LEXUS Service Bulletin

Section :	Chassis/ Power Train
Ref. No. :	CP−3007
Date :	Sep., 2003
Page :	1 of 38

Area Application : USA, CANADA, Europe, G.C.C. Countries, Australia

Model Name : LS430, GS300, GS430, SC430

Model Code : UCF30, JZS160, UZS161, UZZ40

Subject : SUPPLEMENTAL FOR REPAIR MANUAL (DIFFERENTIAL)

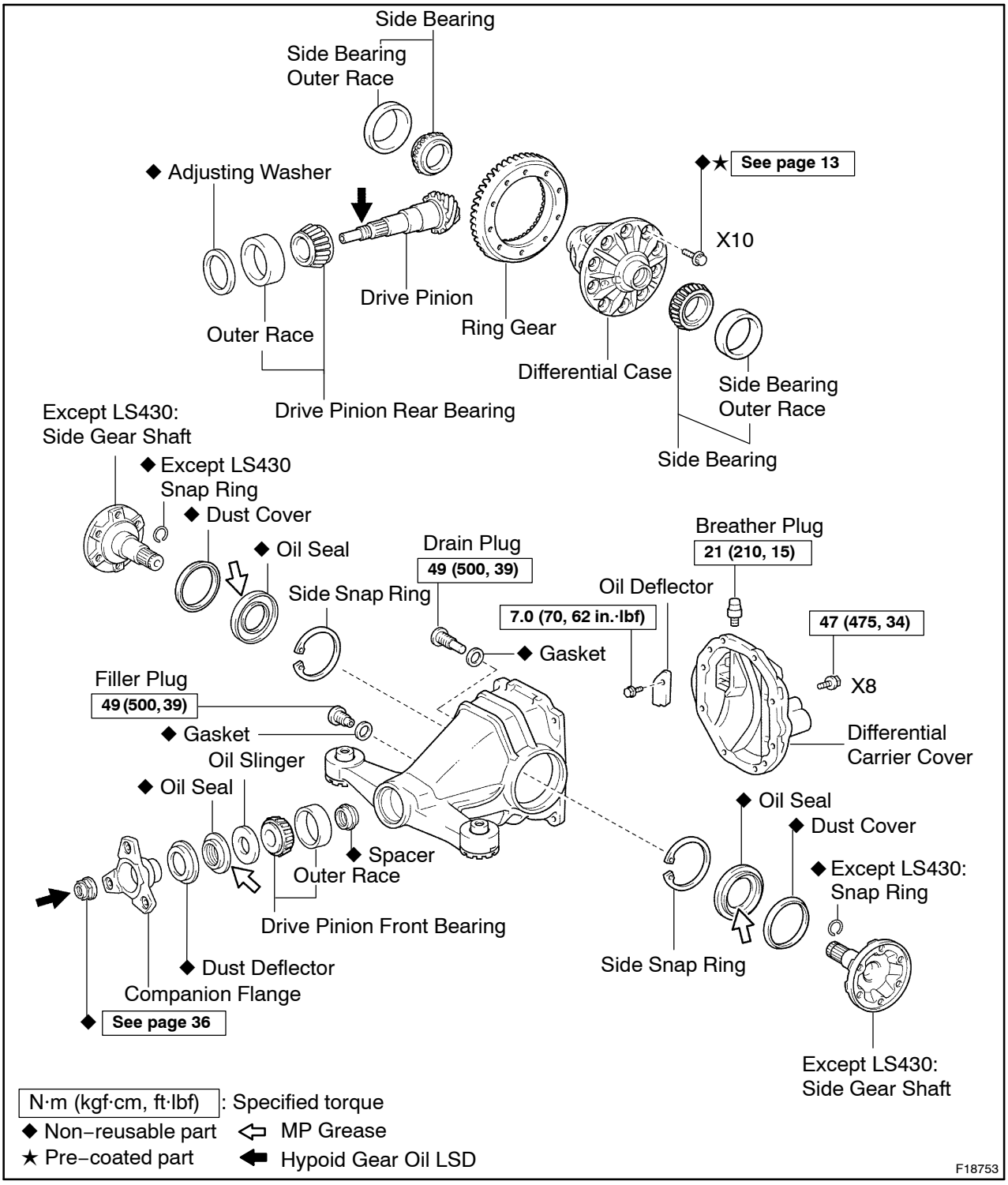
This Service Bulletin is to inform you of the repair procedure for Differential.
The attached pages will be applied to the following manual.

Pub. No.	Publication Name
RM988U	2003 LS430 Repair Manual
RM974U	2003 GS300/GS430 Repair Manual
RM962U	2003 SC430 Repair Manual
RM792E	LS430 Repair Manual
RM875E	LS430 Repair Manual Supplement
RM588E	GS300 Repair Manual
RM694E	GS300 Repair Manual Supplement
RM786E	GS300/GS430 Repair Manual Supplement
RM879E	GS300/GS430 Repair Manual Supplement
RM858E	SC430 Repair Manual

Production Effective :

VIN	Production Date
−	From June, 2003

REAR DIFFERENTIAL CARRIER
COMPONENTS



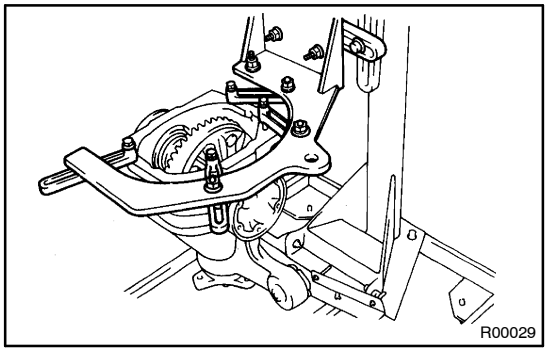
DISASSEMBLY

1. REMOVE DIFFERENTIAL CARRIER COVER

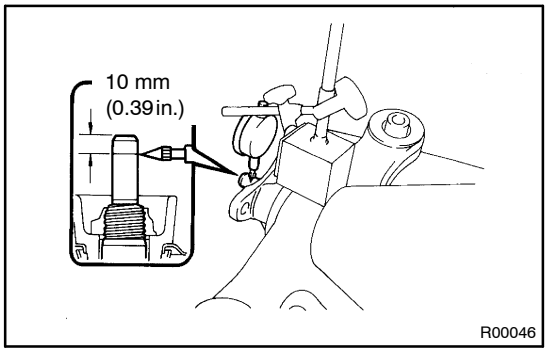
(a) Remove the 8 bolts from the carrier cover.

(b) Using a brass bar and hammer, separate the cover from carrier.

(c) Remove the breather plug from the differential carrier cover.



2. SET DIFFERENTIAL CARRIER TO OVERHAUL STAND ETC., AS SHOWN

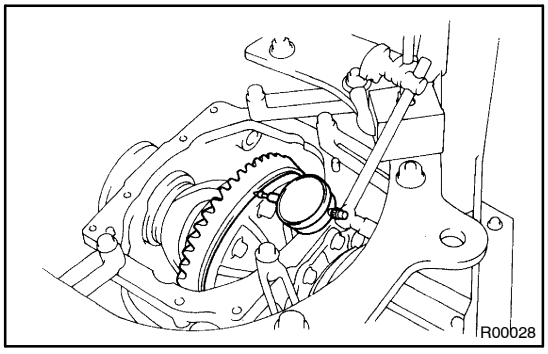


3. CHECK RUNOUT OF DRIVE PINION

Using a dial indicator, measure the runout of the drive pinion at a position 10 mm (0.39 in.) away from the end of the shaft.

Maximum runout: 0.08 mm (0.0031 in.)

If the runout is greater than the maximum, replace the drive pinion and ring gear.

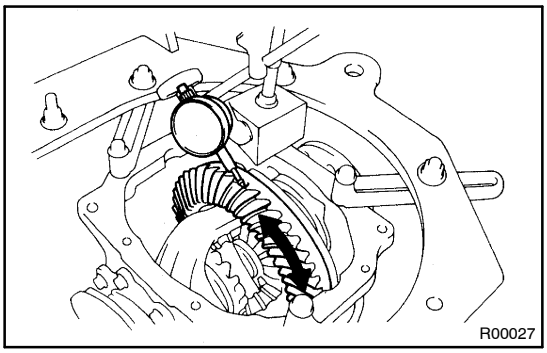


4. CHECK RING GEAR RUNOUT

Using a dial indicator, measure the ring gear runout.

Maximum runout: 0.05 mm (0.0020 in.)

If the runout is greater than the maximum, replace the drive pinion, ring gear and differential case.



5. CHECK RING GEAR BACKLASH

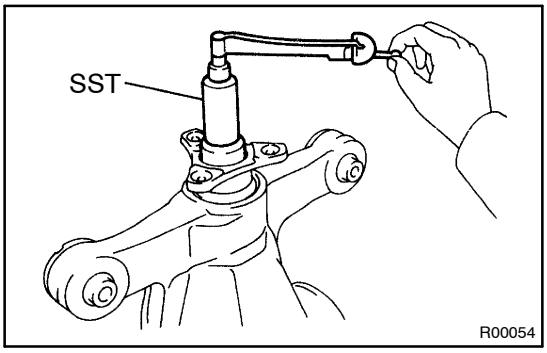
Using a dial indicator, measure the backlash of the ring gear at 3 points at least and check that the average value is within the specification.

Backlash: 0.08 to 0.13 mm (0.0031 to 0.0051 in.)

NOTICE:

The difference between the maximum and minimum measured values must be less than 0.05 mm (0.0020 in.).

If the backlash is not within the specification, adjust the backlash.



6. MEASURE DRIVE PINION PRELOAD

Using SST and a torque wrench, measure the preload using the backlash of the drive pinion and ring gear.

Preload (at starting):

0.5 to 0.8 N·m (5 to 8 kgf·cm, 4.3 to 6.9 in.·lbf)

HINT:

For vehicles which have run less than 8,000 km (5,000 miles), the preload may be large.

SST 09229–55010

Maximum preload (at starting):

1.8 N·m (18 kgf·cm, 16.0 in.·lbf)

7. CHECK TOTAL PRELOAD

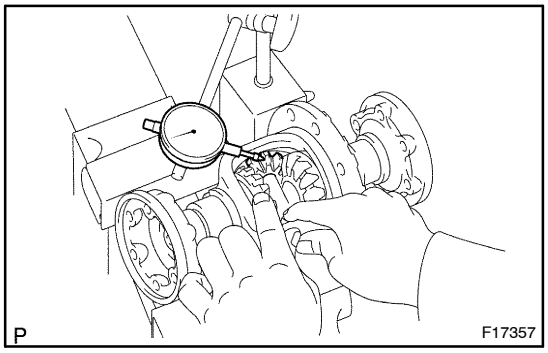
Using SST and a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

SST 09229–55010

Total preload (at starting):
Drive pinion preload plus

Differential Gear Ratio	Specified Value
3.266	0.53 to 1.58 N·m (5.4 to 18 kgf·cm, 4.69 to 13.89 in.·lbf)
3.615	0.48 to 1.43 N·m (4.9 to 15 kgf·cm, 4.25 to 13.02 in.·lbf)
3.769	0.46 to 1.37 N·m (4.7 to 14 kgf·cm, 4.08 to 12.15 in.·lbf)
3.916	0.45 to 1.32 N·m (4.6 to 13 kgf·cm, 3.99 to 11.28 in.·lbf)

If necessary, disassemble and inspect the differential.



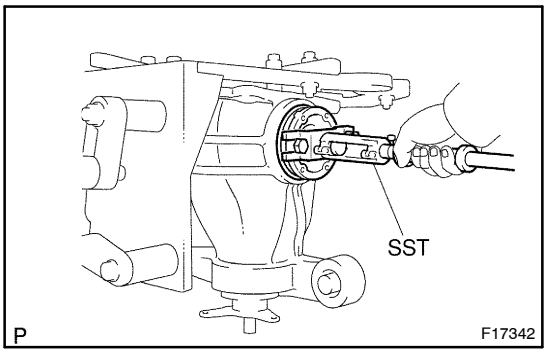
8. INSPECT PINION GEAR BACKLASH

(a) Using a vise, hold the differential case between two aluminium plates.

(b) Set the dial indicator on the tooth tip of the pinion gear tooth at a right angle. Hold the side gear in the differential case and check that the backlash is 0 mm.

If the backlash is not within the specification, replace the rear differential case with a new one.

9. CHECK TOOTH CONTACT PATTERN



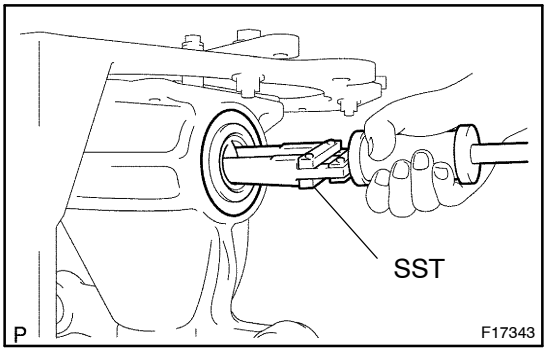
10. REMOVE SIDE GEAR SHAFTS

(a) Using SST, remove the 2 side gear shafts.
SST 09910–00015 (09911–00011, 09912–00010, 09914–00011)

NOTICE:

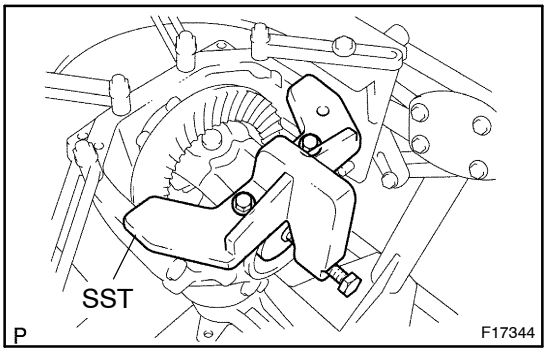
Be careful not to damage the oil seal.

