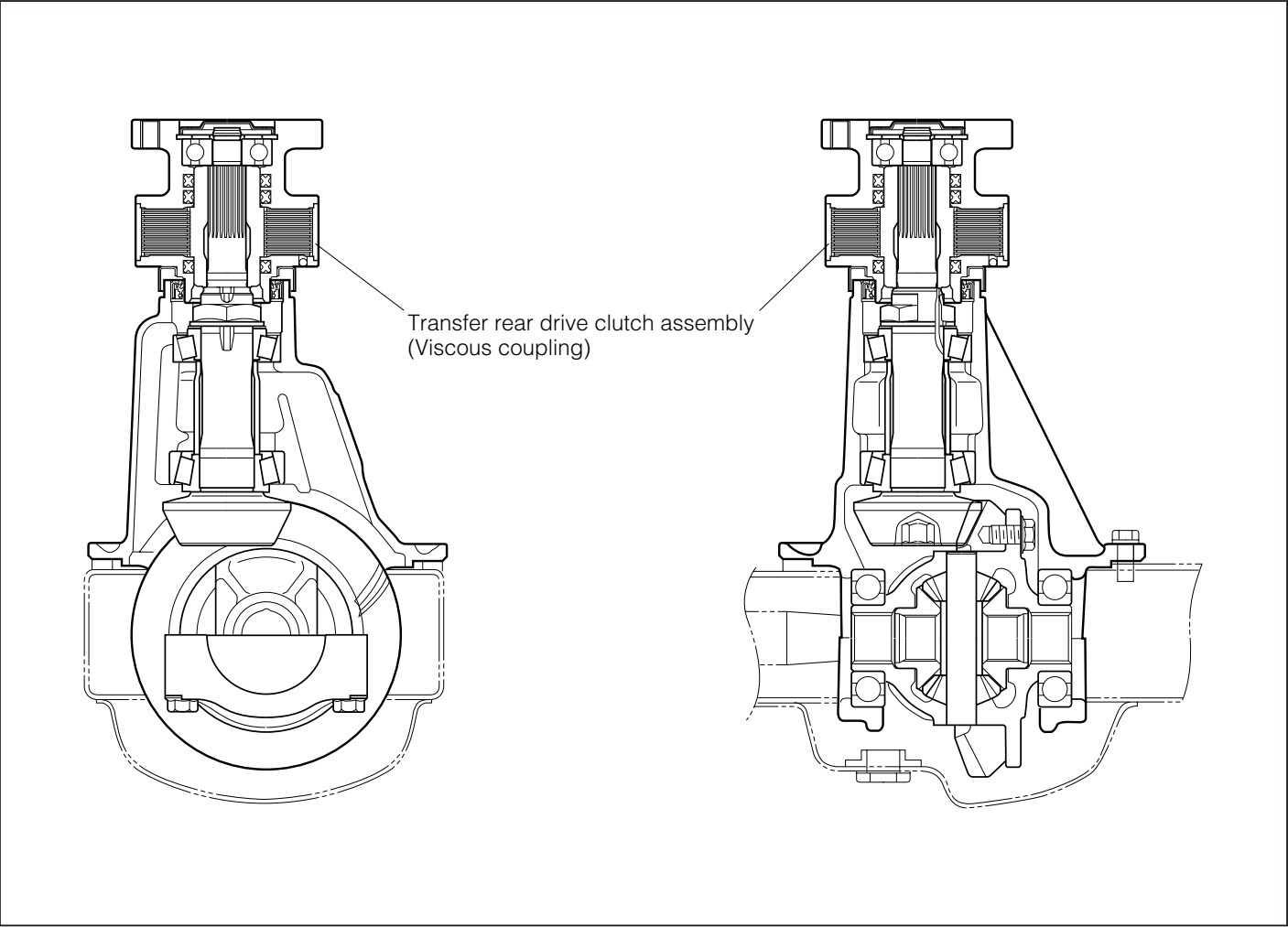


DIFFERENTIAL

REAR DIFFERENTIAL	DF- 2
SECTIONAL VIEW	DF- 2
SPECIFICATIONS	DF- 2
COMPONENTS (1)	DF- 3
COMPONENTS (2)	DF- 4
REMOVAL	DF- 4
DISASSEMBLY	DF- 6
INSPECTION	DF- 9
ASSEMBLY	DF-10
TIGHTENING TORQUE	DF-18
SSTs	DF-19
GENERAL TOOLS	DF-19

REAR DIFFERENTIAL
SECTIONAL VIEW



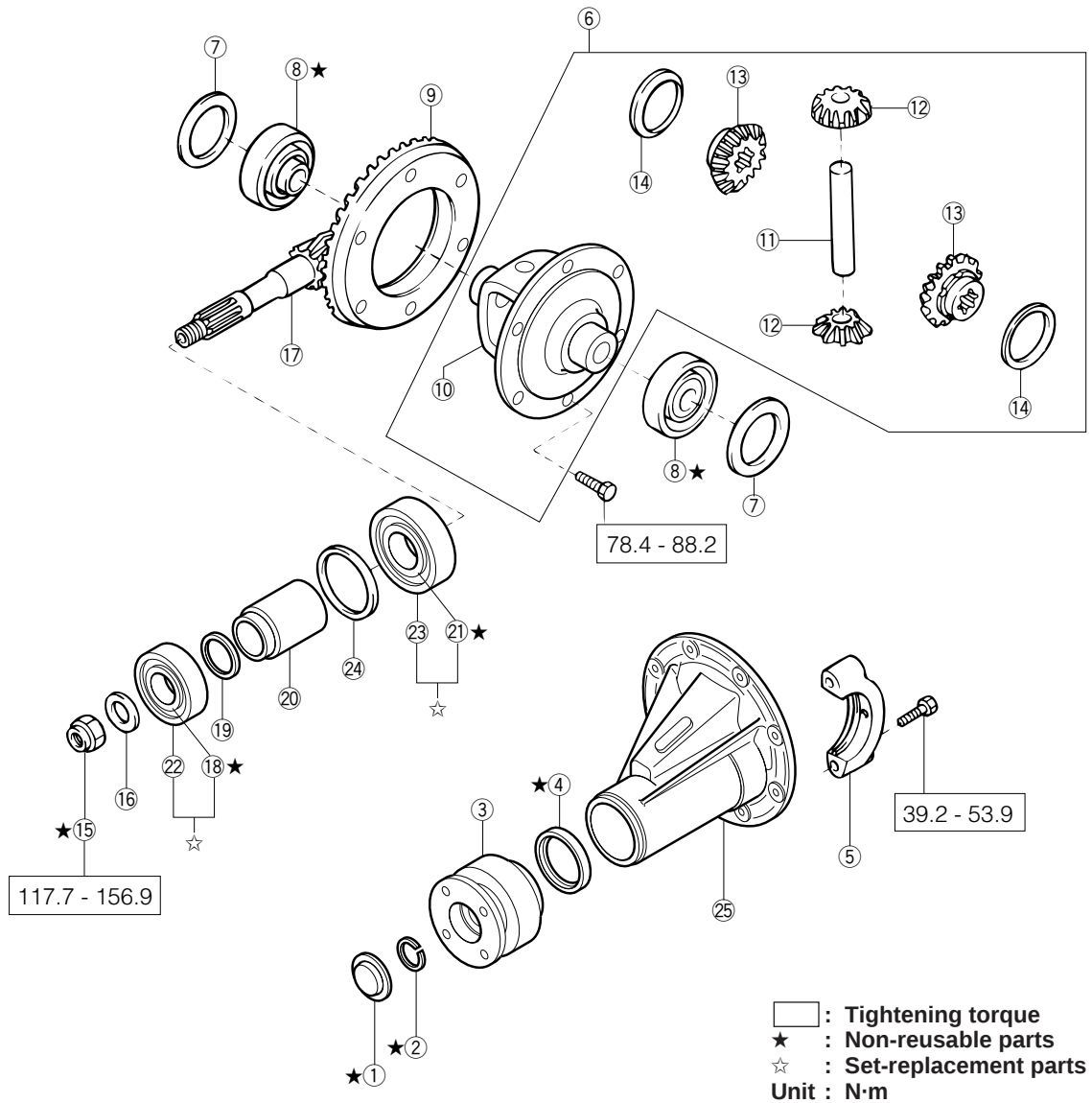
MDF00002-00001

SPECIFICATIONS

Item		Specifications
Reduction gear ratio		3.077
Drive pinion	Number of teeth	13
	Gear type	Hypoid
Ring gear	Number of teeth	40
	Gear type	Hypoid
	Outer diameter	162
Pinion gear	Number of teeth	10
	Gear type	Straight bevel
Side gear	Number of teeth	16
	Gear type	Straight bevel
Oil used	Specified oil	Gear oil SAE 80W-90 (API classification GL-5)
	Full capacity	1.0 liter

