FRONT AXLE

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GENERAL INFORMATION

The front axle consists of front hubs, knuckles, wheel bearings and drive shafts, and it has the following features.

- The wheel beearing is unit bearing integrated with hub (Double-row angular contact ball bearing).
- The drive shaft incorporates B.J.-T.J. type constant velocity joints with high transmission efficiency and low vibration and noise.
- ABS rotors for detecting the wheel speeds are press-fitted to the B.J. outer wheels in vehicles with ABS or ACD.

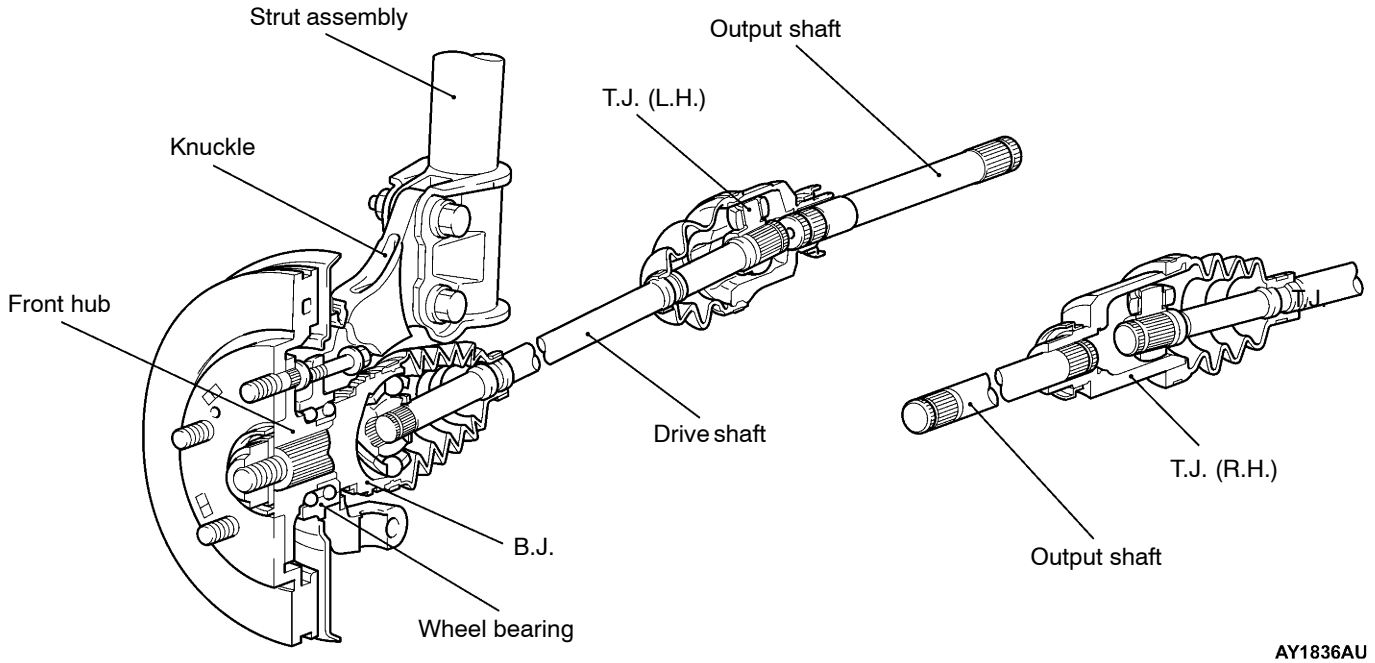
NOTE
1. B.J.: Birfield Joint
2. T.J.: Tripod Joint

SPECIFICATIONS

Item			Specifications
Wheel bearings	Wheel bearing type		Hub unit bearing (Double-row angular contact ball bearing)
	Bearing (outside diameter) mm		87*1
Drive shaft	Joint type	Outside	B.J.
		Inside	T.J.
	Shaft length*2 × Shaft diameter mm	Left	350 × 26
		Right	427 × 26

NOTE
*1: The wheel beearing is integrated with hub, only the outer diameter is shown.
*2: The shaft length indicates the length between the center points of each joint.

STRUCTURAL DIAGRAM



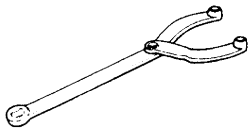
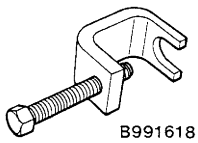
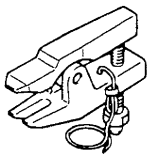
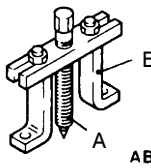
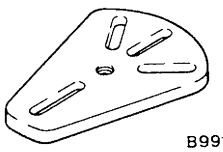
SERVICE SPECIFICATIONS

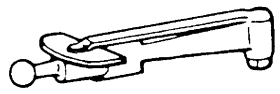
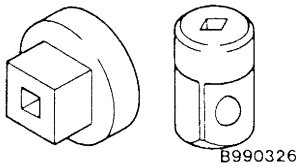
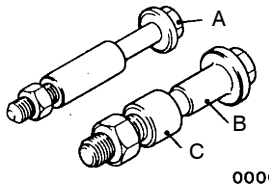
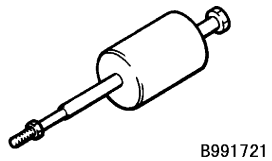
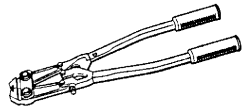
Item		Standard value	Limit
Wheel bearing axial play mm		-	0.06
Wheel bearing rotation starting torque N·m		-	1.03 or less
Setting of T.J. boot length mm		85 ± 3	-
Opening dimension of the special tool (MB991561) mm	When the B.J.boot band (small) is crimped.	2.9	-
	When the B.J.boot band (big) is crimped.	3.2	-
Crimped width of the B.J.boot band mm		2.4 - 2.8	-

LUBRICANTS

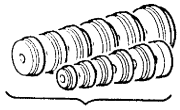
Items	Specified lubricants	Quantity g
T.J. boot grease	Repair kit grease	120 ± 10
B.J.boot grease	Repair kit grease	110 ± 10