(b) Using a screwdriver, remove the 2 snap rings from the side gear shafts.



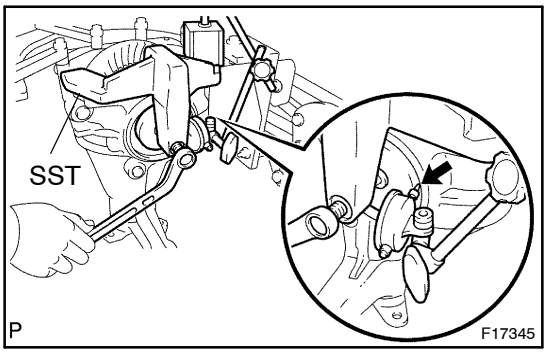
11. REMOVE SIDE GEAR SHAFT OIL SEALS

Using SST, remove the 2 oil seals.
SST 09308–00010



12. REMOVE SIDE SNAP RING

(a) Set the SST to the rear differential carrier.
SST 09571–50010



(b) Set the dial indicator to the differential carrier.

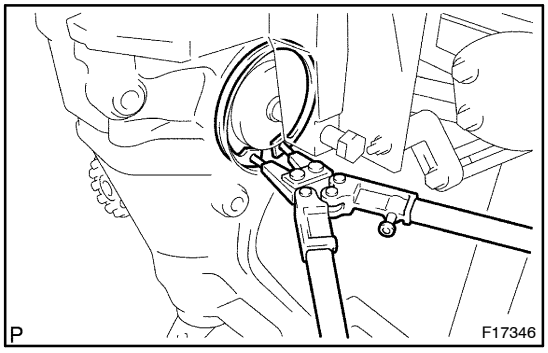
(c) Tighten the bolt of SST and alter the differential carrier shape so that 0.1 mm (0.004 in.) of clearance between the side bearing (outer race) and side snap ring can be made.

NOTICE:

Observe the dial indicator so that the differential carrier will not change the shape more than 0.2 mm (0.008in.).

HINT:

- Set the dial indicator to the rearmost position (upper side in the illustration) of the area around where the oil seal is tapped in.
- Approximately 0.1 mm (0.004 in.) clearance between the side bearing outer race and the side snap ring is sufficient enough for the washer to move slightly.



(d) Using the snap ring pliers, remove the side snap ring on the drive pinion side.

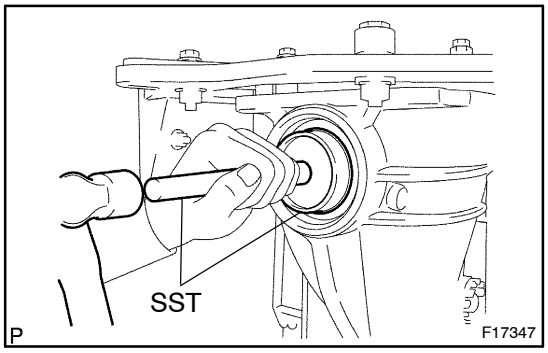
HINT:

For reassembly purposes, measure the thickness of the snap ring. Write down the result.

(e) Remove the dial indicator and loosen the bolt of SST.

NOTICE:

Do not remove the SST.

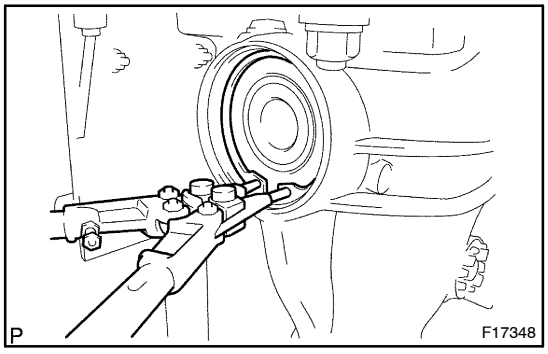


(f) Using the SST and a hammer, create a clearance between the side bearing (outer) on the ring gear and snap ring.

SST 09608–32010, 09950–70010 (09951–07200)

HINT:

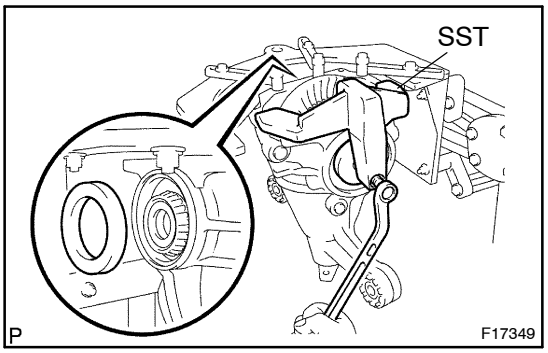
The clearance cannot be seen, but tapping the SST with a hammer three or four times should be enough.



(g) Using the snap ring pliers, remove the side snap ring on the ring gear side.

HINT:

For reassembly purposes, measure the thickness of the side snap ring. Write down the result.



13. REMOVE SIDE BEARING OUTER RACE

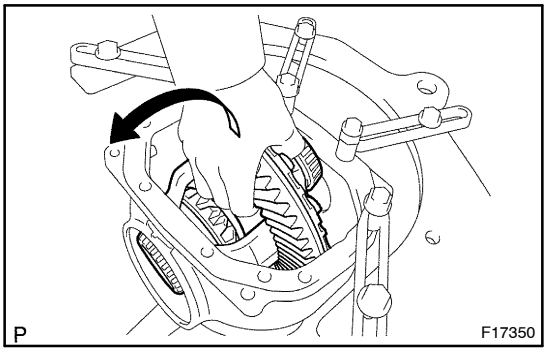
(a) Tighten the bolt of SST and push out the side bearing outer race on the ring gear side.
SST 09571–50010

NOTICE:

Do not drop the side bearing outer race.

(b) Remove the SST.

(c) Remove the side bearing outer race of other side.

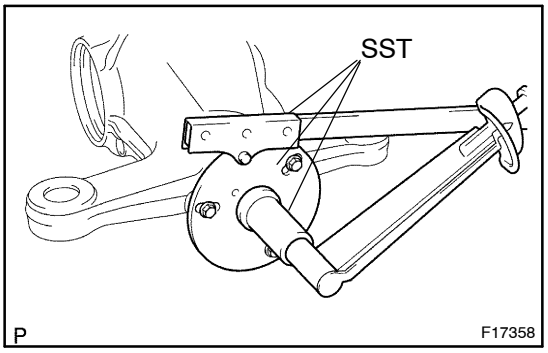


14. REMOVE DIFFERENTIAL CASE

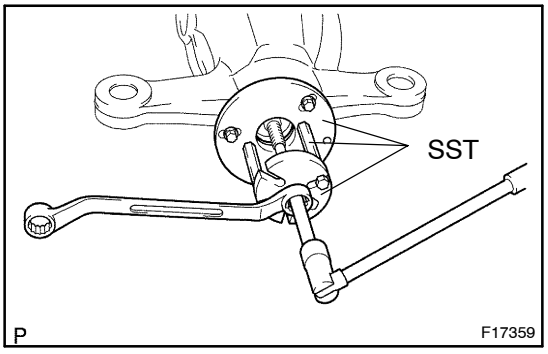
Take the differential case out of the carrier with lifting the ring gear side, as shown in the illustration.

15. REMOVE DRIVE PINION NUT

(a) Using a chisel and a hammer, loosen the staked part of the nut.

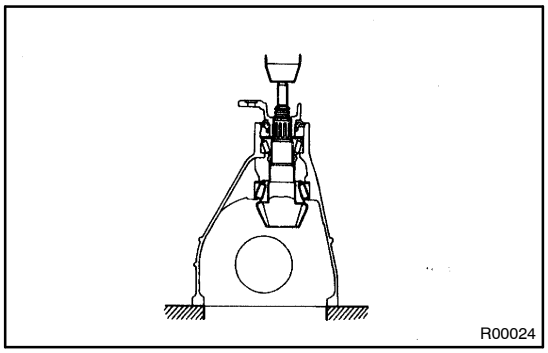


(b) Using SST, hold the companion flange and remove the nut.
SST 09229–55010, 09330–00021, 09950–30012 (09955–03040)



16. REMOVE COMPANION FLANGE

Using SST, remove the companion flange.
SST 09950–30012 (09951–03010, 09953–03010, 09954–03010, 09955–0303, 09956–03060)



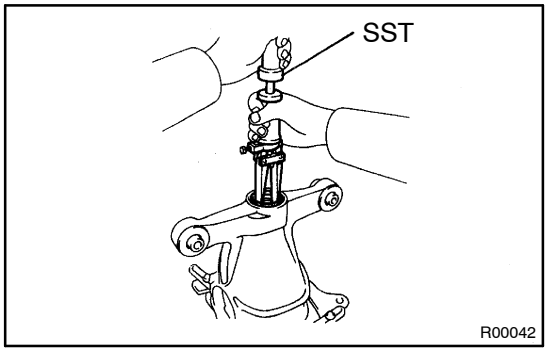
17. REMOVE DRIVE PINION AND SPACER

(a) Using a press, remove the drive pinion with the rear bearing.

NOTICE:

Be careful not to drop the drive pinion.

(b) Remove the spacer from the drive pinion.

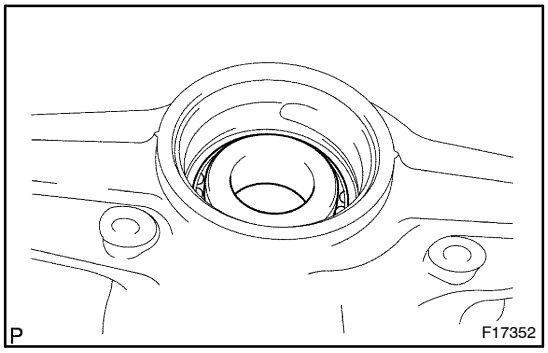


18. REMOVE OIL SEAL

Using SST, remove the oil seal.

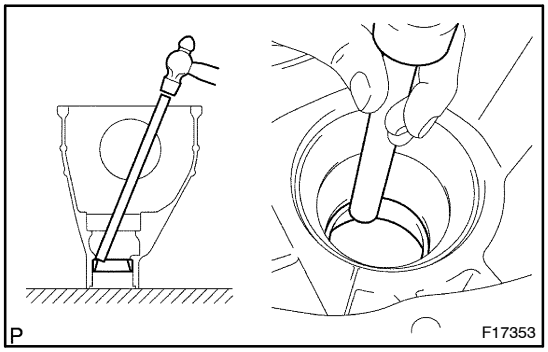
SST 09308–00010

19. REMOVE OIL SLINGER AND FRONT BEARING

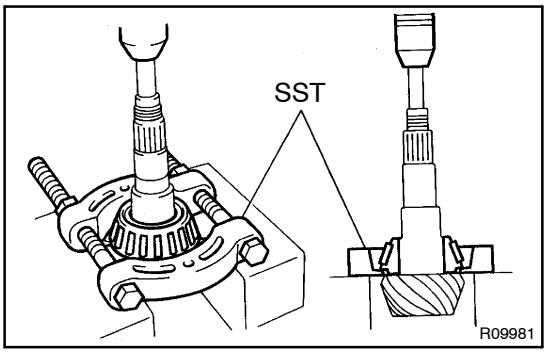


20. REMOVE DRIVE PINION FRONT BEARING

(a) Remove the front bearing from the differential carrier.



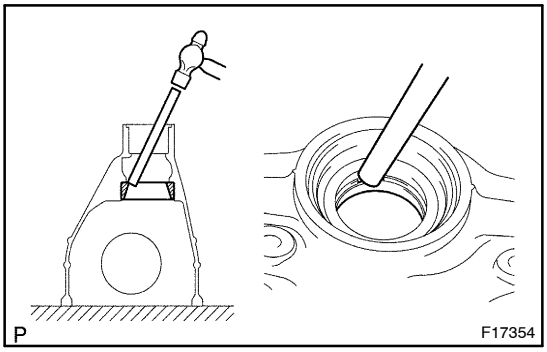
(b) Using a brass bar and a hammer remove the front bearing outer race.



21. REMOVE DRIVE PINION REAR BEARING

Using SST and a press, remove the rear bearing from the drive pinion.

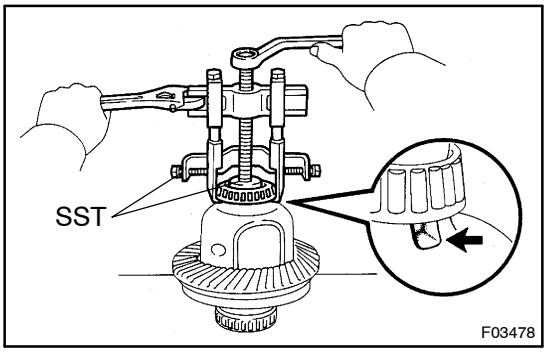
SST 09950–00020



22. REMOVE REAR BEARING OUTER RACE AND ADJUSTING WASHER

(a) Using a brass bar and a hammer, remove the rear bearing outer race.