MDF00003-00000

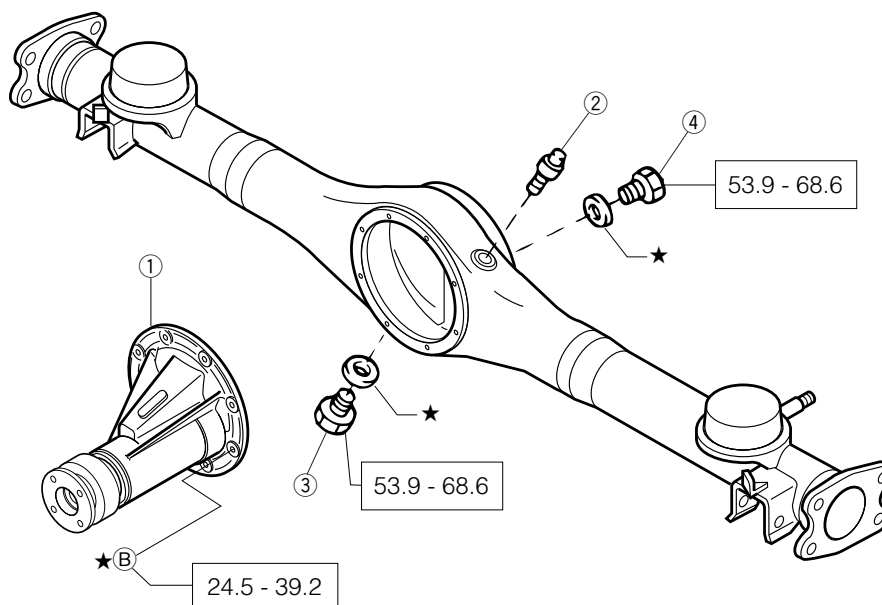
COMPONENTS (1)



- ① Plug
- ② Shaft snap ring
- ③ Transfer rear drive clutch assembly
- ④ Type T oil seal
- ⑤ Differential bearing cap
- ⑥ Differential case assembly
- ⑦ Shim
- ⑧ Radial ball bearing
- ⑨ Differential ring gear
- ⑩ Differential case
- ⑪ Differential pinion shaft
- ⑫ Differential pinion
- ⑬ Differential side gear
- ⑭ Side gear thrust washer
- ⑮ Nut

- ⑯ Plate washer
- ⑰ Differential drive pinion
- ⑱ Tapered roller bearing (Front inner)
- ⑲ Shim (For Pre-load adjusting)
- ⑳ Drive pinion bearing spacer
- ㉑ Tapered roller bearing (Rear inner)
- ㉒ Tapered roller bearing (Front outer)
- ㉓ Tapered roller bearing (Rear outer)
- ㉔ Shim
- ㉕ Differential carrier

COMPONENTS (2)



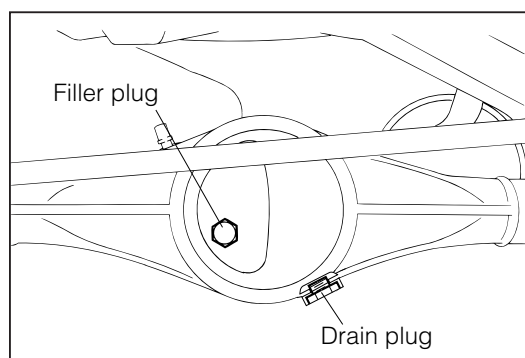
- ① Differential carrier assembly
- ② Breather
- ③ Drain plug
- ④ Filler plug
- ⑤ Gasket

□ : Tightening torque
★ : Non-reusable parts
Unit : N·m

MDF00005-00003

REMOVAL

1. Lift up the vehicle.
2. Remove the filler plug and drain plug. Drain the oil from the rear axle housing assembly.
3. Remove the rear wheels (right and left).

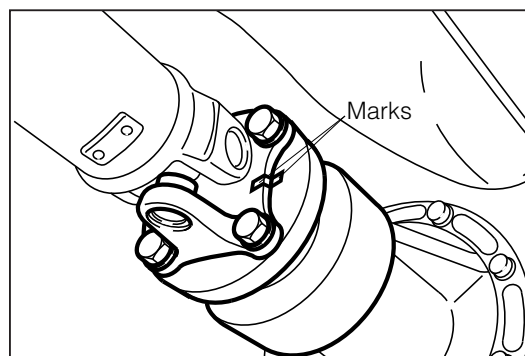


MDF00006-00004

4. Remove the propeller shaft assembly.
- NOTE:**
- Refer to the Propeller Shaft section.

CAUTION:

- Hung the removed propeller shaft from the vehicle with a rope or the like, being careful not to allow the propeller shaft to make excessive bending.



MDF00007-00005

5. Remove the rear axle shaft.

NOTE:

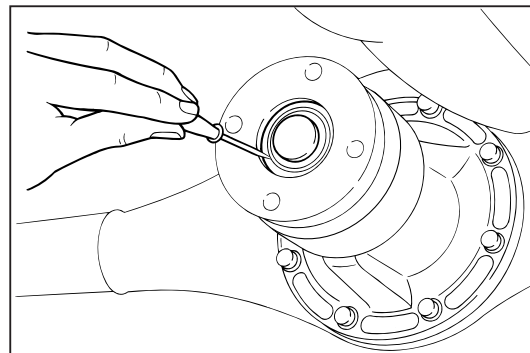
- Refer to the RS section.

MDF00008-00000

6. Removal of transfer rear drive clutch assembly
(1) Remove the plug with a tool having a sharp edge.

NOTE:

- Be careful not to scratch the plug contact surface of the clutch assembly.
- Never reuse the removed plug.

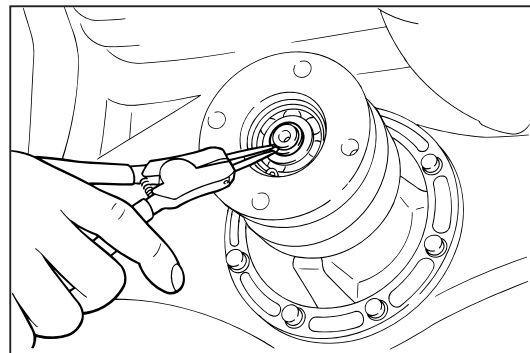


MDF00009-00006

- (2) Remove the shaft snap ring, using a snap ring expander and a flat screwdriver.

NOTE:

- Never reuse the removed snap ring.



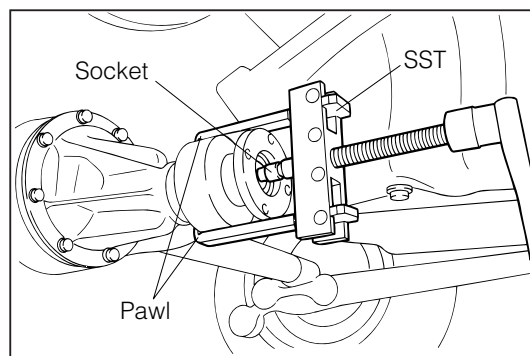
MDF00010-00007

- (3) Remove the transfer rear drive clutch assembly, using a socket (10 mm) in combination with the following SST.

SST: 09334-87201-000

NOTE:

- Be careful not to allow the SST pawl to be caught at the welding section of the drive clutch assembly housing.



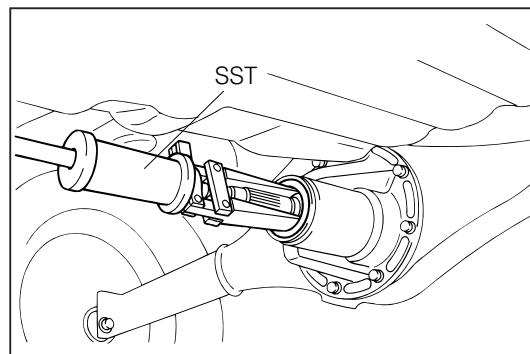
MDF00011-00008

- (4) Remove the oil seal, using the following SST.

SST: 09308-00010-000

NOTE:

- Never reuse the removed oil seal.



MDF00012-00009

7. Removal of differential carrier assembly

(1) Remove the eight bolts which secure the differential carrier assembly.

NOTE:

- Never reuse the tightened bolts.

(2) Remove the differential carrier assembly.

NOTE:

- If there is difficulty in removal, lightly tap the flange section at the circumference of the differential carrier assembly with a plastic hammer or the like.
- Remove thoroughly the bonding agent adhering to the mating surface with a scraper.