SPECIAL TOOLS

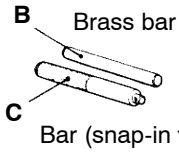
Tool	Number	Name	Use
	MB990767	End yoke holder	Fixing of the hub
 B991618	MB991618	Hub bolt remover	Removal of the hub bolt
 B991113	MB991113 or MB990635	Steering linkage puller	Disconnection of ball joint
 AB990241	MB990241 A: MB990242 B: MB990244	Axle shaft puller A: Puller shaft B: Puller bar	• Removal of the drive shaft • Removal of the hub
 B991354	MB991354	Puller body	• Removal of the drive shaft • Removal of the hub

Tool	Number	Name	Use
	MB990685	Torque wrench	Measurement of wheel bearing rotation starting torque
 B990326	MB990326	Preload socket	Measurement of wheel bearing rotation starting torque
 00005697	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 rotation starting torque • Measurement of wheel bearing axial play MB991000, which belongs to MB990998, should be used as a spacer.
 B991721	MB991721	Sliding hammer	Output shaft removal
	MB991561	Boot band clipping tool	Resin boot band installation

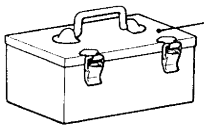
MB990925



A
Installer adapter



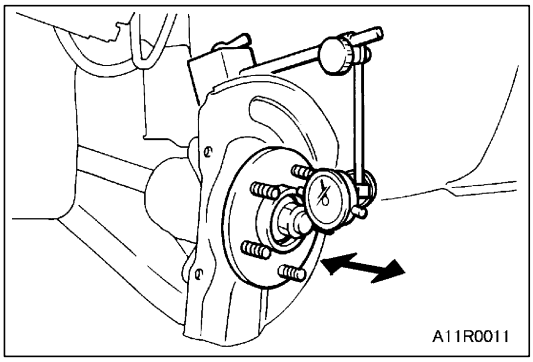
B Brass bar
C Bar (snap-in type)



Tool box

A11W0113

Type	Tool number	O.D. mm	Type	Tool number	O.D. mm
A	MB990926	39	A	MB990933	63.5
	MB990927	45		MB990934	67.5
	MB990928	49.5		MB990935	71.5
	MB990929	51		MB990936	75.5
	MB990930	54		MB990937	79
	MB990931	57	B	MB990938	-
	MB990932	61	C	MB990939	-

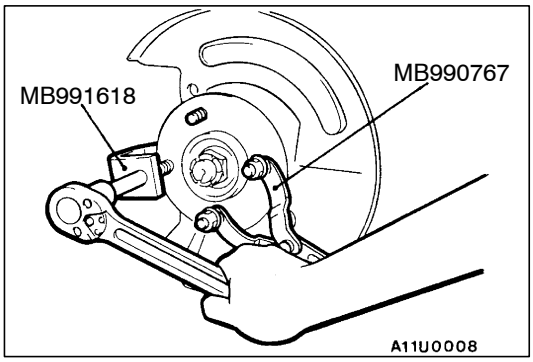


ON-VEHICLE SERVICE

WHEEL BEARING AXIAL PLAY CHECK

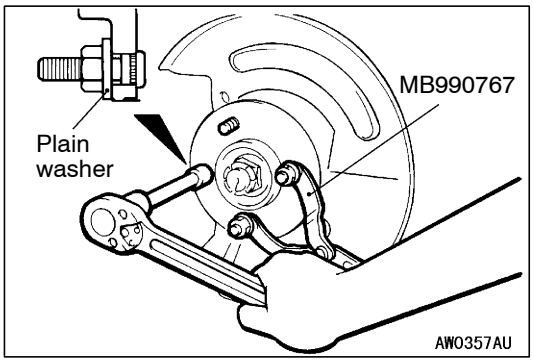
1. Remove the disc brake caliper and suspend it with a wire.
2. Remove the brake disc from the front hub.
3. Attach a dial gauge as shown in the illustration, and then measure the axial play while moving the hub in the axial direction.

   Limit: 0.06 mm
4. If axial play exceeds the limit, replace the front hub assembly.



HUB BOLT REPLACEMENT

1. Remove the caliper assembly and secure it with wire so that it does not fall.
2. Remove the brake disc.
3. Use the special tools to remove the hub bolts.
4. Install the plain washer to the new hub bolt, and install the bolt with a nut.