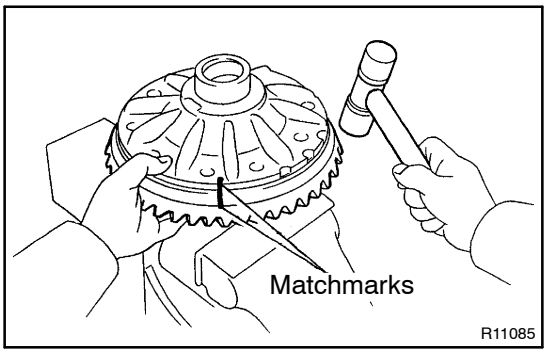
(b) Remove the adjusting washer.



23. REMOVE SIDE BEARINGS

Using SST, remove the 2 side bearings from the differential case.

SST 09950–40011, (09951–04020, 09952–04010, 09953–04030, 09954–04010, 09955–04061, 09957–04010, 09958–04011), 09950–60010 (09951–00450)

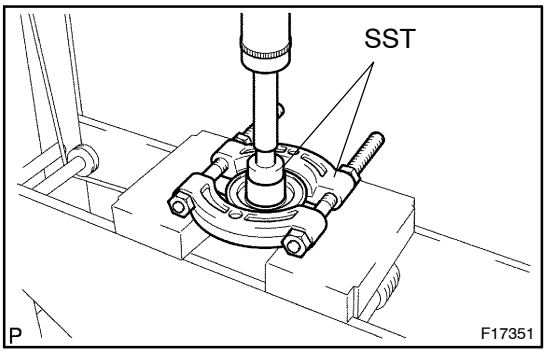


24. REMOVE RING GEAR

(a) Place matchmarks on the ring gear and differential case.

(b) Remove the 10 ring gear set bolts.

(c) Using a plastic hammer, tap on the ring gear to separate it from the differential case.

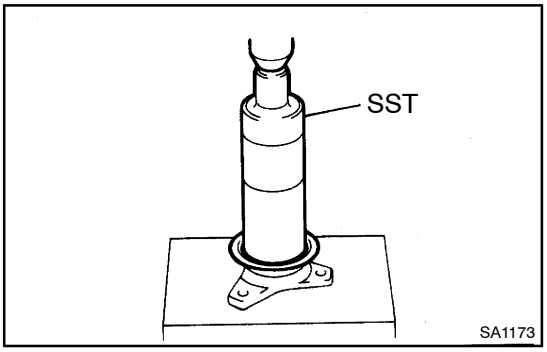


REPLACEMENT

1. REPLACE COMPANION FLANGE DUST DEFLECTOR

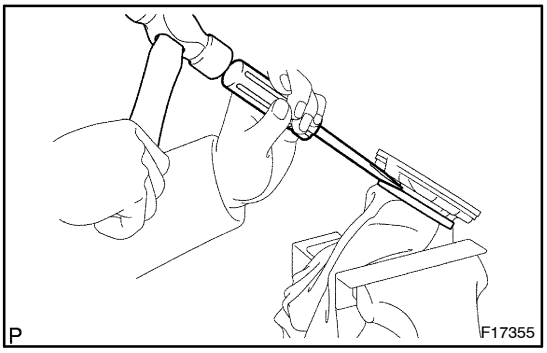
(a) Using SST and a press, remove the dust deflector.

SST 09950−00020, 09950−60010 (09951−00510), 09950−70010 (09951−07100)



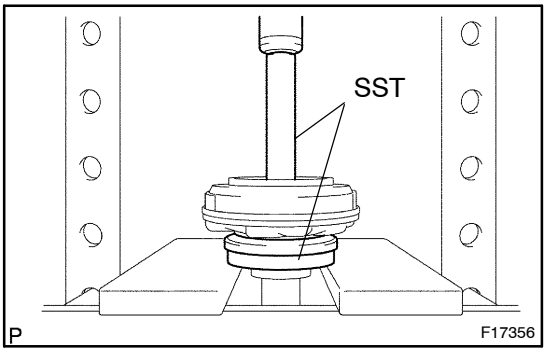
(b) Using SST and a press, install a new dust deflector.

SST 09316−60011 (09316−00011)



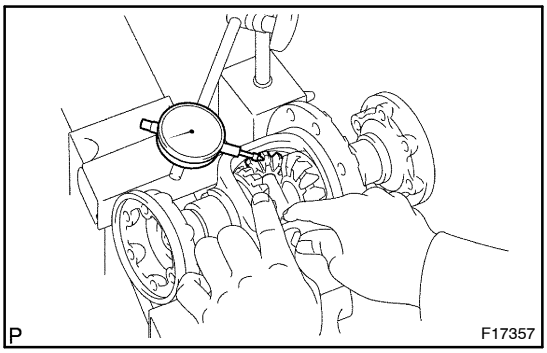
2. REPLACE DUST COVER

(a) Using a screwdriver and a hammer, remove the dust cover.



(b) Using SST and a press, install a new dust cover.

SST 09502−24010, 09950−55011 (09950−05061), 09950−70010 (09951−07200)



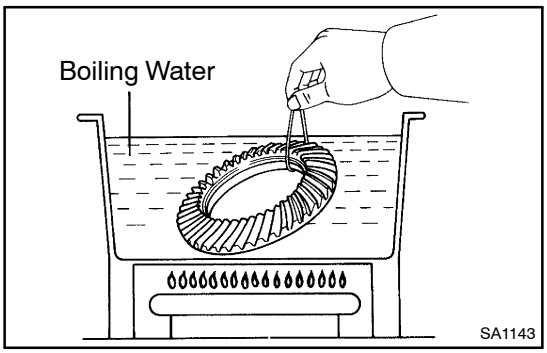
REASSEMBLY

1. INSPECT PINION GEAR BACKLASH

(a) Using a vise, hold the differential case between two aluminium plates.

(b) Set the dial indicator on the tooth tip of the pinion gear tooth at a right angle. Hold the side gear in the differential case and check that the backlash is 0 mm.

If the backlash is not within the specification, replace the differential case with a new one.

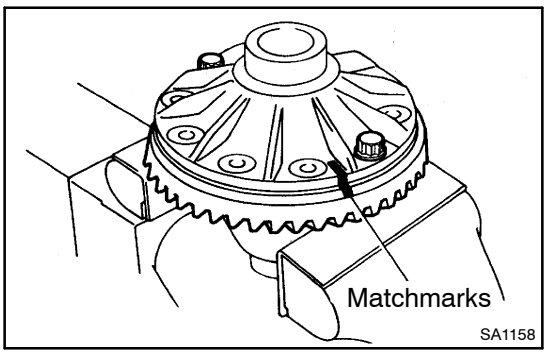


2. INSTALL RING GEAR ON DIFFERENTIAL CASE

(a) Clean the contact surfaces of the differential case and the threads of the ring gear and differential case.

(b) Heat the ring gear in boiling water.

(c) Carefully remove the ring gear from the boiling water.



(d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

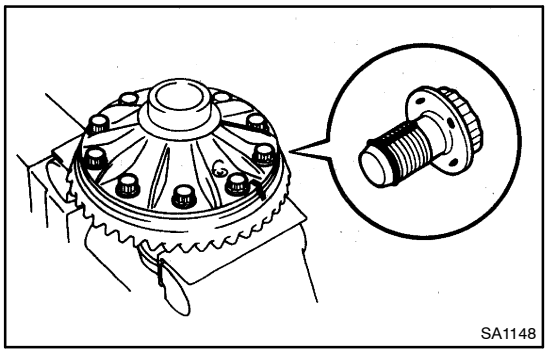
HINT:

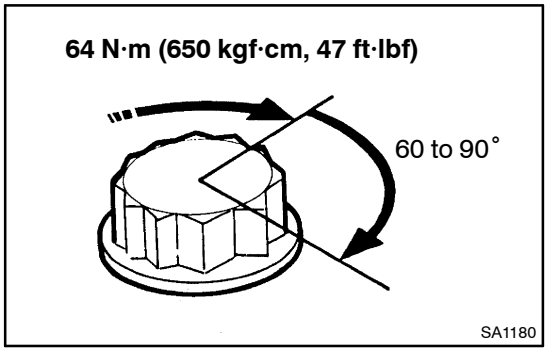
Align the matchmarks on the ring gear and the differential case.

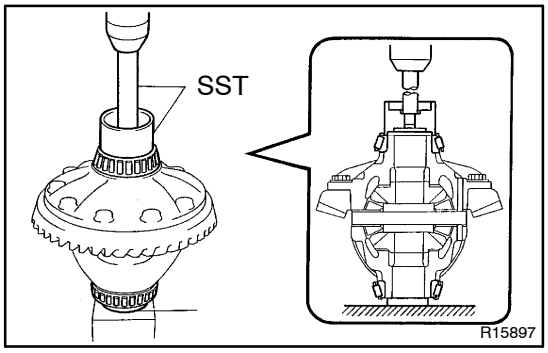
(e) Tighten 2 of the bolts temporarily so that the bolt holes in the ring gear and differential case are not misaligned.

NOTICE:

The ring gear set bolts should not be tightened until the ring gear has cooled sufficiently.







3. INSTALL RING GEAR SET BOLTS

(a) After the ring gear has cooled sufficiently, install new 10 ring gear set bolts to which thread lock has been applied.

Thread lock:
Part No. 08833–00100, THREE BOND 1360 K or equivalent.

NOTICE:

New ring gear set bolts should be used in every case.

(b) Torque the 10 set bolts uniformly and a little at a time.

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

(c) Tighten the bolts more by 60 to 90°.

NOTICE:

Tighten the bolts in diagonally opposite pairs.

4. INSTALL SIDE BEARINGS

Using SST and a press, install the 2 side bearings.

SST 09950–60010 (09951–00560),
09950–70010 (09951–07100),
09950–60020 (09951–00810),
09950–70010 (09951–07100)

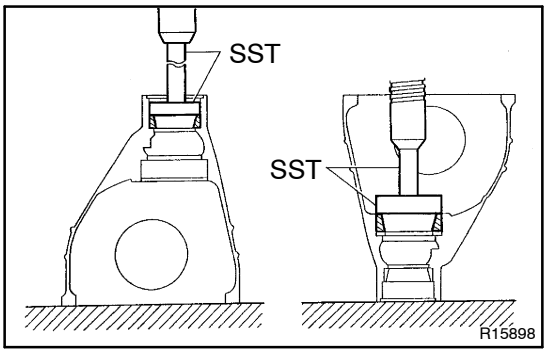
NOTICE:

Be sure to install the 2 side bearings in the correctly.

5. INSTALL DRIVE PINION BEARING OUTER RACES AND ADJUSTING WASHER

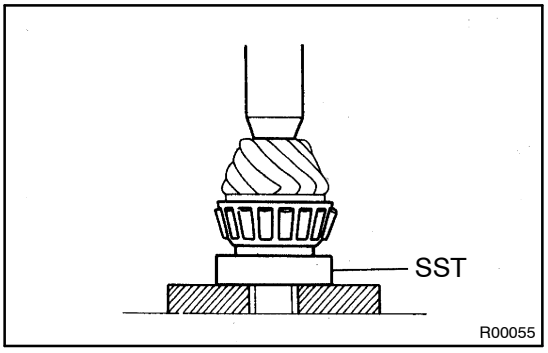
HINT:

- The adjusting washer is used for adjusting the tooth contact pattern. 42 types of washer with different thicknesses are available.
- First fit a washer with the same thickness as the washer which was removed, then after checking the tooth contact pattern, replace the washer with one of a different thickness if necessary.
- When removing an adjusting washer, be sure to replace it with a new one.



(a) Using SST and a press, install the front bearing outer race.
SST 09950–60020 (09951–00710), 09950–70010 (09951–07150)

(b) Using SST and a press, install a new adjusting washer to the rear bearing outer race.
SST 09255–10012, 09950–70010 (09951–07150)

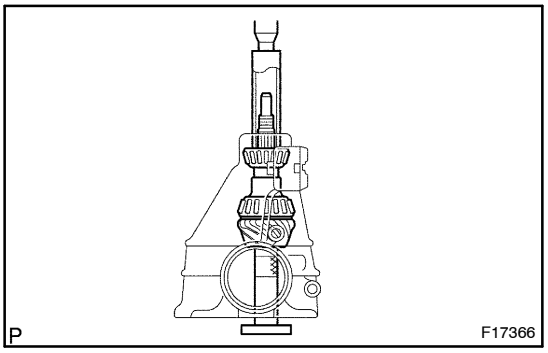


6. INSTALL REAR BEARING TO DRIVE PINION

Using SST and a press, install the rear bearing.
SST 09502–24010

7. TEMPORARILY INSTALL DRIVE PINION, FRONT BEARING, OIL SLINGER AND COMPANION FLANGE

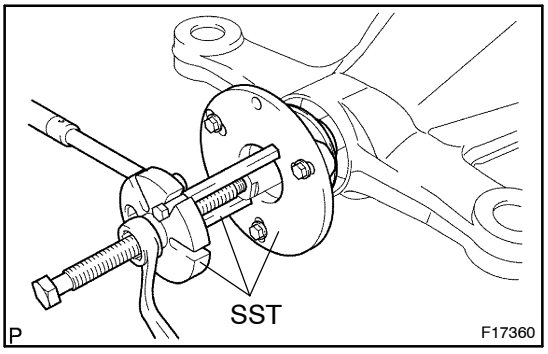
(a) Install the drive pinion in the differential carrier.



(b) Using SST and a press, install the front bearing on the drive pinion.
SST 09316–60011 (09316–00011), 09608–04031

HINT:
Assemble the spacer and oil seal after adjusting the tooth contact pattern.

