover and installer (MB991017)
   - Spacer (MB991000)

   **Tightening torque: 226 ± 19 N·m**
2. Hold the front wheel hub assembly in a vice with a wooden block.
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: 1.03 N·m**
5. If the rotation starting torque is not within the limit range while the nut is tightened to 226 ± 19 N·m, replace the front wheel hub assembly. If there are any signs of binding or tight spots when the wheel bearing turns, replace it.




6. Measure to determine whether the wheel bearing axial play is within the specified limit or not.

   **Limit: 0.05 mm**
7. If the play is not within the limit range while the nut is tightened to 226 ± 19 N·m, replace the front wheel hub assembly.

# DRIVE SHAFT ASSEMBLY

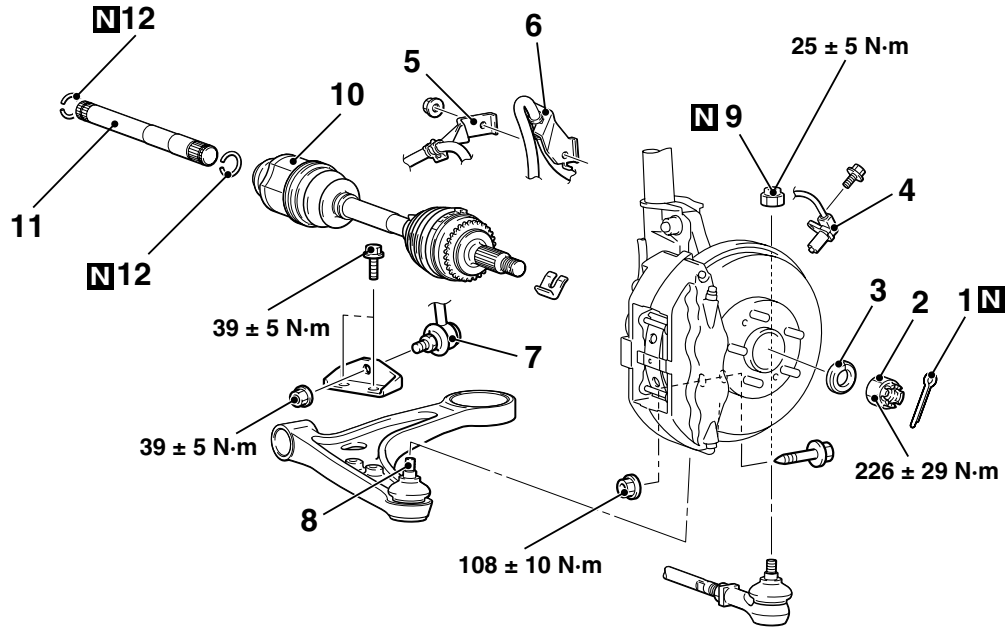
## REMOVAL AND INSTALLATION

M1261003500537

**⚠ CAUTION**

- **Do not strike the ABS rotors installed to the EBJ outer race of drive shaft against other parts when removing or installing the drive shaft. Otherwise the ABS rotors will be damaged.**
- **Be careful not to strike the pole piece at the tip of the front ABS sensor with tools during servicing work.**
- **During maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched. And if there is brake fluid on the caliper, wipe off quickly.**

| Pre-installation Operation | Post-installation Operation |
|---|---|
| • Front under cover, side under cover removal<br>• Transmission Fluid Draining (Refer to GROUP 22A, On-vehicle service – Transmission oil replacement P.22A-149).<br>• Transfer Oil Draining (Refer to GROUP 22A, On-vehicle service – Transfer oil P.22A-149). | • Check the ball Joint dust cover for cracks or damage by pushing it with your finger.<br>• Transfer Oil Filling (Refer to GROUP 22A, On-vehicle service – Transfer oil P.22A-149).<br>• Transmission Fluid Filling (Refer to GROUP 22A, On-vehicle service – Transmission oil replacement P.22A-149).<br>• Front Under cover, side under cover Installation |