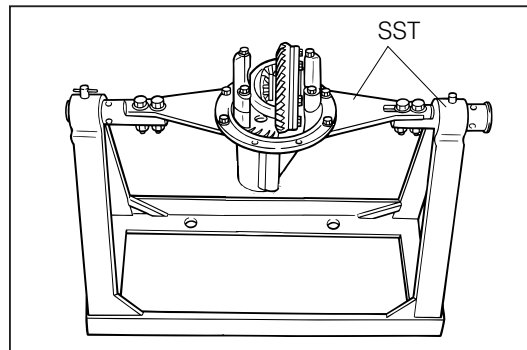
MDF00013-00000

DISASSEMBLY**Check prior to disassembly**

1. Set the differential carrier assembly to the disassembly stand (SSTs).

SSTs: 09219-87202-000

09548-87201-000



MDF00014-00010

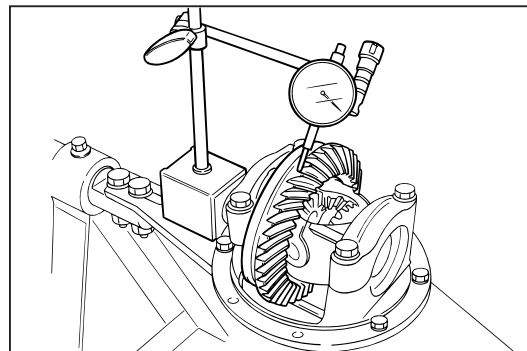
2. Backlash check of differential ring gear

(1) With a dial gauge set at the right angles with the ring gear teeth surface, secure the flange of the drive pinion. Measure the backlash by moving the ring gear.

Specified Value: 0.08 - 0.15 mm

NOTE:

- The measurement should be made at three points or more at the ring gear circumference.

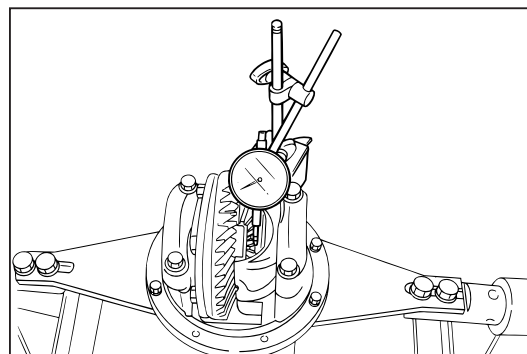


MDF00015-00011

3. Backlash check of differential side gear

(1) With a dial gauge set at the right angles with the side gear teeth surface, secure the pinion to the differential case. Measure the backlash of the pinion and side gear.

Specified Value: 0.05 - 0.20 mm



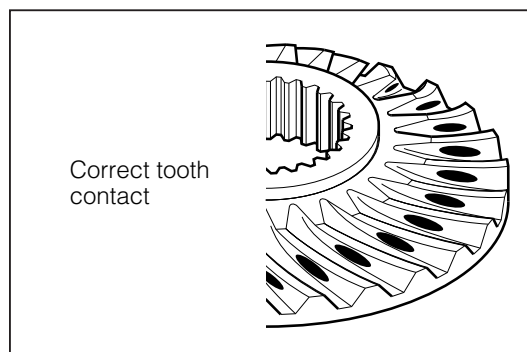
MDF00016-00012

4. Check of teeth contact between differential ring gear and differential drive pinion

For the checking procedure, refer to the paragraph 5 on page DF-14.

NOTE:

- In cases where the tooth contact fails to conform to the right figure, write down the thickness of shims to be used as a reference during the assembling.



MDF00017-00013

5. Check of preload of drive pinion
Measure the preload of the drive pinion, using a torque wrench in combination with the following SST.

SST: 09564-87201-000

Specified Preload: 0.59 - 0.98 N·m

NOTE:

- Be sure to perform the check after removing the transfer rear drive clutch and type T oil seal.

Disassembling of differential case assembly

1. Put mating marks on the differential bearing cap and carrier, using a punch and a hammer.
2. Remove the bolts which secure the differential bearing cap. Remove the differential bearing cap.

NOTE:

- Since the differential bearing cap has been manufactured integrally with the carrier, never disturb the combination of these components.

3. Remove the differential case assembly and shims (for differential case thrust).

NOTE:

- For easier assembling, keep the shims in order, separating the shim for the back of the gear from that for the teeth surface side.

4. Remove the radial ball bearings, using the following SST.

SST: 09502-10012-000

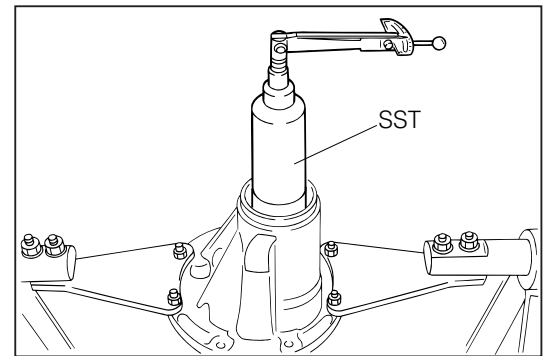
NOTE:

- Never reuse the removed bearing.

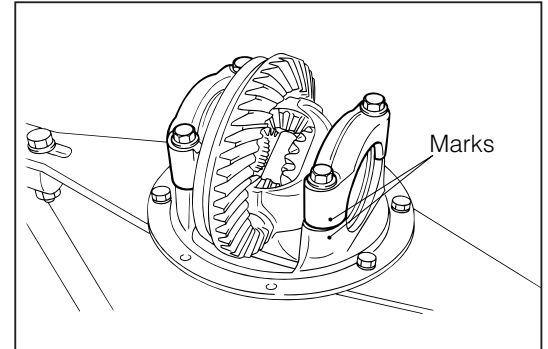
5. Install the differential case in a vice with aluminum sheets interposed.
6. Put mating marks on the differential case and differential ring gear. Then, remove the differential ring gear.

NOTE:

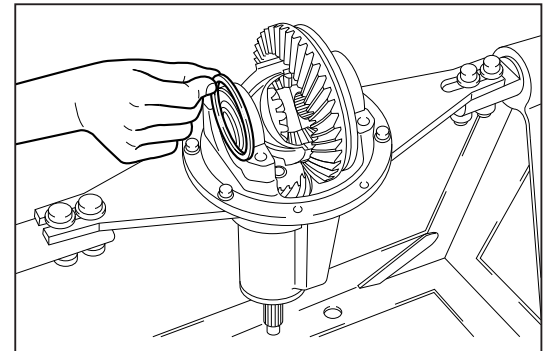
- When it is difficult to remove the ring gear, remove it by lightly tapping with a plastic hammer.



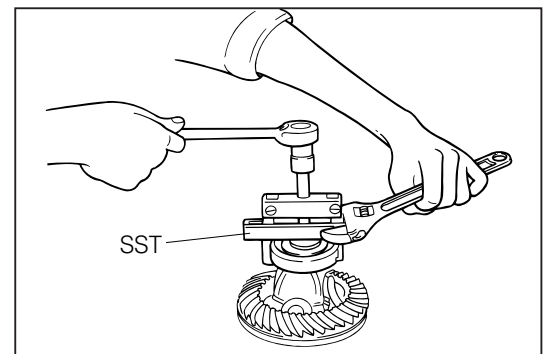
MDF00018-00014



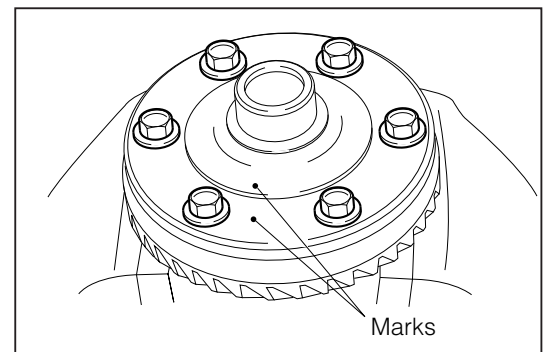
MDF00019-00015



MDF00020-00016

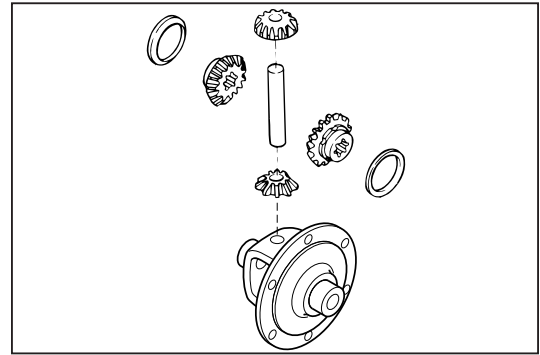


MDF00021-00017



MDF00022-00018

7. Pull out the differential pinion shaft. Remove the differential side gears, differential pinions and side gear thrust washers.