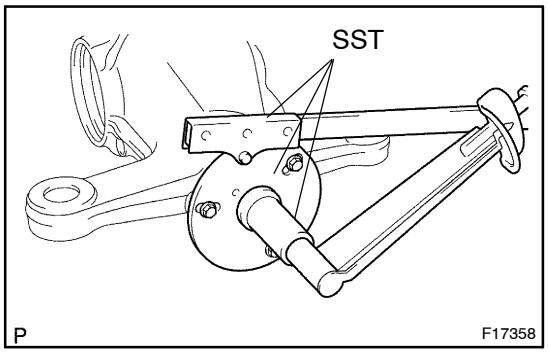
(c) Install the oil slinger.

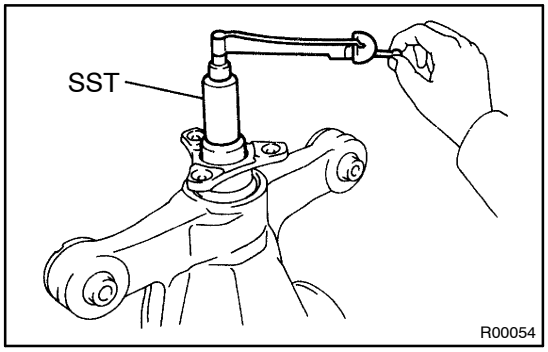


(d) Using SST, install the companion flange onto the differential carrier.
SST 09950–30012 (09951–03010, 09954–03010, 09956–03060, 09955–03040)

NOTICE:

- **Because the spacer is not installed, leave a little looseness between the companion flange and the drive pinion when installing.**
- **Apply hypoid gear oil SX to the screw and tip of the SST center bolt before using.**





8. TEMPORARILY ADJUST DRIVE PINION PRELOAD

(a) Adjust the drive pinion preload by tightening the companion flange nut.

HINT:

Tighten the nut approximately 98 N·m (1,000 kgf·cm, 72 ft·lbf) and tighten more while observing the preload. Using SST, hold the companion flange and tighten the nut.

SST 09229–55010, 09330–00021

(b) Using SST and a torque wrench, measure the preload.

SST 09229–55010

Preload (at starting):

New bearing:

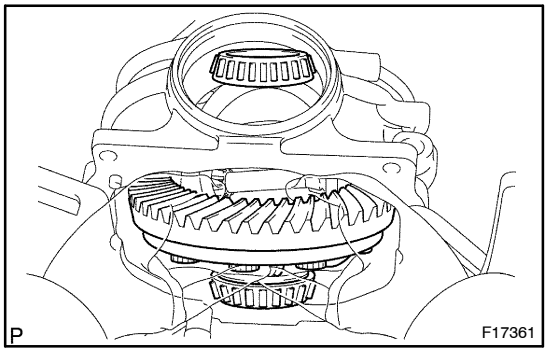
1.2 to 1.8 N·m (12 to 18 kgf·cm, 10.4 to 15.6 in.·lbf)

Reused bearing:

0.5 to 0.8 N·m (5 to 8 kgf·cm, 4.3 to 6.9 in.·lbf)

HINT:

For vehicles which have run 8,000 km (5,000 miles) or less, if the preload value measured before disassembly is greater than the specification for a reused bearing, return the preload to the same as before disassembly. If the preload is not within the specification, adjust the rear differential drive pinion preload or repair as necessary.

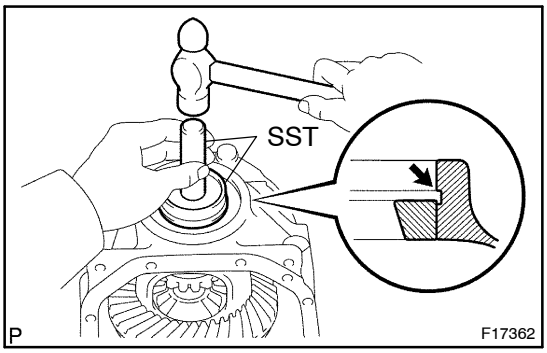


9. INSTALL DIFFERENTIAL CASE

Install the side bearing in the differential carrier first, as shown in the illustration, then install the differential case.

NOTICE:

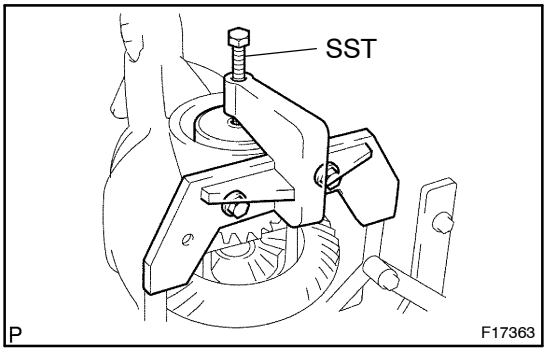
Do not damage the side bearing and ring gear.



10. INSTALL SIDE BEARING

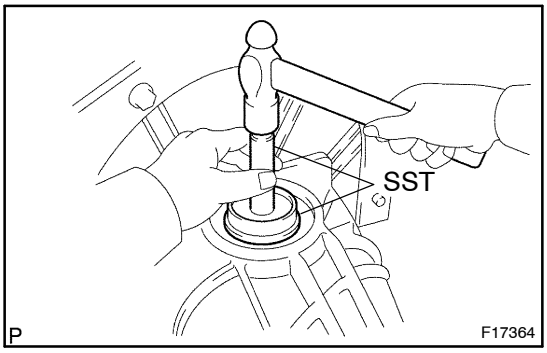
(a) Using SST and a hammer, install the side bearing outer race.
SST 09608−32010, 09950−70010 (09951−07200)

HINT:
Tap in the outer race until half of the side snap ring groove of the differential carrier can be seen.



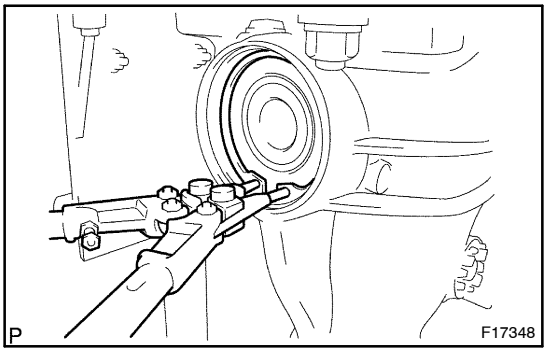
(b) Set the SST to the differential carrier.
SST 09571−50010

(c) Tighten the bolt of SST until the SST disc lightly hits to the side bearing outer race.



(d) Using SST and a hammer, install the side bearing outer race.
SST 09950−70010 (09951−07200), 09608−32010

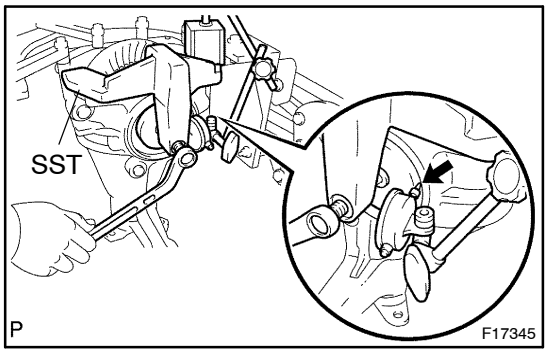
HINT:
Tap in the outer race until it hits the case bearing roller.



11. INSTALL SIDE SNAP RING

HINT:
This procedure is required only when final gear set (drive pinion & ring gear) is replaced.

(a) Using the snap ring pliers, install the thinnest side snap ring on the ring gear side.



(b) Set the dial indicator to the differential carrier.

(c) Tighten the bolt of SST to alter the shape of the differential carrier approximately 0.1 mm (0.004 in.).

SST 09571–50010

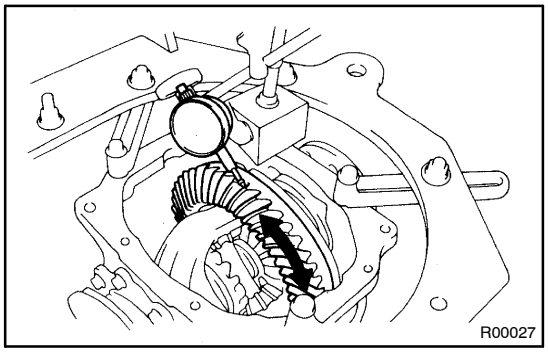
NOTICE:

Observe the dial indicator to ensure the differential carrier does not alter the shape by more than 0.2 mm (0.008 in.).

HINT:

- Set the dial indicator to the rearmost position (upper side in the illustration) of the area around where the oil seal is tapped in.
- Tighten the bolt of SST to apply the preload to the side bearing.

(d) Turn the ring gear clockwise and counterclockwise several times.



(e) Using a dial indicator, measure the backlash of the ring gear in 3 positions.

Backlash: 0.08 to 0.13 mm (0.0031 to 0.0051 in.)

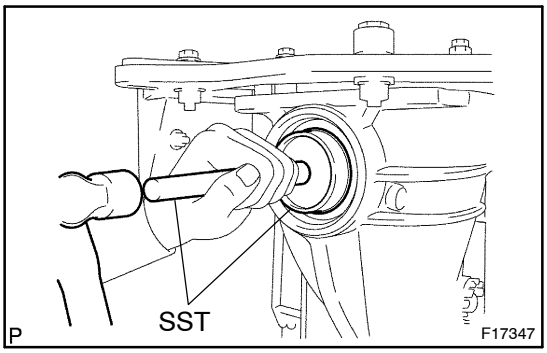
NOTICE:

The difference between maximum and minimum values must be within 0.05 mm (0.0020 in.).

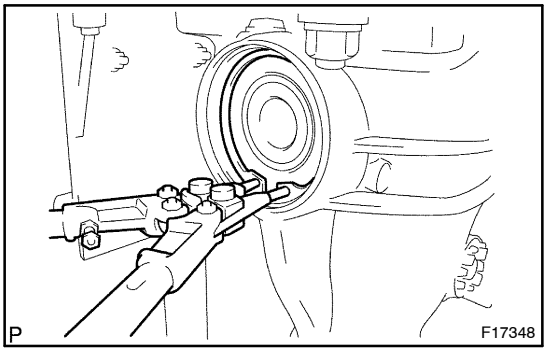
HINT:

Write the values for reference to select a side snap ring. If a value is not within the specified range, replace it with a different thickness of side snap ring in the following procedure.

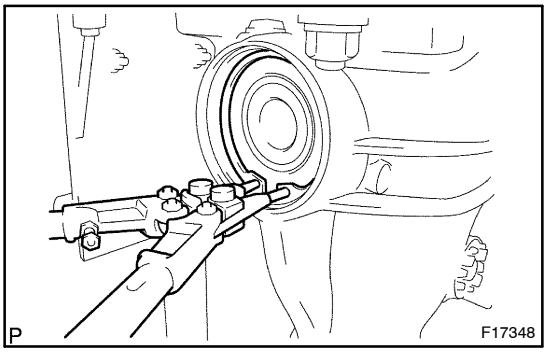
(f) Loosen the bolt of SST and separate the SST disc from the side bearing outer race on the drive pinion.



(g) Using SST and a hammer, create a clearance between the side snap ring on the ring gear side and outer race.
SST 09608–32010, 09950–70010 (09951–07200)



(h) Using the snap ring pliers, remove the side snap ring on the ring gear side.

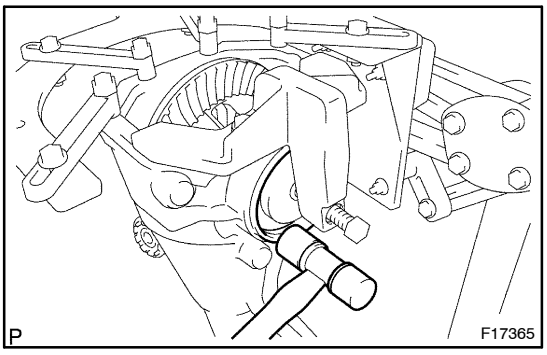


(i) Using the snap ring pliers, install a side snap ring with different thickness.

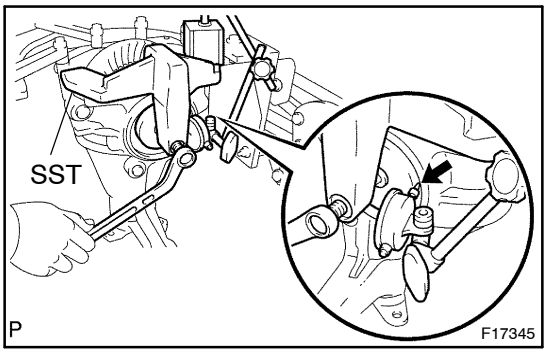
HINT:

- There are 39 types of side snap ring varying in thickness by 0.02 mm (0.0008 in.).
- When the side snap ring thickness changes by 0.02 mm (0.0008 in.), the backlash changes by 0.02 mm (0.0008 in.).