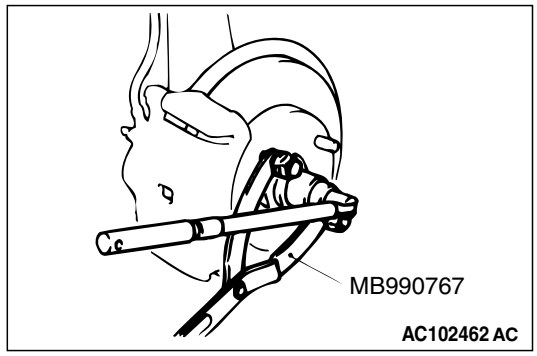

AC211632 AC

| | | Removal steps |
|---|---|---|
| | 1. | Split pin |
| <<A>> >>B<< | 2. | Drive shaft nut |
| >>B<< | 3. | Washer |
| | 4. | Front ABS sensor |
| | 5. | Front ABS sensor harness bracket |
| | 6. | Brake hose bracket |
| | 7. | Stabilizer bar link connection |
| | 8. | Lower arm ball joint connection |
| <<B>> | 9. | Self-locking nut (tie rod end connection) |
| <<C>> >>A<< | 10. | Drive shaft |
| <<D>> >>A<< | 11. | Output shaft |
| | 12. | Circlip |

## REMOVAL SERVICE POINTS

### <<A>> DRIVE SHAFT NUT REMOVAL

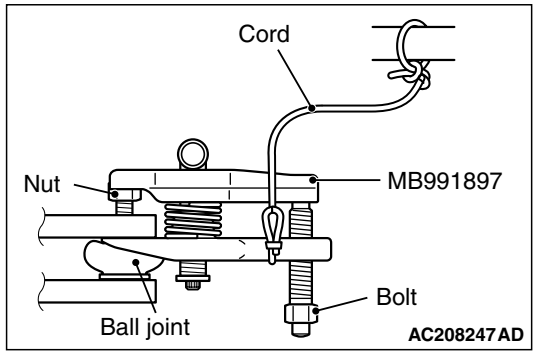
**⚠ CAUTION**
**Do not apply pressure to the wheel bearing by the vehicle weight to avoid possible damage when the drive shaft nut is loosened.**



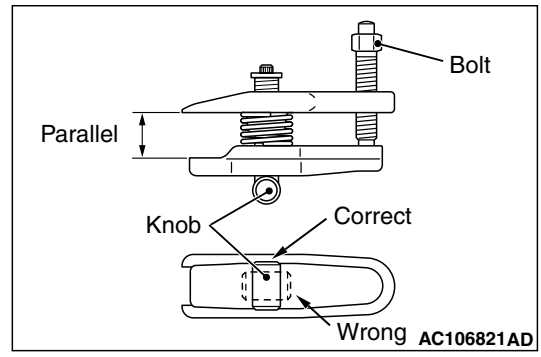

Use special tool end yoke holder (MB990767) to fix the hub and remove the drive shaft nut.

### <<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.**

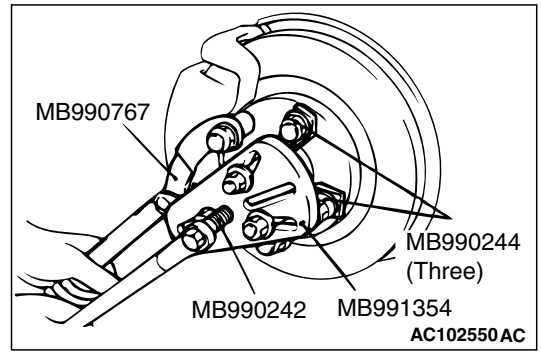



1. Install special tool ball joint remover (MB991897) as shown in the figure.

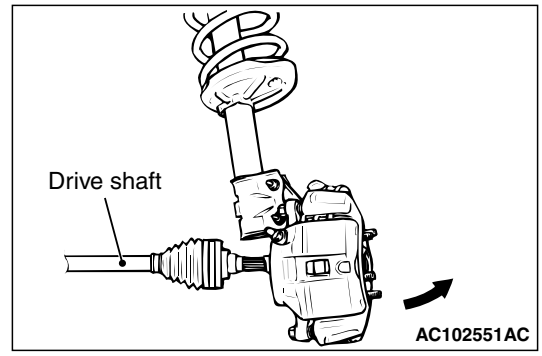



2. Turn the bolt and knob as necessary to make the jaws of special tool parallel, tighten the bolt by hand and confirm that the jaws are still parallel.
   *NOTE: When adjusting the jaws in parallel, make sure the knob is in the position shown in the figure.*
3. Tighten the bolt with a wrench to disconnect the tie rod end.