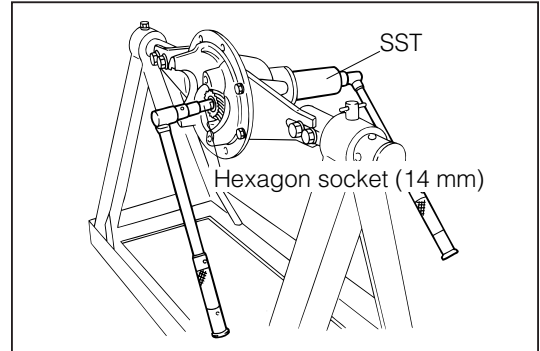


MDF00023-00019

Removal of differential drive pinion

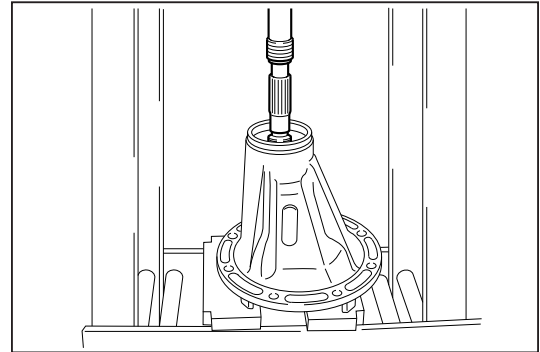
1. While preventing the differential drive pinion from turning by applying a 14 mm hexagon socket and a handle to its head section, remove the nut, using the following SST.

SST: 09564-87201-000



MDF00024-00020

2. Remove the differential drive pinion with a press.



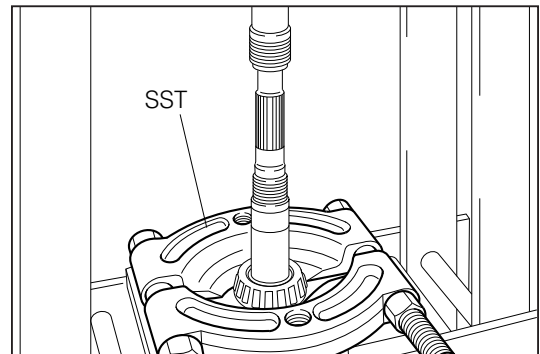
MDF00025-00021

3. Remove the tapered roller bearing (rear inner race), using a press in combination with the following SST.

SST: 09950-87701-000

NOTE:

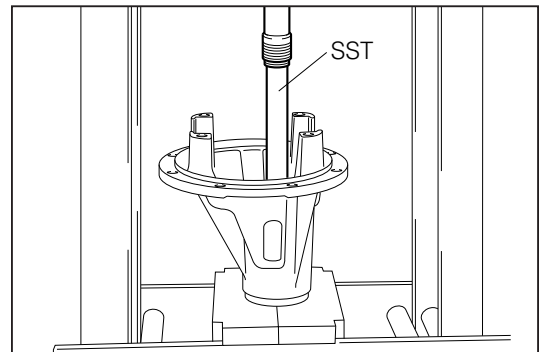
- Never reuse the tapered roller bearing. (When removed, the inner race and outer race should be replaced as a set.)



MDF00026-00022

4. Remove the tapered roller bearing (front outer race), using a press in combination with the following SST.

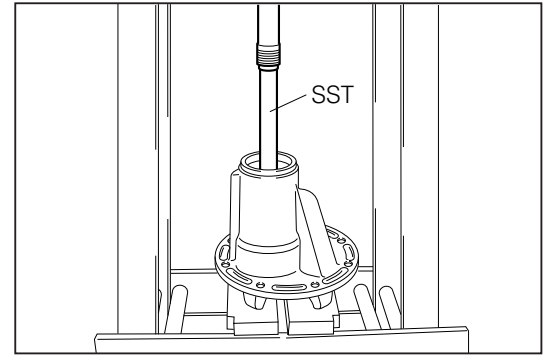
SST: No. 4 of 09608-87501-000



MDF00027-00023

5. Remove the tapered roller bearing (rear outer race), using a press in combination with the following SST.

SST: No. 4 of 09608-87501-000



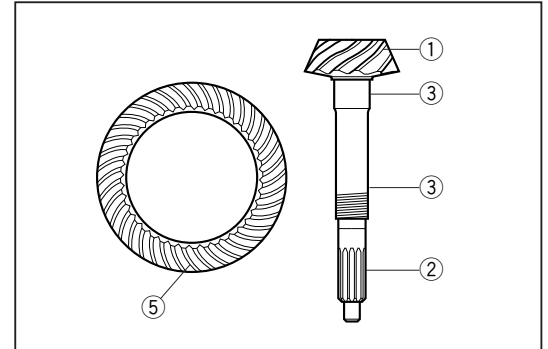
MDF00028-00024

INSPECTION

1. Differential drive pinion and ring gear
 - (1) Inspect the differential drive pinion teeth surface ①, splined section ② and bearing installing sections ③ for damage.
 - (2) Inspect the differential ring gear teeth surface ⑤ for damage.

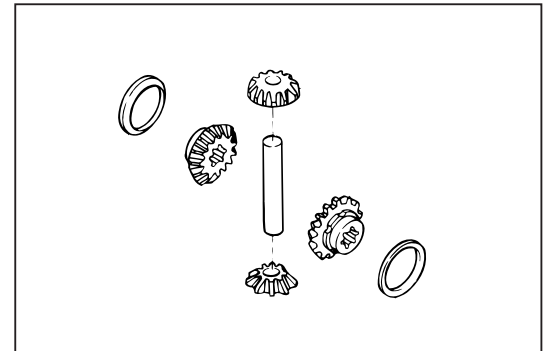
NOTE:

- When replacing, the differential drive pinion and ring gear should be replaced as a set.



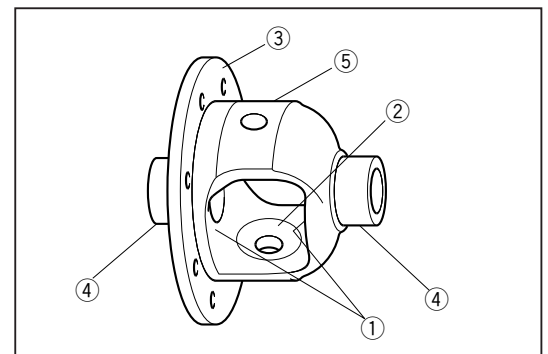
MDF00029-00025

2. Differential side gear, differential pinion and differential pinion shaft
 - (1) Inspect the differential side gear, differential pinion and differential for damage and wear.



MDF00030-00026

3. Differential case
 - (1) Inspect the following sections for damage and wear.
 - ① Boss contact section of side gear
 - ② Pinion contact section
 - ③ Ring gear installing section
 - ④ Side bearing press-fit section
 - ⑤ The case proper



MDF00031-00027

4. Bearing
 - (1) Lightly turn the tapered roller bearings (front and rear) and radial ball bearings (differential side). Ensure that they turn smoothly.

NOTE:

- When replacing the tapered roller bearings, the front and rear bearings should be replaced as a set.

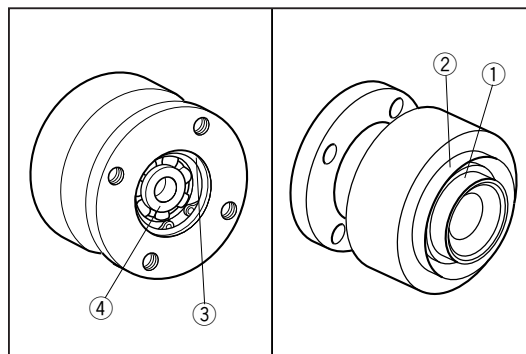
MDF00032-00000

5. Transfer rear drive clutch assembly

(1) Inspect the following sections for damage, wear, oil leakage, etc.

- ① Oil seal contact section
- ② Deflector section
- ③ Plug installing section

(2) Turn the bearing by finger. Ensure that it turns smoothly without emitting any abnormal noise ④.

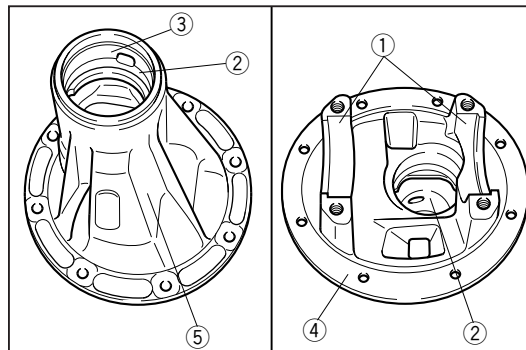


MDF00033-00028

6. Differential carrier

(1) Inspect the following sections for damage.