Parts No.	Thickness mm (in.)	Parts No.	Thickness mm (in.)
90521–99062	3.66 (0.1441)	90521–99084	4.06 (0.1598)
90521–99063	3.68 (0.1449)	90521–99085	4.08 (0.1606)
90521–99064	3.70 (0.1457)	90521–99086	4.10 (0.1614)
90521–99065	3.72 (0.1465)	90521–99087	4.12 (0.1622)
90521–99066	3.74 (0.1472)	90521–99088	4.14 (0.1630)
90521–99067	3.76 (0.1480)	90521–99089	4.16 (0.1638)
90521–99068	3.78 (0.1488)	90521–99090	4.18 (0.1646)
90521–99070	3.80 (0.1496)	90521–99091	4.20 (0.1654)
90521–99071	3.82 (0.1503)	90521–99092	4.22 (0.1661)
90521–99072	3.84 (0.1512)	90521–99095	4.24 (0.1669)
90521–99073	3.86 (0.1520)	90521–99096	4.26 (0.1677)
90521–99074	3.88 (0.1528)	90521–99097	4.28 (0.1685)
90521–99075	3.90 (0.1535)	90521–99100	4.30 (0.1693)
90521–99076	3.92 (0.1543)	90521–99101	4.32 (0.1701)
90521–99077	3.94 (0.1551)	90521–99102	4.34 (0.1709)
90521–99078	3.96 (0.1559)	90521–99103	4.36 (0.1717)
90521–99079	3.98 (0.1567)	90521–99104	4.38 (0.1724)
90521–99081	4.00 (0.1575)	90521–99105	4.40 (0.1732)
90521–99082	4.02 (0.1583)	90521–99107	4.42 (0.1740)
90521–99083	4.04 (0.1591)		

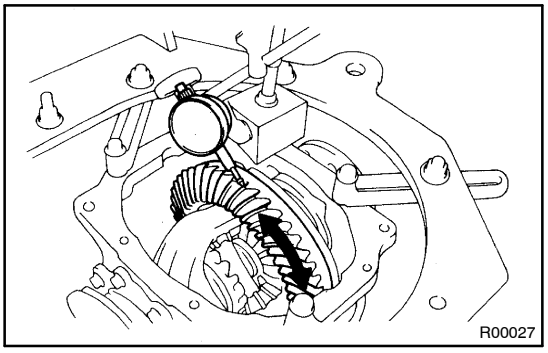


(j) Using a plastic hammer, lightly tap the drive pinion side of the differential carrier.

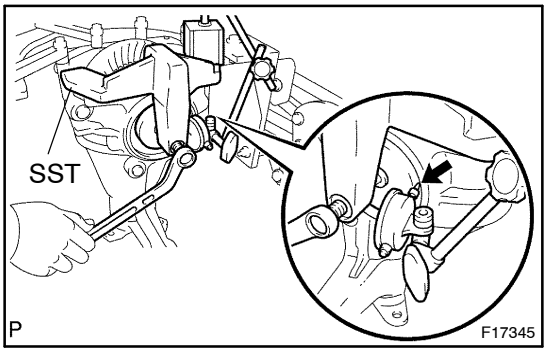


(k) Set the dial indicator onto the differential carrier.
(l) Tighten the bolt of SST to alter the shape of the differential carrier by 0.1 mm (0.004 in.).
SST 09571–50010

HINT:
Set the dial indicator to the rearmost side (upper side in the illustration) of the oil seal tapped in.

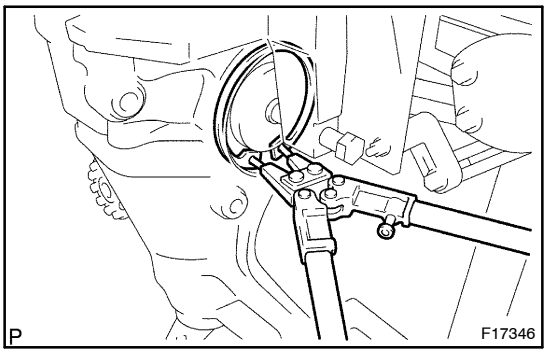


(m) Using a dial indicator, measure the ring gear backlash.
Backlash: 0.08 to 0.13 mm (0.0031 to 0.0051 in.)
(n) If the backlash is not within the specified range, replace the side snap ring on the ring gear side using one with a different thickness.

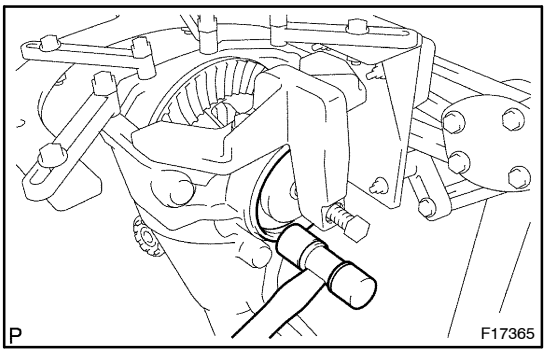


12. ADJUST RING GEAR BACKLASH
(a) Set the dial indicator to the differential carrier.
(b) Tighten the bolt of SST to alter the shape of the differential carrier 0.1 mm (0.004 in.).
SST 09571–50010

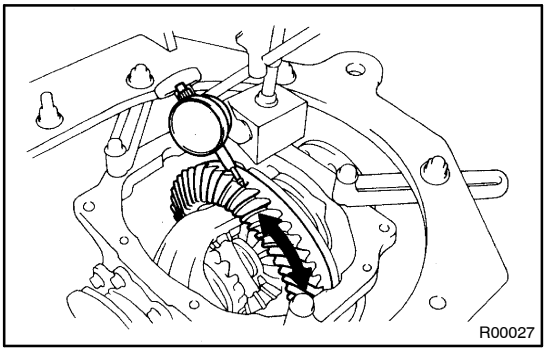
HINT:
Set the dial indicator to the rearmost side (upper side in the illustration) of the oil seal tapped in.



(c) Using snap ring pliers, install the thinnest possible side snap ring on the drive pinion side.
(d) Remove the dial indicator and loosen the bolt until the SST disc is separated from the outer race.



(e) Using a plastic hammer, lightly tap the drive pinion side of the differential carrier.



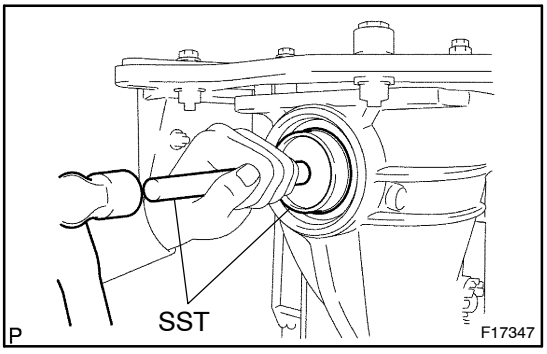
(f) Check the backlash around the ring gear. If even one backlash is smaller than the specified value, adjust the differential ring gear backlash by replace the side snap ring on the drive pinion side with a thicker one.

Backlash: 0.08 to 0.13 mm (0.0031 to 0.0051 in.)

HINT:

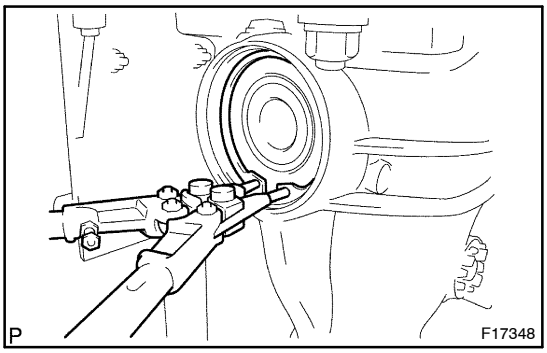
If a value is not within the specified range, replace it with a different thickness of side snap ring in the following procedure.

(g) Loosen the bolt of SST and separate the SST disc from the side bearing outer race on the drive pinion.

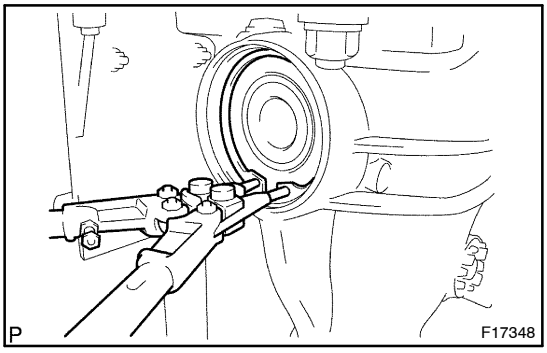


(h) Using SST and a hammer, create a clearance between the side snap ring on the ring gear side and outer race.

SST 09608–32010, 09950–70010
(09951–07200)



(i) Using the snap ring pliers, remove the side snap ring on the ring gear side.

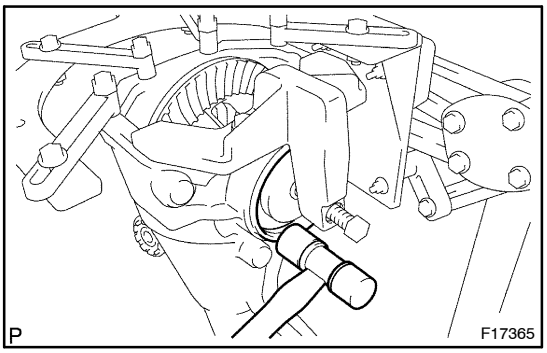


(j) Using the snap ring pliers, install a side snap ring with different thickness.

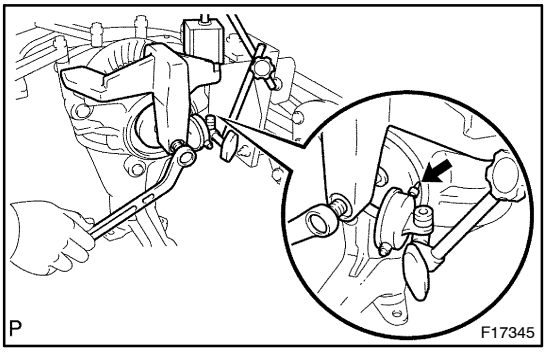
HINT:

- There are 39 type of snap ring varying in thickness by 0.02 mm (0.0008 in.).
- When the side snap ring thickness changes by 0.02 mm (0.0008 in.), the backlash changes by 0.02 mm (0.0008 in.).

Parts No.	Thickness mm (in.)	Parts No.	Thickness mm (in.)
90521−99062	3.66 (0.1441)	90521−99084	4.06 (0.1598)
90521−99063	3.68 (0.1449)	90521−99085	4.08 (0.1606)
90521−99064	3.70 (0.1457)	90521−99086	4.10 (0.1614)
90521−99065	3.72 (0.1465)	90521−99087	4.12 (0.1622)
90521−99066	3.74 (0.1472)	90521−99088	4.14 (0.1630)
90521−99067	3.76 (0.1480)	90521−99089	4.16 (0.1638)
90521−99068	3.78 (0.1488)	90521−99090	4.18 (0.1646)
90521−99070	3.80 (0.1496)	90521−99091	4.20 (0.1654)
90521−99071	3.82 (0.1503)	90521−99092	4.22 (0.1661)
90521−99072	3.84 (0.1512)	90521−99095	4.24 (0.1669)
90521−99073	3.86 (0.1520)	90521−99096	4.26 (0.1677)
90521−99074	3.88 (0.1528)	90521−99097	4.28 (0.1685)
90521−99075	3.90 (0.1535)	90521−99100	4.30 (0.1693)
90521−99076	3.92 (0.1543)	90521−99101	4.32 (0.1701)
90521−99077	3.94 (0.1551)	90521−99102	4.34 (0.1709)
90521−99078	3.96 (0.1559)	90521−99103	4.36 (0.1717)
90521−99079	3.98 (0.1567)	90521−99104	4.38 (0.1724)
90521−99081	4.00 (0.1575)	90521−99105	4.40 (0.1732)
90521−99082	4.02 (0.1583)	90521−99107	4.42 (0.1740)
90521−99083	4.04 (0.1591)		



(k) Using a plastic hammer, lightly tap the drive pinion side of the differential carrier.

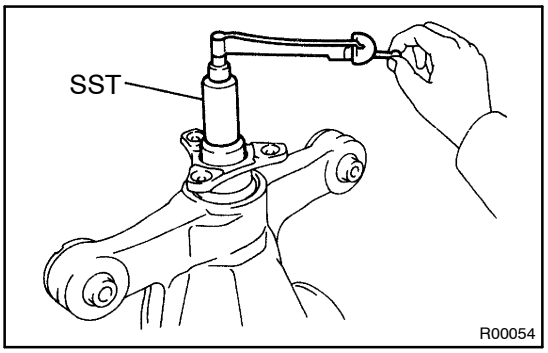


(l) Check the backlash around the ring gear. If even one backlash is smaller than the specified value, adjust the ring gear backlash by replace the side snap ring on the drive pinion side with a thicker one.

Backlash: 0.08 to 0.13 mm (0.0031 to 0.0051 in.)

HINT:

If a value is not within the specified range, replace it with a different thickness of side snap ring in the same procedure.

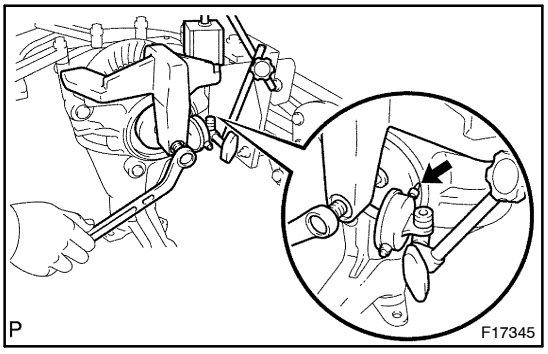


13. ADJUST TOTAL PRELOAD

(a) Using SST and a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.
SST 09229–55010
Total preload (at starting):
Drive pinion preload plus

Differential Gear Ratio	Specified Value
3.266	0.53 to 1.58 N·m (5.4 to 18 kgf·cm, 4.69 to 13.89 in.·lbf)
3.615	0.48 to 1.43 N·m (4.9 to 15 kgf·cm, 4.25 to 13.02 in.·lbf)
3.769	0.46 to 1.37 N·m (4.7 to 14 kgf·cm, 4.08 to 12.15 in.·lbf)
3.916	0.45 to 1.32 N·m (4.6 to 13 kgf·cm, 3.99 to 11.28 in.·lbf)

NOTICE:
If the measured preload is less than the specification, replace the side snap ring of the drive pinion side with a thicker one.
If the preload is greater than the specification, replace the snap ring of the drive pinion side with a thinner one.
HINT:
Change the side snap ring thickness by 0.02 mm (0.0008 in.) will change the total preload by approx. 0.1 N·m (1 kgf·cm, 0.9 in.·lbf).