### <<C>> DRIVE SHAFT REMOVAL

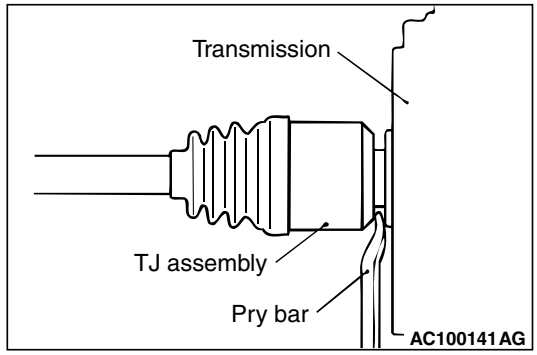



1. Use the following special tools to push out the drive shaft from the hub.
   - Puller shaft (MB990242)
   - Puller bar (MB990244)
   - Puller body (MB991354)
   - End yoke holder (MB990767)



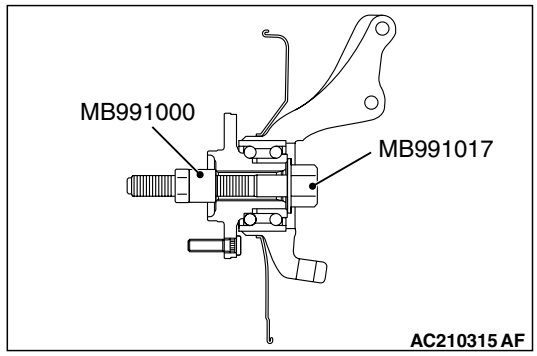

2. Remove the drive shaft from the hub by pulling the bottom of the brake disc towards you.

**⚠ 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.

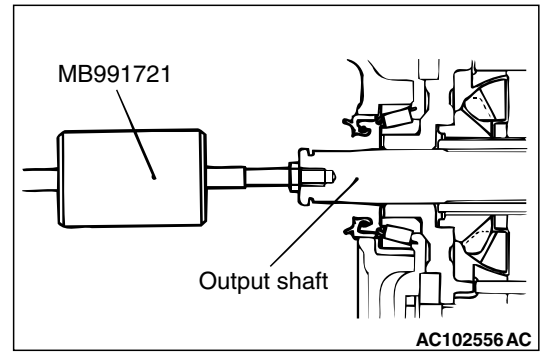
**⚠ CAUTION**




**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)**

## <<D>>OUTPUT SHAFT REMOVAL

**⚠ CAUTION**
**When pulling the output shaft out from the tansaxle, be careful that the spline part of the output shaft does not damage the oil seal.**



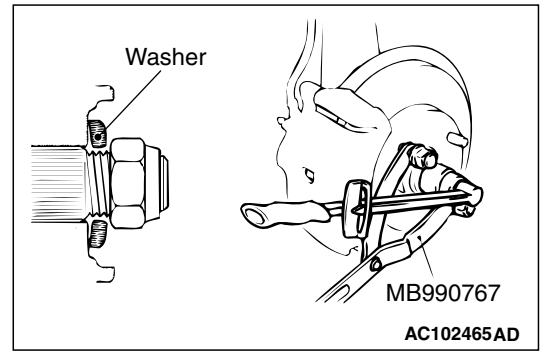

Use special tool slide hammer (MB991721) to remove the output shaft.

## INSTALLATION SERVICE POINTS

## >>A<< OUTPUT SHAFT/DRIVE SHAFT INSTALLATION

**⚠ CAUTION**
**When installing the output shaft or the drive shaft, be careful that the spline part of the output shaft or the drive shaft 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.