- ① Side bearing installing sections
- ② Bearing outer race installing section
- ③ Oil seal installing section
- ④ Carrier cover installing section
- ⑤ The carrier housing



MDF00034-00029

ASSEMBLY

1. Assembling of differential case assembly

(1) Assemble the side gear thrust washers, side gears, pinions and pinion shaft to the differential case.

NOTE:

- Apply gear oil to each part.
Specified Oil: Hypoid gear oil SAE 80W-90
(API classification GL-5)

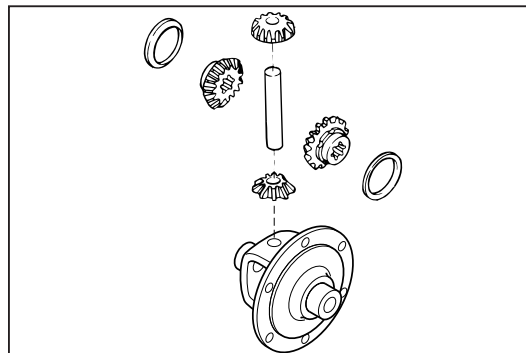
(2) Secure the flange section of the differential case in a vice with aluminum sheets interposed.

(3) Apply a dial gauge at right angles with the teeth surface of the differential side gear.

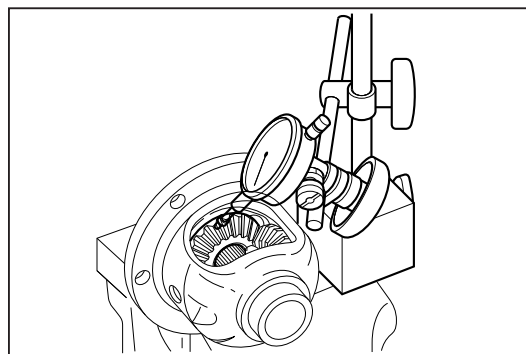
(4) Measure the backlash of the differential side gear.

Specified Value: 0.05 - 0.20 mm

If the backlash is not within the specified value, adjust it by selecting a suitable thrust washer from the table below.



MDF00035-00030



MDF00036-00031

Table showing availability of side gear thrust washers

Part number (Reference)	Thickness (mm)
41361-87501-000	0.8
41361-87506-000	0.9
41361-87507-000	1.0

NOTE:

- As for the part number, confirm it by means of the parts catalogue.

MDF00037-00000

- (5) Assemble the differential ring gear to the differential case, while aligning the mating marks put during the disassembling. Tighten the six bolts to the specified torque.

Specified Torque: 78.4 - 88.2 N·m

NOTE:

- Be sure to use the designated bolts.

- (6) Assemble the new radial ball bearings, using a press in combination with the following SST.

SST: 09309-87201-000

2. Temporary assembling of differential drive pinion

- (1) Assemble the shims (for adjusting the drive pinion protruding amount) which were removed during the disassembling and the tapered roller bearing (rear outer race), using a press in combination with the following SST.

SST: 09517-87703-000

NOTE:

- If the inner race was replaced, be sure to use a new outer race, too.
- Inspect the shim for wear and damage. If the shim exhibits wear or damage, replace it with a new shim which has the same thickness.

- (2) Assemble the front outer tapered roller bearing, using a press in combination with the following SST.

SST: No. 8 of 09608-87501-000

NOTE:

- If the inner race was replaced, be sure to use a new outer race, too.

- (3) Press the new rear inner tapered roller bearing into the differential drive pinion, using a press in combination with the following SST.

SST: No. 11 of 09608-12010-000

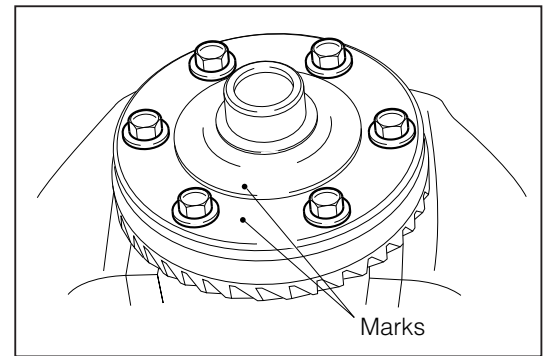
NOTE:

- Never reuse the removed bearing.

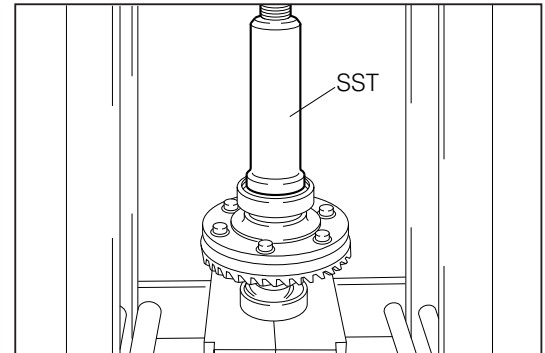
- (4) Apply gear oil (hypoid gear oil SAE 80W-90 (API classification GL-5)) to the tapered roller bearing (front inner). Temporarily assemble the tapered roller bearing together with the differential drive pinion subassembly to the differential carrier.

NOTE:

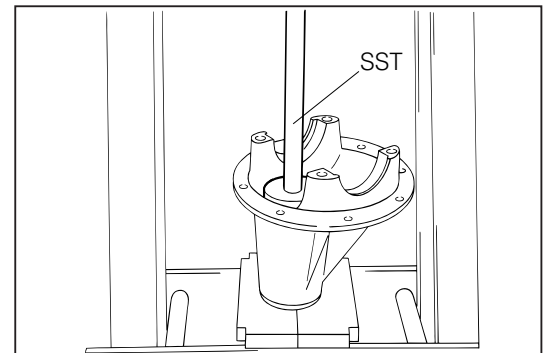
- Do not assemble the drive pinion bearing spacer and shims (for preload adjustment) at this time.



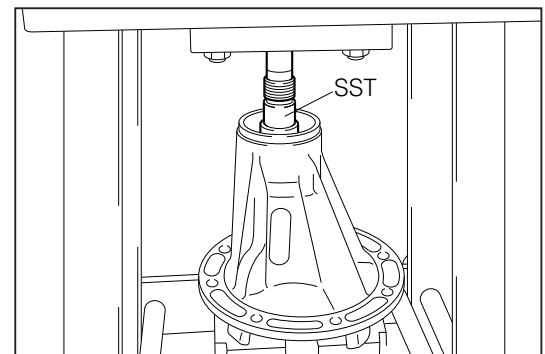
MDF00038-00032



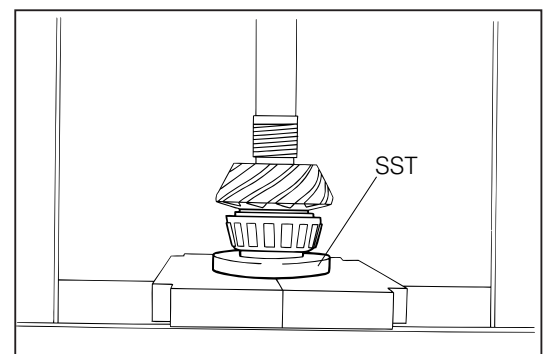
MDF00039-00033



MDF00040-00034



MDF00041-00035



MDF00042-00036

- (5) Prevent the drive pinion from turning by installing a 14 mm hexagon socket and handle to the hexagon hole located at the head of the differential drive pinion. Tighten the nut to the specified preload, using the following SST.

SST: 09564-87201-000

Specified Preload: 0.59 - 0.98 N·m

NOTE:

- Before measuring the preload, turn the bearing in the normal direction and reverse direction several times so that the bearing is bedded-in.

3. Assembling of differential case assembly and check and adjustment of ring gear backlash

- (1) Assemble the differential case assembly to the differential carrier. Insert the shim which was removed during the disassembling to the back side of the ring gear.

NOTE:

- Apply gear oil (hypoid gear oil SAE 80W-90 (API classification GL-5)) to each part.
- Check the shim for wear and damage. If the shim exhibits wear or damage, replace it with a new shim which has the same thickness.

- (2) Assemble the differential bearing cap, while aligning the mating marks which were put during the disassembling. Tighten the four bolts to the specified torque.

Specified Torque: 39.2 - 53.9 N·m

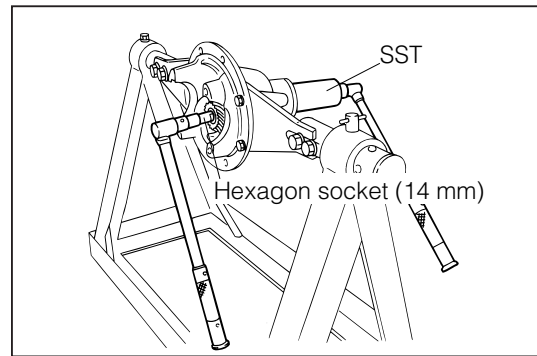
NOTE:

- Assemble the bearing cap with the differential case assembly pushed toward the inserted shim.