(b) Set the dial indicator to the end of the ring gear face.
(c) While holding the companion flange, rotate the ring gear and measure the backlash.
Backlash: 0.08 to 0.13 mm (0.0031 to 0.0051 in.)

NOTICE:
- **If the measured value is out of the specified value, adjust it by increasing or decreasing the thickness of both right and left side snap ring equally.**

- **When the side snap ring thickness changes by 0.02 mm (0.0008 in.), the backlash changes by 0.02 mm (0.0008 in.).**

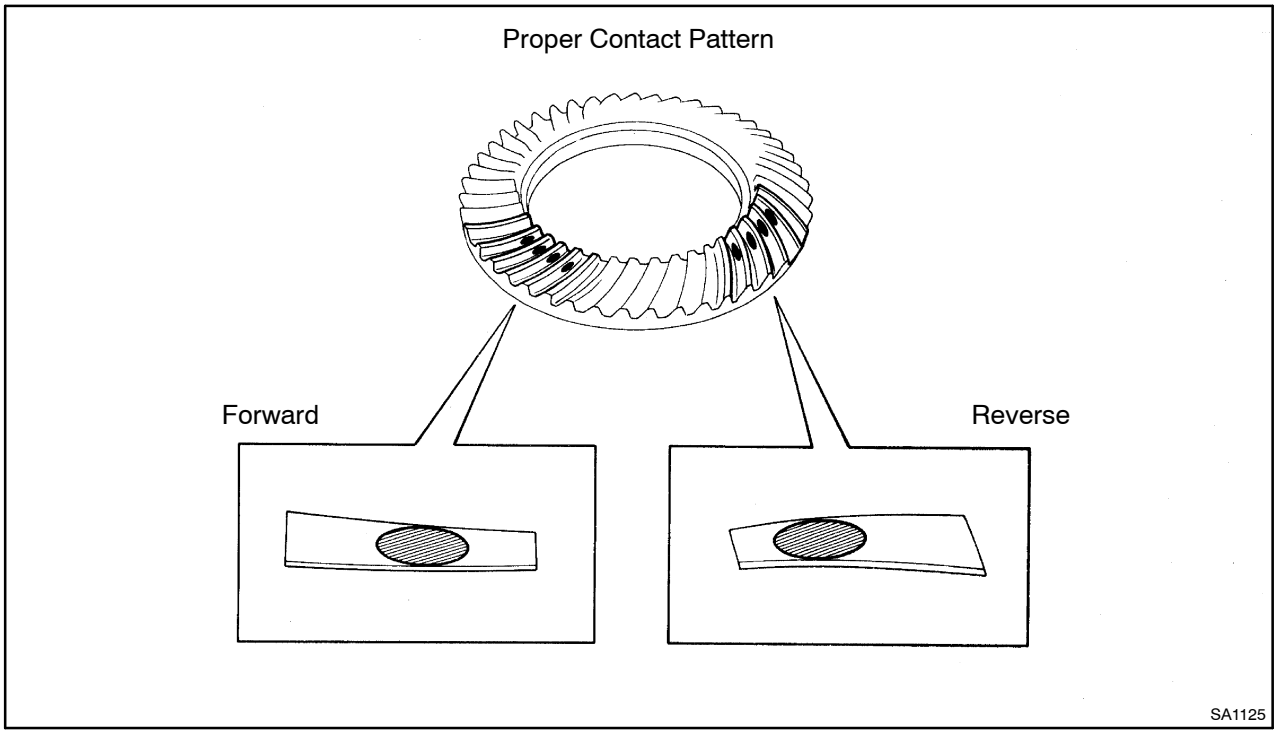
(d) Recheck the total preload.

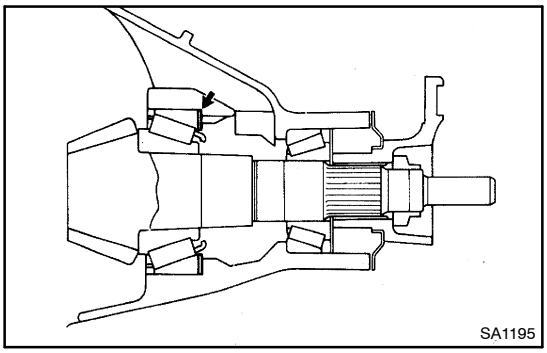
14. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(a) Coat 3 or 4 teeth at the 3 different positions on the ring gear with red lead primer.

(b) Hold the companion flange firmly and rotate the ring gear in both directions.

(c) Inspect the tooth contact pattern.





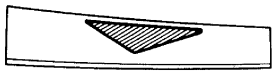
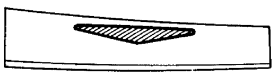
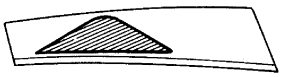
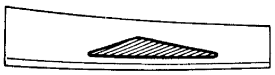
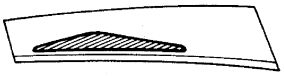
If tooth contact pattern is not correct, replace the adjusting washer installed on the front of the drive pinion rear bearing to adjust it.

NOTICE:

Make sure to always use a new one when replacing adjusting washer.

HINT:

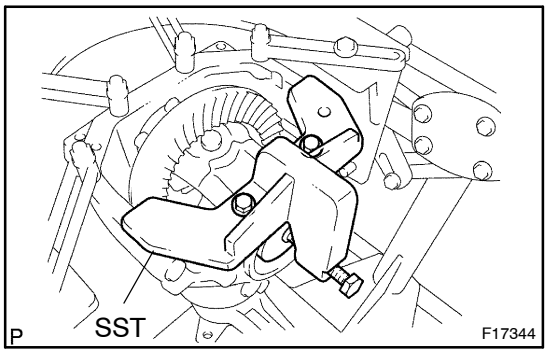
Refer to the table on the next page for selection of the adjusting washer.

Example tooth contact pattern		Adjusting rear differential drive pinion plate washer selection	
Forward	Reverse		
		+ 0.08 mm (+ 0.0031 in.)	Replacing the washer with one 0.08 mm (0.0031 in.) thicker will give proper contact pattern.
		+ 0.14 mm (+ 0.0055 in.)	Replacing the washer with one 0.14 mm (0.0055 in.) thicker will give proper contact pattern.
		– 0.08 mm (– 0.0031 in.)	Replacing the washer with one 0.08 mm (0.0031 in.) thinner will give proper contact pattern.
		– 0.14 mm (– 0.0055 in.)	Replacing the washer with one 0.14 mm (0.0055 in.) thinner will give proper contact pattern.

V02917

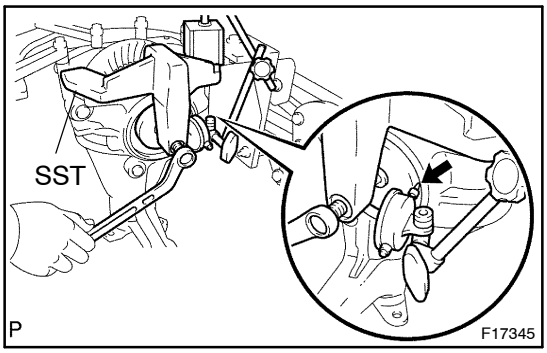
HINT:
Adjust differential drive pinion plate washers in 42 (different thickness in 0.01 mm (0.0004 in.)) units are available.

Parts No.	Thickness mm (in.)	No.	Parts No.	Thickness mm (in.)	No.
90201–70001	1.87 (0.0736)	87	90201–70022	2.08 (0.0819)	08
90201–70002	1.88 (0.0740)	88	90201–70023	2.09 (0.0823)	09
90201–70003	1.89 (0.0744)	89	90201–70024	2.10 (0.0827)	10
90201–70004	1.90 (0.0748)	90	90201–70025	2.11 (0.0831)	11
90201–70005	1.91 (0.0752)	91	90201–70026	2.12 (0.0835)	12
90201–70006	1.92 (0.0756)	92	90201–70027	2.13 (0.0839)	13
90201–70007	1.93 (0.0760)	93	90201–70028	2.14 (0.0843)	14
90201–70008	1.94 (0.0764)	94	90201–70029	2.15 (0.0846)	15
90201–70009	1.95 (0.0768)	95	90201–70030	2.16 (0.0850)	16
90201–70010	1.96 (0.0772)	96	90201–70031	2.17 (0.0854)	17
90201–70011	1.97 (0.0776)	97	90201–70032	2.18 (0.0858)	18
90201–70012	1.98 (0.0780)	98	90201–70033	2.19 (0.0862)	19
90201–70013	1.99 (0.0783)	99	90201–70034	2.20 (0.0866)	20
90201–70014	2.00 (0.0787)	00	90201–70035	2.21 (0.0870)	21
90201–70015	2.01 (0.0791)	01	90201–70036	2.22 (0.0874)	22
90201–70016	2.02 (0.0795)	02	90201–70037	2.23 (0.0878)	23
90201–70017	2.03 (0.0799)	03	90201–70038	2.24 (0.0882)	24
90201–70018	2.04 (0.0803)	04	90201–70039	2.25 (0.0886)	25
90201–70019	2.05 (0.0807)	05	90201–70040	2.26 (0.0890)	26
90201–70020	2.06 (0.0811)	06	90201–70041	2.27 (0.0894)	27
90201–70021	2.07 (0.0815)	07	90201–70042	2.28 (0.0898)	28



15. REMOVE SIDE SNAP RING

(a) Set the SST to the differential carrier.
SST 09571–50010

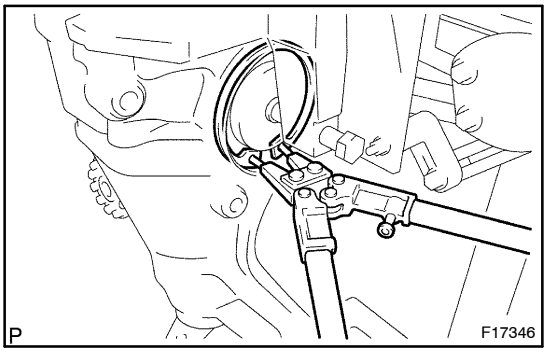


(b) Set the dial indicator to the differential carrier.
(c) Tighten the bolt of SST and alter the differential carrier shape so that 0.1 mm (0.004 in.) of clearance between the side bearing outer race and snap ring can be made.

NOTICE:
Observe the dial indicator so that the differential carrier will not change the shape more than 0.2 mm (0.008 in.).

HINT:

- Set the dial indicator at the rearmost side (upper side in the illustration) around which the oil seal tapped in.
- A 0.1 mm (0.004 in.) clearance between the side bearing outer race and side snap ring is sufficient if the washer slightly can move.

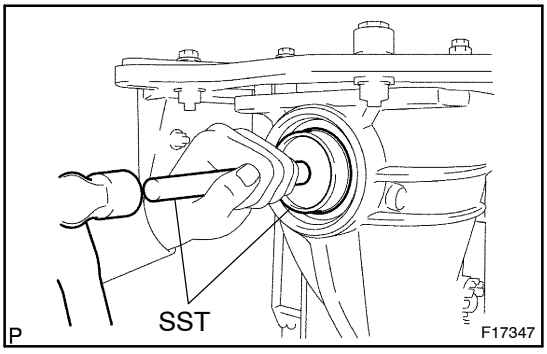


(d) Using the snap ring pliers, remove the side snap ring on the drive pinion side.

HINT:
For reassembly purposes, measure the thickness of the side snap ring. Write down the result.

(e) Remove the dial indicator and loosen the bolt of SST.

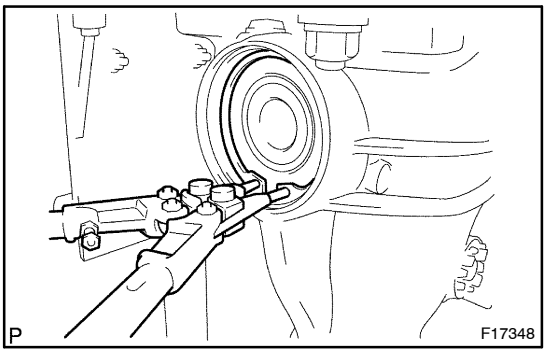
NOTICE:
Do not remove the SST.



16. REMOVE SNAP RING

(a) Using SST and a hammer, create a clearance between the side bearing (outer) on the ring gear and side snap ring.
SST 09608−32010, 09950−70010 (09951−07200)

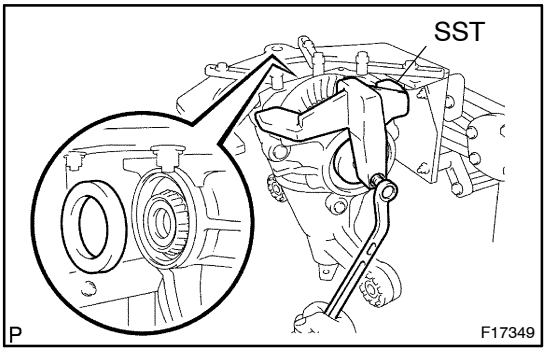
HINT:
The clearance cannot be seen, but tapping the SST with a hammer three or four times should be enough.