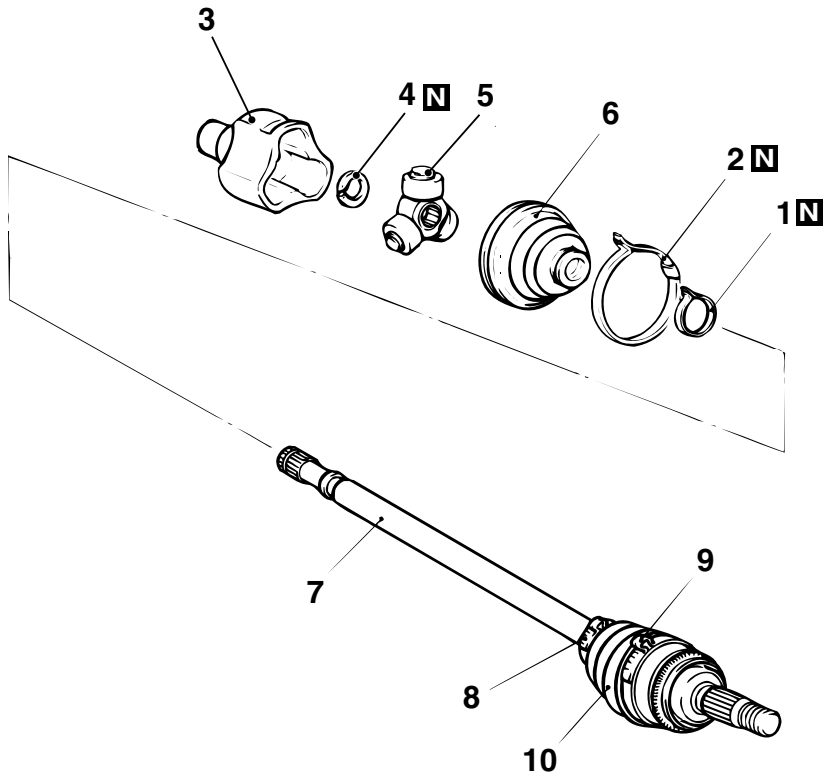
**Tightening torque: 226 ± 29 N·m**

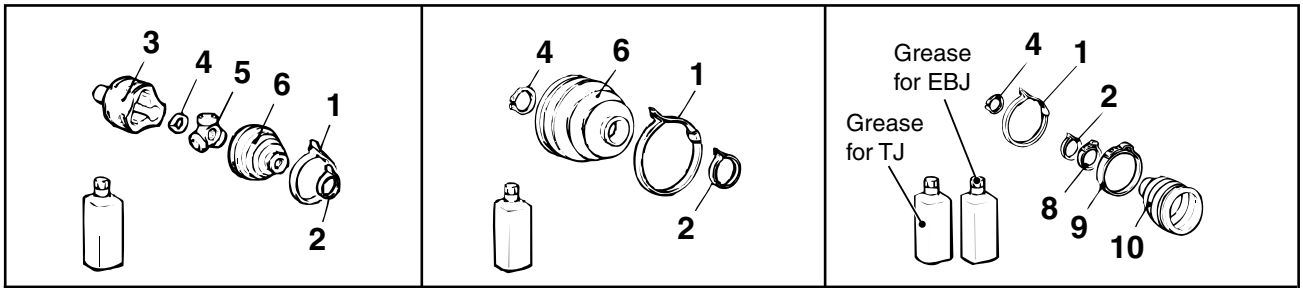
## DISASSEMBLY AND REASSEMBLY

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**⚠ CAUTION**

- **Be careful not to damage the ABS rotor, which is attached to the EBJ outer race during disassembly and reassembly.**
- **Never disassemble the EBJ assembly except when replacing the EBJ boot.**




| TJ boot repair kit | TJ repair kit | EBJ boot repair kit |
|---|---|---|

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**Disassembly steps**

| | | | |
|---|---|---|---|
| | **>>D<<** | 1. | TJ boot band (large) |
| | **>>D<<** | 2. | TJ boot band (small) |
| **<<A>>** | **>>C<<** | 3. | TJ case |
| | | 4. | Snap ring |
| **<<A>>** | **>>B<<** | 5. | Spider assembly |
| **<<B>>** | **>>A<<** | 6. | TJ boot |
| | | 7. | EBJ assembly |