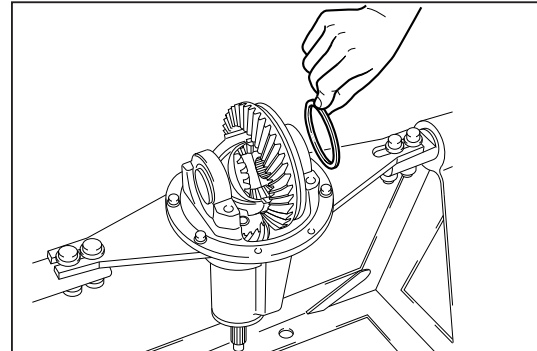
- (3) While applying a dial gauge at right angles with the teeth surface of the ring gear, secure the flange of the drive pinion gear. Measure the backlash by moving the ring gear.

If the backlash is too large, increase the shim thickness. Conversely, if the backlash is too small, decrease the shim thickness.

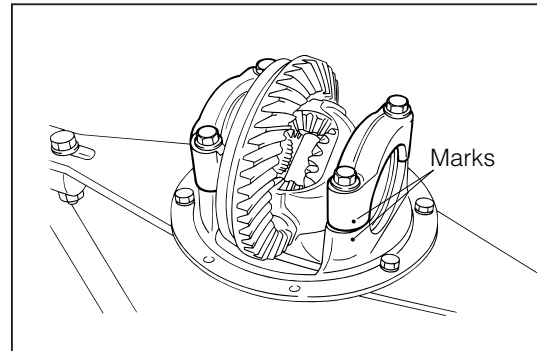
Specified Value: 0.08 - 0.15 mm



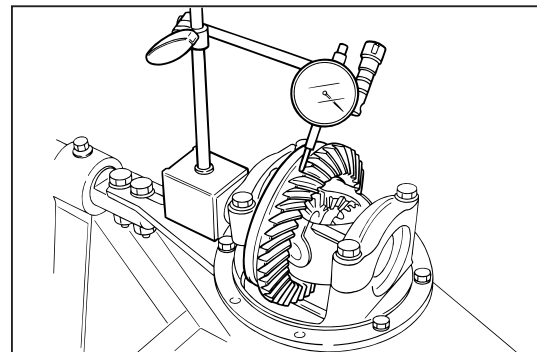
MDF00043-00037



MDF00044-00038



MDF00045-00039



MDF00046-00040

Table showing availability of differential case side shims

Part number (Reference)	Thickness (mm)
90045-64500-000	0.15
90045-64501-000	0.20
90045-64502-000	0.25
90045-64503-000	0.50

NOTE:

- As for the part number, confirm it by means of the parts catalogue.

4. Adjustment of end play of differential case

- (1) Remove the bearing cap. Select a suitable shim in such a way that the clearance between the bearing on the ring gear teeth side and the differential carrier becomes the specified value.

Specified Value: 0 - 0.05 mm

Table showing availability of differential case side shims

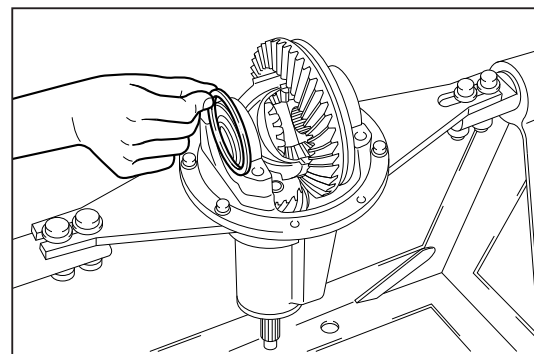
Part number (Reference)	Thickness (mm)
90045-64500-000	0.15
90045-64501-000	0.20
90045-64502-000	0.25
90045-64503-000	0.50

NOTE:

- As for the part number, confirm it by means of the parts catalogue.

NOTE:

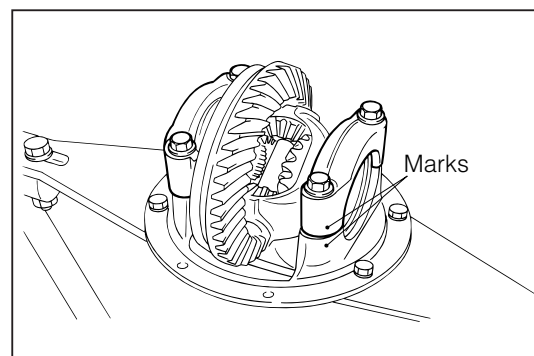
- If it is difficult to assemble the shim, after inserting the shim to the ring gear teeth surface side, insert the shim on the back of the ring gear by lightly tapping the back of the ring gear with a plastic hammer.



MDF00047-00041

- (2) Assemble the differential bearing cap, while aligning the mating marks put during the disassembling. Tighten the four bolts to the specified torque.

Specified Torque: 39.2 - 53.9 N·m



MDF00049-00042

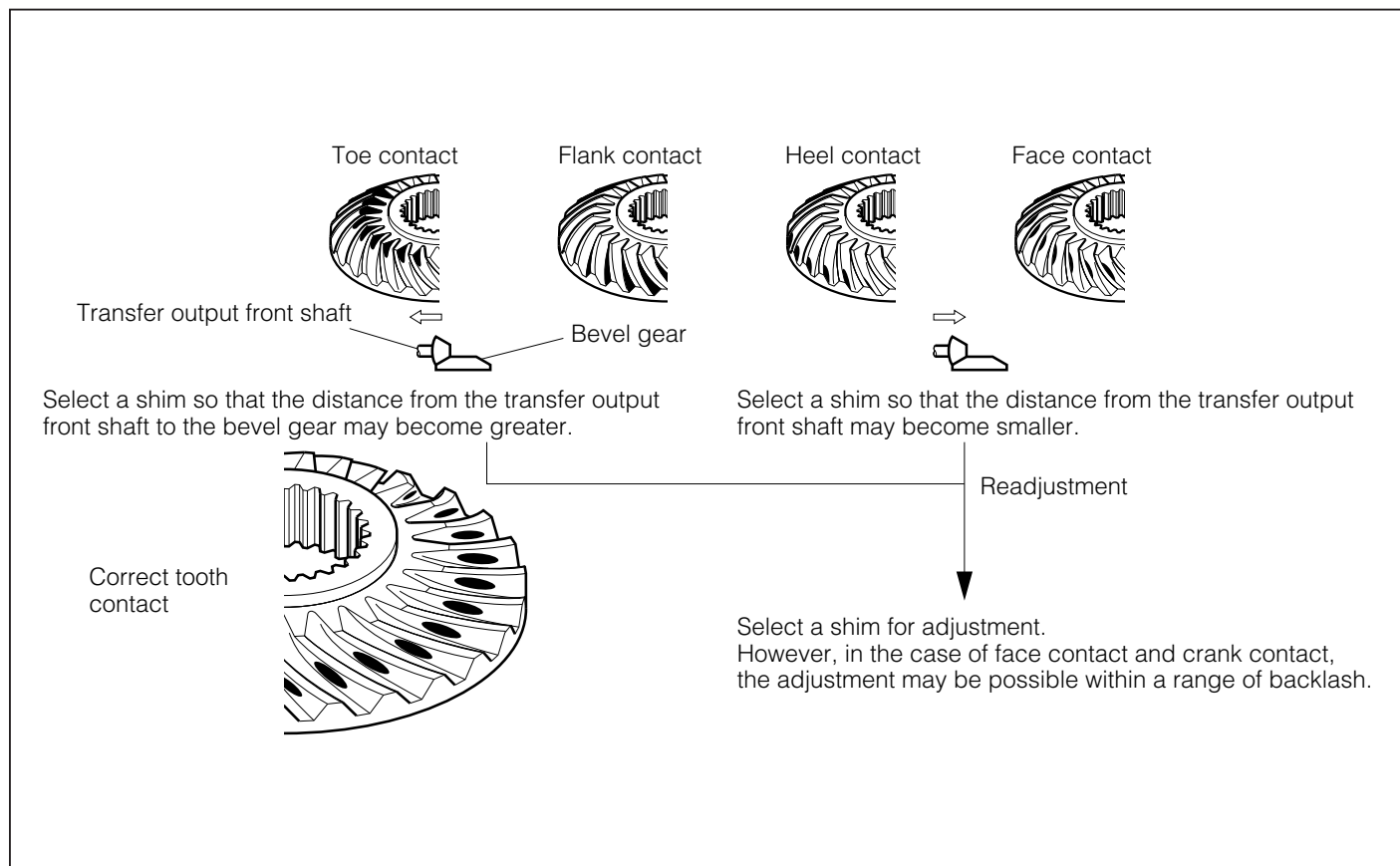
5. Adjustment of teeth contact of ring gear

Apply a thin film of red lead evenly to the both sides of the ring gear teeth surface. Then, check the teeth contact with the drive pinion.