HUB AND KNUCKLE ASSEMBLY

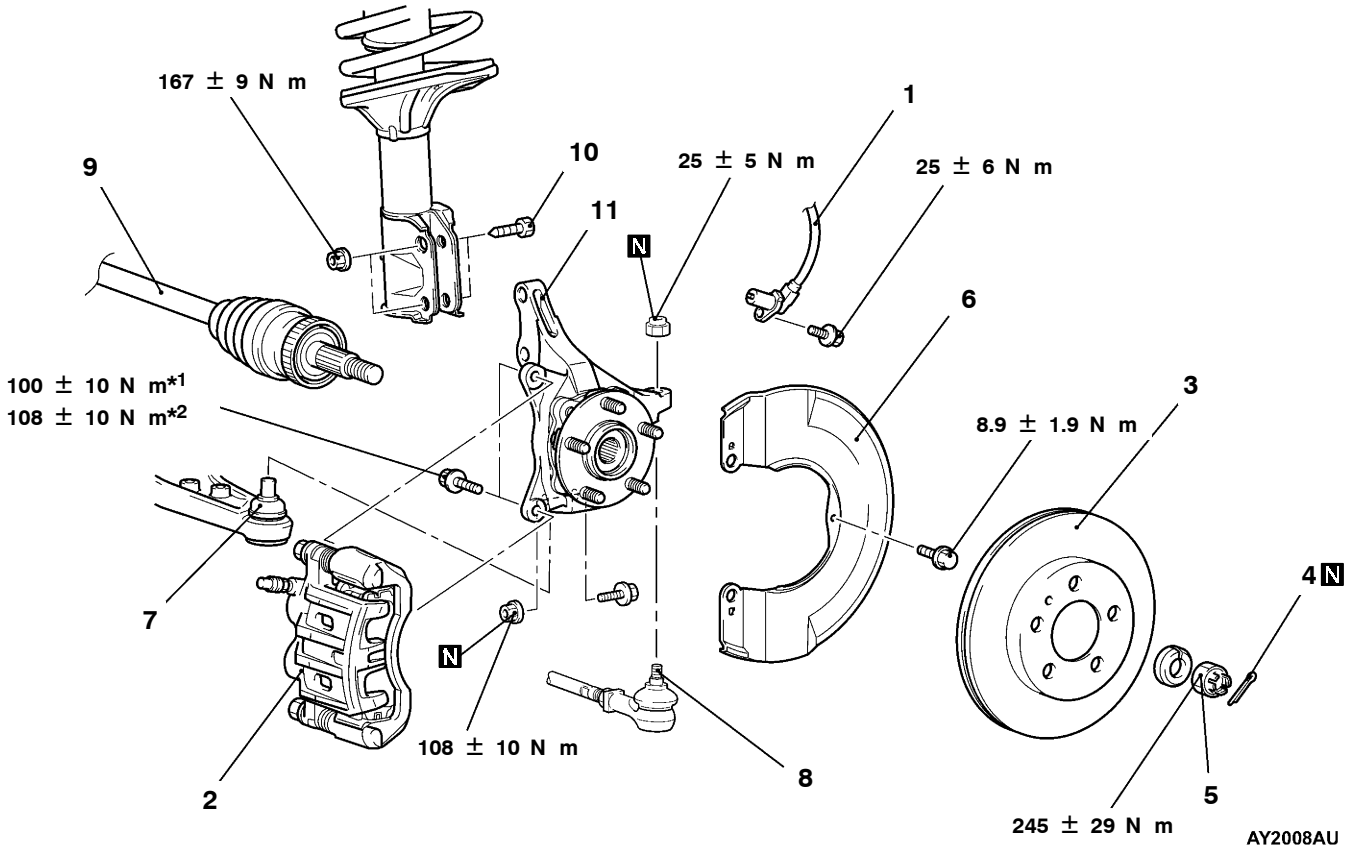
REMOVAL AND INSTALLATION

Caution

If the vehicle is equipped with the Brembo disc brake, 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 out quickly.

Pre-removal and Post-installation Operation
- Transmission Fluid Draining
- Transfer Oil Draining (Refer to GROUP 22 – On-vehicle Service.)

Pre-removal and Post-installation Operation
- Check the dust cover for cracks or damage by pushing it with finger.
- Transfer Oil Filling (Refer to GROUP 22 – On-vehicle Service.)
- Transmission Fluid Filling



*1: Vehicles without BREMBO disc brake

*2: Vehicles with BREMBO disc brake

Removal steps

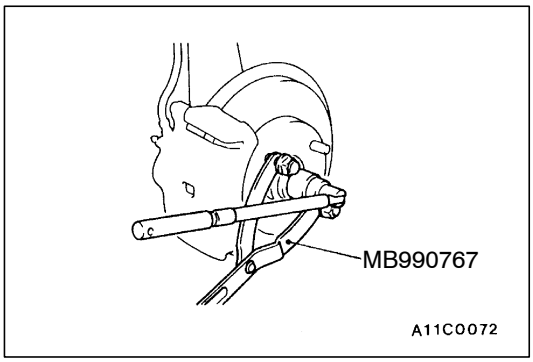
1. Front speed sensor <Vehicles with ACD or ABS>
◀A▶ 2. Caliper assembly
3. Brake disc
4. Split pin
◀B▶ ▶A◀ 5. Castle nut
6. Dust shield
7. Connection for lower arm ball joint
◀C▶ 8. Connection for tie rod end
◀D▶ 9. Drive shaft
10. Front strut to hub and knuckle mounting bolt and nut
11. Hub and knuckle assembly

REMOVAL SERVICE POINTS

◀A▶ CALIPER ASSEMBLY REMOVAL

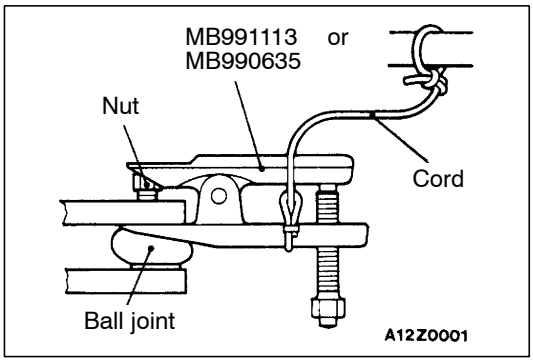
Secure the removed caliper assembly with wire, etc.

Caution
If the vehicle is equipped with the Brembo disc brake, 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 out quickly.



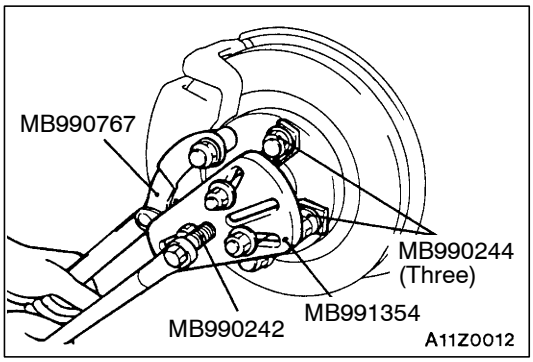
◀B▶ CASTLE NUT REMOVAL

Caution
Do not apply the vehicle weight to the wheel bearing while loosening the castle nut. Otherwise wheel bearing will be damaged.



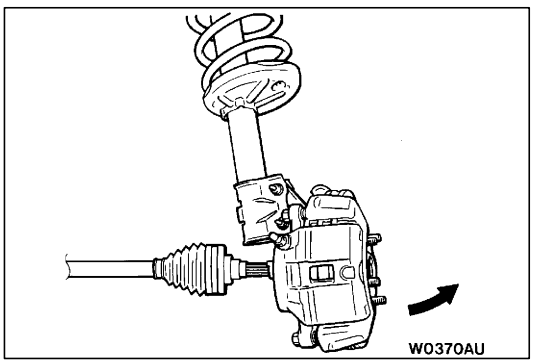
◀C▶ TIE ROD END DISCONNECTION

Caution
1. **Loosen the nut only; do not remove it from the ball joint. Otherwise ball joint thread will be damaged.**
2. **The special tool should be suspended by a cord to prevent it from coming off.**

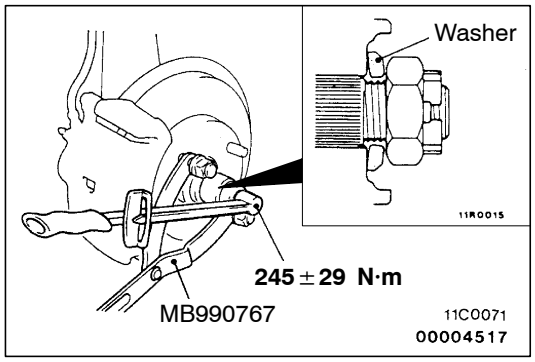


◀D▶ DRIVE SHAFT REMOVAL

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



2. Withdraw the drive shaft from the hub by pulling the bottom of the brake disc towards you, and then remove the hub retaining bolts.