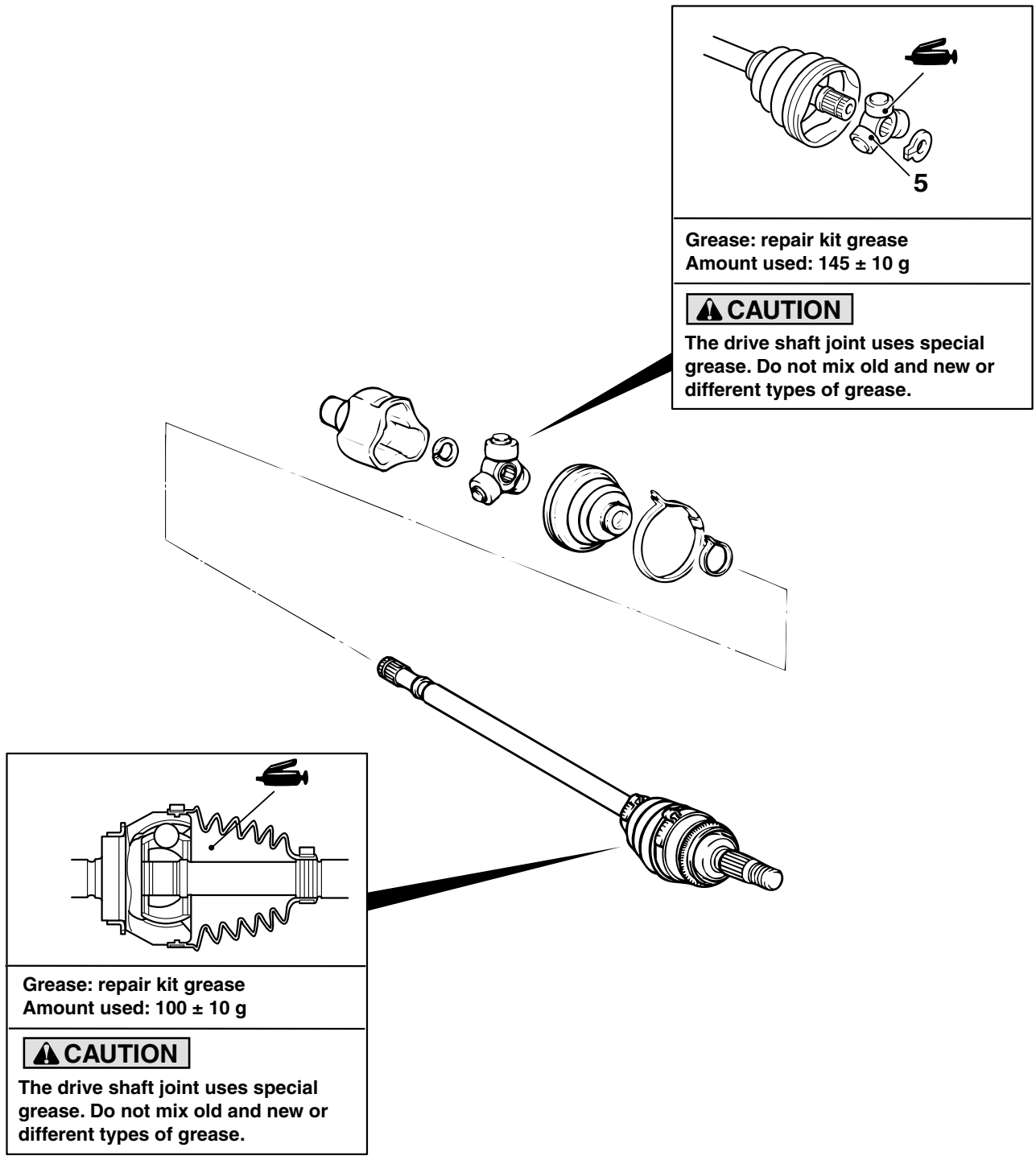
**Disassembly steps (Continued)**

8. EBJ boot band (small)
9. EBJ boot band (large)
10. EBJ boot

*NOTE:*

- *TJ: Tripod Joint*
- *EBJ: Eight Ball Fixed Joint*

## LUBRICATION POINTS




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## DISASSEMBLY SERVICE POINTS

### <<A>> 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.

## <<B>> 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<< TJ BOOT INSTALLATION

Wrap plastic tape around the shaft spline, and then install the TJ boot band (small) and TJ boot.