Select a suitable shim by referring to the figure below to adjust the teeth contact.

NOTE:

- Turn the drive pinion in the normal direction and reverse direction, and check the teeth contact of the ring gear at several points at the ring gear circumference.



MDF00050-00043

Table showing availability of shims for adjusting drive pinion protruding amount

Part number (Reference)	Thickness (mm)
90045-64049-000	0.15
90045-64050-000	0.20
90045-64051-000	0.25
90045-64052-000	0.50

NOTE:

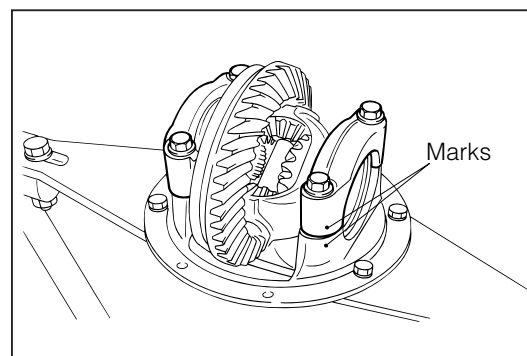
- As for the part number, confirm it by means of the parts catalogue.

6. Assembling of differential drive pinion

(1) Remove the differential bearing cap, differential case assembly, shims and differential drive pinion.
(Refer to page DF-7.)

NOTE:

- For easier assembling, keep the shims in order, separating the shim for the teeth surface side of the ring gear from that for the back of the ring gear.
- Do not remove the tapered roller bearing (rear inner) at this time.



MDF00051-00000

MDF00052-00044

- (2) Assemble the drive pinion bearing spacer and the shim (for preload adjustment) which was removed during the disassembling to the differential drive pinion.

NOTE:

- Check the shim for wear and damage. If the shim exhibits wear or damage, assemble a new shim which has the same thickness.

- (3) Apply gear oil (hypoid gear oil SAE 80W-90 (API classification GL-5)) to the tapered roller bearing (front inner). Temporarily assemble the tapered roller bearing together with the differential drive pinion subassembly to the differential carrier.

- (4) Prevent the drive pinion from turning by installing a hexagon socket and handle to the hexagon hole located at the head of the differential drive pinion.

- (5) Tighten the nut, until the specified preload is applied to the drive pinion, using the following SST.

SST: 09564-87201-000

Specified Preload: 0.58 - 0.98 N·m

- (6) Remove the nut once.

- (7) Install the plate washer, while aligning it to the cut-out section of the drive pinion.

- (8) Prevent the drive pinion from turning by installing a hexagon socket and handle to the hexagon hole located at the head of the differential drive pinion.

- (9) Tighten the nut to the specified torque, using the following SST. Then, ensure that the preload becomes the specified value.

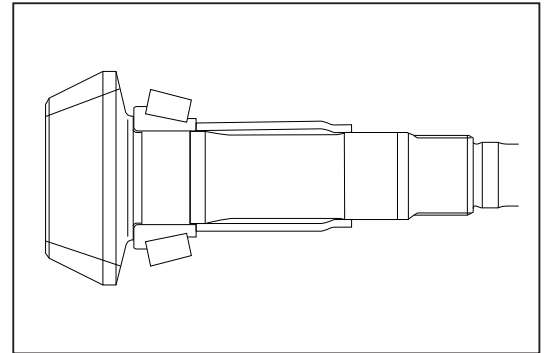
SST: 09564-87201-000

Specified Tightening Torque: 117.7 - 156.9 N·m

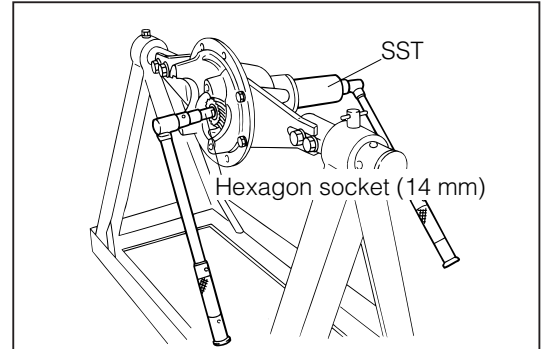
Specified Preload: 0.58 - 0.98 N·m

NOTE:

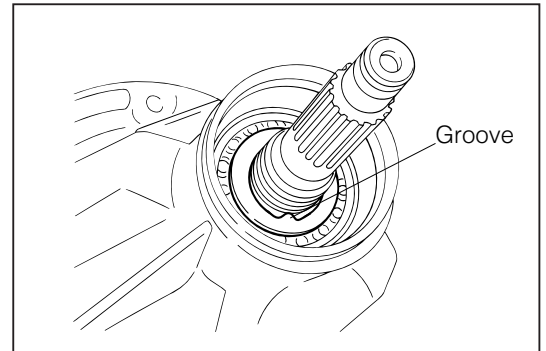
- Before tightening the nut, make sure that the plate washer is properly fit into the cut-out section of the drive pinion.
- After the assembling, turn the drive pinion in the normal direction and reverse direction several times so that the bearing is bedded-in.



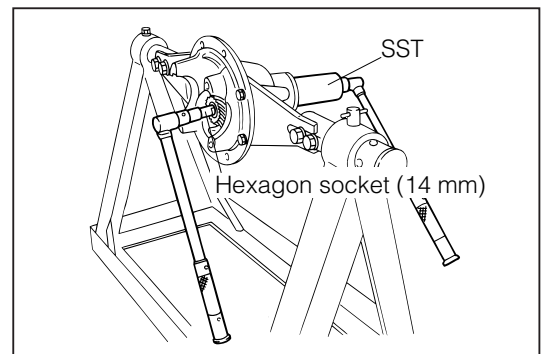
MDF00053-00045



MDF00054-00046



MDF00055-00047



MDF00056-00048

- (10) Measure the bearing preload of the drive pinion. If it is not within the specified value, adjust it by selecting a suitable shim for preload adjustment from the table below.

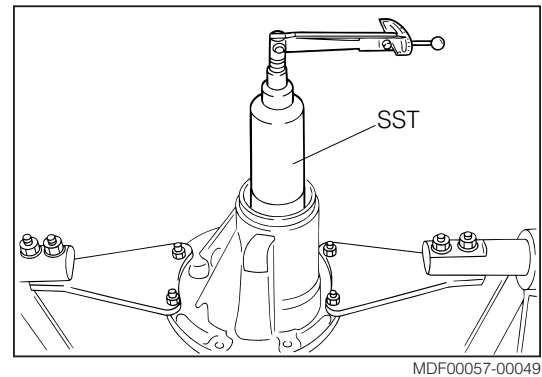
Specified Preload: 0.58 - 0.98 N·m

Table showing availability of shims for preload adjustment

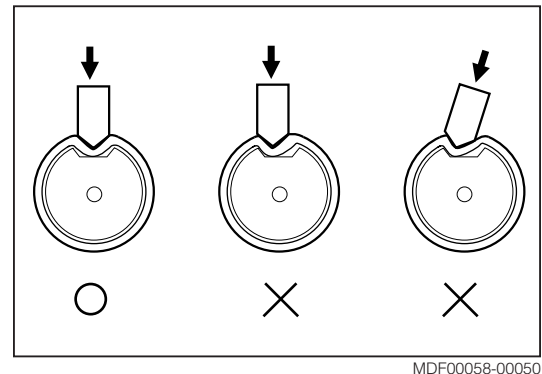
Part number (Reference)	Thickness (mm)
90045-64529-000	0.25
90045-64530-000	0.30
90045-64531-000	0.40
90045-64532-000	0.50

NOTE:

- As for the part number, confirm it by means of the parts catalogue.



- (11) Stake the nut securely to the bottom of the groove of the drive pinion.

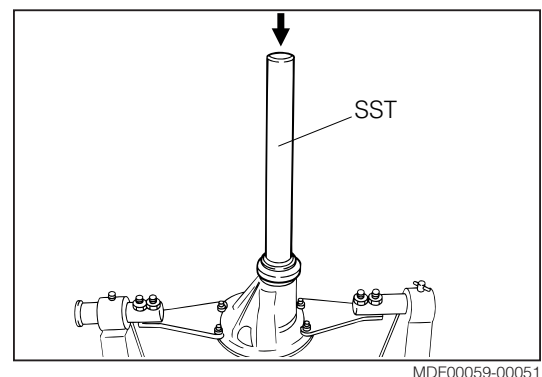


- (12) Assemble a new, type T oil seal, using the following SST.