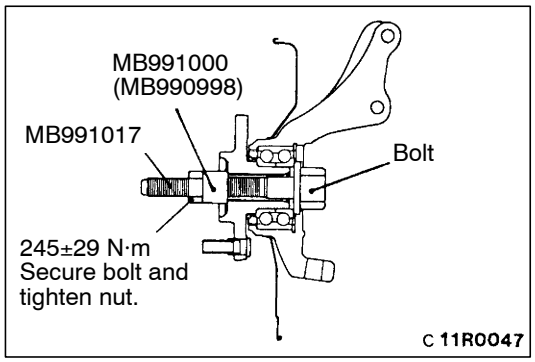


INSTALLATION SERVICE POINT

▶A◀CASTLE NUT INSTALLATION

1. Be sure to install the castle nut washer in the specified direction.
2. Using the special tool, tighten the castle nut.

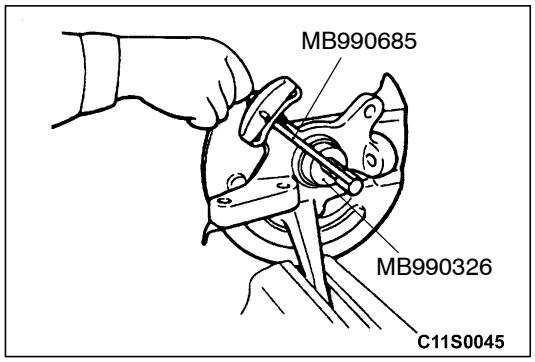
Caution
Before securely tightening the castle nuts, make sure there is no load on the wheel bearings. Otherwise wheel bearing will be damaged.



INSPECTION

INSPECTION OF WHELL BEARING ROTATION STARTING TORQUE

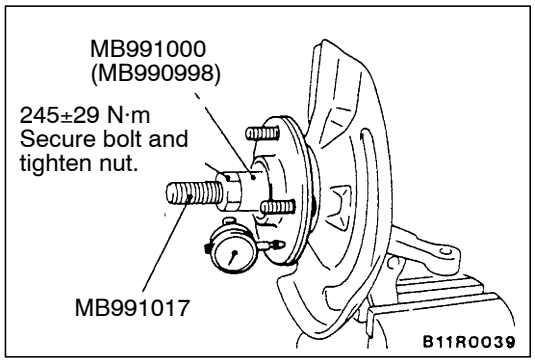
1. Tighten special tools in hub and knuckle assembly to the specified torque.



2. Measure the wheel bearing rotation starting torque with special tools.

   Limit: 1.03 N·m or less

3. Wheel bearing rotation starting torque must be under the limit value and there should be no roughness when rotating the hub.



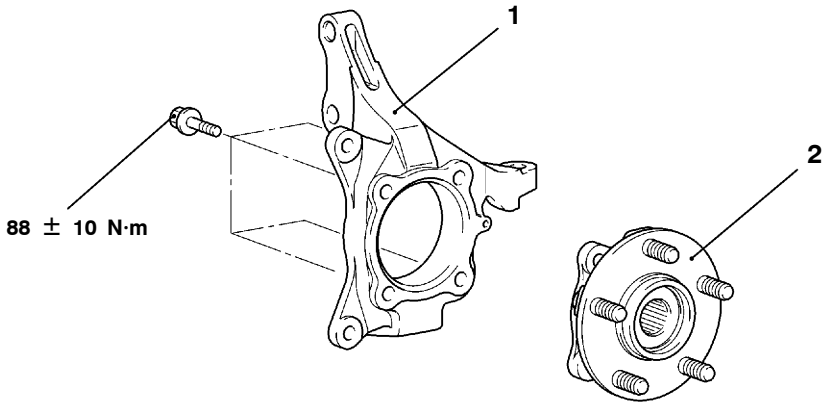
WHEEL BEARING AXLE PLAY CHECK

1. Secure knuckle in a vice to measure axle play in wheel bearing.

   Limit: 0.06 mm

2. If the limit value of wheel bearing axle plya cannot be obtained when tightened to the specified torque (245 ± 29 N·m), check mounting bolt for hub and knuckle assembly. If no defects are found, replace hub assembly.