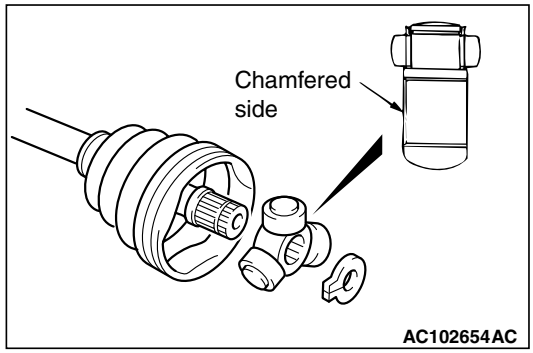
## >>B<< SPIDER ASSEMBLY INSTALLATION

**⚠ 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**

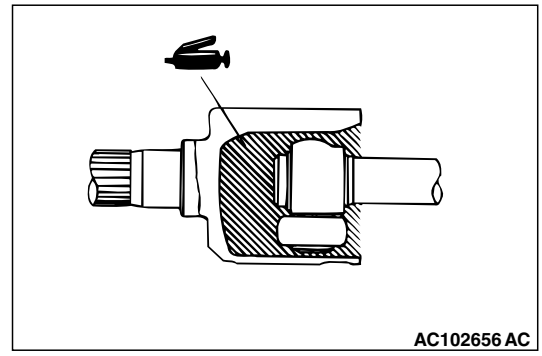



2. Install the spider assembly to the shaft from the direction of the spline chamfered side.

## >>C<< TJ CASE INSTALLATION

**⚠ CAUTION**

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

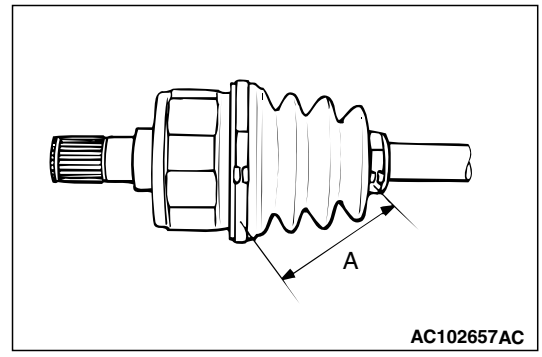



After applying the specified grease to the TJ case, insert the drive shaft and apply grease one more time.

**Specified grease: Repair kit grease**
**Amount to use: 145 ± 10 g**

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

## >>D<< TJ BOOT BAND (SMALL)/TJ BOOT BAND (LARGE) INSTALLATION




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): 85 ± 3 mm**

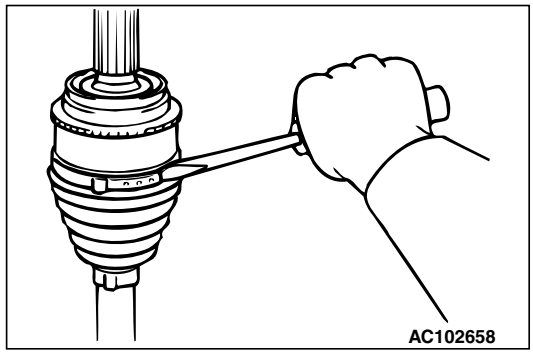
## INSPECTION

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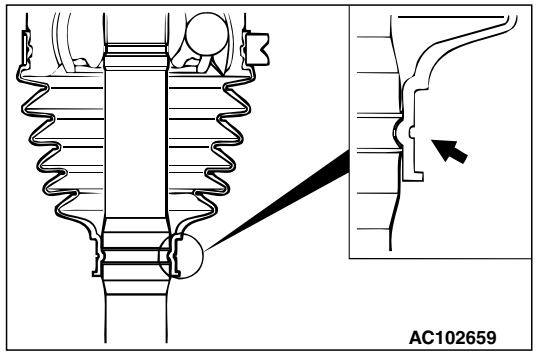
- Check the drive shaft for damage, bending or corrosion.
- Check the drive shaft spline part for wear or damage.
- Check the spider assembly for roller rotation, wear or corrosion.
- Check the groove inside TJ case for wear or corrosion.
- Check the boots for deterioration, damage or cracking.