(b) Using the snap ring pliers, remove the side snap ring on the ring gear side.

HINT:

For reassembly purposes, measure the thickness of the side snap ring. Write down the result.



17. REMOVE DIFFERENTIAL CASE BEARING

(a) Tighten the bolt of SST and push out the outer race on the ring gear side.

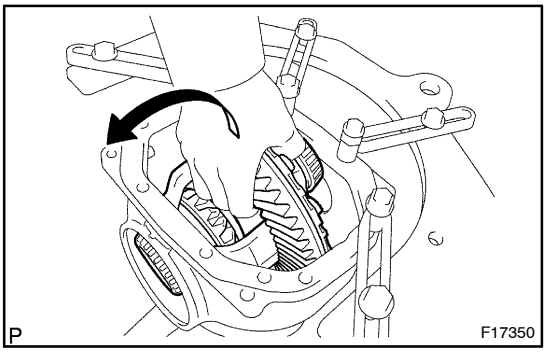
SST 09571−50010

NOTICE:

Do not drop the side bearing outer race.

(b) Remove the SST.

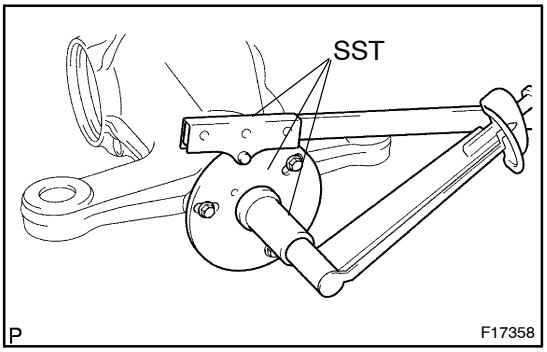
(c) Remove the side bearing outer race of other side.



18. REMOVE DIFFERENTIAL CASE

NOTICE:

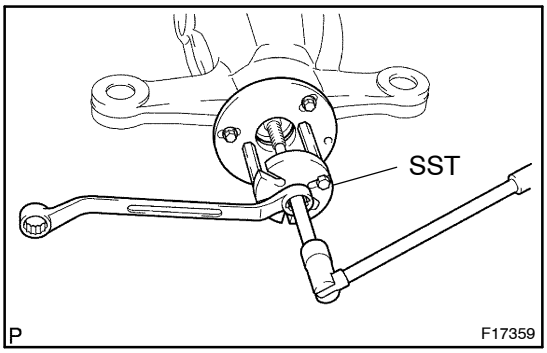
Do not damage the side bearing and the ring gear.



19. REMOVE REAR DRIVE PINION NUT

Using SST, hold the companion flange and remove the nut.

SST 09229−55010, 09330−00021, 09950−30012 (09955−03040)



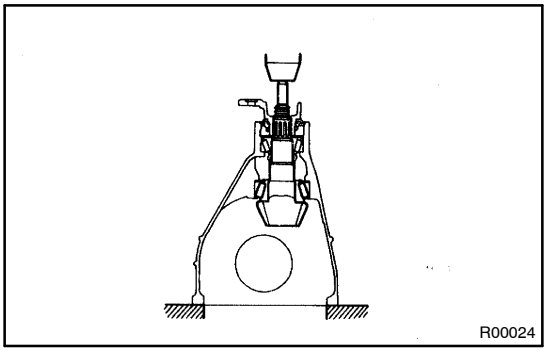
20. REMOVE COMPANION FLANGE

Using SST, remove the companion flange.

SST 09950–30012 (09951–03010, 09953–03010, 09954–03010, 09956–03060, 09955–03040)

21. REMOVE OIL SLINGER

Using a magnet hand, remove the oil slinger.

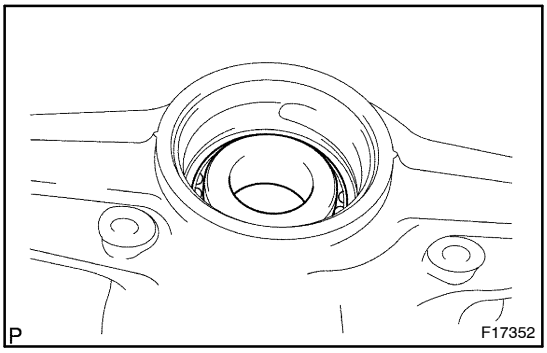


22. REMOVE DRIVE PINION

Using a press, remove the drive pinion with the rear bearing from the differential carrier.

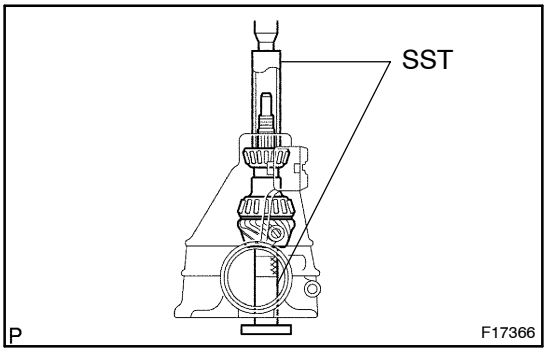
NOTICE:

Be careful not to drop the drive pinion.



23. REMOVE FRONT BEARING

24. INSTALL SPACER



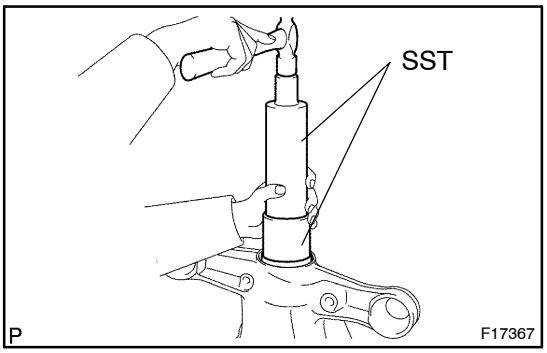
25. INSTALL DRIVE PINION

Using SST and a press, install the drive pinion.

SST 09316–60011 (09316–00011), 09608–04031

26. INSTALL OIL SLINGER

Install the oil slinger to the drive pinion.



27. INSTALL OIL SEAL

(a) Apply a dab of MP grease No.2 to a new oil seal lip.

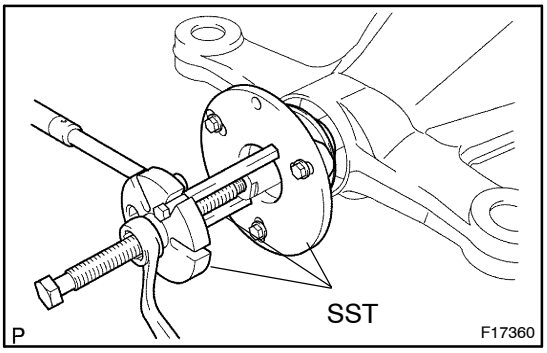
(b) Using SST and a press, insert the new oil seal into the differential carrier.

NOTICE:

Be sure the oil seal is straight when inserting.

Oil seal drive in depth: 0 ± 0.5 mm (0 ± 0.020 in.)

SST 09316–60011 (09316–00011), 09710–04101



28. INSTALL COMPANION FLANGE

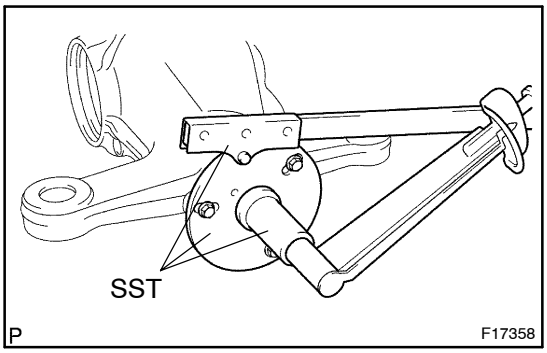
(a) Using SST, install the companion flange to the differential carrier.

SST 09950–30012 (09951–03010, 09953–03010, 09954–03010, 09956–03060, 09955–03040)

NOTICE:

Apply hypoid gear oil SX to the SST center bolt tip and threads before use.

(b) Apply hypoid gear oil LSD to the threads of a new nut.

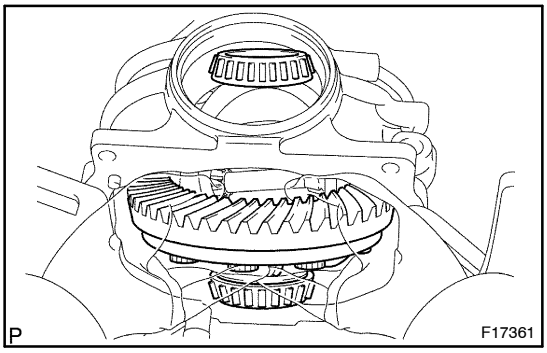


(c) Using SST, hold the companion flange and tighten the nut while observing the preload by SST and torque wrench.
SST 09229–55010, 09330–00021
Torque: 98 N·m to 490 N·m (1,000 kgf·cm to 5,000 kgf·cm, 72 ft·lbf to 361 ft·lbf)

NOTICE:

- **Do not tighten excessively, otherwise, the threads will be stripped.**
- **Apply hypoid gear oil LSD to the threads of the nut and drive pinion.**

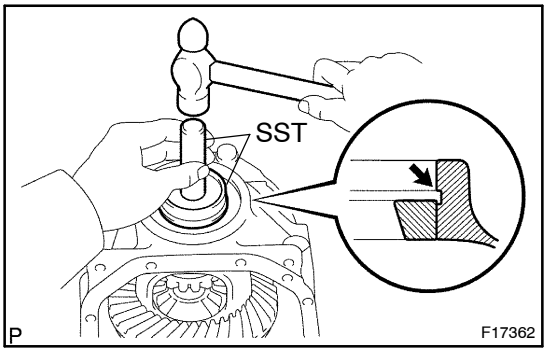
HINT:
Tighten the nut using approximately 98 N·m (1,000 kgf·cm) and tighten more while observing the preload.



29. INSTALL DIFFERENTIAL CASE

Insert the differential case from the ring gear tooth side to install.

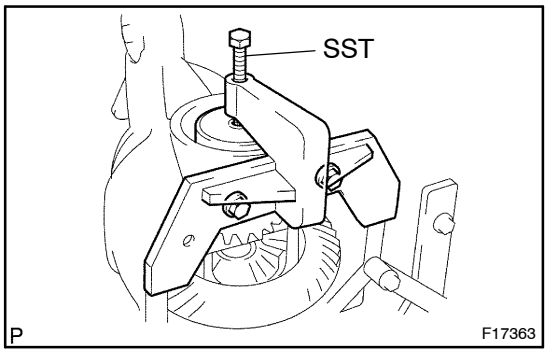
NOTICE:
Do not damage the side bearing and ring gear.



30. INSTALL SIDE BEARING

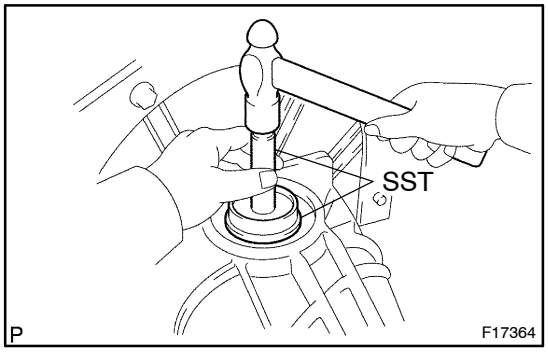
(a) Using SST and a hammer, install the side bearing outer race.
SST 09608–32010, 09950–70010
(09951–07200)

HINT:
Tap in the outer race until half of the side snap ring groove of the differential carrier can be seen.



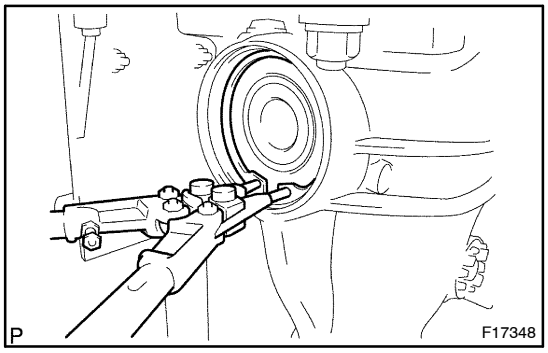
(b) Set the SST to the differential carrier.
SST 09571−50010

(c) Tighten the bolt of SST until the SST disc lightly hits to the side bearing outer race.



(d) Using SST and a hammer, install the side bearing outer race.
SST 09950−70010 (09951−07200), 09608−32010

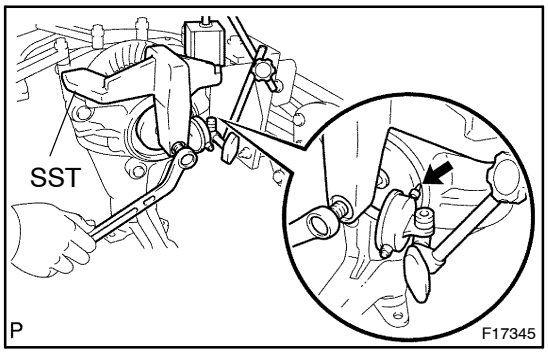
HINT:
Tap in the outer race until it hits the side bearing roller.