DISASSEMBLY AND REASSEMBLY



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Disassembly steps

1. Knuckle
2. Front hub assembly

DRIVE SHAFT

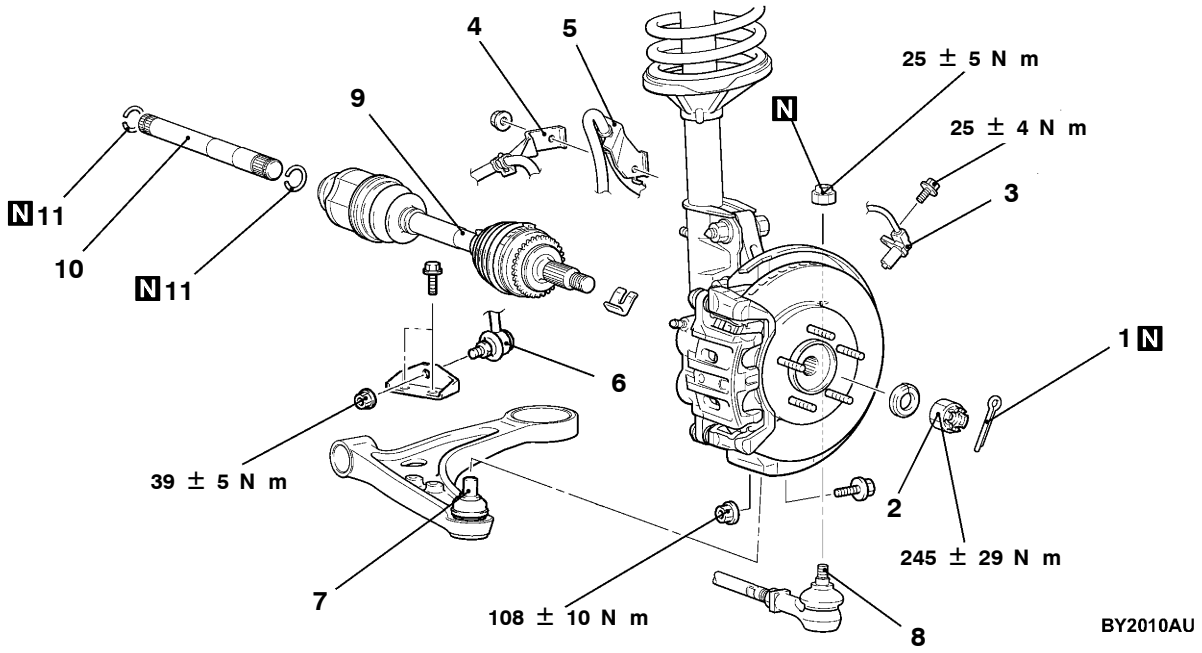
REMOVAL AND INSTALLATION

Caution

1. **If the vehicle is equipped with the Brembo disc brake, 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 out quickly.**
2. **For vehicles with ABS or ACD, do not strike the rotor for wheel speed sensor installed to the B.J. outer race of drive shaft against other parts when removing or installing the drive shaft. Otherwise the rotor for wheel speed sensor will be damaged.**

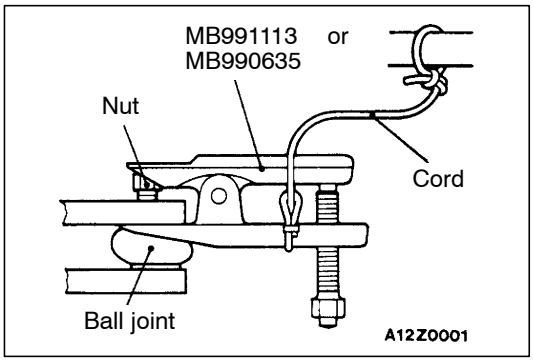
Pre-removal and Post-installation Operation
- Transmission Fluid Draining
- Transfer Oil Draining (Refer to GROUP 22 – On-vehicle Service.)

Pre-removal and Post-installation Operation
- Check the Dust Cover for cracks or damage by pushing it with finger.
- Transfer Oil Filling (Refer to GROUP 22 – On-vehicle Service.)
- Transmission Fluid Filling



Removal steps

▶B◀ 1. Split pin
▶B◀ 2. Castle nut
3. Front speed sensor <Vehicles with ABS or ACD>
4. Front speed sensor harness bracket
5. Brake hose bracket
6. Stabilizer bar link connection
7. Lower arm ball joint connection
◀A▶ 8. Tie rod end connection
◀B▶ ▶A◀ 9. Drive shaft
◀C▶ ▶A◀ 10. Output shaft
11. Circlip

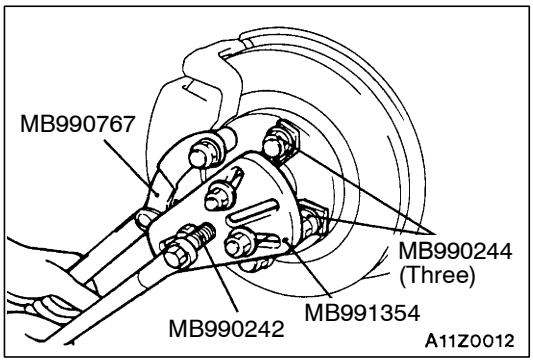


REMOVAL SERVICE POINTS

◀A▶ TIE ROD END DISCONNECTION

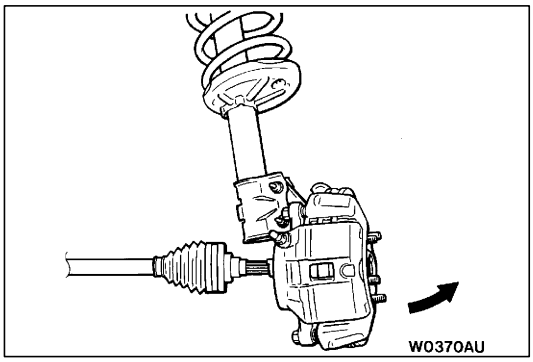
Caution

1. **Loosen the nut only; do not remove it from the ball joint. Otherwise ball joint thread will be damaged.**
2. **The special tool should be suspended by a cord to prevent it from coming off.**

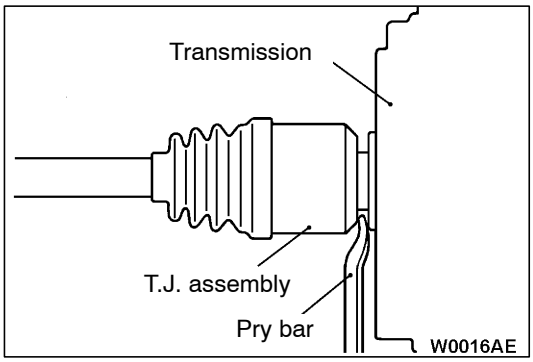


◀B▶ DRIVE SHAFT REMOVAL

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



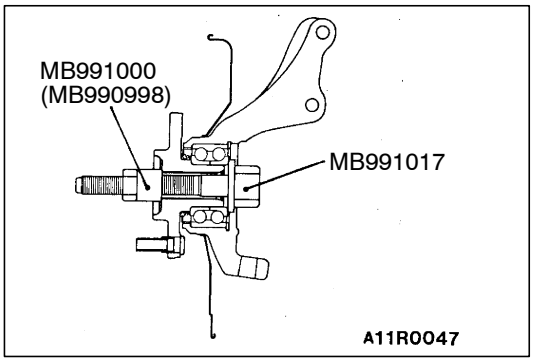
2. Withdraw the drive shaft from the hub by pulling the bottom of the brake disc towards you, and then remove the hub retaining bolts.