## EBJ BOOT (RESIN BOOT) REPLACEMENT

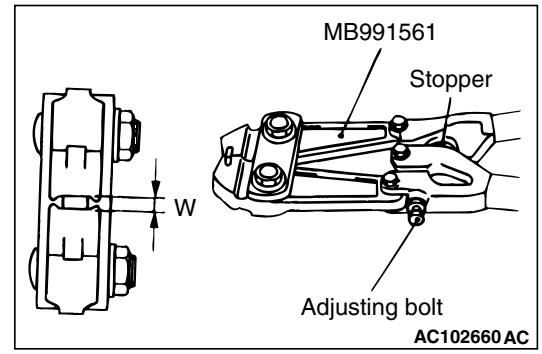
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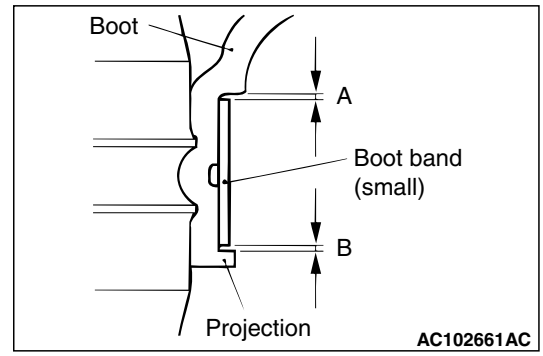

1. Remove the boot bands (large and small).
   *NOTE: The boot bands cannot be re-used.*
2. Remove the EBJ boot.
3. Wrap a plastic tape around the shaft spline, and assemble the boot band and EBJ boot.




4. Align the centre groove on the EBJ boot small end with the shaft groove.

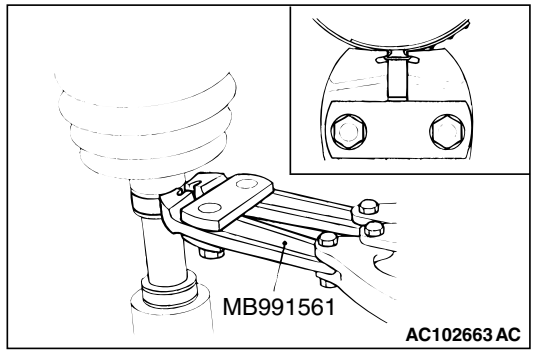



5. Turn the adjusting bolt on special tool boot band crimping tool (MB991561) so that the size of the opening (W) is at the standard value.
   **Standard value (W): 2.9 mm**
   **<If it is larger than 2.9 mm> Tighten the adjusting bolt.**
   **<If it is smaller than 2.9 mm> Loosen the adjusting bolt.**
   *NOTE: The value of W will change by approximately 0.7 mm for each turn of the adjusting bolt.*
   *NOTE: The adjusting bolt should not be turned more than once.*

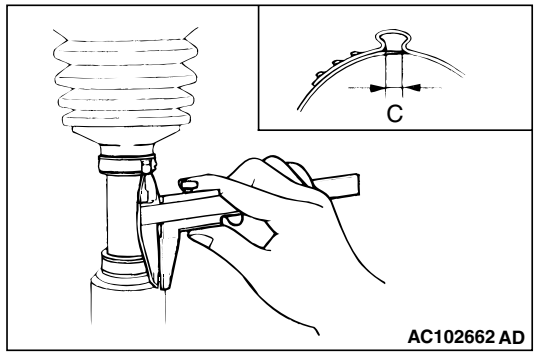



6. Position the EBJ boot band (small) so that there is even clearance at either end (A and B).

**⚠ CAUTION**
- **Secure the drive shaft in an upright position and clamp part of the boot band to be crimped securely in the jaws of special tool.**
- **Crimp the boot band until special tool touches the stopper.**