31. INSTALL SIDE SNAP RING

(a) Using the snap ring pliers, install the side snap ring in the differential carrier on the ring gear side.

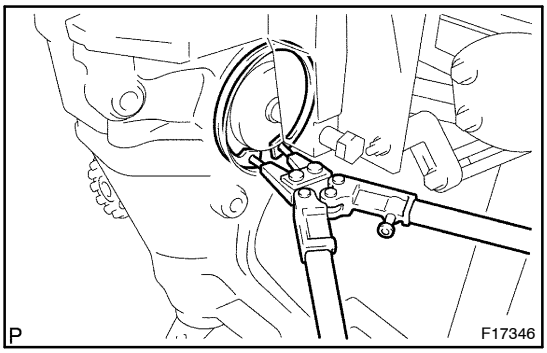
HINT:
Use the snap ring installed at tooth contact adjustment.



(b) Set the dial indicator to the differential carrier.

(c) Tighten the bolt of SST to alter the shape of the differential carrier.

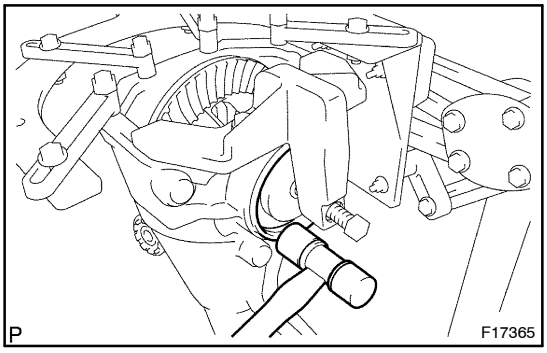
NOTICE:
Do not alter the shape excessively.
Shaped limit: 0.20 mm (0.0079 in.)



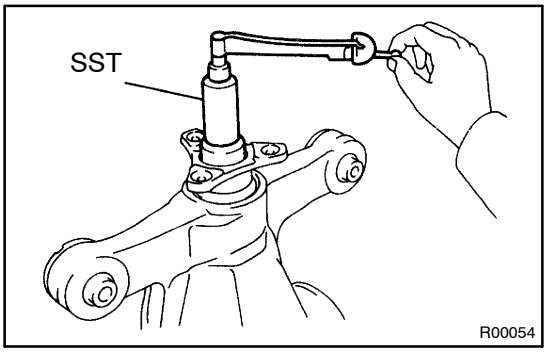
(d) Using the snap ring pliers, install the side snap ring on the drive pinion side.

HINT:

Use the side snap ring installed at tooth contact adjustment.



(e) Remove the dial indicator, hit the differential carrier on the drive pinion side using a plastic hammer to stabilize the side bearing.



32. ADJUST DRIVE PINION PRELOAD

(a) Using SST and a torque wrench, measure the preload.

SST 09229–55010

Preload (at starting):

New bearing:

1.44 to 2.01 N·m (14.8 to 20.5 kgf·cm, 12.7 to 17.8 in.·lbf)

Reused bearing:

0.5 to 0.8 N·m (5 to 8 kgf·cm, 4.3 to 6.9 in.·lbf)

NOTICE:

Rotate the flange clockwise and counterclockwise several times to stabilize the bearing before measuring the differential drive pinion preload.

(b) If the preload is greater than the specified maximum value, replace the bearing spacer.

NOTICE:

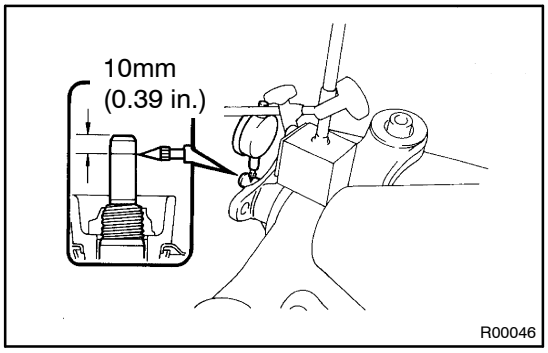
A bearing spacer is deformed if it is once used. If the drive pinion preload is greater than the specified maximum value.

(c) If the preload is less than the specified minimum value, check the preload while tightening the nut by 5 to 10 degrees to adjust it so that it becomes within the specified value range.
Torque: 98 to 490 N·m (5,000 to 1,000 kgf·cm, 361 to 72 ft·lbf)

HINT:
Tighten the nut approximately 98 N·m (1,000 kgf·cm) and tighten while observing the preload.

(d) Even if the nut tightening torque is greater than the specified maximum value, if the preload is less than the specified minimum value, loosen the nut and check that the threads of the nut and drive pinion are not stripped. If necessary replace the nut or drive pinion and ring gear.

(e) If the threads are not stripped, replace the spacer and apply the hypoid gear oil LSD to the threads and repeat the procedure.

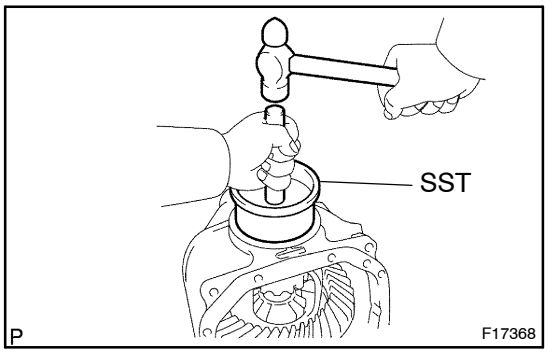


33. INSPECT RUNOUT OF DRIVE PINION

Using the dial indicator, measure the runout of the drive pinion at a position 10 mm (0.39 in.) away from the end of the shaft.

Maximum runout: 0.08 mm (0.0031 in.)

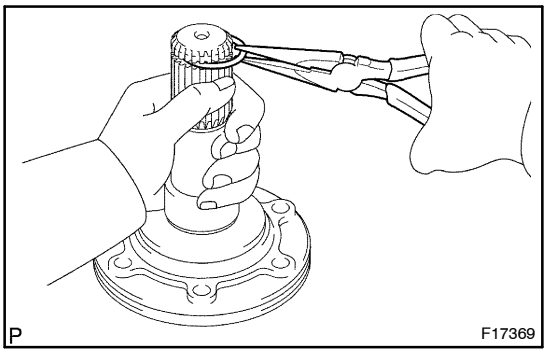
If the runout is greater than the maximum, replace the drive pinion and ring gear.



34. INSTALL OIL SEAL

(a) Apply MP grease No.2 to the 2 new oil seal lips.

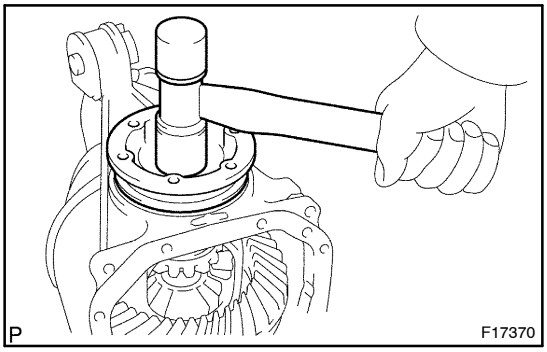
(b) Using the SST and a hammer, tap a new oil seal until the face becomes flush with the differential carrier surface.
SST 09223–15030, 09950–70010 (09951–07200)



35. INSTALL SIDE GEAR SHAFT

(a) Apply MP grease No.2 to the 2 new snap rings.

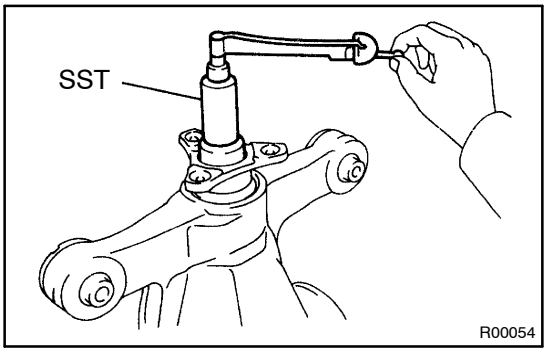
(b) Install the snap ring.



(c) Using a plastic hammer, install the side gear shaft.

NOTICE:

Be careful not to damage the oil seal.



36. INSPECT TOTAL PRELOAD

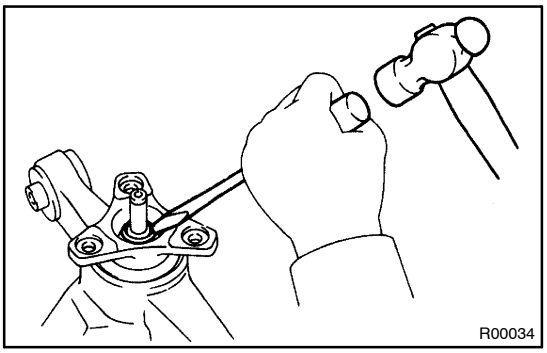
Using SST and a torque wrench, check the torque (at starting) with the drive pinion and ring gear teeth contacting.

SST 09229–55010

Total preload (at starting)

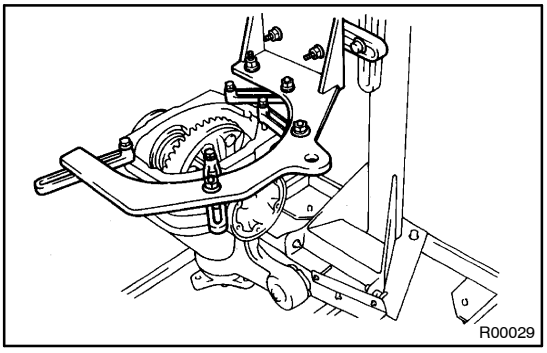
Drive pinion preload plus

Differential Gear Ratio	Specified Value
3.266	0.53 to 1.58 N·m (5.4 to 18 kgf·cm, 4.69 to 13.89 in.·lbf)
3.615	0.48 to 1.43 N·m (4.9 to 15 kgf·cm, 4.25 to 13.02 in.·lbf)
3.769	0.46 to 1.37 N·m (4.7 to 14 kgf·cm, 4.08 to 12.15 in.·lbf)
3.916	0.45 to 1.32 N·m (4.6 to 13 kgf·cm, 3.99 to 11.28 in.·lbf)



37. INSTALL DRIVE PINION NUT

Using a chisel and a hammer, calking the nut.

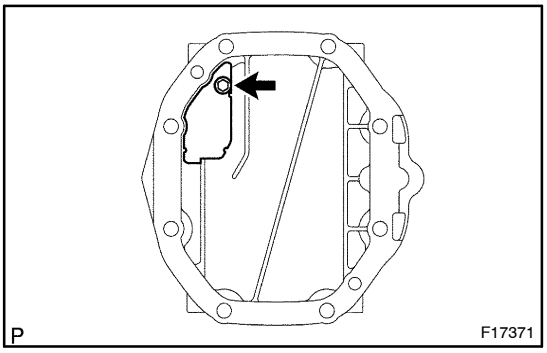


38. REMOVE DIFFERENTIAL CARRIER

Remove the differential carrier from the overhaul attachment.

NOTICE:

Clean the fitting surface between the differential carrier and carrier cover.



39. INSTALL DIFFERENTIAL CARRIER COVER

(a) Clean the seal packing attached on the differential carrier and carrier cover using a scraper and wire brush. Then remove the oil with white gasoline or something.

NOTICE:

Be careful not to scratch the fitting surface.

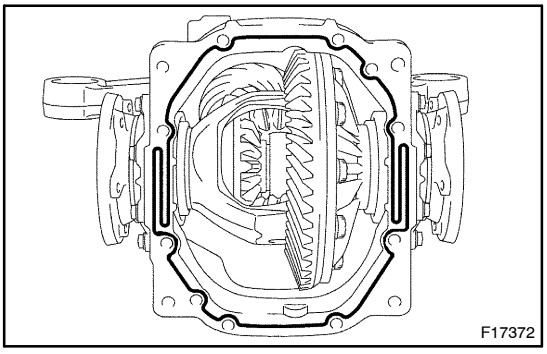
(b) Install the oil deflector to the differential carrier cover.

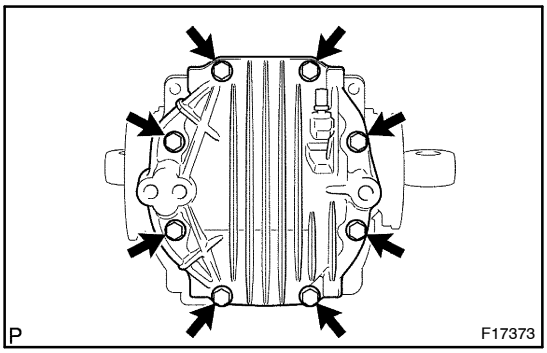
Torque: 7.0 N·m (70 kgf·cm, 62 ft·lbf)

(c) Apply seal packing 1281 to the position in the illustration of the differential carrier.

NOTICE:

- **The seal packing application is 2 to 3 mm width entirely.**
- **Overlap the sealant at least 10 mm at the beginning and the end of application.**
- **Install the differential carrier cover within 3 minutes of application.**





(d) Install the differential carrier cover with the 8 bolts.
Torque: 47 N·m (475 kgf·cm, 35 ft·lbf)

NOTICE:
Do not fill the oil or drive immediately after installing the differential carrier cover. Leave the vehicle at least 1 hour. Also, avoid sudden acceleration and deceleration at least 12 hours after application.

(e) Install the differential breather plug.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)