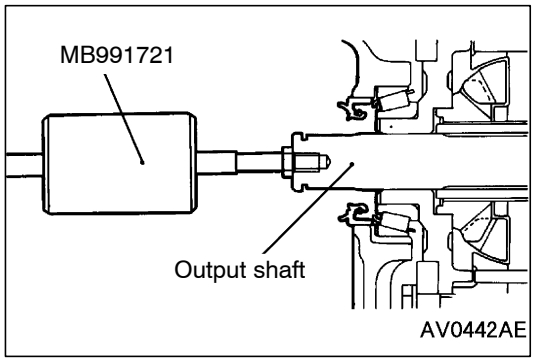


3. Remove the drive shaft from the transmission by the following procedure.
   Insert a pry bar between the transmission case and the drive shaft, and then pry the drive shaft from the transmission.

   Caution

   (1) Do not pull on the drive shaft; doing so will damage the T.J.; be sure to use the pry bar.
   (2) 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) Do not apply the vehicle weight to the wheel bearing while loosening the drive shaft nut. Otherwise wheel bearing will be damaged. If, however, the vehicle weight must be applied to the bearing (because of moving the vehicle), temporarily secure the wheel bearing by using the special tool.





◀C▶OUTPUT SHAFT REMOVAL

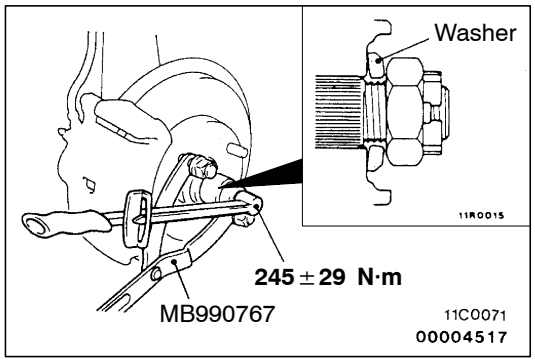
Use the special tool to pull out the output shaft.

Caution
Do not damage the oil seal of the transmission by the output shaft splines.

INSTALLATION SERVICE POINTS

▶A◀OUTPUT SHAFT/DRIVE SHAFT INSTALLATION

Caution
Do not damage the oil seal of the transmission by the output shaft and drive shaft splines.



▶B◀CASTLE NUT INSTALLATION

1. Be sure to install the castle nut washer in the specified direction.
2. Using the special tool, tighten the castle nut.

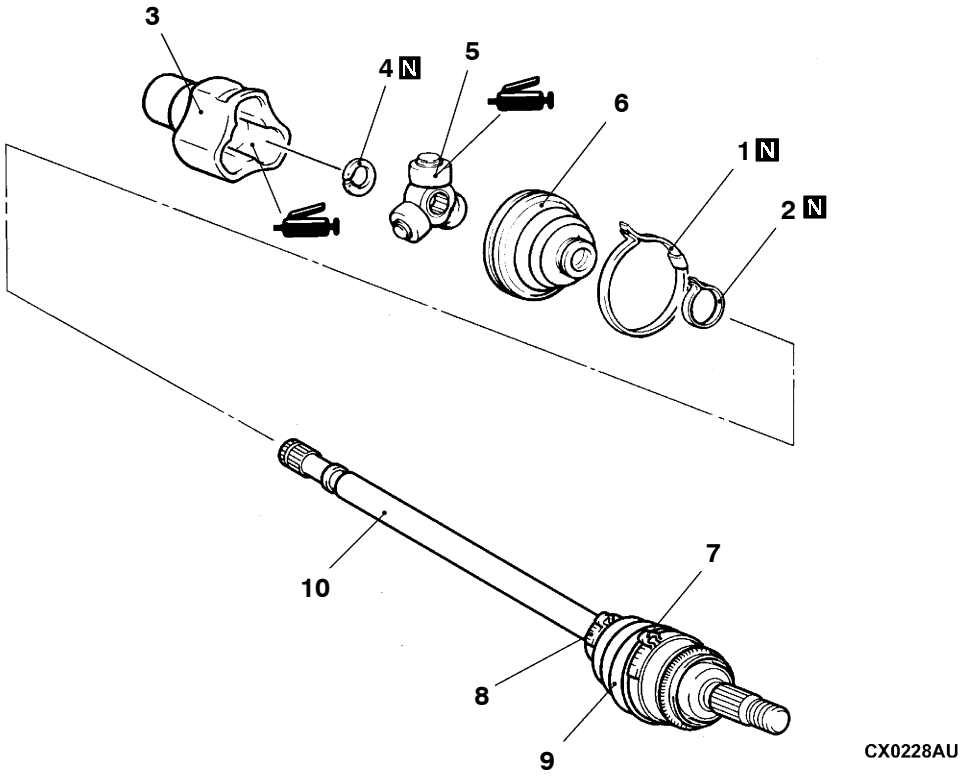
   Caution
   Before securely tightening the castle nuts, make sure there is no load on the wheel bearings. Otherwise wheel bearing will be damaged.

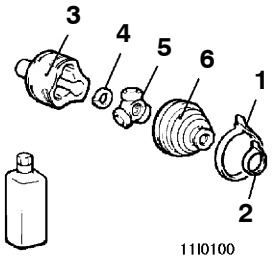
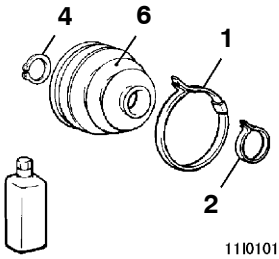
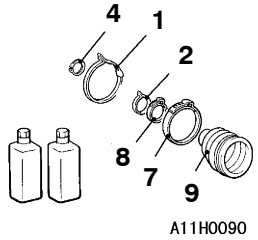
DISASSEMBLY AND REASSEMBLY

Caution

(1) On the vehicles with ABS or ACD, when the drive shaft is disassembled or reassembled, be careful not to interfere with the rotor for wheel speed sensor installed to the B.J. outer race to prevent the rotor from damage.