SST: 09309-87301-000

NOTE:

- Be sure to press the oil seal up to the end of the carrier. Refer to the sectional view (page DF-2).
- Apply MP grease to the entire periphery of the lip section of the oil seal.

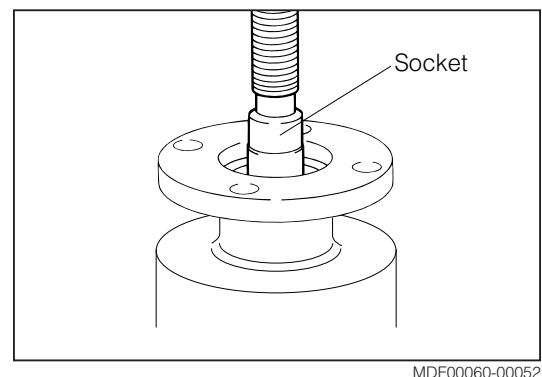


7. Assembling of transfer rear drive clutch assembly

- (1) With a socket (17 mm) applied to the inner race of the bearing, press the transfer rear drive clutch assembly into the drive pinion with a press.

NOTE:

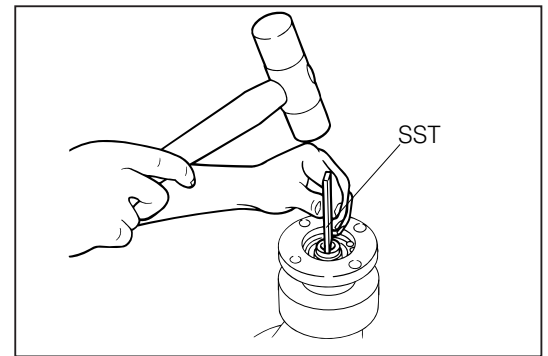
- When assembling the transfer rear drive clutch assembly, be careful not to allow the sub lip of the oil seal to face toward the reverse direction.



- (2) Insert the new shaft snap ring, using the following SST.
SST: 09202-87202-000

NOTE:

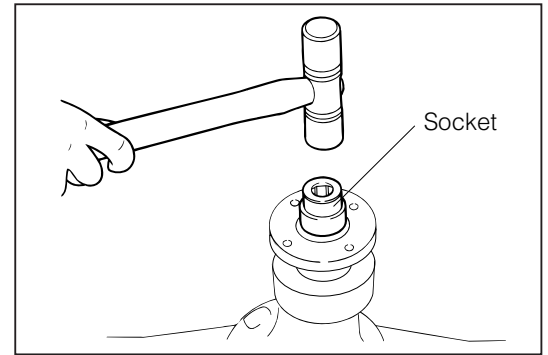
- Be sure to confirm that the snap ring is securely fit into the groove section of the drive pinion.
- The snap ring is a non-reusable part.



- (3) Assemble a new plug to the transfer rear clutch, using a socket (32 mm).

NOTE:

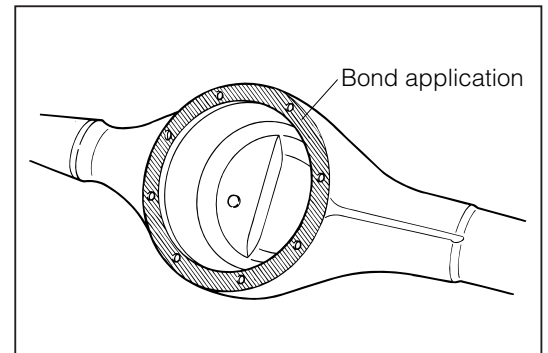
- The plug is a non-reusable part.



8. Assembling of differential carrier assembly

- (1) Apply specified liquid gasket to the differential carrier assembly installing section of the rear axle housing assembly.

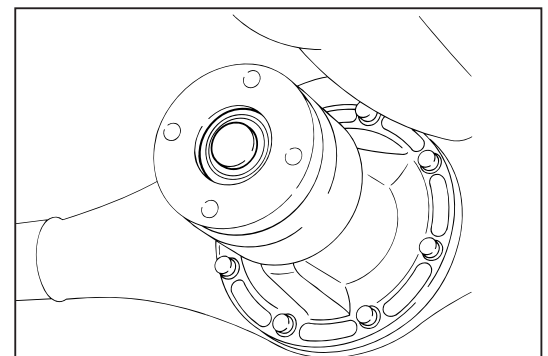
Liquid Gasket: Three Bond 1104



- (2) Install the differential carrier assembly. Tighten the new eight bolts to the specified torque.
Specified Torque: 24.5 - 39.2 N·m

NOTE:

- The bolts are non-reusable parts.

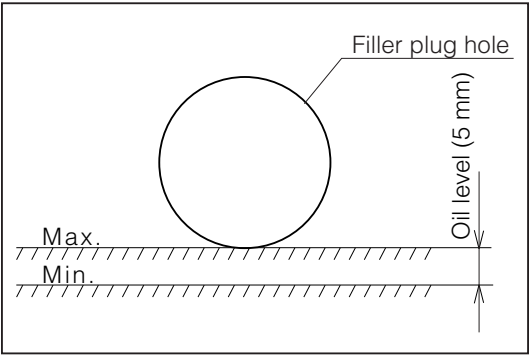


9. Operation after installation

- (1) Install the rear axle shafts.
- (2) Install the propeller shaft.
- (3) Tighten the drain plug with a new gasket.
Specified Torque: 53.9 - 68.6 N·m

MDF00065-00000

- (4) Fill the specified oil.
Specified Oil: Gear oil SAE 80W-90
(API classification GL-5)
Oil Level: 0 - 5 mm from lower edge of filler plug hole
- (5) Tighten the filler plug with a new gasket.
- (6) Install the rear wheels.
- (7) Lift down the vehicle.



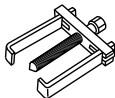
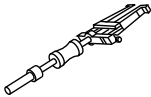
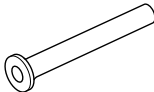
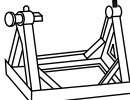
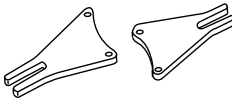
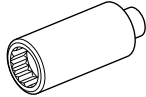
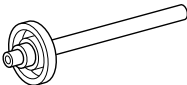
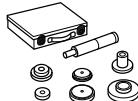
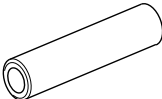
MDF00066-00057

TIGHTENING TORQUE

Section	Torque	
	N·m	kgf·m
Filler plug × Rear axle housing	53.9 - 68.6	5.5 - 7.0
Drain plug × Rear axle housing	53.9 - 68.6	5.5 - 7.0
Differential carrier assembly × Rear axle housing	24.6 - 39.2	2.5 - 4.0
Differential ring gear × Differential case	78.5 - 88.2	8.0 - 9.0
Differential bearing cap × Differential carrier	39.2 - 53.9	4.0 - 5.5
Differential pinion × Lock nut	117.7 - 156.9	12.0 - 16.0

MDF00067-00000

SSTs

Shape	Part Number, Item nomenclature	Use
	09334-87201-000 Transmission bearing puller	For removing transfer rear drive clutch
	09308-00010-000 Oil seal puller	For removing drive pinion oil seal
	09309-87301-000 Output shaft bearing replacer	For driving drive pinion oil seal
	09950-20017-000 Universal puller	For installing transfer rear drive clutch
	09219-87202-000 Engine overhaul stand	For disassembling/assembling differential assembly
	09548-87201-000 Differential overhaul attachment	For disassembling/assembling differential assembly
	09564-87201-000 Drive pinion lock nut socket	For removing/installing drive pinion lock nut For adjusting drive pinion bearing preload
	09502-10012-000 Differential bearing side puller	For removing/installing differential side bearing
	09608-87501-000 Axle hub & drive pinion bearing tool set	For removing drive pinion bearing outer race (front, rear) For pressing drive pinion bearing outer race (rear)
	09517-87703-000 Oil seal replacer	For pressing drive pinion bearing outer race (front)
	09608-12010-000 Front hub & drive pinion bearing replacer set	For pressing drive pinion bearing rear inner race
	09309-87201-000 Transmission bearing replacer	For assembling differential side bearing
	09950-87701-000 Bearing pulling attachment	For removing rear inner tapered roller bearing
	09202-87202-000 Valve spring replacer body	For driving plug of transfer rear axle

MDF00068-00058

GENERAL TOOLS

Snap ring expander, hexagon socket (14 mm)

MDF00069-00000