7. Use the special tool to crimp the boot band (small).




8. Check that the crimping amount (C) of the boot band is at the standard value.

   **Standard value (C): 2.4 – 2.8 mm**

   **<If the crimping amount is larger than 2.8 mm >**

   **Readjust the value of (W) in step 5 according to the following formula, and then repeat the operation in step 7.**

   **W = 5.5 mm – C**

   **Example: If C = 2.9 mm, then W = 2.6 mm.**

   **<If the crimping amount is smaller than 2.4 mm >**

   **Remove the EBJ boot band, readjust the value of (W) in step 5 according to the following formula, and then repeat the operations in steps 6 and 7 using a new EBJ boot band.**

   **W = 5.5 mm – C**

   **Example: If C = 2.3 mm, then W = 3.2 mm.**

9. Check that the boot band is not sticking out past the place where it has been installed. If the boot band is sticking out, remove it and then repeat steps 6 to 8, using a new boot band.

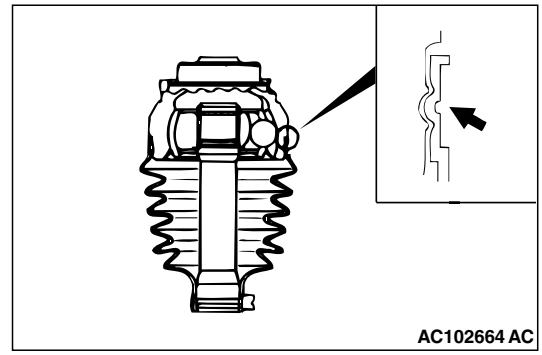
**⚠ CAUTION**

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

10. Fill the inside of the boot with the specified amount of the specified grease.

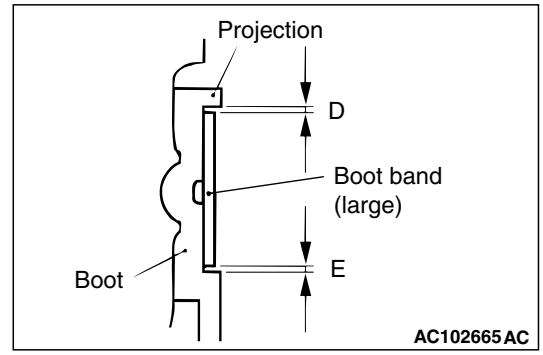
    **Specified grease: Repair kit grease**

    **Amount to use: 100 ± 10 g**

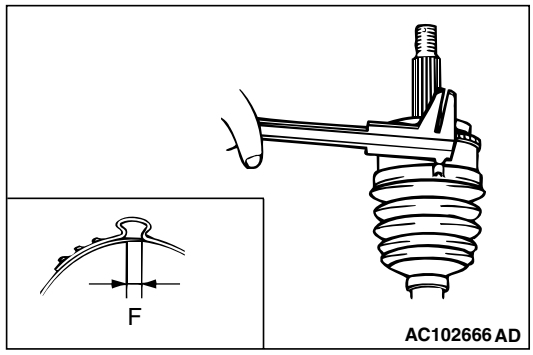



11. Align the centre groove on the EBJ boot big end with the EBJ case groove.
12. Follow the same procedure as in step 5 to adjust the size of the opening (W) on the special tool so that it is at the standard value.

    **Standard value (W): 3.2 mm**




13. Position the EBJ boot band (large) so that there is even clearance at either end (D and E).
14. Use the special tool to crimp the EBJ boot band (large) in the same way as in step 7.




15.Check that the crimping amount (F) of the boot band is at the standard value.

**Standard value (F): 2.4 – 2.8 mm**

**<If the crimping amount is larger than 2.8 mm >**

**Readjust the value of (W) in step 12 according to the following formula, and then repeat the operation in step 14.**

**W = 5.8 mm – F**

**Example: If F = 2.9 mm, then W = 2.9 mm.**

**<If the crimping amount is smaller than 2.4 mm >**

**Remove the EBJ boot band, readjust the value of (W) in step 12 according to the following formula, and then repeat the operations in steps 13 and 14 using a new EBJ boot band.**

**W = 5.8 mm – F**

**Example: If F = 2.3 mm, then W = 3.5 mm.**

16.Check that the boot band is not sticking out past the place where it has been installed. If the boot band is sticking out, remove it and then repeat steps 13 to 15, using a new boot band.