(2) Never disassemble the B.J. assembly except when replacing the B.J. boot.



		
T.J. repair kit	**T.J. boot repair kit**	**B.J. boot repair kit**

Disassembly steps

- ▶B◀ 1. T.J. boot band (large)
- ▶B◀ 2. T.J. boot band (small)
- ◀A▶ ▶A◀ 3. T.J. case
- 4. Snap ring
- ◀A▶ ▶A◀ 5. Spider assembly
- ◀B▶ 6. T.J. boot
- 7. B.J. boot band (large)
- 8. B.J. boot band (small)
- 9. B.J. boot
- 10. B.J. assembly

DISASSEMBLY SERVICE POINTS

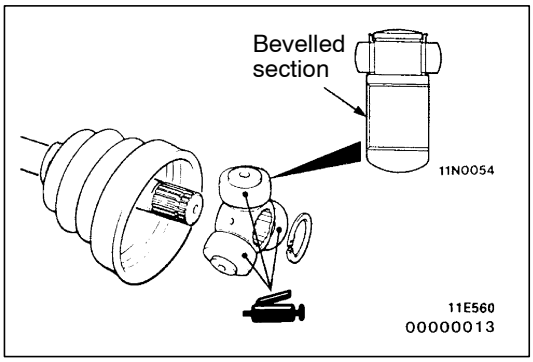
◀A▶ T.J. CASE/SPIDER ASSEMBLY REMOVAL

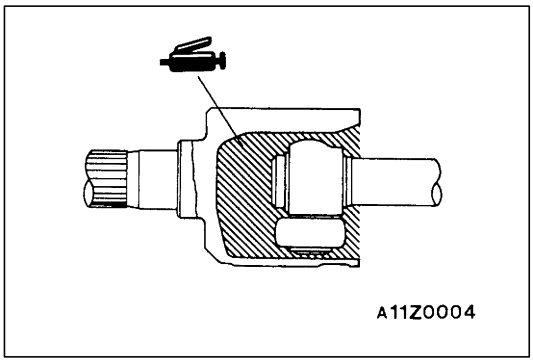
1. Wipe off grease from the spider assembly and the inside of the T.J. case.
2. Always clean the spider assembly when the grease contains water or foreign material.

Caution
Do not disassemble the spider assembly.

◀B▶ T.J. BOOT REMOVAL

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





REASSEMBLY SERVICE POINTS

▶A◀ SPIDER ASSEMBLY/T.J. CASE INSTALLATION

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

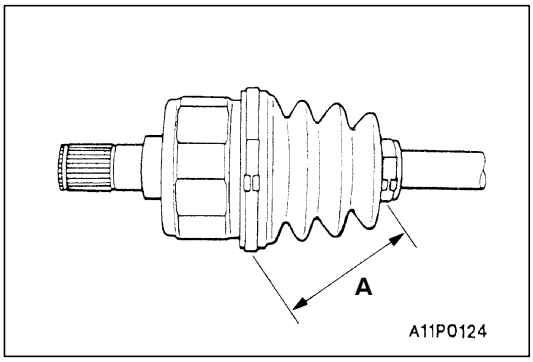
   Caution
   (1) The drive shaft joint uses special grease. Do not mix old and new or different types of grease.
   (2) If the spider assembly has been cleaned, take special care to apply the specified grease.
2. Install the spider assembly to the shaft from the direction of the spline bevelled section.
3. After applying the specified grease to the T.J. case, insert the drive shaft and apply grease one more time.

   Specified grease: Repair kit grease

   Amount to use: 120 ± 10 g

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

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



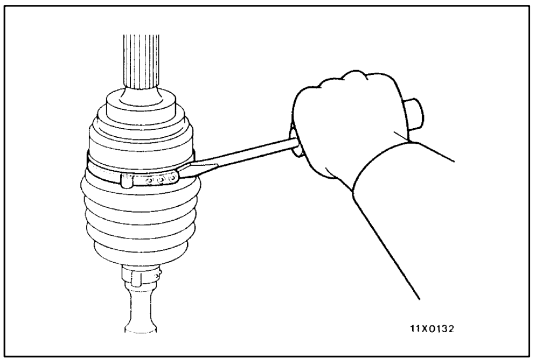
▶B◀ T.J. BOOT BAND (SMALL)/T.J. BOOT BAND (LARGE) INSTALLATION

Set the T.J. boot bands at the specified distance in order to adjust the amount of air inside the T.J. boot, and then tighten the T.J. boot bands securely.

Standard value (A): 85 ± 3 mm

INSPECTION

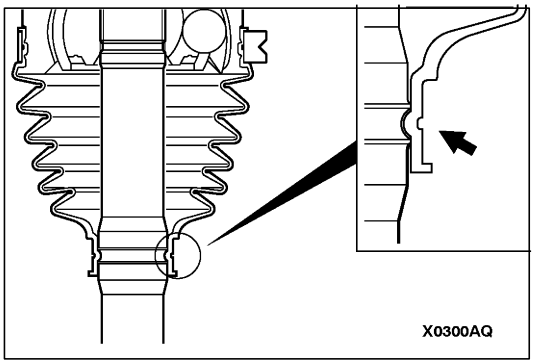
- Check the drive shaft for damage, bending or corrosion.
- Check the drive shaft spline part for wear or damage.
- Check the spider assembly for roller rotation, wear or corrosion.
- Check the groove inside T.J. case for wear or corrosion.
- Check the boots for deterioration, damage or cracking.
- Check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



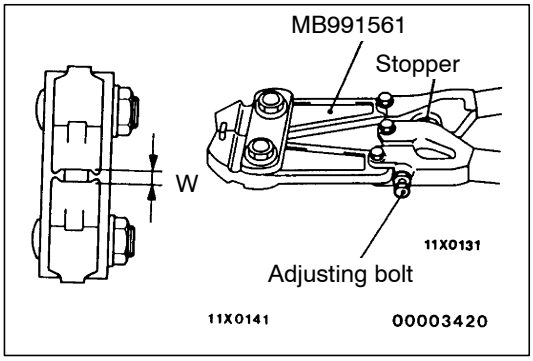
B.J. BOOT (RESIN BOOT) REPLACEMENT

1. Remove the B.J. boot bands (large and small).

   NOTE
   The B.J. boot bands cannot be re-used.
2. Remove the B.J. boot.
3. Wrap a plastic tape around the shaft spline, and assemble the B.J. boot band and B.J. boot.



4. Install the groove in the center of the small diameter part of the resin boot by fitting to the groove of the shaft.

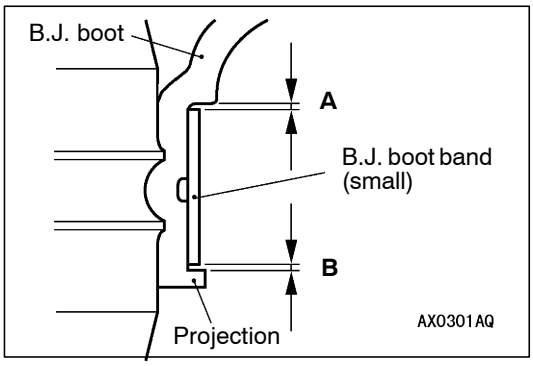


5. Turn the adjusting bolt on the special tool so that the size of the opening (W) is at the standard value.

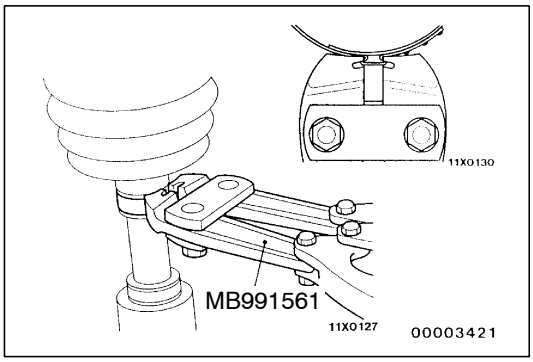
   Standard value (W): 2.9 mm
   <If it is larger than 2.9 mm>
   Tighten the adjusting bolt.
   <If it is smaller than 2.9 mm>
   Loosen the adjusting bolt.

   NOTE
   (1) The value of W will change by approximately 0.7 mm for each turn of the adjusting bolt.

(2) The adjusting bolt should not be turned more than once.



6. Install the boot band (small) in order to create clearance as A and B in the illustration.

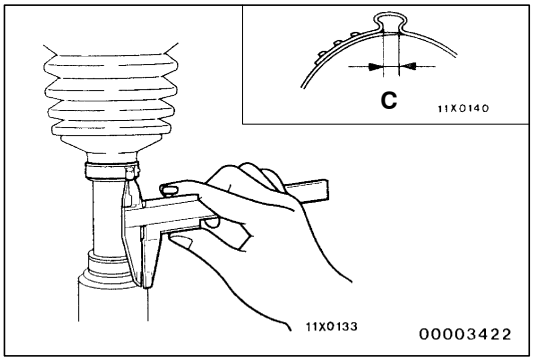


7. Use the special tool to crimp the B.J. boot band (small).

Caution

(1) Secure the drive shaft in an upright position and clamp the part of the B.J. boot band to be crimped securely in the jaws of the special tool.

(2) Crimp the B.J. boot band until the special tool touches the stopper.



8. Check that the crimping amount (C) of the B.J. 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 B.J. 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 B.J. boot band.
W = 5.5 mm - C
Example: If C = 2.3 mm, then W = 3.2 mm.

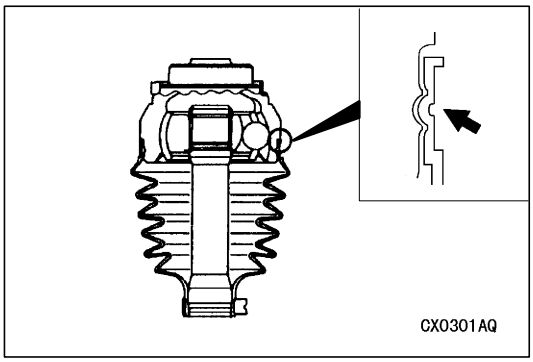
9. Check that the B.J. boot band is not sticking out past the place where it has been installed.
If the B.J. boot band is sticking out, remove it and then repeat the operations in steps 6 to 8 using a new B.J. boot band.

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

    Specified grease: Repair kit grease

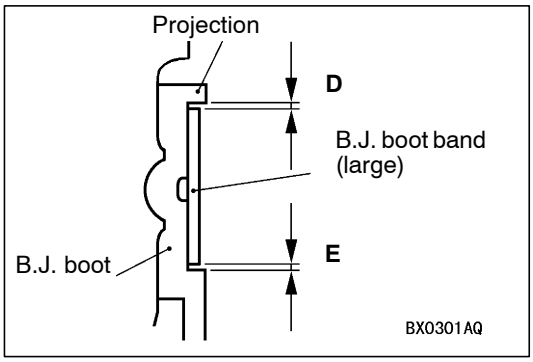
    Amount to use: 110±10 g

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

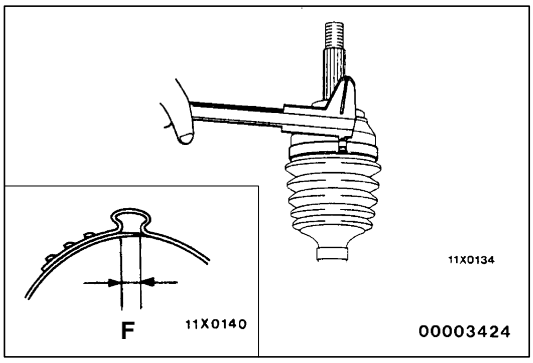


11. Install the groove in the center of the large diameter part of the resin boot by fitting to the groove of the shaft.
12. Follow the same procedure as in step 5 to adjust the size of the opening (W) on the special tool so that it is at the standard value.

    Standard value (W): 3.2 mm



13. Install the boot band(large) in order to create clearance as D and E in the illustration.
14. Use the special tool to crimp the B.J. boot band (large) in the same way as in step 7.



15. Check that the crimping amount (F) of the B.J. 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 B.J. 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 B.J. boot band.
    W = 5.8 mm - F
    Example: If F = 2.3 mm, then W = 3.5 mm.

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

NOTES